THE WIRELESS WEEKLY

A Journal Devoted to the Interests of Wireless Enthusiasts both Amateur and Professional

OFFICIAL ORGAN OF THE AUSTRALASIAN RADIO RELAY LEAGUE.

Vol. 3. February 8, 1924. No. 18

Broadcasting and the Farmer

The benefits of Broadcasting are largely aimed at the man on the land. Through the broadcasting station, the city may be brought right to the front door of the homestead "out west." The average farmer is undoubtedly interested in stock and market reports from the city—but he is also closely interested in the events affecting his nearest country centre. He wants to know the result of the stock sales, the latest local news—the hundred and one things which are of purely local interest. A low power radio telephone transmitter in the country centre could perform this service for him, but a wise Government has placed this benefit out of his reach. Six months of the Sealed-receiver Regulations have left the farmer just as isolated as he was five years ago, and the monopoly for which those Regulations were framed stands perilously close to losing his interest altogether.

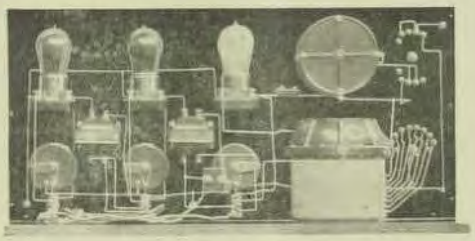
Roster for Week ending 13th February, 1924

	7.30 to 8.0	8.0 to 8.30	8.30 to 9.0	9 to 9.30	9.30 to 10
Thur. Feb. 7	2 RA 2 GR	2 IJ 2 JM	ZG	2UW	2 YI 2ZZ
				2 ZN "	
Friday, 8	2 IJ 2 GR	"	"	" "	" "
				" "	
Saturday, 9	2 RA 2 GR	2 IJ "	"	" "	" "
Sunday, .. 10	2 RA 2 GR	"	"	" "	" "
Mon., ... 11	2 RA 2 GR	2 IJ "	"	" "	" "
Tues., ...12	2 IJ "	"	"	" "	" "
				2 ZN "	
Wednes., ...13	2 RA 2 GR	2 IJ "	2 VX	2 UW	" "

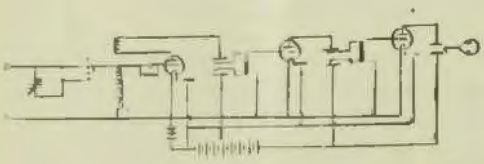
WIRELESS WEEKLY CUP COMPETITION

EXAMPLE SET

1. Completed Set.



2. Interior of Set.



3. Circuit Diagram

THREE VALVE EXPERIMENTAL SET.

This set consists of 24 x 12 Bakelite Panel; a vario-coupler, with a wave length range from 200 to 1500 metres; a .001 mfd. variable condenser, with vernier adjustment; series parallel switch, switch and studs for varying the wave length; one 6 ohm. rheostat, and two 30 ohm. rheostats; jacks and plugs to enable the use of one, two or three valves; 2 Jefferson transformers; one UV-200 radiotron valve and two UV-201A radiotron valves; 3 bezels, set in panel; 2-40v. Ever-ready high tension batteries are placed inside cabinet, the connection being made with flex and Morse clips; all insulation throughout is of the best Bakelite.

COUNTRY COMPETITORS

Reports from Radio Clubs and dealers in Wireless Apparatus indicate that several sets for the Wireless Weekly Cup Competiti on are in course of construction. Enquiries from a number of places in Victoria and N.S.W. have been received. Country radio enthusiasts appear to have made an early start. The closing date for entries will be announced later.

Intending competitors will be well advised to send their nominations early.

Photos. of sets should be printed on glossy paper and the diagrams of the circuit should be drawn in ink. The circuit of the set must be shown.

The diagrams need not be elaborate, but should show clearly the wiring and all necessary details.

What is Required.

Competitors are required to submit:

1. One photo. not less than 4in. by 3in., showing the set complete.
2. One photo. not less than 4in. by 3in., showing the wiring of the set.
3. An ink diagram not less than 4in. by 3in., showing the circuit and wiring.
4. A small paragraph of not more than 100 words describing the set.
5. The nomination form shown here, witnessed by a member of the committee of a radio club or any trader advertising in Wireless Weekly, or a local J.P.
6. Entries should be addressed to the Editor, Wireless Weekly, 33 Regent St., Sydney, N.S.W., and marked "Wireless Weekly Cup Competition" in the bottom left hand corner.

Great interest and enthusiasm is being shown in this competition, and the number of enquiries received from other States shows that much importance is attached to the result.

It will be not merely the general appearance of a set that will be judged, but also the method of wiring, placing of the various parts, and the efficiency of the circuit submited. In fact, the winning set will be as nearly perfect as is possible, so it is up to every competitor to put absolutely the best work into his outfit.

NOMINATION FORM

I ..... of

..... desire

to enter my ..... set in

Wireless Weekly Cup Competition. I agree to abide by the conditions set down by the proprietors, and I solemnly declare that I am a wireless amateur as defined in page 2 of W.W. No. 15, Vol. 3, of January 18, 1924.

(Signed) .....

Witness .....

WIRELESS TRAGEDY

Special Appeal to Experimenters

A Fund Inaugurated

Hardly any wireless experimenters have not heard of the unfortunate accident which occurred recently, and which resulted in one of the State's keenest wireless experimenters losing his life.

The fatality was all the more distressing owing to the fact that it was witnessed by his wife who was at his side during the carrying out of the tests, and almost within the hearing of his little daughter, who, in a childish way, always worked with her father.

"Wireless Weekly" has decided to inaugurate a fund to help the dependents of the late Mr. Moore and its management feels sure that amateurs as a whole will rise splendidly to the occasion and give and give again.

Practically all Mr. Moore's spare money was spent on his experiments for the advance of wireless. His tragic end left a gap in the ranks of the experimenters that will probably never be filled. But it also left his widow and two little ones facing that lonely road ahead, and in need of every penny that will help to tide them over until something turns up. They claim not only our sympathy but our assistance. To the experimenter, in the country as well as in the city, we make this appeal for funds.

The whole of the wireless apparatus belonging to the late Mr. Moore is on sale at the shop of Miss Wallace, Royal Arcade, Sydney, where all experimenters are recommended to call and see whether there they cannot find something they require and thereby help his dependents.

If it is not sold at the auction sale on the 6th of this month, there will be a short wave receiving and transmitting 4 cage aerial for sale; 70 ft. complete with telescopic top mast: one of the finest in the State.

No amount need be considered too small. Whatever your donation may be, forward it without delay to the Editor of Wireless Weekly.

The Late Mr. F. L. Moore

All amounts will be acknowledged through the columns of Wireless Weekly.

A board of trustees consisting of three experimenters known to most wireless enthusiasts, Messrs. F. Basil Cooke, Phil Renshaw and J. W. Robinson, has been appointed. These three gentlemen have agreed to handle the money and to see that it is properly disbursed.

Let us have your donation without delay. When you read this appeal do not decide that you will give something and then forget about it.

Send your little bit along at once to Wireless Weekly, 33 Regent St., Redfern.

