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SIXPENCE

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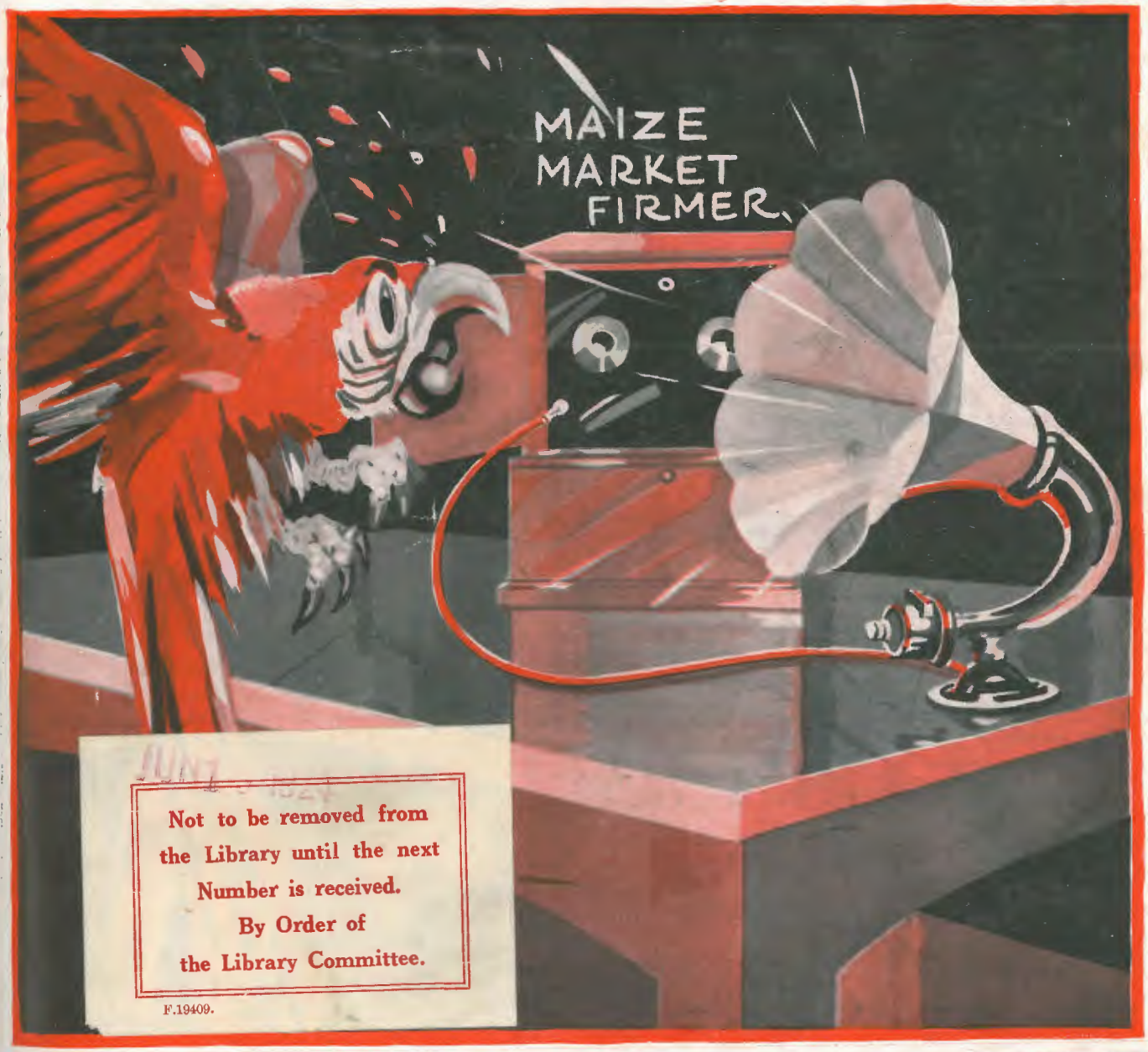

"AMAZING" NEWS BY RADIO!

RADIO

IN AUSTRALIA & NEW ZEALAND

Incorporating "Sea, Land and Air".

