



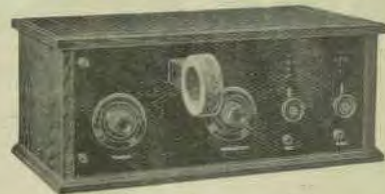
Friday, September 5th, 1924

WIRELESS WEEKLY

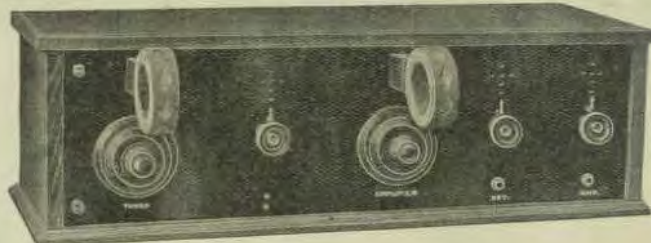
SIGNAL Home Assembly Sets



Model Phone Valve, £5/10/-



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



Model T, 4 Valves (Radio Freq.)
£13/13/-

Model S, 3 Valves (Radio Freq.)
£11/11/-

Make It Yourself

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

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

ASK YOUR DEALER FOR "SIGNAL"

and if he has not yet stocked it write us
DEALERS -- WRITE FOR OUR DISCOUNTS

United Distributors Limited

28 Clarence-st., Sydney

(WHOLESALE)

592 Bourke-st., Melbourne

Have you Heard the News?

O'SULLIVAN IS KNOCKING 'EM ALL STIFF!

The Talk of the Town.

English 3 Valve Sets Complete with Loud Speaker, Batteries, Aerial Wire, Earthing Connection and Ready for Use. PRICE £26/0/-

Call in and have a demonstration of its wonderful tone. Other goods just as sensational in Prices and Values.

O'Sullivan's Electrical Shop

296 PITT ST., SYDNEY.

Opposite Water and Sewerage Board.

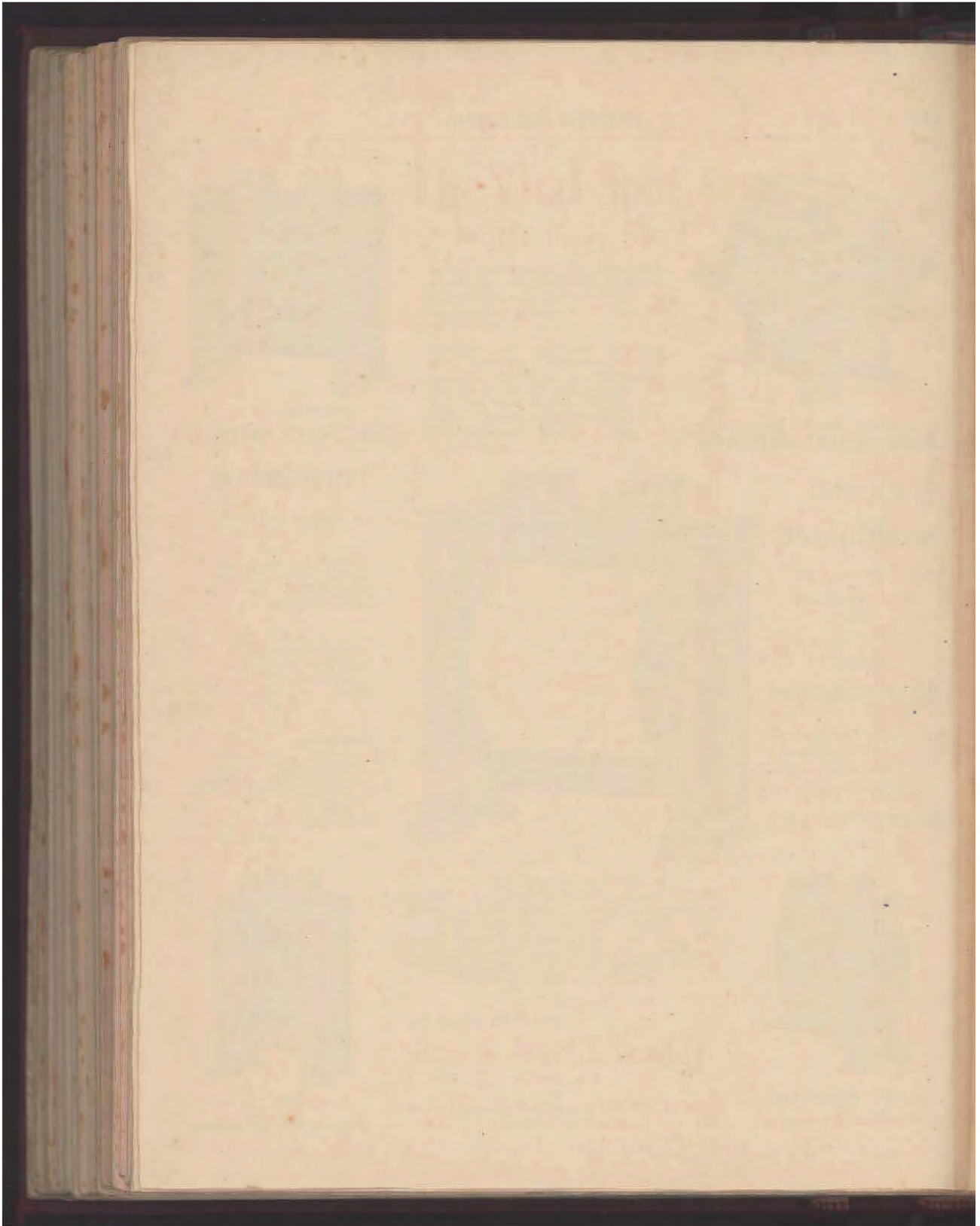
GRODAN SPIDER WEB FORMERS

ONE OF THE BEST
TUNING UNITS ON
THE MARKET



CAN BE USED IN
VALVE OR CRYSTAL SET.

All the principal Radio Stores at Ninepence (9d.) each.
Ask for Grodan Brand Variocouplers and Cardboard Tubes.



FAMOUS FROST PARTS LIKE POSTAGE STAMPS — USED EVERYWHERE

THE MOST COMPLETE LINE OF GUARANTEED QUALITY RADIO PARTS EVER OFFERED IN AUSTRALIA

FROST SOCKETS

- 414 SINGLE SHOCK ABSORBER SOCKET, for Standard 8/3
- 415 SINGLE SHOCK ABSORBER SOCKET, for UV199 4/3
- (All above sockets are made of Shellite and have sponge rubber cushions.)
- 416 BAKELITE SOCKET, for 220 and UV199 Valves 3/2
- 417 BAKELITE SOCKET, for Standard Valves 4/4
- 418 3 GANG SHOCK ABSORBER SOCKET, for Standard 21/6
- 419 VALVE SOCKET, for Standard Valves 2/0
- 420 3 GANG SHOCK ABSORBER SOCKET, for UV200 21/0

FROST RHEOSTATS & POTENTIOMETERS

- 421 COMPLETE WITH HARNED BLADE BAKELITE KNOBS, METAL SHAFTS, TIGHTLY FINISHED, KNURLED TERMINALS, ALL TECHNICALLY PERFECT
- 422 RHEOSTAT, 5 ohms (Marconi Shellite) 2/2
- 423 RHEOSTAT, 5 ohms (Marconi Bakelite) 4/8
- 424 RHEOSTAT, 25 ohms (Marconi Bakelite) 7/5
- 425 RHEOSTAT, 50 ohms Variable (Marconi Bakelite) 6/0
- 426 RHEOSTAT, 5 ohms Metal Frame 5/3
- 427 RHEOSTAT, 5 ohms Variable Metal Frame 7/4
- 428 RHEOSTAT, 25 ohms Metal Frame 5/4
- 429 RHEOSTAT, 25 ohms Variable Metal Frame 7/6
- 430 POTENTIOMETER, 100 ohms (Marconi Bakelite) 3/6
- 431 POTENTIOMETER, 200 ohms Metal Frame 2/5
- 432 POTENTIOMETER, 100 ohms Metal Frame 2/8

FROST MISCELLANEOUS

- 433 EXTENSION COORD., complete with Adapter and Plug 22/6
- 434 LOOSE COUPLER, of Resonating Transformer 7/5
- 435 CRITICAL TUNING COIL, RESONANT (1100 cycles) 2/0
- 436 RADIO JACK BOX (for 4 plugs) 2/0
- 437 ADAPTER, for USB or UV199 2/0

"Appliances" 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 LLancet

FROST'S

FROST JACKS AND PLUGS

- WORLD PLATED, PORCELA INSULATION, NICKELED WELDER CONTACT, BRASS CORE SILVER CONTACT POINTS
- 438 OPEN CIRCUIT JACK 4/4
- 439 DOUBLE CIRCUIT JACK 4/4
- 440 OPEN CIRCUIT JACK 4/4
- 441 FILAMENT SINGLE JACK 4/4
- 442 FILAMENT DOUBLE JACK 4/4
- 443 AUTODYNE CIRCUIT JACK 4/4
- 444 PLUG, DOUBLE (2 connections) 4/4
- 445 PLUG, SINGLE 4/4

FROST MISCELLANEOUS

- 446 RESISTANCE UNIT, 20 ohms (to increase resistance) 2/0
- 447 IMPEDANCE UNIT, 10 ohms (to increase wave length) 1/0
- 448 POTENTIOMETER SWITCH 4/4
- 449 PARALLEL SWITCH 4/4
- 450 PUSH-PULL MASTER SWITCH 4/4

FROST HEAD PHONES
STANDARD THE WORLD OVER

- 451 TONES (Ammonium Head Piece), 5000 ohms 30/6
- 452 TONES (Aluminium Head Piece), 200 ohms 27/6
- 453 TONES (Marconi Shellite Head Piece), 200 ohms 45/6

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

"Appliances" Cards Furnished Dealers and Clubs Without Charge

United Distributors Ltd.
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MANUFACTURERS OF HOME ASSEMBLY SETS

Puth Brisbane Adelaide Melbourne



FROST RADIO
No. 414, Shellite Shock Absorber Socket, Standard Size, made of little Shellite.

For close fit, with a cushioned pad of three Shellite Shocks. The construction is identical with one excepting sockets, permit for heat expansion and contraction.



FROST RADIO
No. 422, Frost Radio Head Piece Rheostat or Potentiometer.

Designed to operate in the best sound and tone, with complete freedom of all moving parts and guaranteed to deliver uniform results. Made to order and built up as to give a rigid structure. The whole of the construction and the contacts are General standard. Multiple scale markings, for precise reading, also available in some instances, according to the needs of various operators. Small metal parts and wire, fitted together.

- No. 422, Metal Frame Rheostat, 5 ohms 2/2
- No. 423, Metal Frame Rheostat, 25 ohms 7/5
- No. 424, Metal Frame Rheostat, 50 ohms 6/0
- No. 425, Metal Frame Potentiometer, 100 ohms 3/6
- No. 426, Metal Frame Potentiometer, 200 ohms 2/5
- No. 427, Metal Frame Potentiometer, 100 ohms 2/8

READ OF THE ABOVE WITH REFERENCE TO.



FROST RADIO

FROST COMBINATION POTENTIOMETER-RHEOSTAT

COMPLETE WITH SENSORS, ALL HAVE KNURLED BINDING FOR CONVENIENCE AND ARE TECHNICALLY PERFECT.

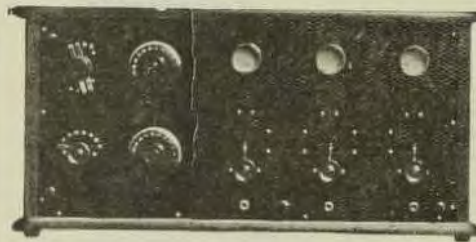
448 TONE CONTROL UNIT, a combination of a 10-ohm Variable Rheostat and 500-ohm Potentiometer 17/6

449 TONE CONTROL UNIT, a combination of a 5-ohm Variable Rheostat and 100-ohm Potentiometer 17/6



FROST RADIO
No. 451, 5000 Ohm P.P., Toney Unit.

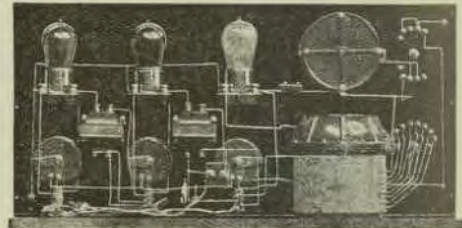
Make this 3 Valve Receiving Set YOURSELF



—or you can purchase this 3 valve Experimental Set, complete with Baldwin Phones, Radiotron Valves, all batteries, aerial wire, insulator, etc., Amplion Loud Speaker. Price £42/10/-.
Country residents have no difficulty in picking up K.G.O., San Francisco, on a COL-MO Receiving Set.

Complete List of Parts required to build this Set as illustrated.

3 N.P. Bezels	0 3 9
Piece of Bakelite, 20 x 9 x 3/16 ..	1 0 0
Vario Coupler R.P.M.	1 12 6
(Gilfillan Coupler if desired) ..	2 18 0
Knob and Dial	0 2 6
.001 Vernier Condenser ..	1 12 6
3 Rheostats	0 15 0
3 Radiotron valves	5 5 0
(3 Valves, English, if desired) ..	3 3 0
3 Radiotron Sockets	0 18 0
(3 valve sockets, English, if desired)	0 6 0
Series Parallel Switch and Studs ..	0 6 0
Selected Switch and Studs ..	0 4 6
3 Jacks	0 3 0
1 Plug	0 2 8
Wiring Wire and Terminals	0 4 0
1 6-volt 60 amp. Accumulator ..	3 18 0
1 80-volt high tension Battery ..	1 5 0
1 Grid Condenser	0 1 6
1 Pair COL-MO Phones	1 12 6
100 ft. Aerial Wire	0 2 9



SHOWING INTERIOR OF SET

8 Insulators	0 2 0
1 Lead-in Insulator	0 1 3
Quantity of Lead-in Wire	0 1 0

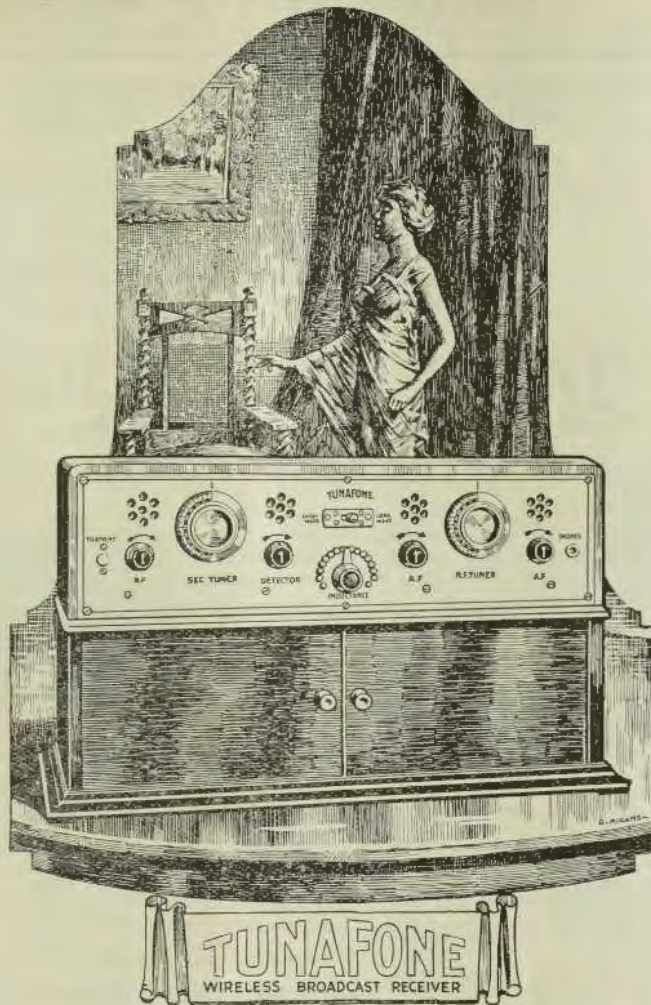
NO FURTHER CHARGE is made for supplying a diagram of circuit. Also the panel will be drilled to suit either the Radiotron or English Valves, free of charge.

ALL THE ABOVE AND 250,000 OTHER PARTS OBTAINABLE FROM

COLVILLE - MOORE

WIRELESS SUPPLIES LIMITED

10 ROWE STREET (HOTEL ^{NEAR} AUSTRALIA) SYDNEY



ABROAD AT HOME with a TUNAFONE MODEL X4

The Tunafone Model X4 consists of one stage of Radio Frequency amplification Detector and two stages of Audio Frequency amplification, a combination that will bring in far away broadcasting stations with great volume, and is the ideal receiver.

This model is supplied as illustrated above, with Battery Cabinet. No provision as a rule has been made to house batteries. The A and B Batteries are usually strewn about the table with their miscellaneous assortment of wires, making an unsightly affair suitable for a radio workshop, but not pleasant for a living room or other place in the house.

