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SEPTEMBER 3, 1924

No. 38



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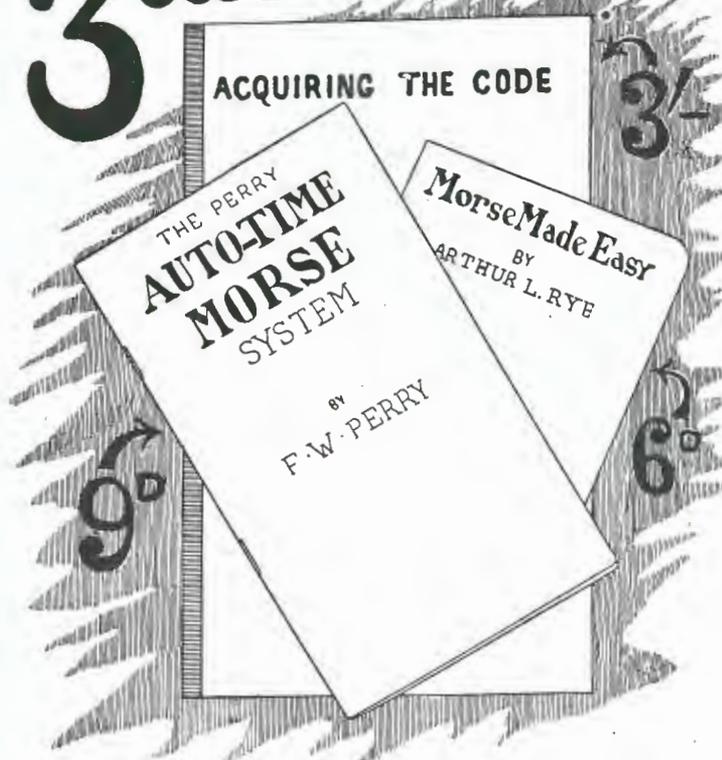
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Incorporating "Sea, Land and Air"

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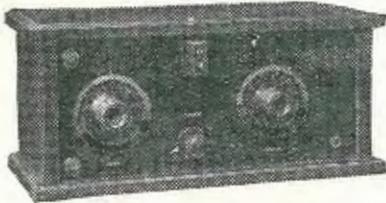
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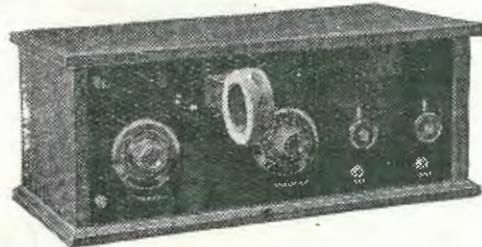
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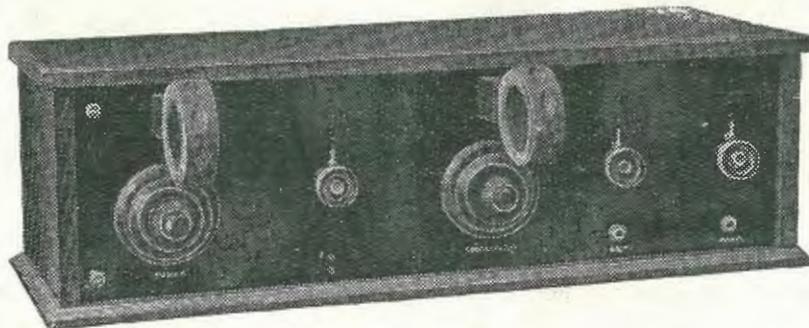
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Radiotorial

"Crys"



HE gentleman whose name occupies the position of honour in this Radiotorial is the most talked-about person in Australia to-day. Nor is that the least remarkable thing about him—not by a long chalk! He possesses many other arresting features. He is many and yet he is only one, and then again, he is unique and there are several thousands of him. He comes in countless shapes and forms and sizes, and the more frequently one meets him the more different he seems to be—and yet, withal, he is ever the same for he is a real democrat, is this "Crys."

YOU will find him in the highest houses in the land and then again, you will discover him in the humblest of shacks and in either he is just as welcome.

HE is the Whisperer of Wisdom for Those Who Want to Know. He is the *solaceur* of elderly maiden ladies for whom the passing of long, dull evenings in the drab dereliction of knitting woollen "jumpers" for heathen esquimoux presents no delights. He is the old bachelor's pet croney—he is the flapper's delight. He is the Thousand and One Nights' Entertainment in One. He is, as you have no doubt guessed by now—The Crystal Radio Receiving Set!

KGO to Broadcast Special Programme for Australian Listeners

THE Editor of "Radio" has much pleasure in announcing that he has arranged, through the Radio Corporation of America, for KGO, the General Electric Company's broadcasting station at Oakland, California, United States of America, to transmit a programme especially intended for reception by Australasian listeners-in.

NEXT Saturday evening, August 30, on a wave-length of 312 metres, KGO will transmit items from 7 p.m. to 9 p.m., Sydney mean time.

ALL those experimenters and listeners-in who hear this station are requested to send full reports of their reception to the Editor, "Radio," 97 Clarence Street, N.S.W.

SPECIAL NOTICE!

OUR regular readers will note that in the current issue of our magazine we are again publishing two articles which have already appeared in "Radio"—"Eight Efficient Crystal Receivers" and "An Efficient One-valve Receiver."

OUR reason for doing so is this: the demand for copies containing either of these articles has been so great that it has far exceeded the supply and was such that these two issues of "Radio" were sold out almost immediately they were placed upon the newsstands. Since then, we have received hundreds of letters enquiring where or whether these numbers were to be had, and until we decided on the above procedure, we were regretfully unable to assist any of our readers in this direction.

IT is, then, with the purpose of insuring that our subscribers shall not, after all, be disappointed, that we have decided to re-print in this issue these two most popular articles.

A Two-Valve Broadcast Receiver

Simple and Efficient

A Set that Everyone Can Use



One efficiently pick up broadcast programmes from Australian stations, the receiver must be capable of responding to a fairly wide band of wave-lengths. The transmitters at present on operation are Broadcasters Ltd., Sydney (2BL), on 350 metres, Associated Radio, Melbourne (3AR), on 450 metres; Farmers Ltd., Sydney (2FC), on 1,100 metres, and Westralian Farmers, Perth (6WF), on 1,250 metres, with another in Melbourne which will shortly be transmitting on a wave-length of 1,720 metres. With a receiver employing "Honeycomb" inductance coils for tuning, it is possible to cover the commercial broadcasting range with a set of coils ranging from 50 turns to 250 turns, and when employing a regenerative valve receiver the strength of reception will

be as good as with any other form of inductance. It often happens that due to an overdose of classical or jazz music, or the desire to tune in particular items from each of the broadcasting stations, the coils have to be changed frequently during the listening-in period. This operation may be perfectly simple for the dyed-in-the-wool-experimenter, but when the receiver has to be handled by other members of the household whose technical abilities sensibly approach zero, complications are likely to arise in choosing the correct coils to use for the various circuits which go to make up a modern receiver.

The writer had the problem of constructing a simple yet very efficient receiver, capable of being used by all members of the household, and if the following instructions are carefully followed, a similar outfit can be dupli-

cated with very little trouble by the experimenter handy with a few simple tools.

As a guide to the prospective constructor, the following list of apparatus that will have to be purchased or manufactured at home has been prepared:—

- (a) Variable condenser with vernier control. Capacity not to be less than 0.0005 microfarads (23 plate size).
- (b) Series parallel switch with six contacts and two end-stops, Framingham pattern.
- (c) Remler 1½ in. radial switch.
- (d) Nine switch contacts and two end-stops for item (c).
- (e) Two pieces of 3 in. and 2½ in. cardboard tubing about 6 in. long. (If these sizes are not available, larger diameters can be used if the turns of wire are reduced proportionately).
- (f) Dubilier Combination grid leak and condenser, type 600.
- (g) Dubilier Fixed Condenser 0.001 microfarads, type 601.
- (h) Federal Anti-capacity Switch with twelve contacts.
- (i) Two Radiotron sockets.
- (j) Two UV201A valves.
- (k) Inter-valve transformer. If an open core transformer is desired similar to item 12 of Fig. 2, purchase 6 ozs. of No. 44 s.w.g. Beldenamel wire for the winding and ¼ lb. of soft iron wire for the core.
- (l) Telephone transformer (optional). This will have to be made specially as it is not a commercial article. Primary will need 1.5 ounces No. 44 s.w.g. Beldenamel, Secondary four ounces No. 40 s.w.g. Beldenamel, with ¼ lb. soft iron wire for the core.
- (m) Three feet of No. 26 Eureka silk covered resistance wire for filament fixed resistances.

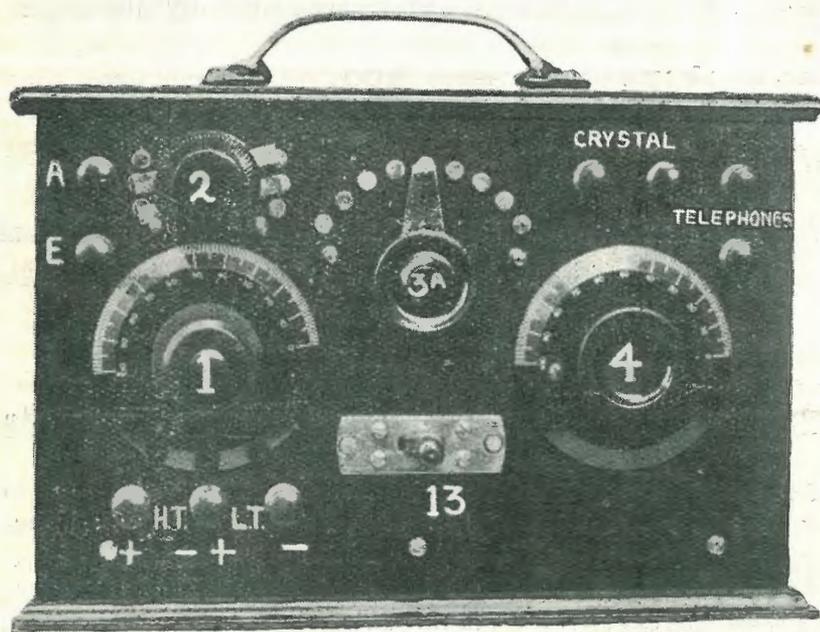


FIG. 1.

A view of the front of the panel of the receiver. Details are:—1: Variable condenser and vernier control. 2: Series parallel switch. 3A: Multi-point switch. 4: Re-action coupling indicator. 13: Anti-capacity switch key.

- (n) One ounce of No. 36 d.s.c. copper wire for rotor and stator windings.
- (o) Bakelite panel to suit cabinet available.
- (p) Three-inch dial for rotor shaft.
- (q) Nine insulated terminals for various connections on panel.
- (r) Various pieces of scrap ebonite, and short lengths of rubber and cotton covered bell wire for minor details and wiring.

Referring to the photograph in Fig. 1, the main controls of this receiver are as follows:—The left hand dial (1), controls the variable condenser and vernier used to tune the circuit in conjunction with the stator winding of the vario-coupler. The reaction coupling is indicated by the right hand dial (4), and the amount of aerial tuning inductance in circuit, by the multi-point switch (3a) between the two. Beneath the inductance switch is a "Federal" anti-capacity switch key (13) with twelve contacts. This key performs several functions. When thrown to the left it closes the filament circuit of the detector valve, switches on the high tension battery, and connects the telephone receivers into the plate circuit of the first valve. In the centre position, all circuits are off, and when on the right, both detector and audio valve filament circuits are closed in addition to the plate battery, and the telephones are connected into the plate circuit of the audio valve. A series parallel switch (2) for the tuning condenser and terminals for Aerial (A), Earth (E), Batteries (HT and LT), and a Crystal Detector complete the apparatus on the front panel. The crystal detector circuit is not used in conjunction with the valves, but is an emergency form of reception to be called into use during such times as the filament battery is away being re-charged, or the valves in-operative for any other reason.

The circuit employed in this receiver is shown in Fig. 3, where it will be seen that the simple single circuit regenerative connection is used, with one step of transformer coupled audio amplification. Each item has been numbered, and will be described in that order.

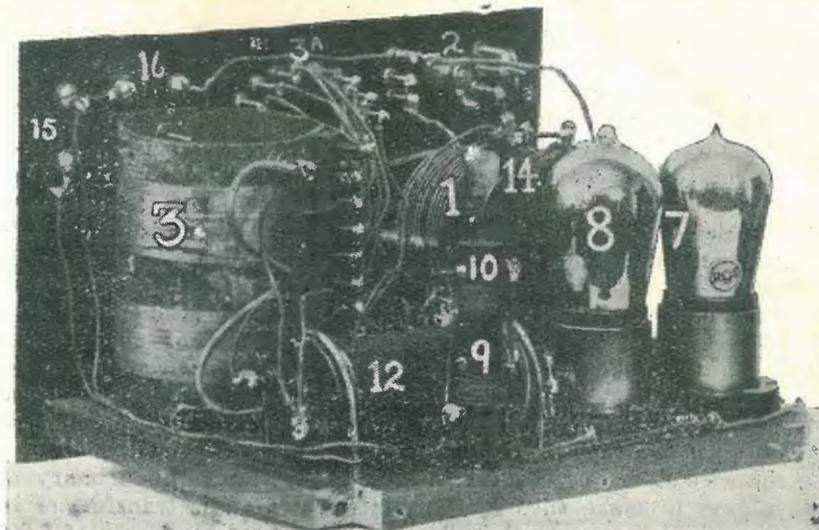


FIG 2.

Interior view of Receiver, showing position of components. Details:— 1: Tuning condenser. 2: Series parallel switch. 3: Stator of re-action tuning unit. 3A: Multi-point switch. 7 and 8: Radiotron valves. 9 and 10: Fixed resistances. 12: Audio-frequency transformer. 14: Telephone transformer. 15 and 16: Terminals for connection to telephones and crystal detector.

(1) The tuning condenser is a 23-plate 0.0005 microfarad Kilbourne and Clarke pattern with a vernier plate for fine tuning. In choosing a condenser for use in a valve circuit employing regeneration, always select one with a "pigtail" connection to the rotary plates to avoid the terrible scratching noises caused by variable resistance connections always met with in condensers relying upon a rubbing contact for the completion of the electrical circuit.

(2) So that the condenser can be employed to the best advantage in giving as large a wave-length variation as possible with the available inductance, it should be so arranged that it can be connected either in series with the coil or in parallel with it. This is accomplished by the series parallel switch Item 2, which was built up from a set of Framingham switch parts. It is not necessary to employ the whole of the switch contacts supplied, as a neater switch can be assembled with only six contact studs as shown.

