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VOL. I.

MARCH 5, 1924

No. 25



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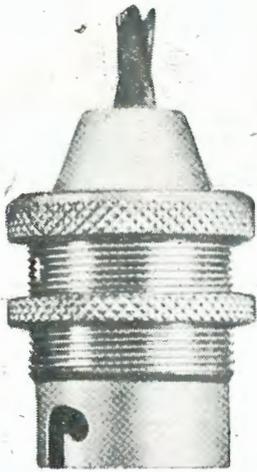
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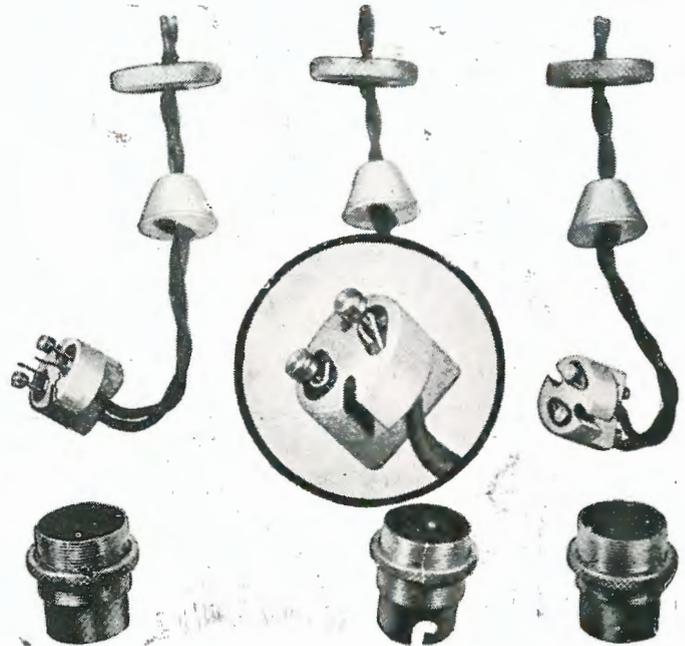
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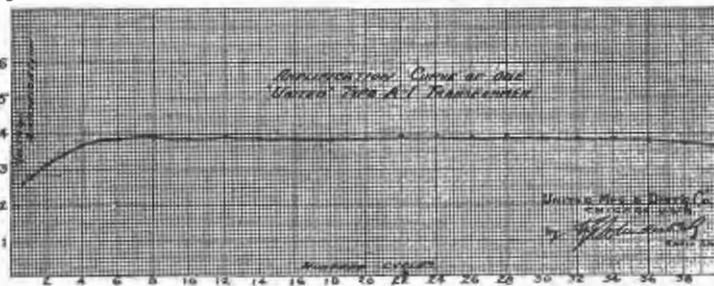
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Is Broadcasting a Rival to the Theatre?

AWAY back, to most of us, in the dim, distant past, there began a new form of public amusement. For the humble outlay of some two or three coppers we were permitted to be thrilled as we never had been before. For this small sum we were allowed, we say "allowed" advisedly, for none know so well as we how we clamoured for the privilege, to make our tortuous way among hard, uncomfortable seats and sit in a tin cavern whose dark and dismal atmosphere kept our impressions of the place wavering between that of the tomb and the ultimate circle of Dante's Inferno. Then, with one hand tightly clutching our hat, and the other a small paper slip on which was smudgely inscribed the magic cypher "3d."—our passport to Paradise—we saw visions. We saw Life in all its myriad diversities, a little highly coloured perhaps, why not? but nevertheless, Life. We saw, in short, those thought-fancies, which till those eventful days had lived only in our brain and between cardboard covers.

IT was a poor thing, no doubt, but our own, and at the time we would not have changed places with a Prince.

AT first, it was so easy to grip us. To gaze with staring eyes at a white sheet hung away in the distant darkness and suddenly see appear a railway tunnel from which burst a flying express apparently thundering towards us at a mile a minute; to see it leaping over the metals, nearer, nearer, until with shrieking whistle, it seemed, and thundering wheels, it swept past us—indeed that aroused emotions in us never hinted at before! Even to watch a street scene—the Central Railway Station at the five o'clock rush—even that sent cold shivers of almost hysterical excitement down our poor over-worked spines!

IN time, of course, the first novelty wore off. Better picture palaces were built and we experienced less violent palpitations of the heart in greater comfort. Better pictures began to be shown. Now we watched the unfolding of a plot, the story of a life. There were "fade-outs," "close-ups," "double-exposures." We clung to this jargon of the technical and the initiated and spoke it to the mystification and grudging admiration of our friends. An infant industry was beginning to stretch its chubby little limbs and take notice, and we wanted to be in the van of progress.

THEN arose the first wiseacres, the scoffers—the Retrograders. "It won't last," they said. "It can't!" But it did. Then, later, although they never changed their song, they sang it to another tune. "Enough! Away with it! It will destroy the Stage," they howled. But it didn't.

THE younger school of emotions caught up to the older, and they went down the years together, hand in hand. They are now and they will to-morrow. In many ways they have become moulded into one. What is lacking in the one she takes from, and is freely given by, the other. The Stage has learnt from the Screen, and the Screen has learnt from the Stage. Each to the betterment of the other.

AND now History is up to one of her tricks again—her oldest. She is repeating herself.

AS the cinematograph came upon us, so has wireless telegraphy, telephony and Broadcasting in that order, and the story of their coming has been startlingly the same as that of the Kinema. First we were told by the Retrograders: "Pooh! It's only the mere novelty of the tin-pot thing! It can't last!" Exactly the same things, you will note, that they said on the other occasion. Perhaps, in those early days, it was a "tin-pot thing," but the Idea was there. Development was all that was wanted.

GRADUALLY it did. It ran through the Americas like a pampas fire. It flashed across the Old World. It reached the poles. It encircled the seas. It was.

BUT what of the army of Retrograders? Were they dismayed by the prodigious growth and progress of this eighth wonder of the world? Not a bit of it! Defeated on every other ground in their striving after proof of the transience of radio, they fell back upon their old cry to meet the same situation: "It will destroy the Stage," they howled. "The Art of the Drama will be lost to us!"

THE Stage will never die, nor will the moving pictures, nor Broadcasting. Each of these three has its objects—to amuse and instruct. The differences lie only in the method of approach. By the evolution of this last, the Two will become the Trinity—the Three in One, the One in Three—Stage, Screen and Ether.

Highlights of Radio Broadcasting

Giving Horsepower to the Voice

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

A BROADCASTING station is roughly a one-horsepower voice. This novel but correct way of regarding a broadcasting station is justified by the value of power which leaves the aerial wires of the station to be picked up in a multitude of homes. It may be added that one

It takes slightly less than 750 watts to make a horse-power, so that the average high-grade broadcasting station sends out a power of between 500 and 1,000 watts. This power sent out from the broadcasting station travels in all directions and is, in part, picked up by a myriad of receiving sets. It

known case is anything strengthened to the same extent as the voice of man in a broadcasting station. Careful measurements have indicated that the power of human voice, in loud speech or song, is only about one one-hundred-millionth of a watt! This incredibly tiny amount of power is yet sufficient to be heard by the ear for a few hundred feet. The ear is therefore a most sensitive instrument and, in fact, is about as sensitive as the eye itself so far as the amount of power required to give a definite sensation is concerned.

But we have desired, in radio broadcasting, to extend the scope of the voice of man from a few hundred feet to hundreds of miles, or even thousands of miles. So that we have to produce an approximate "one horse-power voice," or, as it is more usually called, a 500-watt transmitting station. It should be considered that this means that we have to increase the power of the human voice over fifty billion times. In other words, if everyone on earth were to get together and shout at once, the voice power produced would still fall far short of the strength of the voice of a broadcasting station. In fact, the world's call would be only about one-thirtieth as strong as that of the broadcasting station. It is little wonder, therefore, that broadcasting stations can be heard so far under favourable conditions. Favourable conditions are, naturally, those when the night is "electrically silent": that is, free from electrical disturbances or static which causes noises or crackling sounds in the receiver and thus prevent hearing clearly the distant call of the transmitting station. Very literally, therefore, are we justified in calling radio broadcasting "the voice of the world."

Another way of getting at least some idea of how much the voice must be strengthened in a broadcasting station, is by considering how long it would take to pile up the necessary



POWER AMPLIFIER OF WJY, RADIO CORPORATION STATION, AEOLIAN HALL, NEW YORK, SLIGHTLY OBLIQUE VIEW, WITH OPERATOR IN ATTENDANCE.

horsepower consists in hoisting half a ton from the ground to the top of a 33-foot building in one minute—and that one horsepower therefore is a fairly considerable amount of power.

It is more customary to use another unit of power in speaking of broadcasting stations; namely the "watt."

is much more than ample to feed all the receiving sets within its range considering the fact that modern receivers strengthen the signals they receive by power from local batteries to an enormous extent and thus require very little power to feed them.

To go back to broadcasting speech—it is probable that in no other

power out of units made up from the power of the individual voice. Suppose that a man added the power of one human voice to his store of voice power every second, and that this addition of one voice per second were carried on day and night without stop, month after month, and year after year. Suppose, too, that the

It is not accomplished all in one radiotron, but generally in five or ten of these tubes, and sometimes in as many as fifteen of them. Each radiotron proportionately increases the power that is poured into it, until the final tubes give the full power.

The systematic amplification of the voice starts with some low power

of the Model UV-204 variety, each of which radiotrons actually has an output of 250 watts. It will be seen that a graded series of tubes is used since it would be uneconomical to use power tubes at the beginning of the amplification, where only small amounts of power have to be handled. The power radiotrons are used only toward the end of the amplification where the power has already been raised to very considerable magnitudes.

