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IN AUSTRALIA & NEW ZEALAND

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" . . . AND THEY LIVED HAPPILY EVER AFTER "

RADIO

IN AUSTRALIA & NEW ZEALAND

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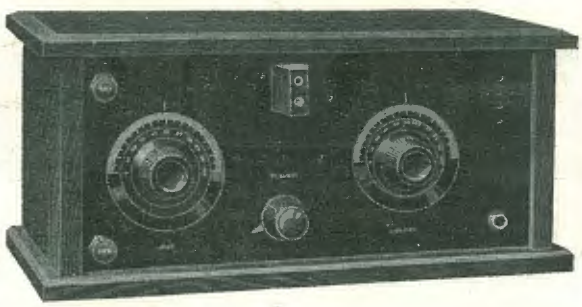

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"Hello, Australia!—England Speaking"!

ON the fourth of May, 1922, Mr. E. T. Fisk, Managing Director of Amalgamated Wireless (A/asia), Ltd., in the course of an address on "Wonders of Wireless" to members of the Ad. Men's Club, Sydney, said: "I am more than ever satisfied that in four years, or, at the most, in five, the human voice will be carried from here to England and *vice versa,* and that you in Sydney will be able to call on your office telephone a number on the telephone exchange in Auckland or Wellington."

TWO years and one month later—June 2, 1924—nearly three years sooner than might have been originally expected, Mr. Fisk, with receivers to his ears and seated at an ordinary wireless receiving set in his home at Vaucluse, Sydney, proved his forecast beyond the shadow of a doubt.

HE heard that which had never been heard so far away before—the spoken word which had travelled some twelve thousand odd miles in the infinitesimal fraction of a second of time. The voice of Senatore Marconi, speaking from the wireless station at Poldhu, England, on the other side of the world, was heard, to all intents and purposes, simultaneously at a house in a suburb of Sydney, Australia.

THE wonders of wireless are innumerable, but surely this last passeth all understanding!

TO think that by a certain and simple application of the laws of the Science of Wireless one can stand in front of a microphone (mouthpiece) and in an ordinary modulated tone of voice speak and be heard on the other side of the globe is incontestably one of the most stupendous, established facts ever maintained by Man on this earth.

NOR did the miracle stop there. The crowning glory of it all was in the point that the apparatus on which Mr. Fisk heard the message was almost identically the same in pattern as that which may be found in thousands of Australian homes to-day.

AS it was—and the more one contemplates it the more does one's amazement grow—absolutely no preparations were made beyond those ordinarily inseparable from picking up a ubiquitous amateur radio experimenter's " 'phone" messages from the house opposite.

WITH the consummation of Mr. Fisk's forecast in 1922 goes the last of the barriers that have sustained Australia's not-necessarily-glorious isolation. With an Imperial Government which it is hoped will give every assistance to the placing on a sound commercial and practical basis of this many-years-longed-for process of radio communication, Australia will stand on an equal trade and national footing with those countries which form the very hub of the universe.

IT must be remembered that the performance of the feat of this round-the-world-communication is by no means the end. It was not achieved by that system of wireless telephony known as "The Beam," for purposes of speaking to Australia from England that has not yet been used in its entirety. If it had been used fully on this recent momentous occasion "I would have got it," Mr. Fisk declared, "at least twenty times stronger."

"AT least twenty times stronger." One would almost think that reference was made to the addition of an amplifying unit to a nearby broadcasting station, instead of to a spot that is some twelve thousand miles away!

AS we received the news of the great fact, one feature that stood out in bold relief was that in the case of other inventions of this century and the last, from the time when the brain-child was first demonstrated to that when it had come into ordinary practicable every-day use was more often than not a life-time of years. How different it has proved with Radio!

FROM the day when Marconi first succeeded in transmitting Morse signals through the air to be picked up at a station a few hundred yards away to this month when he spoke to Australia from England is hardly more than two decades. What results to achieve in so short a period when we remember that the perfection of other inventions not a millionth the value of this have oftimes demanded lives before giving up their tantalising, and, on occasions, more or less worthless secrets.

WHAT need is there for further to be said? What more *can* be said? Wireless witchery beggars all description. The most enthusiastic and sanguine pen baulks at such a procession of superlatives and "exclamation-marks." There remains but to record.

WILL it ever end? *Can* it ever end?

Radio Talks for the Layman

Induction: A Simple Explanation

(By J. W. Robinson.)

This is the second of a series of articles by Mr. Robinson. In them no attempt has been made to furnish a wealth of technical detail, but the phenomena on which Wireless working is based are explained in terms which make a thorough understanding of them a matter of simplicity to even the merest novice.—Ed. "R."

INDUCTION and inductance are terms with which the wireless amateur meets during the very earliest portion of his studies and which remain important factors with him even when he has reached the "multi-valve" stage.

The beginner when arranging his first crystal set discovers that he must have an inductance coil for tuning purposes and, if that coil happen to be of the loose coupler type, he finds that the currents handled in one portion of it are transferred to the other portion "by induction." In many cases he is quite at a loss to understand just what is meant by both terms and very often confuses the two.

It will be the writer's object in this article to simply explain the principle of induction and also to describe just to what use the phenomenon is put in connection with a wireless receiver.

In the previous article it was pointed out that wireless is based upon a practical application of the theory of electricity and magnetism and, more particularly, upon the effects produced by these two forces when utilised in a dual capacity. In no branch of wireless is this fact more clearly demonstrated than when induction is considered.

Father Hayden, Chaplain at the St. Atlanta Federal Penitentiary (U.S.A.), is shown tuning-in the set which he recently had installed for the prisoners' benefit. His zeal on their behalf is unflagging and it is said that much good has resulted. This seems a splendid tip for some of OUR gaol Chaplains.

When an electric current flows along a conductor a magnetic field exists around that conductor. Similarly, if a conductor is moved across a magnetic field a current of electricity is induced in that conductor.

Two very simple experiments will demonstrate this: for instance, a current-conveying-wire may be held over a pivoted magnetic needle and while the current flows the needle will be deflected. This deflection is caused by magnetic lines of force created around the wire, acting on the magnetism of the pivoted needle.

In order to prove that a reverse action has the same effect a very simple experiment may be carried out. If a wire is wound around a bobbin with a hollow core, connected so as to form a complete circuit in which a measuring instrument is included, and a magnet be quickly plunged into the air space in the core a deflection of the needle of the instrument will follow. In other words, as the lines of force from the magnet cut the windings of the coil they induce in it a current. The induced current flows only as long as there is movement between the coil and the magnet.

Induction may be said to be the transferring of an electrical current from one conductor to another without any actual contact between the two conductors. The principles to which we have just referred are, of course, used to achieve such an object.

Reference has been made to magnetic "lines of force," and it may be here explained that this refers to the effects surrounding a magnet. As heat is felt around a fire, and as it becomes less intense at a distance, so lines of force exist around a magnet, these lines being stronger when close than at a distance.

Now as we have learned that a current when flowing through a wire creates lines of magnetic force around that wire, it does not require much effort to realise that if the conductor is arranged so as to bring these lines closer together, the magnetic effects will be increased. For instance, if the conductor is wound in the form of a spiral there will be a greater magnetic effect than if it is merely stretched out straight.

Let us now see what will happen if we place two coils together and pass a current through one of them. As the current springs into existence it will create a magnetic field around the coil, and the lines of force from this will cut across the windings of the second coil and induce in it a current. We know, however, that the current will be induced in the second coil only as long as there is *movement* between it and the lines of force. Consequently, the current induced in the second coil will only momentarily flow.

Madge Bellamy, the well-known screen favourite, listening-in during her travels on location through the wilds of Nevada (U.S.A.). It will be noticed by this picture that all casts and creeds can enjoy Radio concerts!

If, however, we cause an alternating current—a current which changes the direction of its flow many times per second—to flow in the first coil, the lines of force will be constantly changing and crossing and re-crossing the second coil and will induce in it a current which will flow as long as there is a flow of the original current.

The strength of a current which is thus induced depends mainly upon the strength of the magnetic lines of force, the number of turns of wire in the second coil and the rapidity with which the lines of force cut the turns of wire. If a large number of turns of wire be included in the second coil the current induced in it will be at a much greater pressure than that in the first or primary coil.

These facts are utilised in the construction of transformers which are used in both transmitters and receivers. A transformer merely consists of two coils wound around either an iron or open core. An alternating or oscillating current produced in the primary induces another current in the secondary. The induced current may be higher or lower in voltage, according to whether the number of turns on the secondary coil be greater or less than the turns on the primary. If the secondary coil contains a greater number, the transformer is termed a "step up" transformer, and if it contains a lesser number it is termed a "step down" transformer.

In cases where it is desired to raise the voltage or pressure of a direct current (which, of course, for obvious reasons, will not operate a transformer) apparatus known as an Induction Coil is used.

The Induction Coil consists of a number of turns of wire wound around a core consisting of a bundle of lengths of soft iron. On top of this primary winding, and carefully insulated from it, are wound a large number of turns of finer wire. A small hammer, to which a spring is fitted, is connected in the primary circuit and fitted so as to break that circuit if it is moved towards the iron core. This arrangement is known as the "Make and Break" portion of the circuit.

When a direct current is passed through the primary coil, the iron in the core becomes a magnet and pulls the small string contact towards it. Immediately this happens, the circuit is broken, the current stops flowing, and the iron in the core is no longer a magnet. The contact is pulled back by the spring but on reaching the original position it again makes a circuit. This cycle of operations is repeated many times per second.

Let us consider the result. The rapid make and break merely has the effect of causing a fluctuation in the strength of the magnetic field surrounding the primary coil and this induces currents in the secondary.

(*Continued on page* 168.)

