ISSUED EVERY — — SECOND WEDNESDAY

SIXPENCE

RADIO

IN AUSTRALIA & NEW ZEALAND

Registered at G.P.O., Sydney, for transmission by post as a newspaper.

VOL. II | SEPTEMBER 17, 1924 | No. 39

"GOING ASTRAY" VIA RADIO

RADIO

IN AUSTRALIA & NEW ZEALAND

Incorporating "Sea, Land and Air"

Managing Editor: S. E. TATHAM.

Associate Editor: N. H. THOMPSON.

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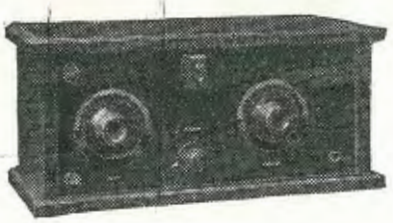
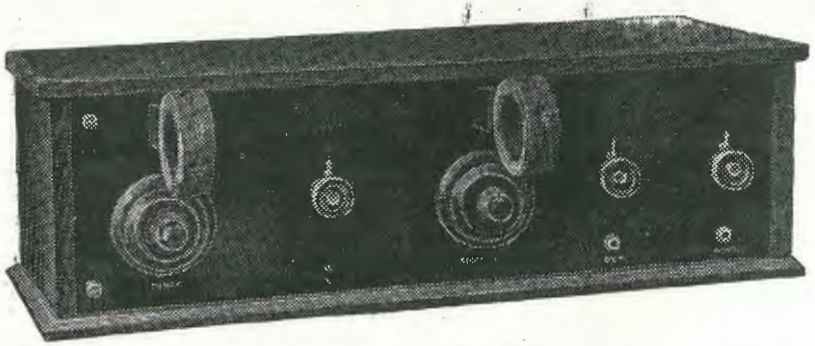
SIGNAL Home Assembly Sets



Model Phone Valve, £5/10/-.

Model Q 2 Valves, £9/9/-.
Model R. Three Valves (Audio Freq.), £11/11/-.



Model S Three Valves (Radio Freq.), £11/11/-.

Model T. Four Valves (Radio Freq.), £13/13/-.

Make It Yourself.

THE SIGNAL HOME ASSEMBLY SETS are designed to meet all demands for complete sets (less Batteries, Valves, Headphones and Aerials) ready to be assembled. Simply constructed, and yet efficient. Each set contains all the parts necessary to construct the set proper. All contained in an attractive oak cabinet, mission finish, with engraved Bakelite panel all bored ready for mounting the parts.

INSTRUCTIONS and a clear diagram make it very easy to assemble these sets.

BOYS, YOUNG and OLD, here you can get all the thrill and satisfaction of MAKING YOUR OWN, and SAVE HALF THE COST

ASK YOUR DEALER FOR "SIGNAL."
and if he has not yet stocked it write us.
DEALERS—WRITE FOR DISCOUNT.

United Distributors Limited

(WHOLESALE)

28 Clarence Street, SYDNEY. 592 Bourke Street, MELBOURNE.

To the Wireless Neophyte

QUITE logically, we are going to presume in this issue's Radiotorial that you have at last become interested in Radio and that you have really reached the state of mind when you calm your inward yearnings by whispering to yourself: "Now, I must get that set next Friday —a cheap one, of course, but I must get it."

AGAIN, quite logically, we are going to presume that this is the first time that you have come across our magazine—although that does not at all necessarily follow that it will be the last—quite to the contrary, in fact! Very well, then, you are a beginner in Wireless filled with vague un-rest but confident that the only way in which you may regain your peace of mind will be by means of ether-wafted words and song. You have read this number of *Radio* and have come out of the somewhat gruelling bout with your mind in a mild haze, but with the Great Question firmly fixed in your brain: "How do I begin?"

THIS is where we will endeavour to help you, but, first of all, we must decide what sort of a Neophyte you are. Do you want to buy your set complete, or do you want to buy the parts and put it together yourself?

IF your wallet is not exactly bursting at the seams with Commonwealth bank notes start with a Crystal Radio Receiving Set. So that there may be no mistake, we will remark it again: *Start with a Crystal Radio Receiving Set,* and for the benefit of those who may not have heard us on the two previous occasions we will take this further opportunity of repeating ourselves once more: START WITH A CRYSTAL RADIO RECEIVING SET! The reasons are, in a nut-shell, that it is easy to make, easy to operate, easy to buy and easy to keep up—the latter cost after construction amounting to exactly nothing, for long before it has worn out you will be well on the way to putting the final touches to your Super-heterodyne—but that is another story.

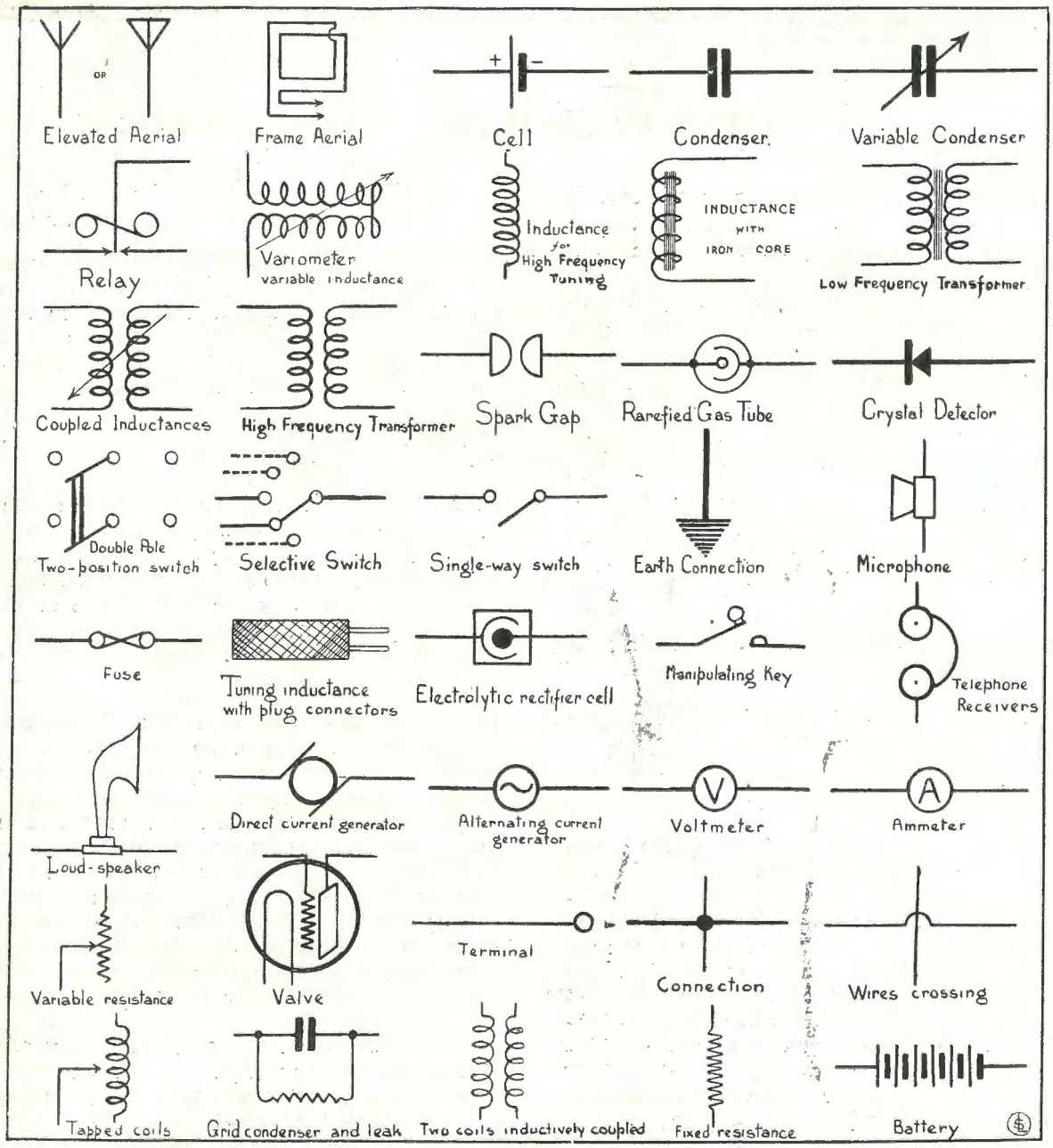
THE crystal set requires no batteries and will not operate a loud-speaker (a horn after the style of that employed in the gramophone). To listen with it, ear-'phones of a particular pattern are used; it is not advisable to try those attached to your ordinary house telephone! For purity of sound, that is, realism of the words and music received, the crystal set has never been surpassed. No, not even by the six and seven valve set.

VERY well, then. Buy or build your crystal set and let it teach you things—you will be surprised how quickly it will!—learn all you can from it, so that when you eventually come to the time when you sigh for somewhat better things in the way of one or more valve sets, you will not face it with a total lack of knowledge of the laws and practices of Wireless—you will know something about it.

IF you are wise, your next step will be to procure a one-valve set. Again, do not expect it to work a loud-speaker. As a rule, a set with less than three valves does not successfully operate one of these, although, in exceptional cases, as was reported in a recent issue of *Radio,* an ordinary crystal set of the type known as a Loose Coupler worked one, but that, of course, is almost unheard-of. To get long distance stations, you will need a set of five valves and all thes things cost money, while other essentials will be batteries. On the other hand, if you can afford it, buy or make the best you can. You will never regret it.

AND one last word. Never forget that wireless is like a great many other things. To walk one has first to be able to crawl—first crawl well and later you will be able to walk all the better!

Graphical Symbols as Used in Wireless Diagrams



CUT THIS OUT AND KEEP IT FOR REFERENCE PURPOSES

Sydney Church Service

Heard at Goulburn

QUITE a number of radio enthusiasts in Goulburn (N.S.W.) sat by their sets for several hours the other evening upon the occasion of the broadcasting of a church service from St. Mark's, Darling Point, Sydney, by 2FC, states the Goulburn *Evening Post*. Amongst them was Mr. E. Gould, who had a large gathering of friends at his home in Bradley Street for the occasion. Mr. Gould's set is a four-valve one, operating an Amplion loud-speaker, and from the moment the first announcement was made at 7.30 p.m. until the close of the service the listeners were able to follow every portion of it. The chiming of the church bells first gave a religious atmosphere to the proceedings, and was followed by the choir rendering the hymn, "All People That On Earth Do Dwell." The rector, Rev. E. Howard Lea, then read the State Governor, Sir Dudley de Chair's, message, which was followed by "God Save the King." The reception of this item was particularly good, as was also another hymn, which was sung immediately afterwards. The rector's sermon was followed with interest, the volume being sufficient to make it audible throughout a large hall. Apart from the novelty of "attending" a church service held simultaneously over 100 miles away, the demonstration proved the boundless possibilities of the radiophone as a home educator and entertainer to those who are far removed from the big centres of population. There is little doubt, the writer concludes, that the radio boom which swept over America a few years back will soon grip Australia. Demonstrations such as that given on Sunday night will pave the way.