A portion of this amplifying equipment is illustrated in the first photograph, which includes the 50-watt radiotrons of one of the "power amplifiers" in the transmitter room of stations WJY and WJZ, of the Radio Corporation of America at Aeolian Hall, New York. It really consists of two such amplifiers, one on the top row and one on the bottom row of panel, and with suitable equipment in the middle row so that either amplifier can be used as desired, thus avoiding the danger of suspension of service if a tube burns out. Each of the amplifiers contains three of the 50-watt radiotrons.

Four of the 250-watt radiotrons, in the final amplifier of station WRC of the Radio Corporation at Washington, D.C. are shown in their mounting at the top of the transmitter in an accompanying photograph. The tubes are held in a spring-supported mounting to protect them from shock. In addition, the entire transmitter in every station of the Radio Corporation is provided in duplicate to prevent breakdowns from affecting the service.

The control room amplifiers which contain the lower power radiotrons were shown in an earlier article on "Picking Up Broadcast Music," and really resemble the "power amplifiers" closely in appearance.

Each of these amplifiers requires considerable personal supervision to make sure that all power supplies are in perfect condition, that the tubes are functioning perfectly, and that the amplification, which is being used is sufficient and suited to the purpose. Special attendants are therefore required, making another link in the long chain of individuals who make reliable broadcasting service possible.

There is one case of amplification of power in broadcasting which goes even further in increasing power than

(Continued on page 624.)



"CLOSE-UP" OF FOUR 250-WATT TUBES AT TOP OF ONE OF AEOLIAN HALL TRANSMITTERS, FROM BACK.

apparently interminable task of piling up a voice as strong as that of a broadcasting station from individual feeble voices. Sixteen centuries would have come and gone before their long task would have been completed!

This modern miracle of science is accomplished instantaneously, however, through the powerful agency of the vacuum tube which, as is now so well-known, is a remarkable amplifier.

radiotrons, such as the Model UV-201-A tubes of which as many as twelve, or as few as three, may be used depending on conditions. From these are fed the more powerful UV-202 radiotrons, which give an output of five watts each. The power of the voice, now enormously increased, passes into 50-watt radiotrons, such as the Model UV-203 tubes, and finally into the so-called "power tubes"

Senatore Marconi Broadcasted

A Chat on Radio

Some Early Experiences

RECENTLY at 2LO (the British Broadcasting Station) Senatore Marconi delivered the following speech which was Broadcasted. He said:—

"I gladly accept the invitation of the British Broadcasting Company to speak to listeners-in on the first anniversary of the official commencement of Broadcasting in Great Britain. Broadcasting constitutes one of the most interesting developments in the science of radio communication. I

Asia. The insignificant trumpet, made, I believe, out of a cigar-box, which was fitted over the microphone into which Dame Melba sang, is still preserved at Chelmsford and deserves to rank as an historical souvenir.

"Only three years separate us from that novel and interesting experiment, and yet to-night the managers of the B.B.C. inform me that important speeches like those recently delivered by General Smuts and by

jesty the King, on some great occasion like the opening of Parliament, may be heard delivering his address from the Throne, not only by the people of these islands, but by millions of the population of Canada, Australia, South Africa, India, and all the scattered possessions of the British Crown. I can imagine nothing more likely to strengthen the ties which bind the British people to their Monarch than the opportunity which Broadcasting will afford of enabling the people of the Empire to listen to the actual voice of their King and Emperor.

"There have been in the history of invention one or two discoveries which have changed the character of peoples and revolutionised the conditions under which they live. Printing was one of them; wireless is another. As a writer in the *Times* said recently, 'Broadcasting has done for human speech what printing did for the written word.'

"I should like to say a few words more on the subject of wireless telegraphy. The general public did not perhaps realise its value as a practical means of communication at sea until 1912, when, on the occasion of the *Titanic* the lives of 700 people were saved by the wireless call for assistance. To-day no vessel over a certain tonnage puts to sea without the means of communication by wireless. Not a month, hardly a day passes without some seafaring men owing their safety and their lives to the fact that wireless has provided them with the means of keeping in touch with their fellow-men.

"I hope I shall not be thought egotistical if I make a very brief reference to my work in connection with wireless.

"In 1895 I commenced my first experiments with electric waves in my father's house, near Bologna. My first experiments were across distances of only a few yards from room to room. The next step was to try longer dis-



Here we have a London Beauty Chorus in a New York Theatre chiming in with Chicago Music Broadcasted from WJAZ.

have watched its rapid growth with great pride. I know of hardly any other form of human activity in which such marked progress has been made in so short a time.

"One of the most interesting early experiments in Broadcasting took place in this country in the early months of 1920, when a number of concerts were transmitted from the Marconi Wireless Station at Chelmsford, and Madam Melba's voice was heard throughout Europe and even in

Lord Curzon have, thanks to Broadcasting, been heard by audiences of at least two million persons. No one would venture to place a limit on the possibilities of an invention which has already made such marvellous progress. If to-day the voice of a speaker in London can reach every part of the United Kingdom, it will not be very long before British statesmen will be able to address every part of the British Empire. It may be that the time is not far distant when His Ma-

tances in the garden. At about that time I made the discovery that by means of elevated wires or aerials attached to both the transmitting and the receiving instruments, communication over what were then reckoned considerable distances could be carried out—that is, up to nearly two miles.

"Although the apparatus which I employed in those experiments was very simple, all present long-distance apparatus is a direct evolution from it.

"In 1896 I came to England, and the first British patent for wireless telegraphy was taken out. Sir William Preece, who was then Chief Electrical Engineer of the Post Office, gave me an opportunity of giving a demonstration before officials of the G.P.O., and successful tests were carried out between St. Martins-le-Grand and the Thames Embankment. I remember very well the excitement which was created when we succeeded

in obtaining effective signals over that distance. Shortly afterwards, on Salisbury Plain, distances of $1\frac{3}{4}$ miles and then of four miles were obtained. From that time onwards rapid progress was made in the improvement of apparatus and the distance covered, and in 1897 the Wireless Telegraph and Signal Co. was formed, which in 1900 became Marconi's Wireless Telegraph Co.

"There is a great deal that I should like to say about the different stages in the development of wireless telegraphy. I can only now refer to one. On December 12, 1900, I succeeded in sending out from Poldhu, Cornwall, across the Atlantic, a succession of S's, represented in the Morse Code by three dots, and these signals were distinctly heard in America. From these experiments we were able rapidly to proceed to the establishment of a trans-Atlantic service.

"Of the future of wireless telegraphy I have not the time to speak;

I can only say this, that recent experiments between Cape Verde Islands and this country, which I carried out, have entirely revolutionised our ideas, both of the power and of the wave-length required for clear and effective signalling. Working with only one kilowatt and on a wave-length of a hundred metres, I was able over this distance of 2,250 miles to maintain effective communication between Poldhu, Cornwall, and my yacht *Elettra*.

"One other interesting result was achieved by these experiments—we were able to confine our signals to a narrow belt between the two points of communication, instead of radiating them in all directions. The advantage of this in securing secrecy of communication will be obvious.

"Ladies and gentlemen, I am glad to have had this opportunity of speaking to you. I hope that your interest in wireless will grow day by day, and keep pace with the practice of it."

India's Radio Stations Several to be Dismantled

RECENTLY at Delhi, India, a radio broadcasting conference was held under the presidency of Mr. H. A. Sams, Director-General of Posts and Telegraphs, and attended by some twenty manufacturers' representatives and the press.

The president opened proceedings by recommending on the advice of a British manufacturer, that only one broadcasting company, a consolidation of manufacturers, should be allowed to transmit in India. An outline of the conditions of the license was placed before the conference for consideration, and two sub-committees, one consisting of the manufacturers and the other the press representatives, were appointed to consider the Government's proposals and suggest modifications.

A Hindu delegate asked whether the term "manufacturers" would be exclusively confined to British manufacturers or not. The answer was that only imported sets from England would be admitted, although permission would be accorded to purchase parts in the United States and foreign

countries, so long as they were assembled in India.

In India, at the moment, radio enthusiasts are increasing greatly in number. Recently at an open-air concert, wireless music was heard and a Mrs. Stapleton, wife of the Calcutta Superintendent, sang several songs at Temple Chambers, near Highcourt. At Chowring Lea, in the exhibition grounds, where the listeners were sitting, they heard her quite plainly at a distance of three miles and came away hugely delighted at their experience.

Many demonstrations have been given and all of these have been under the control of the Indian States and Eastern Agency, who are the Marconi Company's sole Indian representatives.

A Calcutta newspaper recently held the first wireless telephone talk ever taking place in India with a Marconi official sitting on the Khargpur golf links, operating a motor car wireless set. The distance between the two sets was 72 miles and the ex-

periment proved altogether successful.

In India, at the present moment, there are 29 radio stations, but all of these are not constructed for commercial purposes. Of the total, eight are coastal stations, of which those at Calcutta, Karachi, Madras, Rangoon and Bombay are the most important, while the other three are at Victoria Point, Diamond Harbour and Port Blair. Diamond Harbour is of no value—and its abolition is likely. Other stations that will be "scrapped," either in part, or entirely, are those at Patna, Paona, and Ishakur, while the Maymyo Burma station will be partly dismantled and those at Pashwar, Lahone, Quetta, Delhi, Jutogh, Allakabad, Nagpur, Mhow, and Secunderabad will be placed "in care of maintenance parties, which will keep the stations in running order and ready for service on six hours' notice."

This year stations are to be opened at Mingaldon and Madras for commercial purposes and these economies are expected to yield a saving of 453,000 rupees.



The service conducted at Washington Cathedral upon the death of ex-President Woodrow Wilson was broadcasted throughout the whole of America.

It has been estimated that in five years there will be one million radio outfits in the United States capable of receiving speech from Europe, South America and the East!

Word comes of a man camping in the wilds north of Grand Rapids, Michigan, U.S.A., who, with an old flower-pot as a loud speaker to his receiving set, heard broadcasting concerts from the centres of civilization with the greatest ease!

Mme. Elsa Stralia, the well-known Australian singer, who was lately at Covent Garden, London, is now engaged in singing for Broadcasting at the Capitol Theatre, New York.