The Tunafone Model X4 is supplied with a battery cabinet with ample room for A and B batteries and head phones, and also conceals all wiring.

The Tunafone Model X4 is supplied as above with four tubes, B Batteries and Head Phones, and carries with it a GUARANTEE OF SERVICE. Price of Set and Battery Cabinet, £36.

DEALERS, write for the exclusive Tunafone Agency proposition to Sole Distributors for N. S. W.:-

THE CONTINENTAL RADIO & ELECTRIC CO., INC. (Wholesale Only)

GLADSTONE CHAMBERS, 90 PITT STREET, SYDNEY.

CHAS. R. GABB & CO.

14 Chessal St., Adeladie.

WILLS & CO., PTY., LTD.

7 Quadrant, Launceston.

Corbett, Derham & Co. Pty. Ltd. (Wholesale Only), Manufacturers, 573-85 Lonsdale-st., Melbourne



35 Cases Just Landed!
**Complete Stocks
of all Wireless Parts**

Every separate part necessary for the construction of a Valve Receiving Set is now available at David Jones'. These parts are guaranteed, and each is subject to thorough testing before delivery. Expert advice on their assembly freely given by F. Basil Cooke, F.R.A.S.

Many scarce lines are included in the following list :—

- | | |
|---|---|
| 201 A Radiotron Valves. Price 35/-. | Magnus V.T. Sockets. Price 4/- |
| Remler V.T. Bakelite Sockets. Price 5/9 | Aerial-earth Switches. Price 2/6 and 3/3. |
| Remler Coil Plugs, No. 48. Price 3/9 | Marco Potentiometers. Price 13/9. |
| Universal B Battery Clips. Price 1/6 | Complete 2 Stage Audio Amplifier with socket transformer, rheostat, etc. Price 80/- |
| Dubilier Micador Grid Cord. Price 2/6 | Polar Co. Vernier, 2 coil-holder. Price 22/6 |
| Bradleystats. Price 12/6 | Knobs high-grade, with sight line. Price 1/6 |
| Bradley Leaks. Price 12/6 | Marco Rheostat, 30 ohms. Price 7/-. |
| Test Clips. Price 6d. | Jumbo push-pull Switch. Price 3/-. |
| Magnavox, R 3. new model. Price £10/10/- | 23 Plate K.C. Condensers. Price 21/- |
| Magnavox, No. 4 model. Price 48/10/-. | 43 Plate K.C. Condensers. Price 32/6 |
| Jefferson No. 41 Audio Transformers. Price 32/6 | Western Electric Loud Speaker. Price £2/19/6 |
| Battery Switches. Price 2/6 | Lightning Arrestors, from 5/6 |
| Sterling Pocket Meters. Price 15/-. | Buzzer. Price 5/6 |
| A.P. Valves, 2 in 1 standard base 35/- | Super Heterodyne Transformers. Price 35/- |
| Super Heterodyne Oscillators. Price 16/6 | |

DAVID JONES'

RADIO DEPARTMENT = 252 YORK STREET, SYDNEY

The Best is always the Cheapest in the Long Run

The dominant thoughts when buying Radio parts should be, "Are They Efficient?" and "How Long Will They Last?"

GILFILLAN PARTS

Furnish the answers to those questions

They are 100% efficient

They never wear out



R 350

These condensers are of new design, are equipped with heavy moulded bakelite end plates, are rigidly braced and will not warp out of shape. The metal plates are of scientific design and occupy centre of space at all positions.



R 125

VARIOCOUPLER

The finest that can be produced. Moulded brown bakelite, split bronze bearings; winding tapped at 15 points for very close tuning. Obtainable in two sizes.

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Our Demonstration Hall open
every afternoon.

ANNOUNCEMENT

TO INTERSTATE TRADE.

HARRINGTONS LTD. have taken over the sales and distribution of MARCO Products throughout Victoria, Queensland, Tasmania, South Australia, and Western Australia.

Write for Price List.

Harringtons LTD

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Sydney

MELBOURNE: 266 Collins Street.
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BRISBANE: 93 Queen Street.
ADELAIDE: 10 Bunde Street.
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AUCKLAND, N.Z.: 140 Queen St.

TRADE MARK

ADVANCE

RADIO GOODS

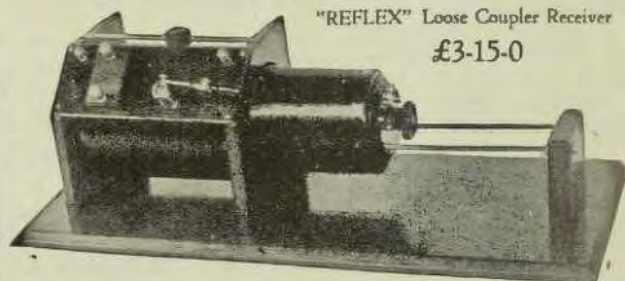
For Better Reception of The Broadcasting

Watch for the NEW VALVE PEEP SCREWS AND USE "ADVANCE" Double Coil Mountings, Coil Plugs, Potentiometers, Rheostats, Valve Sockets, Condensers, Transformers, Etc., Etc.

CLARKE & HAGBLOM Products.



OUR SPECIAL
LINE
PEERLESS
Head Phones
2000 Ohms.
32/6



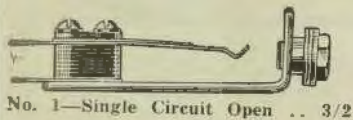
Complete Set of Parts to make the above Set 36/6
Postage 1/6

RADIO HOUSE
619 George Street, Sydney

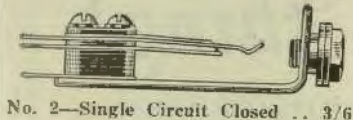


SATURN

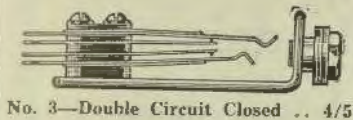
Products



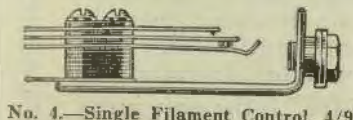
No. 1—Single Circuit Open .. 3/2



No. 2—Single Circuit Closed .. 3/6



No. 3—Double Circuit Closed .. 4/5



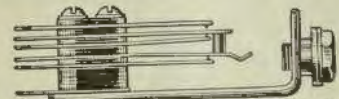
No. 4.—Single Filament Control, 4/9



No. 4a—Second Audio Jack .. 5/4
(For Neutrodyne Receivers)

This Jack is an improvement on any other Jack on the market. It is made entirely of non-ferrous metals, therefore no magnetic influences. The bracket is made of specially prepared brass strip with rounded edge, bent against the grain, insuring extreme strength and good appearance. Nipples, washers, screws, all made of Brass, highly nickeled and polished. All blades are made high grade German silver of spring temper, having tension springs where needed. The contact tips are made of pure silver, the best substitute for platinum. The ends of the blades are made with the crowfoot offset, allowing easy access for all wires; they are tinned and charged with a non-corrosive soldering flux, thereby preventing acid corrosion and consequent short circuits.

They are of standard dimension and fit any standard plug, and can be mounted on any panel.



No. 5—Double Filament Control, 5/-



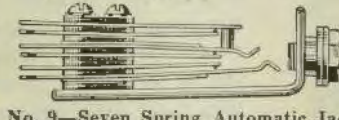
No. 6—Detector Jack
(For Neutrodyne Receivers) 6/-



No. 7—Loop Antenna Jack .. 4/5



No. 8—First Audio Jack .. 5/8
(For Neutrodyne Receivers)



No. 9—Seven Spring Automatic Jack
6/-



Welby Radio Co.

Wholesale Only
13 ROYAL ARCADE, 1st Floor
(North Side)
SYDNEY





Hearing's the thing!

The Headphones are all-important. There is only one economy possible, and that is to buy the best. The construction of

Brown's Type "A" Headphones

is quite distinctive. The ordinary diaphragm is replaced by an iron reed, tuned to a suitable tone, to which an aluminium cone-shaped diaphragm, spun to the fineness of paper, is screwed. This diaphragm will respond to the most feeble impulses which would not affect other headphones. Broadcast vocal and instrumental music is heard at great distances with wonderful distinctness.

Wireless enthusiasts agree that "super-sensitive" is the only way to adequately describe these phones.

"To obtain the best results from your receiving set it is essential to use best headphones."

Procurable from all Radio Dealers.

Amalgamated  Wireless
(Australasia) Ltd.

97 Clarence Street
Sydney

Collins Steeet
Melbourne



EDITORIAL

MR. FISKE, says a daily paper, told the Science Congress at Adelaide, that a trunk wireless telephone service between London and the capital cities of Australia is now coming into view. The same paper has unearthed the fact that Sydney broadcasting has been heard at Rabaul.

The statement of Mr. Fiske, while it will provide a new subject for attention on the part of those papers whose policy on wireless matters seems to be to tear everything to pieces and leave things at that, and while it will afford fresh scope for the activities of non-wireless writers on wireless in the dailies, is founded on hard, cold fact, and is amply substantiated by recent speech reception from England, and by the records put up every night by amateur transmitters. While the daily papers are discovering wireless, amateurs are reaching out for fresh worlds to conquer. Mr. Allsop's reception of speech from a 1½ k.w. station in England caused a small stir in the experimental world—until this was eclipsed by the feat of a New Zealander, who, with a power of only 10 watts, successfully worked two way telephony (for a short time, it is true), with an experimenter on the other side of the Andes. Undoubtedly this is a record which has not been approached elsewhere, and which, by the way, it is questionable whether any commercial company has been able to get within hailing distance of.

But such is the perseverance of the experimenter, that, long ere the commercial service predicted by Mr Fiske, is actually in existence, the gulf will have been bridged by experimenters and the exchange of speech between England and Australia be an almost everyday occurrence.

Our remarks last week on the subject of a transmitting test week have already produced results, and, besides a few transmitters, a number of experimenters possessing receivers only have written us expressing a desire to co-operate.

This is encouraging — but we want to reach much further afield than the environs of Sydney.

Any person owning a receiver is welcome to co-operate in the test, which, it is proposed, will be

held from October 1st to October 7th, and we want all those who wish to join in, to notify us as soon as possible.

Sydney at the present time resembles nothing so much as a world gone crystal mad. What may be termed the cult of the crystal is daily attracting a large number of followers; in fact, it seems that Mah Jong, golf, bridge, and—if we may mention it within shooting distance of the above pastimes for the elite—ye olde and venerable game of two up, are being rapidly deserted for the new and fascinating hobby of tickling the galena.

That it is absorbing the attention of young and old alike was demonstrated to us by a little incident that occurred last Sunday. We were passing a two storied house not a million miles from Mosman, when the noise of hammering rent the solemn calm of the Sabbath afternoon, and glancing up to the balcony we observed a venerable old gentleman of at least 65 summers. With a militant look in his eye, a screw driver in one hand, with the other he clutched an object and held it up, the better to view it—and behold, 'twas a single slide tuning coil. Yea, verily, when the bug bites, it bites good and hard, and none may escape it.

FROM PORT MORESBY.

Many amateurs in this State will remember Mr. Leo Cusack, late of Pennant Hills radio, and now doing a term of tropical service at Port Moresby, Papua. In a recent letter to us, Mr. Cusack mentions that the following amateur transmitters have been logged at good strength at Moresby on 1 detector and 1 low frequency. 2CM, 2HM, 2DS, 2GR, 3XF, 3BH, 3MH, 3BU, 4EG, 5AD, and 5BG. 2FC comes in well, but on that wave length, interference from Japs is very bad. The voice of 2BL is frequently heard up there, and many a good programme has been enjoyed.

Leo sends his "Howdys" to all his friends in the wireless world.

WHAT ARE FROST LINES?

SEE PAGES 2 and 3.

ANOTHER COMPETITION

£30 WIRELESS SET FOR 7d.

In order to bring the merits of the Inkontaina Bottle and Inke before the public, the directors of Inkontaina Limited have decided to launch a competition, the prize for which will be a £30 wireless set. Full details will appear in our next issue. In the meantime secure a bottle of Inkontaina ink from the local stationer at a cost of 7d. and study the good points of the bottle.

D.X.

G. Eastway, "Wyoming," Maroubra Bay Rd., South Randwick, sends us his latest. Using one detector valve (UV-199) he has logged the following keypunchers:

C.W. and Phone.—Vic.: 3JU, 3BD, 3BM, 3JD, 3BU, 3LO. N.S.W.: 2CR, 2GQ, 2BM, 2BY, 2HM. Queensland: 4GE. N.Z.: 3AD, 3AC. Tasmania: 7BE.

C.W. only.—Vic.: 3BQ, 3BH, 3SW, 3DB, 3JR, 3LS, 3EN. Queensland: 4CG, 4CK, 4AN, 4CM, S.A.: 5AC, 5EN, 5LO. W.A.: 6AG. N.Z.: 1AA, 4AA, 2AP, 1AO. Tasmania: 7BK. U.S.A.: 6 CGW, 9ZT.

Mr. Eastway tells us that on more than one occasion he has heard 6WF (Farmers, Perth) but unfortunately interference from 2FC has rendered reception difficult.

A Wireless School

IT is a foregone conclusion that Radio has come to stay. This newest scientific invention has indeed captured the public fancy. There is no doubt but what Radio will be of tremendous commercial and educational use. This, aside from the immense amount of pleasure derived by "listeners in" when concerts are broadcasted.

The latest innovation in Australia is a Wireless School Department, which has been inaugurated by the Claravox Radio Company and which is under the direct supervision of Mr. Walter Hannam.

Mr. Hannam is well-known in Radio circles and can be termed a true Wireless expert. For eighteen months, Mr. Hannam accompanied the Sir Douglas Mawson Antarctic party as chief Wireless Engineer. During the war, he served in France for two years as Wireless instructor. His first license was obtained in 1908. Mr. Hannam's broadcasting station, 2YH, is well-known to all Radio enthusiasts.

The objects of this Wireless School are to teach pupils of all ages the principles of wireless. How to construct their own Valve Receiving Sets and the Morse Code. The pupil builds his own set under the direct supervision of Mr. Hannam and at the same time, lectures are given explaining the principles and functions of each part which goes into the assembly. This, naturally, means that the pupil will obtain an absolutely thorough knowledge of Wireless Receiving.

The first term of three months' duration starts on September 5th. As there will only be a limited number of pupils accepted, it would be advisable for any person interested in this class of work to enrol at once.

Strange to say, there is no fee for this tuition. It is all absolutely free of charge. Naturally, the Claravox people attach a string to this free instruction, the condition being that all parts be purchased from the Claravox Radio Company. This will not be any hardship on the part of the pupil, as the component parts are all of the very highest quality obtainable and at prices which are, in a great many cases, below cost of those elsewhere.

This opportunity should appeal to those people who are desirous of owning and operating a Valve Receiving Set, but object to the high cost of such an outfit. As a big percentage of the cost of Radio Receiving Sets can be charged to the knowledge of knowing how to do it and to labour, it can be readily understood that a great saving will be affected. The Claravox people will teach people to build 2, 3, 4, 5, or larger Valve Radio Receiving Sets. Their address is Adams Chambers, 195 Elizabeth Street, Sydney.

THOSE LIMERICKS

Did you hear that one of 2 CM's last Sunday night? If not, here it is:

A florid young man of Roseville,
Who was given the first name of Phil,
He's the Institute's Bard, and he finds the work
hard,

"Twill be harder, but needs Phil's skhil sthil.

There is the story of the dusky lady, narrated by Mas in the Rock Island "Argus," who went into a drug store and asked for a cent's worth of insect powder.

"But that isn't enough to wrap up," objected the drug clerk.

"Man," exclaimed the dark lady, "I ain't asked you to wrap it up. Jes' blow it down my neck."
—Exchange.

WHAT ARE FROST LINES? SEE PAGES 2 and 3.

INTERSTATE NOTES

VICTORIA.

3 B. Q.

Mr. Max Howden, the Columbus of Wireless, who first discovered America over the ether, as far as Australia is concerned, is an excellent example of how industry is liable to get rewarded when there are discerning business firms about. He has recently been appointed works manager in the wireless department of Messrs. Corbett, Derham & Co., of Melbourne. His first task was the exceedingly knotty one of designing a Tunaphone capable of receiving broadcasting on all wave lengths, from amateurs up to Farmers.

Of course, the feat was accomplished. 3BQ is well-known to all who take notice of "clicks" that pass in the night, and it is one of the ironies of Fate that he regards the mystic letters B.C.L., as a badge of contempt. The picture of Columbus loaded with chains in his old age, is a pathetic one, but in this modern case, no doubt, the chains will be of gold.

Perth Telephony Heard in Melbourne.