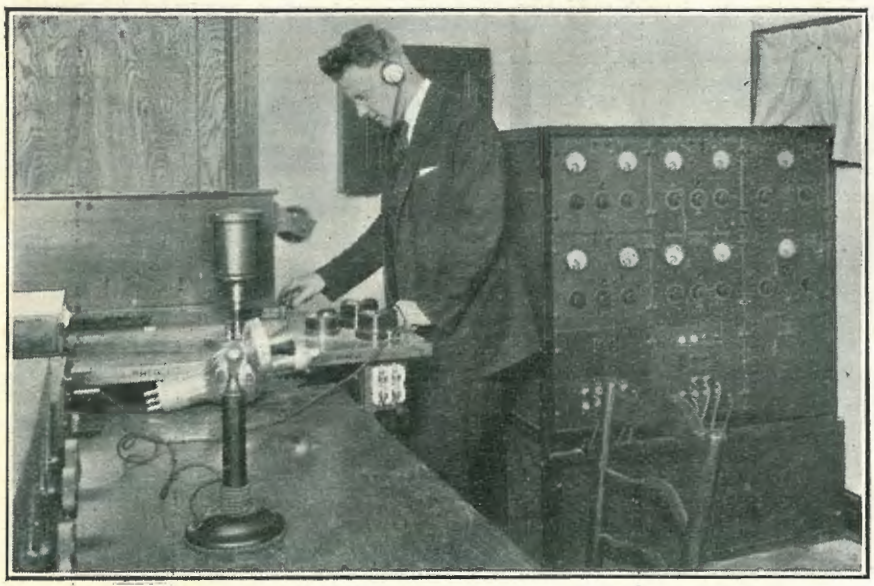
Highlights of Radio Broadcasting

Some Points about Loud Speakers

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

TO compress an entire orchestra into a tiny circular sheet—this is the audacious demand of the modern radio engineer when he insists that the loud speaker shall reproduce perfectly for the broadcast listener the concert which is being given at some broadcast station studio. The problem is really a comparatively recent one. While telephone receivers have been known for fifty years, they were generally adapted only to reproduce the voice feebly and with fair accuracy at best. It was necessary to press them to the ear to understand at all well, and they failed to reproduce music with any reasonable degree of satisfaction. If it was attempted to make loud speakers of them, they rattled and distorted the music badly. A new electric and acoustic technique has had to be developed to meet the requirements of an effective loud speaker. Only after considerable research and development has it become possible to produce such devices which will accurately follow their vocal masters at the broadcast studio.

A little consideration will indicate why the construction of a satisfactory loud speaker is so difficult. It must faithfully reproduce all sounds from frequencies as low as fifty vibrations or cycles per second (corresponding to the deepest tones of the organ and piano) to frequencies as high as eight or ten thousand cycles per second corresponding to the highest overtones of the violin or piccolo and certain of the overtones of the spoken consonants "s" and "f"). It must be capable of producing soft, pure notes and also extremely loud notes, so that the expression and meaning of musical compositions or oratorical efforts shall not be lost. It must accurately reproduce, in correct proportion, the voice and its piano accompaniment, or the various instruments which blend into an orchestral ensemble. And, when finally produced, it must be a sightly or even ornamental article since its place is generally in the home.



Here is shown the Supervising Engineer watching the oscillograph mirror at WJY, and thus keeping a check on the quality of the broadcast transmissions.

Great care is taken at high-grade broadcasting stations to ensure accuracy of quality in the concerts sent out from such stations. In fact, a great deal of the distortion imputed by some listeners to the station is really due to their unsuitable loud speakers. The experience is often repeated of listening to an exquisitely rendered concert from a definite station on one receiving set, only to be amazed at its poor quality on a nearby receiving set. It is for this reason that the listener should suspend judgment on the quality of a concert until he has proven beyond doubt that his receiving set is correctly designed and used, and that his loud speaker is a good example of a reliable product. The method of supervising the quality of transmission by ear and eye at stations WJY and WJZ, of the Radio Corporation of America, Aeolian Hall, New York, is shown in the accompanying photograph. The supervising engineer listens to the quality of the music on a suitable receiving set, and at the same time watches a wavering line of light on the oscillograph mirror whereby he can tell the strength and, to a great extent, the quality of the outgoing concert. The broadcast listener would be amazed at the extreme complexity of the sound waves shown on the oscillograph mirror. They look as complicated as a cross-section of a line of ocean waves in a bad storm, and it is really one of the great achievements of science that such complicated sounds should be reproductive at all, much less by so simple a physical structure as a circular sheet or diaphragm.

Loud speakers in general include a strong magnet, which is either a permanent steel magnet or, in a few cases, an electrically-excited magnet, which requires battery current for its functioning. There is also a coil of wire, generally wound over the permanent magnets, through which flow the electric currents, which carry the music in the form of regular or irregular fluctuations of these currents. In some loud speakers, an iron diaphragm is set into motion by the variation of magnetism caused by the incoming electrical currents carrying the music. In others, diaphragms of mica or other material are set into motion by mechanical systems attached to them, which, in turn, are controlled by varying magnetic pulls on a steel or iron movable part of the system. The exact arrangement of the loud speaker is therefore not yet standardized, but what is required from the loud speaker is well-known to the experts; and elaborate electro-acoustic laboratories have been established by the leading radio companies for the continued development and improvement of the device.

Practically all loud speakers are provided with a horn of wood, fibre, papier maché, or some other material which is believed to be suitable. A great deal of quality and sensitiveness of the loud speaker depends on the materials, shape, and mode of attachment of the horn. As a general rule, short horns emphasize the higher pitched notes. However, so much depends on the angle of the horn opening and on its method of attachment, together with the characteristics of the telephone receiver portion of the loud speaker, that no general statements can be here given as guides to what constitutes a suitable horn.

In the development of the new Radiola loud speakers which have been designed as the result of much systematic laboratory experimentation literally thousands of accurate measurements have been made to avoid the common faults of most loud speakers. Unfortunately the testing procedure and laboratory arrangements are too technical and complicated to be described here, but they represent a most interesting modern development in the field of sound reproduction.

The principal faults of some loud speakers, and the general listening tests for them are:—

1. The loud speaker fails to reproduce high pitched notes, but does respond to low pitched notes. Such loud speakers will sound well on piano pieces in the lower register, and on bass voices. Tenors and sopranos will sound thin and weak, and the violin will lack piquant quality being "flattened out" into flute quality. Speech, and particularly feminine speech, will not be fully intelligible. Orchestral selections will sound noisy and will have a drumming quality.

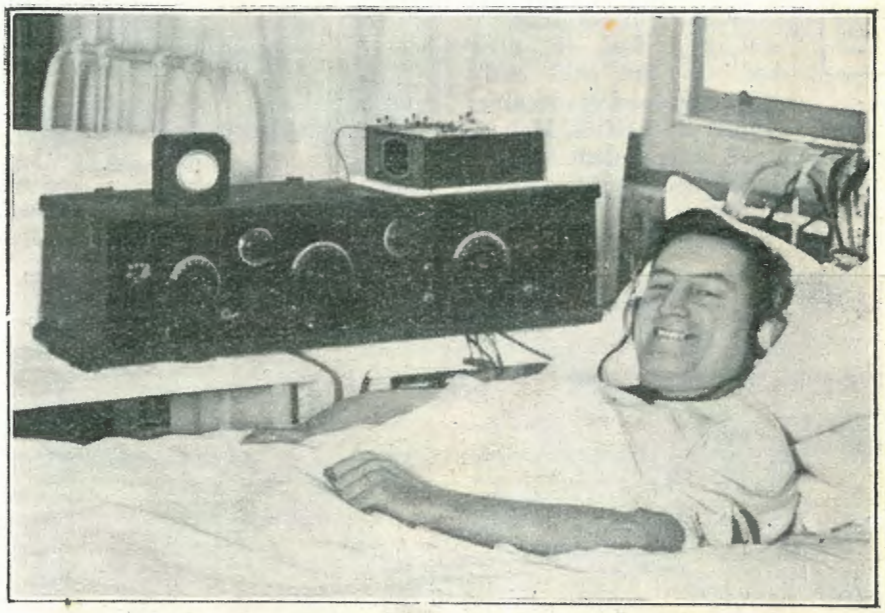
2. The loud speaker fails to reproduce low pitched notes, but does respond to high pitched notes. Speech will be fairly intelligible on such loud speakers, but the piano will sound thin and much like a harp or guitar. Bass voices will be weak or else sound like thin baritones. The effect in the rendition of orchestral selections will be feeble and squeaky, and without "body" and roundness. The accompaniment of the 'cellos and violins, and other deep-voiced instruments will be lost. The general effect will be that of a cheap and poorly designed phonograph with a small horn.

3. The loud speaker may reproduce only notes in the middle register, dropping out high and low pitched notes. This is unfortunately a fairly common fault. While speech is moderately intelligible on some examples of this class of instruments, music is very unmercifully treated, and the faults found are a combination of those mentioned in 1 and 2 above.

4. Loud speakers should not rattle on the loudest notes which are produced; but the user should be cautious in drawing conclusions since he may be overloading his radiotrons by excessively loud signals, combined with low plate voltage and incorrect grid bias. Unless the listener is sure the radiotrons are not themselves being "saturated" or overloaded, he should not blame the loud speaker for rattling noises. The best way of checking up on this point is by trying a known reliable loud speaker on the set in place of the suspected one.

5. Loud speakers occasionally are insensitive; that is, they fail to respond to weak signals at all, and do not give a good response to reasonably loud signals. The only test is by comparison with standard makes. The objection to insensitive loud speakers is the necessity for overloading the radiotrons to get a loud signal.

(*Continued on page* 168.)



Although it is six years since the Great War ended, this wounded "Digger" is still confined to his bed through injuries. However, to judge by his six-inch smile it would seem that some kind soul by the presentation of this fine multi-valve set has done a great deal to lighten his lot. (Other Australian and New Zealand Good Samaritans, Please Note!)

"Hello, Australia!—England Speaking!"

Successful Reception of Speech

Heard Direct in One-fifteenth of a Second

WHILE the majority of people throughout Australia were snugly tucked in their beds in the cold early hours of Monday morning, June 2, 1924, Mr. E. T. Fisk, Managing Director of Amalgamated Wireless (A/sia), Limited, was busily engaged manipulating minute controls on a wireless receiver in his experimental station at his home in Vaucluse, Sydney. A great experiment was in progress—something that hitherto had not been attempted—the reception of the spoken word direct from England.

Mr. E. T. Fisk and his set at which another milestone in the path of wireless progress was passed when he heard speech transmitted by wireless telephony direct from Poldhu, England.

At a few minutes before five o'clock, while the stars and street lamps were still blinking through a murky gloom, Mr. Fisk suddenly heard a voice saying:—

"Hello, Vaucluse! Poldhu, England, speaking."