Bishop Manning has ordered the removal from the altar at the Cathedral of St. John the Divine, New York City, of a receiver for a system of amplifiers. "Nothing of a worldly nature should be in this sacred place" is his explanation. "Besides, communicants know their service by heart and it should not be necessary for them to hear the words of the celebrant."

The latest is long-distance hypnosis by radio. Joseph Dunninger, hypnotist and mind reader from the offices of "Science and Invention," New York, has succeeded in putting to sleep the subject in an office some ten miles away.

A whisper into the microphone of a radio broadcasting station sets up vibrations which go round the earth seven and a half times in a second.

A delightful innovation in the way of broadcasting was carried out by 2FC the other evening. A lecture on music, illustrated by various selections, was given. For three-quarters of an hour Mr. William Beattie spoke

Henri Staell, Messrs. William Beattie, H. Mallam Grieves, Kelly, E. H. Richmond and Miss Ivy Dunstone.

Speaking at Taree (N.S.W.) the other day of his proposal to instal radio receiving sets in isolated country schools, the Minister for Education, Mr. Bruntnell said: "It will make the schools a centre of social influence and help to make the lot of settlers in remote parts more tolerable. An educational programme can be broadcasted about once a week and when noted visitors come to Sydney and speak, their speeches can be heard direct by people who otherwise would have to wait days to read about them. It would also bring the parents into closer touch with school work, and make them more interested. The cost will not be as great as installing a piano in the school."

The Wireless Telegraph Co. of South Africa is building a 750-kilowatt station at Klephenvel, near Capetown. The aerial will be circular in form, reports an exchange, and a mile and a half in diameter, with 16 towers. Capetown has been given a six-kilowatt broadcasting set.

With the formation of the Broadcasting Company of Australia Pty., Ltd., in Melbourne, Farmer & Co., Ltd., Sydney, have extended their radio activities to the southern capital. The interests concerned also embrace J. C. Williamson and J. and N. Tait and the company has an authorised capital of £100,000. The station's aerials will be 300 feet high and it will operate on five kilowatts. The Melbourne board of control will consist of Sir George Tallis and Messrs. J. Tait, S. Fripp and F. Lloyd, while Mr. G. Wright will represent the interests of Farmer & Co., Ltd.

2FC	
BROADCASTING TIMES.	
Sydney Mean Time.	
P.M.	
12.55	Chimes.
1.00	Time Signals; News Items;
to	Weather Reports; Stock
1.45	Exchange News; and Produce News.
3.00	Chimes.
3.05	General News and Orchestral Items.
to	
4.00	
6.30	Chimes.
6.33	Children's Bed-time
to	Stories; Late News; Stock
7.15	Exchange Reports; Late Sporting & Market Reports.
7.55	Chimes.
8.00	
to	Entertainment.
8.45	
9.05	
to	Entertainment.
10.00	

on music, and such points as he laid particular importance upon, were illustrated by selections on the studio player-piano and also by violin items contributed by Mr. Farnsworth Hall, of Farmer's Studio Instrumental Trio. Later, a programme which included string trios, violin solos, vocal music and an oboe solo was given. Among the artists who contributed to the evening's entertainment were M.

A.W.A.'s New Assistant Manager

Mr. J. L. Mulholland's Speedy Rise

Mr. J. L. Mulholland, whose photograph is reproduced below, has recently been appointed and taken up the duties of one of the assistant managers to Amalgamated Wireless (Australasia) Ltd.

Mr. Mulholland's electrical experience dates from the time when he was connected with the Queensland Post and Telegraph Department. After a period in the Government's service, he resigned his position in 1911 in order to join the Wireless Service in Sydney. Then, in August, followed attachment as wireless operator to the *Koombana*, while later again Mr. Mulholland served on the *Karooia*, *Mataram* and *Makura*. In June, 1913, a sea-going sub-inspectorship was secured and in this capacity he saw service on the *Maunganui* and *Bombala*.

A little over 12 months later, on March 9, 1914, to be precise, Mr. Mulholland was appointed Sydney inspector. From July, 1915, to July, 1920, he was manager of the New Zealand branch of Amalgamated



Mr. J. L. Mulholland.

Wireless Ltd., and was then promoted to traffic manager at head office, which he held till September of last year when he was appointed to his present executive billet of assistant manager.

During the comparatively short period in which Mr. Mulholland has been connected with Amalgamated Wireless Ltd., his rise to the important post he at present holds has been almost meteoric. Nevertheless, Mr. Mulholland thoroughly deserves his promotion both from his keen technical and practical knowledge of radio and all appertaining thereto and also for reason of his popular and kindly personality.

Mr. Mulholland has always endeared himself to all members of the large staff with which he has come in contact and the feeling of pleasure at his most recent achievement has been general throughout the firm.

Radio takes this happy opportunity of congratulating Mr. Mulholland just once more on his well deserved promotion.

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NEW WIRELESS STOCKS JUST ARRIVED

Chelsea Products—

Variable Condensers, Panel, .001 with Dial	£1 13 6
Variable Condensers, Panel, .0005, with dial	£1 10 0
Vernier Condensers, Panel, .001 with Dial	£2 5 6
Vernier Condensers, Panel, .0005 with Dial	£2 2 0

Dial and Knob, graduated 0-100, 3/6 each; 0-50, 3/6; for Rheostats, 3/-.
Audio Frequency Transformers, 35/-; 199 Tube Sockets, 4/-.
Variometers, with vernier and Dial £2 13 6
Vario-couplers with Dial £2 13 6
Magnavox R3, £10; Weecoalves, 35/-; 4-pin Sockets, 2/6; British Valve Bases, 10/-; 4-pin Insulators, 1/6; 70,000 ohm Resistance, 8/9; Mullard "Ora," 20/-.

BURGIN ELECTRIC COY. WIRELESS ENGINEERS AND SUPPLIERS,
Showroom and Sales Dept.: 1st Floor, Callaghan House, 391 GEORGE ST., SYDNEY.

A Bendigo Radio Enthusiast

"Logs" Ships all Around Australia

We have received the following interesting letter from Mr. J. Ellis, of Bendigo, Victoria. Mr. Ellis has had many experiences during his wireless activities, some of which he relates below. For some years he taught Telegraphy at Bendigo Railway Centre.

In describing his set, Mr. Ellis writes:—

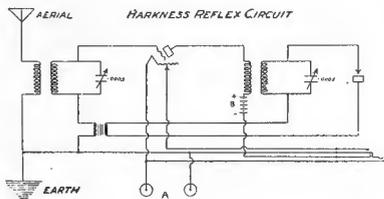
I am sending you two photos. of my wireless equipment. The aerials are 50 feet high, T pattern, with three wires stranded 7/18. Eighty-six feet in length, they are about three feet apart. The photo. makes it appear as though the three were joined in the centre, but this is not so.

The No. 2 circuit is the one I usually use for telegraphy. The earthing system consists of the same kind of

I use a diamond type of H T battery. The filament is lit by the accumulator battery from an old motor car. The valve mounting I made myself and also mounted the rheostat and terminals for the 'phone, etc. I prefer the way my wires are shown, as it is much easier to change the circuits.

I have frequently logged boats all round Australia on the one valve, and

Seek the advice of
Mr. F. BASIL COOKE, F.R.A.S.,
on the
"HARKNESS"
REFLEX CIRCUIT.



A great deal of interest is now being taken in the famous "Harkness" Circuit. It is simple to operate and very effective, combining the purity of crystal reception with the loudness of the Valve. Mr. Cooke's advice about this Circuit is at your disposal.

The following material is required:—

2 $\frac{1}{2}$ Tubing	Each	9d.
No. 26 Covered Wire, 4-oz.		
Spools	1/3	
2 .0005 m.f. Variable Condensers Gilfillian ..	Each	26/-
Argentite Crystals, 2/-, 3/-, 3/6		
Standard A.F. Transformer		25/-
90-Volt B Battery		25/-
Filament Control Jack		6/-
1 Valve Socket		6/6

DAVID JONES'
RADIO DEPARTMENT,
22 YORK STREET, SYDNEY.



Mr. J. Ellis, of Bendigo, Victoria, seated before his Wireless Set, the greater part of which he made himself. (See next page.)

wires and ten feet beyond, with cross arms under the downward T portion. It is connected to two water mains, one coming from the front street and the other from the side. A large copper plate is buried about five feet down. The leads come through the centre of a window, a hole being bored through and the lead can be seen coming in under the blind to the cut-out switch.

even heard the *Ormuz* two days off Fremantle, and the *Niagara* two days off Sydney. During September last I sent a radio message to a cousin on the *Ormuz*, two days off, welcoming him to Australia. I heard Fremantle sending a message and then heard the *Ormuz* replying to Fremantle.

Wishing *Radio* every success, I remain yours sincerely, J. Ellis.

"A RECEIVING SET IN EVERY HOME."

No home in which it is desired to create the real "home atmosphere" should be without a broadcast receiving set. The cost is small; the value great. Investigate the matter for yourself, and you will soon follow the lead of thousands of other happy home makers.

Broadcast Programmes

What Does the Public Want?

THE broadcasting of theatrical performances, news, stock and exchange quotations, bed-time stories, fashions for women, concerts, speeches, etc., etc., has, comparatively speaking, been in existence but a few weeks in Australia. Many hundreds of people still enjoy the broadcasting of musical and other items more from the point of view of the experience of a novelty. "Listening-in" sets are not yet sufficiently general to enable the broadcasting stations to determine exactly what the public really wants and likes to listen to. We would suggest that in a few months' time a call for a statement of popular opinion be made among the owners of radio receiving telephone sets linked up to broadcasting stations, as to what they really preferred to have carried across the ether to their homes. The replies could then be placed on a percentage basis, and a very accurate idea of what Australia likes best broadcasted could be got.