OFFICIAL JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA.

[New South Wales and Queensland Divisions.]

Managing Editor: S. E. TATHAM.

Associate Editor: N. H. THOMPSON.

CONTENTS

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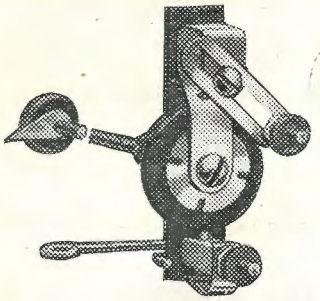
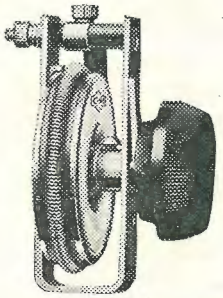


The C-H Variable Grid Leak can be mounted on the tube socket—panel controlled. Adjustable for all grid condensers.



The C-H Radio Potentiometer. The potentiometer with the resistance unit that does not wear and cannot be displaced under constant usage.

The C-H Radio Switch. A push and pull switch, controlling and protecting batteries.

Cutler Hammer

A COMPLETE LINE OF RADIO CURRENT CONTROL APPARATUS MADE BY THE MOST FAMOUS ELECTRICAL CONTROL ENGINEERS.

For more than a quarter of a century the name **CUTLER HAMMER** has been known throughout the world as a passport of technical efficiency.

Their Radio parts are used in all laboratories where efficiency and precision are demanded. We are glad to announce to the Public and Trade that we have a full and complete line of **CUTLER HAMMER** Rheostats, Pontentiometers, switches, and Amplifying Units.

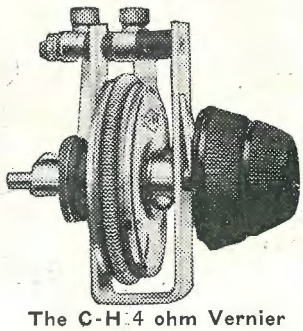
CUTLER HAMMER parts are stocked by all up-to-date Dealers.

Are you Using

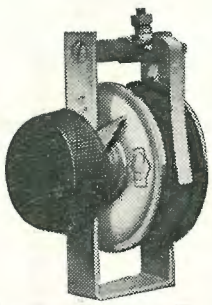
UNITED Honeycomb coils and coil mountings?

UNITED Transformers and Condensers in your Set to obtain the greatest efficiency?

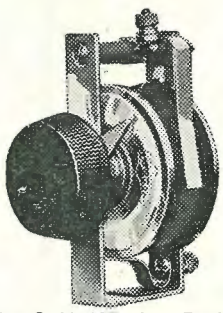
"Applause" Cards Furnished Dealers and Clubs Without Charge.



The C-H 4 ohm Vernier Rheostat.
Perfect detector tube control. Also furnished without vernier for amplifier tube control.



The C-H 30 ohm Radio Rheostat.
For control of the 1/4 ampere, "UV201A-C301A" type receiving tubes and the "UV199-C299" type.
Same also with Vernier.



The C-H 125 ohm Radio Rheostat.
The rheostat that makes it possible to use a 6V storage cell with the UV199 or C299 tubes.

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WHOLESALE ONLY.

MANUFACTURERS OF

RADIOVOX SETS

28 CLARENCE STREET, SYDNEY and at 592 BOURKE STREET, MELBOURNE.

Australian Experimenters and KGO

IN an early issue of this magazine, Vol. 2, there appeared a brief announcement to the effect that a new broadcasting station "just across the Bay from San Francisco" had started operations and that reports stated that it had been heard in China, Japan and other sections of the Orient. In the following number appeared half-a-dozen lines of small, black type stating that a certain Mr. A. E. Wright, of Scarborough, South Coast, New South Wales, had heard this station.

AND that was how it all began. Only a harassed literary staff and an overworked printer know what it became! In reply to our published request that all experimenters who succeeded in "logging" the American station should let us have full particulars as to what was heard, slowly and hesitatingly at first, but gradually increasing to astounding numbers, the letters reporting reception began to pour in by every mail.