Simultaneously another milestone in the progress of wireless had been passed! The human voice, and appropriately enough that of Senatore G. Marconi, had annihilated the 12,000 miles of space between England and Australia in 1/15th of a second.

What an achievement! But Mr. Fisk worked tediously on until well after eight o'clock, and thus for three hours successfully held the voice being transmitted from England direct to Vaucluse, in Sydney.

So loud were the signals at times that on occasions the voice was audible three feet away from the telephone receivers!

The transmissions consisted of calls to Vaucluse, Sydney, and several extracts were read from the London *Times* and copied down by Mr. Fisk.

The receiving circuits employed were not of any extra special design.

The transmission took place on a wave-length hitherto practically untouched. The power used at Poldhu by Senatore Marconi, who was transmitting, was 20 kilowatts. The apparatus consisted of special equipment recently developed and newly built by Marconi himself.

In an address to the members of the Ad. Men's Club in Sydney in May, 1922, and in a lecture delivered at the Royal Colonial Institute in London in December, 1922, Mr. E. T. Fisk predicted that within three or five years from that time the human voice would be carried by wireless direct from England to Australia. And he was right! In fact, it happened six months before he predicted it would.

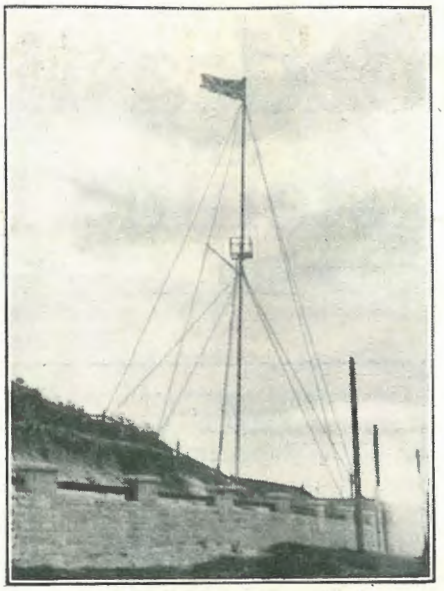
Like the first tests of wireless telegraphy that Marconi conducted over short distances in England, this test of telephony is also the first between England and Australia. As it was such a success, there seems no doubt whatever that telephony has surely come to stay.

The new Beam System of transmission being developed by Marconi was not fully used in these tests, the signals for Australia being more or less broadcasted. As the signals received were so strong without the beam, and were readable three feet away from the telephones, it is almost impossible

to predict what the strength will be when the Beam System is employed.

What a field of possibilities these experiments have opened up, and all while most Australians were sleeping soundly! Nevertheless, every Australian was indeed pleased to read the next day in the papers of the success of these tests, and not only are business men thinking of the wonderful facilities telephony will offer when placed into commercial operation, but the general public is also thinking of the entertainment they will receive right in their own homes from the other ends of the world.

The possibilities are unlimited, and they will be developed. Nothing is more certain. Wonderful things will be done, and every Australian will unquestionably benefit by and enjoy them.



One of the aerial masts at Mr. Fisk's home at Vaucluse, Sydney.

For commercial interests direct wireless telephony from England to Australia means that business people will be in constant touch with activities on the other side of the Globe, actually while they are happening.

As Mr. Fisk also predicted less than three years ago, Australians should soon be able to sit comfortably in their homes here and listen to the world's great musical and theatrical artists performing in England, or perhaps on the Continent.

It will happen. In fact, with the great development work going on both in England and Australia, it must inevitably happen.

It is all possible, and in the next issue of *Radio* we hope to publish a special article from Mr. E. T. Fisk on this wonderful subject.

Wireless in Great Britain

AMONG the personnel aboard the Special Service Squadron's light cruisers which recently paid a visit to Brisbane were several English wireless experimenters, and one of them, Mr. Hubbard (5OX), of London, gave to a representative of *The Daily Mail* a most interesting interview concerning wireless matters in England and America.

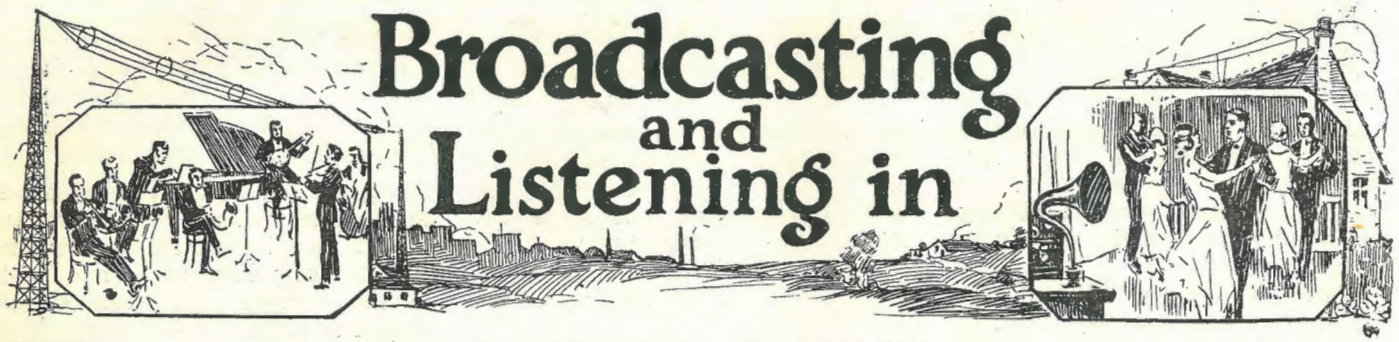
He said:—"Wireless in England has 'caught on' more than anything else I have known. There are eight broadcasting stations, each of which transmit from 3.30 p.m. to 10.30 p.m. on week days, and 3 p.m. to 5.30 p.m., and 8.30 p.m. to 10.30 p.m. on Sundays. Their power is 1500 watts. The programmes are excellent. Occasionally one broadcasting station contributes the programme for all stations. This is called simultaneous broadcasting, and is carried out by connecting stations together by means of trunk telephone lines and is very successful. No induction ever occurs, and the music comes out clear, as though from the station itself.

"Besides the above broadcasting stations, several relay stations are being erected, and will be connected to broadcasting stations as for simultaneous broadcasting and the programme retransmitted on a low wavelength. This idea is mainly for users of crystal sets that cannot receive broadcasting stations direct, and is very successful with the one relay station that is working at present. The British Broadcasting Company is well supported, and is continually carrying out experiments to better its programmes. Their studios are excellent. When one speaks in one of them it is uncanny as the voice is absolutely dead. There is not one atom of echo effect. Quite recently 2LO, the London station, carried out experiments by receiving New York broadcasting and retransmitting it. It was not very successful at first, but I have been informed since I left England that this experiment has been successfully carried out and crystal set listeners-in have had the pleasure of listening to New York concerts.

"The New York broadcasting is received on a super-heterodyne set and passed on to 2LO by means of telephone lines and simultaneously broadcasted to all stations. Amateur transmitters in England are numerous and good work has been carried out. They are all 10-watters, but for trans-Atlantic tests a few fellows obtain a special 100-watt license. Our first amateur to get two-way communication across the Atlantic was 2KF, and he was quickly followed by 2SH. The amateur transmitters are not allowed to use their transmitters during broadcasting hours, which, of course, 'gets up their noses' somewhat, but for all this amateur transmitters and the B.B.C. are on the best of terms.

"Sunday is a great day for amateur transmitters, as it is the only free day they have and listeners-in often have a switch round on their condensers and listen to some of the transmissions. Since I have been away from England I have received news that 5OX is receiving excellent reports on his transmissions of gramophone records and pianoforte solos, and one small concert he gave was remarked upon in the wireless papers.

"Reception in England is good. 5OX uses a detector and one L.F. note magnifier, and receives WGY, New York on a loud speaker. In transmitting, 5OX's records are London to Edinburgh, 450 miles, speed, using four watts, and London to Denmark, about 1,000 miles C.W., using 6½ watts. It has been a great pleasure to me to have visited Australian amateurs during this cruise, and I shall return to England with a large amount of information to give to my fellow amateurs. I hope that should any Australian amateurs come to England they will call on 5OX, 196 Putney-bridge Road, Putney, London, so that I can show them how things are going in England. In conclusion, I would like to wish all experimenters the best of luck and every success in the experiments."



AN American economist, Roger W. Babson, estimates on the figures for 1923 that the people of the United States will spend approximately 350,000,000 dollars for radio equipment during the present year. A conservative estimate of the business in vacuum tubes alone, is about 50,000,000 dollars. At least five times as much will be spent on radio sets and parts, while the sale of batteries, both dry cell and storage, is expected to reach the total value of 45,000,000 dollars!

* * *

IT is foretold that the time will shortly come when everyone will possess his own pocket radio set. It will be of the same size as an ordinary watch and probably worn in the same way, the chain acting as a tiny aerial.

* * *

ACCORDING to latest advices, no less than 750,000 listening-in licenses have been issued to radio enthusiasts in the United Kingdom. The nightly wireless audience numbers about 2,000,000.

* * *

THE King by his installation of a radio receiving set at Buckingham Palace has set the seal of Royal approval upon the broadcasting vogue. His set has no aerial and no "earth," instead a copper plate is let into the top of the cabinet of mahognay and ebony inlaid with ivory, box-wood and mother-o'-pearl. This constitutes the aerial and a similar one below forms the "earth."

* * *

EVA LE GALLIENNE, daughter of the poet Richard Le Gallienne, who was recently starring through the United States in "The Swan," was lately broadcasted from WOR (U.S.A.), when she gave readings from her father's better-known poems.

2FC

BROADCASTING TIMES.

Sydney Mean Time.

P.M.

12.55: Tune in to the Music of the Chimes.
1: "Sydney Morning Herald" News and Cable Service.
1.25: Coastal Farmers' Market Reports.
1.30: Stock Exchange Intelligence.
1.32: Weather Report.
1.35: Midday "Evening News" News and Cable Service.
1.45: Close down.
3: Chimes.
3.5 to 3.45: Musical Programme.
3.47: Afternoon Weather News.
3.50: "Evening News" News and Cable Service.
4: Close down.
6.30: Chimes.
6.33: Children's Time — Lamplighter Stories.
7: Dalgety's Market Reports.
7.5: Fruit and Vegetable Market Reports.
7.7: Closing Stock Exchange Intelligence.
7.10: Late "Evening News" News and Cable Service.
7.15: Close down.
7.55: Tune in to the Music of the Chimes.