An investigation based on these lines was recently carried out in America and met with great success. Without going so far as to say that Australian amusement tastes altogether coincide with those of the United States, Australians and Americans have much in common and the latter's tastes in radio news and entertainment noted down in "cent per

cent" may very closely approximate those of the race "Down Under."

This questionnaire shows the present percentage of importance the different forms of entertainment take in the average broadcasted programme, together with the public's vote as to how much they would like of them in each aerial entertainment.

Markets and weather—present, 23 per cent.; ideal, 20 per cent.

News and sport—present, per cent. included under other headings; ideal, 12 per cent.

Speeches—present, 18 per cent.; ideal, 20 per cent.

Sixty-one per cent. of the people who filled in the questionnaire asked



Above photograph shows the aerials of the Wireless Set of Mr. J. Ellis, of Bendigo, Victoria. They are of the T pattern, 50 feet high, with three stranded 7/18 wires. (See opposite page.)

Classical music and opera—present 34 per cent.; ideal, 30 per cent.

Jazz—now, 25 per cent.; desired, 29 per cent.

for more radio broadcasting, while 39 per cent. claimed that less time would meet the requirements of the average working man as he had only the nights in which to listen-in.

STROMBERG-CARLSON

SUPER No. 2-A Radio Headset SENSITIVE

£2/5/-.

Why buy a cheap inferior set when you can obtain a high efficiency No. 2-A at half the cost of an equal set? It is built by Telephone Manufacturers of 30 years' standing. DURABLE, COMFORTABLE, ACCURATELY REPRODUCES VOICE and MUSIC. Permanent adjustment, unaffected, by climatic and temperature changes. Also RADIO PLUGS and JACKS; MICROPHONES, all types.

Ask your dealer or write us direct.

Aust. L. P. R. BEAN & CO. LTD., 229 Castlereagh St., Sydney Reps.

Interstate:—BRISBANE: S. H. Smith, Radio House. ADELAIDE: Chas. Atkins & Co.
PERTH: T. Muir & Co., 99 William Street. MELBOURNE: Homecrafts, 211 Swanston Street.

Ways and Means of Increasing Radio Sales

A Word to the Wise (Dealer)

By ERNEST A. DENCH

THERE are many ways and means of increasing wireless sales, but what the radio merchandiser seeks more than anything else is a constant flow of new ideas. The ways and means are always at his beck and call, but sometimes striking ideas for utilising them are lacking.

Display work may be divided into three sections: Exterior, window and interior. Exterior exhibits serve to halt passers-by and get them to look at your windows and possibly step inside the shop.

The striking device that the Radio Stores Company, Los Angeles, U.S.A., employed—or we should say, employ, because it is semi-permanent until Mr. David Roney, president, thinks of something better—was a parrot. Not the talkative, live specimen, but a life-size or thereabouts replica in wood, painted in natural colours. All day long the parrot, perched on a wooden stand, throws a naughty look at the thousands who pass by the store. His ears (we presume parrots have ears!) are covered up with a radio headpiece, while issuing from his mouth are the words: "C'mon, lissen in." This parrot device has been the cause of much favourable comment and mouth-to-mouth advertising, identifying the Radio Stores Company in the minds of the public.

Another form of exterior exploitation is the taking of a stand at a local exhibition. The stand part is all right so long as the exhibit is a little out of the ordinary. A year or two ago, the wireless exhibit was a novelty—comparatively few people had "listened-in"—with the result that crowds were attracted. Now that the novelty stage of wireless has passed, you have to exercise your ingenuity. This was done by Frank B. Wilson, Seattle, Washington, on the occasion of a recent exhibition stand. A long wooden trestle, covered with billows of blue silk to repre-

sent water, was occupied by a large canoe, borrowed from a local club for the occasion. The sole occupant of the canoe, an attractive young woman in a stylish dress (both the wax model and the dress being borrowed from a local specialty shop for women), was reclining with her head propped up against a soft pillow, with a radio headpiece fitted over her

vided by a loud speaker placed by the bow of the canoe. In front of the trestle were several show cases containing a complete line of wireless sets and parts, while a small table was devoted to radio handbooks and magazines. A cash register and a salesman were on hand to make sales.

Originality is now beginning to creep into wireless window displays, where a year or two ago most radio trims consisted of a few sets and parts. A fine example of radio display enterprise comes from England. Mr. J. Overton Larty, Shirley, Birmingham, constructed a miniature two-storey house out of cardboard. The house was fifteen inches high from roof to the ground. The windows were lined with white tissue paper, with an electric light bulb placed behind them to produce the illusion of a lighted home. At each side of the house was a two foot pole, protected with twine supports, tied to hooks in the floor. On the roof of the house was inscribed the caption: "A Happy Radio Home." Suspended across the two poles was the aerial, on which was painted the following appeal: "Concerts at Home—Buy a Wireless Set." To indicate that messages were being received, tiny electric light bulbs flashed intermittently from the aerial.

The motif of a striking display by E. D. O'Dea, display manager, McCarthy Bros., and Ford, Buffalo, N.Y., was to visualize the tremendous distances, widely separated, which could be brought within the hearing of "listeners-in" on the radio. The background consisted of a scenic drop of a section of the globe, with Buffalo at the top and Paris and Honolulu at either lower corner. Billows and puffs of light blue gauze were draped along the bottom of the globe, on the floor itself, to give it a cloudy atmosphere effect. Wireless receiving sets, along with ap-



head. That she was "listening-in" was apparent by the fact that the boat was properly equipped with an antenna, aerials and a working set. If spectators doubted the feasibility of the exhibit, entertainment was pro-

appropriately worded cards, were grouped over stands or on the floor down in front.

Human interest is an important display factor, for if you can make people envious of an incident they would like to duplicate in their own home, the sale is as good as made. This was the selling appeal made by Alex. Grants & Son, Syracuse, N.Y. The window represented a living room scene, the furnishings for which were borrowed from a local furniture house in return for window card publicity. Seated on chairs before an open fireplace were a man and woman "listening-in." Their wireless receiving set reposed on a table in front of them.

Another human interest example was the work of Shepard's, Boston, Mass. It showed a living room scene at night in a pleasant home. This ably demonstrated the advantage of the loud speaker for parties and other events where there are not enough headpieces to go around. A radio receiving set with a loud speaker connected to it reposed on the table, and it was apparent that a concert was being broadcasted. The hostess,

with two lady guests, all in pretty evening frocks, were "listening-in." A little girl, also arrayed in her "best," was curled up in an arm-chair, reading a story book, and taking in the music and comment of the guests at the same time! A sign in front, worded "There is a Radio Receiving Set for Every Home," was

A FINE FEAT.

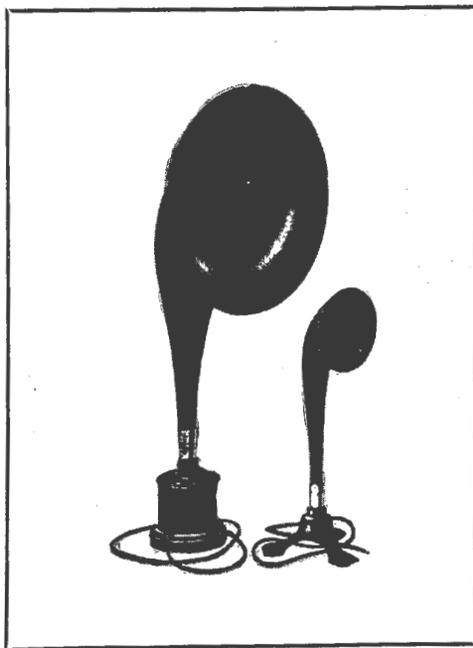
The members of the Millhill (England) School Experimental Wireless Station are feeling very proud of themselves at present. One of their members, an 18-year-old boy, lately succeeded for the first time in maintaining both-ways trans-Atlantic Morse communication with Halifax, Montreal, Maine and Pittsburgh.

accompanied by a range of prices for the different sets.

It is not because we consider it least important that we leave interior display methods until the end. It is because spectators must be captivated by your exterior and window displays before they are likely to in-

vestigate what you have on show inside your establishment.

The wireless department of Gimbel Brothers, Philadelphia, Pa., is on one of the upper floors, far, far away from the crowds in other parts of the shop. This makes for complete concentration and a large degree of privacy for wireless enthusiasts who visit the department to "listen-in" or to tell their wireless troubles and seek intelligent advice on the purchase of sets. Apart from this, Gimbel Brothers maintain a broadcasting station, which fact is proclaimed on a large banner in the radio department. A circular division of glass counter showcases contains a wide assortment of radio apparatus. Over to one side is a large felt covered table, on which radio receiving sets are demonstrated for the benefit of prospective purchasers. To the rear of the department is a stand-like enclosure, with a glassed-in panel, so that people can stop and listen when anything is being broadcasted. This two-folded attraction brings wireless enthusiasts into Gimbel Brothers' radio department despite its out-of-the way location.



CLEAR AND TRUE *Western Electric* LOUD SPEAKERS

When used with a correctly designed and adjusted radio receiving set, Western Electric Loud Speakers give a clear and true reproduction of speech and music over the entire musical range, including the low bass notes of a pipe organ and the high tremolo notes of a violin.

Western Electric Radio Equipment can be obtained direct and also from Radio dealers in town & country. We are at all times pleased to give expert advice and help regarding Radio installations and equipment.

Western Electric Company
(Australia) Ltd.

192-194 Castlereagh Street,
SYDNEY.

'Phones: City 336, 356.

Buying a Receiving Set

(By "Ray Dio.")

DURING the last few months, now that broadcasting has definitely begun in Australia, people who

ing-in' on his set. It was wonderful! I think I'll get one. Now, how do I go about it? I know nothing about

This article is written specially for them.

If you know little or nothing of wireless, or about a receiving set, and you intend to buy one, the best thing to do on the eventful day is to take a friend with you who *does* understand. Tell him your requirements and how much you intend to pay, and let him do the rest. You will perhaps be surprised to see how eager he will be to go along with you.