The Broadcasting of the Operas

ON the evenings of September 3 and 4 and the matinee of September 5, Grand Opera was broadcast from Her Majesty's Theatre, Sydney, by Messrs. Farmer and Company's broadcasting service at 2FC. It is hardly necessary to add that this innovation proved to be a stupendous success, and if there are to be any lingering regrets about it, it is the fact that it was not done before.

On the first night "Il Barbiere" was cast into the ether in its entirety, while on the subsequent evening and matinee listeners-in in some of the farthermost parts of the Commonwealth heard every note of "The Tales of Hoffman" and also the various portions of "I Pagliacci," "Aida," "Rigolletto" and "Lucia di Lammermoor."

Farmer and Company made elaborate arrangements for the carrying out of the broadcasting and a small microphone was fitted to the front of the stage inside the footlights. This was connected to a special collecting panel installed in the basement. From here the music and voices were amplified and transmitted to the studio. There again, it was "stepped-up" and sent to the Willoughby station, where it was disseminated. With the aid of a listening-in set at 2FC this transmission was carefully checked, although this was hardly necessary, as every word of the songs was clearly audible, as well as the applause and the cheers of the audience.

Of the many listeners who invited numbers of friends to their houses to hear the operas broadcast was Mr. E. T. Fisk, of Vaucluse, who related how on one occasion Miss Gladys Moncrieff, who was singing at the time at the same theatre, was heard by a man on a ship situated just off Honolulu, while similar reports of satisfactory reception were received from as far away as Kansas City, U.S.A.

It will be interesting to learn how far were heard on this last occasion the voices of the greatest opera company that has ever visited these shores.

Avoidance of Panel Surface Leakage

By BRAINARD FOOTE (Radio Engineer).

WHETHER or not a radio panel should have a highly polished surface or be given a dull finish has in the past been more or less a matter of taste. Some experimenters didn't care for a lustrous, satin-like surface, and, accordingly, roughened it with fine sandpaper or pumice-stone, and rubbed a little oil in when the roughening process was completed.

Is this good practice? No, far from it! The manufacturers of Radion, for instance, have taken particular pains to provide a surface of mirror-like smoothness for their panels, and to finish both sides of a panel in the same manner. While it is true that Radion's surface is handsome, the high polish is intended to insure a permanently high surface resistance.

When the builder of a set dulls the panel's finish, he very greatly increases the surface area and provides many tiny cavities for the lodgment of dirt and grime. And when he finishes the dulling process with an oil rub-down, he is in reality doing his best to assist dust particles floating in the air to settle on the panel and fill the small pockets he has already placed there. Moisture also can collect in the pores of a roughened surface and dust may dissolve in it, forming an attractive path from one binding post to another for radio frequency current to follow.

Hence BOTH front and rear surfaces of one's panel should have a high polish which never requires oil for "beauty" purposes. Sub-panels, as well, should have flawless surfaces, as well as any other material upon which sockets or tuning instruments are to be mounted, if one is going to be consistent and apply the principle of "A chain is no stronger than its weakest link."

Sacrystal

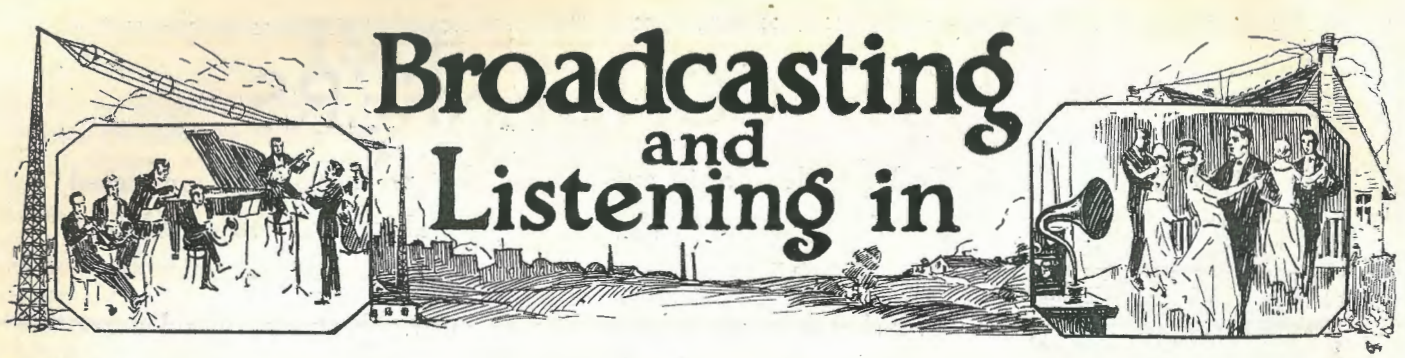
AN advertising announcement which should prove of particular interest to all Wireless experimenters and listeners-in who use crystal detectors in their sets appears on page 325 of this issue of *Radio*.

It concerns a Molybdenite crystal called Sacrystal, which is taken from the New South Wales mines of Miss P. Sachs, of Randwick, Sydney. Thus, it is a local product, and for no other reason than that should be supported but it has far more claims to serious consideration as a first-class mineral detector.

Miss Sachs has in her possession a large number of letters from competent Australian and foreign authorities who tested Sacrystal, and all of them refer to it in the most enthusiastic terms.

In aspect it is entirely distinctive having the appearance of, for all the world, as though it were flakes of lead foil, while permanent sensitivity is claimed for it and there are no "dead" spots. It is interesting to relate that had it not been for Mr. H. Payne, of *The Australasian Wireless Review*, it is likely that Miss Sachs would never have known that this mineral would form such a splendid detector for wireless apparatus. He it was who first investigated its possibilities, and to him is due in no little measure the popularity and reputation it enjoys to-day.

Sacrystal is obtainable at all the leading wireless supplies stores, and is sold at the small price of 1/6 a box.



MERITS of portable receivers have long been recognized, but a serious disadvantage was demonstrated at the Radio Section of the recent Paris Fair, relates the *Wireless World*. Dr. Titus Konteshweller, who had been advertising his portable set at the Fair, happened to leave his stand for a few moments, and on his return discovered that the extreme portability of the set had been taken advantage of. The thief has not yet been discovered.

1YA has recently been carrying out tests in connection with broadcasting the orchestra from the Lyric Picture Theatre, which is situated a short distance away. A microphone is placed 45 ft. away from the orchestra and the music is then stepped up through a six-stage amplifier. Very good results have been obtained so far, and it only needs a little more adjustment to make the transmission perfect.

THE prize radio drama, "A Million Casks of Pronto," recently produced by WGY, the Schenectady station of the General Electric Company, will soon be given by the KGO Players, under the direction of Wilda Wilson Church. This play, in a prologue and two acts, was written by Miss Agnes Miller, of New York, and was adjudged the best of three hundred manuscripts submitted to WGY in a play competition. Miss Miller received a prize of £100. Elaborate arrangements are being made in the KGO studios to give the play a creditable production. The cast has been carefully selected and special sound devices are being developed to convey atmosphere for the performance. Miss Miller is a graduate of Barnard College, New York City, and served for eighteen months during the war in the United States Naval Reserve. She was employed in the foreign language censorship department, and her experience in handling of code messages in many different languages gave her the ground work for the story, "A Million Casks of Pronto."

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 to 10.0 — Entertainment. 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.

WHETHER radio waves could even carry the atmosphere of the play has long been doubted by the sceptical. But, according to Howard I. Milholland, studio manager of KGO, the General Electric Station, their mail indicates that both kinds of atmosphere may be delivered by radio. "I want to tell you," writes Emma F. Rucker, of Piedmond, California, "that I listened in to your play, 'Seven Keys to Baldpate,' and found myself shivering, so realistic was the wind whistling around the old Inn out on the mountain side. And before I thought, I requested the maid to bring me a shawl, much to the amusement of the family." And here's the admission that the atmosphere of the play "got over" also. "I suppose that in radio drama the quality of the voice is a very important factor," continues Miss Rucker. "Mary's voice sounded particularly right for the character. I found that I was able to picture her quite readily, and when she was talking I found myself getting the atmosphere of the play."

AN interesting log is that belonging to Mr. J. Worthington, of Byron Avenue, Takapuna, Auckland. This experimenter has been successful in picking up over 300 American amateurs and also several of the most prominent broadcasting stations there. The amateurs received are scattered all over U.S.A. and are most prominent in Nos. 2, 5, 6, 7, 8, and 9 Districts and cover all sizes of transmitters from 5 to 20 watts. All the above work is done on a three coil circuit using Detector only, and when two stages of audio are added, the majority of the signals can be heard 100 yards from the loud-speaker. As soon as the power is available in Takapuna, Mr. Worthington will install a transmitter.

MR. RUSSELL WHITE, of 1AO, reports that the signals from his amateur Transmitting station have been heard as far away as America, a letter to that effect having been received from an American amateur. 9FFU.

Crystal Valve Receivers

Various Combinations

How to Make and Use Them

MANY experimenters and listeners having started off with a crystal receiver are now anxious to add to it and increase the strength of signals. Splendid results are being obtained with crystal receivers, in many cases they are working three and four sets of 'phones. As a result it is sometimes thought that by purchasing a loud-speaker that the crystal receiver will work it, but such is not the case. There is only one method of working a loud-speaker off a receiver employing a crystal detector and that is to use an amplifying valve in conjunction with it.

The valve may be used as either a radio frequency or an audio frequency amplifier. In the former case it will amplify the incoming signals before rectification by the crystal and in the latter case the rectified signals will be amplified.

Figure 1 shows a Crystal-Valve circuit employing the valve as a radio frequency amplifier and the Crystal as detector.

Figure 2 shows another Crystal-Valve circuit with the Crystal as detector and the valve as an audio frequency amplifier.