(3) The stator of the reaction tuning unit consists of a cardboard tube three inches in diameter which has been dipped into a bath of very hot paraffin wax to improve its insulation and dielectric properties. The particular tube shown in the photograph of Fig. 2 was obtained from an empty cardboard container in which

the familiar "Snow Glow" Cleanser is sold. The winding for the stator consists of 210 turns of No. 36 double silk covered copper wire with taps taken off at turns No. 20, 30, 45, 65, 90, 120, 150, 180 and 210. To provide a solid termination for the various taps taken from the stator winding, an ebonite strip runs the whole-length of the coil, into which ten one-eighth inch whitworth brass machine screws are screwed. Each tap is soldered to one of these screws, as can be seen in the photograph of the inside of the receiver, and to these in turn are soldered the wires which connect to the inductance selector switch. The winding is in two sections to allow for the rotor shaft and connecting leads to pass through the stator tubing. For the rotor bearing strip use a piece of one quarter inch ebonite or bakelite one inch wide and four inches long, which is attached to the stator and panel as shown in Fig. 4.

(4) The rotor is wound on a waxed cardboard tube $2\frac{1}{2}$ inches diameter and $1\frac{1}{4}$ inches long, with 40 turns of No. 36 double silk covered copper wire in two sections of 20 turns to allow for the rotor shaft. A single bearing supports the rotor, through which passes a $\frac{1}{4}$ in. threaded brass shaft. By having a thread on the shaft and bearing a greater wearing surface is obtained, and, in addition,

there is no need to provide locking collars on the rotor shaft to prevent the rotor from being pulled out of centres with respect to the stator. Anchor the rotor wire by soldering to two small machine screws and lead off the external connections by means of two flexible leads passing through holes in the centre of both the rotor and stator tubes. These wires are again terminated on two screws terminated on the end of the stator. This multitude of terminal screws may seem unnecessary, but, as there is bound to be a fair amount of movement among the various connections during the wire-up of the receiver, it is always best to make sure of the weak ones and do a strong job right away.

(5 and 6). The grid leak and condenser are a combination unit consisting of a Dubilier 0.00025 micro-

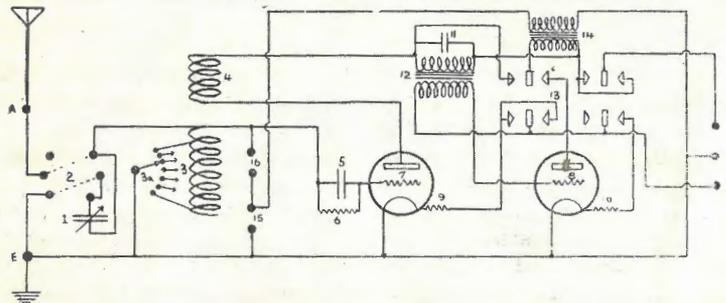


FIG. 3.
Wiring diagram, showing connections of series-parallel switch, inductance taps switch and valve-control switch.

farad fixed condenser (type 600) with a leak resistance of two and a half megohms. If these items are bought separately be sure and do not obtain a condenser of too high a capacity or otherwise the quality of the higher tones of the speech and music are likely to suffer. The reason for this is, that between each modulation of the carrier wave corresponding to the audio vibrations of the received signal the condenser has to discharge and recharge sufficiently to give a corresponding reproduction in potential applied to the grid, and if its time period is too high the higher frequencies of the voice and music will suffer distortion.

(7 and 8). The valves used are Radiotron 201A type, which operate from a four-volt battery supply. These valves are excellent amplifiers, and stand unequalled amongst those available for general experimental

and broadcast use. Their current consumption when operating from a four-volt storage battery with a two ohm series resistance is between 0.18 and 0.20 amperes. Sufficient electron emission is obtained with this current to work most loud-speakers to the limit of their distortionless capacity.

(9 and 10). In series with each valve filament is included a small fixed resistance of about two ohms value, which consists of two feet of No. 26 silk covered Eureka resistance wire wound around a piece of ebonite rod half an inch in diameter.

(11). Across the primary of the inter-valve audio transformer is connected a fixed condenser of 0.001 microfarads capacity (Dubilier type 601) to act as a radio frequency bypass for the radio frequency component of the detector plate current.

(12). The audio frequency transformer in this receiver consists of an open iron core 5/8 in. diameter, and three and a-half inches long wound with 10,000 turns of No. 44 Beldenamel copper wire for the primary and 40,000 turns of the same gauge material for the secondary. While this type of transformer possesses many advantages in the way of high amplification and freedom from distortion over wide ranges of frequency and magnetising current, its construction will be found rather difficult for those not in the possession of a lathe or other form of winding gear. Any good make of closed core transformer can be used in its stead.

(13). This item acts as a battery and amplifier switch and consists of a twelve-spring "Federal" anti-capacity switching key. The various connections are shown in Fig. 5, and

they should be studied carefully. As it is a difficult proposition to do good soldering in a cramped position, all the leads going to the switch should be soldered to it before putting it into position, and left long enough to connect to the other items of the receiver. If soldering paste is used to assist in connecting the leads to the switch, be sure and wipe all excess away before putting the switch into the receiver.

(14). A telephone transformer is employed to isolate the windings of the receivers from the injurious effect of the steady, direct current flowing in the plate circuits. It also enables the emergency crystal connection to be brought into operation without altering the telephone connections. It is wound on a similar size core to item 12 with a primary of 10,000 turns of No. 44 Beldenamel wire, and a secondary of 10,000 turns of No. 40 Beldenamel. Referring to Fig. 2, this transformer is located immediately in front of the two valves. If separate terminals are provided for the telephones when used in the crystal and valve circuits respectively, this transformer can be dispensed with.

(15, 16 and 17). These items refer to the terminals on the front of the panel for connection to the telephones, crystal detector and batteries respectively. Only three battery terminals are used, and they are located directly beneath the variable condenser. The left-hand terminal connects to the positive of the high tension battery, the centre one is common to both the high tension negative and the low tension positive, while the remaining one is for the low tension negative. Always connect the high tension negative battery terminal to that terminal of the low tension supply which is earthed. This procedure guards against the burning out of the valve filaments should the positive of the high tension battery ever become accidentally earthed.

All terminals on the receiver have insulated tops and for connection at the rear of the panel each is fitted with a small copper lug, to which the various leads are soldered.

To prevent the rotor from being turned through an angle of more than 180 degrees, and thereby running the risk of breaking the connecting leads, a small screw was inserted in the

dial—visible near the "100" mark—which comes into contact with the nuts on the screws which pass through the panel from the rotor bearing strip. Before setting the dial on the rotor shaft, arrange the position of the rotor so that maximum regeneration is obtained when the 100 mark on the dial is at the top.

Detail dimensions are not given for the complete assembly of the receiver and amplifier, owing to the fact that

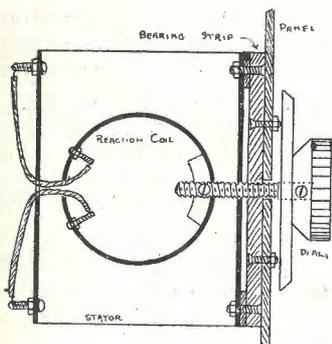


FIG. 4.

Here is shown the construction of the tuning unit and re-action coil.

the sizes of individual parts will vary according to the make, and the reader may, in all probability be in the same position as the writer in having available a suitable cabinet into which the receiver can be built.

All apparatus is contained on the panel and a base attached at right angles to it. The latter is cut to a size which allows it to slide into the containing cabinet.

When the position of all apparatus has been laid out on the panel and baseboard, make a rough plan of the components in ink, and referring to the circuit diagram in Fig. 3, draw in, in pencil, between the various terminals, the way in which the wires should be connected. Commence wiring those most difficult of access first, and as each is soldered into place fill in the line in ink. By doing this the procedure of the work can be seen immediately, and if the work of wiring up has to be deferred for a day or two it will be an easy matter to take up the wiring again without running the risk of missing connections. Test out all connections on completion with a dry-cell and pair of telephones, taking particular care that the filament and plate wiring does not come into contact at any point.

The layout of the receiver panel should be planned out on a drawing board before drilling the panel and when everything is to the designer's satisfaction, use the drawing for a template to mark the location of the various holes to be drilled. Cut the full scale drawing to the size of the panel and attach it in several places

with a touch of glue or other adhesive.

After using the receiver for crystal reception, always make sure that the contact wire is removed from the crystal before switching on the valves or otherwise it will act as a low resistance leak across the in-put and greatly reduce signal strength.

The operation of the receiver is similar to all other single circuit receivers, and a *resumé* of the procedure of control will therefore not be

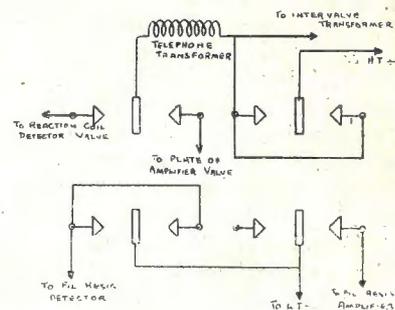


FIG. 5.

Diagram of connections to the various contacts on valve control switch.

required for those sufficiently advanced to construct a duplicate.

In conclusion, the writer wishes to state that he will be pleased to answer any questions regarding this receiver if they are addressed and forwarded to the Editor of *Radio*.

The "Ripple" Disaster

IN connection with the coastal steamer *Ripple* disaster, a strong protest has been voiced throughout the Dominion against the absence of wireless installation on the vessel, likewise the fact that the vessel *Futurist*, which was sent out in search of the *Ripple*, was also without wireless.

Strong comments were made by members in the House of Representatives, and the Premier gave the House the assurance that nothing would be left undone to prevent a recurrence of the disaster. From now onwards no ship passenger or cargo vessel, would leave New Zealand ports without wireless installation.

It is interesting to note that a late member of the crew of the steamer had a receiving set on board, but this was removed when he left the boat.

Mr. E. Shrimpton, Chief Telegraph Engineer, states that the usual objection was on the score of expense, as the apparatus was so seldom required.

It was suggested that a modified system be used which ships' officers could work, but he replied that unless taught while young, men could never pick up telegraphy properly. A set might be used by which certain pre-arranged signals could be sent, in which officers could be coached.

If the difficulty of obtaining men

who could send clearly could be surmounted, it would pay owners to put in Wireless apparatus.

DO NOT FORGET.

THIS magazine is a splendid advertising medium as a glance through the current issue will show. The more advertisements it carries the better and bigger it will become as a wireless publication. Not the least of the ways for making it this, is, when writing to advertisers, to bring to their notice that their announcements were seen in *Radio*.

An Efficient One-Valve Receiver

Easy to Build—Simple to Operate

Using Famous P1 Circuit



AFTER one has experimented with Crystal Receivers for a time there inevitably comes the desire for a valve to get longer distance and louder signals. But, compared with a Crystal Receiver, a Valve Receiver is a far more expensive item. So when commencing with the first valve every experimenter should select the circuit, and parts that will give the best service.

The P1 receiver is well-known in all wireless circles. It is used extensively in commercial wireless sta-

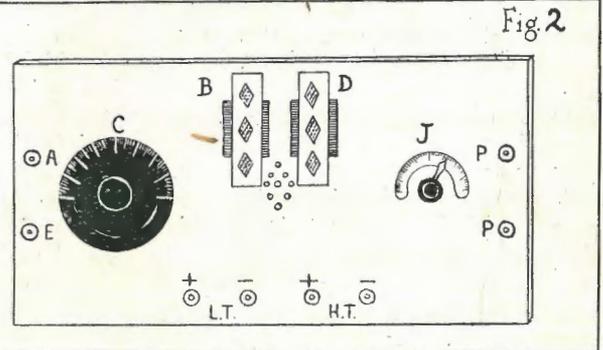
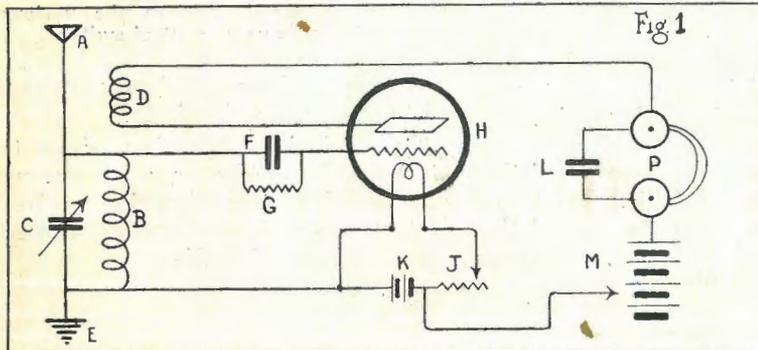
The Tuning components of this receiver are in the form of Honeycomb Coils and a Variable Condenser. By being able to interchange the Coils any wave-length between 100 metres or less up to 25,000 metres or more may be tuned in. As almost everyone, at the moment, both Experimenter and Broadcast Listener, is anxious to listen to the various broadcasting stations in and around Australia and New Zealand which operate on wave-lengths between 200 and 2,000 metres, the following table of coils to use in this simple receiver will

Grid. Coil.	Reaction Coil.	Wave-length.
75	50	400-800
100	75	550-1100
150	100	800-1600
200	150	1100-2200

Coils for wave-lengths higher than 2,000 metres are obtainable at most radio dealers.

The apparatus required for this set is as under:—

- 1 Piece of Bakelite Panel.
- 2 Panel Mounting for Honeycomb Coils (one being variable).
- Honeycomb Coils and Plugs.
- 1 Variable .0005 Condenser (23 plate).
- 1 Grid Condenser and Leak.



Index to Figures 1, 2 and 3. A: Aerial. B: Grid Coil. C: Twenty-three Plate Variable Condenser. D: Reaction Coil. E: Earth. F: Grid Condenser. G: Grid Leak. H: Valve. I: Valve Holder. J: Filament Rheostat. K: Low Tension (A) Battery. L: Fixed Condenser across 'phones. M: High Tension (B) Battery. P: Telephone Receivers.

Figure 1: Schematic Diagram of connections.

Figure 2: Front sketch of Panel, illustrating method of mounting parts. The index above also serves here with the exception of LT: Low Tension Battery Terminals. HT: High Tension Battery Terminals.

tions in Australia and in many Australian and New Zealand ships. It is very sensitive and a good distance getter.

The circuit is regenerative. As a result the valve will "howl" unless carefully handled. When your valve is howling or oscillating you are interfering with other receivers round about, and you cannot receive speech clearly because it will be distorted. However, the adjustments are simple and, after using it a few times one soon becomes accustomed to it and quite good results and long distances will be enjoyed with just the one valve.

be of interest. Two coils are necessary. One known as the Grid Coil and the other as the Reaction Coil. The first column shows the number of turns for Grid Coil; the second column the number of turns for Reaction Coil, and the third column the minimum and maximum wave-lengths which can be received when using a .0005 Variable Condenser in Series or Parallel with the Grid Coil.

Grid Coil.	Reaction Coil.	Wave-length.
25	35	150-260
35	50	200-400
50	50	270-550

- 1 Filament Rheostat.
- 1 Valve.
- 1 "A" Battery (low tension) (either Dry cell or Accumulator, according to valve used).
- 1 "B" Battery (high tension).
- 1 Pair of Telephone Receivers.

Any licensed radio dealer will be able to supply the above-mentioned parts and, as there is such a variety of apparatus on the market to-day, it is not an easy matter to recommend any particular brand. However, go to a good, reliable dealer and he will take care of you.

