WIRELESS WEEKLY

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

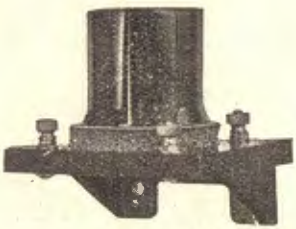
VOL. 4. No. 22. 3D FRIDAY, SEPT. 12, 1924.

FEATURE

A SPECIAL SINGLE VALVE SET

VL

FAMOUS FROST PARTS

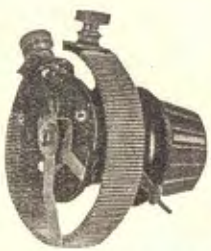


FROST-RADIO

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 molded 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 molded 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, 400 ohms 5/6

No. 605, Metal Frame Potentiometer, 200 ohms 5/6

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

THE MOST COMPLETE LINE RADIO PARTS EVER

ONE PRICE

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 SOCKET**, 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 & 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 Adaptor 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

FROST

"Applause" Cards Furnished Dealers and Clubs Without Charge

United Distributors Ltd.

(WHOLESALE ONLY)

MANUFACTURERS OF RADIOVOX SETS

A FEW TERRITORIES OPEN FOR AGENTS

28 Clarence St., Sydney Hobart

"LIKE POSTAGE STAMPS — USED EVERYWHERE"

OF GUARANTEED QUALITY OFFERED IN AUSTRALIA

ALL DEALERS

F O N E S

FROST JACKS AND PLUGS

NICKLE PLATED, FORMICA INSULATION, NICKLED SILVER CONTACT SPRINGS, PURE SILVER CONTACT POINTS.

133	OPEN CIRCUIT JACK	4/6
131	DOUBLE CIRCUIT JACK	5/-
134	CLOSED 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)	15/-
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 (Aluminuim 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.

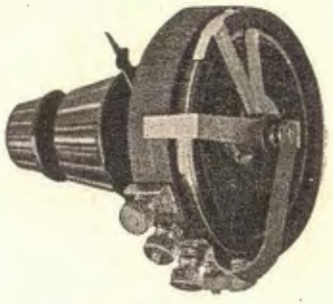
"Applause" Cards Furnished Dealers and Clubs Without Charge

United Distributors Ltd.

(WHOLESALE ONLY)

MANUFACTURERS OF HOME ASSEMBLY SETS

Perth Brisbane Adelaide Melbourne

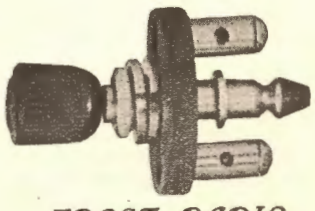


FROST-RADIO

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



FROST-RADIO

No. 608, Push-Pull Battery Switch, 4/-.

Slogan Competition

Extended till September 30

HARDLY necessary to dwell here upon the statements made by the Editor in the previous issue of the Wireless Weekly, in relation to the Slogan Competition.

Readers will know the reasons that necessitate the extension of the Competition.

But, let us repeat the gist of his remarks:

We want an original slogan: one that is essentially a wireless slogan; one that is expressive of the service of our store.

Some enterprising person is going to win that three valve Signal Set prize.

A little thought may win YOU this handsome prize.

Remember it is not necessary for customers to have purchased goods at the Store to be eligible.

Address all Entries to this Store. All Envelopes to be marked "COMPETITION."

E. R. CULLEN

96 BATHURST STREET

Telephones: City 869 & 2596

Large stocks of REMLER goods have just arrived. Inspection with no obligation to purchase is invited.

Crystal Sets from . 30/-
Frost Phones . . . 32/6
Western Electric Phones 44/-.
Brandes Phones . . 40/-
Murdoch's Phones . 30/-
New System's Phones, 35/-.
Sterling Phones . . 44/-

Super Crystal Set

Still on Show

Insulator's Crystal Set is still on show in our windows. See it! Parts, of Grodan manufacture, as used by Insulator procurable here from 9/-

Phones, Redfern 964 and 930.

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

Vol. 4. No. 22. SEPTEMBER 12th, 1924.

CONTENTS:

EDITOR: A. W. WATT — The Editor will be glad to consider Technical and Topical Articles of interest to Australian Experimenters. All Manuscripts and Illustrations are sent at the Author's risk, and although the greatest care will be taken to return unsuitable matter (if accompanied by stamps), the Editor cannot accept responsibility for its safe return. Contributions should be addressed to the Editor, "Wireless Weekly," 33/37 Regent Street, Sydney, N.S.W.

SUBSCRIPTION RATES — Twelve months (52 issues), 13/-, post free. Six months (26 issues), 6/6, post free. Single Copies, 3d. each, or post free, 4d.

QUESTIONS and ANSWERS DEPT. — Except in the case of subscribers, all Technical Questions, or those entailing research work or drawings, must be accompanied by a postal note or stamps to the value of 1/-.

ADVERTISING — Advertising Rates may be had on application to the Advertising Manager. Copy must be in the hands of the Editor by the Friday preceding each issue. If copy is not received in time, the previous week's advertisement will be repeated.

All accounts should be made payable to Publicity Press Ltd., 33/37 Regent St., Sydney

Agents in Great Britain: The Colonial Technical Press Ltd., Dudley House, Southampton Street, Strand, W.C. 2.

EDITORIAL

IN another portion of this issue appears a copy of a circular letter from Mr. Malone, Chief Manager of Telegraphs and Wireless, in which he draws attention to the lamentable fact that many operators of receivers are not in possession of a license. Quite naively, the Postmaster-General's Department expresses surprise that this could be so, and the circular goes on to say that great efforts were made in drawing up the recent Wireless Regulations to facilitate the development of broadcasting and to bring within the range of the whole community, at low cost, the benefits to be derived from high-grade broadcasting stations.

Nobody will quarrel with this last statement, just as most of us are prepared to admit that great efforts were also made at one time to make broadcasting as expensive a hobby as possible. It is beyond all question that there are large numbers of receivers in the possession of people who are operating them without a license, but it must be remembered that the main contributing cause of this sorry state of affairs may be summed up in two words—"Sealed Receivers."

As was pointed out in this journal, and in perhaps one or two others, the late lamented Regulations, in making wireless for the masses quite out of reach, simply made poachers of thousands who were determined to enjoy the privileges of wireless in the only way that could appeal to Australians—with the use of open receivers. Since an experimental license was beyond the scope of most enthusiasts, there swiftly came into vogue the moonlight aerial, the hall-room aerial, the rafter aerial, the clothes-line aerial, and, for those with the necessary cash, the indoor loop. From a private source the information was given to us that in one large town alone there were 60 license-holders, and something like 600 receivers.

The position was inevitable, like sly-grog and other things, and was foretold again and again by men who had the vision to see where we were heading. The precedent having been established, it is only natural to suppose that it would be followed by large numbers who, knowing the circumstances, were bitten by the wireless bug when the open set Regulations came into force.

The damage, however, was done, and the Postmaster General, having sanctioned the Regulations which brought the pirate into being is now placed in the unfortunate position of having to find ways and means of blotting him out of existence. Truly a sorry position, and one that merits our heartfelt sympathy. How the blotting will be done it will be interesting to observe. Perhaps by a special Police Force, or by the establishment of gangs of Roughnecks, empowered to search the premises of suspects. If the bumpy course of Wireless in Australia may be regarded as an indication, then the remedy will prove a greater farce than the crime itself.

However, with the last paragraph of Mr. Malone's circular, we are in entire accord; in fact, we have been preaching the doctrine of co-operation so long that it is almost unnecessary to comment upon it here. Broadcasting must be regarded, not from the stand point of a passing hobby, the fruits of which may be lightly filched from the ether, but as a blessing which will carry in its train benefits that may scarcely be imagined. Broadcasting companies must at least be recompensed for the expense they are put to in presenting programmes which are frankly admitted to be among the best in the world. They bring pleasure to thousands and joy to many homes and institutions where the glorious sunlight seldom penetrates. As time goes on, the benefits of broadcasting will be brought to the sufferers in the hospitals, to the unfortunates in gaols, and to the many others whose lives are filled with anything but the joy of living. But, the services rendered by the broadcasting companies — services, the value of which will probably never be realised—cannot be conducted free. They must be paid for, and there are very few who cannot afford to pay the modest fee asked.

The average Australian is a fair-minded citizen, and, so to all those enjoying the privileges of broadcasting, we want to put this question: "Have you taken out a license?" If not, then do your part in the enlarging and improvement of the present high grade broadcasting services; pay in your fee to-day. Be fair!

WHAT ARE FROST LINES? SEE PAGES 2 and 3.

Are you joining in? The Wireless Weekly Transmitting Test Week, which it is proposed to hold from October 1st to October 7th still calls for supporters.

It needs every transmitter and every receiver to make it a howling success. So far a considerable number of city and country enthusiasts have assured us of support, and we hope that Interstaters will co-operate. Notifications should reach us as soon as possible so that we can finalise arrangements.

177 Annandale Street,
Annandale.
29/8/24.

The Editor,
Wireless Weekly, Sydney
Dear Sir,

I note in a recent issue the proposal to carry out transmitting tests. While wishing success to all concerned, I humbly desire to make myself heard on behalf of all crystal D.X. hounds.

After having logged KGO, we young sprites naturally turn to the amateur wave-band. Our one limitation lies in our inability to read C.W.; consequently, one feels it would not be asking too much of the A.R.R.L. if local transmitters were requested to CQ in I.C.W. once or twice.

Yours faithfully
HAROLD J. HAMNET, 4240.

"Brooks Cottage,"
Ellendon St.,
BUNGENDORE, N.S.W.
28/8/'24.

To the Editor

Dear Sir,

I have read a lot in your valuable paper concerning the reception of 2FC in the country.

I have had the pleasure of picking up 2FC's broadcasting since the beginning of this month and on my double slider crystal set, using Q.S.A. and galena crystals. The distance from Sydney is 182 miles, and the volume at which items are heard is quite comfortable and they are very distinct. Last night the reception was so plain that one could imagine the artists were in the next room. From 6.30 p.m. until 7.15 p.m. I heard children's stories, then musical items from a little after 8, until the National Anthem at 10 o'clock. I have found dull and rainy nights to be the most suitable for 2FC.

My aerial is a twin wire, about 100ft. long (east and west). The lead-in comes in from the Eastern end, and the height both ends, is 45ft. The earth comprises a sheet of galvanised iron (4ft. x 3ft.) dug into the earth about 3 feet odd deep. My set is home-made, double slider type, and the phones are Sullivan's 2000 ohms. Should there be expressed doubt about this reception, I would be pleased to furnish you with witnesses to some of the receptions.

Yours etc.,
(Mr.) E. W. C. MATTHEWS,
Licensed Experimenter.

"In the Wayback."

To the Editor

Dear Sir,

The question I would like to ask you is this—can you explain a raspy-like noise, heard on almost any wave-length, very loudly, and of about 2 minutes' duration, on Saturday evening, 23rd August, at between 9.30 and 10 p.m.? If you cannot, would you be so kind as to publish this? One of your many readers might be able to explain.

Yours etc.,
"WAYBACK."

---

9 Cremorne Rd.,
Cremorne,
31/8/'24

To the Editor

Dear Sir,

I wish to inform you of my reception of K.G.O. last night on a single valve receiver using a C-299 valve.

I am a fourteen-year old experimenter, and my set, which is home-made, is of the three-coil regenerative type with untuned primary. The coils I used on this occasion, were special low loss ones wound somewhat the same way as was described in the article on efficient short wave receivers in the issue of "Wireless Weekly" for August 22nd. The circuit is also the same.

(Continued on Page 24)

WHAT ARE FROST LINES? SEE PAGES 2 and 3.

THE

HEADQUARTERS
Room 24 2nd Floor
82 Pitt Str.
SYDNEY N.S.W.

Wireless Institute of Australia

N.S.W. Div. Inc.

Incorporating the Affiliated Societies and The Australian Radio Relay League

Phil Renshaw Hon.Sec.
Box 3120 G.P.O. Sydney
Phone B 2235
A.H.Perrett Publicity Officer

Monthly General Meeting.

THE next general meeting of this Division of the Institute will be held at the Royal Society's Rooms, 5 Elizabeth Street, Sydney, on Tuesday, 16th September, 1924, at 7.45 p.m. On this occasion the evening will be spent in an exhibition and explanation of apparatus. The new testing sets of the Insttiute which have now arrived from America, will be on view and their operation will be explained. These pieces of apparatus in themselves will form a very interesting subject for discussion, the wave meter alone being an excellent piece of workmanship of which the Institute may well be proud. The degree of accuracy obtainable with this instrument is very high and the many uses to which it can be put will be a revelation to those who have never seen an instrument of this nature before. The other pieces of apparatus will also prove of interest and the detailed explanation of their working which will be given should form a very attractive evening. At the same time it is proposed to hold an exhibition of members' apparatus, and all members are hereby invited to bring along to the meeting any piece of apparatus which they may consider worthy of exhibition. Members will be invited to give a short account of the apparatus and its application to radio usage and it is hoped that a representative collection will be seen. Such evenings as these should prove of great benefit to members as the interchange of ideas and discussion which will no doubt be provoked will be fruitful in producing much interesting experimentation in the application of new ideas to existing circuits, and the adoption of other apparatus to the experimenter's own set. Members should therefore make a careful search of their laboratories and select anything that may be of interest and bring it along to the meeting.

Library.

Members' of this Division are advised that there are a number of radio books and magazines on hand at Institute headquarters, 82 Pitt St., Sydney, which may be availed of by members between the hours of 10 to 12 a.m. and 1 to 4 p.m. Mondays to Fridays, and 10 to 12 Saturdays. Arrangements will shortly be made to issue the books from the Institute library at a small charge. Any suggestions as to further suitable books to be obtained for the library will be welcomed. Communications should be addressed to the Library Committee, Box 3120, G.P.O., Sydney.

Australian Radio Relay League.

The organisation of the Australian Radio Relay League has now reached that stage when matters can be finalised and the working schedule finally brought into operation. The results so far have been highly satisfactory as far as they go, and considering the difficulties which have presented themselves, the officials of the League have to be congratulated upon the good work which they have done. It is very necessary that every experimental transmitter who can take part in the League's activities should do so, and to this end a special meeting has been called for Tuesday, 23rd September, 1924 at 7.30 p.m. sharp, to which all those holding transmitting licenses who are ready and prepared to whole-heartedly support this movement, are invited. The meeting will be held at the Institute headquarters, 82 Pitt Street, second floor, and it is anticipated that the result of this meeting will be an active programme in which there will be work for every member. It has been emphasised in these columns, not once, but many times, that the membership of the League does not entail any hardship, but will prove a matter of absorbing interest to those who participate in its activities. At the same time, it has also been pointed out that regularity in the performance of the duties undertaken is of paramount importance. There will be a job for every member, which will be of service to Australia, and the scheme to be outlined at the meeting will be one which it is confidently anticipated will prove attractive from

ARE YOU USING FROST PARTS? SEE PAGES 2 and 3.

every point of view. The officials of the League have done much spade work, and it is to be hoped that their efforts will be crowned with that success which can only be assured by the active and hearty co-operation of every transmitter.