Contributions to date:

	£	s	d
Proprietors Wireless Weekly	5	0	0
United Distributing	10	10	0
Mr. Quaife	0	10	0
Wireless Weekly Staff ..	1	3	6
P. Renshaw	3	3	0
Mr. Jones	0	10	6
G. Taylor	1	1	0
J. W. Robinson	1	1	0
F. Basil Cooke	1	1	0
O. Sandel	1	1	0
Mr. Allsop	0	10	6
Mr. Saunders	0	10	6
Robert H. Doyle	1	1	0
Miss Day	0	10	6
A. F. Price	2	10	6
H. A. Marsden	1	1	0
A. Dare	0	10	6
M. McIntosh	0	10	6
Colville Moore	1	1	0
—. Herker	0	5	0
—. Sanders	0	1	0
Concord Radio Club	0	10	6
Total	£32	2	6

Testing Receivers in the Country.

The following letter, written by a citizen of the United States, is so interesting in view of the present situation, that we are printing it word for word.

"Just back from a trip down the South Coast testing radio sets. I'll tell you about it. George Brown, Jack McCathie and myself left early Saturday morning by automobile for Robertson. We had nine radio sets ranging from an 8 valve super heterodyne to a one horse power crystal set. Some of the sets were sealed to 1100 metres and 350 metres.

"After having a very warm ride and changing a couple of blown out tyres on the way we arrived at Mittagong at 12.30. Having no aerial to hook to we used a 20 ft. wire lying on the ground and attached to the car for an earth, using the neutrodyne on a loud speaker. This way we had music for lunch from Briadcasters Ltd., who came in very loud and clear. After lunch, starting for Robertson via Moss Vale, we left the set working with the aerial dragging on the road behind and still the programme came in very loud and clear. This is about 75 miles from Sydney so is not much of a feat.

"Arriving at Robertson we unpacked our gear at the the Chateau, which is up on a large hill commanding an excellent view of the surrounding country. Three very high pine trees furnished us with far end supports for three different aerials, each running out from the water tower in a different direction. Each aerial was 100 feet long to the set. The iron pipe for the water system furnished a very excellent ground. Hooking up the instruments we got immediate results. The music came in very loud and clear. We tried all sets, and fair results on all. The sealed sets were not satisfactory as we could barely tune in on their wave length.

After dinner we retired to our radio room and set about testing each set. Results were even to be had on the crystal set by using all three aerials. Static was beginning to come in very strong and steadily grew worse. A storm was coming for sure and the wind began to blow. Sydney Broadcasters came in very clear on the lower wave length (350 meters) but the 1100 meter station did not come in loud or clear.

The Little American out in the Bush

Photographs taken 72 miles north of Sydney on Newcastle Road. Using 20 ft. insulated wire for aerial and 10 ft. bare wire for ground. Broadcasters could be heard on loud-speaker 50 yards away. 2JM and 2ZG came in very loud and clear.

"We brought in quite a few amateur stations between 9 p.m. and 11 p.m. among them were 3AC New Zealand and four stations we could not make out. 3BD in Victoria, very clear and distinct. 2ZG who came in very strong and clear, and several others. By 11 p.m., the static was so bad we could not distinguish anything, so off to bed.

"4 a.m. to 7 a.m., Sunday morning we could get nothing but ship stations, and the static was very bad. Taking three sets we motored on to Nowra and down the coast to Milton. We got very good results there as the Sydney 350 metre station was testing. Nothing could be received on the sealed sets, as our wave meter registered 344 metres and we could not tune them in at all. Up to this time I was sure the neutrodyne could be sealed to comply with the regulations for distant reception but now am thoroughly convinced that it cannot be done, and still get results one would expect of it. We returned to Robertson that night in a heavy rain, after having visited Kangaroo Valley, Fitzroy Falls and Belmore Falls. The scenery is very beautiful with the tree ferns and rich undergrowth reminding me somewhat of the Island of Hilo in the Hawaiwan Islands. Sunday night was very good as it was raining and static was not bad. No great distance was reached as I was using the two foot loop on the heterodyne. One thing I will say about the latter set, it brings in very little static on the loop.

We came home Monday afternoon by way of Bowral and Picton. Two stops were made for tests while tyres were being changed, and it surely was raining. Arrived in Sydney at 6.30 p.m. pretty tired out, but in time to set up for the evening concerts. Australia is some place, I'll tell the world.

I really do not believe the sealed set can be made a success here under present regulations, especially for distant reception. It will eventually be worked out in time, as nothing is impossible, but much experimenting will have to be done to accomplish it. Even if it is a success from a sales and educational point of view, it is merely a mechanical instrument. The fun that we have in The States of being able to turn the dials bringing in one station after another is eliminated here. Also the boy who wants to know what makes the wheels go round is prohibited to take a "look see" as the working parts are sealed, not to be opened.

It is regrettable because of the fact of its being sealed. Our views as to the educational value of a radio set to the younger generation are entirely out of order here. I think of the boys of from 7 years old to 70 years building their own sets, asking the why and the wherefore of each separate part, testing and developing new and better circuits, occupying their evenings in a real instructive pastime. I hope to see the time for this to come here as many young boys now running the streets will become occupied in making his own radio. Dealers do not dare to encourage such a thing now on account of sealed sets, and not everyone being able to get experimental licenses."

MOUNTING CRYSTALS IN WOOD'S METAL.

The best way to mount crystals in Wood's metal is to take a few fragments (sufficient to half fill the cup) and then hold a hot soldering iron, poker, or, indeed, anything hot enough, against the outside of the cup until the Wood's metal inside just begins to melt. Immediately it melts, remove the soldering iron, wait a second or two, and then press the crystal into the wood's metal with the aid of a pair of tweezers. The pressure of the crystal will make the melted metal rise up round it and when it sets the crystal will be properly secured.

LISTENING IN AT LUNCH TIME

Another Broadcasting Station

We have received a communication from the Chief Manager, Telegraphs and Wireless, Melbourne, informing us that the particulars contained in the list of broadcasting stations licensed up to 31st December, 1923, should be amended as follows:

License No. 1—Call letters to read 2FC.

License No. 3—Call letters to read 2BL.

License No. 5—Call letters to read 3LO.

License No. 6—Wave length to read 770 metres.

*

The following additional license has now been granted:

License No. 7—Associated Radio Co. of Australia, Ltd., Melbourne. Wave length, 480 metres; power 1500 watts; call letters 3AR; financial guarantee, £1000 fixed deposit. Subscription to be charged.

Relative Advantages of Single and Double Circuit Tuners.

Prior to the introduction of broadcasting, the ordinary type of radio receiver used by the amateur was of the double circuit or three circuit type. Because the radio amateurs were well versed in the use of these instruments it was not difficult for them to use these tuners and they took pride in their skill of operation. However, when broadcasting was initiated, the need for a simple tuner device that could be used by the layman was considered necessary and a single circuit tuner was developed. On account of the simplicity of this new tuner and in view of the great number of amateur stations operating at the present time, confusion resulted concerning the efficiency of this tuner. Interference of two transmitting stations is the cause of trouble in the use of the single circuit tuner.

No receiving tuner, whether it be of the single or double circuit type, will prevent two transmitting stations operating identically on the same wave length from setting up interference in the receiving set, unless the signals of one station are of sufficient intensity to drown out those of the other station. Two transmitting stations operating on nearly the same wave length will produce an audible note or "whistle" in a receiving apparatus, which no tuner of either the single or double circuit type will eliminate. The cure for this problem is the using of wave lengths by the transmitting stations of sufficient separation so as not to produce an audible note.