Both the above diagrams show, for the sake of simplicity, single circuit receivers using honeycomb coils and variable condensers for tuning. It should be understood, however, that anyone using a single slide tuning coil or a loose coupler can add a valve as amplifier to their crystal receiver.

To assemble a set similar to that shown in Figure 1, it will first of all be necessary to have the following material:—

3 Honeycomb coils (the number of turns depending on the stations it is desired to receive).
3 Variable Condensers .0005 mfd. capacity.
1 Valve Holder.
1 Valve.
1 Filament Rheostat.
1 "A" Battery.
1 "B" Battery.
1 Crystal Detector.
1 .001 mfd Fixed Condenser.

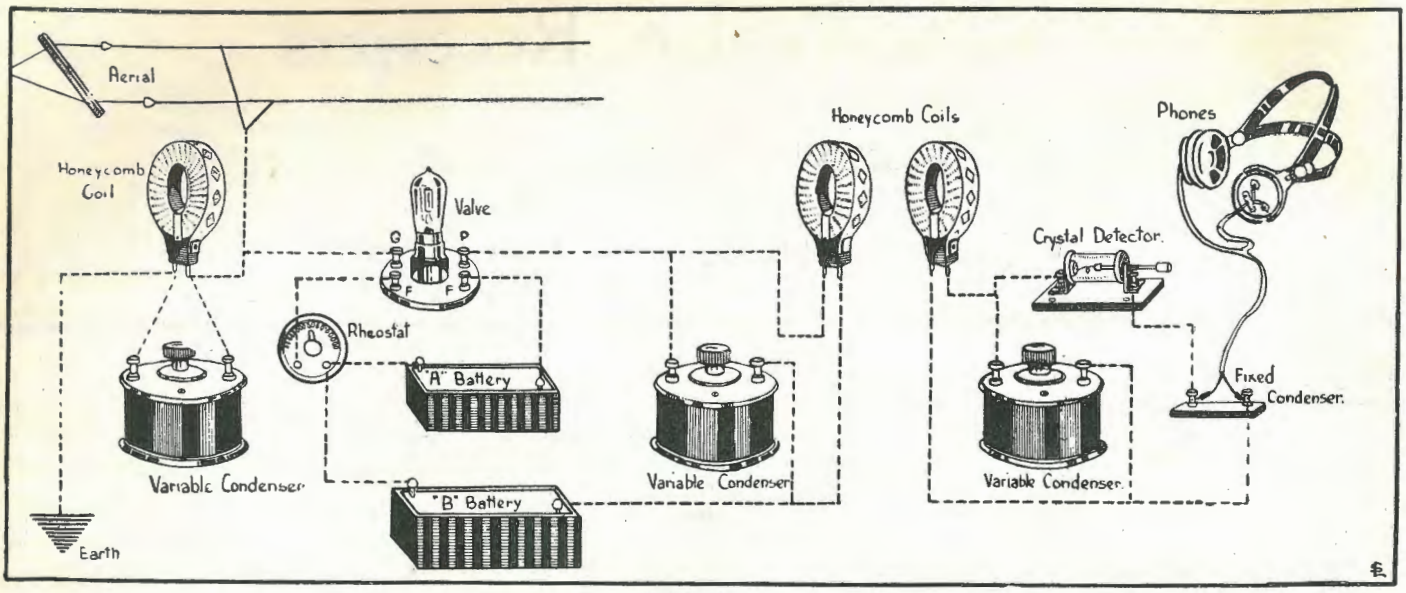


FIGURE 1.
Showing a Crystal-Valve Receiver, using the Valve as a Radio Frequency Amplifier and the Crystal as a Detector. The dotted lines indicate the wiring connections.

1 Pair Telephone Receivers, or a loud-speaker.

The above apparatus should be connected up as shown in diagram. The gear can be mounted on either a base or panel and it will present quite a good appearance.

This receiver, one stage of radio frequency amplification and Crystal Detector, will give quite good results, and within twenty miles of a broadcasting station should work a loud-speaker. It should be understood that over 'onger distances it will work well but do not expect loud-speaker results. Quite good results will be obtained on headphones.

To assemble the crystal-valve receiver shown in Figure 2, which depicts a crystal as detector and a valve as an audio frequency amplifier, secure the component parts listed hereunder:—

1 Honeycomb Coil (number of turns depending on the stations it is desired to receive).
1 Variable Condenser .0005 mfd. capacity.
1 Crystal Detector.
1 Audio Frequency Transformer.
1 Valve Holder.
1 Valve.
1 Filament Rheostat.
1 "A" Battery.
1 "B" Battery.
1 Pair of Headphones or a Loud-speaker.

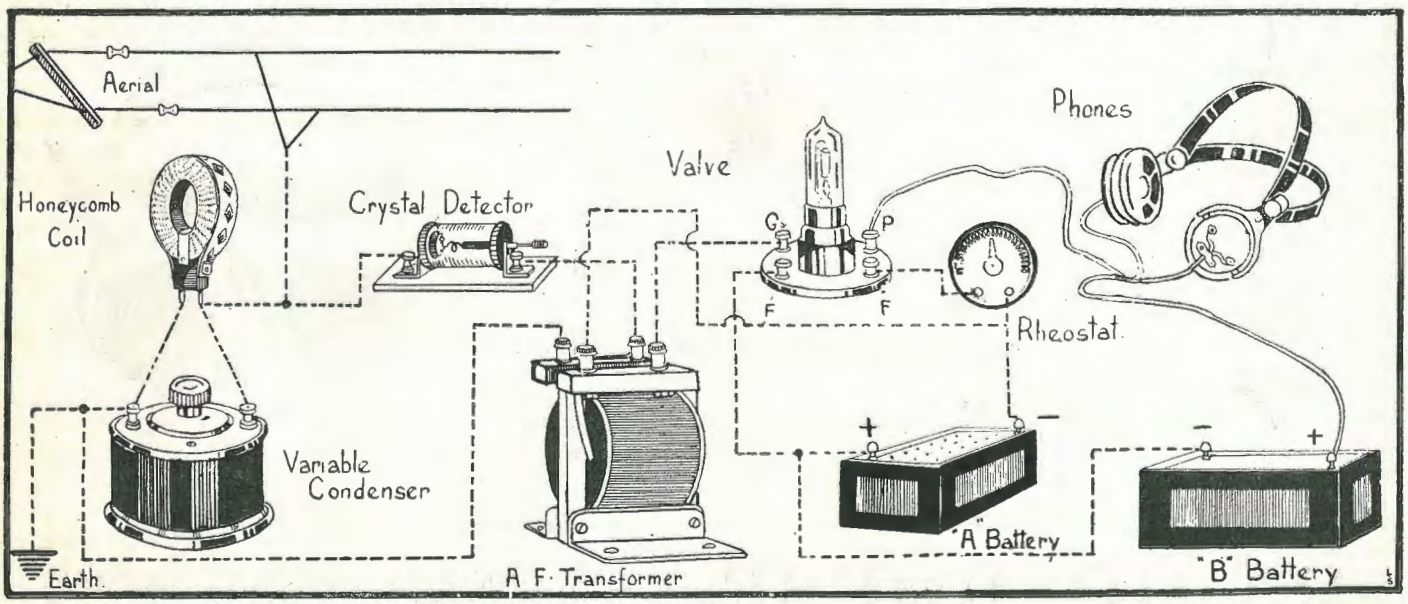


FIGURE 2.
Another Crystal-Valve Receiver. In this case the Crystal is used as Detector and the Valve as an Audio Frequency Amplifier. Wiring connections are also indicated by dotted lines. If it is desired to use a Loud-speaker, same should be connected where headphones are shown in both this and Figure 1.

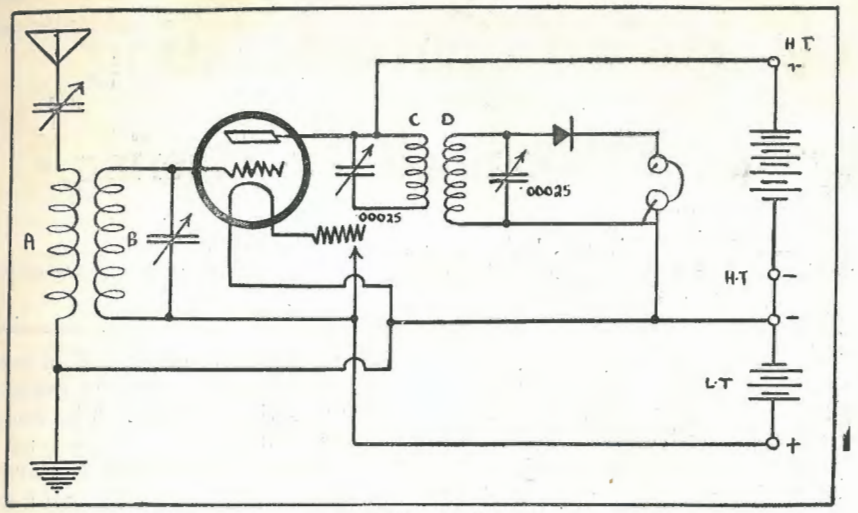


FIGURE 3.

One Stage of Radio Frequency Amplification with Crystal Detector. The coils B, C, and D may be all the one value dependent on the wave-length it is desired to receive. Coil A will vary according to the size of aerial used.

The necessary parts can be obtained at almost any radio shop and we specially recommend readers to peruse the advertisements appearing in this paper for information about prices, etc. When communicating with advertisers you are asked to mention the fact that you saw their announcement in *Radio*.

Figures 3 and 4 show two other methods of using crystal and valve in one receiver. The captions under the diagrams are self explanatory.

Readers requiring any further data or information about any of the receivers referred to in this article should write to the Editor of *Radio*, Box 2516, G.P.O., Sydney, and all information will be mailed free of charge.

The above material should be mounted on either a base or a panel and connected up as shown in diagram Figure 2.

This receiver known as a crystal detector and a one stage audio frequency amplifier will give similar results to the one previously described.

No doubt the circuit shown in Figure 2 will be the most popular because it will fit in with crystal receiving sets now in use.

The audio frequency amplifier can be added to any crystal receiving set whether the tuning element be a single or double slide tuning coil or a loose coupler. All that is necessary is to connect the primary side of the audio frequency transformer to the 'phone terminals of your present receiver and the rest of the connections as shown from the transformer on in Figure 2.