Perth Farmer's broadcasters is gradually winning its way into the sets of Victorian ether-swipers. Receptions ranging from the three valve power to five have lately been reported, and Perth, once notable for its remoteness, bids fair to become almost as domesticated here as Sydney. Meanwhile, these are the delightful days of pioneering. Young Colin Sampson, mentioned in previous notes, has opened his heart to a three-valve set and reports having heard Perth's whistle just above Farmers, of Sydney, but who can be ecstatic during these last few weeks of static? Mr. Jarvis, a young manufacturer of X-ray and wireless parts, has heard Perth intermittently on 5 valves with a loud speaker, but he also has been victimised by static.

Static.

Talking of static, it is odd that we amateurs put up with it so patiently just as we do with tight lacing, tight collars, tight boots, and other civilised afflictions. The remarks of Mr. Burrows, in a recent Wireless Weekly as to the lack of enthusiasm over that big prize for the elimination of static, are well to the point. The total elimination is, of course, a tough problem, but there are certain alleviations or palliations of the disease that deserve a trial. Balanced circuits, screening the

aerial in a cage of high resistance wire, the use of a loop, substituting counterpoise for earth, a short aperiodic aerial, and numbers of other devices, singly or in combination, form a fertile field for investigators. Moreover, static is not always the culprit. It is reported most on high wave lengths, for which we use larger coils and other devices more or less foreign to the first design of the set, and, therefore, likely to be makeshift in design or fitting.

The Dealer's License.

Yet another crime has been added to the Commonwealth decalogue—that of selling wireless goods without a license. While the regulation is designed to serve a very proper purpose, namely, to provide a means of securing a contribution from dealers to the upkeep of broadcasting, still its incidence is peculiar. Big wholesaler and small vendor and installer alike contribute £5, and businesses worth hundreds of pounds a year, pay no more into the Treasury than the small suburban man who likes to keep a few coils and telephones and other accessories for a chance customer. Of course, the small shopkeeper is too small to protest, so he either pays up or is wiped out. To add another terror to the overburdened suburban man in Victoria, at least, the Victorian Electrical Federation has already espied a fresh outlet for its organising abilities, and is forming a Wireless Traders' Section. This means that, besides £5 to the Commonwealth, the unfortunate "Licensed Radio Dealer" will also have to subscribe £10/10/- to the Victorian Electrical Federation, which will not allow its wholesale section to sell goods at wholesale prices to any retailers outside the fold. This would necessitate a suburban dealer doing a considerable trade in wireless goods to recompense him for the initial yearly "overhead" of £15 odd. Of course, this will drive suburban business into the metropolis where, no doubt, the influential members of the Federation want it. Up, then, of necessity will go the prices of material, costs of installation, etc., and wireless will become a luxury like electric kettles and other high-priced goods under V.E.F. control.

The High Cost of Wireless

To do the V.E.F. a little more than abstract justice, it is well to add that its organiser, a man of

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

interesting personality and ability, can very glibly present quite another view of its intended activities. With such wise apothegms as that "Rome was not built in a day," suburban electricians have been lured into the lion's den with a lively anticipation of favours to come, when all electricians will be of one mind, and the public at the mercy of high prices. What with the V.E.F. and the Department of Telegraphs and Wireless, the dealer in wireless goods is likely to feel very much between the devil and the deep sea, and his customers are liable to feel the pinch accordingly. Australians are not likely to be particularly intrigued into paying from £20 to £100 for the relatively meagre services offering by broadcasters, when the printing press and the gramophone give a wider range at a lower price without reduction.

Crime in Wireless

A young fellow employed in a Melbourne wireless store has just been sentenced to one month's imprisonment for stealing wireless goods from his employer. It is a distressing feature of such cases that the boy is led into crime by a very commendable youthful enthusiasm which gets him the job and then brings about his downfall. One would like to see some other means of nipping such criminality in the bud than the unimaginative process of imprisonment. On the sound Shakespearean principle that "lilies that fester smell far worse than weeds" it is also true that many amiable young fellows with a smattering of technical training and a hankering to possess suddenly, what, to purchase out of their wages would take a long time, are likely to make the worst criminals. In this particular case, the thefts were extensive, and totalled over £100. In the simplicity of youth, most of the goods he had kept at home, and built up into a wireless set. His employers said they had no desire to see him dealt with harshly, and in his own behalf he made a statement that indicated he was by no means a bad boy, but apparently there was no option but to imprison him. It is cases like these that cry out against modern methods of dealing with incipient criminality. The drastic unfairness of it is realised only by those who, mixing with young fellows on terms of familiarity, know the bad habits of speculation and deceit that are too common and yet go undetected. Very often a caution from a friend or employer, sets the young man on the up-grade, for it is only a temporary fever very much like the excesses of University Students, for example, who run amuck awhile, but afterwards settle down into a sober, righteous and godly life, ending up perhaps, as J. P.'s. To make criminals of such unformed char-

acters is a grotesque perversion of civilised institutions.

Recovering the Ashes.

The Victorian Wireless Institute is fortunate in possessing among other good lecturers on its club roster, a very experienced handler of radium and X-rays, Mr. Baker, of W. Watson & Sons, the well-known scientific instrument makers. He is down on the roster to lecture on Radiation, which he treats from the broad view of all known waves, from radium to wireless. In the course of discussion, after a recent lecture, he was led to relate how he retrieved the radium tube recently lost at Melbourne Hospital. It will be remembered that after a patient had been treated with radium, a novice rolled up the wrappings and three radium tubes and all in the waste bin. After these had been incinerated in the destructor, to the horror of the staff, the radium was found to be missing. The ashes were raked from the destructor in the faint hope that the tiny silver tube of radium might be found there, but a frenzied overturning of the ashes proved fruitless. £200 worth of radium was astray. Mr. Baker volunteered his services, after the University had pronounced the case hopeless. He took with him an electroscope, surely as simple a piece of apparatus as ever was seen. He diverged the gold leaves duly, by rubbing his ebonite penholder on his sleeve and approaching it to the electroscope, then passed tray after tray of ashes near the sensitive instrument. After about two hours monotonous procession of ashes, suddenly the gold leaves dropped together. Mr. Baker pounced upon the tray, sorted out the ashes carefully, and came upon a little blackened object that proved to be the missing tube. This is, indeed, an excellent example of the service that science can render to humanity. Mr. Baker, with his two gold leaves, forms a picturesque figure in the imagination.

A Novel Notion—Three Phase Wireless

As far as known, all transmissions hitherto, has been in single phase, but it is highly probable some form of three phase transmission through the ether, will come into vogue in the future. Its potentialities are promising. Either straight three or triple phase of the one wave length could be used, or the message split over three or more different wave lengths emitted simultaneously. When properly handled, this would secure secrecy, as reception of only one or two of the constituent wave lengths would yield a meaningless mass of fragmentary sounds. The possibilities of even present transmission on the one wave length being slightly out of phase with one another, are worth investigating. They might explain a few puzzles.

THE
Wireless Institute of Australia
N.S.W.  Div. Inc.
Incorporating the Affiliated Societies and The Australian Radio Relay League

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A.H. Ferrer Publicity Officer

RADIO RELAY LEAGUE.

SLOWLY but surely the officials of the League are getting an organisation together which should prove of invaluable benefit in case of emergency. It is very gratifying to note that inter-State transmitters are evidencing a very keen interest in this matter. The numerous enquiries which have been received by the Hon Secretary, Mr. Phil Nolan (2 Y1), Box 3120, G.P.O., are proof that the matter has been taken seriously. Victoria, South Australia, and Tasmania in particular have shown keen interest in the matter and it is hoped that before long a working schedule will be in force under which it will be possible to relay messages at regular intervals between all States of the Commonwealth. Those transmitters who have not yet forwarded details of their Station with particulars of the times they are prepared to work are invited to do so without delay. The amount of time which must be devoted to this work is not by any means great, one hour a week is quite sufficient although more would be welcomed, but whatever period is undertaken must be regularly adhered to and the duty undertaken must be regarded as a sacred one. This will not entail any hardship, but it is essential for the success of the League that it should be so, and experimental transmitters taking part in the activities will be well rewarded by knowing that they have helped to create an organisation which will be a national asset in case of emergency.

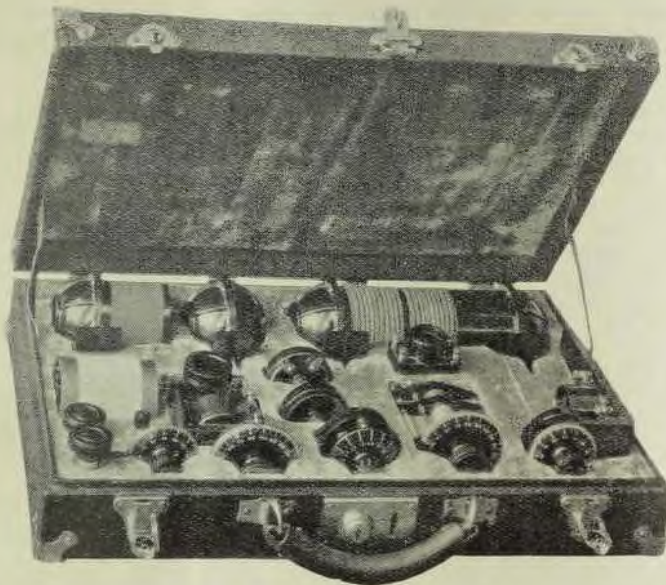
AFFILIATED CLUBS.

The interest shown in the affiliated scheme by the various Clubs and Societies in N. S. Wales is still very keen. Indeed there is no reason to ex-

pect that it should be otherwise, in view of the many benefits which accrue under the scheme. Enquiries are still being received from those few Clubs which up till now have not linked up with the Wireless Institute in this manner and it is confidently hoped that before long every Club will be inter-linked in this way. In connection with this it is expected that at an early date the roster for lectures arranged by the sub-committee will be in full swing and the inter-change of talent such as is assured by the strenuous efforts of the sub-committee concerned, will be of incalculable benefit to every experimenter. As pointed out in these notes last week, every Member of a Radio Club should attend the meetings not purely with the selfish idea of obtaining information and help for himself, although undoubtedly very few meetings pass without something being gleaned, but he should have the far broader outlook of the benefit that he himself can give to his fellow-experimenters, and indeed to the whole movement of wireless in Australia, by his presence. Many a time some casual remark passed by possibly the most insignificant Member of a Club has set others thinking and it is doubtful if the final result of such achievements as have astounded the world can be really traced back to their original source. It should be the aim of every experimenter to add something to the lustre of the glorious name that the wireless amateur of Australia has already gained and to this end no contribution either in the way of lectures, discussions, criticisms or questions should be considered too trivial for presentation to the Club or Society to which the experimenter belongs. In this connection a word to those who at present are not attached to any Society may not be out of place. The fact of belonging to a Society should not be considered as a tax either upon the time or the

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

The Grip de Luxe



The photograph shows a type of ultra modern radio traveller's sample bag. It was designed by Mr. Hayward C. Parish, General Sales Manager, of Harrington's Ltd., distributors of the well-known Gilfillan products, which are extensively used in the manufacture of high class sets throughout Australia. The grip, which is of black morocco, lined inside with rich blue plush, contains the Gilfillan variocoupler, variometer, variable condenser, and other parts which will be recognised in the photograph.

as an honour and as a means of furthering not only the interests of the individual concerned, but also the whole wireless movement in Australia. To be the proud possessor of a wireless set with an experimental licence carefully pasted on the wall over it should not satisfy any genuine experimenter. His aim and object in life should be to add to the store of knowledge of the art possessed by his fellow-man, and unless he can disseminate the knowledge that he gains his work will largely fall to the ground. The best way in which the knowledge can be passed on is by a Club, and for his own sake, for the sake of his fellow-experimenters, for the sake of the science of wireless and

for the sake of Australia, every experimenter should belong to a Radio Club.

CERTIFICATES.

Those experimenters who are entitled to the Certificates issued by the Wireless Institute of Australia, are requested to kindly collect them from the Institute Headquarters, 82B Pitt St., Sydney, between the hours of 10-12 a.m. and 1-4 p.m. Up to the present it may have been inconvenient for some to call, but they should make a point of doing so as early as possible.

A. H. PERRETT
Publicity Officer.

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

A REAL SUPER CRYSTAL SET

We make no apologies for reprinting this article. Our object is to serve the greatest number, and enquiries show that hundreds and hundreds were disappointed in not being able to get Wireless Weekly the week before last. Incidentally we want to remark that this crystal receiver is original, and was designed solely by Insulator—Editor.

WOULD you like to make a crystal set which will Beat anything you have ever heard? Do you want a receiver which will give you results equal to the average single valve set? Do you want a set which is simplicity itself in tuning; one which will give better results than the usual single slide coil with its attendant nuisance of a slider?

Of course you do, provided it is easily made and of course, provided it doesn't cost too much. Well, then, here is one which will just fill the bill nicely. Pardon me for praising by own creation, but this set is absolutely wonderful. In all my experience I have never heard one crystal set which will give anything like the volume; which is as simply made; which is as cheaply made, and which is as easy to tune. I know I am writing like a politician would talk; but excuse me, people, I am carried away with the enthusiasm over this latest creation of mine, and so will you when yours is going.

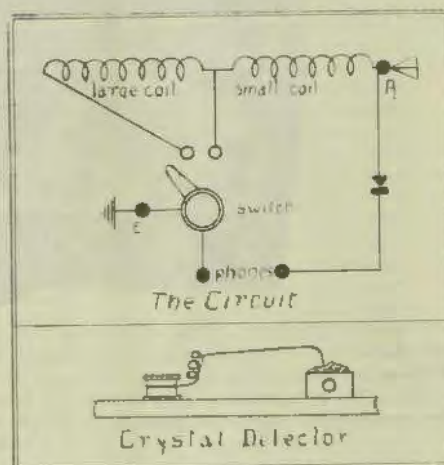
You see I know you will make one just to try it. The complete set of parts may be bought for under 10/-, and you will say that my claims are justified once you spend one hour to build it.

I have long had in my mind to devise some sort of crystal set which will function equally well on the wave lengths of the two N.S.W. broadcasting stations and which can be made cheaply and easily. Many different ideas have I had of late, but one trial of each was sufficient for me to discard most of them. This little fellow has stood the test, so now I have no hesitation in giving you the particulars necessary to make it.

For tuning coils, I employ Grodan Spider Web formers wound with No. 28 gauge D.C.C. wire. One former is wound with just sufficient wire to bring in Broadcasters (Sydney) Ltd., and the second former carries the necessary number of turns which, when used in conjunction with the first former acting as a variometer, will give Farmers with surprising strength.

No other wave lengths are provided for, as I realise that most people wish to hear only these two stations. A switch operating on two contact studs will give either of these two stations at will. Better than wandering along a coil with a slider, don't you think so? Sure you do!

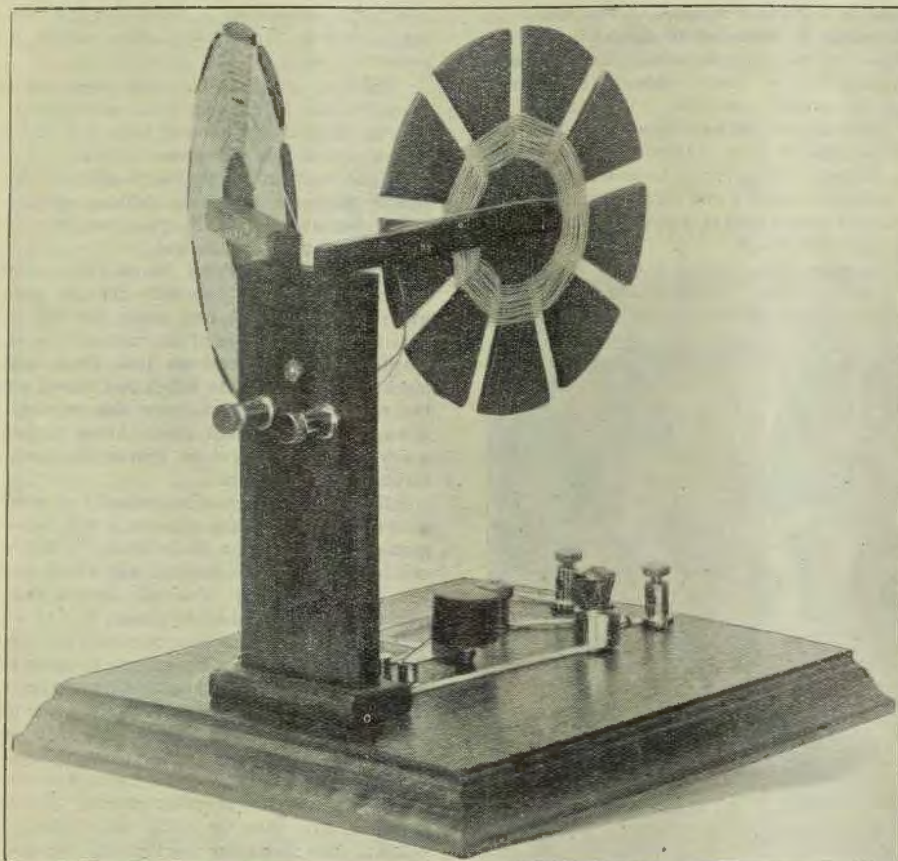
Look at the illustrations now. The whole outfit looks very well. You will notice that all the wiring is "above board." This I have done in order that you may follow it out clearly, but in order that no mistake will be made (I, too, make mistakes) I have drawn the wiring diagram.