EXPERIMENTERS residing in the Eastern States predominated, and of these, those living in New South Wales were easily the most numerous—particularly those whose stations are located in the country districts and are consequently more or less free from interference—but Queensland formed a close second and Victoria a very creditable third, with New Zealand bringing up the rear.

WIRELESS sets on which the music and speech were heard went right through the range from one to six valves, and, although there were not a great many of the former whose owners notified us of any startling success in this direction, there were quite sufficient to show beyond any fear of contradiction that the voice and the sound of stringed and brass instruments can be heard with marvellous distinctness by the suitable application of Wireless Science over a distance of many, many thousands of miles of ocean.

IN some quarters considerable dubiousness prevailed as to whether the reports of success sent in by Australian experimenters bore any foundation on fact. The only reason for the arising of these doubts in those writers' minds that this magazine can find is that they (the writers) had but taken the trouble to read one or two claims which might, perhaps, have owed their origin to the fertile imagination of their author, and immediately put the whole thing down as "hot air."

SPEAKING for itself, *Radio* has never required more proof from an experimenter with regard to his "logging" of this station—or any other, for that matter—than his written word. Our general opinion of him as a type is too high for that. It might be mentioned in passing, though, that several amateurs, so that there could not be the slightest doubt as to the bona fides of their genuine reception, voluntarily took the trouble to demonstrate before a Justice of the Peace, while another in a letter to the Editor agreed to forfeit £100 to any person who could prove that his claims of satisfactory "logging" were false. Thus, although these additional proofs were quite un-called for, they go a long way to show the spirit and enthusiasm with which these unofficial trans-Pacifice tests were carried out.

MR. A. E. WRIGHT, of Scarborough, South Coast, New South Wales, whom, of course, we all know well, has just received a letter from the Electric Appliance Company, of San Francisco, in the course of which they write:—.

> **"We have your very interesting communication of March 24 with reference to the radio station KGO and the contents have been read with considerable pleasure. Your representation is in every way authentic and we are glad to know that KGO is being heard in Australia. We look forward to a "re-vamping" of the radio regulations of this country during the next session of Congress, after which KGO will be operated to its full capacity of 5,000 watts. We trust that under these conditions you will be able to listen-in on this station frequently and hope that you will enjoy the programme.**
>
> **We are informing the local radio press of the fact that you have heard this station.....**
>
> **We have also noticed in the April 2 edition of "Radio," published in Sydney, a notation to the effect that you were able to tune in KGO.**
>
> **Awaiting the pleasure of your further reports, we remain,**
>
> **Yours faithfully,**
>
> **ELECTRIC APPLIANCE CO.**

IT only remains to say here what has been said before, what will no doubt be said again but what most emphatically must be repeated now:—*Australian wireless experimenters can lead the world—WHEN THEY LIKE!*

Radio Talks for the Layman

The First of a Series of Interesting Articles

(By J. W. Robinson.)

MR. J. W. ROBINSON has agreed to write a series of articles for "Radio." In these, the beginner will be specially catered for and wireless in its various branches will be described in a popular form. No attempt will be made to furnish a wealth of technical detail, but, on the other hand, the Science will be reviewed in terms which will make the subject clear to even the merest novice.—Ed.

DURING recent years, and more particularly during recent months, wireless in all its branches has made very rapid headway, and to-day, instead of the Science being regarded by the general public as something weird and mysterious, it has come to be considered almost as a necessity of life.

Its extension to all branches of shipping has linked up practically every unit of the world's mercantile fleets with international lines of communication, and the development of extra sensitive receivers coupled with the construction of modern continuous wave systems of transmission has made possible the linking up of the constituent parts of Empires.

What is, however, probably one of the most striking features in connection with the advancement of wireless is the extraordinary interest which has been displayed during the past two years in connection with the use and study of wireless purely as a hobby. In older parts of the world literally hundreds of thousands of men and youths have developed a keen interest in the Science, and in Australia to-day the amateur wireless movement embraces some thousands of followers.

Whereas in the past an aerial system erected at a private house was an object calling for comment, the reverse is the case to-day, a fact which no doubt prompted the publication of a recent cartoon portraying a gentleman describing the position of his house to a prospective guest by saying, "You will quite easily find it—it is the only house in the street without an aerial!"