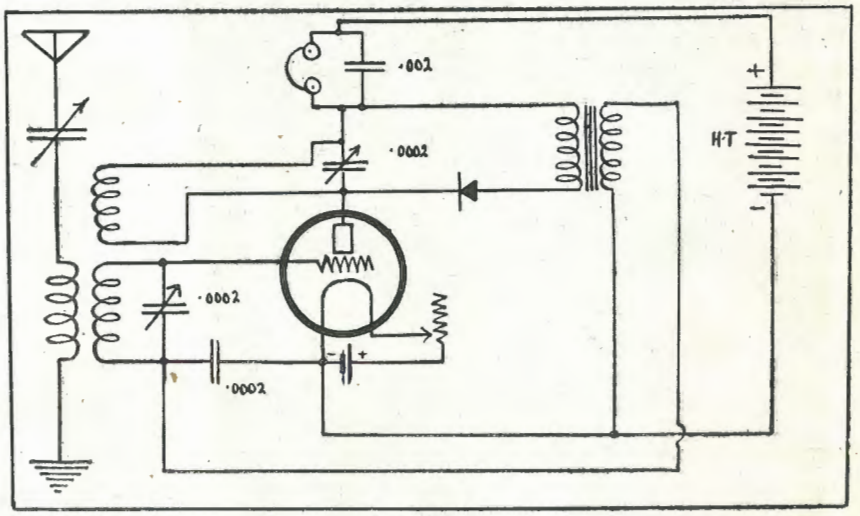


FIGURE 4.

A Valve and Crystal combination making use of regeneration. This is a three coil circuit on the reflex principle, the valve acting as both a radio and audio frequency amplifier. The high frequency oscillations in the tuned anode are rectified by the crystal and the low frequency component passes through the primary of the Low Frequency Transformer. Both Radio and Audio frequency regeneration is availed of.

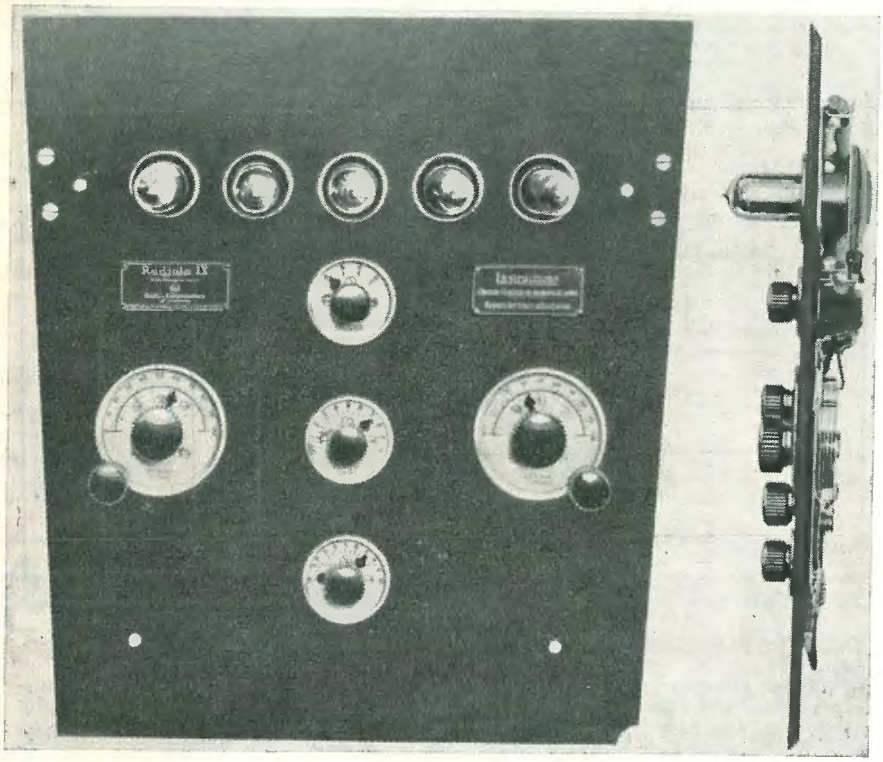
Highlights of Radio Broadcasting

Radio Engineering and Phonograph Engineering

By Dr. ALFRED N. GOLDSMITH, B.S., Phd., Fellow I.R.E.,
Chief Broadcast Engineer, Radio Corporation of America
(Special to "Radio.")

ENGINEERING forever widens its scope, and new fields which are at first developed by a hit-or-miss method gradually become the subject of orderly and rapid development by skilled engineers. No devices more fully illustrate this evolution from chance trials to systematic technical improvement than those two related instruments: the radio receiver and the phonograph. The nature of the music originally put out by phonographs, and later by the first radio loud-speakers, "designed" by a wild guess, is too notorious to require comment. When it is contrasted with the superb effects which can be obtained to-day under suitable conditions, the debt owed to engineering becomes evident and the possibilities of the future are seen to be even more attractive.

Up to the present the acoustic problems in the production of desired sounds have been very similar for the radio receiver and the phonograph. Each uses a small vibrating sheet or diaphragm to produce the sounds. In the case of the phonograph, the diaphragm is generally a circular piece of mica mounted in the reproducing head of the phonograph and vibrated by mechanical connection to the needle resting on the record. In the case of the radio loud-speaker, an iron diaphragm (or one of other suitable material) is vibrated electro-magnetically through the agency of currents which are produced by the radio receiver and its amplifier. The defects of such diaphragm systems may be very serious unless every feature of the dimensions, mounting, and control of the diaphragm is thoroughly understood and accurately worked out. The sound produced by the diaphragm in each case passes through and is modified by a horn, and here again is ample opportunity for bad or good design and objectionable or good results. The material of the horn, its size, shape, and mode of attachment are all of importance, and require careful study and experimentation to get the best results. The radio receiver has the best of the problem, in one way, because one can, after all, increase the amount of available power for vibrating the diaphragm as much as may be desired by radiotron amplifiers, whereas the power obtainable from a needle riding in the groove of the phonograph record is strictly limited. Each field has found its own acceptable solutions, and satisfactory results are now being obtained.



Radiola IX. for phonographs—front and side views, showing extreme thinness.

The output of a phonograph and that of a radio receiver are not so much alike, nor so competitive, as is sometimes believed to be the case. A phonograph record is, of course, a reasonably permanent article. Even if the record is worn out, it can be replaced by the purchase of a duplicate. It represents the result of a considerable number of rehearsals of the artist, and may fairly be assumed to be the best recording possible of the particular selection. The broadcast performance is, generally speaking, final—that is, if it is not quite what the broadcaster desired, it can nevertheless not be recalled or modified. And, as a general rule, it is heard once, and is not available for indefinite repetition. A phonograph

(*Continued on page* 318.)

(*Continued from page* 316.)

record can also give the auditor music or speech from persons who are unavailable at the time, either through absence or death. The broadcaster must confine himself to personalities and performances of the present unless he, too, uses records for his "raw material" for broadcasting. Unless one has a great number of broadcasting station programmes at his choice, the phonograph will be more likely to furnish just the type of music which is wanted at the very moment it is desired, always assuming that the user is financially very solvent and willing to purchase the assortment of records required for his desired range of entertainment.

A combined Radiola and phonograph.

The capabilities of the radio receiver are unique in a number of respects. An important speech is to be delivered on a given evening. It can reach a million homes by radio, with all the timeliness and personal interest which attaches to it. It can carry to the radio audience the words of the greatest statesmen or leaders in other fields of activity at the instant they are spoken, and with all the delicate individual touches which make such speeches so interesting. This is not possible of achievement in the form of a permanent record, the psychology of the response to the record being quite different from that of the reaction to the actual broadcast speech. Broadcasting can carry the best concert being given in a group of cities within reasonable distance from each other, to all residents of the great area surrounding these cities, and at the very instant that the concert takes place. It can give performances lasting for many hours, where the trouble and expense of gathering approximately the equivalent entertainment in phonograph records would be prohibitive even if, indeed, it were not frequently impossible to assemble the desired programme in the form of records. The continuity of the performance of a play or opera is not disturbed in radio broadcasting, and it is an admirable means of bringing the most recent artists before the entire public and probably before their efforts have been in part stabilized in record form. The recent rapid development of the radio drama and of political broadcasting indicates other fields which will in all likelihood remain exclusive to radio. The romance of radio is replaceable in no other way. Through the miles of darkness, carried by no visible force, come the concerts and speeches which entertain and instruct the radio listeners. There is and must always be a thrill in the knowledge that an annihilator of space has been placed at the disposal of mankind. Men have always felt the cramping limitation of their own slow capabilities of travel. The task of carrying oneself to a distant city is sufficiently trying to make its elimination by radio a permanent and stable human asset.

It is, therefore, logical to expect that radio and the phonograph will be, to some extent, mutually supplementary. Each will supply its quota of enjoyment in its own way and utilize its own capabilities to the full. The combination of the two fields of endeavour is, in fact, rapidly proceeding in certain technical directions. The first of the accompanying photographs shows a radio receiver capable of inclusion in the lid of certain vertical phonographs, or capable of installation in a suitable part of certain console phonographs. The most noticeable and unusual feature of this receiver is its careful adaptation to phonograph requirements, and in particular its extreme thinness. The space volume of such a receiver is only ten or fifteen per cent. of that of the usual equivalent separate receivers, and every resource in design has been utilised to produce so unusual a result. The average thickness of the receiver is less than one inch. While, possibly, entirely experimental hand-made receivers have been made as thin as this, it must be remembered that the form shown is capable of quantity production in

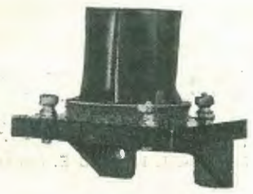
(*Continued on page* 325.)

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/-
410 CRYSTAL TUNING COIL SLIDER (1100 metre range) 27/6
501 RADIO JACK BOX (for 4 plugs) 28/-
611 ADAPTER, for C299 or UV199 .. .. 5/6

F F
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FROST JACKS AND PLUGS.

NICKEL-PLATED, FORMICA INSULATION, NICKELLED SILVER COMPACT SPRINGS, PURE SILVER CONTACT POINTS.

133 OPEN CIRCUIT JACK 4/6
134 CLOSED CIRCUIT 5/-
131 DOUBLE CIRCUIT JACK 5/-
135 FILAMENT SINGLE JACK 6/-
136 FILAMENT DOUBLE JACK 6/6
126 NEUTRODYNE CIRCUIT JACK 6/6
140 PLUG, DOUBLE (2 connections) 5/-
139 PLUG, SINGLE 4/6

FROST MISCELLANEOUS.