The material required is as follows:—

- 2 Grodan Spider Web formers.
- 1 Baseboard, 6½ x 5in. (wood).
- 2 Coil Supports, 4in. or 5in. long x 2in x 2in.
- 1 Vertical board, 5½ x 2in. (wood).
- 4 Terminals (aerial, earth and phones).
- 1 1½in. Switch.
- 3 Contact Studs.
- 4 ozs. No. 28 D.C.C. Wire.
- 4 ½in. x 6 Csk. Brass Wood Screws.
- 1 Flat top terminal.
- 1 Crystal Cup.
- 1 Catwhisker.

These last 3 items may be dispensed with, and a crystal detector complete may be purchased. But I have used the terminal cum crystal cup cum catwhisker type of detector, preferring it in fact.



By the time this appears in print the various sizes of boards will be available at most of the advertisers in this issue where also may be obtained the Grodan Spider Webs.

I have always had a hankering after these Spider Webs. Old readers will remember the regrets I expressed about not being able to obtain these formers for the Portable Single Valve Set, which I described some months back. They are particularly useful for many purposes. I'll tell you more about their uses at some later date.

Now I will tell you how to wind these formers. Using the 28 gauge wire, leave about 8 inches for connections and take the wire through a slot and

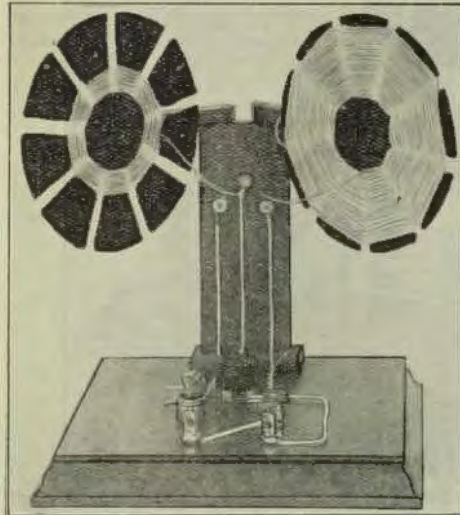
in front of a section, through the next slot behind the next section, through the following slot, in front of the next section, and so on. One turn when completed will have the wire on alternate sides of the sections, and the second turn will show the wire on each side. Quite a simple operation altogether.

On one former (Broadcasters) I have 26 turns of wire, 13 on each side. This just gives me Broadcasters nicely on my aerial. Your aerial may be different, so I advise you to wind on 32 turns, and connect the beginning of the coil to your aerial, and the 32 turns to the earth. (Bare the ends of the wire first, of course.) Also to your aerial connect

one side of the crystal detector, the other side of which goes to one phone terminal. The remaining phone terminal is connected to earth.

Connect up your phones now. Can you hear Broadcasters? You can! Alright now, still listening in, unwind one turn. Getting louder? Good! Now unwind the next turn. Louder still? Well, then break off here. Unwind the next turn, note the strength and continue to unwind until you achieve maximum results and leave it at that. To keep the coil secure pierce a hole in the former and lace the end through.

Before going any further I want to tell you this. Don't be scared of this unwinding process: it is really very simple and even if you do unwind



too much wire it will only take you two minutes to rewind the coil.

However, having found the correct number of turns required for one coil pick up the second former and wind it full with 88 turns (44 on each side) of the 28 DCC wire.

A guide to the correct number of turns required for the second former can be gauged from my own set. I have 26 turns on one coil and 86 on the other. This second former is not of such great importance as far as the number of turns is concerned, as the coupling will make up any deficiency in this direction.

Both coils being wound, turn your attention now to the wood-work. Sandpaper well and give, say, a couple of coats of shellac varnish for appearance's sake.

Painting or varnishing holds a peculiar fascination for me, in common with most people. Once I have finished my allotted task with the brush, I look about, like Alexander, of old, for further worlds to conquer. Only the pleadings of Mrs. Insulator stops me from slap dabbing up and down everything at hand. Oh, yes, you have finished the shellacing! Pardon me!

Pick up the vertical board (2in. wide) and half way along drill two holes for the aerial and earth terminals and one more for the contact stud to which the join of the two coils is secured. On the top edge, half an inch from each side mark out the spots into which you intend screwing the coil holders. Now screw this vertical board down to the baseboard using brass countersunk screws. These screws of course are screwed up through the baseboard.

Next mark out your baseboard. I won't give you any directions for this as I will leave it to yourself. Study the illustrations. The switch, contact studs, crystal detector and phone terminals are clearly shown. You can accept this as a guide. Assemble the parts now.

The coil supports now require your attention. Drill a hole sufficiently big enough to allow the two remaining wood screws to pass through up to their heads. Countersink with a large drill or if stuck use a penknife. Using shoemaker's brass spriggs, attach the coils to the other ends of these supports (see illustrations) making sure that both coils are running in the same direction. Screw the supports, now with the coils, on to the vertical board. You remember marking out the places for this.

Next the wiring. This is easy too. The inside of the smaller coil is taken to the aerial terminal from which a lead is taken to one side of the crystal detector. The outside of the smaller coil is joined to the inside of the larger coil and the joined portion is clamped under the contact stud in the vertical board. Be sure you leave sufficient wire to allow the coils to swing right away from each other. From this contact stud a wire is connected to one of the contact studs in the baseboard.

The remaining contact stud in the baseboard has the end of the larger coil connected to it. A connection is now taken from the earth terminal

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

to the switch, and from thence to one of your phone terminals. The remaining phone terminals is connected to the remaining side of the crystal detector. This completes the wiring.

Connect your aerial and earth to their respective terminals and also your phones. Insert a piece of crystal—I always use N.H.M. galena, that's it in the illustration, and say, lend me your ear till I whisper this: "It is the best crystal I have every struck." Listening in are you? Splendid, isn't it? Have you heard anything better in the way of crystal sets? I knew you hadn't! Now switch across to the next contact stud. Gee! doesn't the "Hello man" or "Uncle George" sound close? Notice the difference in Farmers' when you bring the one coil close to the other. Notice also the difference when one is moved away from the other. Leave it at its loudest spot as far as the coupling is concerned and scratch about the surface of the galena until you find the most sensitive spot.

Splendid little set, isn't it? Very well, I'll leave you with it, as I know that you are proud of it. I know I am because I can see big things in it. And I can see the joy it will bring to "kiddies" of from 3 to 60. That alone repays me for the time spent in perfecting it, and I am sure many will be made at various homes.

In passing, I want to mention that the selling rights of this complete receiver are reserved. Since the photograph of this set was taken I have noticed an improvement by shunting the phone terminals with a Wetless .001 phone condenser. Get one, they're good.

CULLEN'S SLOGAN COMPETITION

After carefully considering the numerous entries for the above competition, and after long consideration by Mr. E. R. Cullen and myself, we finally decided that, owing to the lack of originality shown in the efforts, that this competition shall be run for a further period.

To the many who have sent in slogans, we want to say this: Practically 95 per cent. featured some such slogan as "Cullen Conquers Competition."

Now, while the word "Cullen" is not necessarily debarred from the competition, it is advisable that competitors keep the thought before them that what is really required is essentially a wireless slogan.

It is pointed out that the prize, which is a 3 Valve Signal Set, is well worth trying for, and in

fairness to those who have already sent entries, and also to give a chance to fresh competitors, all restrictions have been removed; that is to say, it is not necessary for a competitor to have purchased goods at Mr. Cullen's store, to be eligible for the competition.

Now, readers; pile in and do your best.

A. W. WATT,

Editor.

Insulator



Stung to the quick by the photograph we published of him last week, our friend, "Insulator," who scarcely needs any introduction to readers of Wireless Weekly, has come out of his shell, and given us this photograph for publication.

A modest, retiring citizen of a likeable, easy going disposition, pleasing personality, and prone to spend much of his time after business hours untangling the knotty points of wireless for the enthusiasts who visit his home at Marrickville.

And now that we've let you in this far, we may as well take you right into our confidence and tell you everything—but don't let it go any further! His name is William Lambert Hamilton, President of the Marrickville and District Radio Club, and recently unanimously elected a member of the Wireless Institute of Australia.

SEE THE FROST LINES ON PAGES 2 and 3.

ANOTHER SHORT WAVE RECEIVER

By W. A. Stewart

SINCE writing my last article I have found something new in the way of short wave receivers.

This new receiver is known as the Reinartz All Wave Tuner, and as its name implies, it will cover any wave length within reason.

Before going further I do not want anyone to consider that I invented the circuit or even improved on it; all I have done is to build up a receiver from the instructions given, and believe me, it is the goods.

The receiver will go down to 30 metres and up to anything you like; although it oscillates it will not reradiate. It has only one valve, is the most selective ever, has but two tuning controls and is absolutely silent when there is nothing doing.

The circuit, which is shown in Fig. 1 is an adaption of the original Reinartz circuit with the exception of the plate coil, and the addition of a detuning coil in the aerial circuit. The object of this coil is to detune the aerial circuit so that its effect on the tuning will be negligible. It will thus be seen that any size aerial may be used without any alteration to the wave length of the circuit.

The coil L2 is the main coil in the circuit and has four ends. The beginning of the coil is connected to the aerial, the first tap goes to the earth the next tap to the main tuning condenser, while the end goes to the grid condenser.

The coil L3 is a Radio Frequency choke and is used to keep the radio frequency currents out of that part of the circuit which is at audio frequency; this coil is of importance and must be used.

The two condensers C1 and C2 are both eleven plate variable condensers of good quality. Care should be taken to see that the condenser C2 has well insulated ends, as it has the B battery potential continually across it, and if it leaks at all it will soon run the B battery down, especially if 60 volts are being used as some of the harder tubes often need. The condenser C1 should also be of good quality as the frequency is extremely high on 30 metres, and a poor condenser will ruin the selectivity of the receiver. It will be noticed that the moving plates are earthed which minimises body capacity effects to a great extent.

The condenser C3 is composed of two feet of lamplex, one wire of which is connected to the

aerial, and the other to one switch point. The other ends are left disconnected. This condenser, on account of its small size, makes the set extremely selective, and is only switched in when QRM is bad.

In the original circuit the size of the grid condenser was given as .001 but this was unsatisfactory, so a .0002 was used instead. A variable grid leak is also an advantage.

The filament is not critical, so any rheostat that is suited for the valve in use may be used. Although of American origin the circuit functions quite well on English Valves, a Phillips D1 or a Cossor giving excellent results.

We will now pass on to the actual construction itself.

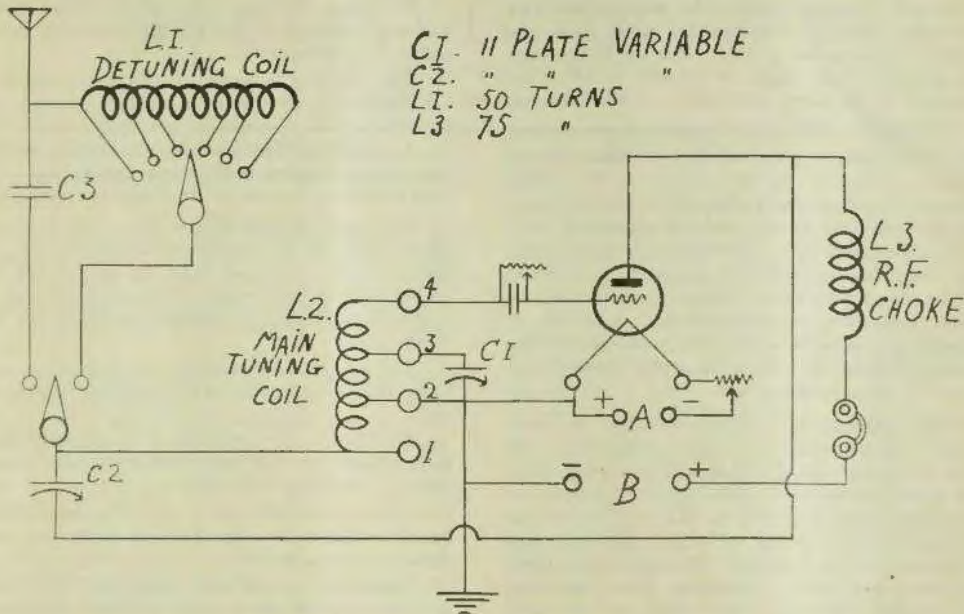
There is no occasion to be very fussy concerning the coils, and Reinartz recommends that they be wound in the following fashion.

Get an ordinary drinking glass about two and a half inches in diameter, wind the wire on jumble fashion, slide the coil off and wind a few turns of thread round it, and there you are.

For the plate choke coil (L3) wind on 75 turns of 24 D.C.C. This coil is secured as near the plate connection of the valve as is possible, and should be mounted at right angles to all other coils.

The detuning coil L1 is wound with the same size wire on the same size former. Fifty turns are put on, tapped every ten; they then are connected to the six points of a switch, the arm of which is connected to one point of the other switch arm which is used for cutting in the coil or condenser. This coil is mounted on the panel, and can be fixed so that the taps hold it up. It should also be at right angles to the other coils.

The next coil, L2, the most important of the lot, is wound with 14 or 16 D.C.C. on the same former; five turns are put on, and a tap taken. Then fifteen more turns, another tap, then five more, and the coil is finished. You will notice that there are three times as many turns in the centre section as there are at the ends, the wave length range of the coil described is 150 to 250 metres, so it will be seen that if a nought is added to the centre section of the coil and a nought to the total number of turns, the wave length range of any coil



C1. 11 PLATE VARIABLE
 C2. " " "
 L1. 50 TURNS
 L3 75 "

Reinartz All Wave Tuner.

can be calculated before it is built. Always maintain the three to one ratio, and the tuner will be O.K.

If we provide four terminals on a strip of bakelite, the coils can be changed at will, and the reason for the name All Wave Tuner is explained.

On the same strip of bakelite, mount the valve socket, and mount it so that the only connection between the last terminal and the grid terminal of the valve is that of the grid condenser.

Run all leads as direct as possible, and as far as possible keep them at right angles to each other. If the battery terminals are mounted at the back of the baseboard, and the aerial, earth, and phone terminals on the panel, the wiring is easy, and the leads are quite short.

In mounting the main tuning coil L2, the four leads can be secured to a small strip of bakelite, and four copper spade terminals soldered to the ends of the wire, so that it will just be the right dis-

tance to allow the coil to slip under the four terminals.

In laying out the panel, mount the condensers about four or five inches between centres with the switch arms one beneath each other mounted between the dials. The rheostat can be mounted near the extreme end of the panel and the leads are then as short as possible. With a little manipulation the receiver can be built on a panel 12 inches by 6 inches, which is quite a convenient size.

The grid leak on my own receiver was made by attaching a small piece of bakelite by two machine screws to the grid condenser. Before putting in the screws, put plenty of pencil lines around the holes, clamp the screws up tightly, and while the set is in operation rub on a pencil line, containing this until the results are best. If too much is put on, rub it off with an eraser. On no account use paper or cardboard for a grid leak as it is hydro-

WHAT ARE FROST LINES? SEE PAGES 2 and 3.

scopic and in damp weather the value of the grid leak alters, causing undue noise in the receivers, which is often called static. If a set is functioning properly, there should be no noise at all in the receivers if the aerial and earth are disconnected.

In operation the set is extremely easy to handle, no trouble being experienced in controlling the oscillations, with the variable condenser C2. The detuning switch on the aerial coil is adjusted until the set oscillates freely, and the tuning is done by the condenser C1. The tuning is particularly sharp on the condenser, but a station once heard can be copied over quite a large range on the condenser controlling the oscillations. A feature of capacity regeneration is that the regeneration condenser (C2) does not alter the wave length nearly as much as a tickler would.

The originator of the circuit, Mr. Reinartz, claims that it is selective enough to tune out a one K.W. station operating a thousand feet away, on a five metres difference in wave length. I have not experienced Q.R.M. as bad as that, but it is quite a simple matter to tune out any of the local stations, some of which are quite close, on two or three degrees on the tuning condensers; V.K.Q. has long since stopped worrying me, while 2BL is never heard. The set will oscillate quite freely well below one hundred metres, and I am building a coil to go down to 30 metres, on which wave length Reinartz himself is transmitting in U.S.A., using one half K.W. The U.S.A. Navy also intend to carry out tests on fifty metres using two K.W. input. With a stage or two of audio amplification little difficulty should be experienced in bringing some of these stations in, as there is practically no Q.R.M. or static on these low wave lengths.

Another great feature of this set is that it will not reradiate, radiation being effectively blocked by the detuning coil (L1).