The accompanying diagrams clearly show how the apparatus is connect-

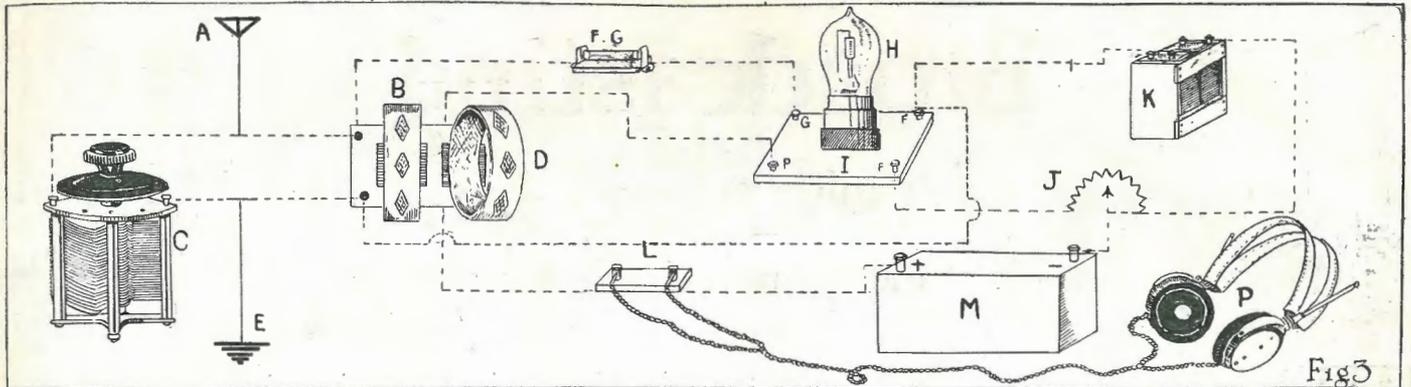


Figure 3: Illustrates the various component parts of receiver and how same are connected. The dotted lines indicate connecting wires.

ed up and how it is mounted on the panel. It is also advisable to mount the panel on a wooden base or mount the panel in a small cabinet which can be obtained very cheaply from any radio dealer. The cabinet is recommended because it makes a much nicer finished job and is better for the receiver.

To tune—place the Honeycomb Coils in the holders. Switch on Filament Rheostat and also connect vari-

able lead to "B" (H.T.) Battery. By means of the variable coil handle widen the space between the two coils. Next slowly turn the dial of the Variable Condenser until the signals desired are coming in as strong as possible. To strengthen signals increase voltage from "B" (H.T.) Battery and bring the two coils closer together until maximum signals are obtained. It is at this stage that you should be careful not to allow your valve to oscillate. When you are re-

ceiving speech or music from a broadcasting station as the two coils are brought closer together so the signals increase in strength until suddenly they will become so loud that they will be distorted and the valve will oscillate. Immediately that happens, widen the distance between the coils until you get the signals loudly but quite clearly. You are then getting the best out of your receiver and you will not be interfering with anyone else nearby.

Be Sure it's a "BURGINPHONE"

Then you will be sure of getting features that are possible only to an organisation with experience.

We manufacture high-class Broadcast Receivers which work efficiently. We invite your inspection of our receivers. Their record stands alone:—

Our Model 9—5-Valve receiver—has picked up broadcasting over 8,000 miles distant and in at least six different places in New South Wales and Queensland.

Daylight Loud Speaker Reproduction at 400 miles.

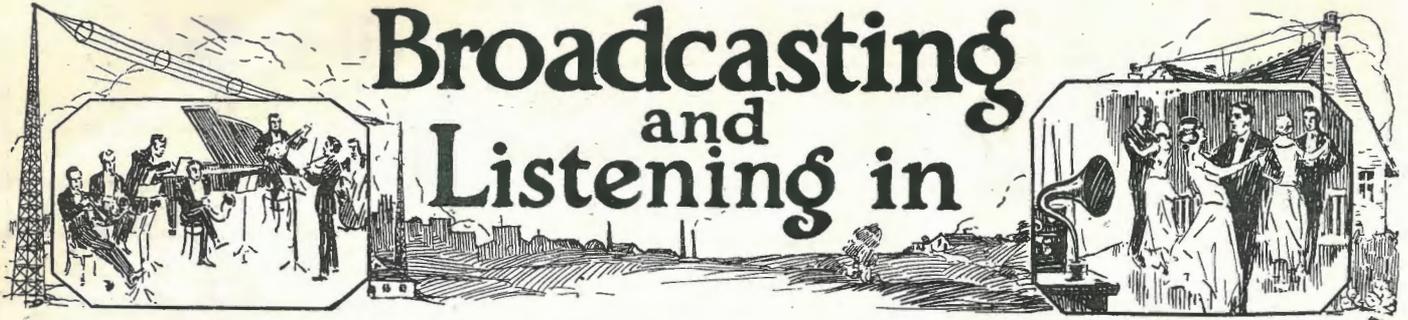
Send for Illustrated Catalogue and Price List.

BURGIN ELECTRIC COY.

WIRELESS ENGINEERS AND SUPPLIERS.

Showrooms and Sales Dept.: 1st Floor, Callaghan House, 391 George St., Sydney

Mention "Radio" when communicating with advertisers.



Broadcasting and Listening in



ARAJ Samideanoj per tiuj
ci parolado kaj aliaj propa-
gandaj laboraj ni dis-
vastigas scion prinia ingvo
—the foregoing has no-

thing to do with the Grand Opera season in Sydney, but is merely a little Esperanto which was cast into the ether the other evening from 3AR. Translated it means: "By means of these speeches and other propaganda work we spread the knowledge of our language," and was spoken from the Associated Radio Station by Mr. Rawson, the Secretary of the Melbourne Esperanto Club.

A VERY close imitation of many spoken sounds was produced recently during a lecture by Dr. Harvey Fletcher to members of the New York electrical societies. Using a combination of vacuum tube oscillator, amplifier and tuned circuits, a loud speaker was made to say "a, e, i, o, u," in unmistakable fashion. The oscillation and amplifier were the electrical prototypes of the human vocal chords and throat, producing a musical note rich in over-tones, while the tuned circuits took the part of the mouth in strengthening certain of these.

GEORGE LAKHOWSKY, a French scientist, recently stated that it is possible to talk to another person's brain by means of "N" waves. He also claims that by this means it is possible to cure disease, solve crime and become the master of the world. Others, while admitting that such things are possible, state that they will not come into being for a considerable number of years, yet, although they admit that this scientist is talking cold, hard fact when he declares that the basis of his claims is that human beings, and no doubt the lower animals, possess rays or

some strange power by which such phenomena as telepathy is possible.

MR. J. C. PRICE, of Wireless House, Brisbane, recently gave two public demonstrations of wireless telephony. In conjunction with the

Mr. C. A. Jackson and Mr. J. Williams were responsible for the Interstate transmission. At Paddington, Mr. Price employed a portable set of three valves (dull emitters), and a portable loud speaker. At the conclusion of the performance Mr. Price delivered a short lecture.

NO less than four demoninations are now broadcasting church services in Auckland. Beresford Street Congregational, the Church of Christ, the Baptist Tabernacle, and the Salvation Army, are all having one service per month put on the air from 1YB. Private wires run from the places of worship to the broadcasting station, and a system of microphones is arranged in each church, so that not only the preacher's voice but also the singing of the choir and congregation are transmitted. The services are greatly appreciated, favourable reports coming to hand, even from as far as New South Wales.

THE Editor of *Radio* recently visited an experimenter's home in Sydney, within five miles of both 2FC and 2BL. Signals from these stations were received on a loose coupler employing a crystal detector, and so strong were the signals that they operated an "Amplion" loud-speaker.

AUCKLAND has quite a large number of doctors who are keenly interested in wireless and by no means the least prominent is Dr. Dundas Mackenzie, who has installed a four-valve receiver, which is comprised of detector and three stages of Audio Frequency, while the system of tuning is the popular three-coil circuit with one or two improvements. To successfully operate the three stages of audio a special system of earthing and screening has been evolved, which in the preliminary tests has proved entirely satisfactory.

2FC

BROADCASTING TIMES.

Sydney Mean Time.

Wave Length: 1100 metres.

Midday Session:

12.55 Tune in to the Studio Chimes.
12.58 Time Signals from Farmer's Master Clock (Sydney Observatory Time), Coastal Farmers' Market Reports, Stock Exchange Intelligence, Weather News, "Sydney Morning Herald" news and cable service, "Evening News" midday news bulletin.

1.15 Close down.

Afternoon Session:

3.30 Studio Chimes.
3.33 Musical programme by Farmer's Orchestra broadcast direct from Farmer's Oak Luncheon Hall. Numbers will be played at intervals to 4.45.
4.45 Stock Exchange, weather, afternoon news.

Early Evening Session:

6.30 Studio Chimes.
6.33 Children's Hour.
7.0 Dalgety's Market Reports, Fruit and Vegetable Markets, Stock Exchange, Late News.
7.15 Close down.

Night Session:

8.0 } Entertainment.
to }
10.0 } See list hereunder.

EVENING ENTERTAINMENT.

As far as possible the following schedule is adhered to:—

Monday: Theatre Night.
Tuesday: Popular Concert
Wednesday: Jazz Night.
Thursday: Classical Night.
Friday: Popular Concert.
Saturday: Choral and popular numbers.

Queensland division of the Wireless Institute, he staged a demonstration at the Windsor State school, the second performance taking place in a hall at Paddington, in the presence of a large and interested audience. At Windsor the broadcast from the Institute came in strongly, and the Sydney broadcasting was also picked up.



R. JOHN KILLEN, of South Singleton (N.S.W.), advises he receives Farmer's Broadcasting Station—2FC—on a crystal set, the signals being very clear and strong. His aerial is 200 feet long, 40 feet high, consists of two 3/20 wires spaced 10 feet apart, and is of the T type. All his instruments, including condensers, are home-made. (Well done, Mr. Killen.—Ed. R.)

IN the course of three weeks under perfect receiving conditions, Mr. D. S. Donkin, of Burradoo (N.S.W.) heard the following stations on 'phone: 2AK, 2BK, 2BM, 2BS, 2CM, 2CR, 2DS, 2GQ, 2GR, 2HM, 2IJ, 2JM, 2LO, 2RA, 2RJ, 2SA, 2WV, 3AR, 3BH, 3BM, 3BQ, 3EF, 3GI, 3XF, 5BN, 5BS, 5DO, 4EU, 4EG. The receiver is a four valve, radio detector and two audio, with single wire T aerial 80ft. long and 60ft. high.

"YOUR readers may be interested to know that with a single valve regenerative set (3 coil) I hear 2FC, Sydney, plainly every night, a distance of nearly 700 miles, which I consider pretty good for a single valve set," writes Mr. A. R. Oates, of Peterborough (S.A.). "The clarity of the music is all that could be desired but I intend adding another valve in the near future to get greater volume."



FOLLOWING is the DX report of Mr. H. L. Hobler, Rockhampton (Q.), for July 7 to August 11, inclusive: 'Phone—N.S.W.: 2BL, 2GQ, 2HF, 2CM, 2HM, 2CR, 2GR, 2AY, 2FC, 2DS, 2RJ. Vic.: 3XF. N.Z.: 1YA (2,000 miles, heard three feet from the 'phones, using five valves). U.S.A.: Has heard KGO on one valve repeatedly, as were all the other above stations except 1YA and 3XF. Morse—Q.: 4CK, 4GE, 4AN. N.S.W.: 2GQ, 2CM, 2HM, 2CR, 2ZZ, 2GR, 2AY, 2YG, 2BK, 2QG, 2LO, 2YI, 2DS, 2KO, 2BF, 2YB, 2RJ. V.: 3BM, 3OT, 3XF. S.A.: 5WJ, 5LO, 5CM. N.Z.: 4AP, 4NAI. All these stations were heard on Morse repeatedly except 4CK, 4NAI, 5LO, 4GE, 2QG, 3XF, 2KO, 4AN, 2YB, and 2RJ. KGO and 2BL have been heard repeatedly on one valve during daylight and 2FC (800 miles) on the same number of valves on a 600-metre harmonic. All Q., N.S.W. and V. experimenters are audible away from 'phones on 'phone and Morse when using four valves. 2HM is quite audible 14 inches from the 'phones using three valves and no audio. "If experimenters would give their calls and names more often," Mr.

Hobler writes, "they would receive many more reports. Often speech, etc., is heard but no call sign is given and the sender may thus lose a good QSL. If the experimenters logged above have not received a QSL and they will write to me, I will let them have a detailed report."

MR. N. DOSSETTE, of Ayr (North Q.) writes that his best "'Phone" to date is 2BL and 2FC—1,050 miles to the South. This was put up with a single valve set. Other stations heard lately include 4AB, VIA, VIB, VIC, VID, VIF, VIG, VIH, VII, VIJ, VIM, VIN, VIP, VIR, VIS, VIT, CGT, VLA, VJZ, VJA and VJI.

ON the evening of August 10, Mr. R. Broughton, of Gilmore, near Tumut (N.S.W.) picked up portion of a concert transmitted from KGO. On the two following evenings he repeated his performance. During the past few weeks he has also heard the following stations on music and speech: N.S.W.: 2GR, 2BF, 2HM, 2JM, 2AR, 2RJ, 2ZN, 2ZZ, 2UW, 2BK, 2GQ, 2CM, 2CR, 2SO. V.: 3AH, 3BQ, 3BU, 3BD, 3JR, 3BF. S.A.: 5AB, 5BN, 5BQ. Tas.: 7BN. N.Z.: 1YA, 2AH, and broadcasting station 4YA. All these results were obtained using the PI circuit described in Radio No. 36, with one stage of Low Frequency Amplification. C299 valves were used with a pair of Murdoch's 'phones "of a very respectable age." 2FC and 2BL come in on surprising strength and can be heard all over a large room. The set was entirely home-constructed.

The Vital Parts of your Set are Valves and Headphones

WE SPECIALISE IN THESE TWO LINES.

FOR INSTANCE:

We make a Special Carton for sending Valves to the country. It is almost impossible for the postal people to break a valve packed in this carton.

The New Prices of Valves.

PHILLIPS, D1, D2 and E	18/6
MARCONI, R	19/-
MULLARD	19/-
DE FOREST RADIOTRON	35/-

Headphones of High Quality that we Stock.

PEERLESS, 2000 ohm	32/6
TRIMM, 2000 ohm	32/6
TRIMM, 3000 ohm	45/-
RED SEAL—the Aristocrat of all Headphones ..	50/-

WE HAVE ALL OTHER BRANDS.

SEND FOR OUR PRICE LIST.

RADIO HOUSE, 619 George Street, Sydney
THE QUALITY RADIO STORE.

Losses in your Receiver

How to Avoid Them



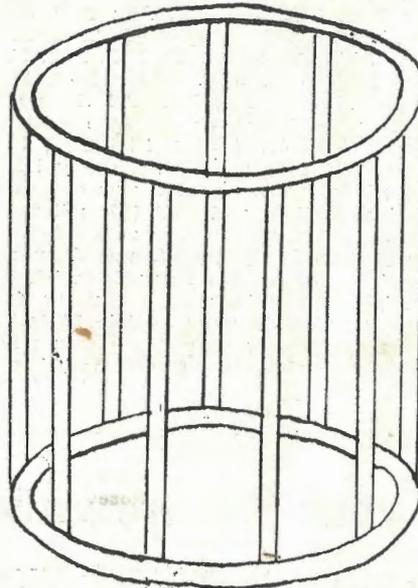
WHAT causes losses in a receiving set? The biggest factor is cheap material and poorly designed parts.