Transmission of Music

The transmission of music from experimental stations has on occasions proved so strong as to entirely block out long distance working and this is a matter which is certainly disheartening to experimenters who have perhaps spent many hours in patiently tuning some long distance station. The suggestion has been made, that before transmitting music, the station operating should send out a signal on the lines of the high power signal sent out by stations before going on to high power. Before the station switches on to high power, the signal "MIM" is transmitted and it is suggested that the signal "MOM" should be sent out before music is turned on. This suggestion is made with the hearty approval of many experimenters and it is made here so that any criticism which may be desirable may be offered before it is adopted. After sending out this signal, the station desiring to transmit music should listen in and it would give a chance for anyone who was working a long distance station to finish the message, or alternatively to ask the station about to transmit music, to stand by for a few minutes as important tests may be in progress. This suggestion is not made in any way to limit the liberties of experimental transmitting stations but with a view to facilitating the working of all stations and it is only by the active and sympathetic co-operation of all experimenters that any real experimental work can be accomplished.

Notes.

Recently tests of a military character were carried out between stations 2ED and 2KC, and the operators of these stations have requested that readers should note this fact; if on that occasion they were heard working, and were called by any experimenters, they were unable to answer, but this must not be implied as any discourtesy on their part, as under the circumstances they were unable to reply. It is hoped that these tests will be repeated later on, so that if on any occasion these stations fail to reply when they have been heard working, it may be assumed that tests of this nature are in progress.

A. H. PERRETT,
Publicity Officer

A Gentle Hint

WE have received a circular from Mr. J. Malone, Chief Manager, Telegraphs and Wireless, which reads as follows:—

"The Postmaster-General's Department expresses surprise that a number of users of wireless receiving apparatus have so far failed to obtain broadcast listeners' licenses, and are continuing to make use of their sets illegally.

"Great efforts were made in drawing up the recent Wireless Regulations to facilitate the development of broadcasting, and to bring within the range of the whole community, at a very low cost, the benefits to be derived from high-grade broadcasting stations.

"It will be realised that the merits of a broadcasting programme are directly influenced by the income of the company licensed to undertake the work, and those users of wireless receiving apparatus who are operating illicitly are not only pirating on the companies concerned, but are preventing those who are honorably fulfilling their obligations from reaping the benefits which should accrue were all listeners paying their just contribution.

"It is believed that in the great bulk of cases where persons are operating receiving instruments without being in possession of a license, they have no intention either of breaking the law or defrauding the Broadcasting Company of its legitimate clients, and the Postal Department feels that it is only necessary to bring the matter to the notice of unintentional offenders in order to ensure their early compliance with the Regulations. The position is obviously one which cannot be permitted to drift indefinitely before having recourse to legal action.

"It is only by the constant and hearty co-operation of all concerned that real success can be achieved, and an earnest appeal is made to everyone interested in wireless broadcasting to loyally co-operate with the Department in order to ensure that the full benefits arising from the service may be secured for the community at large."

——::——

The teacher, prompted by superior authority, had asked permission by letter, of a girl's parents to have her take the Schick mentality test. The permission was refused by the child's mother in a letter which ran as follow:

"I received your letter asking to have my girl take the Scheek test. I will not have my girl take no Sheek test. I have seen that Sheek at the theatre, and I will have nothing to do with no test of his."—Boston Transcript.

RANGE OF RECEIVING SETS

AMONG the numerous questions to-day asked by the prospective purchaser of a radio receiving outfit are, "How far will it receive? What is the range?" etc. Not only in this instance, but in the case of the editor of the question column of the different radio publications, whose duty it is to solve problems relating to radio reception. People who are supposed to have a high degree of intelligence and common sense often write in to ask why they cannot pick up a certain distant station, giving the construction of their equipment to the smallest detail. Others say, "I have a honeycomb coil set and galena detector; how can I receive?" It is quite evident that inquirers of this nature have not stopped to analyse the situation, or else have no conception of the number of factors which govern the propagation of electromagnetic waves.

Before we proceed any further, let it be understood that no receiving set has any definite range. This is mostly due to the numerous variable factors upon which the receiving range depends, and these being very rarely the same for any two outfits regardless of their similarity in design and construction.

Some of the most important of these variable factors will be made clear by the following simple analogy: Suppose a steam whistle of given intensity be used to represent the transmitting station and the ear on a human being the receiving set. If the person moves away from the whistle it is obvious that the intensity of the sound will decrease directly with the distance, until he reaches a point where it will be just audible. This distance will designate the maximum range of reception for the given intensity or power of the transmitter.

Now, suppose the intensity of the whistle is increased. It will be clear that it would be possible for the person to hear it at a greater distance. Hence we are able to say that the power of the transmitting station is one of the variable factors which govern the range of reception.

Assuming that the intensity of the whistle remains constant, but that certain obstacles are placed in the path of the sound waves. Now, the person would have to move closer to the transmitter in order to hear it. Here we have another variable factor governing the distance at which a transmitter can be heard—obstacles in the path of the propagated waves.

Again, take an instance where there are several whistles blowing. It is evident that these will tend to drown out the one which the person is endeavoring to hear, and so decrease the maximum distance which he would ordinarily be able to hear it. This cause for decreasing the range of reception is termed "interference." These facts when explained in this way are familiar to most people, and can be applied directly to wireless.

It is evident that the factor which is a measure of distance range of a receiver is the current in the receiving aerial—the greater this current the greater the range. The amount of current in the aerial receiver is dependent upon a number of different variable factors. In addition to the ones explained in the above analogy, we have height of transmitting and receiving aerials, amount of current in each, length of transmitted wave, distance and decrease of energy due to absorption.

The received current depends upon the height of the receiving and transmitting aerials, and the higher these are the greater will be the range of reception. This is true theoretically only, and there are several other factors influencing this, among which is "static" interference, which will be discussed later.

As the distance between transmitter and receiver increases it is obvious that there will be a decrease of receiving current. Furthermore, there will be a decrease owing to the imperfect state of the medium in which the transmitted waves travel. Steel buildings, vegetation, mountains, etc., all have considerable effect upon the signal strength. Another point which comes in here is the relative conductivity of the ground. It is a known fact that reception over salt water is better than over land. This is due to two reasons: first, there are no obstacles to interfere with the propagated waves, and, second, salt water has a higher relative conductivity than the earth.

Let us consider interference. If there are a number of other stations operating in close prox-

PAGES 2 and 3 TELL YOU ALL ABOUT THE FROST LINES.

imity to the receiver, they will tend to drown out the distant one, in spite of the fact that the desired signal is quite clear when the interference is gone. In addition to this kind of interference we have static."

The range of a receiving outfit is determined not so much by the actual value of received current, but more by the ratio of signal strength to the interference. Hence, at certain times when static is strong, a receiver may have a very small range, while at other times when static is comparatively small, it may have a very great range.

Referring again to the height of the receiving antenna; it will now be understood that although increasing the height would increase the value of received current, it would also increase the static interference. As a result the ratio of static-to-signal strength is not really increased, thus the range is not increased. This is one of the chief oppositions to large aerials. Static has a small effect on small aerials and by using a proper amplifier, the signal strength may be increased without increasing the amount of static.

Then again, there are the daily and seasonal variations in the strength of received current to be considered. At night the range of reception on any set is decidedly improved. This is due to the ionising effect of sunlight on the atmosphere. Atmospheric conditions also tend to make the autumn and winter months better for reception than the spring and summer. This is not so much true in warm climates as it is where cold winters prevail.

In addition to these principal factors which govern and influence the signal strength and consequently range, there are other conditions such as changes in cloud stratas, variations in atmospheric pressure and sun spots. These all tend to have some effect on the efficiency of the receiving set.

Those who live in the vicinity of a large broadcasting station should consider themselves indeed fortunate. Instead of weeping at their inability to listen to stations hundreds or thousands of miles distant, it would be well for them to arrange their equipment so as to obtain maximum results on reception from their local station.

Harringtons Ltd. Exhibit at the Brisbane Show.

CONSTRUCTING WIRELESS COMPONENTS

Concerning rheostats, aerial to earth change-overswitches, plug switches, inductance slider, and valve and crystal circuits.

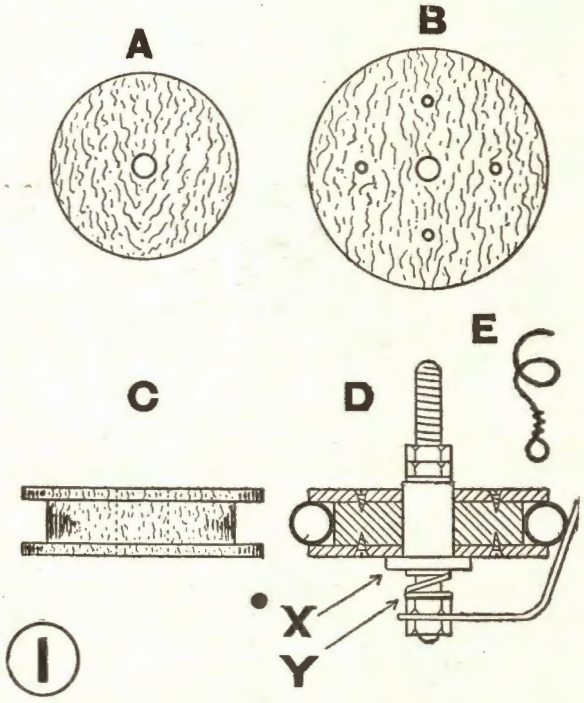
IN the rheostat to be described the resistance element consists of about eight feet of No. 18 Eureka resistance wire wound in the form of a helix and attached round a groove in a circular former. When a lathe is not available it will be necessary to build up the former as shown in Fig. 1.

A piece of hard and perfectly dry wood 3/8in. in thickness is cut by means of a fretsaw to a diameter of 2 inches as shown at A. From a piece of three-ply wood two discs B are cut out, each 2 3/8 ins. in diameter. A small hole is drilled through the true centre of each, and the two discs or flanges are drilled and countersunk in the position shown for the purpose of attaching them to the main former by small screws. This will be understood by referring to the diagram C, which shows the completed former. A large hole is drilled through the centre to accommodate a brass bush X, and at the same time two small holes are drilled through the former, in any convenient position, for the purpose of attaching the instrument to a panel by means of screws or bolts. The wire is wound round a rod about ¼ inch in diameter and the turns are kept closely together so that when the rod is drawn out the helix will spring out to a diameter of about 3/8 inch.

A loop is made at each end of the helix as shown at E. The spindle consists of a short length of 2 B.A. screwed rod which should fit nicely into a brass bush. The contact arm is cut out from a strip of spring brass and bent to the shape indicated in the sectional diagram D.

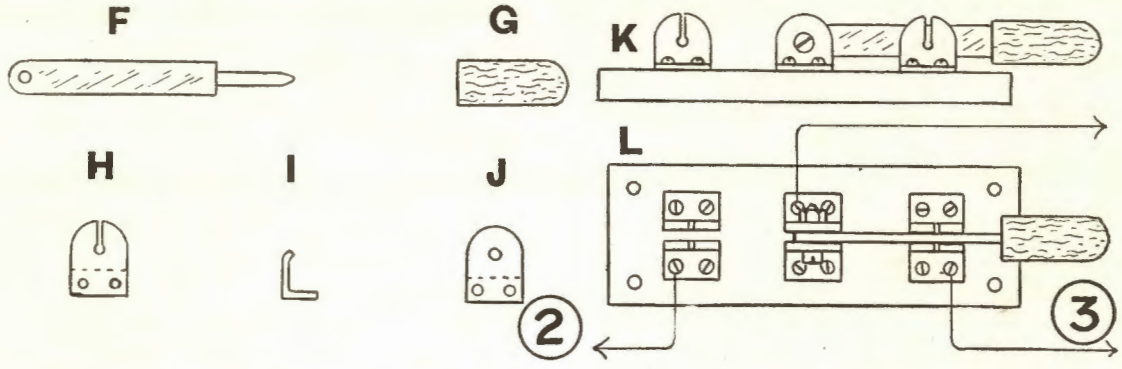
Assembling the rheostat is simplicity itself. First place the bush through the centre of the former and see that it is a good "friction tight" fit in same. Gently pull out the helix until the turns just separate, place it in position round the former and fasten down the loops with small screws, placing a washer under the head of each. There should be a clear space of ⅛ inch between the loops on the end of the helix.

The general arrangement of the rheostat is shown in section at D. The arm is preferably soldered to the lower end of the spindle. Failing this it should be clamped on firmly by means of two lock-nuts. A spring washer Y is placed between the lock nuts and the flange of the brass bush. Two other nuts are locked to the spindle at the other



end of the bush allowing only sufficient thrust for the spindle and arm to revolve freely. An ebonite knob and other manipulating device is fitted to the top of the spindle. Rheostats are always connected in series with one of the accumulator leads for the purpose of controlling the temperature of the valve, the wire from one of the L.T. terminals usually terminating at one of the screws holding the helix in position and continued to

SEE THE FROST LINES ON PAGES 2 and 3.



the valve from off the arm. By means of the spring washer the arm is in good electrical contact with the brass bush, and a wire soldered to the bush or secured under the flange will be found quite satisfactory.

An alternative method for making this connection is to solder a short length of soft flexible wire or a small spiral of copper foil to the bottom of the spindle. Another simple form of rheostat may be built up in similar lines to the flat type of potentiometer previously described. The former should be of slate, fibro, or good hard wood about 3/8 inch in thickness and 4 inches long by 1 inch wide. The same gauge of resistance wire may be used for the winding. One end of this is connected in the circuit, and the other circuit connection is made to one end of the slider rod or contact arm. A springy brass radius arm would be more satisfactory than a slider with a spring plunger, since the turns of wire on the former must be just separated.

An Aerial to Earth Change-over Switch.