Do not laugh at him, the Thing has gripped him, and you will be just as enthusiastic about all appertaining to radio in a month's time.

On the other hand, if you are not fortunate enough to secure a friend to come and assist you with your purchase, the responsibility devolves upon yourself. It would be as well, then, to remember a few things.

Make sure—it may sound ridiculous to speak such a warning, but bitter experience has proved it is not—that the receiving set receives. That is, efficient enough to give out over a large room programmes that have not been broadcast "next door." Faultiness of reception is often blamed on the studio when the real trouble lies in the set itself.



Major Armstrong, of American Wireless fame, is here pictured with his pretty wife and his portable Radio Receiving Set at Palm Beach, Florida. The trio is very popular along the Beach and the Major secures some startling Radio results without the use of either aerial or "ground."

have heard these concerts and items on friends' receiving sets, have kept coming to me and saying: "I was over Psmyth's the other night 'listen-

electricity and less about wireless. How am I to know what and what not to get?"

What would you like to see in "Radio"?

DO you like it as it is, or would you suggest some new 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 personal 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 us to make "Radio" a bigger and brighter publication.

ADDRESS your letter to—

THE EDITOR, "Radio," 97 Clarence Street, Sydney, N.S.W.

Club Notes and News

SUBIACO (W.A.) RADIO SOCIETY.

Mr. H. Hiddlestone has been appointed treasurer of the Subiaco (W.A.) Radio Society. He has been closely connected with this body since its inception and members have every faith that he will guard and extend the interests of the society in every possible way. The club's membership total is now 80.

MT. LAWLEY (W.A.) RADIO CLUB.

On January 10, the above club held its eleventh general meeting, when two new members, Messrs. N. Sharp and G. A. MacDonald were admitted. Satisfactory results were secured on the club's set, which has a wave range from 250 to 1,000 metres, but it is intended to increase this at an early date. The aerial is situated on the roof of the Lyceum Theatre Summer Gardens, and is of an average height of 55 feet, the length being approximately 250 feet with four wires.

GOLDFIELDS (W.A.) SOCIETY.

Nine new members were elected at the last general meeting of this body. Mr. R. Stirling has been elected to fill the position of president made vacant by Major Christie leaving the State.

WIRELESS INSTITUTE OF AUSTRALIA (W.A. DIVISION).

At the next meeting of this body, Mr. Barker, late of the Radio Corporation of America, will lecture on the development of wireless telegraphy and telephony in America.

NEWCASTLE DISTRICT RADIO CLUB.

At the last monthly meeting of the above body it was decided to apply for permission to operate a receiving set and loud speaker at the forthcoming Newcastle show. It is intended, should the request be granted, to transmit music from the club's experimental station in order to familiarise the local people with the association's activities, and the progress of wireless in general.

Great success is continuing to be achieved in the operation of the club's experimental radiophone transmitter. Mr. Spencer Nolan, of Double Bay, Sydney, has notified the Newcastle body that on a recent Sunday morning he had no difficulty in picking them up with a loud speaker.

On February 5 a number of professional theatricals assembled at the house of a member in whose grounds the station is situated and many delightful musical and vocal items were broadcasted. A telephone line was rigged up from the station to the house and the usual back microphone used, while by means of a specially adapted horn, the necessity to hold the microphone close to the mouth was obviated. Thus the songsters were able to stand beside the piano and sing just as though they were at a private function. Local experimenters who listened-in were unanimous in their praise of the evening's entertainment.



Natural Re-PRODUCTION

**Atlas
AMPLITONE
LOUD SPEAKER**

Blast and distortion conquered!!!
Patented Double-diaphragm Re-
PRODUCES the full range of musical
sounds. Adjustable to varying
receiving conditions.

Price
Complete
£8

Multiple Electric Products Co., Inc., Newark, N.J.
Australasian Representative:
EDWARD G. TEN EYCK,
G.P.O. Box 1343. SYDNEY, AUSTRALIA.

PLACE YOUR HOME ON THE AIRLINE.

Instal a broadcast receiving set, and a high-class programme of music, news and information will be available each day and evening for a whole year — and as long after as you wish. You owe it to yourself and family to help in the grand ideal of having "A Receiving Set in every Home."

The Radio Experimenter's Handbook

By Philip R. Coursey, B.Sc., F.Inst. P., A.M.I.E.E.

PART I.

If you desire to design your own set to meet your special requirements, and to plan the whole on a sound scientific basis, this handbook will prove of great assistance to you.

The chief features of such design work are indicated here and can be fully relied upon.

In this part the mathematical formulæ has been practically eliminated, only the General Principles being given.

PART II.

Many experimenting amateurs have requested full mathematical data for design purposes, and this section is devoted to Data and Actual Quantitative Design as well as to a description of many simple high-frequency measurements which can be carried out by the experimenter.

New developments such as the Armstrong Super - Regenerative Receiver are included.

Price, 5/- each, Postage 5/6;
Or, Both Parts, 11/-, Post Free.

Obtainable from all Booksellers, or

THE WIRELESS PRESS,
MELBOURNE :: SYDNEY :: WELLINGTON, N.Z.

Wireless in West Australia

Two more wireless clubs have been formed in W.A. since the last issue of *Radio* appeared. They are the Northam Radio Club and Kelmescott Radio Club. Northam is situated about 66 miles from Perth on the Eastern Goldfields Railway, and Kelmescott is about 16 miles from Perth along the south-western railway. The formation of these two clubs brings the total number of

radio clubs in W.A. up to nine, which in itself speaks eloquently of the rapid progress of wireless in this State.

Mr. B. Congdon, Secretary of the Subiaco Radio Society, has been awarded the gold medal donated by Mr. Cecil Thompson for securing the greatest number of recruits for the club for three months.

Now that Mr. J. Scaddan has taken

over the management of the Westralian Motors Limited, the first thing that greets the eye on entering his office, are photos of motor cars with frame aerial attachments.

The presidents and secretaries of the various radio clubs and societies of W.A. wish to convey their appreciation to the managing director of Amalgamated Wireless (Australasia) Limited, for the very useful presentation made to them.

New Broadcasting Station

Advice has been received in Sydney by Mr. D. T. Hitchen, local representative of the Electric Appliance Company, San Francisco, Cal., that a powerful broadcasting station has just been put into operation at Oakland across the Bay from San Francisco. The call letters of this new

station are KGO, which at the present time is working on a power of 1000 watts. Eventually the power will be increased to 5000 watts. It is stated that KGO has been heard in India, China, Japan and various parts of the Orient.

KGO is "on the air" three times a

week, every Sunday, Wednesday and Friday on a wave-length of 312 metres.

Any Australian experimenters who may hear this station are requested to kindly forward full details of time, items heard, etc., to the Editor of *Radio*, 97 Clarence Street, Sydney.

F. L. Moore Relief Fund

In connection with the steps that have been taken to help the widow of the late Mr. F. L. Moore, who recently met his death by electrocution from a high-tension wire, the following amounts have been received to date:—

F. L. MOORE RELIEF FUND.

	£	s.	d.
<i>Radio Magazine</i>	5	5	0
Amalgamated Wireless Ltd.	10	10	0
Marconi School of Wireless	5	5	0
E. T. Fisk	3	3	0
Major W. H. Newman	1	1	0
W. E. Wilson	1	1	0
L. A. Hooke	2	2	0
C. D. Maclurcan	2	2	0
Neutral Bay Radio Club	1	1	0
Total to date	£31	10	0

Letter to the Editor

The Editor, *Radio*: Sir,—In your issue of February 6, page 571, in an article headed "Australia de G5AT," you state that Australian experimenters who receive these messages are requested to forward their reports to me. This should read South Australian experimenters, as this test is in the hands of the Victorian Division, who desire each Division of the Wireless Institute to collect reports from their respective States.

The wave-length is stated as 1,200 metres. This should read 200 metres, and the time should be given as Adelaide time not Greenwich mean time.

Trusting that you will rectify these errors.

I am, etc. (Sgd.) Clement E. Ames, Hon. Sec., Wireless Institute of Australasia, S.A. Division.

Personal

Mr. A. W. Watt resigned from the staff of Amalgamated Wireless (Australasia) Limited last month to take over the Editorship of our contemporary, *Wireless Weekly*. To mark the esteem in which he was held by the staff at "Wireless House," Mr. Watt was presented with a gold wristlet watch.

Waverley Radio Club

The above body's regular night of meeting has been changed from Thursday to Tuesday on account of its greater convenience for a large number of members.

A Hint

If you use your 'phone unit as a loud speaker, you may sometimes be annoyed by a loud rattle. Try placing a cardboard disc over the diaphragm and screw down the receiver cap to the point where the tone-quality is most satisfactory.

"Radio" is the only paper dealing effectively with Australian Broadcasting activities. It is bright and up to date.

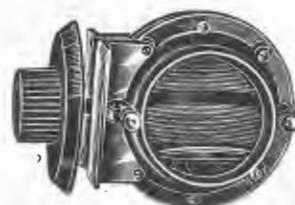
An annual subscription at 10/- will bring it regularly to your home each fortnight. Send that Sub. to-day.

EXPERIMENTERS!



Igranic Vernier Friction Pencil for Fine Tuning.

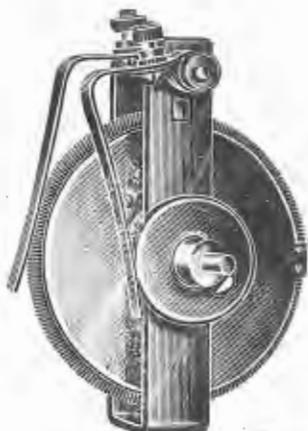
Ask your Dealer
for



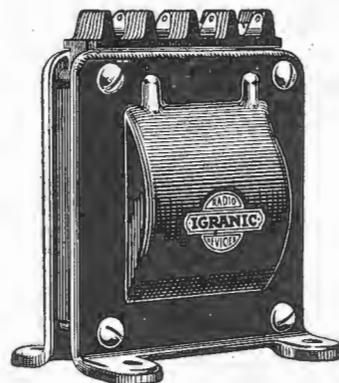
Igranic Variometer. Stator and Rotor of Hard Mouldings of very high Insulating Quality.