The single circuit tuner will enable the listener to differentiate between two local transmitting stations by erecting an aerial not over 15 feet high and 15 to 20 feet in length. It has been conclusively demonstrated that a low aerial is more selective than a high aerial. The selectivity on a given aerial can be increased by an additional series condenser between aerial and tuner.

Selectivity in regenerative receiving sets is primarily a function of the amount of regeneration. Two local transmitting stations on different wave lengths will often interfere with one another on either the single or double circuit receiver, but this is due to the overwhelming power of the transmitter which causes the apparatus to function by shock excitation and respond even when not accurately tuned to the transmitter. It has been demonstrated beyond all cavill that interference set up by two local stations can be eliminated on the single circuit receiver by an aerial, as described above.

The ordinary regenerative set with the double circuit tuner gives from 20 to 50 per cent. reduction in signal the same number of tubes and same audibility over the single circuit with general circuit. In other words, stronger signals will be obtained, in long distance reception, from a single circuit set than from a double circuit set.

The Advantages of Two Aerials.

For those who have interest in long distance reception, as well as local reception and who experience difficulty in obtaining the necessary with the low aerial, owing to it being shielded by buildings, etc., it is sometimes advisable to erect two single wire aerials, one for long distance reception—which may be of any wave length up to 150 feet, and the other for local reception—which is the small one previously described. The small aerial enables one to differentiate between local signals, while the larger aerial can be used for long distance work after the local stations have discontinued.

Some users of receiving sets are now installing two aerials—a long one for long distance reception after the local stations have closed down, and a small one, or an indoor aerial, for local purposes. The indoor aerial may consist of 10 to 25 feet of lamp cord concealed behind the picture moulding, or a piece of No. 28 wire stretched across the corners of the room.

The foregoing are technical points which will stand the closest analysis. Speaking purely from the commercial phases of the matter, the single circuit tuner is, without qualification, the most suitable for the novice, that is, for the user unskilled in the art; for generally the multiplicity of knobs involved in the operation of the double circuit tuner places them beyond the practicability of the non-technical public. Single circuit tuners were designed primarily with the idea of providing simplified operation, and as such, they enable the novice to obtain results which can only be secured from the double circuit tuner when the user possesses an intimate knowledge of the technicalities of the art.

Comparing collectively the advantages of the two types of tuners, it is clear that the single circuit tuner is by far the more useful to the average member of the family, as it enables him with a minimum number of adjustments to pick up far distant or local transmitting stations. Usually the distant station can be found on the single circuit tuner several minutes before it can be located on a double circuit tuner, to say nothing of the increased audibility which the single set provides.

For long distance reception, it is preferable in every case to instal an outdoor aerial in a free open space, keeping the lead-in away from the building and bringing it as directly to the receiving apparatus as possible. The aerial is preferably kept at the maximum distance from power lines, trees, buildings, etc., whereupon a marked increase in selectivity and in signal strength will be obtained.

Never run the aerial lead-in any long distance through the house. Make it as short as possible from the window where the wire is brought in. If the lead-in is long inside the house the walls and ceilings will absorb most of the radio-frequency energy that should be used in the set for producing signals; in other words the signals will be much reduced in strength.

Place the receiving apparatus near the window and run the earth wire to a waterpipe!

Short Pars from Everywhere

In an effort to encourage the scientific development of broadcasting and apparatus for that purpose, the Department of Commerce, U.S.A., has created new form of special license known as the "Broadcasting Development Class." Licenses in this class will be issued to station owners having transmitting and receiving sets of their own design and manufacture, provided in duplicate where failure is likely to occur. These stations are to be used for the improvement of broadcasting and many special requirements are demanded by the Commerce Department, which will furnish detailed information upon application.

Experiments looking toward establishing radio communication with underground operations in mines, in rescue work, etc., are being rapidly pushed to practical reality. Aerials have been established one hundred to two hundred and eighty feet below ground and messages broadcasted from over two miles away have been successfully received.

In connection with the recent announcement by an American Company that it intends shortly to inaugurate a wireless broadcasting service in China the customs has informed the company that any wireless sets imported there will be seized as contraband of war, according to news despatches.

Paul Laffont, Minister of Posts and Telegraphs has drawn up a set of ten commandments covering the installation of wireless apparatus in France. To become the possessor of a receiving outfit, it is not only necessary to know these commandments, but one must prove it by filling out a long questionaire correctly.

The first of these commandments says: "Make out a double application on especially prepared forms, one of which must be stamped and sent to the chief of the telegraph service.

"Second—Send also documents to show your identity, your residence and nationality.

"Third—If you are not French, special authorisation from the Ministry is necessary which will be accorded you after an understanding with the Foreign Office.

"Fourth—Your post must not interfere with that of your neighbour.

Fifth—The upkeep of your machine is your own business.

"Sixth—The Government is not responsible for your operations.

"Seventh—Respect communications you may receive which are not meant for you. On the other hand, remember that the police may be listening in.

"Eighth—The Administration reserves the right to control your post.

"Ninth—Think of your State coffers. Remember the yearly tax is ten francs.

"Tenth — If the Administration thinks it wise to requisition your post, do not complain, but do what is necessary to put the machine in working order."

What We May Expect in Broadcasting

The latest method of broadcasting grain price quotations by radio from Chicago is an important service to the farmer, and it is thus described by the New York Times:

It is 9.15 in the morning. The spacious trading floor of the Board of Trade is astir. Traders are changing from street coats to light jackets before entering the pits. Messengers are scurrying about, hands crammed with order blanks.

On the stroke of 9.30 a gong sounds. Overnight orders to buy and sell grain and produce are rapidly executed. Buyers, representing the consumer, seek the lowest price. Sellers, representing the producer, seek the highest price. The figures at which these two forces meet represents world values.

Over at one side of the trading floor is a man in a glass cage. He is in direct communication with a powerful radio sending station. The opening prices are registered. Without the delay of a second these are transmitted to the radio sender at the station on top of a large Chicago hotel.

Far out in the grain belt, hundreds of miles from the sending station, is Jed Smith, a farmer. He wants to know whether the time is opportune to ship his grain. He steps to his little radio-receiving set, tunes in to the 360 metre wave length, and what he hears runs about as follows:

"WDAP speaking. . . . . Opening prices on the Chicago Board of Trade. . . . May wheat . . . one twenty-three and a quarter. . . July wheat . . . . one fifteen and a half. . . "

Then follow other quotations on grains and provisions, with important market news comment. At half-hour periods from the opening of the market until the close at 1.15 the quotations are broadcast, and thus made available to a legion of farmers and distributors. It is a milestone in marketing progress.

Hardly had the radio become practical when its value in the dissemination of price quotation was recognised at the centre of world grain trade. A test period of broadcasting was opened. In a short time hundreds of letters and telegrams came pouring into the Board of Trade and from scores of cities, towns and villages commencing the service. They came not only from farmers, but country elevators, shippers, banks, business houses and educational institutions that use the quotations in class work.

Advices showed that, in Illinois alone almost 500 towns and villages were using the quotations. Hundreds of farmers not in easy communication with towns obtained small radio receiving sets for home use. Reports from other states told a story of similar interest.

It was then that the Board of Trade determined upon a permanent, continuous broadcasting service, and recently the Board purchased outright the big radio-sending station WDAP, on the Drake Hotel.