This nightwatchman has installed a portable radio receiving set and while on his nightly duties he tunes-in and listens to the latest from the broadcasting studios.

And the wireless movement is by no means at a standstill.

Day by day numbers of beginners are being added to the ranks, in fact, to such an extent is the movement growing that within another year or two the whole of the Commonwealth should be covered by a network of receiving stations and a wireless receiver will be a household utility.

However, in spite of the extraordinary amount of interest being displayed in wireless in an amateur or experimental sense, and in spite of the large numbers of amateurs with whom the beginner is able to come in contact, it is questionable whether there exists any hobby in which the novice may make so many mistakes and costly mistakes, too, as is the case with wireless. Much that is said and written seems to confuse the beginner, and so complex and so varied seem the sets available that it is not a matter for wonderment that the novice "dunno where he are."

Almost invariably he tackles some sort of set which is too complex for him, some sort of set which operates on a principal concerning which he knows nothing, and, although results of a certain nature are achieved, the amateur does not fully understand the exact functioning of his apparatus and consequently does not derive the maximum amount of pleasure from the working of his station.

The best advice which can be offered to a real beginner, to the man who is ready to admit that he knows nothing about wireless, is not to commence the building of a receiver until such time as he has made at least a superficial study of the theory of wireless. The keen amateur will, however, immediately realise that the offering of such advice is considerably worse than useless, because there never existed an amateur who was prepared to study wireless from a book for any longer than ten minutes without deciding to commence immediately the construction of some sort of set!

Bearing this in mind, advice must be framed accordingly, and it is quite

safe to state that the most practical instruction which can be given to the beginner is to study the fundamental principles of wireless and while so doing to build, at the cost of a few shillings only, the simplest form of crystal receiver. From the building of this he will derive much pleasure, and from its operation he will learn much that will stand him in good stead when he reaches the starting point for his first valve set.

It is not the intention of the writer of this series of articles to describe various types of sets, to recommend the use of any particular circuit, or to discuss the construction of receivers. Much information of this type is contained in other pages of *Radio* and the beginner who is seeking information regarding circuits will find much to suit him. The object is to deal in a popular manner with the various principles governing the operation of wireless sets and so to endeavour to give the novice a clear idea of the electrical and magnetic phenomena which, without a popular explanation, may appear somewhat complicated to him.

The amateur who desires to possess an almost expert knowledge of wireless must of necessity understand the principles underlying the operation of wireless apparatus. Wireless may be simply defined as the practical application of electro-magnetics. By electro-magnetics is meant the laws governing and the effects produced by electricity and magnetism when the two phenomena are utilised in a dual capacity. It is necessary, therefore, that to thoroughly understand wireless a thorough knowledge of the simple laws of electricity and magnetism must be possessed by the student. Many cheap text books are available and the beginner would be well advised to purchase one of them and to grasp the meaning of static and dynamic electricity, current, flow, simple electrical laws, the principles of magnetism, the theory of induction and inductance, and to learn the meaning of the various terms applied to the units by means of which electricity is measured.

Right throughout a study of wireless, the simple electrical laws crop up. In fact, it may be said with truth that the whole principle of wireless is based on the simple electrical and magnetic laws. The placing of the operator's hand on a condenser or tuning coil simply means the application of one or more simple electrical theories. The beginner then, who neglects to grasp the basic principles of electricity will not progress very far with his studies before realising that he is completely at sea, but on the other hand the man who is prepared to master some of the simpler electrical rules will find that as he progresses with his wireless studies very little in connection with the operation of a set will worry him.

Of course, results may be obtained without the knowledge to which we have referred, but the maximum amount of pleasure can only be obtained if the amateur understands just why he makes each adjustment to his receiver and just what happens when each adjustment is made.

In future articles some simple descriptions of the various phenomena associated with wireless will be given.

What is claimed to be the world's greatest loud-speaker was recently used at the New York Radio Show. It stands 11ft. 6ins. from the base and the opening of the horn is 6ft. in diameter. The wooden bell is made of 4,000 pieces of mahogany, the base and goose-neck being of aluminium. It weighs 1,000 lbs. and took six weeks to build. It is operated by a super-heterodyne receiving set and can be heard a considerable distance away.