Furthermore the size of the aerial makes no difference to the tuning; in fact the tuning condenser C1 may be calibrated in wave lengths from a wave meter and the readings will always remain constant.

I have only just completed the set, and, judging by the way the local stations come in, as our American friend would say, "She sho' perks."

The set is as quiet as a neutrodyne, being absolutely free from the noise usually found in regenerative receivers.

In tuning, the tuner dial must be moved slowly but once a station is heard, little trouble is experienced in keeping it in.

The coils may be wound in any fashion you like, but they must remain the equivalent of those described.

A vernier arrangement on the dials is an advantage for bringing in the weak stations, but quite good tuning can be accomplished with ordinary dials.

The small series condenser has no effect on the tuning, so that if considerable interference is experienced this condenser may be cut in and the station will be still heard. The condenser can be rolled up and secured beneath the detuning coil on the panel.

The set is the most selective single valve set I have had dealings with, and is by far the quietest.

No trouble is experienced with self oscillation, and the fact that it does not re-radiate should make it even more desirable.

I have not found the A and B battery adjustments critical and once the grid leaks has been adjusted it can be left.

Remember to use good condensers, both fixed and variable, and don't forget to earth the moving plates of the tuning condenser. It is also a good plan to shield and earth this condenser with a piece of brass sheet. This will then eliminate capacity effects.

If the set does not work too well at first, look to the grid leak, as it is important. Also remember to tune slowly as the tuning is very fine and a station may easily be missed.

First Book Censor—This book is something terrible. We've got to ban it.

Second Censer—Is it snappy enough for me to read?

"Sure it is."

"Well, you know you fooled me once."

First man—What kind of leather makes the best shoes?

Second Man—I don't know; but banana skins make the best slippers.—Iowa Green Gander.

"I went to an Irish wedding last night—"

"I suppose the groom wore the conventional black eye?" — Life.

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

SPARK COIL VALVE TRANSMITTERS

FOR SHORT WAVE OPERATION

By W. P. Renshaw, M.W.I.A.

(Paper read before the Wireless Institute of Australia (N.S.W. Division), on Tuesday, August 19th, 1924.)

I HAVE frequently in the past deplored the expense attached to the equipment of even the smallest experimental laboratory with a serviceable transmitter, within the twenty mile radius of a commercial or broadcasting station particularly.

It is with much diffidence that I now approach the subject of this paper, not being what one might term a highly experienced technician; but, however, I have decided to do the best I can under the circumstances, and what little information I have been able to glean I am only too glad to place at the disposal of others interested like myself, and if they profit therefrom I will have at least achieved my object, namely, the popularisation of one of the simplest forms of wireless transmission, which at first sight unfortunately appears rather difficult.

Unfortunately also the impression has gained a place in the experimental mind that unless one has A.C. laid on to the laboratory one cannot consider the installation of a modern transmitter. In one sense this is correct, but after all it is only a matter of £ s. d., for even out-back residents may enter the field of C.W. working provided they can afford to instal the necessary generating plant and provide for its upkeep. For example, Mr. Reg. Fagan, of Mandurama, N.S.W., whose complete outfit ran into considerably over £600.

To instal a 5 watt C.W. transmitter even in the most favourable circumstances where one is connected to an electric lighting and power system, it is necessary to spend up to £50 or £60 at the very least, taking everything into consideration, and allowing for the bulk of the assembling being done by the operator.

This really would not then represent the whole cost, as an experimenter worthy of the name would not be satisfied with "rule of thumb" methods and would require much subsidiary equipment in the way of meters for measuring input to various parts of the outfit, wave meter for correct calibration and various gadgets best known to the experimenter and reluctantly admitted as ne-

cessities, however modest the pretensions of the transmitter.

It is with the object of demonstrating that the matter of finance need not preclude any experimenter who can afford to instal a valve receiving set from possessing an efficient, long-range transmitter, and at the same time showing that one may be far away from any source of electric power supply, that I have for some time now concentrated my experimental activities on the development of the spark-coil valve transmitter.

Those familiar with C.W. transmitters will feel that I possibly rushed in where angels fear to tread, but it is no doubt due to the fact that I have not concentrated on C.W., that I had no fixed ideas and entered the field of transmitters with a more or less open mind. I do not attribute my success with this particular transmitter altogether to my own efforts, as I have had much valuable assistance from many experimenters who have been greatly interested, due to the fact that the arrangement "worked" almost from the jump. The fact that it has securely placed 2D.E. "on the ether" speaks for itself.

It came about one Saturday afternoon about twelve months ago. A young friend and experimenter, by name, Fred. Thom, was visiting my station, and we were lying in the shade of the wireless cabin at 2 D.E., discussing the particular merits of a new phase of reception, namely Reflex Circuits. During the discussion we got on to the re-radiating qualities of various types of receiving hook-ups and I mentioned that if only a little more energy were applicable to such receivers they would make excellent long distance transmitters. Fred casually mentioned that he had heard of a transmitter using a spark coil and a receiving valve and roughly dotted down as much as he remembered of the circuit. It transpired later that the idea was one of Mr. Joe Reeds, which fact, if no other, caused me to take notice.

The possibility of building such a set and getting it to work appealed to me at once and as a preliminary I discussed the matter with both Mr. Joe Reed and Mr. Syd. Colville. Both agreed that the scheme had great potentialities, but as Mr. Reed

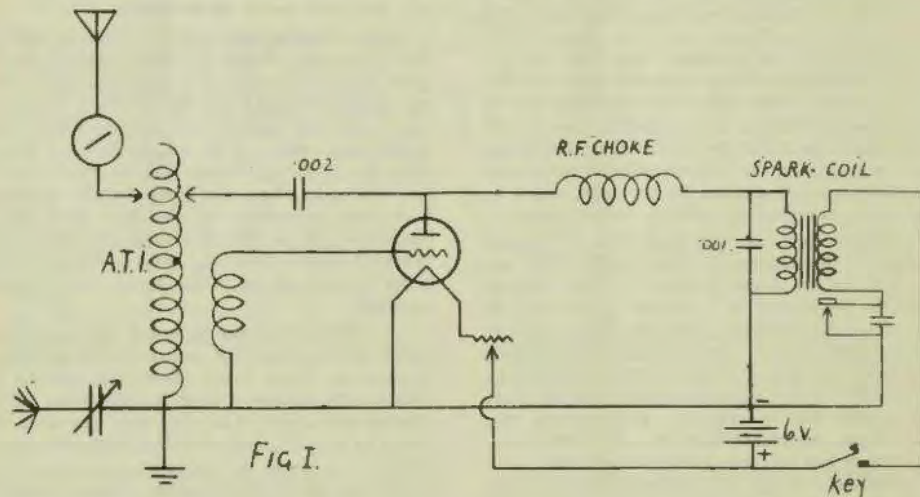
WHAT ARE FROST LINES? SEE PAGES 2 and 3.

had not been very successful with some previous experiments in this direction, they were not too enthusiastic about my making a success of it. The apparatus used consisted merely of a Ford spark coil, a 6 volt battery, a Marconi R receiving valve with rheostat, a 100 turn radio frequency choke, a heavy type .001 transmitting condenser made from photographic plates and zinc sheets, .002 Dubilier or other suitable small type transmitting condenser, telegraph key and aerial tuning inductance with re-action. A tuned counterpoise assists very materially though it is not an essential, whilst using two valves in parallel gives better results still.

The complete hook-up used at my station, 2 D.E., showing the method of connecting up the apparatus, is as under:

part of the secret seems to lie, I might mention I used various types of standard 4in. spark coil without success until recommended to try a common Ford, which possesses the correct inductive ratio, namely a 6-volt input and something between 15,000 and 20,000 volts output, or roughly a ratio of 1 to 3000. More about the function of the coil anon.

An ordinary 6 volt Willard car type accumulator is used by me whilst the Marconi R valve (French R's. also function well) and rheostat are familiar enough to all. For convenience I am using a 100 turn Remler coil and suitable mounting as a radio frequency choke, whilst the heavy type photographic plate condenser consists of 24 half plates enclosing 23 zinc sheets of size 3in. each way less than the half plate.



The aerial tuning inductance consists of mutual inductive type and is made up of 40 turns of No. 16 tinned copper wire wound on a vertical ebonite former, 4in. in diameter, the turns being spaced in grooves at intervals of 1/8in. By means of tens and units multipoint switches, the primary and secondary (mutual) inductances may be varied to obtain the desired wave length.

The re-action coil consists of 40 turns of No. 26 D.C.C. copper wire wound on an ebonite rotor, 3 1/2 in. in diameter and rotating inside the units end of the A.T.I. former, so that at minimum coupling it comes just flush with the units' end.

With regard to the spark coil where a large

The .002 Dubilier condenser is encased in pitch and is of standard commercial design, as may also be the operating key. The successful operation of the set is summed up in the securing of resonance between the various circuits, and even when everything is complete, this involves careful tuning of the secondary and re-actance, and is controlled to a considerable extent by the valve characteristics. In the case of R valve the filament is somewhat overloaded (approximately 6 volts, though designed to operate on 4 1/2 volts maximum) which somewhat shortens the life of the valve in consequence. I intend shortly experimenting with 5-watt tubes in lieu of receiving valve.

SEE THE FROST LINES ON PAGES 2 and 3.

The trembler of the spark coil requires careful attention, and must be kept clean and the points set as closely as possible. One of the chief drawbacks to an induction coil is the difficulty of satisfactorily interrupting the primary circuit, the contacts of the interrupter requiring continual attention even with small coils. With powerful coils this difficulty is very much enhanced, more especially when a station is required to transmit for long periods without a pause.

The function of the coil is to provide the electro motive force necessary for energising the condenser in the secondary circuit. The rise and fall in voltage across the terminals of an induction coil is very sudden and rapid. A simple mechanical analogy will serve to illustrate the point. Suppose that instead of producing current oscillations in an oscillatory circuit, we wish to make a ball bounce on the floor. To get the biggest bouncing effect we must pitch the ball up as high as possible to begin with. If we take the bouncing of the ball as analogous to the current oscillating in the oscillatory circuit we can compare the action of pitching up the ball to the action of charging the condenser. One way would be to hit the ball with a bat. This method can be compared with the method of charging a condenser from an induction coil, because if the action be analysed it will be seen that the force applied to the ball would be sudden and short in duration. Now in this case it is principally a matter of hitting the ball as hard as possible to project it to the maximum height and similarly when an induction coil is used to charge the condenser it is principally a matter of getting the coil to give the maximum voltage kick.

Careful adjustment of the trembler points will enable it to efficiently charge up the condenser at the highest possible frequency, as, working on a wave length approximately 200 metres, the frequency of the oscillatory circuit needs to be in the vicinity of $2\frac{1}{2}$ to 3 millions. To get maximum charging effect from the coil for a minimum expenditure of electro motive force, the frequency of the applied EMF must be in resonance with the circuit to which it is applied. Unfortunately there are five circuits to bring into resonance in the transmitter under discussion, but this need not constitute any considerable difficulty to any experimenter who understands circuit tuning. One fact worthy of note is that every variation of wave length, however slight, will materially affect radiation and must be followed with careful re-adjustment to preserve full resonance throughout.

Primarily there are two distinct circuits to be

considered, one, the low frequency or charging circuit, consisting of coil (primary) and the battery; (2) the high frequency circuit, consisting of the condenser, the inductance, and the secondary of the coil. Each of these circuits has a definite time period of its own, that of the charging or low frequency circuit depending on the frequency of the trembler, and the inductance of the primary, and that of the oscillatory circuit depending upon the capacity of the condenser C, and the inductance of the aerial tuning inductance primary.

In the case of high frequency or oscillatory circuits the frequency of the oscillations varies in practice from about three million per second for producing very short wave lengths of one hundred metres, to about fifteen thousand per second for producing very long wave lengths of twenty thousand metres. In the case of low frequency or charging circuits using a spark coil, the frequency is governed to a large extent by the trembler frequency which varies in practice between about 100 cycles per second to 500 cycles per second. It will be seen therefore that the frequency of the oscillatory circuit is at least many hundreds of times greater than that of the primary circuit. Beyond this difference in frequency, however, there is no fundamental difference between an alternating current and an oscillating current, as these terms are only used for distinguishing the charging circuits from the wave producing circuits.

It may be asked, "Why cannot an ordinary induction coil be used for the direct production of electric waves?" The reason is that the wave length produced is inversely proportional to the frequency, and would be so great if a spark coil of normal frequency were used, that the difficulty and expense of erecting an aerial to radiate such a wave length efficiently would be out of all proportion to the advantages gained. In spark transmission this is obviated by the use of alternators. The problem is in fact similar to the problem of tuning up the primary oscillatory circuit of a transmitter to the aerial circuit, the only difference in the two cases being one of frequency.

The wave length produced by an oscillatory circuit

$$\lambda_m = 1885 \sqrt{C(mfd)L(mh)} \quad (A)$$

where λ equals wave length in metres, C (mf) equals capacity in microfarads and L (mh) equals inductance in microhenries.

The length of an ether wave is equal to the velocity of light divided by the number of waves

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

per second, that is, the frequency. And since this velocity is three hundred million meters per second it follows that

$$\lambda_m = \frac{300,000,000}{n}$$

when n equals frequency or cycles per second.

By substituting this value for λ_m in the equation (a) given above we get

$$\frac{300,000,000}{n} = 1885 \sqrt{C(m.f.)L(m.h.)}$$

$$\text{OR } n = \frac{3 \times 10^8}{1885 \sqrt{C(m.f.)L(m.h.)}} \quad (B)$$

Both these equations A and B apply equally to the oscillatory circuit whose function it is to energise the aerial, and to the primary circuit whose function it is to energise the oscillatory circuit.

As the frequency of the oscillatory circuit is, in practice many hundreds of times greater than that of the primary, it is evident therefore, that the values of either the capacity or the inductance, or of both, in the two circuits must be entirely different.

For the adjustment of resonance in the charging circuit, it is not always possible when designing a transmitter to estimate exactly what will be the inductance of the various parts, such as dynamo, transformer, choke coils, etc. Further, instruments although made to the same designs will not always have exactly the same values of inductance on account of slight differences in workmanship and material. It is therefore usually arranged that a variable inductance or choke coil be included in either the primary or secondary circuit. When, however it is for one reason or another undesirable or impracticable to include a variable choke coil, the spark coil, dynamo, transformer, and other parts of the circuit are so arranged as to give very nearly the required inductance, and the final adjustment in tuning of the low frequency circuit is accomplished by varying the speed of the alternator or in the case under discussion of the frequency of the trembler, until its frequency is in resonance with the circuit. This method, however, only allows for a very limited variation. For one thing if the speed of the trembler is increased or decreased in order

to obtain a higher or lower frequency, the voltage which is generated is increased or decreased in proportion. This in its turn will have the effect of increasing or decreasing the power of the transmitting set, which is for obvious reasons undesirable.

It is desirable therefore that the total inductance of the charging circuit, but more particularly in this case of the secondary circuit, be designed to be very nearly correct. The variation of the frequency of the trembler however, within a limited range is a very convenient method of obtaining perfect resonance.

In the spark coil valve transmitter the note by virtue of the use of a valve or valves in parallel is of the interrupted continuous wave character, as the impulses through the valve are of such high frequency as to approximate a continuous wave train and the set is not radiating at all unless the key is closed. If the key is kept closed the emitted note so closely approximates a continuous wave as not to be recognised as anything else except to the expert. It will thus be understood that when Mr. C. D. Maclurcan (2CM) first got his skill and dextrous receiver hetrodyning with my I.C.W. and immediately christened it the "Banjophone," whilst Mr. R. C. Marsden (2J.M.) in his turn called it the "Swish-Swosh," they were able to detect the almost imperceptible distinction from the true C.W. note.

My Q.S.L.'s. have been more than satisfactory, the long distance ones including Mr. Dane in Melbourne, a station at Woodstock (N.S.W.), and Mr. Todd, of Tamworth, reporting signals QSA, indicating complete radiation both south, west and north, whilst metropolitan receivers in Sydney report enormous punch. This is all very gratifying when one considers the simplicity of the apparatus, using no more than an accumulator battery for the input which approximates 18-watts, an aerial input of 3 watts being obtained measuring 400 milliamps in the aerial.

Mr. J. G. Reed has since succeeded in constructing an efficient similar transmitter, although he is using a low voltage A.C. supply, and we have often worked each other with great success.