"The imagination falters in measuring the full significance of radio," commented Henry A. Rumsey, Chairman of the Board of Trade Radio Committee. "Forces of no less promise have written strange history. In the grain and produce market alone wonders will be accomplished. It will not be long until the farmer in the field follows the course of his daily market as closely as the merchant on the trading floor. And that is precisely what the Board of Trade wants. It has spent a fortune in an effort to give the farmer first-hand information on the ever-shifting world supply and demand. The grain trade is determined to aid the farmer in this end and in every other manner commensurate with sound economics."

"It is our intention," said Robert McDougal, former president of the Board. Speaking at the formal opening of the new station, "to give the entire radio public the official prices and other valuable information in connection with all commodities handled through this channel, thus serving the public from the farmer to the consumer. We hope to broaden our acquaintance and to demonstrate our contention that the Chicago Board of Trade is an open book that 'he who runs may read.'

"The complete ownership and operation of the station will bring to our association, as such, no financial return. But it will work to the mutual advantage of the members and their world-wide clientele. It is indeed a step forward in our endeavour to acquaint the public in the grain business and also with the operations of the world's greatest grain exchange and the largest international enterprise in the Middle-West."

The extent of the territory covered by the radio grain market service has not as yet been fully determined. Those in charge say, however, that a comparatively small radio set is capable of receiving these reports in any state in the Union.

Two thousand five hundred price quotations on wheat, corn, oats, rye, barley, pork, lard, and ribs are issued from the Chicago Board of Trade on every business day. As Chicago is the largest grain exchange in the world the quotations are of vital interest to every one concerned with the production or distribution of these commodities and to persons in scores of related industries.

The radio has placed at the disposal of the farmer all salient features of this machinery of crop information and marketing. It has virtually placed him on a footing with the most enlightened merchant in the world grain and provision markets. The magic is his. He merely stretches phantom fingers in the air and pulls it down.

Crystal Notes.

MANY A SLIP.

There are many kinds of excellent crystals on the market which properly used with the right kind of catwhisker should give satisfactory results in a well-designed receiver, but it cannot be too strongly emphasised that crystals can be spoilt in dozens of ways between the time you buy them from the dealer and your first attempt to listen-in. First of all, if the dealer is not careful he may pick the crystal out of a box with warm fingers, thereby depositing upon the surface a thin, invisible film of grease which will prevent proper rectification. If he is wise he will pick out the piece with a pair of tweezers and wrap it carefully in tissue paper. The purchaser should handle it with equal care when he gets home.

CRYSTAL CUPS.

Many crystal detectors are sold with a cup fitted with a side screw. The object of this screw is to grip the crystal without the need of using Wood's metal or other similar compound. Care is needed in using these cups, because the crystal is so hard that contact is only made in one or two places, and this is rarely sufficient to give the best results. If you use one of these detectors with a side screw I would recommend you to wrap the bottom half of the crystal in silver paper, tinfoil, or any other soft metallic substance, and then tighten up the screw. In this way the screw will make contact with the tinfoil and the tinfoil with practically the whole of the underside of the crystal. This is almost as good a method as using Wood's metal.

Coastal Radio Service.

Mr. L. A. Fontaine (radio-telegraphist), has been transferred from Perth Radio to Esperance (W.A.).

Mr. J. A. Grant is on transfer from Esperance Radio to Broome (W.A.)

Mr. R. Simons (radio-telegraphist, Melbourne Radio) is proceeding to King Island for relief duties.

Queries Answered

V.E. (Lindfield):

1. This would depend mainly upon the distance between the wires. For general purposes, twin wires spaced at least ten feet apart would give you best results.

2. The best position for your aerial would be over the house, as the trees would absorb a certain amount of ra-

Continued on page 12

NEWS IN BRIEF

The American "Ham."

To a student of psychology, the American radio Ham offers a delightful study. It might be mentioned that most people who indulge in radio, other than business men, whose time is limited and such like, come under the above category.

The average "listener-in" (who in a short space of time becomes a confirmed "Ham") generally starts off with a simple crystal or "one valve" set. Becoming intrigued, he applies himself to the subject, and is next found with a two, three or four valve set, and holds forth with maddening persistency about the relative merits of the various circuits, such as the neutrodyne, Flewelling, Reinartz, etc.

At a still later period, and by this time having acquired quite a Blase manner, and with the "I know all about it, you know," manner, he is found with two sets. Probably owing to family pressure, whose sense of artistry is outraged at the collection of junk, wires, etc., strewn about the living room, in addition to their sore limbs through continually tripping over the wires one set is found to be a model of beauty and efficiency, with its polished cabinet, panel, etc.; the other, in all its hideous nakedness, is relegated to some obscure corner of the house where will also be found the high priest (our ham) muttering incantations and making passes over same.

This, though, to the person whose pocket is not too limited, is the ideal arrangement, as the cabinet set in addition to harmonising with the rest of the room, is always ready for use, whilst, on the other hand, our old friend can still carry on his (or her) experiments uninterruptedly.

Many Australian experimenters envy the American amateurs, thinking that American conditions are ideal. As a matter of fact, the Australian experimenter is really in many respects, in a better position than his American cousin, one of the reasons of which is that the ether is not choked up with a very large number of stations, and all confined to a small band of wave lengths. For an American amateur to get "DX," as he calls it, he must at least wait till 10.30 p.m., at which time a large number of stations close down. Very often he must wait till a still later hour. After having patiently waited all that time he settles down for DX, only to find himself getting the mush from some nearby arc, perhaps strength 8, or else to have some "spark fiend amateur's" signals breaking through.

Let it be distinctly understood that your true "ham" does not necessarily want to listen to a broadcasted programme. "Au contraire," he would sooner produce for you a few groans, squeaks and howls from a station some few thousand miles away, than to tune in the finest programme possible, from a station in the immediate vicinity.

A CARBORUNDUM HINT.

A new gramophone needle makes an excellent steel contact for use with carborundum. To get the best from this crystal you must use a potentiometer, a description of which will be found in any book dealing with crystal detectors.

Subscribers are asked to notify Wireless Weekly of any change of address. Communications should be addressed to "WIRELESS WEEKLY," 33 Regent Street City.

Crystal Detectors.

The simplest form of detector used in the reception of radio telephony or telegraphy is the crystal or mineral type, and consists essentially of a contact between the mineral and some other conductor, which is sometimes a metallic wire and sometimes another mineral. Although this type of detector cannot be compared with the well-known vacuum tube for sensitiveness and range, nevertheless, considerable distances have been accomplished with it. We will discuss some of the principle minerals used and the general forms of contact in each case.

The most common class of crystal detectors are those which are either mineral or artificial crystals in contact between the mineral and some other. Of these are, galena, iron pyrites, zincite, bornite, molybdenite, chalcopyrite and carborundum. Fused silicon, a product of the electric furnace, may also be used. Galena is a soft crystal formed in small cubes and is blue-grey in colour. The most satisfactory results are obtained with this crystal when a light contact of fine wire is used. The chemical name is lead sulphide. Iron pyrites, or "Ferron" is a sulphide of iron, it crystallises in cubes like galena, and has a bright yellow metalic lustre. The usual method of contact in the "Ferron" detector is a medium sized metal point, although good results are obtained with a fine wire contact. Molybdenite is a sulphide of molybdenum; it is a blue-grey colour, and can be separated into thin sheets; the mode of contact is similar to the "Ferron" detector. Bornite and chalcopyrite are sulphides of copper and zinc respectively, while zincite is a red oxide of zinc. Bornite is sometimes used in conjunction with zincite, in which the bornite is used as the contact. This form of detector is sold under the trade name of "Perikon." Silicon and carborundum usually give the best results when used with a steel point under considerable pressure, such as the tapered point of a screw. Other forms of contact detectors employ copper pyrites, pyrolusite, chalocite and cuersite, etc.