The materials and parts required to construct a simple but efficient switch for "earthing the aerial" comprise a few odd pieces of brass and a few screws usually to be found lying about the workshop. The switch to be described is known as a single pole double throw or "two way" switch, often indicated in a diagram or text by the initial letters S.P.D.T. It consists of three essential parts, the blade or arm, the clips, and the base. The base should be of 3/8 inch sheet ebonite or fibre, but a piece of good hard wood will make an excellent substitute. If the switch is to be mounted on the panel of the receiver the clips may be attached direct to same and no base will be required. The blade consists of a piece of 1/16 inch sheet brass or copper 3 inch long and about ½ inch wide. A hole is drilled in one end to take a small bolt and the other in one end is filed down as shown at F (Fig. 2) to fit into a hole in a wooden or ebonite handle G. From a piece of the same material cut out six pieces, each about ½ inch wide and 1 inch long and drill them as shown at J. The two lower holes should be large enough to take small wood screws and the hole in the centre should be 1/8 inch in diameter. By means of a hacksaw cut a slot in four of the pieces as shown at H and bend each piece at right angles at the dotted lines as shown at I. The top portion of each should be slightly bent over as shown.

Bend the other two pieces at the dotted lines, but do not cut slots in these. These two clips form the main support for the blade, which can now be bolted between them. Secure them in the centre of a base of any convenient size and screw down the other four clips in the position shown at L (Fig. 3). See that the blade makes a good rubbing contact with all the clips and connect it up to the receiver as follows: The aerial lead-in wire is attached to one of the screws holding down one of the centre clips which support the hinged end of the blade. This wire is shown at the top in diagram L. The lower wire on the right connects one of the clips to the aerial terminal of the receiver, and the wire shown on the left connects the other side of the switch to the earth lead.

When the blade is in the position shown the aerial lead-in is in direct contact with the aerial terminal on the receiver, and when it is thrown over to the other pair of clips it is entirely disconnected from the receiver and connected direct to earth. A side view of the switch is shown at K. If desired, one pair of clips may be omitted

(Continued on page 22)

SEE THE FROST LINES ON PAGES 2 and 3.

THE HISTORY OF WIRELESS

SINCE remotest antiquity man has stood in fear and awe of lightning and thunder. The brilliant displays in the heavens and reverberations in the atmosphere stirred him to the depths of his soul and made him ask, "What is it?" As it was beyond the powers of his intellect to explain the phenomenon, the superstitions of his day and the evidence of great force caused him to ascribe these things to the hand of an angry God. Though thousands of years have passed, the inborn fear of those manifestations is still present.

What would one of these ancients have thought if he could but have been told that the day was coming when those terrific forces that shook the ground and sent shivers down his spine would be harnessed in different ways and put to doing more remarkable things than his imagination could picture? He would most likely have turned and fled from you, thinking you were a mad man possessed of an evil spirit. If you escaped from his friends without being burned alive, you could feel lucky.

But how was man going to reach up into the clouds and harness that dreadful power that lurked there? If the ancients ever thought such a thing could be done, they would most likely have pictured the scientist climbing a ladder into the clouds with some kind of weapon to tame the beast and make him fast. But, no, that is not the way the scientist works. He often does not look at the thing he wants to solve, but apparently starts to do something with no seeming connection, and, behold! he has accomplished the desired results.

And thus it was with electricity. The first record we have of a scientific man starting on this problem is in the year 600 B.C. He observed, when rubbing amber to attract small particles of straw, the amber would not only attract short distances, but lift them. This man may not have known it, but these gentle small forces were of the same character as those terrific ones which we know as lightning to-day.

Assistance was given this in the year 1600 by a man named Gilbert, belonging to Queen Elizabeth's Court. He gathered together all available knowledge on the subject, duplicated the experiments, and compiled the results into a book. This was the first step. During the next century numerous additional phenomena were observed. Scientist after scientist contributed his mite. Looked at in the light of present-day knowledge, these mites were small. But in the light of the times, it meant an immense stretching of the imagination. However, these mites, when added together, amounted to much. It was found that there was not only one kind of electricity, but two; that there were two kinds of substances associated with it—conductors and non-conductors—and that it was possible to build simple machines which would give sparks and shocks. The Leyden jar or condenser was invented and electricity was stored in it, allowing of more remarkable experiments.

Then Benjamin Franklin came along and showed that the electricity generated by these machines was the same as lightning, and from then on the world has known that those inexplicable forces in the heavens would some time be known and their brothers put to work for the benefit of mankind.

In an epoch-making revolution, either in science or politics, it is usually impossible to say that any one man was responsble for it all. As a rule the ideas dribble in, coming from innumerable sources and building a structure that commands the attention of everybody. But the building or altering reaches a stopping point, due to ignorance or difference of opinion. Then if there happens to be the opportune man on the scene, a man of extraordinary vision, judgment and ability, he sees the state of affairs, the possibilities, and very often a method of solution, and, seizing hold of the project, turns it in the right direction and puts it upon a path leading towards completion, which it follows with ever-increasing speed.

Innumerable examples of this kind can be pointed out in the poiltical world, and one or two in the electrical world. When the development of electrical science had progressed a remarkable degree in the early nineteenth century, there came

ARE YOU USING FROST PARTS? SEE PAGES 2 and 3.

upon the scene a man named Faraday. His extraordinary imagination and ability were turned towards this growing science and applied to it with wonderful results. His contributions and work in this line caused electrical science to take an enormous step forward and enter upon the most wonderful period of growth in history. His ideas and theories were so well formed and advanced that many of them are held to this day, and his manner of viewing electrical phenomena continues to be the most logical and simplest. It seemed that his work was the turning point in electrical history; that he opened up a new path along which electrical science has since been travelling with ever-increasing speed, and that he was the marvellous kind that touched the hidden button that opened up the unlimited possibilities before the view of the electrical world.

But what has this to do with wireless waves? The connection of this brief history with the discovery of electro-magnetic waves are not things which are new. They have existed since the beginning of time. They have been used by man since his origin, but their nature was not recognised.

The most common form of electro-magnetic waves is light. All light waves are electro-magnetic waves, and different colors of light waves are merely different sizes of electro-magnetic waves. Conjectures were made during several centuries previous as to the nature of light. Some maintained it was a wave motion, while others maintained it was a stream of particles. The idea occurred to Faraday that possibly light waves could be an electro-magnetic phenomenon, because they could not be waves in any medium known to the scientific world previously. Accordingly he sought for years for a connection between light and electricity or magnetism, and finally found it. He found that the polarized light could be affected by a magnetic field, and no other explanation was possible than there was a common connection between them.

But though Faraday showed there was a connection, it remained for James Clerk Maxwell to prove it. Maxwell took the experimental results of Faraday and put them in mathematical form. By mathematical transformations and solutions, or what to the layman looks like a plain juggling of symbols, Maxwell arrived at some extraordinary conclusions. His conclusions were chiefly that if Faraday's experiments were properly performed and interpreted, that electro-magnetic phenomena could be produced in space detached from the circuits producing them, and they would travel outward with a velocity of light. Maxwell's results were published in 1865, and though of extraordinary value, they were to a certain extent ignored for many years.

Maxwell was primarily a mathematician, so he never investigated his results experimentally. That was left to others. His theories of electro-magnetic phenomena were not readily accepted by the scientific world, and it was not until fifteen years later that a study of the real fundamental part of it was started. In the meantime, many minor prophesies of his had been verified in one way or another and forced the attention of many scientific men to his work. It was, therefore, about 1880 that one of these men, who realised its value, started work. The credit for making this step goes to Henrich Hertz. Hertz built an oscillator to produce these electro-magnetic waves that Maxwell predicted. By a series of experiments, crude, though conclusive, he showed that these waves actually existed. He also showed that they not only moved with the speed of light, but they could be reflected from mirrors, focussed or refracted by lens-shaped masses of proper substance, and that they could be polarized, or, in a word, that they behaved exactly like waves in every way, except that they did not effect the retina of the eye. Since Hertz's time, his experiments have been repeated thousands of times exactly as he performed them, and also in more elaborate and refined form. The results only went to strengthen the conclusions of Faraday and Maxwell that light is an electro-magnetic phenomenon and that electro-magnetic waves may be produced in space.

CENTRAL QUEENSLAND GETS THE PROGRAMME.

Mr. Wm. E. Hagarty, Longreach, C.Q., has put up some good results in the reception of K.G.O. Here is the programme received by him on Saturday, August, 30th.

6.52 p.m.: 1. Jazz orchestra; 2 and 3, violin solos (opera selection); 4, 5 and 6, soprano solo; 7 and 8, recitation; 9, song ("Meeting of the Waters"); 10, song by the same person; 11 and 12, Duet (Man and Woman). The rest of the items were orchestral and songs. Altogether 25 items were heard; several sounded familiar, but there was no static, and a 3 valve non-regenerative circuit was used. Several business men have heard K.G.O. at Mr. Hagarty's station.

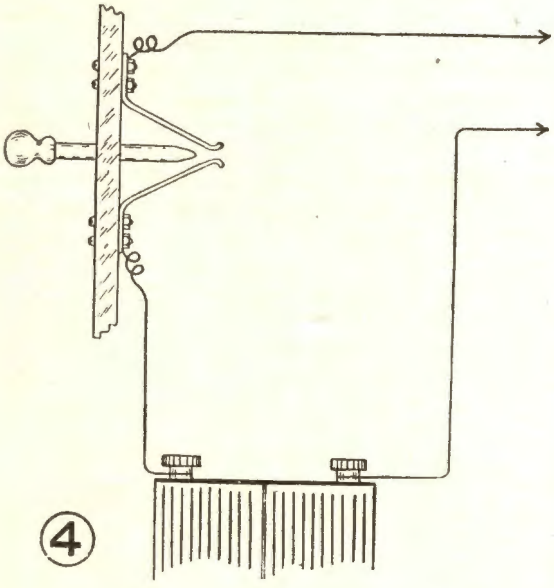
SEE THE FROST LINES ON PAGES 2 and 3.

(Continued from page 19)

and the switch is used as a simple cut-out for the high or low-tension battery current.

A Simple Plug Switch.

An extremely simple form of plug switch, consisting of nothing more than a piece of round metal rod, two spring brass strips, and four small bolts, is shown in Fig. 4. The clips are bent as shown, and bolted or screwed to the inside of the panel so as to allow a clear space of ¼-inch between their extreme ends. They are inserted in series with one of the battery leads, the joints being preferably soldered to any convenient part of the strips. The plug is simply a piece of ⅜-inch round brass rod about 2½ ins. long, slightly tapered at one end and provided with a small wooden knob at the other end, this, of course, being optional. If the panel should be rather thin the hole through



which the plug slides may be bushed with a piece of brass tubing ½-inch long and large enough in internal diameter to slide freely over the plug. When the plug is pushed in it engages both clips and so closes the circuit.

The idea may be somewhat modified by bringing the clips close together, so that they touch each other when the plug is out, and by using a piece of best quality matted ebonite, glass rod or slate pencil for the plug. Thus, instead of pushing the plug in to close the circuit, it will now be necessary to draw it out.

An Improved Inductance Slider.

By this time, no doubt, many readers have come to the conclusion that the ordinary inductance slider with spring plunger is altogether not a nice thing to know, and if I say that in a very short time the pressure exerted by the spring ruins the coil, I shall probably be informed that Queen Anne is dead. It seems rather a pity that this important little fitment should be so sadly neglected as far as improvements are concerned. Having become tired of waiting for some enterprising manufacturer to launch one out on the market, I take a walk down to the workshop, and, after more or less violent rake round the scrap-box, I soon discover that I can manufacture my own sliders—sliders de luxe—at a cost that is almost negligible.

A mere strip of spring brass, two screws, and yet another slice off the broom handle, and we have the complete set of parts required to construct a very simple and efficient slider which is in every way far more satisfactory than the usual type. The piece of broom handle, which should be cut 1¼-inch long, is shown at M (Fig. 5).

A square groove is cut across the base and made to slide comfortably over the usual ¼-inch square brass rod. The groove should be about 3/16 inch deep, so that the base is not quite flush with the lower edge of the rod. The contact arm consists of a piece of spring brass shaped as shown at N, and drilled to take two small wood screws.

A smaller strip O is sweated or riveted to this, and both strips are then bent as shown in the diagram PP, which is an impression of the complete slider attached to the coil. The turned up ends of the small strip engage the underneath side of the square rod, and the end of the large strip makes contact with the bared portion of the coil winding in the usual way.

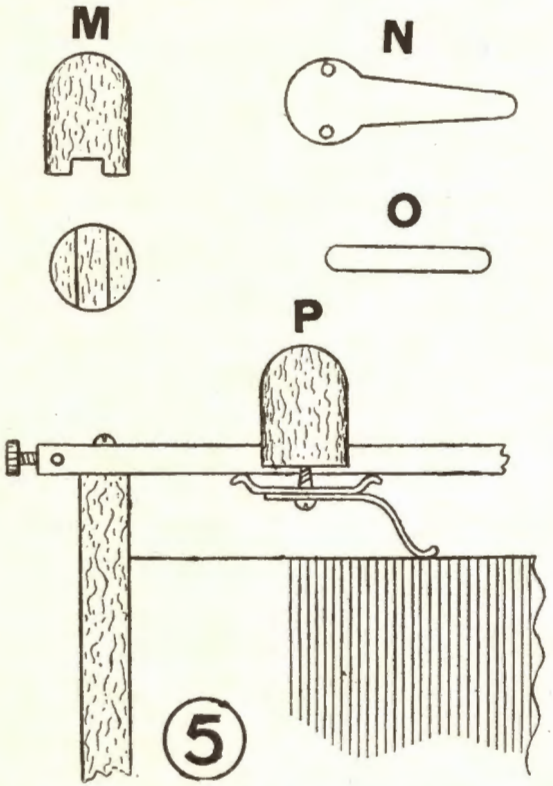
The result is a perfectly silent and smooth variable contact with an entire absence of the usual tearing and scraping effects. The only drawback is that, by fitting this slider to an existing coil, it will fall short by a few inches of embracing the whole winding. This difficulty however, is easily overcome by removing a portion of the winding at one end of the coil or by constructing a new coil and terminating the winding at 2 inches from the edge of the former. This only applies to one end of the coil, as the contact strip will reach the first turn of the winding. This will be easily understood by referring to the diagram P, where the winding terminates at about 2 inches from the end of the former.

WHAT ARE FROST LINES? SEE PAGES 2 and 3.

A Single Valve Low-frequency Amplifier.

It is now proposed to describe the construction of a single valve low-frequency amplifier note magnifier suitable for use in conjunction with a crystal receiver. It is only natural that a beginner having become a fully fledged crystal set operator should desire to try his hand with a valve set, and the single valve L.F. amplifier is usually the next progressive stage.

It should be clearly understood that a low frequency amplifier is purely a note magnifier, and with a 5 to 1 ratio step-up transformer the volume of sound should be increased from one to five, i.e., the telephony and music from the broadcasting station will be approximately five times louder than previously when using the crystal set alone. Low, or audio frequency amplification, as it is known in conventional circles, means increasing the volume of sound after rectification has taken place. It has nothing to do with **distance.** The range of the receiver will remain the same, or perhaps it may be increased very slightly, but it is only intended for note magnifications, and therefore it is a mistaken idea to imagine that, by coupling a L.F. unit to a crystal or valve receiver, it will add another fifty miles or so to the receiving range. Increased range is accomplished by the use of high-frequency amplification.