Internal Windings Cemented in Position.

"Igranic" Radio Devices



Igranic V.T. Rheostat with Vernier, graduated stepless resistance 0 to 4 ohms.



Igranic Low Frequency Intervalve Transformer.

Laminated Core.

Corrected Primary Winding.

Non-resonating Secondary Winding.

DISTRIBUTORS:

Amalgamated Wireless
(Australasia) Ltd.

Wireless in New Zealand

(By Our Special Correspondent.)

The Prime Minister (Mr. Massey) has stated his intention of placing before Cabinet proposals for a high-power station to give direct communication with England. The station will be similar to that designed for Australia, the estimated cost being in the region of £500,000. In this connection, it is interesting to note that the Moreton Estate in Canterbury, South Island, has already offered a free site on Mount Pleasant, on the Cashmere Hills. The position, it is considered, offers special advantages for such a station, but there is likely to be some query as to why the South Island should have the station in preference to the North. Mr. Massey, in acknowledging the generous offer, evidently scented trouble, and replied that he would communicate with the Postmaster-General in regard to it.

The broadcasting scheme which is at present under consideration in the Dominion, will also come up for consideration at the Cabinet meeting. From reports to hand from the chief centres, it would appear that the proposals, as outlined by the deputation that waited on the Minister, are not likely to meet with general approval, it being contended in many quarters that the owners of crystal sets are being exploited in the matter of the license fee, which it is suggested should be 25/-. The scheme is the outcome of the dealers' conference recently held in Wellington. The Auckland Y.M.C.A. Wireless Club has been meeting weekly to discuss the

proposals already put forward and they have formulated seven points in which they are at variance with the proposals submitted by the conference.

The Marine Department, apparently not satisfied with the radio direc-



The former British P.M.G., Sir L. Worthington-Evans, inspects a Marconi Wireless Receiving Set at the Wireless Exhibition, which was held at the White City, London, recently.

tion-finding experiments at the Three Kings last year, intends to make further experiments at the northern point of New Zealand.

The Government steamer *Tutanekai*, after a ten-days' cruise to north-

ern ports with Lord Jellicoe and party returned to Auckland the other week and, after coaling and loading stores will proceed to Northern and West Coast lighthouses. The steamer will take as passengers Mr. A. Shrimpton, Chief Post and Telegraph Engineer, and a party of the Department's electricians, as well as Captain Whiteford, acting nautical adviser of the New Zealand Government. The *Tutanekai* proceeds to Cape Maria, where a temporary wireless station will be fitted up. Afterwards, the steamer will cruise off the coast and make exhaustive tests with her wireless compass to enable the Department to fix on a suitable part of the coast for the erection of a permanent wireless direction-finding station.

Mention may here be made of several excellent receptions of radio telephony performed on a recent Sunday evening. Mr. E. S. Ralls, of Takapuna, who was using a detector only, tuned in 2BL, the station of Sydney Broadcasters, Ltd., on a wave-length of 350 metres. Practically every item was received with great clearness and volume. Mr. G. Owens, of Papatoetoe, Auckland, succeeded in tuning with the Japanese warships which were approaching Wellington. The best results were obtained about 6 p.m., when the speech was distinctly audible, and the operators were heard carrying on a conversation in Japanese. Mr. Owens was using one stage of radio frequency and detector.

"Logging" the Yanks

New Zealanders' Favourite Diversion

THE following tribute to Commonwealth radio experimenters has been taken from the columns of the *Radio Sun and Globe*, New York, and should prove of particular interest to New Zealanders.

It reads:—

"An increase in radio DX (long distance) work during last year has made the logging of Yankee amateurs one of the favourite sports in New Zealand. Interest in radio is moving forward there to a surprising degree, one amateur having heard many sta-

tions in the U.S.A., Canada, Japan, India, South Africa and Egypt. Ever since their successful participation in the first trans-Pacific tests in New Zealand, radio fans have gone in solidly for international DX, and the game lately has been reduced to a competition in listening for the Yanks.

"It has been emphasized frequently by ship operators that receiving conditions in this vicinity are as good, if not better, than anywhere else in the world, and this appears to have been proved by the experience of F. D. Bell, who states that he often hears amateurs in all United States

districts, and as the evening advances one district after another will fade out as daylight sweeps slowly across the continent.

"With fifteen amateur stations already installed and others rapidly going on the air for the purposes of entering the present trans-Pacific tests under the auspices of the *Radio Journal*, the American Radio League, and the Southern California Radio Association, it is confidently expected that before the tests close on November 3, 1924, the New Zealanders will have established two-way communication with American enthusiasts."

Experimental Station 3UX

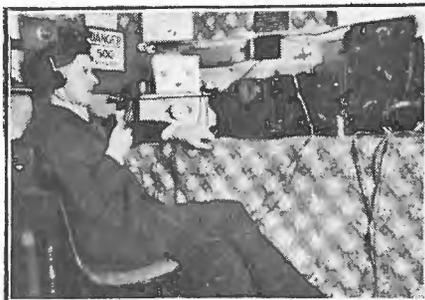
Effective Range of 600 Miles

THIS station is owned and controlled by G. W. Steane, hon. secretary of the Victorian Division of the Wireless Institute of Australia, and is situated at Mout Albert, Melbourne.

The aerial is of the umbrella cage type, supported by one mast 50 feet high. The lower extremity of the aerial is 40 feet above the ground. Underneath the aerial is a radial counterpoise consisting of eight strands of 3/20 copper wire, 7 feet high.

The transmitter consists of 5-watt tubes connected in a parallel working at a plate potential of 800 volts, rectified with 14 pint electrolytic rectifiers and smoothed out with condensers in conjunction with choke with an inductance of 5 henries. The high tension transformer is of the centre tap variety, and consists of an iron coil 1½ by 1½ by 6 by 8. A primary

winding of 800 turns of No. 20 gauge wire. The low tension secondary winding of 60 turns of No. 18 gauge wire and the high tension secondary



Mr. G. W. Steane seated at his set.

winding consists of 1600 turns each side of centre tap.

The circuit is of the two coil variety, using centre tap 26 turns of No. 20 gauge wire for regeneration with separate aerial coil of 16 turns

in No. 14 gauge wire. A .0005 m.f. variable condenser is placed directly across.

The grid leak used consists of a secondary winding spark coil, the primary winding and iron core, of course, being removed. This type of grid leak has been found to give maximum radiation and results.

Modulation is effected by means of a high resistance microphone being placed in series with grid coil and low tension centre tap. A key placed across this microphone permits continuous wave signals to be radiated. The radiation reading is 1700 milliamps, and according to frequent reports this station has a range of at least 600 miles.

The receiver consists of five valves, which can all be used if necessary. Two have radio frequency amplification, one has a detector, and two have audio frequency amplification.

Natural Production

"ATLAS" AMPLITONE LOUD SPEAKER

THE prime distinction between the *Atlas Amplitone* and other loud speakers is that the *Amplitone* is first of all a musical instrument. It rePRODUCES, not a semblance, but the full, clear, natural tones of the music as actually sung or played. It is the same distinction as that between the old-fashioned wax cylinder tin horn, scratchy phonographs of a few years ago and the finest phonographs of to-day, whose reproductions deceive even the trained ear.

THE DOUBLE DIAPHRAGM.

This astonishing faithful re-PRODUCTION is largely due to a patented construction known as "the double composition diaphragm"—the exclusive feature of the ATLAS AMPLITONE, Loud Speaker. It compensates for the shortcomings of broadcasting and receiving conditions, and gives you the programme clear, sweet and natural.

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PRICE
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Interchangeable Radio Transformers

Successful long distance work on all wave-lengths is becoming more difficult every day, owing to the ever-increasing number of transmitters using the ether. Receivers which employ the first valve as a detector and the remainder as audio amplifiers are particularly subject to this interference. Radio frequency amplification increases the selectivity of a receiver to a remarkable degree, as well as the range over which signals can be picked up. Tuned transformer coupling is the most stable and satisfactory method of passing on the energy to the detector.

In Fig. 1 is given the dimensions of a former which can be used for windings for all wave-lengths between 150 and 30,000 metres. It can be turned out from a solid block of insulating material if the experimenter possesses a lathe. The cheapest way is to build it up from discs of one-eighth inch ebonite or fibre. These may be cut out with an adjustable washer cutter,

which can be obtained from any tool supply house.

The pins used for plugging into the standard valve adapter are cut from a length of $\frac{1}{8}$ in. brass rod, which is threaded for $\frac{1}{8}$ in. and split with a fine hack saw for half an inch of the remaining plain end. A hexagonal nut is run on to the end of the thread,

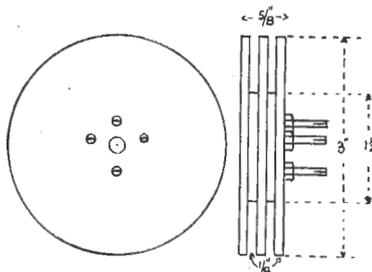


Fig. 1.

and the pin screwed in as shown in the illustration. They now act in the dual capacity of terminals for the wires and clamping screws for the discs. Provide holes through the out-

side discs for the lead in and out wires.

Suitable windings for a range of coils to cover the entire band of waves in commercial use at present are given in the accompanying table. The primary and secondary consist of an equal number of turns in all cases.

Wave-range in metres	Turns.	Gauge.
with .001 m.f.		
200-600	50	24 d.s.c.
500-1,500	150	26 d.s.c.
1,000-3,000	300	30 d.s.c.
2,500-7,500	600	36 d.s.c.
5,000-15,000	1,200	40 d.s.c.
10,000-30,000	2,400	44 d.s.c.