Heat will diminish the sensitivity of a crystal, and for this reason it is mounted in the container of the detector stand by means of an alloy known as Wood's metal, which has a very low melting point and can be softened by hot water. A suitable mounting alloy may be made by adding a few drops of mercury to hot solder. Galena is especially susceptible to heat.

Detector cyrstals are easily affected by contact with the fingers as the grease will destroy the sensitivity; when handling, tweezers should be used. They should be kept free from dust and exposure to the air as much as possible, and for this reason some detectors employ a glass tube to protect the crystal. Grease and dust may however, be easily removed from the surface of the crystal by immersing it in a solution of carbon tetrachloride or common alcohol.

It is sometimes hard to find a sensitive piece of mineral or crystal, and it is usually necessary to examine several before one is found that will be suitable. Almost every piece of silicon is sensitive, or at least has several sensitive points on it. Satisfactory pieces of galena and iron pyrites are harder to find and are usually only obtained by careful selectoin. Molybdenite is easier to find, but then it is less sensitive than galena or iron pyrites. A given specimen of galena or iron pyrites may have different points on its surface that vary in sensitivity; this is also true in the case of carborundum. A sensitive spot on a crystal may be destroyed by static or unusually loud signals, and when this happens it is necessary to move the contact around until another sensitive spot is found. There are some crystal detectors on the market that are supposed to be permanent, but the sensitivity of these cannot come up to the ones in which the contact may be varied.

In order to act as a detector of radio signals, a crystal detector must posses the property of rectification. By this it is meant that it must act as a valve, allowing more current to flow when a voltage is applied in one direction and when it is applied in other or opposite direction. It is by this means that radio telegraph signals or voices are made audible in the telephone receivers.

Sometimes a battery is used in conjunction with a crystal detector in which carborundum is the rectifying substance. This is to enable the operator to adjust the voltage to the best operating conditions of the crystal. The use of mathematics would be necessary in order to explain the above action, and as it is almost obsolete in use, we have omitted it from our discussion. The other minerals and crystals act equally well without the use of the local battery.

Where it is desired to employ a loud-speaker with a crystal detector it is absolutely necessary to use an amplifier of the vacuum tube type. It has been found, in most cases, that a crystal detector in conjunction with a two-step amplifier works equally well, if not better, than a vacuum tube detector as it is more silent in operation.

One of the most valuable improvements in the science of radio will be the invention of an amplifier suitable for the crystal detector, and at the same time simple and inexpensive.

Queries Answered

Continued from page 9

dio energy. If your set contains an efficient lightning arrester, you need have no worry upon this score. If you are not at present using one, instal it right away.

3. Write to any of the traders advertising in this magazine for this information; or better still, make a personal call.

E. G. Levi (Annandale): No firm in Australia at present undertakes this class of work.

T. J. Lucas (Minvip, Vic.):

The station you refer to is Sydney (VIS), 2000 metres, 25K.W. A daily newspaper is published on board Trans-Pacific mail steamers. The press is intended for those ships. Fading is very pronounced on crystal receivers and we would recommend you obtaining a valve license, as you would most probably overcome the fading with the use of a single valve. The trouble is entirely due to atmospheric conditions. You are evidently screened from Melbourne hence the reason why you hear Adelaide so much better than Melbourne. The power of both stations is the same, although Adelaide, having a high shrill note is always easier to read than Melbourne.

G. P. Newman (St. Kilda, Vic.):

Your circuit is quite O.K., but the maximum wave length you would receive would be only about 600 metres. Farmers transmit on 1150 metres. Take your .001 condenser from the aerial circuit and shunt it across the primary. You should then hear Farmers, but not loudly. It is not necessary to use honeycombs.

RADIOCULOUS

A Man named Dodgin.

A man named Dodgin was recently appointed foreman, but his name was not known to all the men under him. One day while on his rounds he came across two men sitting in a corner smoking and stopped near them.

"Who are you?" asked one of them.

"I'm Dodgin, the new foreman," he replied.

"So are we. Sit down and have a smoke."

—Chicago Tribune.

* * *

"You look fed up, old man."

"Yes. I've had a tiring day. That little beast of an office boy of mine getting off for his grandmother's funeral, so just to teach him a lesson I said I would accompany him."

"Ah, not so bad; was it a good game?"

"No, it WAS his grandmother's funeral."—The Passing Show (London).

* * *

The Husband: "Look here, my dear, won't you want to take some fiction with you to pass away the time?"

The Wife: "No, darling; you'll be sending me some letters, won't you?"

—Sketch.

* * *

"Come right on in, Sambo," the farmer called out. "He won't hurt you. You know a barking dog never bites."

"Sure, boss, Ah knows dat," replied the cautious coloured man; "but Ah don't know how soon he's going to stop barkin'."

* * *

Why is Static?

Why is the air full of static? This is a question which must have occurred to many of our readers, who, being incautious enough to demonstrate their sets to their best girls on a summer night when a lightning storm interfered with the usual park-bench petting parties, heard crashes and growls instead of the sweet notes of their favourite broadcasting station. The following history will enlighten them. It may also be read to the children as a bedtime story. After hearing it, they will bawl all night.

* * *

Rollo Senseless was a handsome Lad who, instead of becoming a Movie Actor, got a job as a Research Assistant in a Radio Laboratory. In this Laboratory there glowed a Pliotron Bulb, which the Engineer for whom Rollo worked valued more than his first-born Child. One day Rollo, while carrying the Pliotron about the Laboratory to the Place where its Oscillations were needed most, in one Flash conceived a perfect, one-hundred per cent. All-American Stray Eliminator. In this moment of dizzy Inspiration, it was only natural that Rollo dropped the Pliotron Bulb on the cement Floor. No part of the precious Bottle remained unbroken except the plate, and that was bent. The Research Engineer, seeing the Fragments of the late Pliotron about his feet, fitted up a 2-K.W. Motor Generator and crowned Rollo then and there. With the cracking of Rollo's Skull the Stray Eliminator followed its Inventor to Eternal Rest, and the Strays, in faithful Remembrance, have continued to crackle ever since.

—Radio News.

* * *

The Long and Short of It.

A motor being out of order in a small factory, electricians were repairing it. The owner's father, a very old man was sitting on a chair nearby.

"What is the matter?" asked the old man.

"Short-circuit," was the reply.

"Nothing of the kind," said the old man, "the circuit is long enough; look at the wires running from the wall clear to the machine."

"Here, boy," said the man to the boy who was helping him to drive a bunch of cattle, "hold this bull a minute, will you?"

"No,' answered the boy, I don't mind bein' a director of this company; but I'm darned if I want to be a stockholder."

* * *

Questions and Answers.

Question: The catwhisker of my detector has broken. What shall I do?

Answer: Kill another cat.

Clarence, Simp Falls, Mo.

Question: The lady upstairs threatens to break my neck if I don't stop picking up the concerts on my loud speaker till 2 a.m. and waking her up via the airshaft. How would you handle a situation like this?

Anxious, Harlem.

Answer: Add another step of amplification.

Question: I made a set. Why don't I hear anything? I think the radio is a fake. Pianomover, Sauerkraut, Junction, Pa.