The reader is given the choice of making either one of the two L.F. amplifiers described. Fig. 6 shows a very simple unit, which will doubtless appeal to those readers whose patience or pockets have failed them in the matter concerning the intervalve transformer described in an earlier issue.

Naturally this will not be so efficient and satisfactory as the unit shown in Fig. 7, where the transformer is included, but it will usually give an appreciable increase in volume, providing the correct amount of hgh-tension and filament current is applied to the valve and the receiver is as efficient as possible. Both panels are cut square from ¼-inch (or nearest) sheet ebonite, and are large enough to accommodate the terminals and components comfortably. The surface film on the ebonite should be removed by rubbing it with water.

The terminals, rheostat, and valve holder are in each instance identically situated, so that if it was decided to build the unit shown in Fig. 6 with a view to adding a transformer at some later period, the conversion would be a very simple matter. Small holes are drilled round the edges of the panels as shown for the purpose of attaching same to the top of a cabinet. In both cases the diagrams show the under side of the panels. If desired four valve legs may be attached to the panel in place of the valve holder. With a scriber or other pointed instrument make a thin line from one corner of the panel to the other. Never use a lead pencil for marking off ebonite, as the graphite becomes embedded in the surface and forms a leak between terminals. If a mere pencil line is sufficient for a practical grid leak, as pointed out previously, then it will also act as a leak in any other part of the circuit.

Mark off the position of the valve holder, rheostat, and terminals, in the approximate positions shown, making impressions by means of a sharp bradawl. Apply a little oil to the tip of each valve leg, carefully press it down on the panel, and mark off the four holes quickly in the centre of each oil spot. If separate valve legs are used in place of the holder, take an impression from the valve on a piece of blotting paper and use this as a pattern. This method may also apply to the valve holder.

(Continued on page 26)

WHAT ARE FROST LINES? SEE PAGES 2 and 3.

(Continued from Page 13.)

I saw in the paper that there was a special test, so I decided to have a shot at it. Several times I got on to what seemed to be the carrier, but could not distinguish the music and speech through slight Q.R.M. from Broadcasters and V.I.S. 300 metre harmonics which were quite sufficient to drown it out. However, I heard at times what sounded like a piano or pianola, and later on, I heard very faintly, "This is K.G.O."—and then something, which I could not catch. I hung on to the music until at about ten to 9, when Broadcasters had stopped for their interval. I heard the music come to an end, and a clear announcement, K.G.O. The General Electric Company's." I did not wait for any more, but rushed down to tell the family the glad news. Of course, they all wanted to listen-in, and while they were, K.G.O. evidently closed down, because although I tuned around about 300 metres for awhile afterwards, their carrier was gone.

I am quite certain it was K.G.O., the words "General Electric" being very distinct, and I intend to have another shot to-night.

Wishing your valuable journal "every success."

Yours etc.,

P. ADAM ~.

Garfield Street,
Wentworthville,
To the Editor 2/9/'24.

Dear Sir,

On Saturday night, August 30th, on a single valve, I received K.G.O. The jazz orchestra came in very clear, the bones being pronounced. I am using a U.V.-201A valve. My wife and mother were present at the reception of the above station.

In conclusion I wish to say that I am prepared to listen-in for the amateur transmission tests next month.

Yours etc.,
HAROLD E. ORMEROD.

Farrell's Flat,
South Australia,
August 27th, 1924.
To the Editor

Dear Sir,

On Sunday last, using 4 valves (201 A's) a single wire aerial, 18ft. high, a single circuit tuner (1 coil, 1 condenser—it is an Arcoflex broadcast receiver supplied by Adelaide Radio Co.), I heard K.G.O. at 5.30, and held him until he closed down at 6.30. Most of the transmission was jazz music, and the announcer spoke two or three times. Fading was very bad at times, but when at loudest he could be heard all over the room.

Yours etc.,
J. O. DENTON.

D. X.

E. W. Valentine, Marrickville, sends his list:

Victoria: 3JP, 3B2.

New Zealand: 3AM, 1AK, 2AC, 4AA, 4AG, 4AK, 3AL, 3AD.

REVIEW

LEFAX RADIO HANDBOOK.

We have received a copy of Radiofax, the March supplement of the loose leaf 26 page pamphlet which is issued every month to holders of the Lefax Radio Handbook.

It contains a full list of U.S. and Canadian broadcasting stations, showing their power and wave lengths and gives among other valuable and authoritative information, details of push pull amplifiers and tables outlining the inductance of two wire aerials, and constructional hints on popular circuits.

Dr. J. H. Dellinger and Mr. L. E. Whittemore, the authors of the Lefax Radio Handbook, are excellently qualified to interpret the developments of the times in wireless. They rank high in the scientific world as wireless engineers and are in intimate touch with the fundamental advances in the science of wireless communication.

On purchasing a 30/- copy of the Lefax Radio Handbook, the holder is entitled free to a copy of Radiofax (which fits into the book on the loose leaf system) for twelve months. After that a nominal annual fee is charged which ensures that the purchaser is kept up to date on the progress of wireless.

Our copy from the wholesale agents, Welby Radio Co., Royal Arcade, Sydney.

—::—

Patient—You are quite sure that one of my legs is not longer than the other?

Doctor—Positive.

Patient—And you know that I have nothing the matter with my eyes?

Doctor: Yes.

Patient—And you are sure my heart, stomach and lungs are in good condition?

Doctor—Yes, I'm sure of that.

Patient—Well, then, that professional must have sold me a rotten driver.—Harvard Lampoon.

INTERSTATE NOTES

SOUTH AUSTRALIA.

THE last two weeks have been memorable ones for wireless enthusiasts in South Australia.

Two new stations have been opened up in Adelaide; these are—5 D.N., the station of Mr. E. J. Hume, of Park Terrace, Parkside, and 5 A.B., the station of the South Australian Broadcasting Company at the Grosvenor. 5 D.N.'S transmissions have been remarkably good, coming in very strong and clear.

On Thursday, 21st August, Professor R. W. Chapman, of the Adelaide University, gave a lecturette on "The Wonders of Electricity and the Romance of Civilised Progress." Professor Chapman has a voice very suitable for broadcasting, every word of his speech being clearly heard by all listeners-in. A delightful programme of musical and elocutionary items followed, including three very fine recitations by Mrs. Hume, these being entitled "The Green Eye of the Yellow God," "Tired Mothers," and "Butterflies."

5 A.B. has opened up with a 100 watt transmitter, but his transmissions leave much to be desired, both in strength and clarity; although using more than twice the power of 5 D.N., his transmission is very weak compared with that station.

"Pirates of Penzance."

Listeners-in last Sunday week were given a treat, when Mr. J. T. Fitzmaurice, 5 F.T., of Walkerville, broadcasted the score of the "Pirates of Penzance." The transmission began about 7 p.m., and lasted for two hours. Although the strength was not up to the usual standard, the quality was good. Mr. Fitzmaurice, however, deserves the best thanks of all who listened-in to his music.

Set presented to the Y.M.C.A.

The Adelaide Radio Company have generously presented to the Y.M.C.A., in Adelaide, a radio receiving set. The set is one of the now famous 5 B.G. Circuits designed by Mr. Harry Kauper, comprising two valves and a crystal, one valve acting in a dual capacity. Surprisingly good results are being obtained with this circuit, and the great volume of sound it produces should make it eminently suitable for such an institution as the Y.M.C.A., where a roomful of men can easily hear all that is going on. The set is made up into a highly-polished cabinet, and, although very small, gives a marvellous volume of sound with wonderful clarity.

K.G.O. heard in South Australia.

Everybody seems to be talking of K.G.O. here now; this station comes in very clearly and at times very strongly. Mr. Harry Kauper states that on Wednesday evening he picked up at faint loud speaker strength this station, using his new circuit (two valves and crystal). Mr. Kauper states that little difficulty would be experienced in picking them up on small sets if there were no interference from howling valves in the vicinity.

Mr. Jack Jellett, of Berri, River Murray, states that he picked up K.G.O. on his home-made two-valve set, consisting of detector and one stage of audio frequency amplification, both his valves being W.D.12's (dull emitters), his aerial being 130 ft. long and 25 ft. high, single wire. The set is a three coil regenerative, using 19, 40, and 49 turns.

Quite a number of other experimenters here have logged this station.

Mr. Fisk's Lecture in Adelaide.

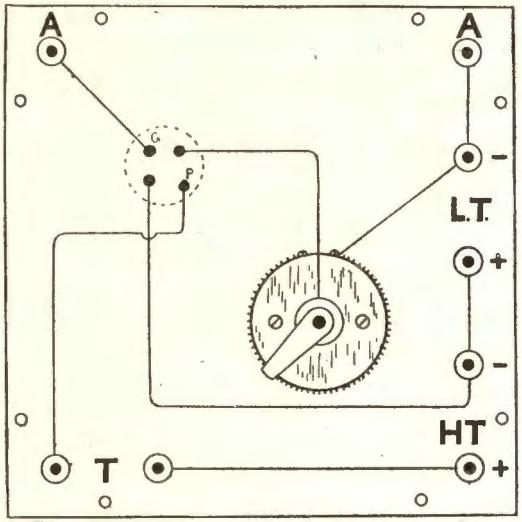
The feature of the week here was the lecture on "Recent Developments in Wireless Communication" given by Mr. E. T. Fisk, of Amalgamated Wireless (Australasia) Ltd., in connection with the Science Congress held in Adelaide during the week. The lecture was given in the Adelaide Town Hall on Wednesday last. The chair was taken by Sir John Monash, who introduced Mr. Fisk.

Mr. Fisk's lecture was given with the aid of lantern slides, and a film showing the action of currents flowing in the different transmitting and receiving circuits made the working of the wireless system clear to many present; the film also showed many interesting features of broadcasting, as exterior and interior views of several broadcasting stations were shown. An attempt to demonstrate music from 2 F.C. was not altogether successful; although music was heard from the loud speaker, the volume was not at all satisfactory, although a six-valve set was in use. Several high-power transmitting stations (telegraph) were tuned in, among these being New York.

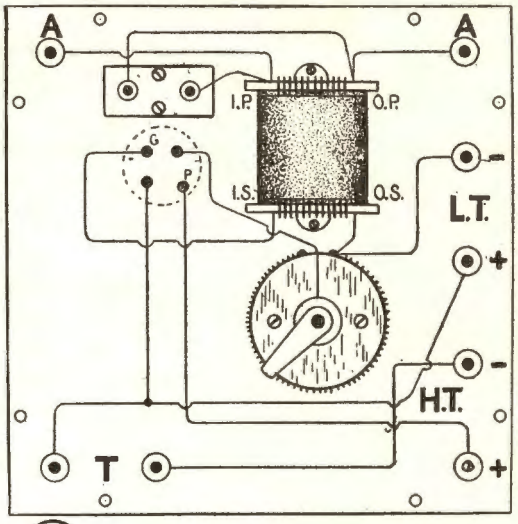
Mr. Fisk's lecture was given in very simple language, so that the most uninitiated could follow

(Continued on Page 36.)

WHAT ARE FROST LINES? SEE PAGES 2 and 3.



6 *A. A. Input from 'phone terminals of crystal receiver.*



7 *A. A. Input from 'phone terminals of crystal receiver.*

(Continued from page 23)

The plate socket should be nearest the centre of panel. This and the grid socket, which is always directly opposite the plate socket, should be parallel to the line marked across from corner to corner. Single 18 wire should be used for making connections, each piece being covered with insulating sleeving. All wires must be kept as far apart as possible.

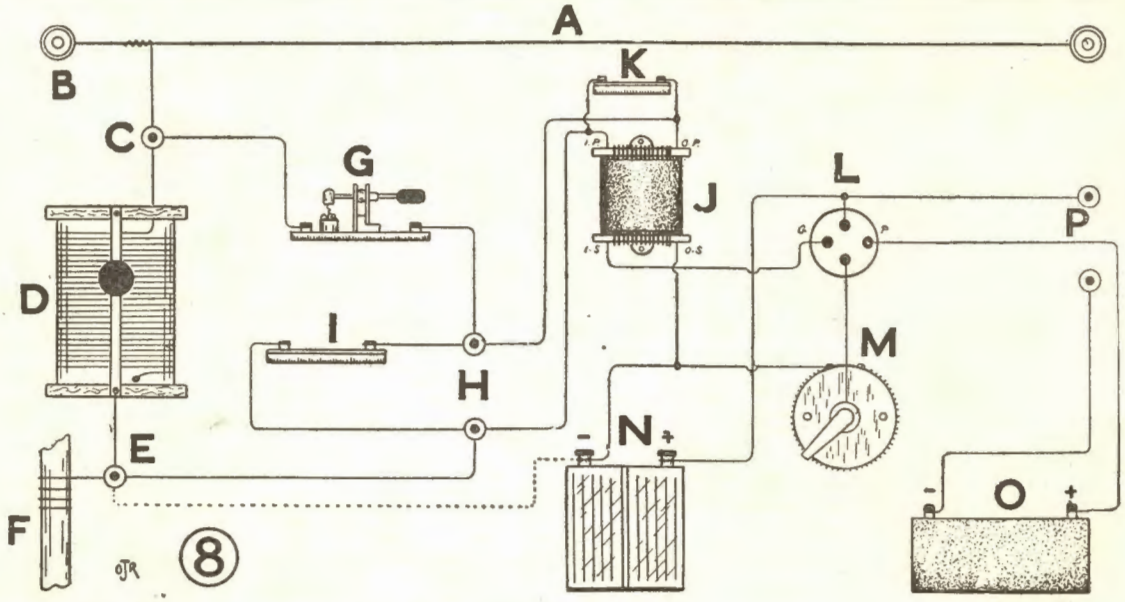
The connections for the unit shown in Fig. 6 are as follow: From one input terminal to grid socket, and from the other input terminal to the low tension negative terminal and on to the helix of the rheostat, from the L.T. positive terminal to the H.T. negative terminal and on to one of the filament sockets, from the H.T. positive terminal to the nearest phone terminal, from the other phone terminal to the plate socket, and from the rheostat bush or spindle to the other filament socket. If the crystal receiver is not provided with a telephone condenser, it will be necessary to connect one across the telephone terminals of the amplifier. This is a matter of experimenting for maximum results. Sometimes it will function better when left on the receiver.

The unit shown in Fig. 7 is a decided improvement on the one just described. The wiring is essentially different, since we have to provide for the four transformer connections, but the arrangement is extremely simple and will be easily understood by referring to the diagram. A small fixed condenser having a capacity of .001 or .002 mfds. is connected in shunt with the primary winding of the transformer. Assuming that the transformer has been provided with two small angle pieces for the purpose of bolting or screwing it to the panel, and that the fixed condenser has been similarly attached, we will proceed with connecting up the unit.