To my mind such a transmitter as the one I have outlined, perfected a bit more, and made a bit more fool-proof, would be invaluable for use between inland stations and farms, and particularly

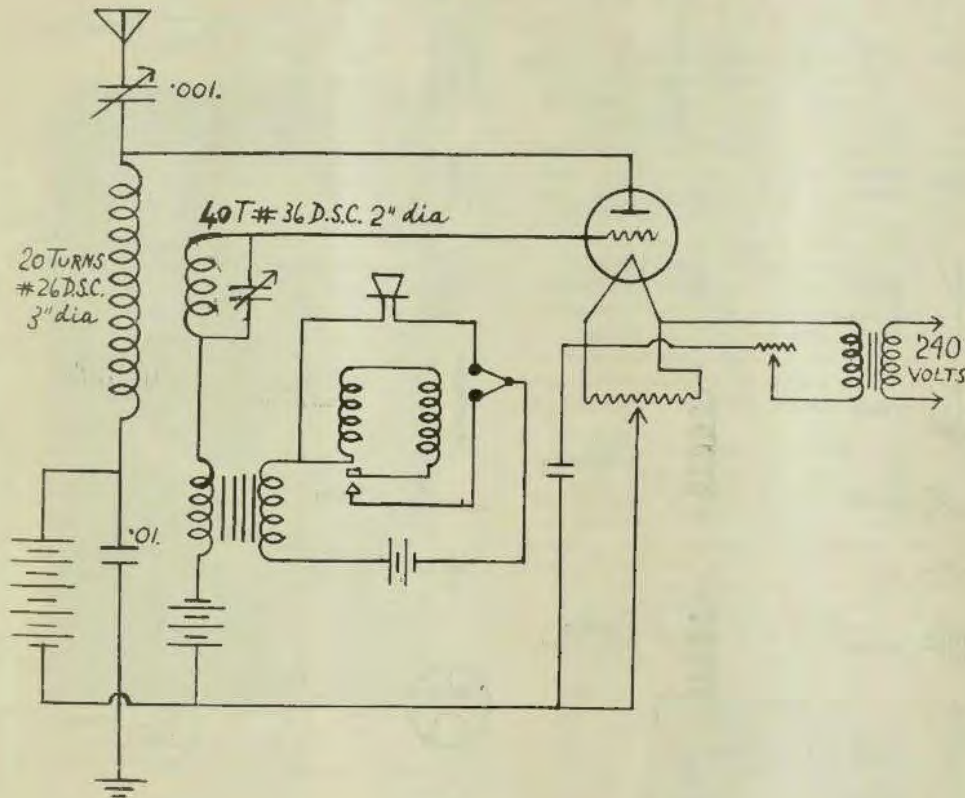
SEE THE FROST LINES ON PAGES 2 and 3.

so for motor car equipment where the necessary source of power is easily available from the car battery.

The telephony and buzzer requirement as indicated by the following circuit has not yet been tried

out by me, but I intend to continue my experiments in this direction at a later date.

(The paper was supplemented by numerous diagrams and explanations and was followed by a spirited discussion.)



Circuit to be tried by Mr. Renshaw.

She had debated in true Fabian fashion for many months the question of whether or not to bob, and two or three times had turned back at the tonsorial Rubicon.

Here she was at last, though, properly shrouded in a barber's chair, a trifle pale, but grimly determined.

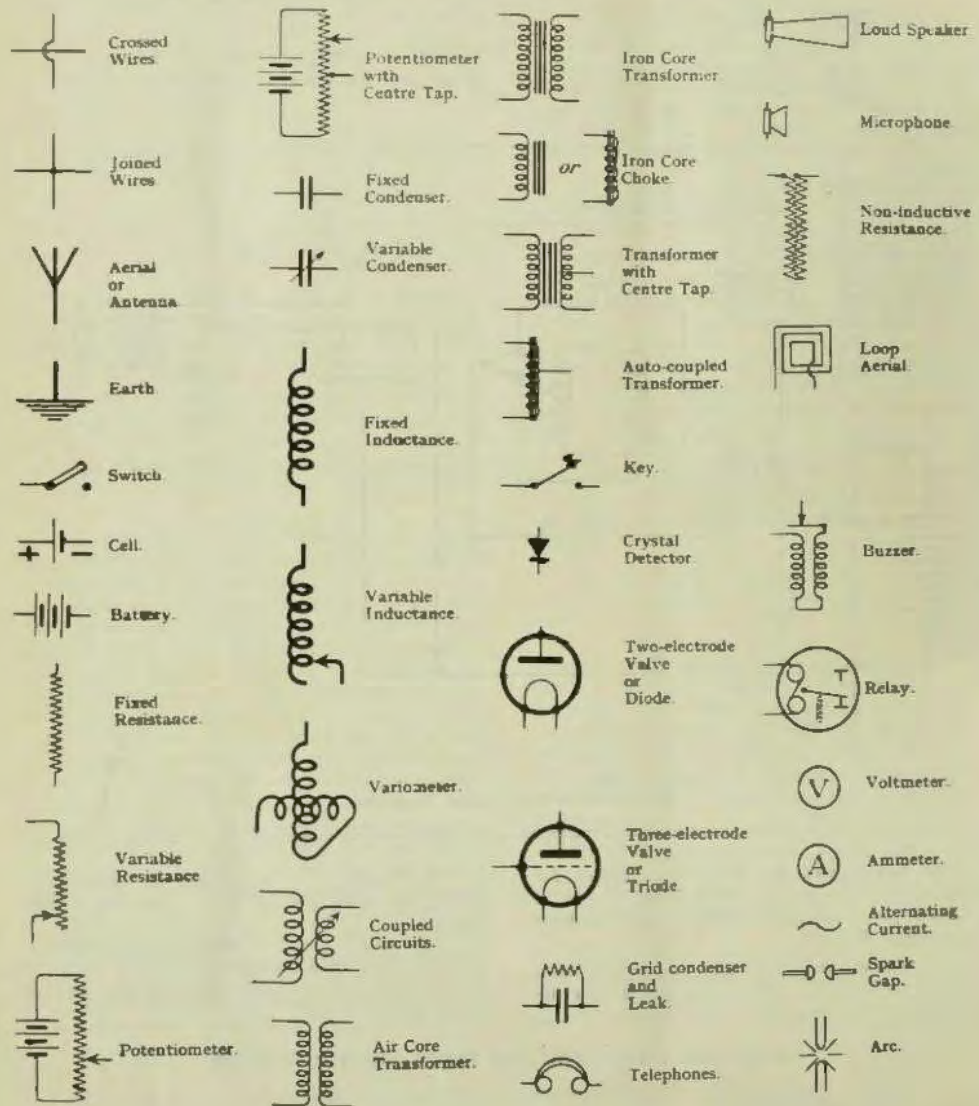
"How shall I cut it?" asked the barber, callously displaying his full kit of gleaming instruments.

The patient gazed at them in fascinated horror, hesitated, then quavered:

"I think you'd better give me gas."—Houston Post.

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

CONVENTIONAL SIGNS USED IN WIRELESS DIAGRAMS



Personalities in the Australian Wireless World



MR. E. A. HORNER
Works Superintendent, Amalgamated Wireless
(A/sia) Ltd.

Although a young man, Mr. Horner has had a varied and extensive manufacturing and electrical training. He served five years' apprenticeship with the New South Wales Government workshops at Randwick, finishing up in 1913.

During the following five years he was occupied for varying periods with such concerns as the Standard Waygoods Electrical Works, in connection with armature winding; with the N.S.W. Government Railway and Tramway Works in their electrical fitting department, mechanical fitting department, tool making and electrical testing depart-

ments; the Naval Wireless Works at Randwick; the White Bay Power House; and the Electricity Supply Department of the Sydney Municipal Council.

In 1918 Mr. Horner joined the staff of Amalgamated Wireless (A/sia) Ltd., as electrical draughtsman, and since that time has held the position of estimating engineer, chief draughtsman, assistant works' manager, and in May of last year, was appointed to the position of works' superintendent.

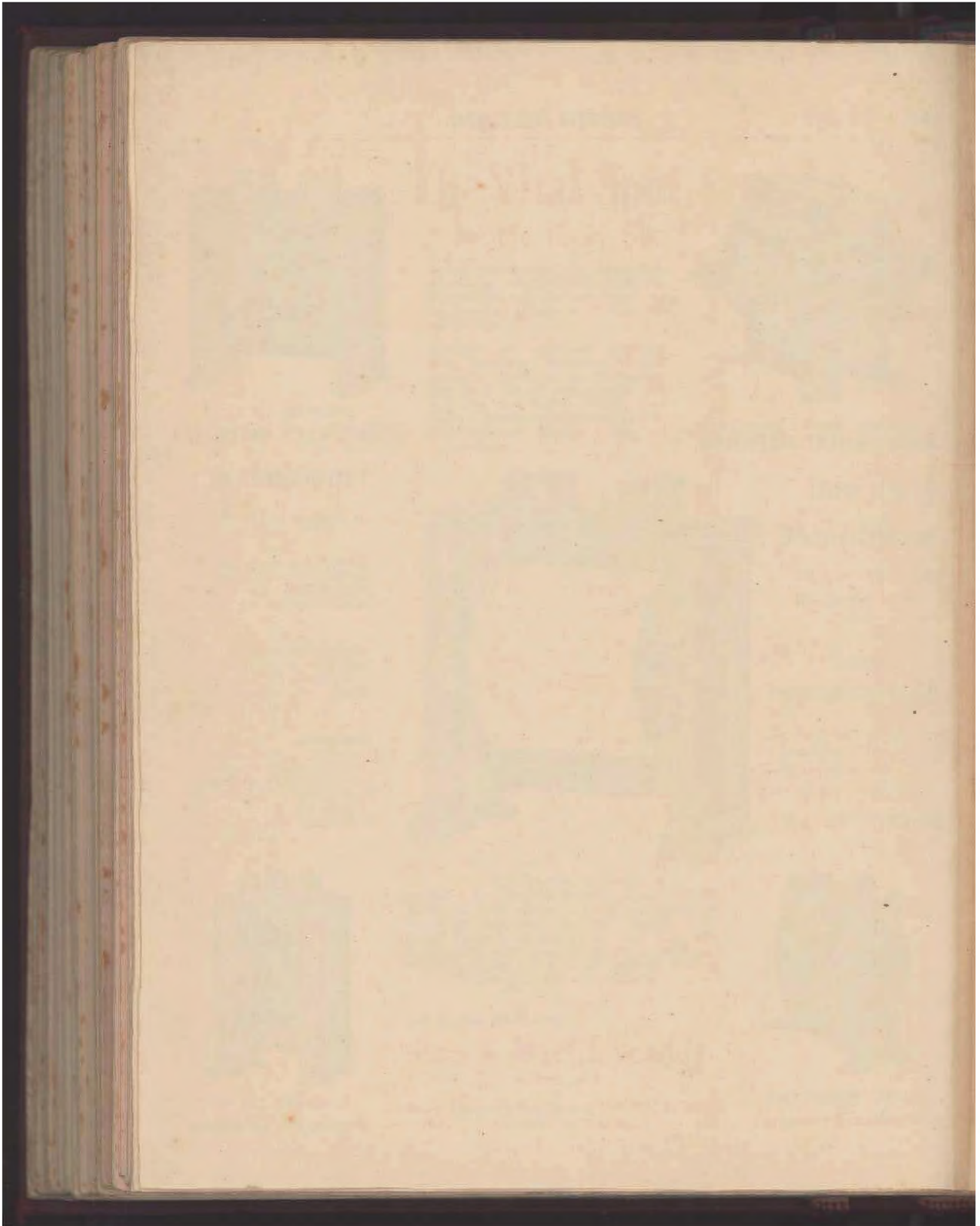
Coupled with his long experience in electrical and wireless work, Mr. Horner is a keen reader of books on every phase of modern industrial development and works' organisation, and with his extremely practical mind it is not surprising that at the radio electric works the system of operation incorporates the very best features in modern works organisation.

During the course of his work at Amalgamated Wireless (A/sia) Ltd., Mr. Horner has supervised the designing of much general electrical and wireless apparatus, including ships' receivers and transmitters, and broadcasting receivers and transmitters.



Mr. G. Maxwell Cutts, Secretary, Croydon Radio Club.

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BEGINNING AT THE WRONG END

By A. Burrows.

EVERY science has its unaccountable phenomena the effects and peculiarities of which seem to baffle the cleverest students. No branch of science is without these unknown quantities, which the medical profession, realising its own helplessness, generally finishes by labelling "X."

A glance down a list of the sciences, and the points which mark their failures, will prove this. Medicine finds itself absolutely helpless when it meets cancer or consumption; astronomy can scarcely tell the first thing about the worlds with whose movements they are so familiar; and engineers have to write off as "unaccountable" the greater number of accidents due to faulty machinery. The list could be continued almost indefinitely.

Wireless perhaps falls in for more than its share of unexplainable annoyances and hindrances—a distinction which it divides, perhaps, with every electrical science, although radio in this respect can safely be said to eclipse them all. It is quite in the contrary nature of things that the greatest boon and advantage of later years, perhaps, should be cursed with such drawbacks and handicaps as static, and to a smaller extent, by fading. There are, of course, a hundred and one other freak phenomena, which all help to render the way of the enthusiast a stony one, but these two instances represent the greatest difficulties which radio has yet to overcome. One of them, fading, also represents a most difficult thing to explain.

Conflicting Evidence.

Many and varied are the causes of fading—according to the theories of experimenters. I have in mind an article in an American paper which blames the phases of the moon for this variation in reception. The writer alleges that reception is best when the moon is at the full, "or during that period when the light from the moon most directly covers the area of radio reception."

Yet this is in direct opposition to the experience of many Australian experimenters. Again, the statement is made that at the critical period when the moon changes from full to no moon at all, reception becomes very poor. Many amateurs, however, assert that this makes little or no difference.

Quite a number of similar statements which lack collaboration are made every day in all parts of the world. All observers, or groups of observers are firmly convinced every time that they have at last nailed the cause of fading, yet seldom do the results of their observations dovetail with those of others.

This same failure to reach any definite conclusion is evident in the observation of the peculiarities of static. Some aver that towards nightfall static is at its worst; others say this is the best time for reception. It has been contended that local thunder storms make little difference in atmospheric conditions, and just as vigorously this statement has been denied. About the only point which appears to carry any certainty is the fact that static is less on the lower wave lengths—and before long some one will probably deny this.

Now, it is hard to believe in the midst of this contradictory data that either fading or static can obey any regular or calculable formula. That worldwide scientific observation fails to reach any set conclusions would appear to indicate that the matters in question don't follow any laws or regulations, so far, in any case, that they can be compared with other visible effects. This, of course, is excepting the undoubted causes of fading and static for example, as daylight, mineral deposits and certain electrical conditions. These, and similar recognised factors, however, play only a very small part in the many causes of atmospheric interference.

Is all this observation, with its impossibility of reliable deduction, therefore useless? It would seem so. Little progress has been made by the results of it.

In no two parts of the globe do conditions appear to run parallel, and fading and static—with a few exceptions—seem to "happen" entirely regardless of everything else.

Reaching a Solution.

Moreover, would anything be gained if any definiteness could be attached to the observations?

Continued on Page 40, Col 1.

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

AN UP TO DATE STATION

SOME weeks ago we published a report of K.G.O. having been logged on a single U.V. 199 valve by Mr. C. Walker, Clifton, Queensland. The main reason for this excellent D.X. work is attributed by Mr. Walker to the fact that a very efficient aerial and earthing system is used.

All the apparatus on the station is home made. Three years ago Mr. Walker started with a loose coupler set, and, having been deeply bitten by the bug, all his spare time has been spent at wireless ever since. His results are shown in the photographs.

Reading from left to right of photo. No. 1.

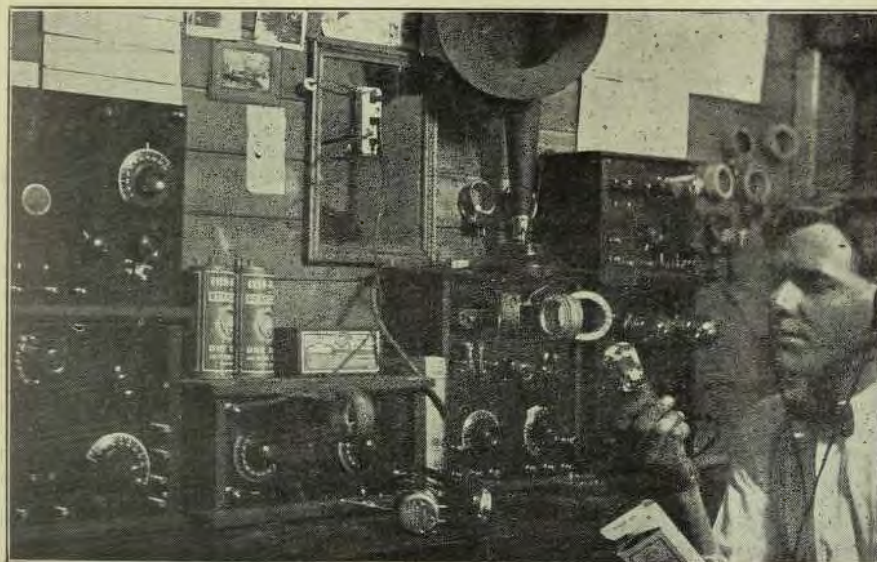
The bottom panel on the left is a single valve set made to use either the U.V.-200 or dry cell tube W.D.12. This set will tune from 250 to 1200 meters and New Zealand broadcasting has been heard with ease, also many N.S.W. and Victorian amateurs on phone.