Answer: Certainly, certainly. We have always thought so ourselves. We never argue with a pianomover.

Question: My husband is a wireless operator on board a ship. Do you think he makes love to other women when he is away from me? Worried Bride, Soup Lake, N.Y.

Answer: Not if he ships on an oil tanker.

Question: My antenna runs directly under a 33,000 volt transmission line. What must I do to safeguard myself and my wife and 14 children? Father, Gruntville, Illinois.

Answer: Get in touch with one of the manufacturers of synthetic insulation. If you have the whole family thoroughly bakelised there is little danger. The dull brown finish is best.

—Radio News.

* * *

Dubb: "Why do you always question patients so closely about what they eat? Does the information you get help you to diagnose their cases?"

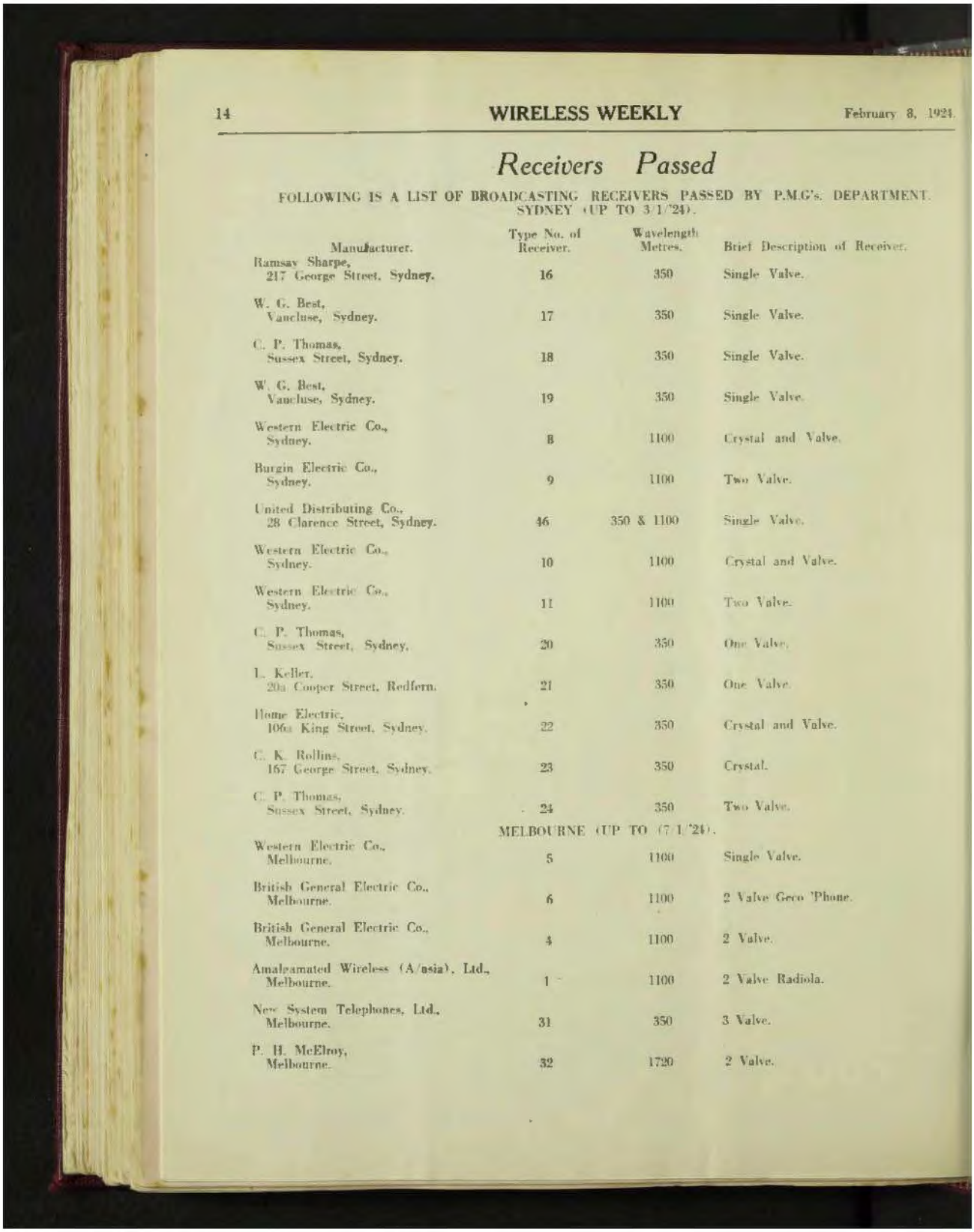
"Doctor: "Oh, no! But by doing so I am enabled to guess what their station in life is, and how much in fees I can probably get out of them."

* * *

"How do you like that cigar I gave you? If you smoke 1,000 of them, and save the bands they give you a talking machine."

"Huh, if I smoked 1000 of them, I wouldn't want a talking machine. I'd want a harp."

Tell your friends about Our Big Competition



Receivers Passed

FOLLOWING IS A LIST OF BROADCASTING RECEIVERS PASSED BY P.M.G's. DEPARTMENT. SYDNEY (UP TO 3/1/'24).

Manufacturer.	Type No. of Receiver.	Wavelength Metres.	Brief Description of Receiver.
Ramsay Sharpe, 217 George Street, Sydney.	16	350	Single Valve.
W. G. Best, Vaucluse, Sydney.	17	350	Single Valve.
C. P. Thomas, Sussex Street, Sydney.	18	350	Single Valve.
W. G. Best, Vaucluse, Sydney.	19	350	Single Valve.
Western Electric Co., Sydney.	8	1100	Crystal and Valve.
Burgin Electric Co., Sydney.	9	1100	Two Valve.
United Distributing Co., 28 Clarence Street, Sydney.	46	350 & 1100	Single Valve.
Western Electric Co., Sydney.	10	1100	Crystal and Valve.
Western Electric Co., Sydney.	11	1100	Two Valve.
C. P. Thomas, Sussex Street, Sydney.	20	350	One Valve.
L. Keller, 20a Cooper Street, Redfern.	21	350	One Valve.
Home Electric, 106a King Street, Sydney.	22	350	Crystal and Valve.
C. K. Rollins, 167 George Street, Sydney.	23	350	Crystal.
C. P. Thomas, Sussex Street, Sydney.	24	350	Two Valve.
	MELBOURNE (UP TO 7/1/'24).		
Western Electric Co., Melbourne.	5	1100	Single Valve.
British General Electric Co., Melbourne.	6	1100	2 Valve Geco 'Phone.
British General Electric Co., Melbourne.	4	1100	2 Valve.
Amalgamated Wireless (A/asia), Ltd., Melbourne.	1	1100	2 Valve Radiola.
New System Telephones, Ltd., Melbourne.	31	350	3 Valve.
P. H. McElroy, Melbourne.	32	1720	2 Valve.

Basic Principles in Receiver Design

The radiophone set is not complete without its receiving system. The received speech must be undistorted exactly as transmitted. Certain fundamental principles must therefore be considered in receiver design.

In the first place what is the exact form of the waves which are received? Suppose that the frequency of the unmodulated wave emitted by the transmitter is f and the amplitude is A. Then the equation of the current in the transmitter antenna will be given where t represents the time. Now when this wave is modulated there is super-imposed on it another audio-frequency wave of current due to the speech. Let us say that the frequency of this audio current is F and its amplitude is B. Then the equation of the speech wave which modulates the radio wave will be given by the usual formula.