8.00 to 10.00 — Entertainment. See List hereunder.

EVENING ENTERTAINMENT.

Mondays:	Popular Concert.
Tuesday:	Theatrical items.
Wednesday:	Dance Programme by Farmer's Novelty Jazz Orchestra.
Thursday:	Music Lovers' Night.
Friday:	Popular Concert and Amateur Theatricals.
Saturday:	Choral and Popular numbers.

"THE art of successful wireless singing is to know how to attack the note and keep an even rhythm by mentally beating each note. By doing that, one directly attacks each sound wave that goes out," says Miss Ruth Cumerford Phillips, late of the Rigo Grand Opera Company, who was recently broadcasted from a Melbourne station.

* * *

RADIO waves cover a scale of their own with frequencies one thousand times as high as the note frequencies of the piano. This scale is about eight octaves long. Broadcasting stations use a little over one octave of it. The wave frequency of any radio station is definitely characteristic of the station, just as the frequency or pitch is characteristic of a musical note.

* * *

THE Greenwich (England) Observatory listens to the British Broadcasting Company's Time Signals and compares the times at which they are transmitted with the time at which they get them back. The result is that on an average, they come back to them nine one-thousandths of a second before they went out, or rather, before they should have gone out! This means that there is no lag due to relay, but that, on the other hand, the lag anticipated has been a shade over that allowed.

* * *

AS the result of a successful experiment in America, it is proposed to instal a wireless plant at Rugby (England), whereby it is intended to connect telephone subscribers to London and New York.

* * *

THE Committee of the Sydney Industrial Blind Institution is arranging to provide wireless sets in the houses of two bed-ridden blind people. One set has already been presented by Mr. A. B. Triggs and the Committee hopes that someone else will follow this example and provide an outfit for the other case, which is a very sad one.

* * *

THE Weetawaa Pastoral Company recently installed a radio plant at Weetawaa (N.S.W.) homestead. It is thought to be the first wireless set installed in the north-west district.

* * *

MR. MALONE, the Controller of Wireless, recently stated that 6,300 wireless licenses had been taken out in the Commonwealth to date.

Radio Station "RA" at Roviana

By J. H. L. WATERHOUSE.

A FEW months ago the tourists on a Burns, Philp steamer were not a little surprised when invited to listen-in whilst their boat was on its way through the lovely islands of the Western Solomons. The programme was provided from the Methodist Mission station at Roviana, where the Rev. F. Goldie has, perhaps, the most up-to-date wireless plant in the Western Pacific.

—Photo. taken by the Author.

Radio Shack. Note the aerial spreader at the top of the palm tree.

Last year a ½ K.W. Marconi cabinet telephone set, supplied by Amalgamated Wireless (A/sia.) Ltd. was installed by Mr. R. Jordan (whose splendid work, by the way, from the wireless cabin of the doomed *Mindini* brought such speedy relief when that vessel was wrecked on lonely Mellish Reef), after much preparatory work had been ably carried out by Mr. E. F. Chivers, D.C.M., of the Mission staff.

A giant "Ivili" tree (*Afzelia bijuga*) was selected as a likely "pole," and the aerial stretched between it and a tall coco-nut palm on the sea beach.

Some diversion was afforded, during the work of erection by the unsolicited and un-rehearsed acrobatic antics of a boy named Mailagi, who did aerial stunts on the limb of the tree to which the spreader was attached—at a height of 115 feet! The whites present were rather relieved when the agile native reached the ground in safety.

Though neither Mr. Chivers nor the writer had had any previous experience of wireless work, they have carried on since Mr. Jordan left, and quite a fair volume of business, both for the Government and general public is handled by "RA," which works in conjunction with Tulagi (200 miles) and Rabaul (400 miles). Excellent results have been obtained with both C.W. and 'phone. With the latter it has been found possible to work with Townsville (VIT) about 1000 miles away. The power for the plant is derived from a 24 h.p. Skandia engine, which is also utilised for running a sawmill, etc. An interesting feature of the work at RA is the employment of native Solomon Island lads in the wireless office.

—Photo. taken by the Author.

Mr. Waterhouse and the set which handles a considerable amount of wireless traffic.

Jottings from 2FC

INSPECTION of the mail daily received by the management of 2FC, Farmer and Company, Limited's broadcasting studio, Sydney, unmistakeably shows that no limit to distance or locality can be set as regards the hearing with ease and accuracy of the items regularly disseminated. Professor Stewart's recent lecture at the studio was heard at Cassilis (N.S.W.) and even as far afield as Innisfail (Q.), while a listener-in at Bourke notified the management that he heard speech well on a loud-speaker. A listener-in who states that he heard the result of the 'Varsity boat-race broadcasted lives at Perth and another at Northam (W.A.) hears whole programmes—"from Chimes to National Anthem" he writes.

The other evening, on the occasion of Miss Josie Melville's return to Sydney in the revival of "Sally," portions of the production were broadcasted and splendid balance between orchestra and singers was secured by the radio engineers.

It might be mentioned in passing that many New Zealand listeners have mistaken the ringing of the studio chimes for the tolling of the General Post Office clock.

When Miss Ethel Osbourne was recently broadcasted from the Sydney Town Hall, she received an enormous number of congratulatory letters from those who had heard her. One enthusiast who lives at Brighton (V.) wrote:—"You are the best we have ever known. The 'Ave Maria' sounded as though you were in the same room." A timber cutter with his three mates camped in the bush some seventy miles from Sydney heard Miss Osbourne with ease on a one-valve set lent to them by a commercial traveller who was passing along their way.

One evening recently at Boggabri, some 300 odd miles from Sydney at a house at which a concert from 2FC was being heard, a trunk line conversation from Sydney was in progress. The speaker at the Sydney end suddenly enquired from whence came the music. Imagine his surprise when he was told that it came from the capital where he was speaking!

Other artists and lecturers who have lately been broadcasted from Farmer's studio include Adelaide Bruce, the well-known Victorian contralto, the children's choir of the Stanmore Domestic Science School—forty voices under the baton of Miss O'Brien—this feature proved so successful that it is very likely that it will become a permanent item of the programmes; Mr. Smith, Director of Education, and Mr. Bruntnell, the Minister, Mr. Dash, the President of the Teachers' Federation, who spoke during the recent tests carried out to ascertain the feasibility of broadcasting in connection with the State Schools' curriculum; Reg Morphew, the popular tenor, and Mort's Dock Choir, who increase their large circle of friends at every "appearance" at 2FC. Other artists include Lyn Cowan of "Yes, We Have No Bananas!" fame, and Paul De Chaumente.

The reception by the Royal Society to Dr. Stefansson was broadcasted on his arrival in Sydney with conspicuous success, while quite a happy little interlude in the programme sent out from 2FC lately was the dissemination by 'Varsity students of several of their Commem. songs.

PERSONAL.

LEADING telegraphist L. R. Flood, of H.M.S. *Hood*, having completed his period of service in the Navy, recently left the war-ship at Auckland (N.Z.) to engage in the commercial radio business.

The results of the recently-conducted trans-Pacific low-power wireless tests as described by Mr. C. D. Maclurcan were eagerly listened to by members of the Wireless Institute (N.S.W. Division) at the annual dinner held at the Wentworth Hotel the other evening. Reading from left to right, back row—Messrs. Moore, Perrett, Marsden, Nolan, McIntyre, Gregory, Miss Wallace, Rowland, Walker, McLellan, Burman, Dewis, Ingram, and Grigg. Seated at table:—Messrs. Colville, Tatham. Mingay, Crawford, Cooke, Davis, C. D. Maclurcan (President), Renshaw (Secretary), Stowe, Crocker, O'Donnell, Challenger, Schultz, Hughes, Murray. Front row:—Messrs. H. R. Gregory, Western, Perry, Wiatt, and Sewell.

Wireless Institute of Australia

(N.S.W. Division)

DELEGATES' COUNCIL MEETS.

THE following affiliated Societies were represented:—Waverley Radio Club, Newcastle and District Radio Club, Katoomba School of Arts Radio Club, Railway and Tramway Radio Association, Campsie and District Radio Club, Leichhardt and District Radio Society, Marrickville and District Radio Club, Artarmon Radio Club, Wentworth Radio Club.

The Chair was occupied by Mr. E. B. Crocker, a councillor of the Wireless Institute, and Mr. P. Renshaw acted as honorary secretary.

Mr. Renshaw then explained matters in regard to business of the Delegate's Council and drew attention of the delegates to the importance of this innovation, stating that it was only by unity of action and harmony that the status of the experimental cause could be preserved. He also mentioned that there had been some attempts made to belittle the operations of this Delegates' Council insofar as that clubs were being warned that while each club only had one voice in the operations of the Delegates' Council, the Institute by virtue of its Council had seven votes to their one each. He drew attention to the ridiculous nature of this statement and explained that decisions of this Delegates' Council would be referred to the Executive Council and that it was not anticipated that any of the findings of the Delegates' Council would be referred to the Executive Council and that it was not anticipated that any of the findings of the Delegates' Council would be turned down, but if the Executive Council did not agree with such findings it would be under an obligation to refer them back to the Delegates' Council for further consideration, perhaps being able to throw more light on contentious matters and thus cause matters to work more harmoniously. Only when a practically fifty-fifty division in the Delegates' Council took place, would the Institute Council have to be very careful in taking executive action on the finding, and it was quite reasonable to suppose that in such cases with a very large minority the matter should receive some further consideration.

Mr. Hannam agreed with Mr. Renshaw's statements, and said that the objects of this meeting of the delegates and the arrangement as a whole were to further the interests of experimental wireless, as experimenters might have many difficulties in the future and it was only by concerted action that they could be overcome.

On the motion of Mr. Hannam, seconded by Mr. Carter, it was decided unanimously "that the action taken by the Wireless Institute in delegating a member of the Institute Executive as Chairman of the Delegates' Council for a period of twelve months, as explained to the meeting on the 19th March last, be now confirmed by this Delegates' Council."

"WIRELESS HOUSE" DANCE.