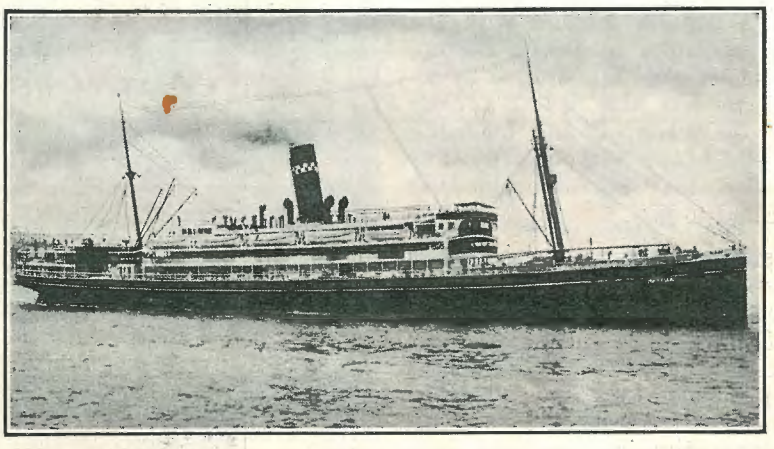
A Life on the Ether Wave

Some Reminiscences of a Marine Radio Officer

(By "A Wireless Operator.")

(Courtesy "World-Wide Wireless.")

IF this were an interview, and some mythical and hardy soul the interviewer, the first question asked would doubtless be: "What do you regard as the most interesting experience you had this summer while acting as radio operator?" And being a truthful soul, I should reply that if there were anything more interesting than observing one of our Swedish seamen with the hose squeejeeing down the deck at 5 a.m., I could not remember it. One Swede, although not surprising to look at, had a positively demoniacal ability to point that hose at my cabin screen. How many dreams that chap interrupted about a world in which there was no static, I would hesitate to record. Nor should I like to saw how many times this self-same Swede managed to wet his own deck-mates in the daily cleaning operation. A hose in full blast really meant nothing in his life. Let him see a screen or an open port along the deck—his aim was perfect, unfailing. And the deck, you ask, was he as efficient there? Well, he managed to distribute a lot of water, but I blush when I think of what he didn't do.



Burns, Philp's palatial s.s. "Marella," which trades between Australia, Java and Singapore.

The "Marella's" Radio Operators.
From left to right: Messrs. L. H. Trenn (2nd), W. H. Harris (1st) and A. B. Sharland (3rd).

But the pleasures of the watch below must go by the boards for the daily excitement and novelty of the radio watch itself. I must explain that I was assigned to one of the cruising passenger ships on the Great Lakes, running between Buffalo and Duluth, a 2,230-mile round trip. We got passengers in our usual ship's company of 450 of all grades, size of pocketbook, and previous condition of occupation. All of the 450 seemed each trip to be universally endowed with a remarkable conversational talent. All of which is interesting for the radioman—if he can stand it. My junior weakened under the strain toward the end of the season and was doing very well, until I found he kept the operating cabin door closed. I was sorry to spoil his little application of the universal principle of self-preservation.

The fact is, and I suppose many operators before myself have noticed it, that times have changed. In the old days, the visitor to the radio cabin used to ask the questions of the operator, on watch in a sort of open-mouthed wonder. The operator gave the information. But now, ah! how different. The intricacies of the tuned receiving circuit mean nothing to your passenger. The feed-back receiving circuit is daily meat and drink to him, radio frequency amplification

(Continued overleaf.)

is his specialty, and vacuum tubes, the former unfailing mysterious funny little lights, are matters of everyday knowledge, like his watch or train schedule, or meat bill.