The in primary and out primary leads from transformer are first connected to the input terminals. The leads from the condenser may either be soldered to these wires near the transformer or connected one to each input terminal, which perhaps is the most convenient method. The in secondary is connected to the grid and the out secondary to the helix of the rheostat and on to the L.T. negative terminal. The L.T. positive terminal is connected to the left-hand telephone terminal and on to one of the filament sockets. Then from H.T. negative to the other phone terminal, H.T. positive to the plate, and the rheostat bush or spindle to the other filament socket.

The amount of L.T. and H.T. current will, of course, depend upon the type of valve used. Each terminal should be carefully marked, and, when finally connecting up, great care should be taken not to allow the high-tension battery leads to come into contact with the low-tension terminals, otherwise the high voltage of the battery will burn out the valve filament. A 2 or 3 mfd. Mansbridge

SEE PAGES 2 and 3 FOR FROST LINES.



A. Aerial, B. Insulators, C. Aerial terminal, D. Tuning inductance, E. Earth Terminal, F. Water-pipe earth, G. Crystal detector, H. 'Phone terminals of crystal circuit, I. 'Phone condenser, J. L.F. Intervalve transformer, K. Fixed condenser shunting primary winding, L. Valve, M. Filament rheostat, N. accumulator, O. High-tension battery, P. Output to H.R. telephones.

type fixed condenser connected in shunt with the high-tension battery will be an all-round improvement. It is sometimes necessary to earth the negative side of the L.T. battery. The pictorial circuit diagram Fig. 8 represents a crystal receiver coupled to the amplifier just described.

Another Single Valve Regenerative Receiver

By "Insulator"

THIS particular single valve set is one which has yielded splendid results, so much so that I have decided to give the usual details. The valve employed is a Marconi D.E. 3, which requires only three dry cells to light up the filament. This will appeal to those who do not wish to purchase an accumulator which is rather expensive in comparison to the dry cells which, in turn, should last about 800 hours with this valve.

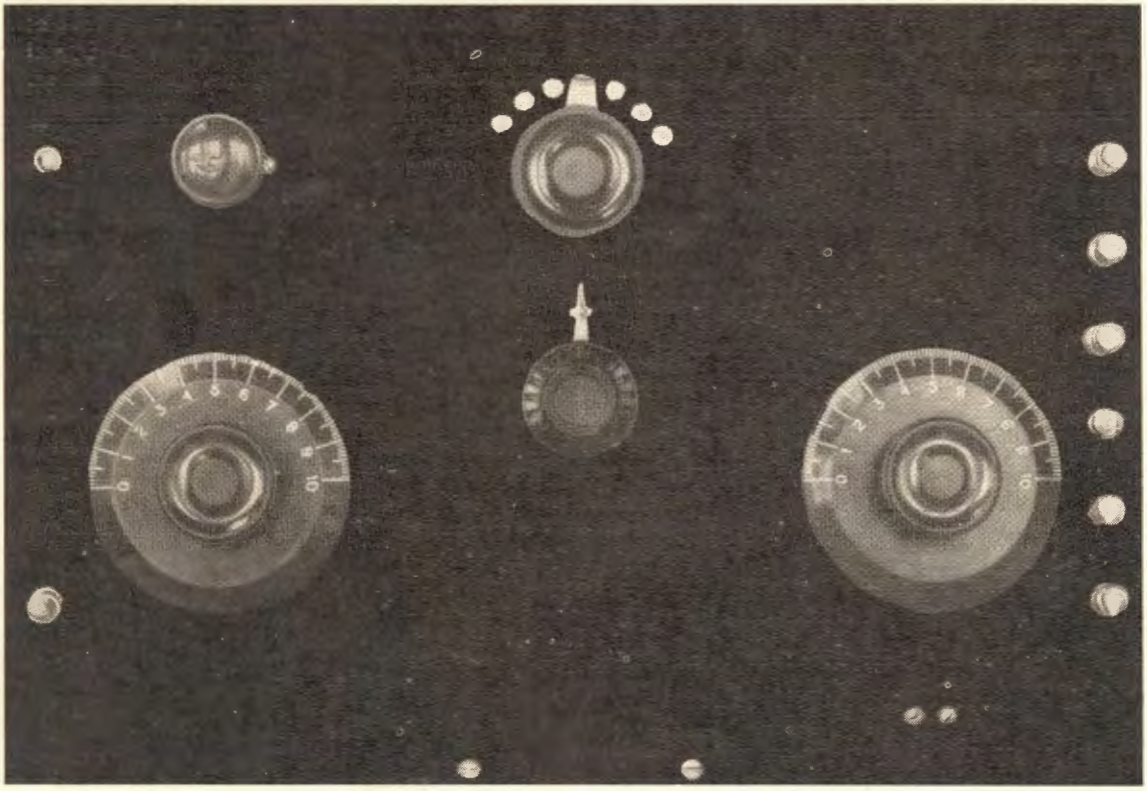
While on the subject of accumulators, may I advise those who intend purchasing such an article, to always buy one of 6 volts and not 4 volts. Some people who intend using an English 4 volt valve, seem satisfied to purchase a 4 volt accumulator. This suffices while a single valve set only is used, but immediately two or more valves are used, the 4 volt accumulator hasn't the pressure to give the proper illumination to the filaments. The rheostats and the internal resistances of the valves, create this effect.

The receiver employs the P.1 circuit, so care in handling should be exerted, otherwise interference will be caused to other listeners-in. Don't forget this now.

The following parts are required:—

1 Bakelite Panel. 13in x 9in x 3/16 in.

1 Piece of Bakelite 3½ x 1¼ x 3/16in.



Front View of Panel.

SEE THE FROST LINES ON PAGES 2 and 3.

1 .001 Variable Condenser.

1 30 Ohm Rheostat Frost.

1 Series parallel switch Frost.

1 Grodan Variocoupler Set.

1 Wetless Grid Condenser .0003.

1 1¼in Switch Arm.

7 Contact Studs.

1 Electrad Grid Leak and Clips.

1 English Valve Socket.

8 Terminals.

2 3 inch Dials.

12 ft. 16 Gauge Tinned Copper Wire.

1 Yd. Bell Flex.

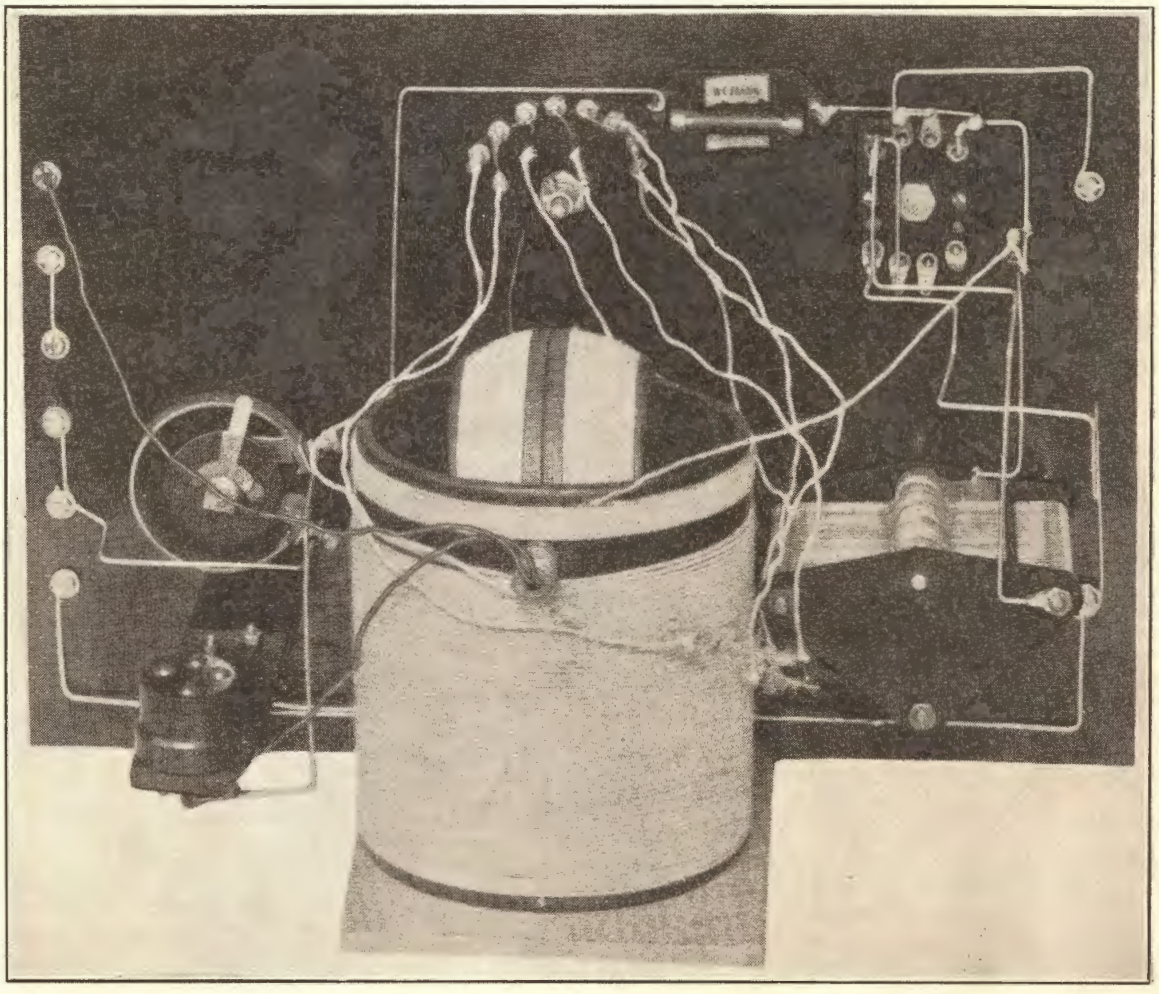
8 ozs. No. 20 D.C.C. Wire.

2 ozs. No. 24 D.C.C. Wire.

Screws, etc.

Quite a lengthy lot, but really not too expensive after all, considering the results achieved.

The first job is to wind the stator of the variocoupler. Pierce two holes 1/8th of an inch from the top; through these thread the No. 20 gauge D.C.C., leaving about 9 inches for connections, and proceed to wind the stator full. About 77 turns, you will find is the maximum which can



Back View of Panel.

PAGES 2 and 3 TELL YOU ALL ABOUT THE FROST LINES.

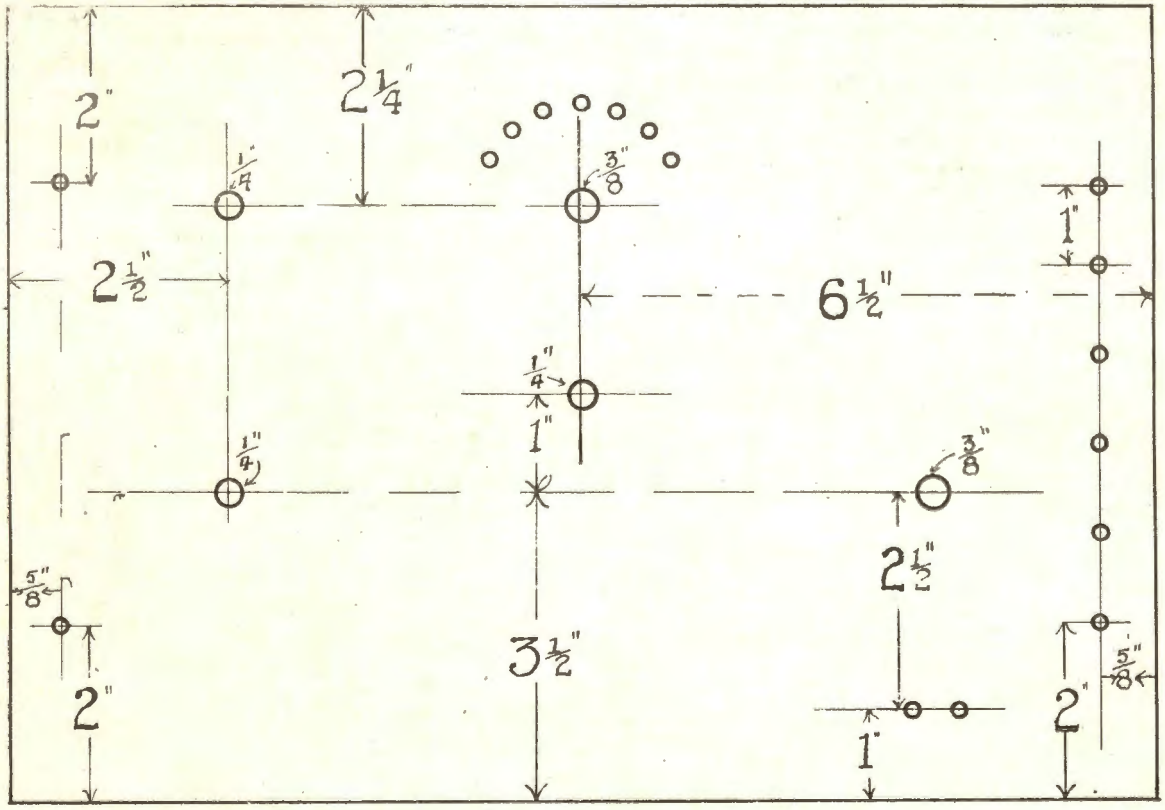
be wound on the stator. Take a tapping at the 10th, 20th, 30th, 40th, 50th, 60th and last turn. **Don't shellac this.**

On the rotor has to be wound 40 turns of 24 gauge D.C.C. wire. Pierce three holes on the outer edge, and winding towards the middle, wind on 20 turns. Break here and thread 1 inch through a hole to the inside. Repeat this operation with the other side and solder the ends inside. The rotor when wound, should have the wire running in the same direction as one continuous coil. This is important. Go ahead and assemble the variocoupler, using the shaft assembly for the purpose.

Turn now to the bakelite panel. Trim up the edges, using a plane or a scraper for the purpose. Mark it out as shown by Fig. 4 (I usually space the contact studs 3/8 in. apart). Drill all the holes now. Polish the panel, using good old Brasso for this purpose. Look now at Fig. 3 where you will see the method employed to attach the valve holder to the panel. The bakelite used, is the small strip you have left, and the small bracket is fashioned out of brass strip, ¾in. wide and 1¼in. long. At ¼in. from each end, drill two holes ⅛in. apart and sufficiently big enough to allow the screws to pass through. Bend this into the form of a bracket. At the other end of the bakelite strip, mount your valve holder. This operation is perfectly simple.