THERE has been an unexpected and unprecedented demand for tickets for the "Wireless House" Social Club's dance which is to be held at St. James' Hall, Sydney, on July 1. A large number of the staff of Amalgamated Wireless (A/sia.) Ltd. and their friends will be present and arrangements will insure that the function will be long remembered as a stupendous success. A few tickets (Ladies, 3/6, Gentlemen, 5/-) are still available and may be had on application either to Misses F. Coy and T. Wall or Messrs. K. M. Spinney and H. J. Coy.

BRISBANE AMATEUR HEARS KGO.

MR. LEIGHTON GIBSON (4AN), of Greenslopes, Brisbane, writes to say that he has heard music and speech from KGO. On the evening of June 4, "about the first night in Brisbane this winter that was entirely free from QRN," he was successful in tuning in at about 5.40 p.m. Two minutes later, weak speech was heard followed by music which was fairly loud. At a quarter to six, he caught a fragment of the now familiar announcement: "KGO, Oakland, California. There will be an interval of, etc., etc." At 6.3 p.m. he shut-down, leaving the set tuned to KGO's wavelength and when Mr. Gibson's father returned from the city he heard this announcement: "KGO, the General Electric Company's Broadcasting Station at Oakland, California, broadcasting from the St. Francis Hotel, San Francisco, KGO, Oakland, California, signing-off. Good-night!" The music throughout was of the "Jazz" variety, writes Mr. Gibson, and an interesting point was that on every occasion the speech was much louder than the music—the announcer's American accent being very noticeable. Fading was pronounced, the music appearing to rise and fall in waves at about half-minute intervals. The receiver used was one tuned R.F., Detector and one A.F. The aerial is a double cage, inverted "L," 65ft. long and 45ft. and 28ft. at the free and lead-in ends.

AN ERROR.

Mr. N. C. Edwards, of Auckland (N.Z.), in consequence of an error which crept into our list of New Zealand experimenters' call-signs published in *Radio* of November 28, 1923, writes to say that his address is 42 Pollen Street, Grey Lynn, Auckland.

Loop Aerials and Direction-finding

By J. G. REED

WHEN carrying out local work with small transmitters, experimenters have no doubt found periods when the interference due to the number of transmitters using the air has been so bad as to render work very difficult. The reason for this is that the ordinary elevated aerial picks up signals irrespective of the direction from which they come, and if they all happen to be on about the same wave-length there will be confusion in the receiver.

An aerial having highly directional properties can be made by winding a large loop of several feet in diameter. When tuned to the wave-length of the transmitting station, this aerial will only give maximum response when the plane of the winding lies along the direction in which the signals are travelling. If the loop is turned through 90 degrees from this position, there will be practically no voltage induced in the winding, and consequently the signal will be at a minimum. The reason for this peculiar propery of the loop, or frame aerial, will be readily understood by referring to Fig. 1.

Assume that "T" is the transmitting station radiating a wave which is rendered graphically by the Sine curve extending to the right. The loop aerial is represented by the single turn of wire A, B, C, D, which is tuned to resonance by the variable condenser "K." At any particular instant the vertical wire AB will be in a portion of the field of the radiated wave which has a different intensity to that existing at C, D. The scale of the drawing has been purposely exaggerated to show this difference of field intensity as clearly as possible. The voltage induced in wire AB will have an intensity of say 10 units and will have an inclination to flow in the direction A to B. In the wire C, D the direction of flow will also be vertical, but as the opposing E.M.F. in AB is greater, there will be a resultant flow in a clock-wise direction. As soon as the phase relationship of the inducing magnetic field changes there will be a corresponding change in the E.M.F.'s induced in the wires AB and CD; always with the same angular lag which sets up circulatory currents.

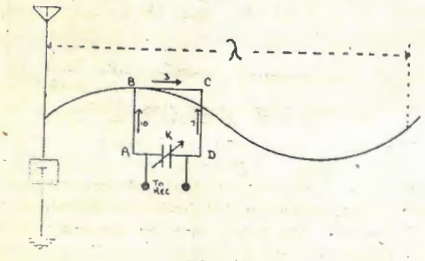


Fig. 1.

Supposing that the loop is turned so that its plane is perpendicular to the page. The induced voltages in each of the wires AB and CD will now be equal in magnitude and phase —which results in a zero circulating current.

In practice the physical dimension of the loop must bear a very much smaller ratio to the wave-length of the transmitting than that shown in Fig. 1. It can also contain more than one turn of wire thereby making up to some extent for the smaller area. There is a limit to the amount of wire that can be used for as the natural inductance is made larger by the greater number of turns, the distributed capacity goes up, also. When the natural wave-length of the loop exceeds that of the signal being received, the signal-strength and directional properties suffer to a great extent. Experience has shown that good signals can be obtained at wave-lengths up to three or four times the natural of the loop if tuning is done by means of a condenser alone, and the range of efficient working can be still further extended by means of a series inductance which keeps the voltage re-actance across the tuning condenser from falling too low. The above table gives the main dimensions for loop aerials which will cover most of the waves met with in practice.

Wave range.	Size.	Turns.	Spacing.	Optimum wave.
150-400	3ft.	6	¼in.	250
500-1500	4ft.	12	¼in.	800
2000-6000	6ft.	45	¼in.	3500
5000-15000	8ft.	80	¼in.	8000

If the reader desires to construct a loop aerial with an optimum wave-length of some other value to that shown in the above table it will be a simple matter to interpolate the figures given. For most purposes loop reception will be confined to the shorter wave-lengths below about 1500 metres, and for this range the following practical design will be found useful.

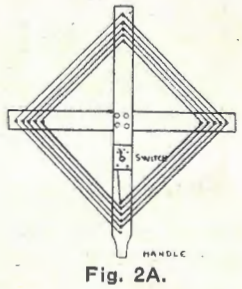


Fig. 2A.

Although the size chosen—namely, three feet square—is a small one, the loop will be found quite a clumsy affair to handle if special means are not taken to support it in such a way as to be easily rotated. The

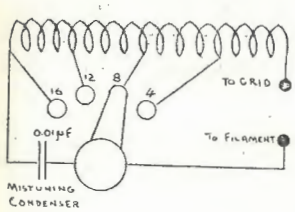


Fig. 2B.

writer solved the problem in the following manner.

From the wall of the radio-room erect a piece of timber about 3ins. by 2ins. and three feet long. This is held in place by a large bracket with preferably a guy-wire to a screw-eye let into the wall or ceiling. This will provide the top support for the loop. Now take two pieces of dressed pine, 2ins. x 1in., one 4ft. 6ins. and the other 5ft. long. Screw these together in the form of a cross and on each arm at a distance of 22ins. from the centre put in on both sides eight half inch wood screws, spaced half an inch apart as shown in the accompanying illustration Fig. 2A.

Use double cotton and rubber covered bell wire, No. 20 gauge, for the winding and commence from the inside. Numbering the arms 1, 2, 3, and 4 respectively, start winding from the inside screw of arm No. 1 and proceed in this manner to arm No. 4, all on the same side of the frame. Now wind a turn on the inside screws of the other side of the frame. Continue in this manner until four turns are put on, and then take off a tap with a piece of similar gauge wire about four feet long. Do this every four turns until the whole 16 are put on.

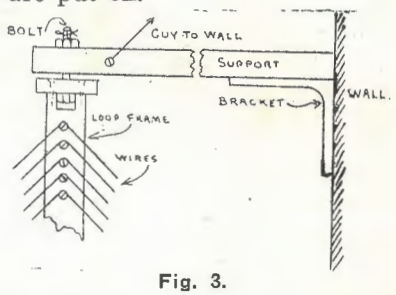
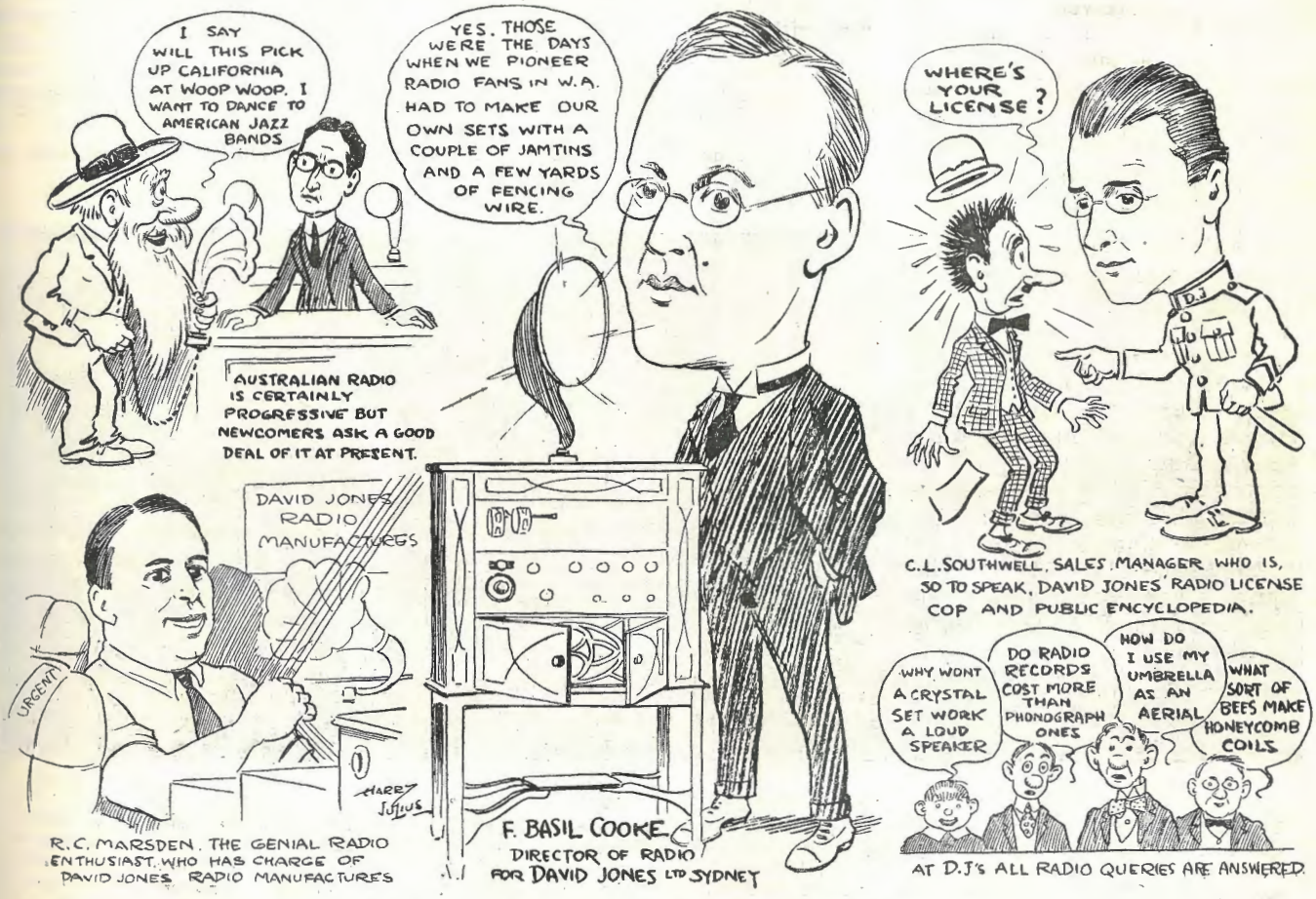


Fig. 3.