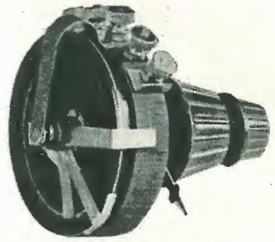
630 RESISTANCE UNIT, 35 ohm (to increase resistance) 3/6
631 INDUCTANCE UNIT (to increase wave length) 5/-
620 POTENTIOMETER SWITCH 5/-
621 PARALLEL SWITCH 5/-
608 PUSH-PULL BATTERY SWITCH 4/-

FROST HEAD FONES

STANDARD THE WORLD OVER.

161 FONES (Aluminium Head Pieces), 2000 ohm 32/6
171 FONES (Aluminium Head Pieces), 3000 ohm 37/6
172 FONES (Maroon Bakelite Head Pieces), 3200 ohm 45/-

THE MAGNETS IN FROST FONES ARE TREATED WITH COPPER TO PREVENT CORROSION BY MOISTURE AND SALT AIR.



FROST RADIO.

FROST COMBINATION POTENTIOMETER-RHEOSTAT.

COMPLETE WITH KNOBS, ALL HAVE KNURLED BINDING POST CONNECTIONS, AND ARE TECHNICALLY PERFECT.

610 TUBE CONTROL UNIT, a combination of a 35 ohm Vernier Rheostat and 400 ohm Potentiometer 17/6

607 TUBE CONTROL UNIT, a combination of a 6 ohm Vernier Rheostat and 200 ohm Potentiometer 17/6

"Applause" Cards Furnished Dealers and Clubs Without Charge.

United Distributors Limited

(WHOLESALE ONLY)

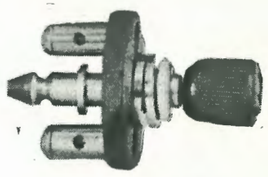
MANUFACTURERS OF RADIOVOX SETS

A FEW TERRITORIES OPEN FOR AGENTS.

MANUFACTURERS OF HOME ASSEMBLY SETS

SEE OTHER LINES, PAGE 306.

28 CLARENCE STREET, SYDNEY. — HOBART — PERTH — BRISBANE — ADELAIDE — 592 Bourke Street, MELBOURNE.



FROST RADIO.

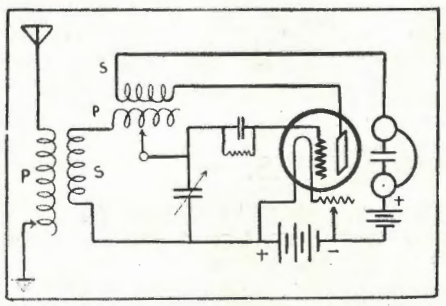
608 PUSH PULL BATTERY SWITCH 4/-

Several Uses for your Vario-Coupler

THE vario-coupler is used more for a single circuit regenerative set than for any other use and most people are inclined to feel that is all it can be used for. There are other uses for it besides acting as primary coil and plate coil. Two couplers may be used in one set and will make up a select as well as sensitive regenerative set. One vario-coupler being used as a loose coupled set and the primary of the second coupler inserted in the grid circuit between the rotor of the first coupler and the grid condenser, while the rotor coil of the second vario-coupler is connected in the plate circuit of the tube to control regeneration. A small variable condenser shunted across the rotor coil of the first coupler and primary coil of the second coupler will facilitate sharp tuning. This arrangement is shown in the drawing.

Where one desires to build a single circuit set and only has a vario-coupler, audion and accessories, it can be done very easily by connecting the stator and rotor coils in series, making a variometer out of it A fixed condenser in series with the aerial, and ground circuit will reduce the wave-length of that circuit. If you haven't an audion detector handy, you can use a crystal detector on local stations and get results.

Quite a number of fans complain about interference and fail to see it



is sometimes caused by having too many turns of wire on the primary winding of the vario-coupler. Where interference cannot be tuned out, it will be found that interference can be considerably reduced if not actually cut out, by simply using fewer turns in the primary coil. The fewer turns used, the sharper will be the tuning of the secondary condenser.

The standard single circuit regenerative set using a vario-coupler and a variable condenser can be very easily made over into a two circuit regenerative set by the addition of a few turns of wire over the primary coil and connecting them in series with the aerial and ground. The variable condenser which was in series with the aerial and primary of the vario-coupler, should now be connected across the primary of the vario-coupler (which, in the reconstructed set, is the secondary coil.) This gives you a set that will tune sharp and you will not be bothered by interference. The number of turns you have in the aerial-ground circuit will control the selectivity of the set. The fewer the turns, the less interference you will encounter. About six will do for the average aerial.

When using a vario-coupler as a single circuit regenerative set, every time the rotor is moved it will affect the primary circuit and the variable condenser should be re-adjusted, even though it be slight, for best results. When used as a loose-coupled circuit, every change in the position of the rotor will affect the setting of the variable condenser a great deal.

Some Hints that May Help

WHEN buying variable condensers be sure and ask the dealer for the capacity, while they may look alike their capacity may vary greatly.

The A battery is connected in series with the filament, B battery in series with the plate.

In connecting up a vario-coupler as a two circuit set, bear in mind there is no electrical connection between the two coils.

A single circuit set is not as select as a two circuit one.

If you are a beginner, do not attempt to build a complicated set.

A variable B battery will help to get the correct plate voltage but a potentiometer will do it better.

Better results are obtained when using separate B batteries on detector and amplifier.

When you put up your aerial pole be sure and put a pulley on top of the pole so you may lower the aerial.

You can't push a button and get opera or jazz. Your set isn't a phonograph.

Your aerial absorbs passing electromagnetic waves and the smaller it is the less you get.

It is a good plan to occasionally lower your aerial and clean off the insulators.

When mother is using her electric sewing machine it will sound worse than static in your set.

Audions of the same make require different plate voltages for best operation.

Most of the squealing in some sets is due to over-regeneration.

It is important to have a test buzzer if you are using a crystal detector.

Edison cells have a voltage of 1.2, while lead cells read two volts.

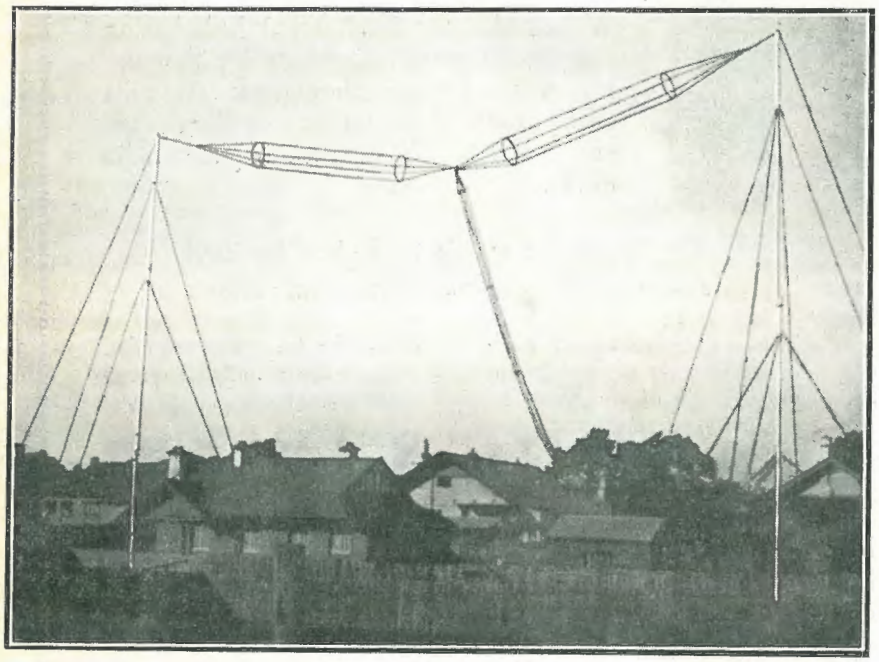
The Proper Installation of Antenna

TO thoroughly grasp the meaning of this article and the apparatus with which it is proposed to deal, it would be as well to regard the antenna as a feeler system and as such, something that picks up or interrupts the radio frequency impulses as they come hurtling through the ether.

It may be hanging in the air between two chimneys or two houses, dropped from a flagpole like an extended umbrella, or a wire loop; or even hung round the room, held up by the pictures on the wall—the pattern matters nothing—the nature of it is just the same, something towards which high-frequency electrical impulses possess an attraction.

The system should be placed at as considerable a distance from other likely conductors as possible. Remember, the greater the intervening distance from the steel framework of buildings, trees, telephone and tramway wires, etc., the better the reception.

Owing to the house shortage in the bigger cities of Australia and the consequent large number of people who "batch" or board, it is often impossible to have a really distinct antenna system, so many radio fans utilize the water piping systems of the house, or the electric light wires, plugging in with special plugs, which while preventing the passage of the line current permits of the high-frequency radio impulses to pass through.



Eighty feet high and each end with the poles 110 feet apart and of the T type is the latest aerial to be installed by 2CM—Mr. C. D. Maclurcan, the well-known wireless experimenter. The lead-down measures 90 feet, and consists of six wires on four one-foot hoops. "The increase in efficiency I have secured with it," says Mr. Maclurcan, "is wonderful." Among other American stations that have heard 2C M by means of it are 6CGW and 6CGO.

Let us, however, confine ourselves to the most popular form of radio feeler—the one wire antenna from 100 to 150 feet long. Up to a certain point, the longer the wire the stronger the signals received, but, on the other hand, it has often been found that antennas more than 175 feet long do not lend themselves to such good reception as do those below that length.

With regard to wire. I have found it better to use a single copper wire, say a No. 14, than a stranded one, especially in a case where the wire is exposed to the weather. Solid wire does not offer the surface for corrosion which is so detrimental to good reception—the antenna's function.

The next point of importance is splicing, and too much attention, in my opinion, cannot be given to it. A good deal of the "skin reception" is lost if every minute it is forced to jump gaps in a splice or connection. The best way of all for connecting is to weld or fuse.

Allow the wires to overlap each other for half-a-dozen or more inches and then, after scraping and cleaning, twist one around the other as tightly as possible. This serves to increase the tensile strength and also to offer plenty of soldering surface.