Assemble all the components on the panel now, terminals first, series-parallel switch next, rheostat, valve-holder, etc. I have allowed for a 3/8 in. baseboard. This fact will be noted when you insert the shaft of the variocoupler through the panel. A glance at the front view of the panel will show how I have transferred the knob and pointer of the rheostat to the vario coupler and attached a dial to the rheostat. This presents quite a nice appearance to the front of the panel. Don't you think so yourself?

Fig. 5 gives the circuit which will also serve for a wiring diagram. Start off wiring by connecting the tappings of the variocoupler to the studs. White silk covered bell flex is what I used for this purpose. Tackle the series-parallel switch now.



Panel Layout Fig 4

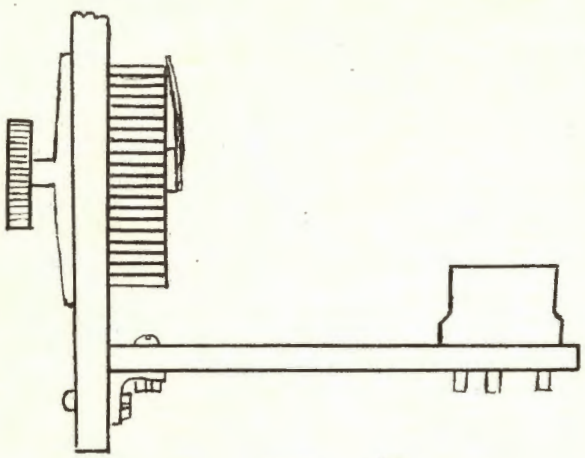


Fig 3

It looks more difficult that it really is, so don't worry.

Looking at the back of the panel view, you will perceive how I have connected the Wetless Grid Condenser. It is really suspended by the heavy wire used in wiring. I soldered the clips for the grid leak to the condenser, but be careful not to melt the tinfoil in the condenser by leaving your soldering iron too long on the condenser terminals. These Wetless condensers are very good indeed; I can certainly recommend them for all purposes. Now, the grid leak used, depends on the actual valve used. With the valve I have, I find 2½ megohms to be just ideal. You, of course, may find your own valve requires a different value.

I take it by this time you have everything wired up. Connect your aerial, earth, A and B batteries and phones, light up your valve, and listen in. Slowly turn your condensers until you hear the broadcasting station. Turn the knob of the variocoupler. When the turns on the rotor are running in the same direction as the stator, you have the maximum regeneration. Be careful not to have this regeneration too full in, as you will certainly cause interference by allowing your valve to oscillate. To tell if you are oscillating, tip the aerial terminal with a wet finger. If oscillation is taking place, you will hear a click in your phones when you touch and also when you lift your finger off the terminal. The presence of this double click is a sure indication that you are causing annoyance to many listeners-in around you. This circuit is particularly good if handled correctly. It is just as easy to handle it correctly as otherwise. Experience alone will teach you more than I could tell you were I to write the whole 64 pages of Wireless Weekly.

It is now quite late—it seems ages since Uncle George said "G—o—o—d night," so I'll leave you to it.

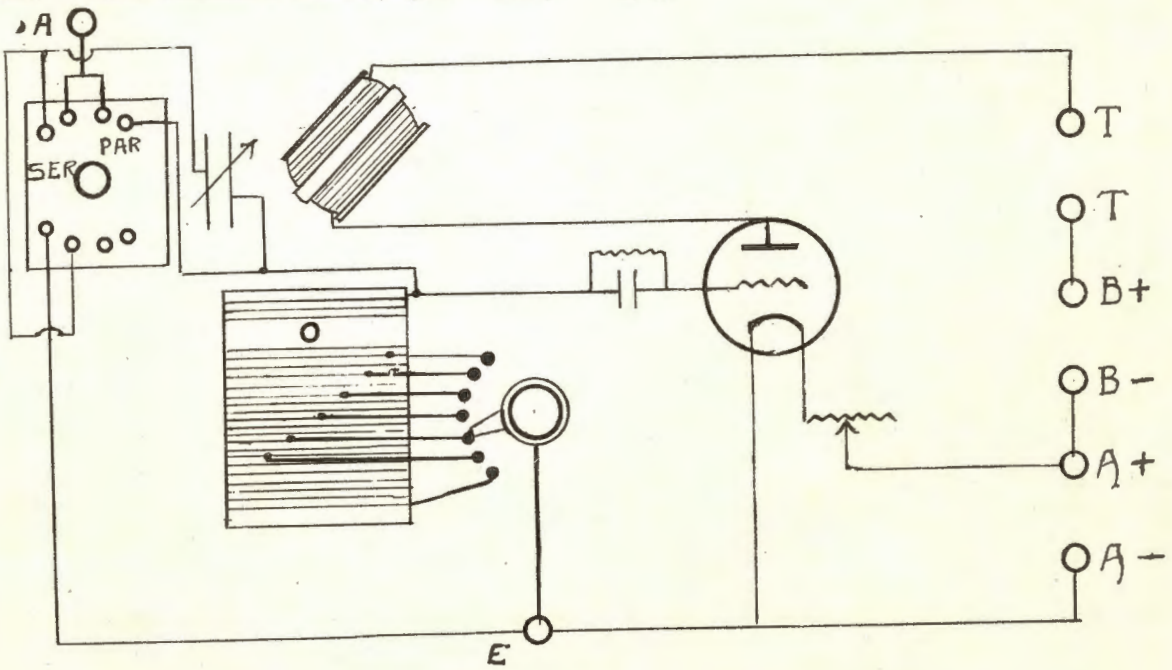


Fig 5

A TRIP TO THE COUNTRY WITH ST. 100

By "Scenturyt."

(This breezy little narrative will afford some interest to country readers.—Ed.)

Pronounce it "sent-you-right." Thanks!

Convalescing after influenzial bronchitis, under doctor's orders to get away from the coastal air for a bit, and with eight weeks' accumulated leave; a visit to son, daughter-in-law and grandson in the wheat country around Ariah Park was the prescription, and one not hard to take, though the usual 'flue depression urged a single to Rookwood. Better counsels prevailing, the set and suitcase were made ready. The former, not being a De Luxe Cabinet, presented transport problems. A couple of kerosene cases and some roofing screws furnishing materials—a near enough cabin resulted. For safe porterage, B batteries, etc., went in the suit case, while undies and other delicatessen were woven among the wires. Accumulator being out of the question, Cunningham's had to be left home, and adaptors, UV-199's and 3.1½ v. Columbia dry cells substituted.

For the benefit of the uninitiated, let it be mentioned that Ariah Park is on the Temora-Griffiths (Yanco) railway, 225 miles air line from Sydney, and about the same from Melbourne.

Sleeper ticket secured, good-bye Strathfield about 8.30 p.m. Early tea at "Coota" West; breakfast Temora, Ariah Park silos 10 o'clock; friendly Lizzie for 10 miles into the pine forest, and there we were.

Only one tree offering for an aerial mast, 85 ft. from the corner of verandah, bit of climbing —clothes prop and line with half a wick on the end—and halliards are rove 35ft. to the truck. Three strand single wire to slip rail lashed to verandah post (making the other mast 22ft. high), halliards running through clothes line pulley, with 3lb. weight at bottom end to allow the tree to bow to the wind without damage. Ground bone dry, except for drain at back of cottage. Iron pin driven in, bell wire lead under the house, 2 auger holes through boards—lead in tubes nothing—and the aerial is rigged. Set on table, hook up, and da-de-da-de-da K. Quite O.K.

Next 2BL, not loud, but quite readable. Then 2FC strong in phones. Same old phones, 3 Brown's 150 singles in series. Anything the matter with crystal and 2 U.V.-199's?

Tried a counterpoise, single bell wire. Reception clearer, but volume weaker. Tried both counterpoise and earth together—no gain; dropped a wire from centre of counterpoise to rabbit netting round the cottage—Oh! Yes, no netting, no nothing up there—cut out original earth and got 25 per cent. improvement in both tone and volume. Got too popular then, so had no opportunity for more experiments.

Neighbours—anyone resident within 25 miles is in this class—no one nearer than 2 miles—called, listened, and called again. See us from that on doing every town every evening, studios, theatres, town hall, lectures, etc., till it became the daily question: "Where are you going to take us this evening, Grandfer?"

Is it worth while? I ask you! Try it!!! Drill, dairy, chooks, chaff, no domestic help, sun-up till dusk; then a bit of ethereal recreation. I do think! When parting came, Granfer got an affectionate farewell, but more than a regretful glance was bestowed on the departing kerosene boxes. However, quien Sabe?

As to those crystals. All the pets went in first, of course, pericon, zincite-bornite, ditto pyrites, etc., but with the close tuning necessary, they mainly functioned in the direction of rousing the spirits of departed dingoes and awaking answering yelps from foxes wandering on their legitimate occasions. Fortunately, the gadget box had been thrown into the suit case, and a remnant of Du Tec was dug out. This proved to be the main stand by, alternating with Q.S.A., and an ancient bit of N.H.M. Galena.

All the familiar Morse was recognisable, but V.I.S. gave place in prominence to V.I.A. Sunday evenings 2CM was heard, not strong, but clear. Riverina wireless at Wagga, 60 miles, held interesting conversations with Kyalram and other Victorian stations, also with Hobart. No replies heard from these, but music and speech were picked up on a couple of occasions from a transmitter not identified beyond that his station was in Flinders St., Melbourne. On one occasion an announcement

was heard—of Armidale. Daylight reception was little inferior to night work. Clocks were set on Saturday by 2F.C. telling off half minutes at midday. Weather data and market reports, wool, wheat and stock sales roused great interest. Weather conditions were variable, from keen frosts with bright days, to blustering winds and rain squalls for two solid weeks, the aerial balance weight ranging up and down as much as 4 feet as the tree whipped. A few bad patches of static, but not many; when bad, reception was hopeless. On two occasions music from 2 F.C. was audible across the room using a loud speaker rolled up out of a piece of sheet zinc.

Comparisons between U.V.199 and Cunningham's since return home, encourage the idea that the latter would have given satisfactory Loud Speaker results. However, distance might have killed, though the ones at home bring in distance stuff stronger than the dull ones. Anyhow, S.T.100 captured music, anywhere between 10 miles and 225.

Q.E.D. (Euclid—not Morse).

ALBURY is amongst the number of country towns logging KGO, and P. Boulton, of Griffith Street, gets this station every Wednesday and Sunday night without exception and has been doing so since June 22nd last. The special concert broadcasted from KGO on Saturday, the 30th August, was worked on the loud speaker for the full duration of the concert. KGO was "loud speakered" the previous Wednesday and also on the following Sunday. Another station brought in regularly is Westralian Farmers (6WF) Perth, Western Australia. This station comes in very well and on September 1st worked the loud speaker. The Choral numbers broadcasted on Sunday nights are a feature of 6WF. This station is heard at Albury from about 9.30 until 11.30. Many amateur stations are picked up nightly, Sydney amateurs coming in better than Melbourne. Melbourne Radio (3AR) is almost unknown in Albury, although Mr. Boulton has picked them up at different times. The receiver used is a one stage radio detector, and two audio, which works 2FC at splendid volume, and 2BL at fair volume. On one occasion (the only test) 2FC was audible with no aerial connection whatever.

The well-known firm of Mick Simmons Limited, for many years engaged in the sporting goods and tobacco trade, have recently installed an up-to-date wireless department, which is being conducted on very modern lines, by the manager of the department, Mr. L. O. Kerlin, lately of Brisbane.

Mr. Kerlin's wireless experience is well known to many, and extends over 14 years. For a considerable time, Mr. Kerlin was Secretary of the Wireless Institute of Australia (Queensland Division), and his articles in the wireless section of the "Queenslander" are familiar to thousands. The first transmitter in Queensland was erected and operated by Mr. Kerlin, and many experimenters will remember the first broadcasting of Commonwealth Electorial Returns from his station at Brisbane. The speech was clearly heard at a distance of over 800 miles.

Complete sets, which are to be known as the "Simolian," are now being manufactured by Mick Simmons Limited, and all sets are personally designed by Mr. Kerlin.

(Continued from Page 25.)

him in his explanations of the working of the wireless telegraph and telephone.

A demonstration of the beam system of transmission was given at the close of his lecture. A beam transmitter of a very short wave length was erected on the platform, and two receivers with loud speakers were placed at the back of the hall (one on each side). The transmitter was switched on, and the beam directed towards one of the receivers which responded, the beam being then directed towards the receiver on the other side, that receiver sending out its response and the first one becoming inoperative.

A Message from Mars.

Professor Kerr Grant caused a good deal of merriment when proposing a vote of thanks to Mr. Fisk. He said the lecturer had not in one respect, perhaps, satisfied some members of his audience, who, not satisfied with the successes achieved on earth, looked out into space seeking for other worlds to conquer. Only a few nights ago he was disturbed from his slumbers by the ringing of the telephone bell, and on going to answer it was met by the enquiry from an arch-enthusiast what wave length should he use to listen to Mars. (Laughter.) Professor Grant said he would not repeat what he said in reply, but he forgave the enthusiast the slight inconvenience he caused, for he had in his hand a message the same person had just received. Professor Kerr Grant then, amid great merriment, read from a tape, with simulated seriousness, the following message:—"Mars, August 27th, 10.21 p.m.—earth time. To Fisk, Town Hall, Adelaide,—Your signals of short wave length received here. Strength fine. Inhabitants of Mars delighted to have their doubts concerning existence of intelligent beings on earth removed. Hope soon to establish permanent service. Please approach Commonwealth Government. — (Signed) Chief Martian."

In replying to the vote of thanks, Mr. Fisk said:—"I would like to ask Professor Kerr Grant to send a message back telling the Martians that we have so many problems on earth in wireless that we cannot take much interest in them at this time. We must wait until they come around again, which, I believe, will be in 120 years' time." (Loud laughter.)

HONEYCOMB COILS
KEEP THIS BY YOU.

The following table shows the sizes of honeycomb coils required for various wavelengths:—

Metres. Wave Length.	(turns). Primary coil	(turns). Secondary coil	(turns). Tickler coil
120-240	25	25	35
210-550	35	35	50
550-700	75	100	50 or 70
900-1400	100	150	75 to 200
1650-2750	300	300	100 to 200
8000-15000	600	750	300 to 500
10000-20000	1000	1250	300 to 500
18000-25000	1250	1500	400 to 600

AUSTRALIAN RADIO RELAY LEAGUE.

Read the particulars of the Special Meeting Notice called in connection with the above in this week's notes of the Wireless Institute of Australia, N. S. W. Division.

Dr. W. G. Woolnough, call sign, 2GW., is at present on an exploring expedition in the heart of South Australia. He has taken with him a receiving set, and will be listening-in every evening for signals from Sydney, from 7 to 10 p.m., Sydney time. We hope that some of our transmitters will try and get in touch with him on Morse, but please send slowly.