These wires should now be connected to a multi point switch, Fig. 2B, which is fitted with a special mistuning condenser to tune the un-used portion of the winding to a wave well above that being received by the ac-

(*Continued overleaf.*)

"Radio" Looks Around the Wireless Shops



SOME IDENTITIES OF DAVID JONES' RADIO DEPARTMENT.

Loop Aerials and Direction-finding

(*Continued from page* 159.)

tive winding. The capacity of this condenser should be about 0.01 microfarads. When connecting the terminals on the loop to the receiving set, the one from the outside of the winding should go to the grid, and the one from the switch to the filament

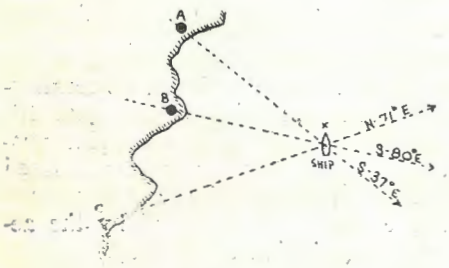


Fig. 4.

Details of the simple rotary movement can be gleaned from the illustration No. 3. Do not forget the split pin which passes through the top of the supporting bolt, for if this is not present, there is always a danger of the nut working loose and letting the whole outfit down on the operating table with fatal consequences to any valves which may get in the way.

The connecting leads to the receiver should consist of rubber-covered electric light flex which must be untwisted to reduce the mutual capacity between the wires. As a refinement, an indicator and compass card can be fitted, when it will be possible to read the bearing of the received station. If the signal being recived is a weak one and audible only over a limited degree of the scale, it is best to work for the maximum signal, but where the reverse is the case, greatest accuracy will be obtained by adjusting the loop to give minimum or zero signal. The bearing of the transmitting station will now be at right angles to the plane of the loop. If two or more stations take across bearings of the same transmitter, it is possible to locate the latter with a fair degree of accuracy providing the bearings are drawn on a suitably scaled map. How this is done is shown in Figure 4, where three stations are supposed to have taken simultaneous bearings on the transmitter "X."

Radio- frequency amplification should be used for work over any considerable distance, and the best form is that employing the super-heterodyne principle; the next best being one stage of tuned anode amplification. Complicated tuning arrangements will lose more signals than they are likely to receive because of the many adjustments required when searching for stations.

For long wave reception, where the number of turns is great, the best way to accommodate them is to screw on to the end of each limb of the loop, wire holders as shown in Fig. 5. The slots for the wires can be cut to any width desired by mounting several hacksaw-blades in parallel in the same frame. To wind an eighty turn loop, have eight saw cuts on each side and wind five turns of bell wire

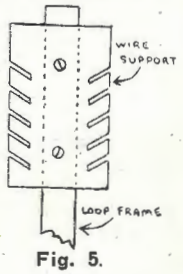


Fig. 5.

in each slot. The slots must be a close fit for the wire to prevent the turns riding upon each other. Put the wire into alternate right and left slots winding five complete turns in each. To make a neat winding, stretch the wire slightly by pulling until it begins to give, every quarter turn. Such a loop can be used for waves as low as 600 metres if the special switch and mis-tuning condenser are fitted.

CLUB DELEGATES MEET.

This is a photograph of the meeting recently held by the Wireless Institute (N.S.W. Division) and the Radio Clubs' delegates at the Society's rooms. Left to right, standing:—P. McDermott (Wyong), N. P. Olsen (Newcastle), E. R. Mawson Campsie), W. L. Hamilton (Marrickville), W. J. Zech (Leichhardt), A. Heppel (Artarmon). Sitting: R. C. Marsden (Wentworth), W. H. Barker (Concord), A. H. Perrett (Wireless Institute's Publicity Officer), E. B. Crocker (Chairman, Proxy Katoomba), Phil Renshaw (Hon. Sec. Wireless Inst.), Alan Burrows (Waverley), W. H. Hannan (Balmain), and W. L. Carter (Railways and Tramways).

"DX" par Excellence

Gisborne (N.Z.) to Buenos Aires

Over Two Hours' Communication

A WORLD'S record on a low-power plant is claimed by Mr. Ivan O'Meara, of Gisborne (N.Z.), who was lately successful in establishing and maintaining wireless communication with Buenos Aires in the Argentine. Whilst endeavouring to pick up the signals of a radio amateur in Los Angeles (Cal.) who has been experimenting in long range communication, Mr. O'Meara heard a South American station calling. Just after 7 p.m. he picked up "KCB8." This he recognised as the Argentine station CB. Replying, he succeeded in conducting communication with a man in Buenos Aires for two hours and ten minutes by Morse. In answer to his station number, Mr. O'Meara received a reply, "Very pleased to hear you." He asked for the name of the person to whom he was talking and got, "Charles Braggia, Calle, Alsina, DF412, Buenos Aires."

Mr. O'Meara then sent his own name and address but the South American could not quite catch it and sent, "Please repeat name and address." Mr. O'Meara did so, and the name this time was received successfully. The following message then came from Buenos Aires. "Mr. Ivan O'Meara, Gisborne. Very glad you have one friend more now. Time here, 5.45 a.m." That would be equivalent to 9.15 p.m. local time. "Is it daylight yet?" was Mr. O'Meara's next query. He received the reply, "It is just dawning." This was at 9.45 p.m., so it would be after six o'clock in Buenos Aires. The message, Mr. O'Meara remarked, was clearest just before dawn but as soon as daylight broke the radio faded out. The Argentine operator Morsed "Good morning," and the communication ceased. The distance between Buenos Aires and Gisborne is about 7,000 miles.

The results were obtained on a wave-length of 125 metres, while the radiation was 2½ amps. Mr. O'Meara despatched a cablegram to the Argentine operator, and later received the following reply. "Hearty congratulations. Your radio received. Charles Braggia."

Valves for Every Purpose

Complete Information

POWER RECTIFYING VALVES.

"KENOTRON" TYPE "UV.216."

A Rectifying Valve for use with five watt transmitting valve. Filament Battery Voltage, 10. Filament Terminal Volts, 7.5. Filament Amps, 2.35. A.C. Input Voltage, 550. D.C. Output Voltage, 350. Socket Type—"U.R. 542."

"KENOTRON" TYPE "UV.217."

Manufactured for use with 50 watt transmitting valves. Filament Battery Voltage, 12. Filament Terminal Volts, 10. Filament Amps, 6.5. A.C. Input Voltage, 1,250. D.C. Output Voltage, 1,000. Socket Type—"U.T. 541."

TRANSMITTING VALVES.

MARCONI TRANSMITTING VALVES.

TYPE "T.15."

A low-power Transmitting Valve, dissipating 15 watts at the Anode. Designed for voltages up to 600. Filament Battery Voltage, 8. Filament Terminal Volts, 6. Filament Amps., 1. Anode Volts, 600. Socket Type—"R."

TYPE "T.30."

A low-power Transmitting Valve, dissipating 30 watts at the Anode, and suitable for voltages up to 1,000. Filament Battery Voltage, 10. Filament Terminal Volts, 7. Filament Amps., 1.8. Anode Volts, 1,000. Socket Type—"R."

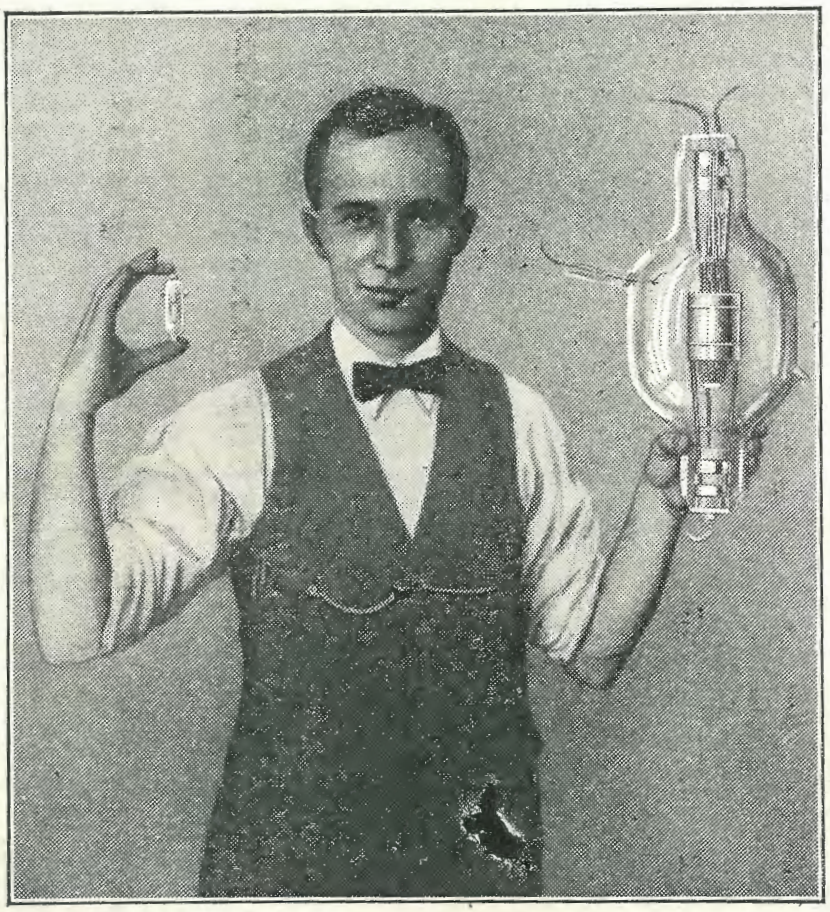
RADIOTRON TRANSMITTING VALVES.