The panel on top of the above set is a five watt Radio Phone Transmitter, almost completed, but waiting for a transmitter's license which was applied for some nine months ago.

The next small panel under the dry battery is the "wonder of the wireless cabin." It is a single wave coil using a U.V.-199 valve. K.G.O. has been clearly logged since the 26th July, at times for over an hour. This station can now be tuned in with almost the ease that our Australian broadcasting is. The music is much clearer with this little set than it is with a three valve Armstrong Regen Set, and at times will operate two pairs of Trimm's Phones.

The set under the loud speaker is a three coil regenerative set, which will tune to practically any wave length by changing coils.

Continued on Page 40, Col 2.

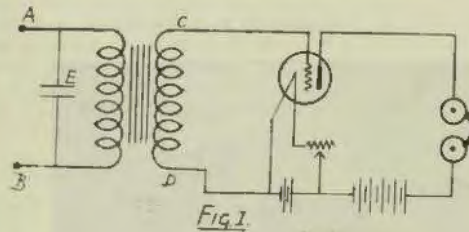


Mr. Walker's Station.

AMPLIFIERS

By "Catwhisker"

RADIO frequency amplifiers are used when long distance signals are to be received whereas audio frequency amplification are used to increase volume of signals. If volume is desired, add audio frequency amplifiers. Fig. 1 is a diagram of an audio frequency amplifier transformer coupled. Use a good audio frequency transformer of about 5 to 1 ratio for first stage and for succeeding stages 3 to 3½ to 1 ratio to get results free from distortion. If transformers are used with too high a ratio, the result is loud signals but terribly distorted. All audio frequency transformers give a little distortion, but this is not noticeable in most makes obtainable in Sydney. Taking Fig. 1, we see that the terminals, A and B, are connected where we usually connect phones or loud speaker on the existing set, be it valve or crystal. A crystal detector and an audio frequency amplifier of about



two stages, gives beautiful results with a loud speaker. A is connected to one primary terminal of our audio frequency transformer + B and B to the other usually marked P.

If the amplifier is being connected to a crystal set, one need not be particular which terminal of the crystal set is connected to A or B, but should it be a valve set, we are adding our note magnifier or audio stage so be careful to connect the plate terminal to B and the B battery terminal to A.

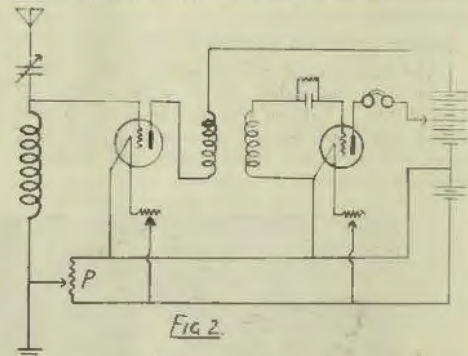
E is a fixed condenser of about .001 M.F.D. capacity connected across the terminals of the primary side of the transformer. This condenser acts as a by-pass for radio frequency currents which, otherwise, would tend to be choked by the winding of the transformer.

C is marked G on the transformer, and is connected to the grid of the valve.

D is marked —F on the transformer and this is connected to our common negative lead.

The rest of the diagram is self explanatory.

A grid bias battery used in audio frequency amplifiers, helps to prevent distortion. To do this, insert a small battery of about 4½ volts in the grid circuit, with the negative terminal on the grid side. The 4½ volt battery will suit a plate voltage of about 100 volts with a 201a valve.



Experiments with different bias potentials will be found best, as each plate potential requires a corresponding potential in the bias circuit.

The grid of our audio valve is always to be kept at a negative potential as then the grid is made to work on the correct portion of its characteristic curve for amplification. Bad howling in the phones can often be overcome by this method or by reversing the connections of the secondary of the last transformer.

If it is desired to use further stages, the primary of the second transformer will go where the phones are shown and they, of course, are omitted. Resistance coupled audio frequency amplifiers are rarely used because of their comparative low amplification for a given number of valves when compared with transformer coupled methods.

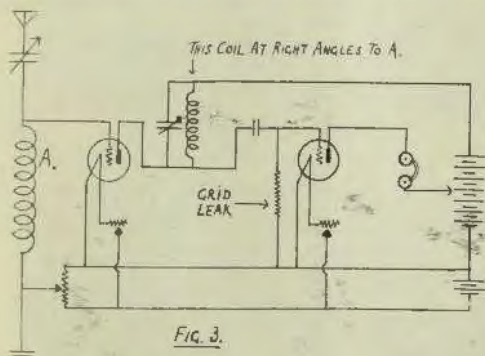
Three stages of audio frequency amplification will give tremendous volume.

Now radio frequency is a different matter. There are several methods of obtaining radio frequency amplification which are as follows:—Tuned transformer coupled, a periodic transformer coupled, resistance coupled and tuned plate or anode method.

The easiest method to handle is the aperiodic transformer coupled method, as no controls are necessary in addition to the ordinary tuning controls of a detector circuit. Figure 2 illustrates this method.

A potentiometer P is used to control the Radio frequency (called R.F.) valve as the grid potential can be regulated by it.

Fig. 3 illustrates the tuned anode method which is very popular. We see that this method requires an additional condenser C., which must be of small capacity to give best results. .0003 is a



good value to use. Also the anode coil must be at right angles to the aerial tuning inductance and the grid leak as shown.

The tuned anode method of R.F. amplification is very selective, whereas the aperiodic method is very broad, as the transformer follows the wave length of the aerial circuit within its limits.

These two methods may be used on short waves, this is, on wave lengths below 1,000 metres.

Resistance coupled R.F. amplification is not used below 1,000 metres, but gives excellent results on high wave lengths. Mr. C. W. Slade published a circuit of resistance coupled Amplification in a previous issue of this paper.

A variometer may be used instead of the inductance and condenser shown in Fig. 3, and excellent results may be obtained within the limits of the variometer.

As Mr. G. M. Cutts explained in a recent issue of W.W., radio frequency amplifiers amplify extremely weak signals and give them sufficient force to affect the detector and be made louder by the use of audio frequency amplification.

Some very interesting experiments may be conducted with radio frequency amplification. The writer has constructed a set with 1 stage R.F. amplification and two stages of audio which will fill a house with music from 2FC and 2BL without aerial or earth connected, but about 10 feet of wire was connected to the aerial terminal and allowed to lie on the floor, the distance being about 8 miles from broadcasting stations. Radio frequency amplification is not so successful on short waves as on long waves.

So far, we have only dealt with R.F. and A. F. amplification using a separate valve for each purpose.

Now, one valve may be made to function in the two capacities. Such a circuit, which employs this method, is called "Dual Amplification," as one valve is being used for a dual purpose.

First the valve acts as a radio frequency amplifier and hands the vibrations on the detector, be it crystal or valve, which detects or makes audible the signals which now pass back through the first valve by means of an audio frequency transformer and the first valve amplifies them at audio frequency. Such circuits as the well known S.T. 100 and Inverse Duplex, make use of this principle, although the inverse duplex has two stages of the R.F. before the detector which also acts as 2 stages of A.F. after detection, so we see that 3 valves are being made to do the work of 5, but, of course, these circuits are much more difficult to construct and operate than the usual one purpose for one valve.

A man of considerable position and importance confesses, with a merry twinkle in his eye, to a serious blow to his reputation from an unexpected quarter.

His small son returned from school and confronted his father with the question, "Father, what are you?"

"What am I, my boy? Why do you ask?"

Well, father," was the reply, "Jenkins came up to me in the dinner hour and said 'What's your father?'"

"And what did you say?" asked his father.

"I didn't say anything," answered the boy. "I just hit him."—Tit-Bits.

SEE PAGES 2 and 3 FOR FROST LINES.

2 B.F.

LAST WORD IN EFFICIENCY

HAVE you heard 2BF? These Sunday afternoon concerts of his are becoming quite a feature, and are doing a great deal towards putting Northbridge on the map. Listeners in almost every State in the Commonwealth, and in New Zealand have reported this station Q.S.A. The owner and chief operator is Mr. L. E. Forsythe, of the well known firm of mast constructors, E. H. Brett & Sons, Ltd., and his station is situated only about half a mile air line from the imposing towers of 2FC.

From first to last, efficiency has been the slogan of Mr. Forsythe in the building of his station, and the nautical appearance of the 84ft. mast, with

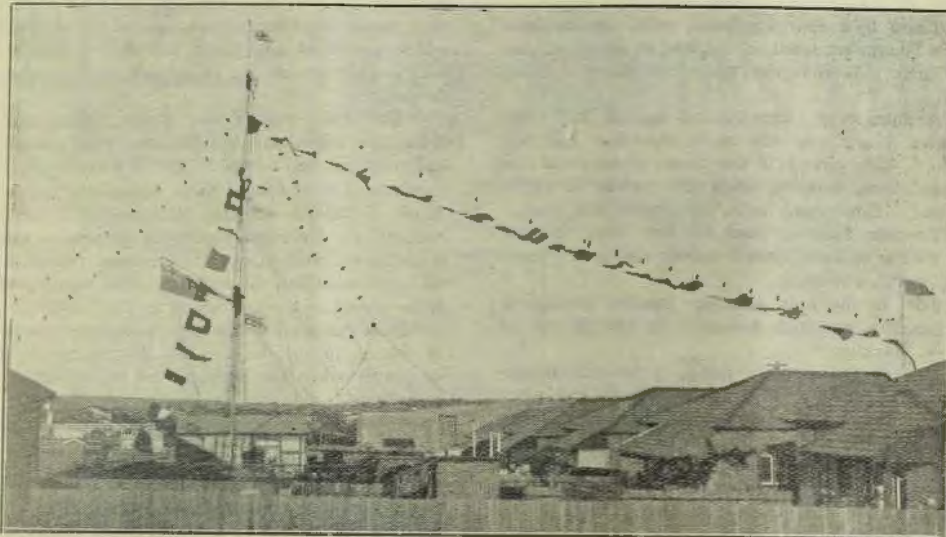
its network of halyards, renders it almost unnecessary to observe here that Mr. Forsythe graduated from the ranks of the Navy. The aerial is of the umbrella cage type with a 40ft. x 60ft. bottom spread of cages leading in in two sections, so that it may be used for D.X. telephony, one half for transmitting and one half for receiving, or as two receiving aerials. The counterpoise is a three wire arranged in four fans spreading directly under the aerial.

The transmitter is a 10 watt Hartley Circuit employing tube modulation. The power supply is derived from the A.C. mains through a transformer and Kenetron Rectifiers.

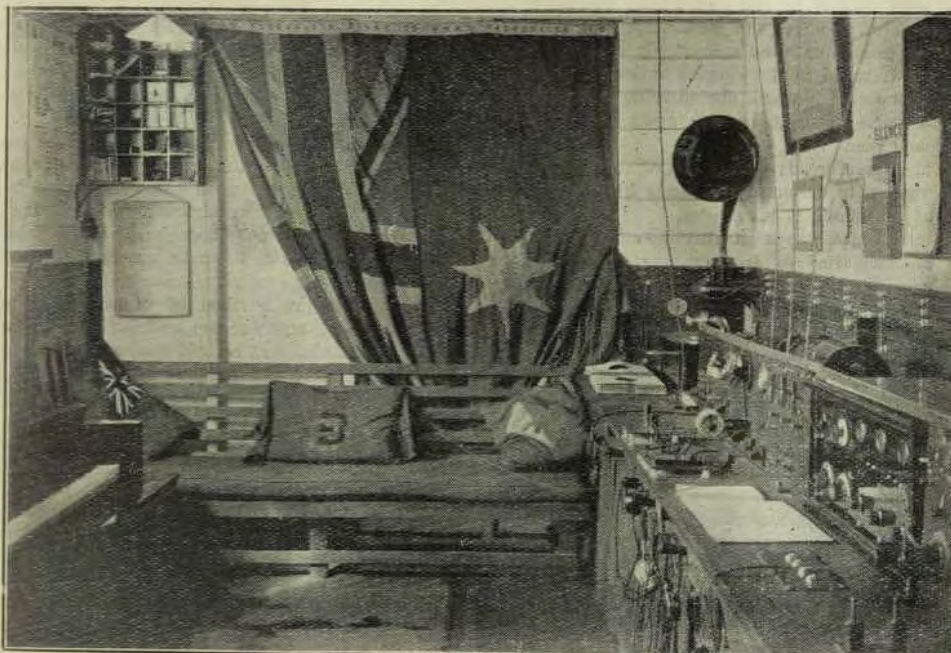
Continued on Page 40.



The Sunday afternoon orchestra at 2BF. Owner-operator L. E. Forsythe, is sitting at extreme left of front row. Assistant-operator, V. Macklin, may be seen at the sitting extreme right. But, say, who is the fair young damsel with the violin ?



The Aerials.



Operating Room at 2 B.F.

(Continued from Page 38)

There is a charging panel with the batteries and a Tungar mounted behind, and so arranged that one battery is charging while the other is being used.

A number of receivers are used at 2BF—one 4 valve, comprising one radio, detector, and two audio. This circuit is the tuned plate resistance coupled type, covering from 150 metres to 30,000 metres. Honeycomb coils, of course, are used.

Another receiver used for low wave lengths, 100 metres to 1000, uses 3 valves and is the vario coupler P.I. circuit.

2BF is the only amateur station in Sydney carrying an assistant operator, in the person of Mr. V. Macklin.

The operating room itself, is beautifully appointed and is fitted throughout from the point of view of comfort and convenience. Imagine a room, warm and cosy, about 20 ft. long by 15ft. wide, fitted up very much like a ship's cabin, decorated with flags and with a piano standing in one corner—and there you have 2BF.

(Continued from page 34)

If it were settled beyond doubt that the moon is the cause of fading, the next step, apparently, would be to eliminate the moon. Or if fading was finally attributed to the varying influence of huge mineral deposits, it would obviously be necessary to remove these deposits, or else make the "waves" go around them.

This, therefore, is plainly one of the rare cases when the study of cause will avail little; all that need be considered is effect.

Static represents a parallel instance. It took only a short time to discover what static is, or what causes it—the most unlearned probably know this—but this knowledge hasn't helped an iota towards a solution of the difficulty, which means, of course, the elimination of atmospheric. Electrical storms, dust storms, and the thousand causes of static are still as prevalent as ever, and the static still comes through just as though X's, so far as we were aware, came from Mars. Knowledge, in this case, has not meant power. And the same can be said of fading.

In any other science the first step is undoubtedly to discover the cause of anything—if the medical profession, for instance, could place its finger upon the cause of cancer, the remainder would be simple. But wireless and its curses, due to at-

mospherics, run upon different lines. It is enough that static is a conglomeration of wave lengths which arrive at any time; and that fading is an inexplicable weakening of signals at irregular intervals.

And if the matter was attacked more forcibly from the viewpoint of devising some means of chopping out the bursts of varied wave lengths regardless of what caused them, and of making transmission strong enough, or reception sensitive enough, to overcome the weak intervals without thinking so much about their reason (which after all is unavoidable), the entire question would probably be closer to a solution.

Such research and investigation are interesting of course, in themselves—but they bring the time no nearer when the problem of atmospheric will be solved.

(Continued from page 35)

The two panels on the right side of photos are: bottom, a two stage audio amplifier. The small panel on top is a single stage audio amplifier which makes 3 coil set into a 4 valve set, using English valves; detector is a Mullard Ora and the audio amplifiers are Marconi "R." The valves are shortly to be replaced by radiotrons. The loud speaker used is an Atlas and the Phones are Baldwin's Mica Diaphragm, Trimm's Dependable and Murdoch's; the Trimm's are found to be equal to any used.

The lead-in wire comes in through the centre of a piece of thick motor screen glass twelve inches by ten. The Twin lead-in goes straight on to the centre of the porcelain earthing switch. The top wire shown going out through the white tube insulator, is the aerial to earth wire and the bottom wire goes to the receivers.

The sets are earthed by eight copper wires (each wire of 3/20 copper) and led to four separate earth leads, viz., an old copper boiler, an old "Ford" radiator, a water pipe leading down a well to the water, and some sheets of flat iron buried four feet in the ground.

The aerial is the "L" type Twin wire 3/20 copper, with 6ft. spreaders, the far end being on a 42 ft. pole, and the lead-in end on a 38ft. pole. There is a direct lead to the wireless sets of about 34 ft. and the twin wires run right on to the earthing switch, leaving only eighteen inches of wire in the wireless room to connect to the set; from the set to the earth is only four feet six inches.

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THE LEICHHARDT AND DISTRICT RADIO SOCIETY.

Members of the Leichhardt and District Radio Society held their 95th general meeting at the clubroom, 176 Johnston Street, Annandale, on Tuesday, August 26th.

The attendance was excellent, and the main business of the evening was the delivery of the second lecture of the syllabus by Mr. F. Thompson. The subject dealt with was "Tuning Apparatus," and it is doubtful if any other lecture delivered before members of the Society at any time has proved to be more instructive or interesting than that which those present on August 26th had the pleasure of listening to.