The spools of wire should be dipped in wax before winding on the former, to guard against trouble due to absorption of moisture from the atmosphere. Wire up all transformers so that the inside primary wire connects to the pin normally used for the grid, the outside primary to the plate pin, and the two secondary wires respectively to the left and right filament pins.

Filament Resistance and Grid Leak Connections

It is often noticed when following diagrams of connections for radio apparatus that the position of the grid leak and filament resistance vary in different circuits.

In the detector circuit the connections should be in accordance with Fig. 1. Connect the low potential end of the grid leak to the positive terminal of the filament battery. With soft valves such as the Expanse B and UV 200 the polarity of this connection makes very little difference, because the cumulative charge on the condenser due to grid rectification is able to leak off owing to the slight positive ionization within the valve

itself, but with hard valves the charge remains isolated, and if not quickly withdrawn it will interfere with the

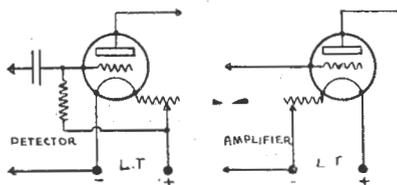


Fig. 1.

Fig. 2.

rectification of following wavetrains. The positive connection offers an inducement for the electrons to flow off, and so the action of the valve is

improved several hundred per cent. For the amplifier the filament resistance should be connected in the negative battery lead, as in Fig. 2, and the low potential lead of the intervalve transformer connected to the negative of the low tension battery. This connection places a slight negative charge on the grid of the amplifier valve, which improves the quality of the speech and music by reducing the tendency for grid currents to flow. If a four volt valve is operated from a six volt storage battery this connection will place a two volt negative charge on the grid of the valve.

List of Amateur Transmitting Licenses

Issued to December 1923

NEW SOUTH WALES.

- 2AJ Short, W., Queenscliff Road, Manly.
- 2AL Cooper, A. E. C., "Edale," Cecul St., Ashfield.
- 2AR Hudson, W. H., 1 Terrace Road, Dulwich Hill.
- 2AS Grigg, H. E., 370 Military Road, Mosman.
- 2AT Swinburne, E. C. R., 39 Parkview Road, Manly.
- 2AY Curston, J. C., "Maruna," Burwood Road, Burwood.
- 2BB Crocker, E. B., 14 Roseby Street, Marrickville.
- 2BC Hurl, N. J., "Strathcona," Northcote Avenue, Killara.
- 2BF Forsythe, L. E., Sailor Bay Road, Northbridge.
- 2BM Vears, E. T., "Pipitea," Cross Street, Leura.
- 2BV Waverley Amateur Radio Club, 42 Evans Street, Waverley.
- 2BY Arnold, E. C., Carthage Street, Tamworth.
- 2CA Bonwill, E. W., Cowra.
- 2CH Henry, C. H., Bridge Street, Uralla.
- 2CI Charlesworth, R. H., 173 Parramatta Road, Haberfield.
- 2CJ Sewell, P. L. H., 12 Dillon Street, Paddington.
- 2CL Caletti, G., c/o. P. L. Stonewall, 83 King Street, Newtown.
- 2CM Maclurcan, C. D., "Namanula," Agnes Street, Strathfield.
- 2CR Todd, L. V. G., Dennison Street, West Tamworth.
- 2CS Swain, L. T., 49 Everton Street, Hamilton.
- 2CW Beer, J., 42 Thomas Street, Ashfield.
- 2CX Stowe, H. A., "Rawane," Royal Street, Chatswood.
- 2CY Parker, P. S., 12 Weldon Street, Burwood.
- 2CZ Exton, C. W., Lismore.
- 2DE Renshaw, R. P., "Waima," Lord Street, Roseville.
- 2DH Mawson, E. R., "Dalsydale," Wonga Street, Campsie.
- 2DK Whitburn, R. P., 7 Hatheon Street, Leichhardt.
- 2DN Blanchard, G. E. H., 60 Bligh Street, Newtown.
- 2DS Davis, R. R., Fisher Avenue, Vaucluse.
- 2EC Gorman, C. A., 31 Sengenhee Street, Arncliffe.
- 2ED Gregory, H. R., "Gerrobbar," Walton Crescent, Abbotsford.
- 2EM Moore, E. J. T., 6 Lower Wycombe Road, Burwood.
- 2FA Colville, S. V., 10 Rowe Street, Sydney.
- 2FB Bishop, F. E., 7 Ellamang Avenue, Kirribilli.
- 2FF Western Suburbs Radio Association, 77 Park Road, Auburn.

- 2FP Baker, E. J., 62 Estell Street, Marysville.
- 2GC Challenger, G. R., 77 Park Road, Auburn.
- 2GP Mackay, C. S., Urunga.
- 2GQ Barlow, E., Faulkner Street, Armadale.
- 2GR Marks, J. S., Ritz Flats, Salisbury Road, Rose Bay.
- 2GU Dunn, R., 324 Anzac Parade, South Kensington.
- 2GY North Sydney Radio Club (G. McClure), Burns Bay Road, Lane Cove.

- 2QY Williams, E. A., Crown Street, Wollongong.
- 2RA Vickery, K. J., Kilbridge Street, Hurlstone Park.
- 2RY Volkman, Reg. V., Post Office, South Grafton.
- 2SO Newcastle Radio Club, 25 Winship Street, Hamilton.
- 2SP Evans, R., "Garth Craig," 6 Flood Street, Clovelly.
- 2ST Tatham, S. E., Stonehenge Flats, Kurraba Road, Neutral Bay.
- 2SX Slade, H. C., "Rockleigh," Lang Street, Croydon.
- 2TS Gill, A. W., "Illaroo," Greengate, Killara.
- 2UI Illawarra Radio Club, 75 Montgomery Street, Kogarah.
- 2UR Creamer, A. H., 10 Hereford Street, Glebe Point.
- 2UU Roberts, R. G. C., 9 Church Street, Ashfield.
- 2UW Sandel, O., Mooramie Avenue, Kensington.
- 2VM Derrick, V. M., 3 Birriga Road, Bellevue Hill, Woollahra.
- 2VX McIntyre, D. G., Livingstone Avenue, Pymble.
- 2WU Morley, W. H., Rangers Avenue, Watersleigh.
- 2WV Burgin Electric Co., 352 Kent Street, Sydney.
- 2XI Craig, W. A., 11 Rockleigh Street, Croydon.
- 2XX Mingay, O. F., Kuringai Chase Road, Turramurra.
- 2YA Haynes, B. L., Sumarez Station, Armidale.
- 2YB Croydon Rado Club (Cutto), Land Street, Croydon.
- 2YC Crawford, C. T., 18 Lindsay Street, Burwood.
- 2YD Donne, C. W., "Lansdowne," Manns Avenue, Neutral Bay.
- 2YE Manly and District Radio Club (Swinburne), Wentworth Street, Manly.
- 2ZN Cottrell, J. W. M., 23 Dolphin Street, Randwick.
- 2ZR Perdriau, W. J. S., 47 East Esplanade, Manly.
- 2ZT Bean, L. P. R., 86 Muston Street, Mosman.
- 2ZU Gilmour, N. G., 156 Kurraba Road, Neutral Bay.
- 2ZV Universal Electric Co. (A. L. Dixon), 244 Pitt Street, Sydney.
- 2ZW Huggins, D. R., 13 Yeo Street, Neutral Bay.
- 2ZX Olsen, N. P., "Normanhurst," Macquarie Street, Waratah.
- 2ZY Sidey, R. L., Highfield Street, Lindfield.
- 2ZZ Smith, C. P., 83 Cabramatta Rd., Cremorne.
- 2ZFI Newtown District Radio Club, 83 King Street, Newtown.
- 2ZGI McIntosh, R. E., Burns Bay Road, Lane Cove.

BROADCASTERS' CALL CHANGED.

The call letters of Broadcasters (Sydney) station have been changed to 2BL. Formerly they were 2SB.

- 2HF Thompson, F., 12 Pearson Street, East Balmain.
- 2HH Wireless Inst., N.S.W. Division, Queen's Chambers, Dalley Street, Sydney.
- 2HP Maclardy, W. J., 46 Murdoch Street, Cremorne.
- 2HY Bongers, G. S., "Marmora," Lawson Street, Rockdale.
- 2IJ Gray, A. H., Florence Street, Killara.
- 2IN Payne, J., 143 Avoca Street, Randwick.
- 2JC Fraser, H., Roderick Street, Tamworth.
- 2JI Wilson, W. A., Archbold Road, Roseville.
- 2JM Marsden, R. C., Victoria Road, Edgecliffe.
- 2JS Stanley, J. M., Northcote Street, Crow's Nest.
- 2JT Luckman, C., 14 Queen Street, Croydon.
- 2KC Fry, R. H., Brighton Street, Croydon.
- 2LI Cook, F. B., 23 Lang Street, Sydney.
- 2LO Schultz, L. N., "Waraba," Burns Bay Road, Lane Cove.
- 2LY Shaw, R. H., 129 Grafton Street, Woollahra.
- 2MA Amalgamated Wireless Ltd., 97 Clarence Street, Sydney.
- 2MB Amalgamated Wireless Ltd., 97 Clarence Street, Sydney.
- 2MC Amalgamated Wireless Ltd., 97 Clarence Street, Sydney.
- 2MD Amalgamated Wireless Ltd., 97 Clarence Street, Sydney.
- 2MJ Newman, W. H., Cooney Road, Artarmon.
- 2MR Stewart, J. E., Garrick Street, Mayfield, Newcastle.
- 2MU Nangle, J., Tupper Street, Marrickville.
- 2OI Whitaker, A. T., 31 Railway Crescent, Banksia.

(Continued on page 624.)



Queries Answered



T. E. F. (Murwillumbah) asks design of 1 K.W. transformer operating from 240 volts A.C. with secondary voltages of 12, 24 and 32.