During modulations these two current waves, equations (1) and (2), are super-imposed on each other and the resultant modulated wave is a combination of both which can be determined by mathematical analysis. The details of this analysis need not be given here, but the resultant modulated current has this equation.

This equation shows that the modulated current is composed of three components, one having a frequency of f, the unmodulated radio frequency; the second having a frequency of f plus F the sum of the radio and audio frequencies. The third having a frequency of f minus F, the difference of the radio and audio frequencies. Thus the radiated modulated wave has not a single frequency, but is a band of frequencies ranging from f minus F to f plus F. Consideration of this fact is important in the design of radiophone receivers. The radiophone receiver must not be a highly selective receiver for the following reasons:

Speech frequency ranges from 300 to 3,000 cycles per second, and in order that the received speech be a faithful copy of the transmitted speech it must not destroy any of the speech frequencies. Suppose the radio frequency is 100,000. That is the transmitted unmodulated wave length is

Suppose we assume that the speech frequency averages about 1,000 cycles. Then the modulated current will range in frequency from f minus F equals 99,000,to f plus F equals 101,000.

If the receiver is a highly selective one and tunes very sharply, say, to 100,000 cycles, then the components of the received wave having a frequency of 99,000 cycles will be eliminated by the sharp tuning, with the result that the received current is not a faithful copy of the speech and distortion results. In other words, in order that the received current be identical with the transmitted speech, the receiver must tune equally well to the

Continued on next page

The Leichhardt and District Radio Society

Members of the Leichhardt and District Radio Society, held their sixty-fifth general meeting at the club room, 176 Johnston Street, Annandale, on Tuesday, January 29th, when several important matters were brought forward for discussion.

Members of the social committee were congratulated upon the way in which arrangements for the recently held launch excursion were conducted, and which were largely responsible for the success of same. Later it was announced that a very interesting and important outing had been arranged for members, who are requested to meet outside the Customs House, Circular Quay, at 2.15 p.m. sharp, on Sunday next.

It was also unanimously decided to make "Wireless Weekly" the official organ of the society.

On Tuesday next the first of a series of lectures arranged under the new syllabus will be delivered by Mr. F. Thompson. The subject of the lecture will be, "Aerials and Earth Connections," and a good attendance of members is anticipated on this important occasion.

All inquiries relative to the activities of the Society should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth Street, Annandale.

Kuringai District Radio Society

At the next meeting of the Society, to be held on Tuesday, 5th February, the portion of the evening usually occupied with a lecture will be given over to a debate on various types of apparatus.

Members are also asked to bring any apparatus as a subject of debate and on which they may require any information; also to come armed with questions regarding any difficulties they are experiencing with their sets.

Buzzer practice will commence as usual at 7.30 p.m.

Newcastle District Radio Club

The above club held its usual fortnightly meeting on Wednesday, 30th ultimo, at the club room, 25 Winship Street, Hamilton.

In the absence of the President (Mr. Seward), Mr. Harper occupied the chair. After the usual buzzer practice, Mr. Swain gave a short address on the club's transmitter, and explained in detail how it was run, and what to do when it "wouldn't."

One new member was elected, and the meeting closed with the usual general discussion.

G. A. SAUNDERS.
The Announcer, Broadcasters (Sydney) Limited.

Straight iron will be found handy for joining fine wires and for doing small straightforward jobs. The right-angled iron is particularly useful for soldering leads to the tips of valve legs and for other work that is not easy to get at.

Basic Principles in Receiver Designs

Continued from previous page

lowest and highest frequencies, in the above case to 99,000 and 101,000 cycles. Thus the important principle is established that for radiophone receivers tuning must be broad.

It is obvious that the higher the audio frequency the broader the receiver tuning will have to be. For in the above case, audio frequency being 1,000 cycles, the difference between lowest and highest frequencies is 2,000 cycles, or 2 per cent. of the radio-frequency unmodulated. Suppose we consider the case where the high musical tones are transmitted, where frequency of speech is, say, 3,000 cycles, then f minus F equals 97,000, and f plus F equals 103,000, thus in this case there is a difference between the lowest and highest frequency of 6,000 cycles, which means a percentage deviation from the unmodulated radio frequency of 6 per cent., which obviously requires much broader tuning to get this band of wave lengths in. It is for this reason that the speech on many receivers sounds low and drummy. For due to the fact that the receiver is sharply tuned to the unmodulated radio frequency, it eliminates those frequencies, and the higher tones are therefore absent from the received speech. In the above case, if the receiver were tuned, say, to 100,000 cycles, it would receive fairly well the frequencies 1,000 cycles higher or lower. But due to the sharp tuning it does not receive equally well the frequencies 2,000 or more higher or lower than 100,000 and therefore the speech sounds dummy.

The receiver which is used for damped wave telegraphy will be capable of receiving speech. For although the speech waves are continuous—unlike damped waves which are not—the speech modulated waves have a varying amplitude which actuate the telephone receiver after being properly rectified by the detector, crystal or tube. The difference between the telegraph receiver and the speech receiver is that the telegraph receiver is generally made very selective, whereas, as explained above the speech receiver requires to be broadly tuned. Hence, contrary to the design of radio telegraph receivers, the high resistance, high decrement receiver is the better design for radiophone work. Although the speech intensity might be less than on the other highly selective type of receiver, the quality of the speech will be good, clear and intelligible.

Licenses Granted

TASMANIA.

Nature of Licence.	Name.	Address.
C	Bishop, M. G.	147 Melville St., Hobart. R.
V	Cave, N. (Wills & Co.)	7 Quadrant, Launceston. R.
C	Crome, H. K.	2 Ratho St., Newtown. R.
V	Davey, H. B.	239 Charles St., Launceston. R.
V	Fawkner, E. P.	111 Wellington St., Launceston. R.
V	Ferrall, E. W. C.	35 Hillside Crescent, Launceston. R.
C	Hodgkinson, F. C.	Queen St., Ulverstone West. R.
	The undermentioned has removed to the address indicated:—	
No. 2237	Richards, G. F.	Sunderland St., Moonah. R.

QUEENSLAND.

V	Blackburn, W. J.	Inkerman Mill, Home Hill. R.
V	Brown, J. R.	Nerang St., Southport. R.
C	Callow, P. J.	Little St., Albion, Brisbane. R.
V	Chauvel, W. T.	Glenlyon Station, via Stanthorpe. R.
V	Draney, W. A.	Thomas St., City View Estate, Greenslope. R.
C	Gover, S. H. J.	McMaster St., Nundah. R.
V	King, F. V.	Warrambah Station, Cunnamulla. R.
V	Lack, F. J.	6th Avenue, Sandgate. R.
V	Mitchell, A. T.	Bowen St., Toowoomba. R.
V	Paget, H. E.	Grenier St., Brisbane. R.
V	Power, A. H.	Blakeney St., Highgate Hill. R.
C	Ramsay, F. C.	Riverview Terrace, Toowong. R.
V	Reedman, A. B.	Gillon St., Norman Park. R.
C	Rodwell, A. E.	Hamilton Place, Bowen Hills. R.
C	Rowlatt, T. W.	C/o Peisker, Broadway St., South Brisbane. R.
Call Sign.	Name.	
4 C G	Stephens, A. N.	Railway Parade, Clayfield, Brisbane. T.

OUTLINES OF WIRELESS.