TYPE "UV.202."

A low-power Transmitting Valve, dissipating five watts at the Anode. Intended for voltages up to 350. Filament Battery Voltage, 10. Filament Terminal Volts, 7.5. Filament Amps., 2.35. Anode Volts, 350. Socket Type—"U.R. 542."

TYPE "U.V.203."

A Transmitting Valve, dissipating 50 watts at the Anode. Suitable for voltages up to 1,000. Filament Battery Voltage, 12. Filament Terminal Volts, 10. Filament Amps., 6.5. Anode Volts, 1,000. Socket Type—"U.T. 541."



A CONTRAST IN VALVES.

The small valve is the "V.24," a Receiving Valve normally operating on 24 volts; while the large valve is the "M.T. 7A," a Transmitting Valve operating on up to 12,000 volts.

RECEIVING VALVES.

MARCONI RECEIVING VALVES.

TYPE "R."

A general purpose valve suitable for use as Detector or Amplifier. An excellent all-round valve for use where it is not desired to employ special types for specific purposes. Filament Battery Voltage, 6. Filament Terminal Volts, 4. Filament Amps., .67. Anode Volts, 70. Socket Type—"R."

TYPE "DER."

A low-temperature valve, requiring small voltage and economical in current consumption. Filament Battery Voltage, 2. Filament Terminal Volts, 1.5-1.8. Filament Amps., .35-4. Anode Volts, 30-50. Socket Type—"R."

TYPE "DE. 3."

A new low temperature Filament Valve for use with dry cells. Will function as detector or amplifier. Particularly useful where accumulators cannot be re-charged. Filament Battery voltage (3 dry cells), 4.5. Filament Volts, 3. Filament Amps., .06. Anode Volts, 20-80. Socket Type, "R."

NOTE.—With one valve in circuit, using three dry cells, either a 30 ohms rheostat should be employed or a four ohms rheostat with 26 ohms fixed resistance in series.

TYPE "Q."

Specially adapted for use as Detector Valve. Filament Battery Voltage, 6. Filament Terminal Volts, 5. Filament Amps., .45. Anode Volts, 50-150. Holder Clips, Type—"V. 24."

TYPES "LS. 1" and "LS. 2."

Low Frequency Amplifying Valves, carefully designed to function with Loud Speakers. Filament Battery Voltage, 8. Filament Terminal Volts, 6. Filament Amps., 1.5. Anode Volts, 300-600. Socket Type—"R."

TYPE "LS. 3."

A Low Frequency Amplifying Valve to act with a Loud Speaker. Splendid for Receiver-amplifiers employing "R." Valves in the receiver. Filament Battery Voltage, 6. Filament Terminal Volts, 4. Filament Amps., .65. Anode Volts, 70-100. Socket Type—"R."

TYPE "LS. 5."

A Low Frequency Amplifying Valve with low temperature filament. Designed expressly for Loud Speaker work. Filament Battery Voltage, 6. Filament Terminal Volts, 4.5. Filament Amps., .8. Anode Volts, 150. Socket Type, "R."

TYPE "QX."

This valve is an excellent Detector, and is equally effective when used as an Amplifier. Filament Battery Voltage, 6. Filament Terminal Volts, 5. Filament Amps., .75. Anode Volts, 25-100. Holder Clips, Type—"V. 24."

TYPE "V.24."

The ideal type for use as Amplifying Valve in cascade circuits. Filament Battery Voltage, 6. Filament Terminal Volts, 5. Filament Amps., .75. Anode Volts, 24 30. Holder Clips, Type—"V. 24."

RADIOTRON RECEIVING VALVES.

TYPE "UV. 199."

A low temperature Filament Valve for use with dry cells. Will function as detector or amplifier. Extremely useful where accumulators cannot be recharged. Filament Battery Voltage, (3 dry cells), 4.5. Filament Volts, 3. Filament Amps., .06. Anode Volts, 20-80. Socket Type, "U.V. 199."

NOTE.—With one valve in circuit, using three dry cells, either a 30 ohms rheostat should be employed or a four ohms rheostat with 26 ohms fixed resistance in series.

TYPE "UV. 200."

A splendid detector, favourably known everywhere. Filament Battery Voltage, 6. Filament Terminal Volts, 5. Filament Amps., 1.0. Anode Volts, 15-25. Socket Type—standard "V.T."

TYPE "UV. 201a."

A new Radio Valve—detector or amplifier. Has a long life with low current consumption. Filament Battery Voltage, 6. Filament Terminal Volts, 5. Filament Amps., .25. Anode Volts, 20-100. Socket Type—standard "V.T."

TYPE "WD. 12."

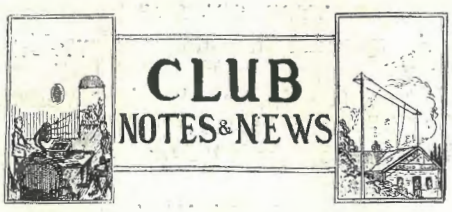
A vacuum tube for use as detector or amplifier. As this valve operates from one dry cell, it is of special value where accumulators cannot be re-charged. Filament Battery Voltage (one dry cell), 1.5. Filament Terminal Volts, 1.1. Filament Amps., .25. Anode Volts, 20-100. Socket Type—standard "V.T."

RADIO SOCIETY OF QUEENSLAND.

AT the last meeting of the Radio Society of Queensland the matter of the formation of the Queensland Wireless Council evoked lengthy discussion. Mr. E. Gabriel, who occupied the chair, and had attended a meeting convened for a discussion of the project as the representative of the Society, detailed to those present what had transpired at that conference. A motion later submitted by Mr. Gabriel, and seconded by Mr. N. B. Harper, to the effect that "the Radio Society of Queensland take no further action in connection with the formation of the Council, as proposed" was carried. Owing to stress of private business, the organising secretary (Mr. N. B. Harper) has been forced to submit his resignation, and, although expressions of regret at his action were voiced at the meeting, this was eventually accepted. Mr. Bell was appointed to fill the vacancy, at the instigation of Messrs. Harper and Underwood, who respectively moved and seconded his appointment. A delegate from the Ipswich Radio Society reported excellent progress from his branch, and on the motion of Mr. Sayce, the affiliation of the smaller body with the Society was accepted.

WEST PERTH—LEEDERVILLE RADIO SOCIETY.

THE usual meeting was held at Mr. P. C. Lindsay's residence, Tower Street, Leederville. The committee met at 7 p.m. and a large attendance was recorded at the general meeting at 8 p.m. For the convenience of the West Perth members, it was decided that the alternate meetings now held at 45 Tower Street, Leederville, would in future be held at the residence of Mr. Lorder, 30 Thomas Street, West Perth. At the next gathering of the society, Mr. Lindsay will deliver a lecture on "Reaction" and in view of the importance this subject holds for the amateur at the present time, a large attendance is expected.



LISMORE (N.S.W.) & DISTRICT RADIO CLUB.

THE annual meeting of the Lismore and District Radio Club was held in the club room at the Lismore Rural School recently. The President, Mr. E. S. Graves, occupied the chair. There was an attendance of about 20 members.

The retiring President submitted a report of the past operations of the club, in which it was mentioned that the membership, which at the inception of the Club in October, 1923, was 16, had since increased to 126 members. This spoke volumes for the enthusiasm and interest displayed by radio experimenters of the town and district.

There was a very great amount of preliminary work to be accomplished before the station could be classified as in full working order. The first consideration was the building of a receiving set, and Mr. G. W. Exton was responsible for the designing of a circuit for a four valve set. The set had been thoroughly tested and had proved to be quite suitable for the station. Music broadcasted from Sydney had been heard 50 yards away from the loud speaker.

On March 7 an experimental station license was granted to the Club. Later it was decided to approach the Minister for Education for permission to use the science room of the Rural School as club rooms and station.

To have formed a club, built a four valve receiving set complete, and secured suitable club rooms, and have a credit balance all within six months was indeed a creditable performance, and spoke volumes for the energy and enthusiasm of the committee. The thanks of the members were due to all those who had rendered valuable assistance, and in particular Messrs. G. W. Exton, H. Holt, P. M. Hoare, G. Wells, N. Thompson, V. Bale, C. Martin, and A. Holley.

Mr. Holt proposed a hearty vote of thanks to the secretary. Such an official could either make or mar any institution. They had been very fortunate in securing Mr. Yung's services in that capacity. Mr. Brown seconded the motion. Mr. Yung's enthusiasm was remarkable, and a great deal of the success of the club was due to his work.

The election of officers resulted as follows:—President, Mr. P. H. Balzer; Vice-Presidents, Messrs. H. Holt and H. Brawn; Secretary, Mr. L. Yung; Hon. Treasurer, Mr. C. Twartz; Committee, Messrs. P. M. Hoare, E. S. Graves, G. Wells, L. Jarvis, H. Russell, H. J. Griffiths, G. W. Exton, D. K. Murray, G. R. A. Watts, R. H. Atkinson, C. Folkes, J. L. Howison, and H. Thompson.

In reviewing the progress of the past six months, Mr. Yung said that a large amount of work had been accomplished, particularly by Mr. Exton, in setting the Club on to its legs. Many might have joined up out of curiosity. At times there had been some disappointments. One thing they must realise was that they were pioneers and had to accept the setbacks, also the criticism of outsiders. They must also realise that they were experimentalists. They must become imbued with the spirit that what others had done they could do, and they must not get downhearted at occasional failures. They could possibly run the set satisfactorily by the expenditure of a lot of money, but that was not going to help wireless along locally. It was practical experience they needed. They had, he thought, done wonders so far. The aim of the Club was for those who had acquired any knowledge to hand it on.