In the event of stranded wire being used, scrape the ends to a fine polish to remove weather corrosion and dirt, and fan them out so that each wire stands out separately. This will allow the numerous strands of one wire to be introduced to those of the other. Then, taking one of the strands, wind it around the other wires. Do this with No. 2 and No. 3, until each strand is wound tightly round the opposite ends. When you have done this, you will have one of the best stranded wire splices that can be made. When properly soldered, it will allow the radio skin reception to pass with only infinitesimal loss.

Soldering, which means the end of the job, is just as important as splicing. First essential is a good soldering flux. Don't omit to heat the connection that is to be soldered before putting on the solder. By this precaution, the solder runs down in the minute crevices of the splice and serves to make a permanent and adhesive join.

Now for the protection of the joint from the affects of the weather. Nothing is better than adhesive tape wound round the join to a depth of three or four thicknesses. Next wind a few strands of copper wire around it and then add a good coat of shellac or paint as a preservative. The purpose of the wire is, of course, to keep the tape from unravelling, should the paint wear off, thus protecting the inner layers.

Of course the antenna wire does not constitute the entire antenna system. Insulators and cleats must be taken into consideration. Personally I would advocate the use of glazed porcelain insulators rather than the cheaper moulded mud varieties. Do not confuse glazed porcelain insulators with the un-glazed ones sold in all electrical shops and used principally for interior wiring work. The latter make extremely inefficient insulators on account of their porous nature which causes them to absorb moisture very quickly.

A good test of a porcelain insulator is to soak it in some dye solution and then crack it open, seeing how far the dye has soaked in. The deeper it has, of course, the more moisture would it absorb from the air. The shorter the distance below the surface the dye penetrates, the more efficient would be the insulator.

A good method of improving inferior insulators is to boil them in paraffin until the porcelain is thoroughly saturated and hence cannot absorb any moisture.

Highlights of Radio Broadcasting

(*Continued from page* 318.)

well-equipped factories, which is a very different matter from the production of a single model. The fundamentals of design have been so well worked out that any form of circuit could now be worked into the same thin form.

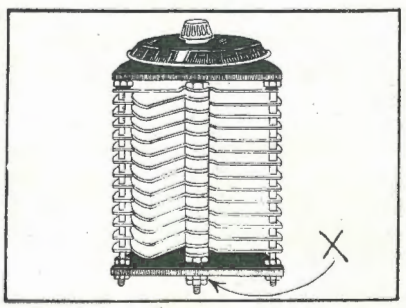
Installed in a suitable phonograph lid, the combined instrument has the appearance shown in the second photograph. The possibilities of such an instrument are indeed striking. One listens to one's favourite broadcasting station concert and then, deciding to hear some particular favourite dance or song, one has only to play the desired record on the same instrument and to hear the music coming from the same horn. The scope of each instrument is therefore widened by the combination. It seems likely that the development of the radio field will again show, as has repeatedly been the case, that new, scientific inventions do not necessarily supersede existing agencies but that they supplement them and broaden their usefulness.

Pig-tail Connections

BY pigtail connections is meant, a flexible piece of wire or belden braid connecting one part of the circuit with the other, where the connection between the two is not a good one.

The two outstanding places for pigtail connections are the variable condensers and variometer. In the usual type of variable condenser, the rotor plates are mounted on a shaft and connection to this shaft and the other circuits of the set is made through a piece of metal, usually brass or copper, pressing against the shaft of the variable condenser. While such a connection may be a good electrical connection for an electrician accustomed to low frequency currents, it is not a good one by any means for the feeble high frequency electrical current we have in radio. It is well known that when similar metals are brought in contact and friction develops, a deposit is formed which is not a good conductor, and in many cases of noisy variable condensers, the noise is due to the poor contact between these surfaces. At other times, a variable condenser may be difficult to adjust and in many cases this is due to the imperfect contact between the shaft and the strip of metal acting as the bearing, which in one position makes good contact and a little farther makes poor contact.

The same condition holds true of variometers whose connection between rotor and stator coils depend



on a similar bearing at the shaft. A variometer should be rotated without any trace of noise and if yours cannot be moved in any position without crackling noises, you should look to this bearing for your trouble, providing the rest of the variometer is O.K. The pig-tail connection should be soldered to the shaft and to the bearing and a "stop" provided so the pigtail will not be twisted off when the variometer is turned. If you are using a variometer in the plate circuit, a loose connection will sound just the same as good summer static.

Switches are another source of noise as the best connection at a switch will become noisy in time unless soldered. The usual switch connection is to solder your lead to a lug or washer and then slip this over the shaft of the switch arm. When used for an ordinary electrical connection, it is a good one but it does not mean a good radio connection by any means. The best away to insure a good connection is to proceed as above and then solder a pigtail to the lead secured to the washer and then run the pigtail to shaft of the switch arm.

For efficiency's sake, it is best not to have any switch taps on your set if you want a noiseless set, unless they are pigtailed as outlined here. If they are not pigtailed, the set will either be noisy or receiving results will not be as good as when switches are not used, due to the liability of imperfect contact at the switch points.

A 1912 Radio Experience

NOTWITHSTANDING the marked advance in the design and construction of modern valves, we should not despise the homely crystal, writes Mr. W. A. Chambers, of Esperance (W.A.), remembering that where it is possible to utilise a crystal in reception this method gives the purest speech.

A 1912 experience may interest us all. I quote verbatim from a letter from H. S. Peet.

"On December 17, 1912, about 4 p.m. (daylight) as the s.s. *Keemun* was coming out of the harbour, Yokohama, I was surprised on listening-in to hear, instead of Morse, a faint, unusual sound of varying pitch, which on tuning-in I recognised to be a human voice singing. For a few moments the tune was drowned by the sending of a nearby station, but between the breaks the voice was faintly but distinctly audible. When the station transmitting Morse ceased, the tune and the words of the song became easily distinguishable and were those of 'The Village Blacksmith.'

"Two verses were heard and towards the end the voice became clearer—possibly due to some readjustment of the transmitter—and the final words, 'Like chaff from a threshing floor' were as distinct as though from a gramophone.

"That evening, I called up the Jap. Govt. station 'Chosi' and mentioned my experience. He informed me that it was probably the Department of Communications at their laboratory in Tokyo experimenting in wireless telephony.

"My receiving set was of the ordinary ship type (Marconi), and as detector I had a piece of Silicon in use. I thought this would interest you . . . ."

When we remember that this incident occurred but seven years after the Atlantic was commercially bridged by wireless it commands a little respect for the Jap's persevering progressiveness.

It may interest you to know that 2FC comes in very well at the local wireless station, strength 7, on one-valve (an oscil-audion). The modulation would seem to be nigh perfect, as we meet with no distortion.

THE NORTHBRIDGE RADIO CLUB.

THE weekly meeting was held on August 27 at the "Revoli" Refreshment Rooms, Sailor Bay Road, Northbridge (N.S.W.). Owing to the increase in membership, it was found necessary to procure new club rooms, this showing more local interest in wireless generally and the club in particular. The meeting was more in the nature of a discussion of ideas for the club's future, many good suggestions being made and adopted. The usual question time gave an opportunity for explanation of varied troubles experienced by members. The club's programme in this respect is especially helpful to new members, who are in need of knowledge or in difficulties.

Enquiries regarding membership may be obtained from the Hon. Sec. A. Cameron, "Ogilvie," Clanwilliam Street, Chatswood.

GOSFORD (N.S.W.) DISTRICT RADIO CLUB.

A CLUB, known as the Gosford District Radio Club, was formed at Gosford (N.S.W.) on July 2 last, when a membership of nine were enrolled, with a show of three aerials to represent the district's activity. The meetings have been held in one of the member's residences on Thursday night each week. Some idea may be formed as to how Radio has taken in this district, by the fact that, although but a few weeks have elapsed, the club's membership has grown to twenty-four and the aerials now number twelve. A walk around the district would disclose several "splinters" ranging from 30 to 60 feet almost ready to add to the present number. The object of the club is to assist the experimenter and every effort is being made to carry out research work in a scientific manner. The method adopted by the club is, that one of the members is undergoing a course of instruction on Radio operating, at the Club's expense. The substance of his studies is being delivered to the remaining members by means of lectures and home study. In conjunction with this, there is practical demonstration in the construction and operation of the wireless set. It is proposed to install a low power transmitting outfit. A more commodious room will soon become a necessity. A visit was recently paid to the local power house, where some instruction was given to members. The success of this club depends a great deal upon the publicity it has received through the district's local paper. A Radio column is written by the members and published weekly, by courtesy of the Editor. The club receives its share of this column. Mr. E. Bailey is the secretary and would be pleased to hear of anyone interested in the Association's movements.

WIRELESS CONCERT BY NEWCASTLE WIRELESS SOCIETY.

FOLLOWING a proposal placed by a member before the Society that some steps be taken by the Wireless Society of Newcastle towards giving the local public an opportunity of realizing the meaning of Radio and what Newcastle amateurs in particular were capable of performing, a plan was formed whereby a public demonstration could be made of wireless telephony conducted by the Society in conjunction with the Newcastle Branch of the Y.W.C.A. Necessary permission was obtained from the P.M.G. and while it was originally intended to make the transmission from the Societies' outfit 2SO was eventually found to be out of the question, owing to the fact that at the last minute the power tube burned out! but Mr. Swain (2CS), the Secretary to the body, placed his efforts and outfit at the disposal of the committee to carry out the transmission from his residence. On Thursday, August 21, the receiver was placed in the café lounge room of the new King Street building of the local Y.M.C.A. The Sterling loud-speaker, operated by a four-valve set, was in charge of Mr. Seward, assisted by other members of the committee. The programme was arranged by the committee of the Y.W.C.A. and included some of Newcastle's best talent. Messrs. Grisdale Coverdale, Welsh and Ewing participating, and also Messrs. Histelow, Lloyd, Ewing and Dr. Plesley. They received the thanks of the audience in many an applause after each item until someone "tumbled to" the fact that the artists could not hear them and so the news spread. (A unique situation for some.) The Society would be glad of Q.S.L. from any amateurs who may have heard this transmission. Please address to L. T. Swain, Hon. Sec. Wireless Society, Everton Street, Hamilton. A large attendance and still larger sale of admission tickets will result in monetary benefit to participating bodies.