Wireless communication is carried out by transferring energy from one place to another by means of waves in the intervening places, says Lt.-Col C. G. Chetwode Crawley, in Modern Wireless.

The energy which produces light or heat is transmitted in an exactly similar manner, but in their case, seems much less mysterious, because we can detect, with our senses, the presence of these waves. Where then is this similarity? It is that the waves in each case are waves in the ether, the all pervading medium which we are assured exists everywhere throughout the whole universe.

The energy which produces heat and light is radiated in the form of waves in this ether, just as the energy of a stone dropped into a pond is radiated in the form of waves in the water, the waves consisting of movements up and down of the little particles of water. The transference of energy by this means, whether in the form of light, heat, or wireless waves, takes place at a speed of about 186,000 miles a second, that is, instantaneously for all practical purposes so far as radiation over the earth is concerned, though, of course, very far from instantaneously when the stupendous distances of astronomical space are being considered. The speed of travel, therefore, over the earth we may consider the same for light, heat, and wireless waves, viz.: instantaneous, but the rates, or as they are usually called, the frequencies, of the ether movements which produce the waves are different. The more rapid the movements, that is the higher the frequency, the shorter are the waves, the length of a wave being the distance from the crest of one wave to the crest of the next one. The most important similarity, therefore, between light, heat, and wireless is that they all consist of ether waves travelling through space at the same speed, and the most important dis-similarity is in the lengths of those waves. The highest frequencies, i.e., the shortest ether wave lengths, produce the Rontgen or X-rays, then come the Actinic rays, which are used in photography, and then the visible light rays at frequencies of about 1200 billions a second for those which produce the sensation of violet light, down through indigo, blue, green, yellow and orange, to some 600 billions a second of red, and then further down through the frequencies which produce heat rays, until at last are reached the wireless waves with frequencies of from a few million oscillations a second.

Wireless in the Next War.

What will be the role of wireless in the next war? The war clouds in Greece and the Balkans, which have happily cleared away, remind us that human nature has not altered sufficiently to warrant the hope expressed a few years ago that there would be no more war, and it is only to be expected that the minds of many people have turned to the thought of the possible achievement of radio in any future hostilities.

The outbreak of the Great War in 1914 found wireless only moderately useful, for since its invention there had not been any previous large war to stimulate its development. Of course, on board ship it was of immense use, and with the aid of codes a considerable degree of secrecy was obtained; but there remained the risk that the code might be stolen, intercepted or translated. Further, as directional wireless was in its infancy, the necessity still held of broadcasting a message in every direction if it was to reach its desired goal. Even now directional transmission from ships is in an early stage of development, and although it is possible to direct a beam for many miles in one direction only, it cannot by any means replace the present all-round transmission when distance and reliability are to be obtained.

Now, strictly directional transmissions would be of immense use in naval warfare, for not only should we ensure a considerable degree of secrecy, but it would be possible to carry on many simultaneous transmissions on the same wave length in different directions without mutual interference. The ether is now so crowded and tuning needs to be so very sharp to utilise the narrow band of wave lengths not actually occupied at any moment that we may be sure that under stimulus of further warfare directional transmission will be developed to a very high degree of perfection. Directional reception was largely developed in the last war with deadly efficacy in localising enemy stations, and has continually improved since the cessation of hostilities. This, combined with the directional transmission which we have foreshadowed, should alter very considerably the aspect of wireless in war.

In another direction—that of the elimination of interference—we may also expect very great developments. Unintentional interference itself is a very great worry in peace time, and when we have added to this interference of a type set up by an enemy with no other purpose than to upset the opposing communications, we need the most ingenious and elaborate method to secure immunity. Natural interference from atmospheric disturbances of whatever sort is the greatest bugbear in practical radio at the present time, and the steps being taken and the experiments being made by numerous radio scientists throughout the world will also serve to help in reducing the deliberate interference.

Long before the outbreak of the 1914 war we had heard a great deal, and read still more, about the wonderful possibilities of wireless control. This aspect of radio has always appealed very strongly to imaginative writers,

and usually the smaller the knowledge of radio on the part of the writer, the greater his predictions of future possibilities. Indeed, we used to hear that, should there be a war, wireless controlled aeroplanes and ships would race about, darting into enemy harbours, destroying ships, forts, towns, and even whole armies. And yet wireless control was hardly used in the last war, and then only in minor action, where indeed its use was fraught with nearly as much danger to the controllers as to the possible victims. So far, to the best of our knowledge, it has been found impossible to obtain the three prime requisites of range, reliability and immunity from interference by the enemy in wireless control of instruments of warfare. By wireless control, of course, we refer to the complete operation by wireless, not to the transmission of orders from one point to another whereby further human agency the apparatus can be operated.

Whatever new inventions may come along (and the man who is clever enough to describe future inventions is usually sufficiently clever to invent them for himself), the greatest use of radio in future warfare will be in the organisation and elaboration of communications everywhere. Secrecy and immunity from disturbance will doubtless be obtained by strictly directional transmissions and reception, together with a possible use simultaneously of several wave lengths, so that unless the receiver is tuned to them all, nothing whatever will be received. The deciphering of enemy messages will thus be so difficult a matter as to tax the ingenuity of the greatest experts, for the mathematical chances of an investigator lighting upon the correct combination, directions and other variable factors will be exceedingly small, and before the chance of deciphering has arrived, new changes can be introduced. At present, whatever wave length is being used, a search on all waves is a comparatively simple matter, while the use of multi-valve amplifiers enables us even now to listen to weak signals over incredible distances. Finally, we are inclined to think that the uses of wireless will be far less sensational and far more practical than is usually predicted. Such is generally the case in warfare.

Published by W. J. Maclardy, of 58 Murdoch St., Cremorne, for the Proprietors and Printers, Publicity Press Ltd., 33-37 Regent St., Sydney.

BROADCAST RECEIVING SETS AND LICENSE FORMS

Together with the FREE SERVICE of Broadcasters (Sydney) Limited may be obtained from the following

L. P. R. Bean & Co.
229 Castlereagh St., Sydney.
Telephone: City 353.

Continental Radio & Electric Company
Equitable Buildings, George St., Sydney
Telephone: B 2467.

United Distributing Company Ltd.
(Wholesalers)
28 Clarence Street, Sydney.
Telephone: City 3566.

W. Harry Wiles
60-62 Goulburn Street Sydney.
Telephone City 3688 1 door from Pitt St.

Wireless Supplies Ltd.
21 Royal Arcade, Sydney
Telephone: M 3378.

Pitt, Vickery Ltd.
335 Pitt Street, Sydney
Telephone: City 6053.

E. R. Cullen
96 Bathurst Street
Telephones: City 869, 2596.

Radio Company Limited.
15 Loftus Street, Sydney.
Telephone: B 5586.

Radio House
619 George Street Sydney
Telephone: City 1487.

Colville-Moore Wireless Supplies
10 Rowe Street Sydney.
Telephone: B2261.

Ramsay, Sharp & Co. Ltd.
217 George Street, Sydney.
Telephone: City 3176.

The Home Electric
106a King Street, Sydney.
Telephone: B 5565.

Pacific Radio Co.
Temporary City Address:
2nd Floor, 121 Pitt St., Sydney.
And 38 Donnelly St., Balmain.

O'Sullivan's Electric Shop
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296 Pitt Street, Sydney.
Telephone: City 8070.

Swains
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18 Hunter Street, Newcastle.