The next questions will be, "How can I tell good parts from poor ones?" or "Name some good parts." As much as any radio editor would like to help you in that line, to do so would keep him in hot water all the time. First, he would have the advertisers and next the manufacturers on his trail. So, the next best thing he can do is tell you what to steer clear of and what is good, without mentioning any names.

If the set has been built properly and all connections tight and it does not give good results, it may be due to any one defective part of your set. A radio set is only as good as its worst part. Where possible, keep away from cheap condensers. Not that all high priced ones are good, but it costs more to make up a good one and therefore cannot be sold at a low price. As air is the best dielectric we have for variable condensers, the less other insulating materials we have supporting the plates, the better. Any material used for supporting the plates should be as small as possible so as to get away from all possible losses. The plates themselves may be aluminium or brass. The knock-down condensers, while very cheap, are not efficient, due to the imperfect contact between plates and washers. Some condensers are made with a needle point bearing on the shaft of the rotor plates. If enough pressure is made on this to make a good contact with the bearing the condenser will be too hard to adjust and you cannot tune close enough. On the other hand, if you do not have it tight, it makes a poor connection. The best way is to have it pig-tailed.

An inductance having low losses must have very little insulating material under it, such as a rubber tube or other material would have. Small forms are better than large ones, due to the difference of pressure from one

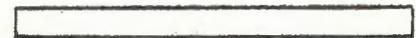
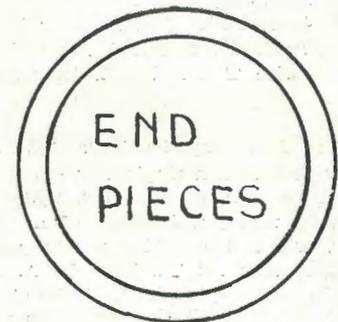
turn of wire to the next. The best form to use is one using some form of skeleton work. There are such forms in radio stores. The U.S. Bureau of Standards developed a low loss coil by having a squirrel cage affair to wind the coils on. This consisted



of two hard rubber rings with eight hard rubber strips connected to them, as shown in the drawings. Bare wire may be used, and in fact is preferable to insulated wire, as there is distributed capacity between turns. Number 18 or 20 copper wire may be used and should be annealed so as to be handled very easily.

Sockets is another place to look for losses. Any old cheap socket will hold your tube without any trouble, but a poor socket forms a leak between the

terminals and energy is lost. Sockets should be inspected to find whether the contacts are springy. If they are not, they soon make poor connection with the audion. A side wiping contact is better than one making contact with the bottom of the prongs.



STRIPS

The grid condenser is a very important item in your set and one most frequently neglected. To prove to yourself that paper insulation is not much, squeeze the grid or bypass condenser together once and note the results. Try this with a mica condenser and nothing happens.

To contradict the above someone will say, why, I use all cheap parts and get excellent results. Maybe so, but you are one in a 1,000 and the other 999 are always having trouble.

AUCKLAND RADIO EXHIBITION.

THE first exhibition in connection with the Auckland Radio Association, was held last month and was a pronounced success. There was a large entry in the various classes of receiving sets and several lectures were given. Demonstrations showed the correct method of tuning receiving sets, and methods of eliminating

interference, etc. Lectures delivered during the course of the exhibition included, "What is Wireless?"

A COSTLESS COURTESY.

IF you want to do this magazine and yourself a good turn which will cost you nothing in the performance, mention that you saw the announcement in *Radio* when answering advertisements.

Jottings from Here and There

UN-LICENSED RADIO STATIONS.

IN view of the increasingly large number of un-licensed amateur radio stations throughout the Dominion, the authorities have warned the public that in future more drastic

advertisement appearing in *Radio*," and you can be sure that your requirements will be observed to the letter. It is only "a scrape o' the pen" but it means a lot to all concerned—yourself included.

very strong, he cut out the two A.F. stages and worked them on two valves (one R.F.) with good results, there being very little fading noticed and much less hum than on a previous occasion. The items heard included a comic song, a piano or pianola solo—very distinct and well-played, two orchestral items and a concluding announcement.

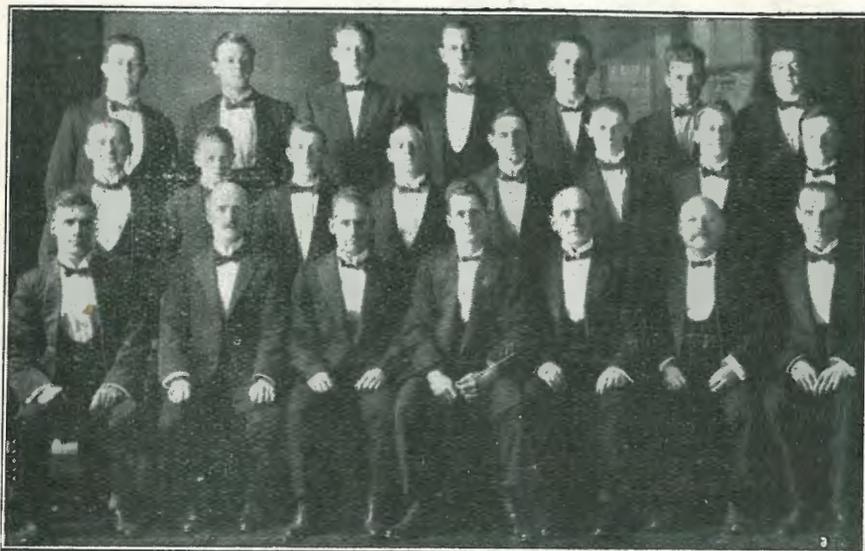
CALLS heard by Mr. C. A. Cullinan, of Diggers' Rest (V.), between July 15 and August 15, inclusive: 2AY, 2AP, 2CX (?), 2DS, 2IJ, 2LO, 2ZZ, 2FC—(below 200 metres), 1AH, 2AC, 4AA. August 16-19, inclusive: 2AP, 2IO, 2XX, 2ZZ, 7BK, 3AL. Mr. Cullinan has just completed the construction of a low loss type of receiver, but it has not yet been properly tested out. With regard to 2FC, this experimenter has heard him on one valve very QSA and on one occasion he was picked up below 200 metres on a harmonic, although very faintly.

COMPANY REGISTRATIONS.

The following are particulars of two registrations in Sydney during the last few weeks:—

Burgin Electric Co., Ltd., has been registered with a capital of £25,000 in shares of £1 each, to take over the business of manufacturers, importers, and suppliers of electrical and wireless apparatus, now carried on as the Burgin Electric Company, at 352 Kent Street, Sydney. Directors: R. Burgin, R. S. Goward, L. W. Knight, and O. F. Mingay.

The Institution of Radio Engineers, Australia, Incorporated, has been formed to advance the interest of those engaged in radio-telegraphy and radio-telephony, and to promote the science and practice of the profession. The first council consists of the following:—E. T. Fisk, M.I.R.E. (first president), Professor Sir Thomas Lyle, Professor T. Laby, F. Leverrier, K.C., J. Malone, Commander F. G. Cresswell, R.A.N., G. J. Weston, L. A. Hooke, W. T. S. Crawford, J. L. Mulholland, A. S. McDonald, G. Apperley, J. G. Reed, and S. Toombs, J.P. (first secretary).



Mort's Dock Male Choir is well-known to all who listen-in regularly to 2FC and on several occasions recently they have given recitals with conspicuous success, which have occupied the whole of the evening. Members of the Choir whose photograph appears herewith are as follow:—Back row, from left to right: Messrs. S. Butcher, E. Tarr, J. Paton, W. Wilkinson, R. C. Rosevear, G. Clancy, F. Bourne. Middle row: Messrs. R. Laughlin, J. Cuff, E. Tyreman, S. Vincent, J. Little, J. Duffy, J. Elliott, J. Harper. Front row: Messrs. T. R. Christie, E. C. Chadborn (Treasurer), C. K. Ellem (Secretary), E. A. Sykes (Conductor), C. Lawrence (President), M. Booker (Accompanist).

LATEST LOGGINGS.

ON the evening of August 15, Mr. G. R. Martin, of Greenwich (N.S.W.) held the Westralian Farmers' Broadcasting Station from 11.30 p.m. to 12.5 a.m., local time. Mr. Martin tuned in with this station on four valves but as static was bad and drowned the music which appeared to be

steps will be taken to ensure observance of the law.

"A SCRAPE O' THE PEN."

COMMENCE your letters to advertisers in this magazine as follows: "Dear Sirs,—With reference to your

ALL WIRELESS RADIO SETS AND REQUISITES

ARE OBTAINABLE AT — LOWEST PRICES — FROM

SWAINS, 119a and 123 Pitt St., Sydney

A FEW DOORS FROM THE G.P.O.

CRYSTAL RECEIVING SETS, from 30/-. Operative up to 25 miles from Sydney.

ONE-VALVE RECEIVING SETS, from 25/10/-. Operative up to 100 miles from Sydney.

Two UP TO SIX VALVE SETS, from £28, Operative up to 5,000 miles from Sydney.

To INCREASE THE EFFICIENCY of YOUR CRYSTAL SET BUY OUR **ONE-VALVE AMPLIFIER**—Ready to connect up—Price 27/7/-; or the **TWO-VALVE AMPLIFIER**—which will operate a Loud Speaker—Price £10/10/-.

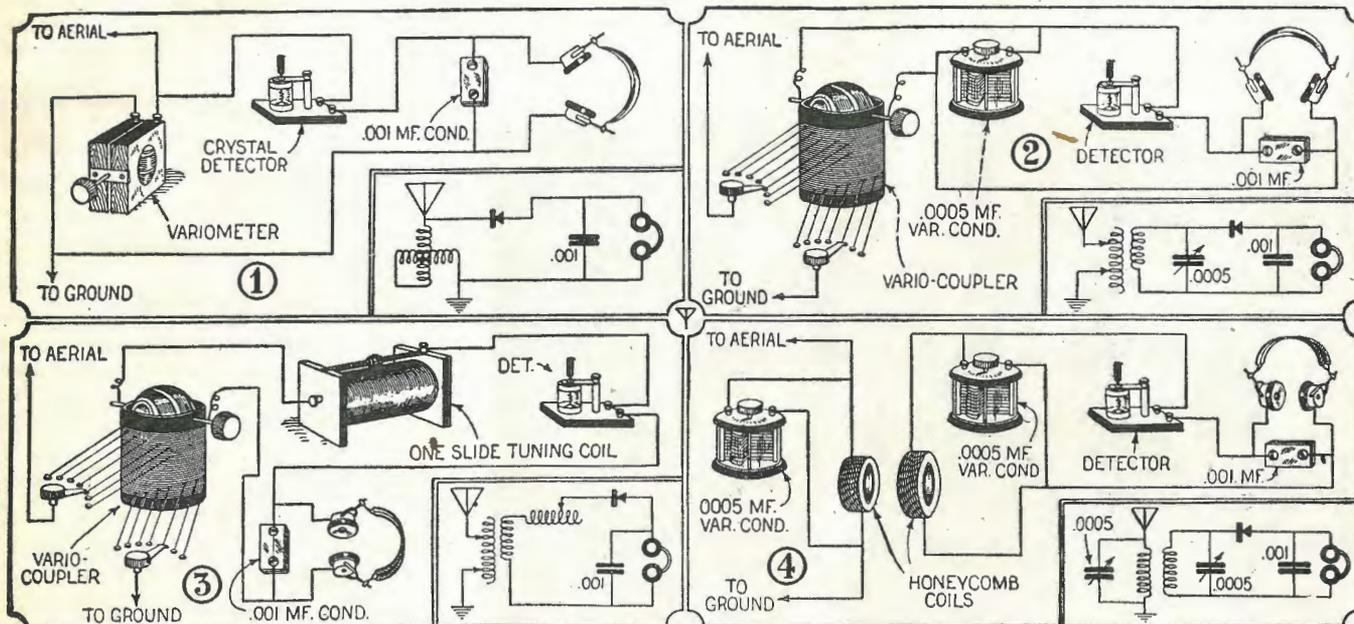
— WE SELL —

THE FAMOUS FROST FITTINGS, all makes of 'Phones and Loud Speakers — THE UNITED DISTRIBUTORS, LTD., HOME ASSEMBLY SETS and RADIOVOX SETS — THE STERLING SETS, Loud Speakers, Valves and Phones — GALENA, ZINCOITE, BORNITE, MOLYBDENITE, IRON PYRITES, AUSTRALITE CRYSTALS.

ALL THE LATEST BOOKS and MAGAZINES on WIRELESS in Stock.

Eight Efficient Crystal Receiving Sets

By A. P. PECK, A.M.I.R.E.
(Reprinted from "Science and Invention.")



VERY often we hear of crystal detectors receiving radio broadcast programmes over distances of 1,000 miles or more. This is usually accomplished under extraordinary conditions and cannot be depended upon. However, the crystal detector, when operated properly and used with a selective tuner, will very often give astonishing results. The writer has personally received from stations 300 miles away using a crystal detector and a circuit similar to that shown in Figure 2. This work was done very consistently during the autumn. The crystal used was a piece of very sensitive galena selected from a pound of the commercial variety. The same work was also done with one of the many synthetic or manufactured crystals now offered for sale.

The diagrams given herewith have been carefully selected to give the best results with a minimum of

apparatus. The circuit in Figure 1 is the simplest of them all and with a standard variometer will give excellent results for local reception. It is not, however, very selective.

The circuits in Figures 2 and 3 are very similar, the secondary tuning being done in Figure 2 with a variable condenser and with a one-slide tuner in Figure 3.

Many amateurs are firm exponents of the use of the honeycomb coils and, therefore, we show the circuit diagram in Figure 4 employing these highly efficient coils. Note that small variable condensers are used, being shunted across the two coils. This gives sharp tuning. The sizes of the coils used must be determined by experiment.