"THAT very much American voice—Krra Ggga Oooh (KGO), Oakland, California, is becoming as familiar to me as the Cochranised tones of 2FC," writes Mr. H. E. Rose, of Yanganbil Station, (N.S.W.) to *The Stock and Station Journal.* "To-night at 6.24 p.m. the old familiar 'Smiles' could be heard 20 feet from the 'phones. I mention 'Smiles' because it was only one of many orchestral pieces, familiar to me. The usual announcement that the music was being broadcast from the St. Francis Hotel, San Francisco, was audible with the 'phones on the table. Last night, as the time approached 1 a.m. ('Frisco time) the Jazz band was encored three times.

HERE is the latest list of stations logged by Mr. W. M. Henry, of Rhodes (N.S.W.). These stations were copied on one valve, and most of them, especially the N.Z. stations, were heard on numerous occasions, 4AA being heard on speech two nights in succession. 4AE was heard transmitting for the Wireless Exhibition held in Brisbane and came in very clearly. Calls are as follow:—(C.W.), N.S.W.: 2HM, 2GQ, 2CR. S.A.: 5BD, 5BF, 5AC. V.: 3BH, 3RY, 3OT, 3BP, 3HL, 3TM, 3LM. T.: 7AB. Q.: 4AN, 4CM. N.Z.: 1AK, 2AP, 2AP, 2AB, 3AP, 3AA, 3AD, 3AL, 3AC, 4AA 4AC, 4AR. U.S.A.: 6CGW. 'Phone—N.S.W.: 2HM, Riverina Wireless Supplies. V.: 3BH, 3AR, 3BU, 3BD, 3LM. S.A.: 5BN, 5BQ. Q.: 4AE. N.Z.: 4AA. All Australian land stations and also the following VPD, VLA, VLD, VLW, HVV, VIH, VLC, VIL. Long wave: XYZ—which he thinks is a high-powered station testing—PKX, JAA, LPZ, Monte Grande in the Argentine, NPN, HZA, KIE, NPG, NPO, ABC, NPM, WQL, KGI, KET, WII, WQK, WSO.

IN response to our request that all experimenters who succeed in hearing KGO should acquaint us of the fact, Mr. George Pratten, of Pymble (N.S.W.), writes us that he heard the Californian station on the evening of August 17 last using only two valves—detector and audio—so loudly that it worked a loud-speaker and could be heard all over the room. The time could be definitely fixed, he says, as just at the end 2BL broadcast the chimes from the Sydney G.P.O. Since this occasion Mr. Pratten was further successful in hearing them on the nights of August 20 and 22.

MR. F. E. SMITH, of Roma (N.S.W.), writes that it was some months ago when he first began to log KGO consistently. On those occasions it was with a five-valve Burginphone set, but since then he has built a five-valve Neutrodyne with a range of from 50 to 360 metres, and this brings in the American station very strongly at times. The following stations have also been heard per 'phone:—4AE, 4EG, 2HM, 2YA, 2CM, 2UW, 2GM, 2GR, 2RJ, 3EF, 2GQ, or BQ, 5BQ. 2YA and 2BL can be heard literally across the street and 2HM and 4EG come in equally well. UV201A valves are used for both amplifiers and detectors, with a 100-volt B battery, which is home constructed. The aerial is a twin 110 feet long and of the L type, with a 6ft. spread supported from a pair of steel tubes masts 50ft. high. On a recent Sunday KGO could be heard 12 feet away from a loud-speaker.

A New Crystal Receiver

QUALITIES possessed by the Radiola Crystal Receiver now placed on the market for the first time by Amalgamated Wireless (Australasia) Limited are such that its advent will undoubtedly cause considerable interest in Commonwealth wireless circles—both technical and otherwise.

Simplicity is the keynote of this admirable little set, while its low cost puts it within reach of the smallest purse. The distance over which it will receive signals from the average broadcasting station is about 15 miles when a good aerial is used, and when the apparatus is so situated that local conditions are favourable for average reception. Its most popular application, however, the manufacturers think, will be within the city and suburban areas.

Greatest selectivity and freedom from atmospheric disturbances are secured by the use of variable inductive coupling while tuning coils

The Radiola Crystal Receiver.

are inter-changeable, so that any wave-length may be had in the twinkling of an eye. Best quality bakelite is used for the base on which the instruments are mounted, while inside connections are made at the back of the panel with rigid wire so as to obviate the possibility of short-circuits. All connections are kept as short as possible, and this insures that the over-all efficiency of the receiver is increased.

Special features which should tend to make this receiver popular with the listening-in public are that it can be operated by anyone not possessing technical knowledge; that a glass enclosure protects the crystal from dampness and dust; that highly selective tuning can be secured by the means of coupled circuits, together with that in the aerial circuit by means of a variable condenser and that the hinged ebonite panel is held in position by one clamping nut and enables the complete wiring to be quickly and easily examined.

The set is priced at £4/15/- with special ebonite covered coils to receive both Sydney broadcasting services.

The Morse Code Simplified

By P.R.B.

NO person should call himself a real wireless enthusiast until he is capable of both transmitting and receiving Morse at a minimum speed of 12 words per minute.

There is not much need to point out the necessity and the many uses of the Morse code, but sufficient to say that all ships' communication and much amateur work are carried out by this means. Any evening whilst listening-in on 600 metres one can hear VIS and other land stations working ships, and, if on lower wavelengths, plenty of DX work in code.

Many ideas have been expressed as to the quickest and most thorough way to memorise it. The best and most up-to-date scheme is to learn the code from A to Z and 1 to 10 inclusive, mastering perfectly a few symbols at a time. Thus the beginner may divide the Alphabet into six sections.

The first lesson should be from A to F inclusive. When the pupil has thoroughly learnt those letters he should tackle the next section G to L. When these are memorized, he should revise the previous twelve letters, and having done this, proceed in the same manner for the next four sections. By this means the Morse code will be cemented into the pupil's mind.

The beginner is warned against learning the code by means of opposites, as experience shows a horribly confused result, e.g.,

A (.—) and N (—.)
E (.) and T (—)

etc., etc.

The next and most important step is practice. Before beginning to practise you should be in possession of a complete buzzer set. At first you should do a little transmitting, making each letter perfect and taking care not to overdo it, always stopping when the muscles become tired. By regular transmitting out of books, newspapers, etc., you will become more acquainted with the code and, at the same time, increase your speed.

It is advisable to do a few days in transmitting before attempting to receive. Your instructor should be well experienced in transmitting so as to make letters well, space properly and keep a uniform speed. He should never transmit too fast for his pupil, causing the latter to "guess" words, and when sending code the instructor should avoid using plain English or any language on account of his pupil being inclined to anticipate words. A good idea is to mix three or four letters and a number of numerals together, e.g.: KBQUM—RZTPA, 17490, etc.

For the best results it will be necessary to maintain regular practice in receiving. I would suggest practising nearly every day for about 30 minutes, if possible.

By following these instructions carefully the enthusiast within a month or so will be a "crack" operator and capable of receiving and transmitting at a minimum speed of 12 words per minute.

So, start and study it to-day, remembering—Practice makes perfect.

Various Types of Radio Frequency Amplification

WHEN one wishes to either increase the distance from which he may receive broadcasted programmes, or use an indoor or loop aerial, he thinks of radio frequency amplification. Having decided on radio frequency amplification, the next step is what type. There are three types: Resistance, transformer and tuned.

The resistance type of radio frequency amplification is not used so much for short wave or broadcast reception, due to its not being efficient on short waves but it is practical for long wave lengths.

The transformer type of radio frequency amplification is widely used in loop aerial sets having but one control, that being the variable condenser, for tuning. Its advantages are as follows: It will respond to a wide band of wave lengths when properly designed, so as to take in all the broadcasting stations, it does not require any adjustment and is small. Its drawbacks are that it responds best, or amplifies greatest, over a narrow band of wave lengths. That is, one designed to cover wave lengths from 200 to 550 metres will have a "peak" and will amplify very well from, say 350 to 450 metres, but will only do fairly well over the lower and higher wave-lengths.

The tuned transformer type consists of two windings with a variable condenser across the secondary so as to put this circuit in resonance with the incoming signal. Some such transformers are in small containers similar to the type mentioned above, while other are wound on cardboard or other composition tubes, such as the neutro-formers in a neutrodyne set. The advantage of this type is they can be so designed that they will respond efficiently to any wave-length between 200 and 550 metres.

The disadvantages are, the neutroformer type are bulky and require considerable spacing and it is not practicable to have more than two stages, due to each stage to amplification having to be tuned to the preceding one and as we only have two arms to do the adjusting with, two stages, together with the tuning of the aerial circuit is all one can handle.

Of the three types, the last two are the only ones that should be given consideration and where one desires simplicity of control the untuned transformer coupled radio frequency transformer is the one to use. On the other hand, if you do not mind a few additional controls, the tuned radio frequency is best due to the fact you can actually tune each stage to the wave-length you are receiving and this gives you high amplification on all stages, which is a feature of the neutrodyne sets.

Due to radio frequency sets being sensitive, you always get considerably more noise on them than you do on a regenerative set or just a straight hookup but the radio frequency amplification allows you to have a self-contained set that can be used in your car, boat, camp or shore with little or no aerial.

The success of one of the three tube reflex sets is due to their step of tuned radio frequency which greatly increases the volume on distant stations.

A BOUQUET.

". . . I will take this opportunity of saying how much I appreciate your paper **"Radio"** — it lets everyone know what everyone else is doing and really seems to take a personal interest in all . . ."

—An extract from a Victorian reader's letter.

TELL THEM!

WHEN writing to advertisers who particularize their wares in this magazine, it is so easy to say, "I saw it in *Radio*," but you will be surprised at the special service and despatch your orders will receive through telling them that.

WITH four valves, Mr. G. R. Martin, of Greenwich (N.S.W.), writes to say that he has heard KGO three times—on the evenings of June 14, August 6 and August 19.

Tools Required for Building Your Set

By "RAY DIO."

I WALKED into a radio store the other day and asked one of the clerks what tools I would require to build my set. He told me enough tools for me to manufacture sets. He mentioned everything except a lathe. Seeing he "knew" what he was talking about, I saw a compact crystal detector set and innocently asked what sized grid leak and condenser were used on it: He replied, "the standard," and smiled. I smiled, too, but was I smiling at, or with him?

This is Kaewieng Radio Station, New Guinea. A 1½ Kw. Marconi transmitter is installed and a considerable amount of traffic is handled by this far outpost of the Empire.