Mr. Thompson dealt very thoroughly with his subject; resonance, coupling, variation of wavelength, and methods of tuning all being explained very clearly and concisely.

At the conclusion of the lecture members showed their interest by asking numerous questions, after which a vote of thanks was carried by acclamation.

Next Tuesday night the Society will hold its 97th general meeting, when the third of the lectures of the syllabus will be delivered by Mr. H. F. Whitworth. The subject on this occasion will be "Crystal Detectors and Their Action," and the lecture promises to be very interesting and instructive.

The Society extends to all local enthusiasts a special invitation to be present at this meeting, and enquiries regarding the activities of the Society are welcomed. These should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth Street, Annandale.

STRATHFIELD AND DISTRICT RADIO CLUB.

The usual weekly gathering of club members took place on Thursday night, with the good attendance that is a feature of the meetings.

Considerable time was taken up making arrangements for the concert which is being pro-

moted by the Club at the Burwood School of Arts on Monday, September 15th, 1924. A monster programme has been arranged, and as this concert is for the purpose of raising funds, we appeal to members of other clubs to help us by rolling up in full force. The committee guarantees there won't be a dull moment in the whole evening's entertainment.

At last the Club affiliates with the Wireless Institute. This is being arranged this week.

Our usual appeal is for the intending members to present themselves any Thursday night at the Club room, Albert Rd. and Duke St., Strathfield, when a hearty welcome awaits you, or communicate with the Secretary, Mr. M. Wraxall, "Almor," Long St., South Strathfield.

Lecture on Thursday, 28th August.

Mr. Campbell will deliver a lecture, the subject of which will be "Crystal Receivers."

(This report was inadvertently held over from last week.—Ed.)

WIRELESS CONCERT BY WIRELESS SOCIETY OF NEWCASTLE

Following a proposal placed by a member that some steps be made by the Wireless Society of Newcastle, towards giving the public of Newcastle an opportunity of realising what radio was and what Newcastle amateurs, in particular, were capable of performing, a concrete plan was formed whereby a public demonstration of telephony could be made, conducted by the Society in conjunction with the Newcastle Branch of the Y.W.C.A. to mutual benefit.

The respective committees worked in harmony in arranging the programme, carrying out exhaustive tests, etc., so as to bring the final result to best possible efficiency.

Necessary permission was obtained from the P. M.G., and while it was originally intended to make transmission from the Society's outfit 2 SO, this was out of the question owing to nothing less than the power tube burning out! But, Mr. Swain, 2CS, the Secretary to the body, placed his efforts and outfit at the disposal of the committee, so that the transmission could be carried out from his residence.

On the night, Thursday, 21st August, the receiver was installed in the Cafe Lounge Room of the new King St., building of the Y.M.C.A., which had been offered for the purpose (a splendid offer which was much appreciated). The Sterling loud speaker was operated by a 4 valve set, and gave

ample volume. Mr. Seward, President of the body, was in charge of the receiving end, assisted by members of the committee.

The programme was arranged by the committee of the Y.W.C.A. and included some of the best of Newcastle's talent. Misses Grisdale, Coverdale and Welsh-Ewing participated; also Messrs. Hestelow, Lloyd, Ewing and Dr. Piesley. They received the thanks of the audience in many an applause after each item, until someone tumbled to the fact that the artists could not hear them! And then the news spread—an unique situation for some present.

The Society would be glad of Q.S.L. from any amateurs who heard this transmission. Please address to L. T. Swain, Hon. Secretary, Wireless Society, Everton St., Hamilton.

A large attendance and still greater sale of admission tickets resulted in monetary benefit to the participating bodies.

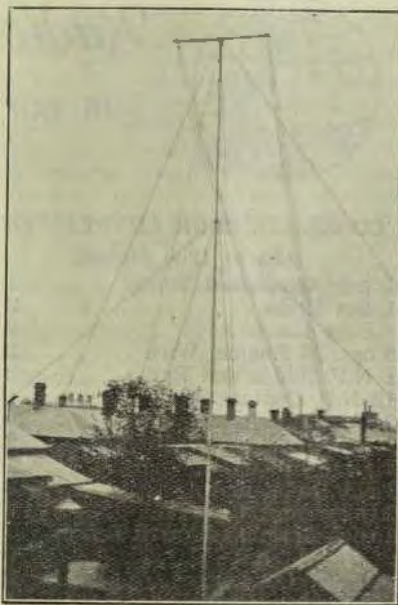
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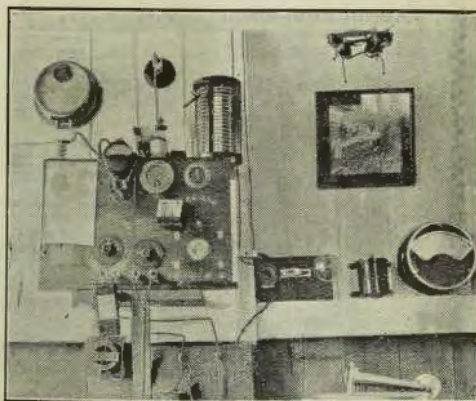
Mr. R. H. Howell, Secretary, Waverley Radio Club.

5 A.D.

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THE STRATHFIFELD AND DISTRICT RADIO CLUB.

The usual weekly meeting of the club was held on Thursday, August 28th, when there was a large attendance. Mr. Campbell gave a very interesting lecture on crystal receivers, which kept the members interested right up till 10 p.m.

On Thursday next, September 4th, Mr. Phil Renshaw is coming to give an address to the members, and on the 11th September, we expect a visit from Mr. Cutts, of the Croydon Club. The Secretary would be glad to hear of any other experimenters who would arrange a date to deliver a lecture to our members.

Members of other clubs, etc., are reminded that the club are holding a grand concert and wireless demonstration at the Burwood School of Arts, on Monday, September 15th, when a huge programme has been arranged; visitors are assured of a very enjoyable evening.

This month, being the Club's Drive Month for new members, we would ask any intending member to call at the Club Room any Thursday night. The Club Room is situated at the corner of Albert Rd. and Duke St., Strathfield, or get in touch with the Secretary, Mr. M. Wraxall, "Almor," Long St., South Strathfield, who will answer any enquiries.

THE CROYDON RADIO CLUB.

The usual weekly meeting of the Croydon Radio Club was held on Saturday, 24th August, at the club rooms, "Rockleigh," Lang St., Croydon, at 7.30 p.m., when all business in hand was rapidly finalised.

Mr. A. S. Ledger delivered the first of his series lecturettes on "Batteries." This series should prove most instructive, for, in radio, it is essential to understand the construction and action, etc., of batteries. The remainder of the evening was main-

ly devoted to properly organised buzzer practice.

All intending members are respectfully invited to communicate with the Hon. Secretary, Mr. G. M. Cutts, "Carwell," Highbury St., Croydon.

THE NORTHBRIDGE RADIO CLUB.

The weekly meeting was held on Wednesday, the 27th August, at the "Revoli" Refreshment Rooms, Sailor Bay Rd., Northbridge.

Owing to the increase in membership, it was found necessary to procure new club rooms—this shows more local interest in wireless generally, and the club in particular. The meeting was more in the nature of discussing ideas for the club's future; many suggestions were made and adopted.

The usual question time gave an opportunity for explanations and a discussion of varied troubles experienced by members. The club's programme, in this respect, is especially helpful to new members who are in need of knowledge or in difficulties.

The next meeting will be held on Wednesday, the 3rd September, in the new club rooms at above address.

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

Add Title Page.

Readers will be very sorry to learn that Mrs. J. Reddie, wife of the Advertising Manager of Wireless Weekly, passed away on Wednesday, August 27th, after a brief illness. Mr. Reddie has been associated with this paper from the publication of the first issue, and it is to a great extent due to his efforts that it has been possible to build Wireless Weekly up to its present day standard — the largest Wireless Journal published in Australasia.

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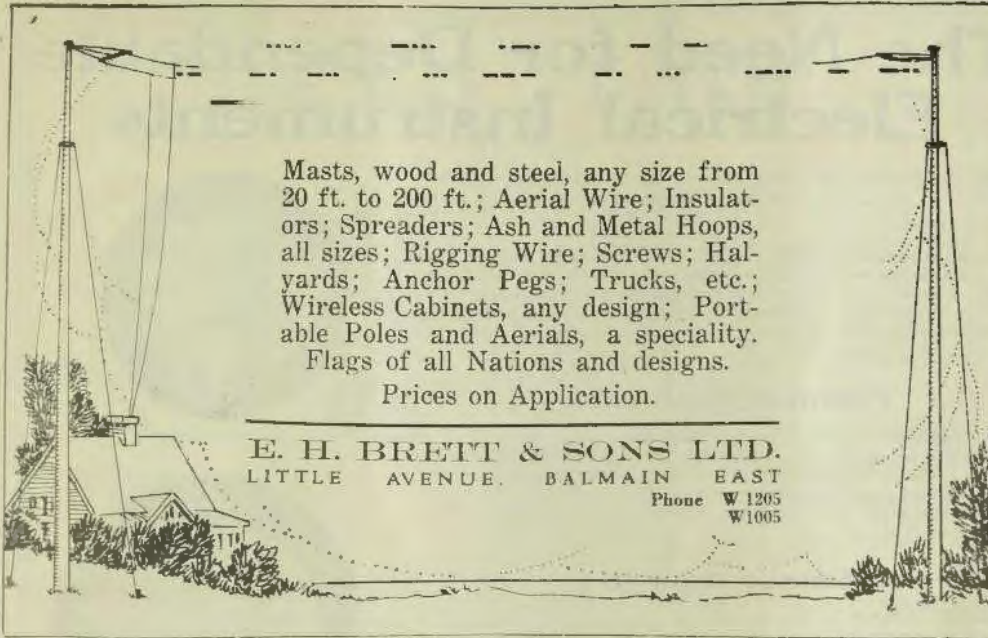
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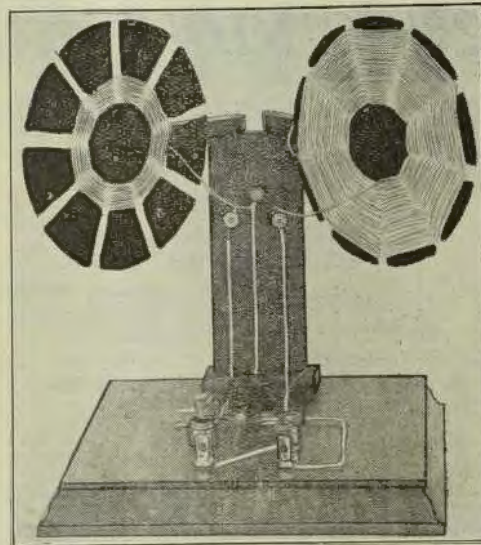
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English Brass Terminals	3/9 doz.	Sterling	44/- each
4-pin Valve Insulators	1/4 each	Trimm's Dep.	32/6 each
Crosley Porcelain Sockets	2/3 each	S. & C.	45/- each
English Valve Bases	6/- each	Dictograph	47/6 each
Large Connectors	7d. each	W. E.	44/- each
Battery Clips, N.P.	7d. each	Variometer Kellogg	57/6 each
Insulators, Brown Strain	1/- each	Variocoupler	63/- each
Dials, 3in.	2/9 each	Variometer, Chelsea (Ver.)	42/6 each
Condensers, variable (Crosley)	17/6 each	Variocoupler, Chelsea	42/6 each
Condensers, 3 plate "Master"	12/- each	De Forest, 3 Coil mt. geared	44/- each
Condensers, 5 plate "Master"	13/6 each	De Forest Coils: 25 turns	11/3 each
Condensers, 3 plate "United"	12/- each	35 turns	11/6 each
Condensers, 5 plate	13/6 each	50 turns	11/9 each
Condensers, 11 plate	16/9 each	75 turns	12/- each
Plugs	2/6 each	100 turns	13/- each
Crystal Detector, dust proof	8/6 each	150 turns	13/3 each
Sockets, U.V., 199 Bakelite	3/- each	200 turns	13/9 each
Transformers, Audio "Chelsea"	23/6 each	250 turns	14/6 each
Switches, S.P.D.T.	2/6 each	300 turns	14/9 each
Sockets, "Bestone"	4/3 each	400 turns	15/6 each
Transformers, Jefferson Star	22/6 each	500 turns	16/9 each
Insulator, Shell White	10d. each	750 turns	20/- each
Valve Sockets, English	1/9 each	1250 turns	23/9 each

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Contact Studs, N.P., per doz.	1/-	Jefferson Transformers, Star	25/-
Runner Rods, nickelled	1/2	Murdoch 3000 Head Phones	30/-
Sliding Contacts, brass	1/8	Winding Wires, all sizes in stock	
Sliding Contacts, N.P. and Rod	2/6	Aerial Wire, Copperweld 100ft.,	4/-
Crystal Detectors, Mounted	3/3	43 Variable Condensers	18/6
Crystal Detectors, N.P., unassembled	2/11	Primary Tubes Wound	3/6
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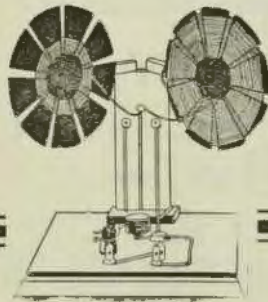
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FOR THE ABOVE, SEE PAGE 21.



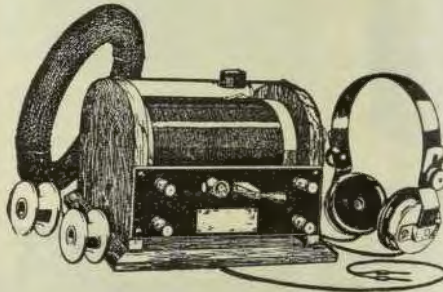
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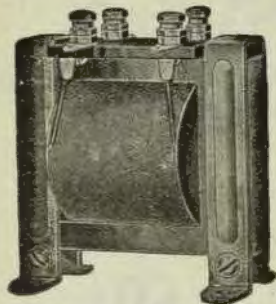
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Those Distant Stations!

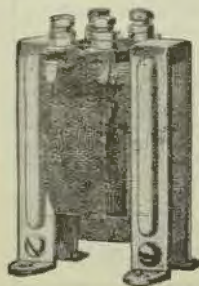
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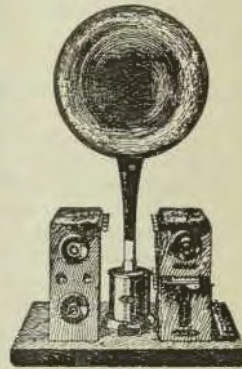
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PACIFIC ELECTRIC CO.

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MURDOCH'S reputation for a highly specialised Service and exceptional value is well known, and with that faithfulness to the ideals of a perfect Modern Store Service characteristic of the Firm, Murdoch's have now added a WIRELESS SECTION, where Crystal Sets, Valve Sets, Accessories, and complete equipment may be obtained at the very lowest prices compatible with the high standard of dependable quality ever associated with the name of Murdoch.

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for Boys, any age up to 15 years.

- 1st Prize £3/3/-
- 2nd Prize £2/2/-
- 3rd Prize £1/1/-
- Special Prize £2/2/-

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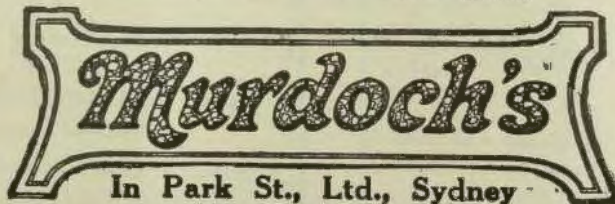
The Free Entry Form (obtainable from Radio Dept.) must be filled in and accompanied by a voucher, which is given with every purchase of 5/- or over from Radio Dept. Murdoch's Experts will be sole judges, and their decision is final.

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Contact Stops, N.P., per doz.	1/-	Jefferson Transformers, No. 41	39/-
Contact Studs, N.P., per doz.	1/-	Jefferson Transformers, Star	25/-
Runner Rods	10d.	Murdoch 3,000 Head Phones	30/-
Sliding Contacts, brass	1/6	Murdoch, 2,000 Head Phones	25/-
Sliding Contacts, N.P.,	2/3	Winding Wires, all sizes in stock.	
Crystal Detectors, Mounted	3/3	Aerial Wire, 3/20	2/9 per 100ft.
Crystal Detectors, N.P., unassembled	3/-	43 Variable Condensers	18/6
Crystal Detectors, glass enclosed, mounted, 5/6		Primary Tubes Wound	3/6
Crystal Detectors, glass enclosed, unmounted, 4/2.		Secondary Tubes, Wound and Tapped	6/-
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Valve Amplifier for use with Crystal Sets, include Valve, Socket, Transformer, Rheostat, Terminals, Panels. Ready to Assemble 65/-		

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WIRELESS WEEKLY

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