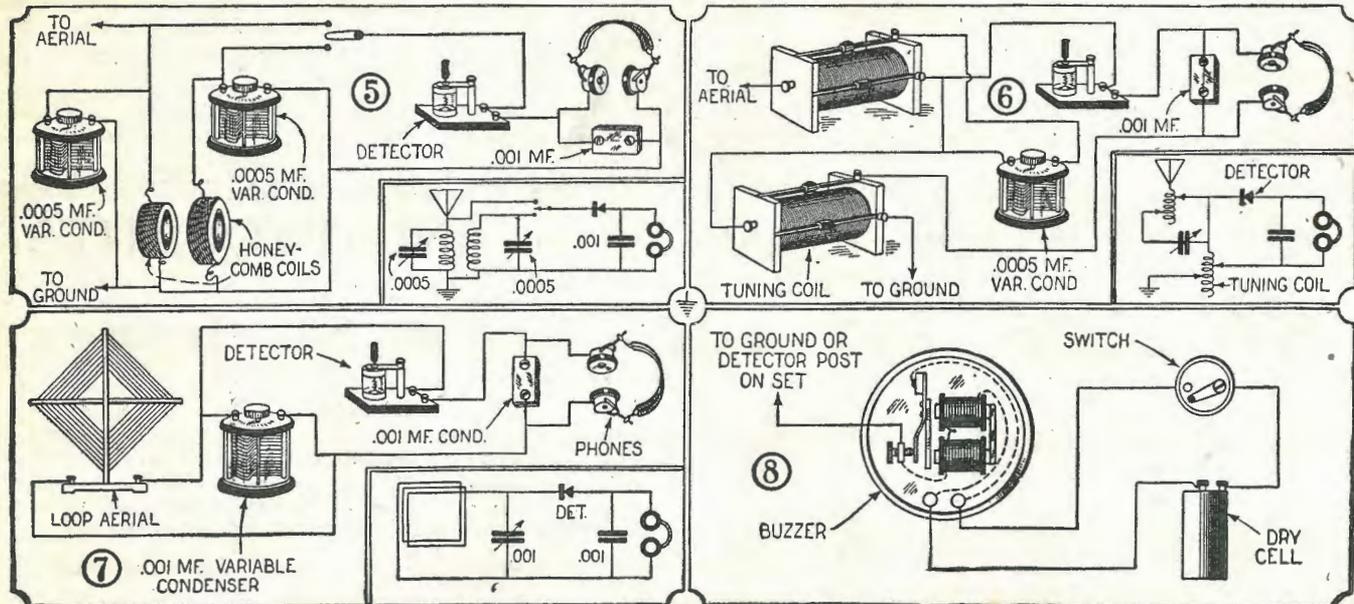
A variation of the circuit given in Figure 4 is shown in Figure 5. The two point switch is added

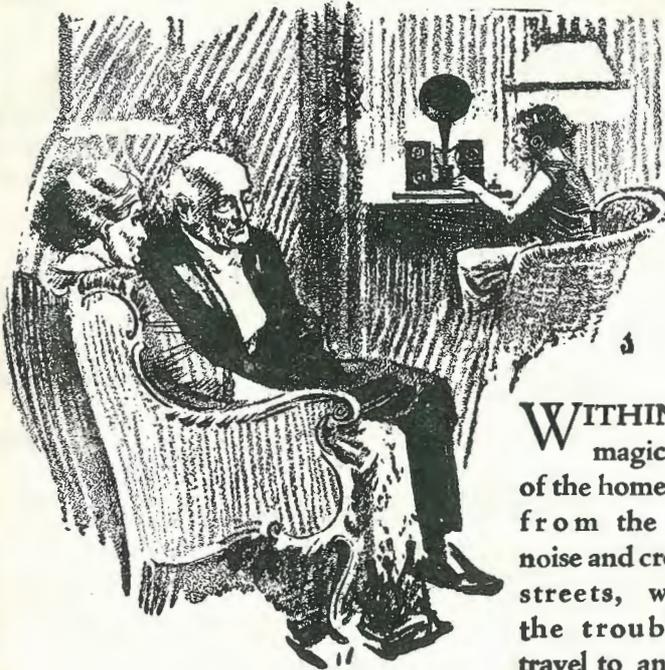
so that for local reception and to obtain slightly louder signals, a single tuned circuit may be used. For selectivity and distance work the switch blade should be placed on the lower point. In radio operator's parlance this is known as a "stand by and tune" circuit.

A combination wave trap and tuning circuit making use of two standard two slide tuners is illustrated in Figure 6.

For reception from stations located not more than two or three miles away, a loop aerial may be used, being connected as illustrated in Figure 7. The loop should be as large as possible so as to pick up the greatest amount of energy. A buzzer test is a great help in crystal reception, both for adjusting and bringing signals that seem to fade.

The circuit of a buzzer test is shown in Figure 8.





WITHIN the magic circle of the home, away from the city's noise and crowded streets, without the trouble of travel to and fro,

every form of entertainment is now brought right into that charmed home circle through the wonders of radio. Old and young can sit at home in their favourite chairs and hear the host of performers which are yours to command when you own

Western Electric RADIOPHONES

The correct volume and purity of tones, together with the absolute simplicity of manipulation, are predominant features of Western Electric apparatus. If you would have the best results, your choice must be Western Electric, a choice that every user has found correct. Descriptive literature and advice on application to:

Western Electric Company
(Australia) Ltd.

192-194 Castlereagh Street, Sydney.
Telephone Nos: City 336 & 356.



JUST ARRIVED

from America

New Parts

IMMENSE shipment of New Radio Parts has just arrived at David Jones', from America.

This comprising a full stock of the famous Cunningham Valves, Models 301A and 299. Price each 35/-

The highly efficient and tremendously popular A.P. Valve. Price 35/-

Also many other highly efficient parts incorporating the latest improvements.

DAVID JONES'

RADIO DEPARTMENT,

252 YORK STREET,
SYDNEY.

AGENTS WANTED.

Well-known London Company, manufacturing Wireless Cabinets of distinction, Wireless Accessories, Insulators, etc., is ready to appoint **SOLE DISTRICT AGENTS** throughout the whole of Australasia. Applications, with trade references, to Box S.G.4, Bertram Day's Advertising Offices, 9/10 Charing Cross, London, S.W.1, England.

TRY CAMPSIE FIRST!

Whether you want a screw or a super-set you will find the quality and prices right. Some of my Specialities are:—

TRIMM'S DEPENDABLE 'PHONES at 32/6; and
RADIOTRON VALVES (201A and 199) at 35/-

VICTOR MARKS' Radio House

BEAMISH STREET, CAMPSIE (next Campsie Street).

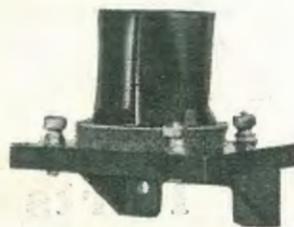
POSTAGE PAID ON ALL GOODS.

Famous FROST Parts

"LIKE POSTAGE STAMPS USED EVERYWHERE"

The Most Complete Line of Guaranteed Quality Radio Parts ever offered in Australia

One Price all Dealers



FROST RADIO.

No. 618, Bakelite Sponge Shock Absorber Socket, Standard base, panel or table mounting 6/3

For 199 Tube 6/3

For those who wish a compact gang of three Shock-Absorber Sockets. The construction is identical with our separate sockets, except for base. For panel or table mounting.



FROST RADIO.

No. 600.—Frost-Radio Metal Frame Rheostat or Potentiometer.

Equal in operation to the best moulded type, with precision, operation of all moving parts and guaranteed resistance wire. Frame is made of heavy sheet brass, nickel plated and formed so as to give a rigid construction both to the windings and the contact arm. Central mounting thimble with locating tip prevents turning when mounted on panel. Washers provided to fit panels of varying thickness. Fluted moulded knob and nickel plated pointer.

No. 600, Metal Frame Rheostat, 6 ohms 5/6

No. 602, Metal Frame Rheostat, 35 ohms 5/6

Same with Vernier 7/6

No. 603, Metal Frame Potentiometer, 0.400 ohms 5/6

No. 605, Metal Frame Potentiometer, 0.200 ohms 5/6

EACH OF THE ABOVE, WITH VERNIER, 7/6.



FROST SOCKETS.

- 618 SINGLE SHOCK ABSORBER SOCKET, for Standard Valves .. 6/3
- 617 SINGLE SHOCK ABSORBER SOCKET, for UV199 and C299 .. 6/3
- (All above sockets are made of Bakelite and have sponge rubber cushions.)
- 612 BAKELITE SOCKET, for C299 and UV199 Valves .. 5/-
- 100 BAKELITE SOCKETS for Standard Valves .. 5/-
- 619 3 GANG SHOCK ABSORBER SOCKET, for Standard Valves .. 24/6
- 616 3 GANG SHOCK ABSORBER SOCKET, for UV199, C299 .. 24/6

FROST RHEOSTATS AND POTENTIOMETERS

COMPLETE WITH TAPERED BLACK BAKELITE KNOBS, METAL PARTS HIGHLY NICKELLED, KNURLED TERMINALS, TECHNICALLY PERFECT.

- 650 RHEOSTAT, 6 ohm (Maroon Bakelite) .. 7/3
- 651 RHEOSTAT, 6 ohm Vernier (Maroon Bakelite) .. 9/6
- 652 RHEOSTAT, 35 ohm (Maroon Bakelite) .. 7/3
- 653 RHEOSTAT, 35 ohm Vernier (Maroon Bakelite) .. 9/6
- 600 RHEOSTAT 6 ohm Metal Frame .. 5/6
- 601 RHEOSTAT, 6 ohm Vernier, Metal Frame .. 7/6
- 602 RHEOSTAT, 35 ohm, Metal Frame .. 5/6
- 604 RHEOSTAT, 35 ohm Vernier, Metal Frame .. 7/6
- 654 POTENTIOMETER, 400 ohm (Maroon Bakelite) .. 9/6
- 605 POTENTIOMETER, 200 ohm, Metal Frame .. 5/6
- 603 POTENTIOMETER, 400 ohm, Metal Frame .. 5/6

FROST MISCELLANEOUS.

- 301 EXTENSION CORD, complete with Adapter and Plug, 20ft. .. 32/6
- 400 LOOSE COUPLER or Receiving Transformers .. 75/-
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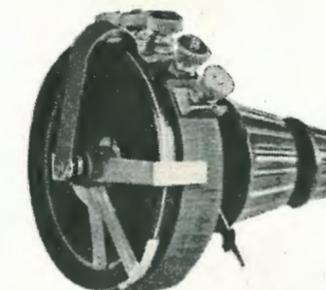
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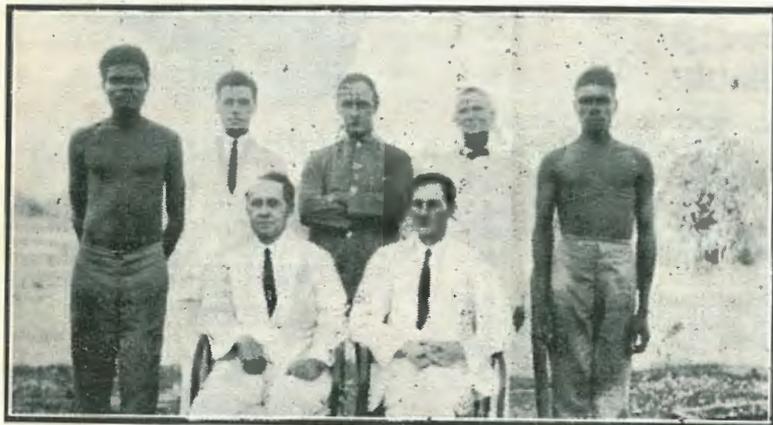
Thursday Island and Port Darwin

By F. Noel Toohey,
(T.S.S. "Marella.")

AFTER steaming up the East coast of Australia, inside the Great Barrier Reef, to the "top" of Australia, Thursday Island is reached.

associated with him Messrs. A. Flood, C. F. Dale and A. Harrower. After leaving Thursday Island, most of the vessels bound from Aus-

tralia for China, Japan, Java and Singapore invariably head for Port Darwin, which is usually the last port of call outward bound and the first port inward bound.



The members of the staff of Darwin (N.T.) Radio Station. Standing, from left to right: Butcher and Messrs. H. E. Oates, G. Walters, C. Stockton and "Paddy." Seated: Messrs. J. Green (Mechanic) and E. J. Smellie (Officer in Charge).

This is one of the prettiest places in northern Australia and when approaching the island the two masts of the wireless stations stand out prominently.

The wireless station at Thursday Island, call letters VII, is ideally situated at the foot of the hills and close to the water's edge.

The transmitting equipment consists of a five Kw., H.F. converter 420 cycles; rotary gap and also a seven KVA motor-generator. The motive power units consist of two two-cylinder twin Gardner engines driving two 11 Kw., Westinghouse interpole generators.

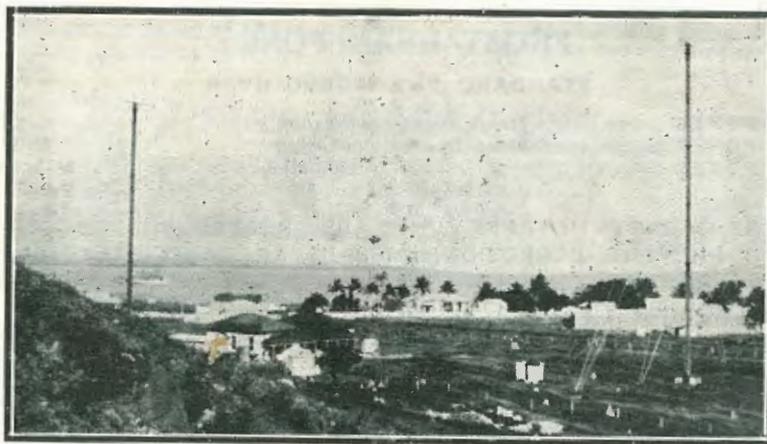
VII is in charge of Mr. H. F. Coffee, who, at the time of writing, has

VID, Port Darwin Radio Station, is situated about a mile from the town. The one mast at this station is high and prominent.

The operating house is a concrete building and the whole of the equipment is housed therein. The transmitting apparatus includes a two Kw., inductor alternator, 420 cycles, and a Quenched Spark Gap. The motive power is supplied by a two-cylinder high-speed petrol engine.

VID has exchanged signals with VPS, Hong Kong radio station, and also other distant stations.

The staff at the time of writing consists of Messrs. E. J. Smellie (Officer in Charge), H. E. Oates, G. Walters, C. Stockton and J. Green.



A view of the Radio Station at Thursday Island. On the left, at anchor, may be seen H.M.S. "Herald."

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2 N.P. Switch Stops	0	0	4
1 N.P. Inductance Switch	0	2	0
1 piece Ebonite	0	1	6
1 N.P. Detector Unit	0	3	3
1 Guaranteed Crystal	0	1	0
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2 Extra Phone Terminals	0	0	8
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"Murdock's" 3000 Ohms	1	10	0
Kilbourne & Clark 2000 Ohms	1	12	6
Trimm's Dependable	1	12	6
Frost's 2000 Ohms	1	12	6
Sieman's 4000 Ohms	1	12	6
New System 2000 Ohms	1	15	0
New System 4000 Ohms	1	15	0
Frost 4000 Ohms	1	15	0
Ediswan 4000 Ohms	1	17	6
Radiola	1	19	6
Baldwin's (Single), for Loud Speaker unit	1	19	6
Brandes 4000 Ohms	2	0	0
Dictograph 3000 Ohms	2	2	6
Stromberg Carlson 2000 Ohms	2	2	6
Sterling 4000 Ohms	2	4	0
Western Electric 4000 Ohms	2	4	0
Western Electric 8000 Ohms	2	5	0
Trimm's Professional	2	5	0

RADIO HEADPHONES.—Continued.

Brown's 4000 Ohms Feather Weight	2	7	0
Nutmeg 3000 Ohms	2	10	0
Western Electric 2200 Ohms	3	15	0
Baldwin's (Double), with Mica Diaphragm	4	0	0
Brown's type D. 4000 Ohms	5	5	0
Brown's type A. 8000 Ohms, with Adjustable Diaphragm	5	15	0

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Loud Speakers

How to get Best Results

IF there is one thing worse than listening to a husky, whispering loud speaker it is listening to a roaring, shouting loud speaker. As is always the way, though, some things will inevitably please somebody, but as this article is written for the majority, we will go into the matter and try and estimate what is considered to be average loudness and the best way to secure it.