The man or boy who is going to make up his own set and lives in the city where he can take the panel to a dealer and have the holes bored will require a pair of six inch long nosé pliers, cutting pliers, small but long screwdriver, and a five-inch screwdriver. That is all the tools you need, unless you include a soldering iron among the tools. If you are situated so that you cannot have a panel bored for you, you will need a small hand drill and an assortment of drills to put the holes in the panel. Now, if you cannot buy the panel from a local dealer, your mail order house certainly sells panels already drilled. Drilling the panel is where most people fall down on the job. Holes are not in line and the set usually looks like a "home-made" affair.

You can pick up most any radio book and it will give you a long list of tools you will require to build one set. If you bought them all, it would pay you to have bought a complete set in the beginning. The idea in building your set is to save money. It is true you still have the tools and they can be used for other things besides building radio sets, but most of you have a hard enough time getting the money together for the parts and do not want to spend any more than is necessary for tools. In a pinch, a pair of pliers and an old knife that may be used for a screwdriver will do.

Your set may call for a bezel, but cutting out such a large hole is not easy and you can do a good job by boring several holes in the space allotted to the bezel. With these holes you can see the tube and note with what degree of brilliancy it is burning. That is all the bezel is for. The bezel lets more dust and dirt get into your set, too.

In putting in your variable condensers, the number of holes required vary. Some need one for the shaft and three for supporting screws; others only two supporting screws and the latest type I have used do not call for any holes other than the shaft. This has a hexagon shaped, threaded bearing into which the upper end plate of the variable condenser screws into, allowing the shaft of the variable condenser to come through the panel and holding it firmly in place. It does not matter how the variable condenser is placed on the panel, the stationary plates can be straight up and down, horizontal, or any point between.

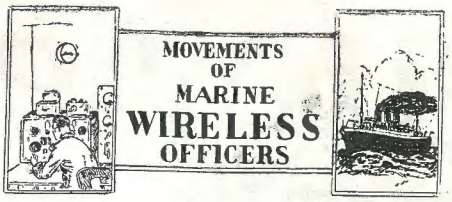
The more tools you have, that is, the greatest variety, no doubt, the better job you will do, but unless you are going to build sets for sale, you will require no more tools than outlined above.

MARCONI WIRELESS BEAM.

Successful Test with South America.

TESTS made by Senatore Marconi from Poldhu to Buenos Aires in the Argentine Republic have been eminently successful. The first message transmitted was from Senor Le Breton, Minister of Agriculture of the Argentine Republic, who is at present in London, to General Justo, Minister of War, Buenos Aires. The message was in Spanish, of which the following is a translation:—"Marconi, who combines great power of realisation with his Latin genius, favours us by selecting Buenos Aires for his first experiment of absolutely direct communication. I avail myself of his generous offer to tender a most cordial salutation to the steadfast defenders of our national flag."

This is the first message which has been transmitted to the Argentine by the Beam system and, according to telegraphic advice just received by Senatore Marconi, the message was received practically instantaneously in Buenos Aires upon a single transmission.



AUGUST.

MR. F. N. DAVIDSON signed off s.s. *Gascoyne* at Fremantle, 15th, and signed on s.s. *Zealandia* at Fremantle, same date.

Mr. C. C. Ulmann signed off s.s. *Zealandia* at Fremantle, 15th.

Mr. A. H. Jeremy relieved Mr. D. N. Quinn on s.s. *Riverina* at Sydney, 21st.

Mr. S. L. Filer signed on s.s. *Baldina* at Newcastle, 27th.

Mr. M. A. Macgoun signed on s.s. *Yankalilla* at Sydney, 27th.

Mr. W. J. Peel signed off s.s. *Victoria* as 2nd operator at Sydney, 21st, and relieved Mr. F. N. Davidson on s.s. *Zealandia* at Sydney, 26th.

Mr. H. B. Tyler signed off s.s. *Changsha* at Sydney, 25th.

Mr. L. N. Callaghan signed off s.s. *Taiyuan* at Sydney, 27th, and relieved Mr. S. M. Brown on s.s. *Ulimaroa* at Sydney, 28th.

Mr. A. S. Smith relieved Mr. W. J. Martin on s.s. *Niagara* as senior operator at Sydney, 27th.

Mr. J. Ouvrier signed off s.s. *Poolta* at Sydney, 28th.

Mr. A. D. Hoskin signed on s.s. *Time* at Melbourne, 22nd.

Messrs. A. E. Shepheard and W. D. Wedgwood signed off s.s. *Changsha* as senior and 2nd operators respectively at Sydney, 25th.

Messrs. E. T. Prentice and R. G. C. Roberts signed off s.s. *Victoria* as 2nd and 3rd operators respectively at Sydney, 21st.

Messrs. J. P. Mulhall and K. W. Downey signed off s.s. *Taiyuan* as 2nd and 3rd operators respectively at Sydney, 5th.

Queries Answered

E. W. (Launceston). Q.: Would a five-plate condenser be satisfactory in the P1 circuit described in *Radio*, No. 36?

A.: Yes, providing you have a fairly large aerial.

Q.: What L.T. and H.T. battery should be used?

A.: This depends upon the particular valve you use. See article, "Valves for Every Purpose," published in *Radio*, No. 33.

J. W. W. (Marrickville). We do not know of any amateurs broadcasting in the district you mention. The nearest regular broadcasting stations would be 2FC and 2BL. Both these stations are being received exceptionally well by amateurs in this district on single valve sets. For particulars regarding other broadcasting stations see page 276 *Radio*, No. 33.

J. M. M. (Punchbowl). We would suggest you communicate with the gentlemen to whom you refer. We feel sure both would be only too glad to give you the information you require.

T. E. E. (Melbourne). Q.: Can you supply me with a circuit for one Stage Radio and Audio to add to my present receiver (circuit submitted)?

A.: We would suggest you try the one-valve amplifier described in *Radio*, No. 37, also a simple and efficient two-valve receiver described issue No. 38.

E. C. A. (Annandale). Q.: Is wire (sample submitted) suitable for winding both primary and secondary tubes of a loose coupler?

A.: The wire you submit would be suitable for secondary windings. Use either 22 or 24 gauge for primary windings.

Inocram (Lidcombe). The usual gauge of wire for winding microphones is No. 44 enamel.

W. F. S. (East Richmond, Vic.). You cannot convert an open core spark coil to operate from commercial alternating currents. An article on "How to Make an Electrolytic Rectifier" was published in *Radio*, No. 23.

E. P. D. (Avondale, Qld.). Q.: Can a ½-h.p. engine and dynamo be procured for charging a six volt accumulator?

A.: We suggest you purchase an electric lighting outfit, 32 volt, such as Western Electric and Lalley Light plants, etc.

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 to estimate the ranges of reception of experimenters' sets, as the controlling conditions vary so considerably.

Q.: Using copper plates, sheet iron and iron pipes for earthing system, should they be connected in series or parallel?

A.: Connect all objects in parallel.

Q.: What size coils are required for 2FC using three-coil tuner and aerial, 120 feet long?

A.: Primary, 150 turns; Secondary, 200; and Re-action, 100 turns.

S. E. (Albury). Q.: Can you supply me with a six-valve circuit comprising two stages Radio Detector?

A.: Circuit posted. It requires considerable personal experimentation to get such complicated circuits to work, and they are not suitable for work on all wavelengths. We would suggest you try the simpler circuits before attempting multi-valve outfits.

B. E. A. (Narrandera). Q.: Is circuit (submitted) permissible?

A.: Yes.

Q.: Would honeycomb coils be more efficient than variometers?

A. Use honeycomb coils for long waves. Variometers are only used for short wave work.

Q.: The circuit specifies a .0005 variable condenser in the aerial circuit; is this correct or should it be a .001?

A.: .0005 variable is O.K.

H. H. (East Brunswick). Please forward further particulars regarding the station you have been hearing, times of transmission, wave-length, etc., when we will endeavour to obtain the information you require. 2HM is operated by Mr. H. A. Marshall, Allingham Street, Armidale.

A. W. S. (Townsville). Q.: What aerial would be the best for receiving Sydney broadcasting stations?

A.: Erect an aerial as long and as high as possible.

Q.: Would a house lighting plant cause interference if aerial were erected near or overhead?

A.: Not if the commutator and brushes are making satisfactory contact.

Q.: Would a three-valve set comprising one Stage Radio, one Detector and one Audio with loose coupler, work a loud speaker?

A.: Yes, your combination is a good one.

Q.: How far could signals from a spark transmitter using small coil similar to Ford ignition coil be heard on a crystal receiver?

A.: About five miles.

Q.: What would be the range of a four-valve receiver?

A.: Owing to the many factors involved it is impossible for us to answer queries regarding range. This depends mainly upon the skill of the operator.

Auckland Radio Exhibition

FOR several days about the middle of last month the Science Building of the Auckland University College was given over to a Radio Exhibition and Convention held under the auspices of the Auckland Radio Association. Interesting lectures were frequently given throughout the four days and several competitions were decided as follow:—Class 1 (best crystal set, cost not to exceed 15/-, exclusive of 'phones): R. W. Hull, 1; T. W. Saunder, 2. Class 2 (best crystal set, no limitation): A. G. Gover, 1; A. F. Mlilar, 2. Class 3 (best single valve set), not yet judged. Class 4 (best multi-valve set): W. D. Wilson, 1; G. W. Snow, 2.

Radiola Crystal Receiver

This set is of the highest quality workmanship and design, while the trade mark "A.W.A." on each instrument is a guarantee of performance. It can be depended upon to give good results over a distance of about 12 miles when used with a good aerial.

The crystal and spiral contact wire are enclosed in a glass tube, which protects them from dust and dampness and ensures permanent adjustment.

The use of variable inductive coupling ensures selectivity and freedom from atmospheric disturbances.

The tuning coils are interchangeable, so that by using coils of suitable values, any required wave-length may be obtained. The cabinet is of handsome appearance, while the instruments are mounted on best quality bakelite, thereby ensuring high insulation.

The set is self contained and only needs connection to an aerial and earth system, and the attachment of a pair of telephones to be ready for immediate use.

Special Features

Can be operated by anyone not possessing technical knowledge.

Glass enclosure protects Crystal from dust and dampness.

Spring clip crystal holder allows quick changing of crystal and ensures perfect electrical contact.

Highly selective tuning by reason of coupled circuits.

Price :

£4 . 5 . 0

with one set of special ebonite covered coils, or £4/15/- with an additional coil.

Procurable from all Radio Dealers

Amalgamated Wireless (Australasia) Ltd.

Clarence Street, Sydney

Collins Street, Melbourne

RADIO DEALERS KINDLY WRITE FOR TRADE PRICE LIST

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