Prior to and at the conclusion of the meeting the members had the privilege of 'listening-in" to an excellent programme distributed by Broadcasters, Ltd., of Sydney. The musical selections were distinctly heard, and an interesting item was the chiming of the Sydney Post Office clock at 8 p.m.

What would you like to see in *Radio?*

DO you like it as it is, or would you suggest some improvements or new features?

In what proportion to the whole contents would you like to see the following classes of matter?—

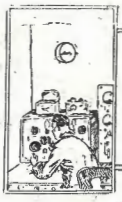
POPULAR BROADCASTING ARTICLES.
TECHNICAL ARTICLES.
INTERNATIONAL WIRELESS NEWS.
THEATRICAL NEWS, SO FAR AS IT IS APPLICABLE TO BROADCASTING.
WIRELESS TELEPHONY.
PICTURES OF THOSE WHO BROADCAST.
SHORT STORIES IN WHICH WIRELESS IN SOME FORM WOULD BE FEATURED.
DESCRIPTIONS OF AMATEUR RADIO SETS WITH PHOTOGRAPHS, DIAGRAMS AND PARTICULARS.
CLUB NEWS AND MOVEMENTS AND SKETCHES OF PEOPLE PROMINENT IN THE WIRELESS WORLD

Perhaps some of the above features do not appeal to you, which and why? Can you suggest others that you think would prove more popular?

What interests you most and least in the regular RADIO contents?

Will you write and tell us? By doing so you will benefit, as you will help to make "RADIO" a Bigger, Better and Brighter publication.

Address you letters to—
THE EDITOR, "RADIO,"
97 Clarence Street, Sydney.



MOVEMENTS OF MARINE WIRELESS OFFICERS

MAY.

M R. F. EXON, who signed off s.s. *Malaytin* at Kobe, returned to Sydney on s.s. *St. Albans* on 22nd and proceeded on Home Port leave.

Mr. F. M. Basden signed on s.s. *Yankalilla* at Sydney, 26th.

Messrs. V. J. Foreman and M. Sherwood King signed off s.s. *Taiyuan* at Sydney, 26th.

Mr. G. H. Tracey relieved Mr. T. O. Sexton on s.s. *Urilla* at Sydney, 27th.

Mr. V. J. Foreman relieved Mr. S. L. Filer on s.s *Baldina* at Sydney, 27th.

COASTAL RADIO SERVICE

STAFF CHANGES.

MR. G. F. COOK, Radiotelegraphist, has been transferred from Perth Radio to Esperance.

Mr. L. A. Fontaine, Radiotelegraphist, Esperance Radio, has been transferred to Perth Radio.

Mr. R. Simons, Radiotelegraphist (relieving) has returned to his headquarters, Melbourne Radio, after relief duties at Flinders Island.

Mr. C. R. Waite (on loan from Marine Department) has been transferred from Adelaide Radio to s.s. *Saros*.

Mr. G. Foot, King Island Radio, has resigned his position.

Mr. S. J. Connor, Radiotelegraphist, Perth Radio, has resigned his position.

Mr. A. G. Kempling has been appointed to Adelaide Radio, as Radiotelegraphist.

Mr. S. A. Cooper, Radiotelegraphist, has been appointed to Perth Radio.

Mr. A. R. Finch, Rigger, is proceeding to Perth Radio for the overhaul of masts and aerials at that station.

Queries Answered

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

C.W. (Lismore)—*Q.*: Is insulated wire detrimental to the efficiency of a receiver when used for wiring?

A.: The insulation on the wire has no effect upon the signals.

R. W. G. (Lucinda Point) submits diagram of his receiver and asks why he is unable to obtain satisfactory results.

A.: We can only suggest you increase the size of the reaction coil, and place the aerial condenser on the other side of the primary coil.

N. C. McM. (Horsham, Vic.)—*Q.*: Why is it I cannot tune in 2FC, although no trouble is experienced with stations on short waves?

A.: To tune in 2FC and 3FC use an anode coil of 200 turns with a diameter of 2in. For the latter station it may be found necessary to increase the size to 250-300.

A. E. W. (Scarborough)—*Q.*: Can you assist me in overcoming induction from near-by generating plant?

A.: This is a matter of personal experiment to determine the best means of cutting out induction from lighting mains. By using an elevated aerial in conjunction with a loop, it is possible to reduce this source of interference under favourable conditions, when the interfering signals come from a different direction to those desired, but this is not possible with a simple DX receiver.

W. T. R. (Concord West)—*Q.*: What valve and batteries would you recommend me to use? (Diagram and particulars of receiver submitted.)

A.: Any of the modern low current valves are suitable for experimental reception, and when the individual peculiarities are mastered there is little difference in their operation. The batteries differ in individual cases. See articles on "Valve Characteristics" published in issues *Radio* Nos. 28 and 30.

Q.: Would position of the lead-in with respect to the receiver have any affect on reception?

A.: This will have little affect, if any.

A. G. H. (Temora) asks for directions for making a Frame Aerial for receiving on wave-lengths up to 600 metres.

A.: See Mr. Reed's article on Loop Aerials in this issue.

J. J. K. (Rosedale, Vic.)—*Q.*: Are there any valves I can use to avoid the trouble of charging accumulators? Are those which work on dry cells satisfactory?

A.: You should use UV199 valves which only require 0.06 amperes or less than one-tenth of that required by the Ediswan E R. Valves. They can be operated from dry cells, three in series being required, as the operating voltage is three volts. The filament resistances will have to be increased to 30 ohms each. Special resistances are now available for this purpose.

Q.: Is there a book of call letters published?

A.: Other than the calls published in *Radio* from time to time the only book at present published is the *Year Book of Wireless Telegraphy and Telephony.*

H. E. B. (Lithgow)—*Q.*: What is cause of difficulty in receiving telephony? (Particulars of receiver submitted.)

A.: We would suggest you try some of the simpler circuits published in *Radio* from time to time. The circuit you have adopted is very difficult to adjust.

L. G. S. (Bassendean)—*Q.*: Can you give me particulars regarding construction of high frequency transformer for wave-lengths up to 2,000 metres?

A.: A radio transformer for 1,000 to 2,000 metre work should have 220 turns of No. 30 d.s.c. on primary and secondary with a mean diameter of 2in.

Q.: Could two small indoor aerials be connected in series for receiving on long wave-lengths?

A.: This is possible, although it is not generally done. Thanks for complimentary remarks re *Radio.*—Ed. *R.*

J. M. (Footscray)—*Q.*: Can you give me particulars for constructing a ten-watt transmitter using two valves?

A.: It would take too much space to give you full particulars in these columns. See article on "Experimental C.W. Transmitters" by Mr. Reed published in issue Radio No. 31.

H. C. H. (Sydney)—*Q.*: Can you assist me to overcome the difficulty I am having with my receiver? (Diagram and particulars submitted.)

A.: You should employ regeneration. Without a personal inspection of your apparatus we are unable to offer any further advice.

H. L. H. (Rockhampton)—*Q.*: How can I tune out carrier waves?

A.: This is impossible if they are all on the same wave-length. The brilliancy of the filament has a slight effect upon the wave-length.

Q.: I can hear 2BL twenty feet from the 'phones using five valves (two audio detector and two radio). How far could I hear him from a loud-speaker (amplion)?

A.: As per note at head of these columns, we *cannot* answer questions regarding range.

J. C. M. (Gretna)—*Q.*: Can you supply me with circuit to use with an "Expanse" No. 1 Receiver for receiving on short wave-lengths?

A.: Use one of the short wave regenerative circuits illustrated in Mr. Maclurcan's article published in issue of *Radio,* No. 30. The reason you cannot receive short waves is that the natural wave-length of the receiver is too high.

Q.: What size coils are required for 150-350 metres?

A.: Using honeycomb coils, 25, 35 and 50 turns.

Radio Talks for the Layman

(*Continued from page* 149.)

In wireless receivers the principle of induction is used to transfer currents from one part of the circuit to another. It does not matter whether the loose-coupler, the vario-coupler, or the honey-comb coils are used, the effect is the same. Rapidly oscillating currents, collected by the aerial, move in the first or primary coil and the secondary is placed close to it so that these currents are transferred to it by induction.

In another article the principle of inductance which follows somewhat closely will be simply explained.

Highlights of Radio Broadcasting

(*Continued from page* 151.)

6. Some loud speakers, while otherwise fairly satisfactory, reproduce combinations of instruments (voice and piano, or violin and piano) less satisfactorily than solo efforts. This fault requires for proof of its existence a careful listening test on a suitable selection from a broadcasting station of repeatedly proven high quality.

It is not implied that the above rough listening tests are an effective substitute for a precision laboratory test of a loud speaker under properly controlled conditions. Conclusions badly in error may sometimes be drawn from a single unsuitable listening test with the loud speaker fed from an unreliable broadcasting station or from an unsuitable receiving set, yet the preceding suggestions do give a general idea of the defects of some loud speakers.

It may be justly said that radio broadcast reception stands or falls in large part on the merits or defects of the loud speaker, since it is this device which finally produces the desired entertainment. It is therefore regrettable that so many inferior articles of this type have been placed on the market by self-styled "experts" who were actually lamentably ignorant of the requirements of the problem. The influence of such loud speakers on the reputation of radio reception has been undesirable. Fortunately, quantitative tests and exact design methods are now available and suitable loud speakers can be obtained. Continued improvement in these devices may also be confidently expected until it will become nearly impossible to distinguish between loud speaker output and the original studio rendition of a musical selection.

NEW W.A. CLUB.

STILL another name has been added to the long list of radio clubs and societies which have been formed in W.A. since June last. On May 13 at the residence of Mr. Vincent, Darlington, an informal meeting of what is to be known as the Darlington Radio and Electrical Society was held.

FREMANTLE CLUB SECRETARY RETIRES.

AFTER the general business had been dealt with at the Fremantle radio club's last general meeting, the President, Mr. Stanley, announced the impending departure of the Secretary, Mr. C. G. Scott, who is leaving for the country. Mr. Stanley emphasised the way in which Mr. Scott had directed his untiring energies towards the club's advancement. His services will be greatly missed.

2YK Now on the Air

THE Dominion Radio Co. (N.Z.), 2YK, with improved apparatus has resumed transmitting on 100 watts. The Otago Radio Association (4AB) are also again at work on Tuesdays and Fridays from 8 to 10 p.m.

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