First of all, however, it would be as well to establish exactly what average loudness is. A good definition is "conversational loudness." Adjust your radio equipment so that when the voice of the announcer comes on, it sounds as though he were speaking in the same room to the company.

If the house in which the room is situated is a small and quiet one, very little power is needed to cause the sound to be heard at conversational loudness.

Don't operate your loud speaker so that the pictures rattle on the walls. That only serves to annoy the listeners and over-strain the equipment. If the surrounding noises are considerable, it will not help things at all to tune up till these noises are drowned in those made by the loud speaker. Such a practice is altogether wrong.

It is surprising how the number of local noises can be eliminated. The simple act of closing a door will often do quite as much as one amplifier to overcome it. In a soft-walled room, if the broadcasting station is near, a crystal detector can insure enough power to give satisfactory results.

Another cause of painful loud speaker noise is when the operator tunes loudly in order to overcome sound reflection. Thus, if portion of the sound waves leaving the speaker strikes the ear direct and the other travels direct to a hard surface and is then reflected to the ear, this comes as interference. The reflected sound has gone farther in leaving the speaker to be reflected back to the ear and thus does not reach the hearer until some time after the original sound it started with. If, on the other hand, the sound given out by the speaker is small, the difference between the direct and reflected sounds

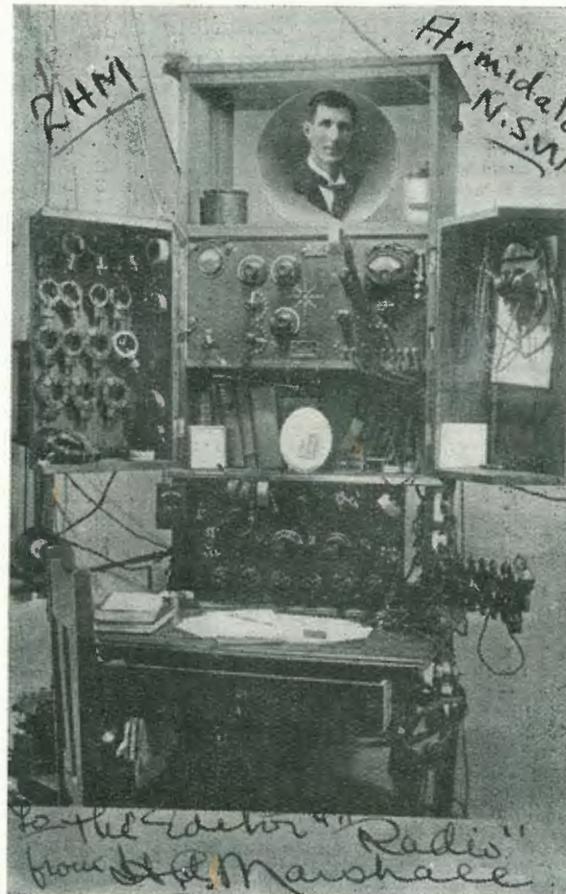
may be so small as to be indistinguishable. In increasing all the sounds from the speaker the difference may be reduced to an unnoticeable minimum, but the total loudness caused by so doing is good neither for the listeners-in nor the apparatus.

Window glass reflects or transmits the maximum of sound. It lets in noise interference from outside and causes reflection interference inside.

also decrease reflection within the room.

If possible, do not instal the loud speaker in a room where smooth plaster walls are the order, as they usually produce the worst interference and reflection because of their size. Soft wall-paper with a surface like blotting paper will give the best results.

All hard, smooth surfaces are sound reflecters, but materials like felt or



Station 2HM. Owned and operated by H. A. Marshall at Armidale, N.S.W.

With windows no reflection is caused, but no interruption to outside noises coming in is effected. In the case where double glass with an air-space between is used, exterior noises may be effectively kept out but reflection of interior disturbances will still exist.

Thick heavy window curtains serve to minimise outside noises and they

upholstery absorb sound and prevent interference.

Therefore, choose your room in which the loud speaker is to be installed with care, and select your broadcasting service from a near studio, so that reception leaves plenty of room in which to be toned down and the voice of the announcer sounds like that of a human being.



AUCKLAND RADIO ASSOCIATION.

THE Auckland Radio Association is to take over the running of 1YB station on one night of each month and will be responsible for programmes provided on each occasion.

WAITEMATA RADIO CLUB.

FORMED in Auckland (N.Z.) a few weeks ago, the hon. secretary of the above club informs us that its objects and aims are to give all members complete theoretical and practical instruction in wireless telegraphy and telephony and to protect the interests of the radio amateur on all and every occasion. Club officers include Messrs. H. C. Ellison, President; F. C. Reardon, Secretary, and A. P. Sullivan, Treasurer.

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MR. GEOFF. HUTCHISON, Longford, Tas., using a single valve (UV199) set, home constructed, can clearly receive 2BL and 2FC any evening. On several occasions he has been able to distinguish what has been said or played at the latter station with the 'phones held a foot away from the head. The first week his set was completed he heard 2FC, 2BL, 2CR, 2GQ, 2RJ and 7BN coming in well, either on speech or music. The aerial used is a single wire 90ft. long at a height at the two ends of 40ft. and 25ft. respectively.

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All the features of such Design Work are dealt with, and the information given can be thoroughly relied upon.

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PART II.—

Many experimenting amateurs have requested full mathematical data for design purposes, and this Section is devoted to Data and Actual Quantitative Design, as well as to a description of many simple High-frequency Measurements, which can be carried out by the experimenter.

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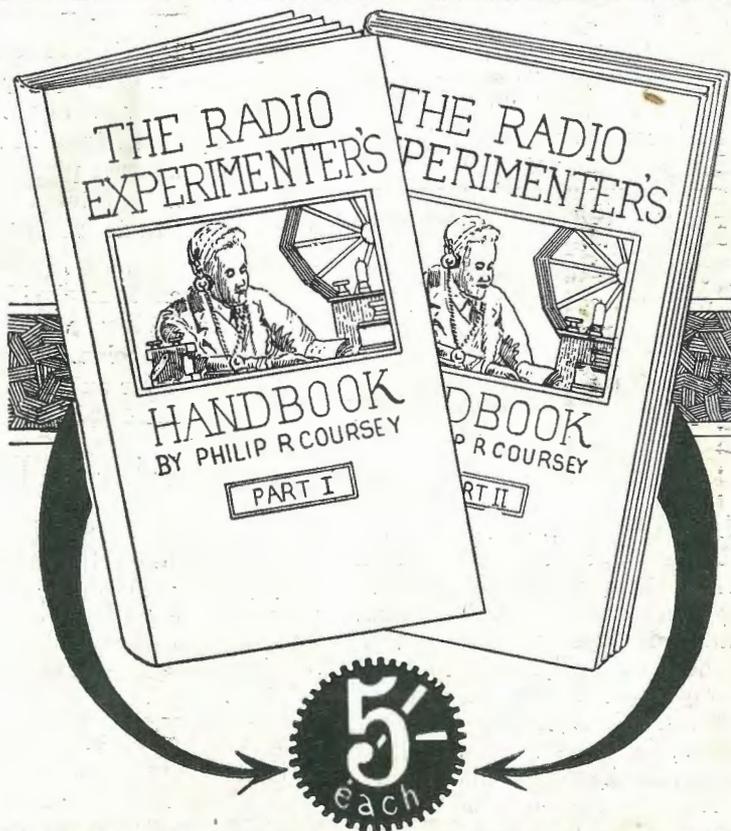
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Distortionless Amplification



EVERYONE is striving for distortionless audio amplification, for it is without doubt the greatest obstacle to faithful reproduction of broadcasted programmes after they have been received. The most popular type of audio frequency amplification is that using transformers. At first it was the practice to use high ratio transformers which gave good volume, but their amplification over the entire scale of frequencies delivered to them was not uniform and on some notes they would be good and clear and on others too loud and distorted, while on others they would not be strong. The remedy for this was to use lower ratio transformers and this helped a great deal but did not entirely overcome the noises due to the transformers themselves and not the tubes as oftentimes thought.

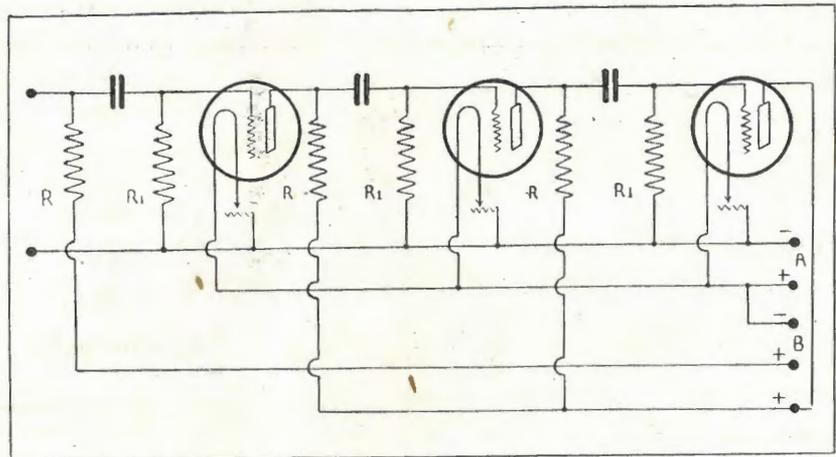
The best form of audio amplification, if you are after quiet amplification, is resistance coupled as shown in the drawing. It will be found that you will require three stages of this to get the same volume you do from two stages of transformer coupled, but you do have almost distortionless amplification and the extra tube, socket and rheostat will be really worth while. At that, when it comes right down to brass tacks the resistance coupled type will not put you to much greater expense when you remember that you do not have to buy two expensive transformers. In most places, the three 1 microfarad condenser will not cost any more than the one transformer and the other transformer will pay for the extra tube.

The lay-out of this is very simple, everything except the rheostats going on the baseboard. The resistances used should preferably be cartridge type that may be slipped into holders and should be placed between the tube sockets. The three fixed condensers which are about four inches long, two inches wide and one inch thick, should be laid directly in the rear of the resistances, as the condensers are connected between the two resistances.

the best results. The above values are for use with 201a amplifier tubes but will vary when other tubes are used.

Plate voltages from 135 up may be used and if your loud-speaker will stand it, voltages of 250 and higher may be used with correspondingly greater volume.

The advantages of this type of amplifier over the transformer coupled, is that it will amplify almost all



High plate voltages should be used with this form of coupling as part of the plate battery energy is dissipated by the high resistance in series with the battery and the plate of the tube. For the usual detector using 22½ volt it will be found desirable to use about 45.

The resistances marked R should be about 15,000 ohms, while R1 should be about 1 megohm. Both of these could be variable and be adjusted for

frequencies with the same strength, which give us distortionless amplification.

If you are already using transformer coupled amplification you can very easily compare it with resistance coupled by getting the necessary resistance and two large fixed condensers and changing the circuit accordingly. You will find that it will not be as loud as your own two steps, but we are after distortionless amplification.

Coastal and Island Radio Service

AMALGAMATED Wireless (A/sia.)

Ltd. operates an extensive system of wireless telegraph stations which link up every part of the Australian seaboard with ships at sea, and which forms the only telegraphic route to many important Pacific territories. The units of this system comprise the Coastal Radio Service, consisting of 18 stations in Australia, and the Island Service, made up of nine stations established in Papua and New

Guinea. The primary functions of the Coastal Radio Service is to maintain communication from the mainland and merchant ships going to and from the ports of Australia. The stations are so placed and organised that at any time of the day or night a message from any vessel within 500 miles of the coast receives immediate attention. The Island stations, although available for ship messages, are chief-

ly engaged in maintaining communication with Australia. Many of these are located in places that the average Australian has never heard of, such as Eitape, Kaewing, Kieta, Manus, yet their efficient operation is vitally important to both the administrative system and business interests of New Guinea. This service gives direct employment to 130 trained Australians absorbing in salaries and wages the amount of £42,000 per annum.



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How to Sensitize Galena Crystals

GALENA forms a very sensitive type of crystal detector when a suitable specimen is obtained, but to do this it is very often found necessary to take a large piece of the mineral and break it into many small pieces. These pieces when tested will yield a few excellent specimens which will bring in signals strong and clear, but the majority will be very much inferior in operation and, as is generally the case, will be thrown away as scrap. If these reject pieces are saved up, it is possible to perform a very interesting chemical experiment with them, and if everything is done properly, they may be sensitized to such an extent that they will often test out better than the original selected pieces.

From a chemical supply house obtain a small porcelain crucible as used for analytical purposes in laboratories. A cheap one should be selected (costing about two shillings at the most) for it will very likely have to be broken at the end of the experiment. Take the galena crystal refuse and break it up into small pieces with a hammer and fill the crucible about half full with the material. On top of the powdered galena spread a layer of sulphur about one-sixteenth of an inch deep. The porcelain lid must now be sealed to the top of the crucible with some plastic clay to make the whole as air-tight as possible, for the contents will oxidise readily if exposed to the air when heated. A Bunsen burner, or other hot flame should be used to supply the heat necessary to melt the contents of the crucible. The latter is best supported upon a silica triangle when being heated. This item can be purchased very cheaply at the same time and place as the crucible.

Keep the crucible and its contents as hot as possible for about half an hour, and then remove the flame and allow it to cool slowly in a sheltered place where there are no draughts.

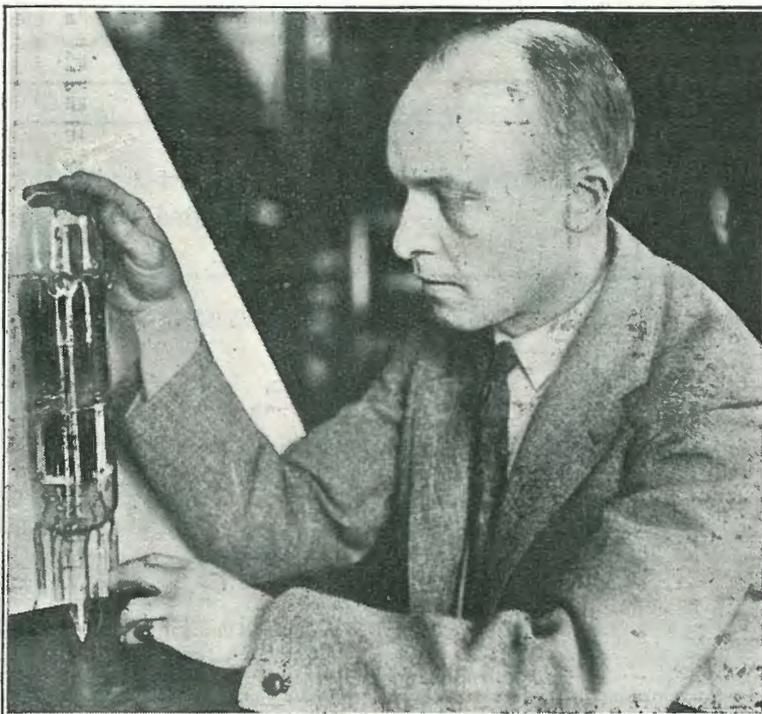
When perfectly cold, break the clay seal and remove the contents. Very often it will be found that the fused galena has stuck tightly into the crucible owing to some re-action with the glaze, and in this case, the cru-

cible will have to be broken with a hammer to get at the contents.