GIGANTIC WIRELESS NET

SHOWING HOW THE AMATEURS ARE HELPING.

A GIGANTIC radio net of transmitting stations is being developed throughout the United States, which will eventually connect every city and town, and practically every household, as far as reception alone is concerned. Under the supervision of the Department of Commerce, this means of disseminating important information, especially in times of emergency, would reach more individuals than there are telephone subscribers, and a larger number than the combined newspaper readers of the nation. For transmission alone it would link up more radio stations than there are telegraph stations, and, considering that they would broadcast, the distribution would be available to all owners of radio sets—almost to every citizen. The operation of this net would be instantaneous and direct to all parts of the country. Secretary Hoover's administration of matters radio would be broadened to the Republic at large in any hour of need.

This proposed radio net is partially in operation to-day, of course, with the number of broadcasting stations now in every state increasing every week, and fans estimated anywhere between 5 and 20 millions, but despite its growth, the present system only transmits news and entertainment at scheduled intervals. What the Government wants ultimately is a system that in emergencies, such as the declaration of war, the call to arms of the nation's man power, or the disruption of continental communications and traffic lines, could call upon all transmitting stations to take the air either locally —by district groups or throughout the country simultaneously, and handle urgent traffic.

Details of such a gigantic scheme, the like of which has never been attempted anywhere, are already being worked out by the Department of Commerce, with the close co-operation of all radio interests. The germ of the idea was started at the Amateurs' Convention in Chicago recently, when representatives of their organisations offered to co-operate with railroads when regular communication systems failed. This work has already gone into the test stage. In several instances operating amateurs have aided in the transmission of railway messages succesfully. The American Radio Relay League has appointed a committee to work out details. The League co-operated with the Pennsylvania System between the Atlantic seaboard and the Mississippi River recently in an emergency test, to the gratification of the General Superintendent of Telegraphs. Other railway systems have declared their desire to establish such an amateur radio auxiliary system in anticipation of a failure of their wire communications or the need for additional terminal and receiving stations along their rights of way.

The activities of between seventeen and eighteen thousand licensed amateurs, all owning listed transmission stations, and all code operators, is only one phase of the general scheme of linking radio nationally. Most of the telegraph and telephone systems of the country are willing to co-operate, if the need arises, but some of them declare that interruptions in their established lines of communication are so infrequent that the necessity of using radio as an auxiliary is not needed. Army Officers in charge of the military radio net, which handles governmental radio traffic throughout the country, say that they could tie in with the amateurs in a very short time to aid in reaching small communities lying outside their main radio traffic lines and beyond the smaller nets in their corps areas. The Naval Communication Service is in close touch with amateur activities; the Research Section is workng with amateurs on short wave transmission with remarkable results.

The Radio Section of the Department of Commerce, and its nine district supervisors, stationed in Boston, New York, Baltimore, Atlantia, New Orleans, San Francisco, Seattle, Detroit, and Chicago, is attempting to co-ordinate the various elements of the proposed national radio net. The Post Office, Agricultural Department, and the Army and Navy are also interested. Not long ago, the Chief Supervisor of Radio sent communications to all field supervisors directing them to make a survey of radio facilities in their districts, ascertaining the possibilities of hooking up all stations in an emergency, and the attitude of the business, railway, communication and other interests. Replies received from practically every district show that the amateurs, manufacturers, broadcasters, railways, newspapers, civic interests, and even the telegraph and telephone companies are ready to co-op-

(Continued on Page 40.)

COUNTERPOISES

By Catwhisker.

It is common knowledge that the ordinary receiving set needs two things before it can be put into commission, and these are—the aerial and the "earth."

I am not going to deal with the aerial, as everyone knows its importance. With the ordinary receiver an "earth" is just as important as the aerial, but its use is not so well understood by the person who is just purchasing a wireless receiver, so perhaps a few remarks would not be out of place.

A German scientist named H. Hertz, was one of the first to experiment with electro-magnetic or wireless waves. He used two plates, one suspended above the other for his aerial and earth respectively. The lower plates were not connected to the ground at all, but the two plates formed the two plates of a condenser, with the air as the dielectric or insulating substance.

When he sets his spark in operation, the dielectric between these plates become strained, and wireless waves were caused to radiate from his aerial earth system. Later, the bottom plate was dispensed with and the earth's surface used instead; then a wire took the place of the top plate. So we have our modern aerial and earth. Now, the usual form of "earth" is not always satisfactory for many reasons, such as lack of moisture in the earth, bad connection with the earth's surface, etc. If it is not possible to have a good earth, rig up a counterpoise.

Now, a counterpoise is merely a second aerial underneath the main aerial, and care must be taken to have it insulated just as well as the aerial is insulated. It is a good plan to have a number of wires in the counterpoise extending from a point under the aerial. The writer has obtained much better results using no earth for reception, but a good counterpoise instead. An improvement will be noticed if counterpoise is tuned. Now, the most satisfactory way to do this is to place a small variometer in series with the counterpoise and the "earth" terminal of the set. If a variometer is unobtainable, use a variable condenser, but I much prefer a variometer. One can be made easily and very cheaply, using a large cotton reel for the rotor and a cardboard tube from a cocoa tin for the stator or outside former. Wind a few turns of thick insulated (cotton, silk or enamelled) wire round the cardboard and wind the cotton reel the same way. Now, connect one end of the wire on the cylinder to one end of the wire on the cotton reel; that leaves one end free to each. One of these ends goes to our counterpoise and the other to the earth terminal of the set. Of course, our cotton reel is placed so that it rotates inside the cylinder and so that the wire on each is parallel. This little home-made variometer will be useful for many experiments. I must say here, that the counterpoise is generally about 7 feet from the ground, so that friends will not run into it, but if you can, put it a few feet from the ground.

It can be fastened to the aerial masts but it is a good plan to have the counterpoise longer than our main aerial and as I mentioned before, don't forget to insulate it properly, including its lead-in. By using this method of "Earth" connection, earth noises and A.C. hum are reduced greatly.

If you use the usual type of earth and intend to give the counterpoise a trial, don't think it is a failure if you connect up and don't hear 2 F.C., or 2 B.L. when you turn the dial to its usual position. By using a counterpoise, I find my natural wave length is slightly lowered, and remember the variometer will also alter the tuning every time it is turned. When the stator and rotor are placed by movement of the rotor so that the turns on each run the same way, the wave length is increased; and when the rotor windings are turned so that they run in the opposite direction, the wave length is decreased. The heading of this article is not variometers, but some may find this little instrument useful, as it is easily constructed and can be used in conjunction with the counterpoise. Counterpoises are much better than the ordinary earth in dry districts and I think surprising results will be got by users. I have found that when the "Earth" is joined with the counterpoise for reception nothing at all is gained.

This article is short this week, but I think enough has been said on the subject to give you a start. You will find out a great deal more when you experiment in this direction.

Next week I hope to write on some other subject which will help you to get the best out of your set.

The Fallacy of the Experimental Station

AND THE DIFFERENCE BETWEEN EXPERIMENTERS AND AMATEURS.

By A. Burrows.

IT can safely be said the ultimate aim of every scientist and experimenter is to produce something which will be of commercial use. The old cry about the cause of science and advancement of experiment is becoming rather worn out, if for that matter, it carried much weight in the eyes of those who were a little discerning. Even the hoary old astronomer would scarcely bury himself (metaphorically speaking, of course) in the stars and planets if it were not for the hope that some day he might be able to commercialise a new chart of the universe, or a street directory for Mars, or something similar, which would be likely to yield him a worthy return for his labour.

There is no reason to think that wireless men there any freer than their brother scientists from this kink of commercialism; and it might often be a debatable point if the alleged "love of the science" proves stronger than the love of what might be gained therefrom. What actually moved those in the long list of inventors and discoverers to the effort which at last won them their fame will, of course, never be known; but remembering the strenuous fights, De Forest and others have made to hold or regain their rights and patents, it would appear that in their case the threadbare slogan, "in the cause of science" was worn a little thinner than usual.

These men—Armstrong, De Forest, and a number of others—are admittedly due for all that they fought for; but they fought, as the protracted legal battles amply show, with a bitterness and rancor which demonstrated that the "honor and glory" of the game were secondary considerations in comparison with its monetary rewards. Marconi, too, made the most of his genius sometimes in a manner not altogether for the furtherance of the science for which he so vigorously professed a deep loyalty —yet of his co-experimenters, who could honestly criticise him?

Amongst the lesser lights of radio the same feeling could be detected, nor were a few stages of high-frequency always necessary to do this. When the experimenter-broadcast-listener controversy was at its maximum, so-called amateurs with one hand (so to speak) denounced the broadcast movement, cursing it heartily, and with the other made P1 sets for the chaps who possibly in the future were going to "howl" them out of existence. And the experimenters who failed, or didn't want to make money in this way, raised their voice against the broadcast-listener more loudly than before, and said behind their hand that you couldn't blame those who were making their fortunes out of the broadcast boom, and they wished they were in their shoes, anyway.

The Commercial Side.

It is interesting to note in this connection that the American Radio Relay League allows membership to none in any way connected commercially with wireless—which seems to at last get nearer a definition of the "experimental status," for in all the argument concerning this much-debated question this viewpoint has never been taken.

If a wireless enthusiast doesn't gain financially, he presumably comes nearer to being a "genuine experimenter" than the man to whom wireless is merely a business. Which is not to say that the commercial man does not do as much—or probably more—as the amateur; but he has no moral right to a distinction which is really intended for the man to whom radio is a hobby with no financial gain attached to it. A man who earns his living by wireless has no more reason to call himself an amateur than a footballer who shares in the gate takings for every match in which he plays. Both are there—to put it coarsely—for what they can get out of it; and if they weren't getting enough out of it they would, perhaps, be somewhere else—not necessarily, of course, but the possibility exists. Is it fair to class those in such circumstances with others to whom the game is purely an interest and a hobby? Which class is more entitled to be called "genuine"?

This, perhaps, gets nearer to a solution of the ancient question of the definition of an experimenter, for to attempt to do it on the old basis of his experimental work seems worse than useless. But if it can be laid down strictly that a genuine experimenter is one who dabbles (regardless of whether he listens to broadcasting or not) in wireless purely for a hobby, then a decided line can be drawn between the two.

(Continued on page 42)

(Continued from Page 37.)

rate. Many of them are anxious to test our proposed plant in an effort to establish a reliable secondary or emergency communication system.

The Commerce Department has authorised both amateurs and broadcasters to transmit on assigned wave lengths in emergencies under the direction of their district supervisors. It is even suggested that licenses of stations where operators are on duty specify that the transmitter must be held in readiness to serve the community or other interests in the event of public need.

Probaby Supervisor Beane, of the 9th District, with offices in Chicago, has gotten further along in his district than in any other section of the country. He has not only secured the co-operation of practically all radio stations throughout the middle west, but has had several practical demonstrations, indicating the aid of such a voluntary radio service. Recently he called a conference on the subject, at which representatives of all branches of the art and industry were present. He reports that amateurs stand ready to handle two-way communication for railways; broadcasters volunteered to serve as point-to-point stations using C.W., co-operating with amateurs for delivery of messages. It was suggested that press dispatches be handled by voice for localities not lined up for code point-to-point transmission. Many broadcast stations, which found their receiving equipment unsuitable, have since installed better receivers and means for using C.W. on emergency code work. Authority has been granted, and plans for intercommunication tests of high-powered broadcasters of the 9th District are being formulated, to study their reliability in both night and day transmission.

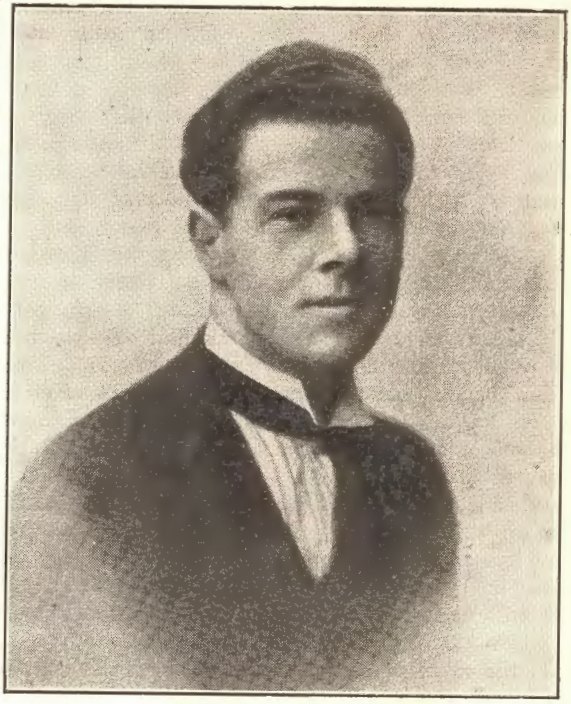
Co-operation of all interests is reported from Seattle, New York, Atlanta and Baltimore supervisors, where district emergency organisations are being formed. The Associated Press and the United Press have expressed considerable interest through the desires to supply newspaper clients with current news when regular lines of distribution fail. Details of a general national plan, with special local provisions, are being developed by the radio section of the Commerce Department at Washington.

Florist—There's a young man who has bought flowers here every week for the past year. He is going to be married in a few days.

"Kind o' tough on you—losing such a good customer."—Life.

RADIO 4AD.
HAVE YOU HEARD HIM?

Below is a photograph of Arthur E. Jordan, owner and operator of Radio 4AD, Invercargill, N.Z. He may be heard on the air nightly.



A man walked into a shoe store, accompanied by his wife and ten children, and said to the clerk, "I want to git the hull lot of 'em fitted up in shoes."

After two hours of hard work, the clerk succeeded in getting each one fitted, and was beginning to make out the bill.

"Oh! Don't bother about that," said the man. "I don't want to buy the shoes. I just want to get the size so's I can order 'em through the mail."—Disston Crucible.

* * *

"Didn't you just love the scenery after leaving Banff?"

"I never saw such wonderful freight cars."—Life.

FROST LINES ARE SHOWN ON PAGES 2 and 3.

(Continued from Page 39.)

It would appear, then, that few alleged experimenters are entitled to be enrolled amongst the honored number who can honestly say they are genuine. This certainly seems a sweeping statement, but it stands the test of investigation. It can safely be said that the percentage of amateurs is microscopic of those who, if they were offered a financial return, would not willingly forsake their standing amongst the "genuine experimenters"—that is, those who experiment purely for the love of the game, consenting to be numbered with those who regard radio (very often unwillingly, it is true) as merely a businesss.

The Genuine Amateur.