Answer: It is assumed you require this transformer for continuous duty. For the core, cut sufficient laminations of 16 mil transformer steel to form a core with an outside dimension of 9in. x 9in. and an inside dimension of 4in. x 4in. The cross section being 2½in. x 2½in. The primary should be former-wound with 350 turns No. 14 D.C.C. in twelve layers, 30 turns wide. The secondary for the 12-volt supply will have to deliver 80 amperes and will require two strands of 7/14 D.C.C. in parallel. Wind three layers of this twin cable six turns wide, giving 18 turns of 2/7/14, and bring out a lead to a terminal. Continue winding with one strand of 7/14 for 18 turns, and bring out another tap, then for 12 more turns and finish off. When taped, the secondary will form a coil approximately 3in. x 2in. cross section.

An excellent text book dealing with transformer design is "A Treatise on Transformers," by Robertson & Bohle.

M. B. (West Maitland): Data is being obtained for transformer and will be published next issue.

R. A. Dio (Clermont, Qld.) asks: (1) Number of valves necessary to relieve Farmer's Broadcasting Station on full power. (2) When will a broadcasting station start in Brisbane?

Answer: (1) As so much depends upon local and intervening conditions, as well as the skill of the operator, it is impossible

to predict with any degree of certainty the range and strength of reception. (2) No information is available at present regarding the Brisbane broadcasting station.

J. E. G. (Benalla) submits diagram and particulars of valve receiver which he has constructed and asks: (1) Why cannot signals be heard, all connections being thoroughly tested, although good signals can be obtained on loose coupler and crystal detector? (2) Would using a different valve be an improvement?

Answer: (1) If possible, try another valve to prove whether your present one is at fault. (2) An "Expanse" B can be used in the circuit you submit, although a hard valve such as a UV201A, R, or DER would give better results. Sharp tuning in the secondary is always noticeable when using coupled circuits. The relative flatness of the primary tuning is probably due to a high earth resistance.

F. C. H. (Te Pohue, N.Z.) intends to construct a two-valve receiver, and asks for suitable battery which he could construct and charge to overcome the difficulty of charging accumulators in outlying districts.

Answer: You should use low temperature valves in your receiver and Edison Primary Batteries. These cells can be obtained in various sizes up to several hundred ampere hours capacity. The cells have a voltage of 0.7 volts, and the following number will be required to work the valves specified DER 3, UV199 5, UV201A 6. When the elements and electrolyte are exhausted, re-fill charges can be purchased

from the makers. Each DER valve will burn for three hours per ampere hour, the UV199 for sixteen hours, and the UV201A for four hours.

C. F. D. (Cootamundra) proposes changing his aerial and asks: Would a three-wire cage type aerial on 2ft. hoops, 90ft. long and 50ft. high, be as effective for receiving as a twin wire "L" aerial, same length and position?

Answer: There will be little to choose between your two aerials, but for neatness and ease of erection use the three-wire cage.

J. K. (South Singleton) You are getting excellent results with such simple apparatus. When using loops and other substitutes for an outside aerial, radio frequency amplification must be used. Regarding your previous query, nothing will be heard with the 'phones in the aerial lead owing to the fact that the frequency is above the limit of audibility.

A. W. C. (Beaumaris) submits circuit and asks for comments on same, also definition of, and difference between, regenerative and non-regenerative.

Answer: Your circuit contains capacity regeneration and when oscillating will energise the aerial, which condition is contrary to the P.M.G. regulations. Use a hard valve such as an "R" or UV201A. A regenerative circuit is one in which either a capacitative or inductive coupling exists between the grid and plate circuit of a valve, capable of causing self oscillation if properly adjusted. A non-regenerative circuit does not possess this feature.

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Or—

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Please find enclosed cheque/money order/postal note, value 10/-, in payment of 12 months' subscription to "Radio."

Signed

Full address

Date

Staff Changes

COASTAL RADIO SERVICE

Radio-telegraphist A. S. Hart—Sydney to Adelaide.

Radio-telegraphist H. E. Oates—Adelaide to Darwin.

Radio-telegraphist J. J. Howe—Hobart Radio to Radiotel. in Charge, Samarai.

Radio-telegraphist M. Mortimer—From R/T. in Ch., Samarai, to Sydney R.

Radio-telegraphist, J. B. Stoyle—From O.I.C., Darwin, to Officer in Charge, Adelaide.

Radio-telegraphist D. B. L. Fleming—Darwin to Hobart Radio.

Radio-telegraphist A. H. Brown—Melbourne to King Island (relieving duties).

Radio-telegraphist R. Simons—Melbourne to Flinders Island (relieving duties).

Mechanic W. Jessop—Senior Mechanic, Townsville, to Sydney Radio.

Mechanic D. Bowles—Sydney to Townsville.

MARINE RADIO SERVICE

Messrs. A. E. Lawrence, A. Truscott and R. B. Lowry signed off s.s. *Boorara* as senior and 3rd operators respectively, at Sydney, February 11.

Mr. A. E. Lawrence relieved Mr. T. Chalmers on s.s. *Canberra*, at Sydney, February 9.

Mr. T. Chalmers signed on s.s. *Echunga*, at Sydney, February 11.

Mr. V. B. Rippingdale signed off s.s. *Changsha*, as 3rd operator, at Sydney, February 11.

Messrs. V. B. Rippingdale and A. Truscott signed on s.s. *Arafura* as 2nd and 3rd operators respectively, at Sydney, February 12.

Mr. L. Graham relieved Mr. M. Webb-Watts on s.s. *Komura*, at Port Adelaide, February 15.

Mr. R. W. Barnes signed off s.s. *South Africa*, at Melbourne, February 7 and signed on s.s. *Yankalilla*, at Melbourne, February 8.

Mr. H. A. Greer signed on s.s. *Yankalilla*, at Melbourne, February 7.

Mr. E. Meissner signed off s.s. *Yankalilla*, at Melbourne, February 7, and signed on s.s. *South Africa*, at Melbourne, same date.

Mr. C. Williamson signed off s.s. *Camira*, at Sydney, February 13, and relieved Mr. R. E. Haddock on s.s. *Kowarra*, at Sydney, February 14.

Mr. R. W. Barnes signed off s.s. *Loon-gana*, at Melbourne, February 11 and signed on s.s. *Oonah*, at Melbourne, February 12.

Messrs. A. H. Jeremy and R. E. Mann signed on s.s. *Victoria* as senior and 3rd operators respectively, at Sydney, February 14.

Mr. G. Pow signed on s.s. *Melusia*, at Sydney, February 14.

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As the cars pass the judge's stand they are clocked and the information transmitted by means of a 30-watt tube set to several positions ranged round the track. At these points, upon receipt of the messages, a man chalks up the relative positions of the drivers, together with their lap times, thus enabling the surrounding public, who are unaware of their position when the cars are indistinguishable on the far side of the course, to know just exactly where their favourite—and their money—stands.

Amateur Transmitting Licenses

(Continued from page 621.)

- 2YF Clarke, F. P. R., "Winona," Lauderdale Avenue, Manly.
 2YG Allsop, R. C., "Levershulme," Botany Street, Randwick.
 2YH Hannan, W. E., 449 Darling Street, Balmain.
 2YI Nolan, P. S., 152 Bellevue Road, Double Bay.

- 2YJ Sainsbury, R. E., "Kermanshah," Wallaroy Road, Concord West.
 2YK Olsen, N. P., 18 Hunter Street, Newcastle.
 2YP Bergen, M. W., "Keera," West Maitland.
 2ZA Keagh, W. G., 24 Harrow Road, Stanmore.
 2ZB Balmain District Radio Club, 29a Ballast Road, Balmain.
 2ZC Lavington, E. M. E., Bennett Street, Bondi.
 2ZD Brain, S. F., 85 Bland Street, Ashfield.
 2ZE Laker, F. J. F., Harfleur Street, Deniliquin.
 2ZH New Systems Telephone Co., 280 Castlereagh Street, Sydney.
 2ZI Dixon, R. H., c/o. C.S.R. Co., Condong, Tweed River.
 2ZJ Simpson, A. W., Duri.
 2ZK Marsh, S., Carrington Street, West Wallsend.
 2ZL Otty, W., Killingworth.
 2ZM Deane, P. M., Clarence Street, Burwood.

Highlights of Radio Broadcasting

(Continued from page 605.)

in the case mentioned in the previous description. This is when a "condenser transmitter" is used for picking up the concert. It so happens that the condenser transmitter can be made to give unusually excellent quality of reproduction and is therefore used at times. It requires, however, far more amplification than the usual carbon transmitters because of its construction and method of use.

In fact, instead of requiring the usual amplification of the transmitter power of fifty billion times, it requires millions of times more amplification even than this. This means that still more radiotrons must be used, and that amplifications running into trillions or quadrillions of times are required. But the mind cannot follow or appreciate the meaning of huge quantities, and so it is not worth while to say more than that a scientific feat in voice amplification far surpassing the wildest dreams of twenty years ago is thus daily accomplished for the entertainment of the broadcast listener.

(To be continued.)

The "Atlas" Amplitone

IN the "Atlas" Amplitone, a new loud speaker placed on the market, Colville Moore Wireless Supplies claim "it reproduces, not a semblance but the full, clear, natural tones of the music as actually sung or played." The secret of this is hidden in the "double composition diaphragm" which is an exclusive feature of the "Atlas" Amplitone. Requiring no storage battery to energise the magnets, it will, it is said, give excellent results with even a single set. Sole distributors for N.S.W., Colville Moore, 10 Rowe Street, Sydney; Victoria, Norris & Skelby, and South Australia, Adelaide Radio Co.

IT is an old saying, but a true one, "that the quality will be remembered long after the price is forgotten." Our printing is readable, well-balanced, correctly displayed, and has a pleasing touch of individuality that will reflect credit upon your business.

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