The lump of galena when cooling will slowly form innumerable small crystals which can be obtained by breaking up similarly to the natural specimen.

This process is the same in general principle to that carried out in preparing the many synthetic crystals obtainable on the experimental mar-

ket. The two main points to be observed during the treatment of the galena are that sufficient heat be applied to melt the material—the fusion point of galena being between 1100 and 1200 degrees, which requires a particularly hot and steady flame such as is obtained from a Bunsen or similar burner—and effective sealing from the air during heating, and slow cooling to form crystals.



This photograph depicts Carl W. Mitman, Curator of Engineering at the United States National Museum, Washington, D.C., holding what is claimed to be the first American-made Valve.

THREE-COIL CIRCUIT POPULAR.

THE three-coil circuit seems to be coming back into its own in N.Z., the recent popularity of neutrodyne and super-hetrodynes having somewhat waned. The general tendency is to experiment more with the three coil circuit on account of its simplicity in operation and flexibility of wave-lengths.

"AS OTHERS SEE US!"

"DOLOROSA": Have you noticed them—how, casting furtive glances to right and left, they gather

together and enter into animated conversation? Mysterious objects bulge their pockets, and they speak a queer jargon. Denunciations of allegedly dilatory governments and scorn of regulations oscillate with such words as "lighting-mains," "battery connections," "contacts" and "signals." Behind closed doors and drawn blinds at night, they may be seen making obeisance and muttering incantations to a weird idol of indicators and knobs. If only some genius could discover a way of transmitting meals by wireless, these "Pirates of the Ether" would never leave their instruments.

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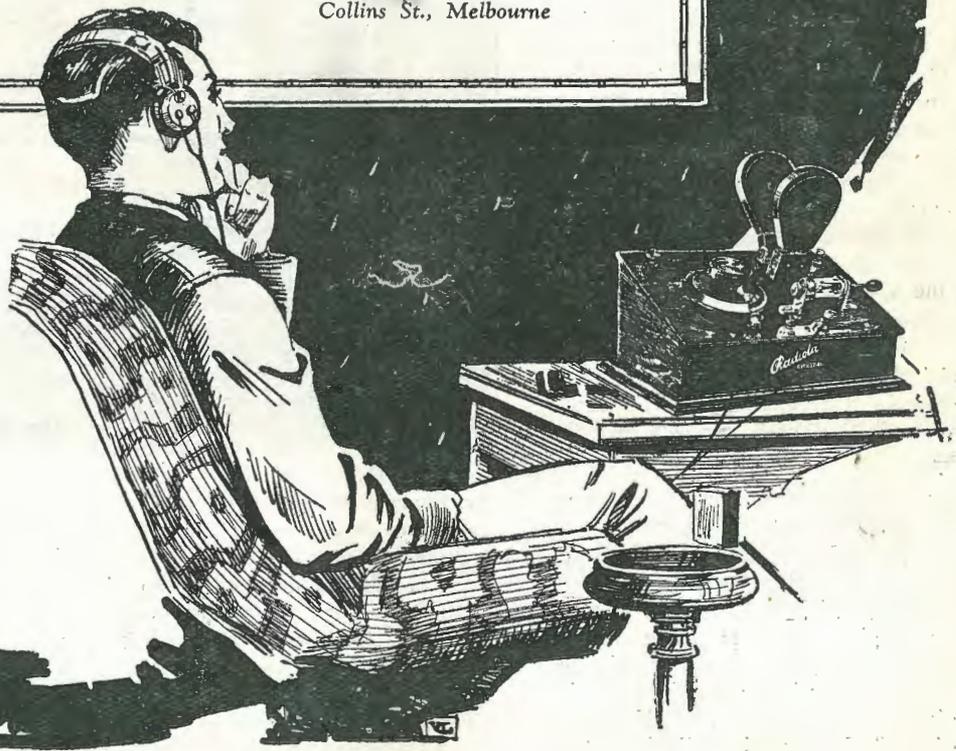
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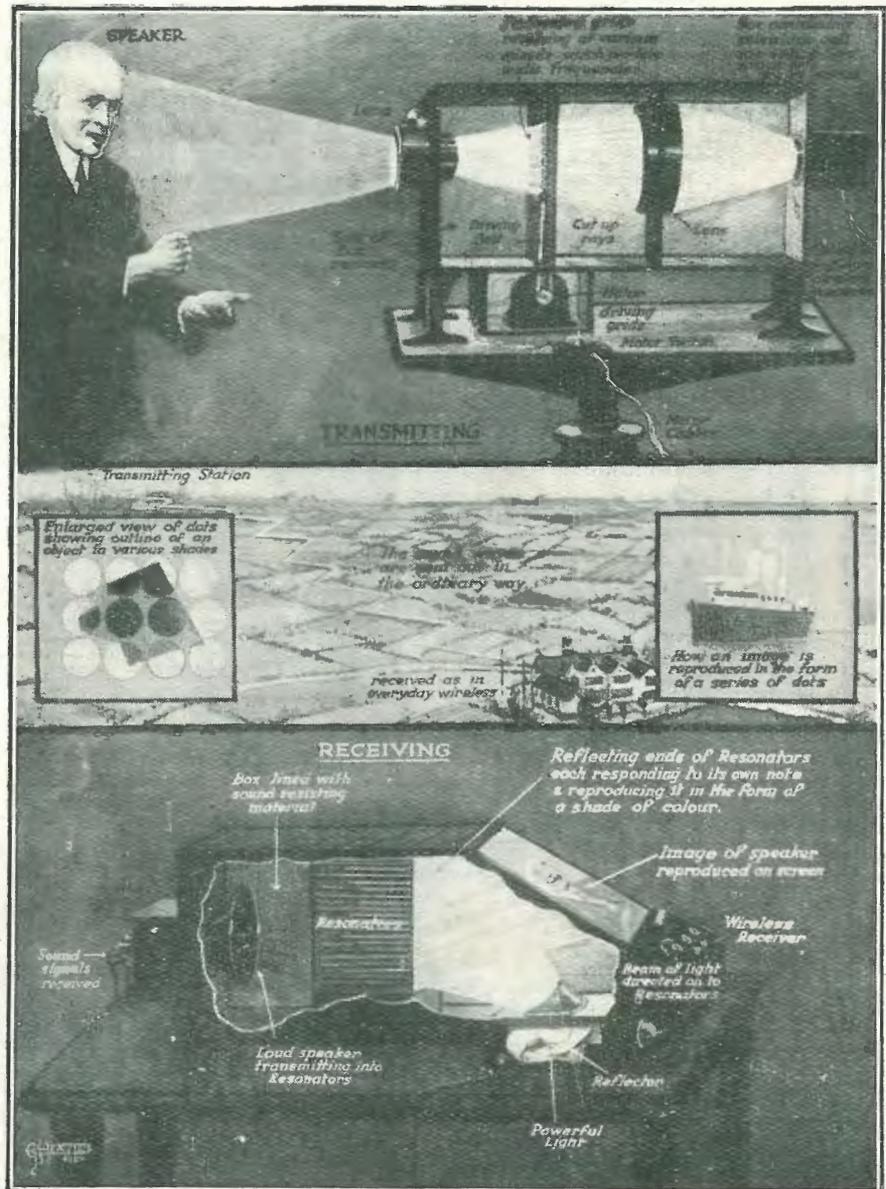
THE most prominent feature of the Marconi exhibit at the Wembley Exhibition is the model of a wireless beam transmitter which is mounted on the roof and rotates slowly as in action. This apparatus represents one of the latest developments in applied radio work and is intended to enable all classes of coastal shipping fitted with an appropriate receiver, including vessels which do not carry wireless operators, to obtain bearings during fog when in the neighbourhood of dangerous points.

After the beam transmitter the most striking exhibits are two "valve pillars." The "valve pillar" is the latest design of electric oscillation generator which has been developed by the Marconi Company for use in high power wireless stations, and this is the first occasion upon which they have been exhibited. These pillars constitute power units which can be used collectively for any required power. Each pillar incorporates sixteen large type Marconi transmitting valves, and is capable of dealing with 80 k.w.; but the power can be regulated in sectional steps of 20 k.w. according to prevailing conditions.

Two exhibits of great popular interest are the complete 6 k.w. standard Marconi broadcasting transmitter, and the Marconi microphone, such as is used in the British broadcasting stations. Other exhibits include amplifiers for commercial wireless stations, portable receivers, and complete cabinet sets for wireless telegraph and telephone working where other means of rapid long-distance communication do not exist—sets which have been designed with the object of providing compact and self-contained installations of low-power and moderate range for general use.

Wireless apparatus for use in connection with aviation comprises a complete aerodrome ground station, embodying special receiving apparatus and including provision for aircraft direction finding; three types of aircraft transmitters and receivers as fitted to aeroplanes on the principal air routes; and a new Marconi direction finder for installation on aeroplanes to enable the pilot to obtain his bearings direct.

Television



Dr. Fournier d'Albe, the inventor of the Optophone, claims to have discovered (with the assistance of Mr. Grindell-Matthews, the "Death Ray" man), a method of television, or seeing by Wireless free from the difficulties that have hitherto barred success. These diagrams show the lines on which the new method proceeds. Here the image of a speaker in passing through a lens, is directed to revolving, perforated grids which produce audio-frequencies, modulating the carrier-wave. The rays are then carried to a selenium cell, which converts them into sound-waves. Sent by an ordinary Wireless transmitter and picked up by the receiver, the waves pass through a loud-speaker to resonators, and a powerful light being directed upon the silvered ends of the resonator tubes, the sound waves become light waves, which next pass to a screen in the form of minute dots which make the picture.



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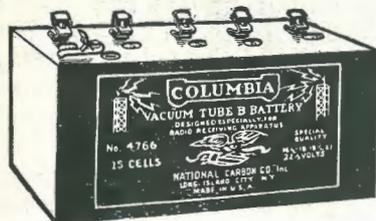
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"Lighthouses"

A "Bed-time Story" told from 2FC



OW that broadcasting has been established in high class and permanent lines by Farmer and Company, Limited, of Sydney, Australian children have become quite keen in their demands to "listen-in" during the session which is regularly set apart at 2FC for their own amusement.

Every evening between half-past six and seven o'clock Farmer's "Hello Man," Mr. A. S. Cochrane, the announcer at 2FC, devotes himself wholeheartedly to the amusement and entertainment of the little ones, and throughout the entire length and breadth of Australia children have learned to look forward to the time for the evening chimes and the "Lamplighter" story which follows them.

Recently, Mr. F. W. Stevens, one of the engineers attached to Farmer's Station, prepared for the benefit of the kiddies a most fascinating story-ette concerning a matter on which all small boys, at any rate, are interested—lighthouses. Mr. Stevens himself was brought up in a lighthouse and his story which was read to the children by Mr. Cochrane was therefore a very real one.

"In the years of long ago," Mr. Stevens wrote, "before steamers were built and only sailing vessel were used, such things as lighthouses did not exist. However, after a long time, a man named Captain Cook sailed away from England on a scientific expedition to Tahiti, an island in the middle of the great Pacific Ocean. After he had finished his work there, he sailed in a westerly direction and one fine morning the man on the look-out sighted land. That land was what is now known all over the world as a part of Australia.

"Captain Cook sailed up the coast from what we now call Cape Howe, past Sydney, and landed at Botany Bay, near La Perouse, first. He then went past Brisbane, and his ship was wrecked on the Great Barrier Reef near Cooktown. He managed to patch his vessel, the *Endeavour*, and went on his way round the North of Australia.

"By-and-by other ships came to Australia, and it was realized that something must be done to put some kind of mark on the shore, so that captains could tell where they were. At first a cairn or heap of stones, was used, but this was only effective in the daytime, so the men had to think of something which would show at night as well. A large, high building was made with a light on the top. In the daytime the building could be seen, and at night, the light would show. As time went on, and more lighthouses were built, it was seen that some difference would need to be made in the lights of different lighthouses. In the daytime it was simple, as the shape of the land and the position of the lighthouse would be enough, but at night, when all was pitch dark, it was different. After many years of experimenting and investigation, the present day lighthouse, which is a wonder in itself, was evolved.

"To start and tell you all about one single lighthouse and all that happens there would take me a long, long time.

"For the present I will just say a few words about the difference between one lighthouse and another. I should tell you that of all the dozens of lighthouses there are on the Australian coast there are not two alike. They may look alike to you, but at night the lights they show are all different from one another. One is arranged so that the prisms, or large pieces of cornered glass, revolve round or turn round—say, three times per minute—another will turn round twice per minute, and another, perhaps only once, and with each turn, the prisms shoot a stream of light across the sea. By counting the number of beams of light per minute the captain of a steamer knows what lighthouse it is.

"Others are what we call occulting lights. That is, they do not revolve but a big shutter worked by very large clockworks drops down over the light and then jumps up again so many times a minute.

"At a place called Point Lonsdale, at the entrance to Port Phillip Bay, at the head of which, of course, stands

Melbourne, many years ago there was a lighthouse built of wood and there was a fixed light in it. By a fixed light, I mean one which neither turned round nor went on or out. You could see it all the time at night. This wooden tower got very old and was unsafe, so it was decided to build a new, big concrete tower, and it was such a beauty, all painted white with the roof or dome quite black. When it was quite ready to light and it was to be the last time the old one was to be lighted, a little boy about four-years-old who lived at the lighthouse was lifted up by his daddy and the little boy lit that old, old light for the last time. For many years that good old light had shown at night and told captains it was at Point Lonsdale, and now it was being lit for the last time.

"Now that little boy is a big man, and it is he who has written this story especially for you. Some lighthouses are built out on little islands in the sea, so that they will show at night and tell captains of big ships not to come too close or they will be shipwrecked. Just near where I said Captain Cook first saw Australia there is an island called Gabo Island, and on it is built the highest light house of any in Australia. It is built of granite, hard brown stone. At a lighthouse like one sees at South Head, Sydney, the men in charge or as they are called—Lightkeepers—can come into Sydney and get food, but at some other places such as Cliffy Island, off the Victorian coast, or at Kent Group in Bass Straits, between Tasmania and Victoria, and at many others, a steamer only calls once every three months with stores, and in some cases as infrequently at six months. For that long time the men and their wives and little boys and girls live away there and never see another soul.