There is the argument, of course, that the wireless profession is necessary—that if it were left to only amateur research it would, perhaps, make little progress. And it can also be advanced that there is no reason at all why the professional experimenter should not be as thoroughly absorbed in his work as the keenest amateur—probably more. Both of these arguments are quite true so far as they go, but they don't go far enough.

The fact remains that there is more merit attached to research which is carried out voluntarily than that which may be simply a matter of routine. And for this reason the chances are that the home-experimenter is more sincere in his work; that he does not always achieve the same results (although his record is, nevertheless, a worthy one) is due to his lack of equipment and money. But what he loses in facilities he generally gains in enthusiasm.

This article is not by any means an attack upon the thousands of experimenters who have turned their hobby to some account. That this should happen, of course, was unavoidable in the progress of wireless; the experts had to be drawn from somewhere, and what was more natural that they should come from the ranks of the amateurs? No words, however, can be too strong in emphasising the abuse of the terms "amateur" and "genuine experimenter." If a "genuine experimenter" is an "amateur," then no man is due for this name after he has discarded his amateur's status. On the other hand, if there is a distinct difference between an "amateur" and a "genuine experimenter" (and it has been amply shown that there is), that difference should be more clearly outlined, in justice to the amateurs. And in time to come the highest compliment that will be possible may be to say that a man is a "genuine amateur."

QUEENSLAND NOTES.

THE Baby Club of Brisbane—the Wooloowin Radio Club—made its first public appearance on Saturday, the 23rd. of August. This was at the Windsor District Show, where the Club made a very creditable display of members' work. The room allotted them was draped in purple and gold on which various diagrams of circuits were displayed, Two members displayed a very elaborate 3 valve and crystal set. By a system of switches, they can operate various circuits on any number of valves or crystal alone. Another set shown was mounted on an old gramophone record suitably cased. Among the crystal sets shown, was one mounted in an ordinary box, the owner of which claims to have received 2FC, using an ordinary clothes line as an aerial. One of the members also showed a complete crystal set built in an ordinary cigarette case, while a match box crystal set was also displayed. Messrs. Harringtons Ltd., also assisted the club by a diplay of Gilfillan radio parts and Imperia listening-in sets, which was much admired. A twin wire aerial was erected above the roof of the building and Sydney broadcasting was received during the evening.

The Mayor, Alderman Bond, in opening the show, drew attention to the Radio Club's display, and hoped all would take the opportunity of visiting this section of the Show. Club members had an exceedingly busy time explaining the various sets and parts on show.

Mr. O. F. Mingay, Manager Radio Department, Burgin Electric Co.

THE RADIO BEGINNER

By W. A. Stewart.

THIS week I intend to divert from short wave work pending the arrival of some more information concerning radio frequency amplification on one hundred metres and under, and will discuss instead some points for the radio beginner.

On picking up any of the radio publications, the average person is confronted with a maze of -dynes, -plexes, supers and other fierce sounding names, and often wonders just where to begin. I don't think a little explanation concerning circuits and sets in general, will be amiss.

Sets may be divided into two classes, crystal and valve; and valve sets may be divided into two classes, single or multi-valve.

If you live within twenty-five miles of a broadcast station, a crystal set will give good music and speech in the headphone. A crystal set will give very clear reproduction but will not operate a loud speaker under any conditions.

Of course, an amplifier may be added to make the music louder. An amplifier usually and almost invariably employs valves to do the amplifying. Microphone amplifiers are often spoken about, but are of very little practical use—they were used by the Navy many years ago, but were discarded on account of their inconsistency. They require special, and very delicate handling, and have to be well constructed. They are extremely subject to vibration and a large burst of static will often throw them out. Taken all round, they are impracticable for the average broadcast listener and if louder reproduction is required, valves will have to be used. The average crystal receiver obtained these days, usually has either one or two circuits, the single circuit variety being known as "single, or double slide tuners," while the two circuit job is referred to as a "Loose Coupler."

In operating the former, one or both sliders are adjusted until the loudest reproduction results. The crystal must be first adjusted until a sensitive spot on the surface of the crystal is found. This is usually accomplished by means of a buzzer and dry cell, one terminal of the buzzer being connected to the earth lead of the set. When the crystal is properly adjusted the note of the buzzer will be clearly audible in the phones.

The loose coupler is rather more difficult to handle. In this case, the aerial or primary circuit must first be adjusted to the aproximate wave length, after having first adjusted the crystal to sensitivity. The secondary circuit is then varied by means of the switch on the end of the coil until the music is loudest. Lastly, adjust the coupling until best reproduction results. Detailed instructions are usually furnished by the suppliers of sets, and half an hour's juggling with the gear at hand, will do more to familiarise yourself than all the reading in the world.

If you live more than twenty-five miles from a broadcast station, a valve set will have to be employed. Although we hear reports of reception on crystal receivers at far greater distance than this, the results can usually be classed as "Freak Reception," and, if investigated, will usually be found to result from re-radiation from a near by valve receiver of the regenerative type.

A good regenerative single valve receiver will give excellent results up to about fifty or seventy-five miles, and even greater distances may be covered under favourable conditions. In a receiver employing valves, batteries are necessary to operate the valve or valves, and the purchaser is given the choice of dry cell or accumulator valves. If the former are chosen, the only trouble attached to the upkeep of the set, is the renewal of dry cells. If a set requiring an accumulator is chosen, the accumulator will have to be charged every three weeks or even more frequently, depending on the number of valves. Battery valves, i.e., those using an accumulator, seem to give more volume, but if portability and less worry is aimed at, the dry cells are ideal. Care must be taken in connecting up a set to see that the batteries are connected to the correct terminals. If the high tension of B

SEE PAGES 2 and 3 FOR FROST LINES.

battery gets across the filament lighting, low tension, or A battery terminals, the valves will be seriously damaged, if not burnt out, and new valves will be required, which means a few pounds at least. Instructions are usually furnished with sets and the terminals are usually clearly marked, and if the instructions are followed, little trouble will result. As the sets differ, no definite instructions can be set down for the operation of the set, and the best plan is to follow the instructions given with the set. If the volume is not all that is required, an audio or low frequency amplifier may be added to amplify the output of the set. A two valve amplifier will successfully operate a loud speaker, while in some cases, one valve will suffice.

This amplifier can take the form of a separate unit or can be included in the same cabinet. An amplifier makes the set no harder to handle and adds only one control or at the most two, to the present set. Plugs and jacks are usually provided so that one, two, or three valves may be used at will. Audio amplification is only used for obtaining loud results, while if distance is aimed at, radio frequency will have to be used. Briefly explained radio frequency amplification means amplifying the music or signals before they are detected and, if you are far from a broadcast station, this means of amplification will have to be resorted to.

A radio frequency amplifier usually consists of an aperiodic air, or iron core transformer, and a valve coupled so as to amplify the signals before detection. Another way of doing this is by means of a coil tuned by a variable condenser. This is known as a tuned plate, and is extremely effective, but is a trifle more difficult to handle. After the signals have been detected, they can be amplified at audio frequency to operate the speaker. With two stages of radio frequency, a detector and two stages of audio frequency amplification — five valves in all — loud speaker results may be obtained up to about thirty miles from a broadcast station, with a very short aerial or in a lot of cases, none at all. Using a good aerial and earthing system, loud speaker results should be obtained up to three hundred miles from both broadcast services at present in operation, while with phones, little trouble should be experienced in bringing in New Zealand broadcast stations, and possibly American stations, although nothing definite can be guaranteed concerning the latter.

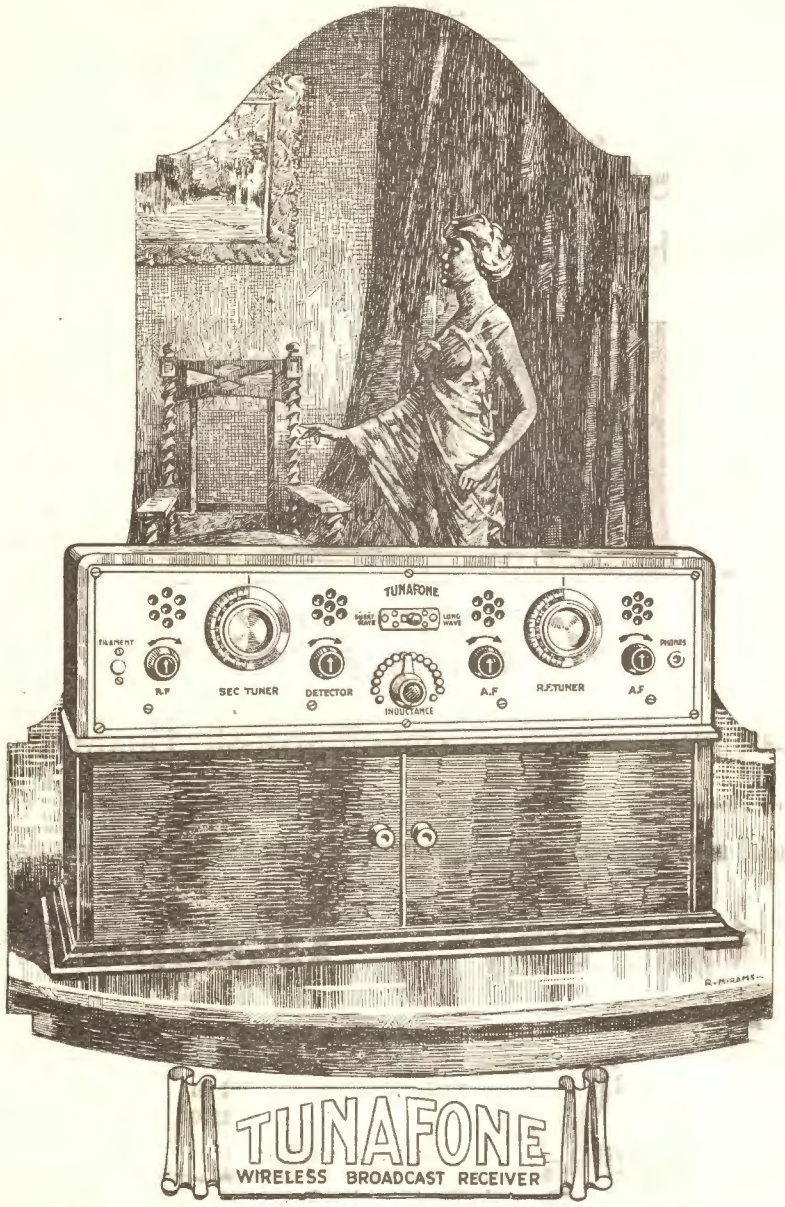
A set employing a stage or two of radio frequency, can be used on a loop or frame aerial; this usually consists of a pancake-shaped coil of wire wound on a frame, stood on the table near the set, and on being turned to the direction of a station, the music from that station will come in loudest. Interference from another station on a set of this type, is reduced to a minimum, and in a circuit such as this, the loop usually constitute the total inductance in the receiver. In many cases a well designed set employing a loop will bring in the distant stations quite well, and at the same time can be made quite portable.

If you live in the country, and do not think you are getting the results you ought, see if anyone else with a set close at hand is also getting poor results, as some localities are what is known as "dead spots," and reception is very difficult. Do not expect too much from a set at first, but as you familiarise yourself with your set, the results will be better. Don't expect loud speaker results from a crystal set, or from a single valve set using a straight out circuit. Don't expect a crystal set to give very good results from an indoor aerial, or any at all from a loop aerial. Don't expect accumulators to last for ever, but see that they are charged at least once a month and more frequently if possible. Look to the B batteries occasionally, as a weak B battery will cause noise like static. With reference to static, this is something that will have to be put up with, but I don't think that the static will cause much interference with high powered broadcasting, especially on the lower wave lengths.

For the person who is desirous of building his own set, the best plan is to go to any of the radio shops, and explain your location and what sort of results you want, and the gear required will be readily forthcoming. It is not a sufficient matter to build your own receiver, and a few hours pleasant work can be put in, in the construction of the set.

Then, there is the pleasure of knowing that you built it yourself. On the other hand, a ready made set is usually constructed by an expert, and results can usually be assured right away.

In conclusion, let me say that if these few simple rules are followed, very little trouble will be experienced by those starting in wireless.



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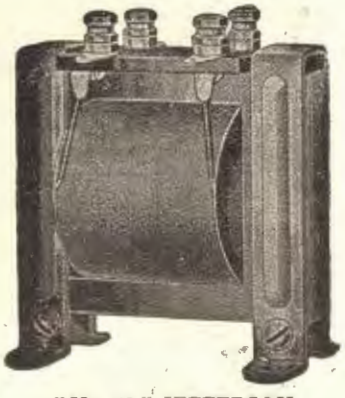

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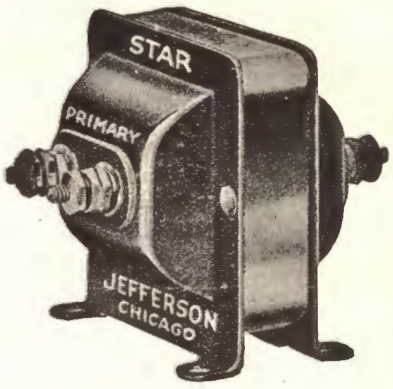

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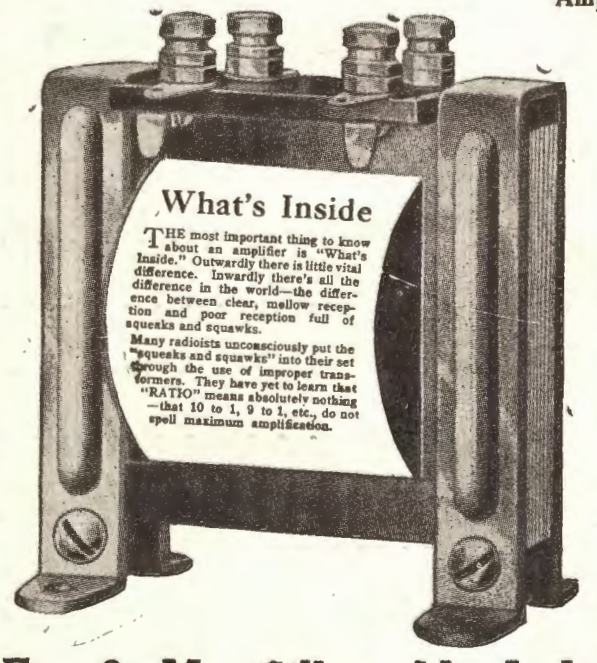

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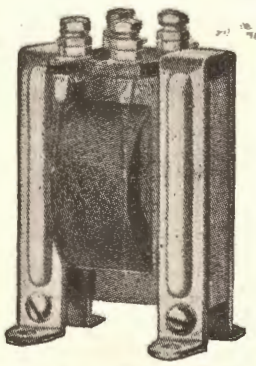

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