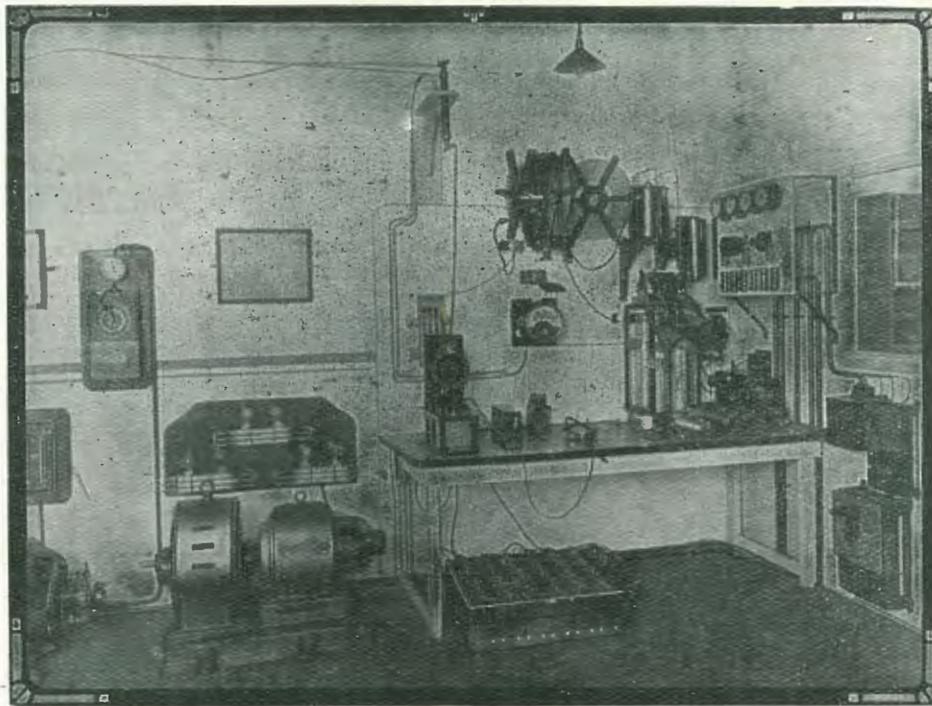
"That is all I can tell you this time, but if you are interested perhaps some other time I will write another little story for your 'Hallo Man' to read you, telling all about what I did when I was a little boy living on a lighthouse right out on the sea."

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Wireless Terms and Definitions

Aerial.—The system of conductors designed to radiate or absorb electromagnetic waves.

Amplifier.—An instrument which modifies the effect of a local source of energy in accordance with the variations of received energy, and in general produces a larger indication than could be had from the incoming energy alone. The triode is the most perfect amplifier of both high and low frequencies.

Atmospherics.—Electromagnetic waves produced by disturbances in the atmosphere or in the earth's surface.

Buzzer.—A make and break producing weak oscillations which are very convenient for testing purposes.

Choke.—A coil with large inductance and small resistance designed to prevent the passage of alternating current, but to permit the passage of continuous current.

Counterpoise.—A system of electrical conductors forming one portion of a radiating oscillator, the other portion of which is the aerial. In land stations, a counterpoise forms a capacity connection to earth.

Coupling.—The connection between two circuits by which energy is transferred from one to the other. The connection may be by magnetic, electro-static or direct coupling, or by any combination of these.

Crystal.—A detector which uses the rectifying properties of the contact between a crystal and a metal surface, or between two crystals.

Detector.—That portion of the receiving apparatus which enables the oscillations to operate an indicator either by controlling a local source of energy or by converting the radio frequency energy into a suitable form.

Direction Finder.—A receiving instrument which, in combination with a special aerial system, enables the direction of the transmitting station to be determined.

Discharger.—The piece of transmitting apparatus across the electrodes of which the spark discharge takes place.

Duplex.—The simultaneous transmission and reception of two messages in opposite directions between two stations.

Earth.—The connection to the earth which in most systems forms the lower extremity of the aerial system.

Electrode.—The end of any metallic conductor in an electric circuit, with the exception of that in a condenser.

Electron.—The natural unit of negative electricity (4.774×10.10 electrostatic units).

Ether.—The medium assumed by the electromagnetic theory in order to explain the translation of energy at finite speed by electromagnetic waves.

Frequency.—A term used in connection with any form of rhythmic motion or rhythmic change, denoting the number of complete movements or changes in a given time—usually a second.

Frequency, Audio.—A frequency corresponding to the normally audible vibrations. These are assumed to lie below 10,000 cycles per second.

Frequency, Radio.—A frequency higher than the normally audible vibrations, that is, higher than 10,000 cycles per second.

Grid.—The controlling electrode of a triode. It is generally in the form of a grid or mesh placed between the cathode and anode.

Heterodyne.—The production of beats by reaction between locally generated oscillations and the received oscillations.

Heterodyne, Self.—A receiver in which a triode acts simultaneously as a detector and as a generator of beat-producing oscillations.

Inductance.—The opposition of a circuit (due to the magnetic field linked therewith) to any variation of the current flowing therein.

Leak, Grid.—A high resistance connected across a condenser in series with the grid to limit the potential obtained.

Microphone.—An instrument for magnifying sounds consisting of a resistance, usually in the form of an electrical contact, which resistance varies greatly with very small movements, such as are produced by sound waves acting on a diaphragm.

Plate.—The anode of a thermionic tube.

Radiogram.—A telegram sent by wireless.

Radiotelephone.—An apparatus for the transmission of speech by wireless.

Reactance.—A function of the resistance inductance, capacity, and impressed frequency of a circuit. Also the American equivalent of "choke."

Rectifier.—An apparatus for converting alternating into continuous current, or into pulses of unidirectional current.

Resistance.—That property of a conductor which transforms electrical energy into heat.

Resonance.—The condition of being in tune.

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

Spark.—An electrical discharge across a gap.

Transformer.—An apparatus for transferring energy from one circuit to another by magnetic induction. It may or may not alter the potential.

Undamped.—Having zero decrement.

Valve, Electronic.—A vacuum tube with incandescent filament and auxiliary electrodes, which may function as an amplifier, detector or generator of electrical oscillations.

Volt.—The unit of electro-motive force or potential.

Voltmeter.—An instrument for measuring the voltage across an electric circuit. Voltmeters are usually connected in shunt across the circuit, and are wound to a very high resistance.

Watt.—The unit of electric power, and equals one volt multiplied by one ampere. 756 watts equal one horse power and one thousand watts equal one kilowatt hour.

Wave Length.—Twice the distance (taken in the line of propagation) between two successive points of zero disturbance, or the distance between two consecutive maxima of the same sign. The wave length is numerically equal to the velocity of the waves divided by the frequency. In radio work short wave lengths are used for short-distance, low-power work, while for long-distance, high-power work long wave lengths are used, although there is no relation between wave length and transmitting range.

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AUGUST.

MR E. I. HYDE signed off s.s. *Milluna* at Sydney, 7th.

Mr. P. B. Holdsworth signed off s.s. *Jervis Bay* as 3rd operator at Sydney, 2nd.

Mr. R. W. S. Bailey signed on s.s. *Jervis Bay* at Sydney, 2nd.

Mr. E. J. Gough signed on s.s. *Tahiti* as 3rd operator at Wellington, 5th.

Mr. F. Marsden signed off s.s. *Kaipoi* at Auckland, 1st, and signed off s.s. *Tahiti* at Wellington, 5th.

Mr. F. T. Neal signed on s.s. *Iron Chief* at Newcastle, 11th.

Mr. R. C. Christie relieved Mr. H. F. Tye on s.s. *Tahiti* as 2nd operator at Sydney, 11th.

Messrs. H. F. Tye and M. L. Myers signed on s.s. *Arafura* as 2nd and 3rd operators respectively at Sydney, 12th.

Mr. K. W. Downey relieved Mr. B. A. Taylor on s.s. *Fordsdale* at Sydney, 12th.

Mr. C. Laurie relieved Mr. O. A. Sutherland on s.s. *Korimoko* at Auckland, 6th.

Mr. C. F. G. Taylor rejoined s.s. *Ngaio* at Wellington, 6th.

Mr. W. C. Brown relieved Mr. G. M. Power on s.s. *Kaituna* at Wellington, 12th.

Mr. S. Haworth signed off s.s. *Hexham* at Newcastle, 9th.

Mr. A. B. Sharland signed off s.s. *Boorara* as senior operator at Sydney, 12th.

Mr. R. L. Beatty signed off s.s. *Iron Monarch* at Newcastle, 14th, and relieved Mr. E. I. Hyde on s.s. *Milluna* at Sydney, 16th.

Messrs. A. B. Sharland and E. E. Windsor signed on s.s. *Boorara* as senior and 3rd operators respectively at Sydney, 19th.

Mr. F. M. Basden signed off s.s. *Yankavilla* at Sydney, 19th.

Mr. A. H. Jeremy signed off s.s. *Melbourne* at Sydney, 19th.

Mr. J. Montgomerie signed off s.s. *Largs Bay* at Sydney, 18th.

Mr. A. A. Sticpwich signed on s.s. *Largs Bay* as 2nd operator at Sydney, 20th.

Mr. S. L. Filer signed off s.s. *Baldina* at Newcastle, 19th.

Mr. M. L. Tongs signed on s.s. *Boorara* as 3rd operator at Sydney, 20th.

Messrs. E. W. Windsor and L. M. Tongs signed off s.s. *Boorara* as 3rd operators at Melbourne, 8th.

Mr. A. S. Smith signed off s.s. *Dimboola* at Melbourne, 11th.

Mr. J. W. Fairley signed off s.s. *Koolonga* at Melbourne, 13th, and signed on s.s. *Ellaroo* at Melbourne, same date.

Mr. J. H. Carty signed off s.s. *Ellaroo* at Melbourne, 13th.

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97-99 Clarence Street, SYDNEY.



S. L. (Horsham). Q.: Is it necessary to insulate aerial mast made of steel tubing or guys staying the mast?

A.: You need not insulate the mast or guys for reception

work.

Q.: Can you give me the formula of the enamel with which some aerial wires are coated; does this have any effect on reception?

A.: Bare wire should be used for aerial and earth. The use of enamel covered is only warranted for shipboard work to reduce corrosion due to gases from the ship's funnels.

F. E. (Warrnambool). Q.: Are Farmer's transmitting on 5 K.W.? If so, how long has full power been used?

A.: Yes. Since April.

Q.: What coils are necessary for wave-lengths 150-300 metres for aerial anode of H.F. amplifier and reaction aerial condenser, .0005 anode condenser .0003?

A.: Aerial 20 turn Honeycomb coil, anode and reaction, 25 turns.

Q.: When will Melbourne's big station be commencing? What power will they be using? What coils will be necessary for receiving this station with above set?

A.: The opening date of the Melbourne station is indefinite. The power will be the same as 2FC, i.e., 5 K.W. You will need a 200 turn aerial coil with 250 in secondary or anode, and 100 turns for reaction. Please note all queries must be signed by your full name. These are answered under initials, or *nom-de-plume*, if desired. —Ed.

E. J. B. (Summer Hill). Q.: Is aerial 30ft. high and 120 ft. long efficient for a crystal set?

A.: Yes.

Q.: What gauge wire is best for aerial?

A.: 3/20 or 1/16 copper.

Q.: Would using more than one insulator at each end be more efficient?

A.: No, except for transmission.

Q.: Do leads have to be insulated?

A.: Only at point of entry to building or where liable to touch earthed objects.

Q.: What size honeycomb coil would be best to receive local stations?

A.: For 2FC use 150 turn honeycomb, and 50 turn for 2BL.

Q.: After tuning in a certain station is it necessary to re-tune to get the same station next day, if the set is not disturbed?

A.: No.

Q.: Is there any way of amplifying speech or music received on a crystal set, without using a valve?

A.: No.

Q.: Can two or more pairs of 'phones be used with a crystal set?

A.: Yes. But signals are thereby weakened.

Q.: Would a pair of 'phones 2,000 ohms give as good audition as 4,000 or 8,000 ohms?



A.: The sensitivity of a pair of 'phones depends on the ampere turns of wire on the magnets. Resistance is no guide when comparing different brands of receivers.

Q.: How is one to identify the station he is receiving?

A.: Each station sends an identifying call either by voice or Mors code. Complete lists of both amateur and commercial call signs have been published in previous issues of *Radio*.

2 B. N. (Ballina, N.S.W.). Q.: What is the best all-round two-valve receiver to construct?

A.: The most satisfactory receiver employing two valves is one with a detector and one valve audio-amplification.

Q.: Would a two-coil, single-valve receiver give better results than a three-coil circuit?

A.: Three coil receivers give greater freedom from interference than two coil

In order to avoid unnecessary delay all letters containing questions to be answered in this section must, in future, be endorsed "Queries Answered" on the top left corner of the envelope. Readers, when writing, are requested to number their questions, phrase them as briefly as possible, and write only on one side of the paper. It should be remembered that it is impossible for us troling conditions vary so considerably to estimate the ranges of reception of experimenters' sets, as the conveniently.

outfits, and are thereby better suited for DX work.

T. M. J. (Barcardine). Q.: What number of turns would a variometer require to receive wave-lengths of 100 to 500 metres?

A.: It would be impossible to build a variometer with so great a range. The ratio is usually 2: 1, that is, from 250 to 500 metres. Advise us where you intend using your variometer, as the wave range depends upon the capacity of the circuit in which it is used.

Q.: What is meant by "Stand by" and "Tune"?

A.: "Stand by" means a connection which gives broad tuning. "Tune" indicates more selective tuning, whereby interference is reduced.

Q.: What is the power of 2BL and VIS?

A. 500 watts and 2K.W. respectively.

Q.: What is the distance record for one valve on telephony?

A.: KGO.

T. F. (Warracknabeal). Q.: What size Spiderweb coils would be required to tune to the Braybook station in 1720 metres?

A.: You will find it very difficult to wind these coils with sufficient wire to tune 1720 metres. Use preferably honeycomb coils of 150 turns primary, 250 turns secondary and 150 turns reaction, with tuning condensers of 0.001 m.f.

Q.: Would a 60-volt H.T. battery work two "Phillips" valves, one H.F. and one detector?

A.: Yes.

Q. What should filament resistances be?

A.: Ten ohms.

Q.: Which coils work the best, basket or spiderweb?

A.: Basket for short waves, and honeycomb for long waves.

Q.: Would the above set operate two or three pair of 'phones?

A.: Yes.

Q.: Is aerial 50 ft. high coming down to 35 ft. two wires 3/20 gauge, 75 ft long with eight insulators on each end O.K.?

A.: Yes.

I. G. (Uralla). The circuit you request is an impracticable one, as no crystal detector could stand up to five stages of preliminary radio amplification, if each was working to any degree of efficiency. The circuit you submit is already regenerative due to the coupling between the coils in the plate and grid circuits of the first valve.

G. H. V. (Leichhardt), referring to article on "Efficient Crystal Receiving Sets" published in *Radio* No. 34. Q.: Number turns and gauge of wire required on vario-coupler for 200 to 1,500 metre wave-lengths.

A.: The receiver described is only suitable for short wave reception. To put sufficient wire on the rotor to tune to 1500 metres would require so fine a conductor as to seriously reduce signal strength. We would suggest you use honeycomb coils or one of the other forms of couplers described in previous issues of *Radio*.

Q.: Does the rotor being placed in centre make any difference to being placed at top of Stator?

A.: Yes. The coupling is tighter.

Q.: Is there any difference in the tuning between a 17-plate and a 23-plate .0005 condenser?

A.: The smaller condenser gives finer tuning due to its more gradual capacity change.

J. M. M. (Lake Boga, Vic.). Q.: Could two stages of R.F. amplification be coupled to a crystal set?

A.: Yes, for weak signals.

Q.: Which crystal would be most suitable for the above?

A.: "Q.S.A." or "A.W.A." Galena.



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