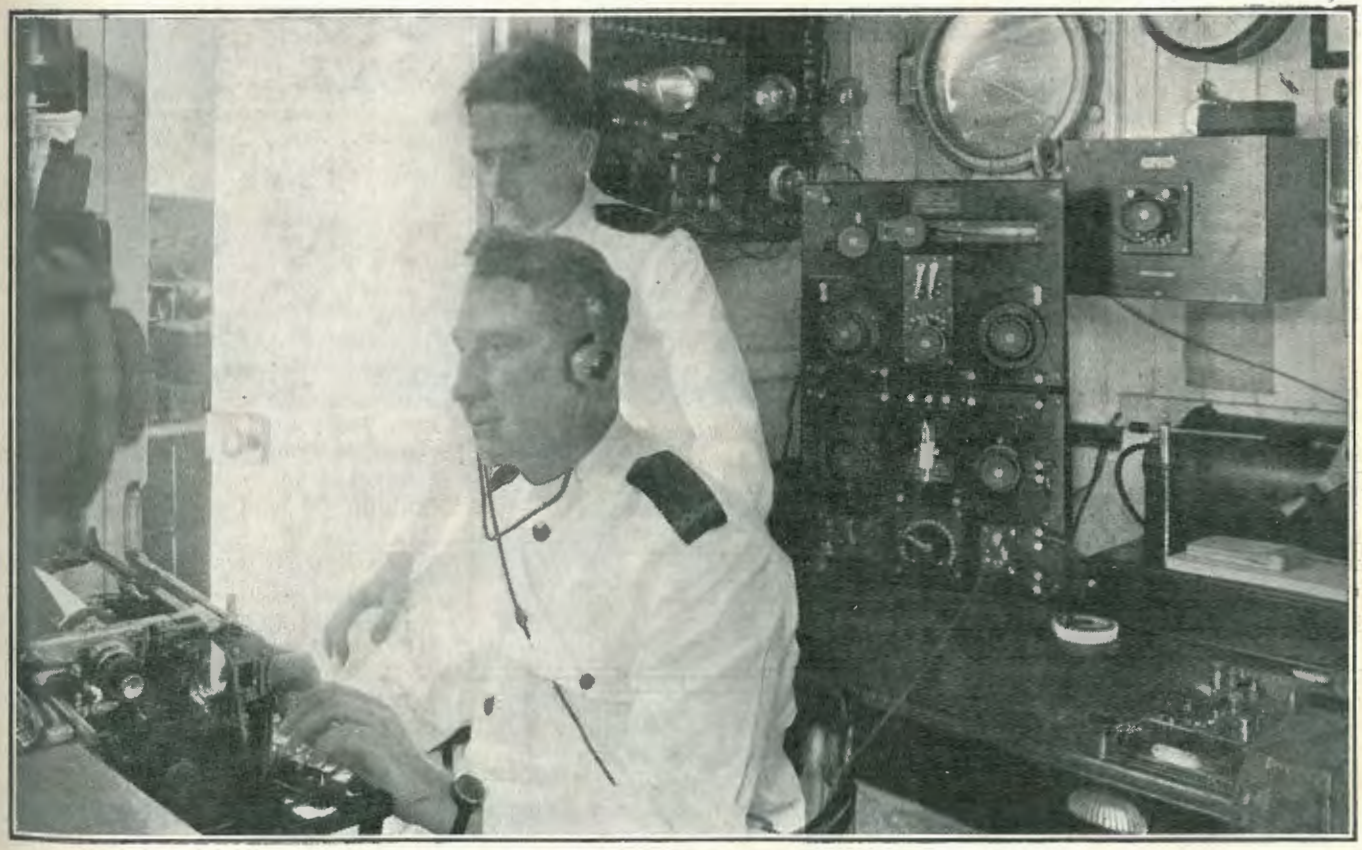
And how about the old standard questions? you ask, are the passengers still asking what that funny jar is for and why you wear those odd black things on your ears? Indeed they are. And here, I think. are a few new ones. First, there is the wise owl who has learned a few of the best radio words. He will plant himself firmly in the best chair the cabin affords and inquire your wave-length. "600 metres? Well, how many miles can you get with that?"

Then, there was the school teacher who confided that she knew a good deal about radio. "You know," she said, looking out over the glistening waters of Lake Superior, "there is one thing I could never understand. How do you get the messages under the waves?" There is probably a good answer for that, but I do not know what it is.

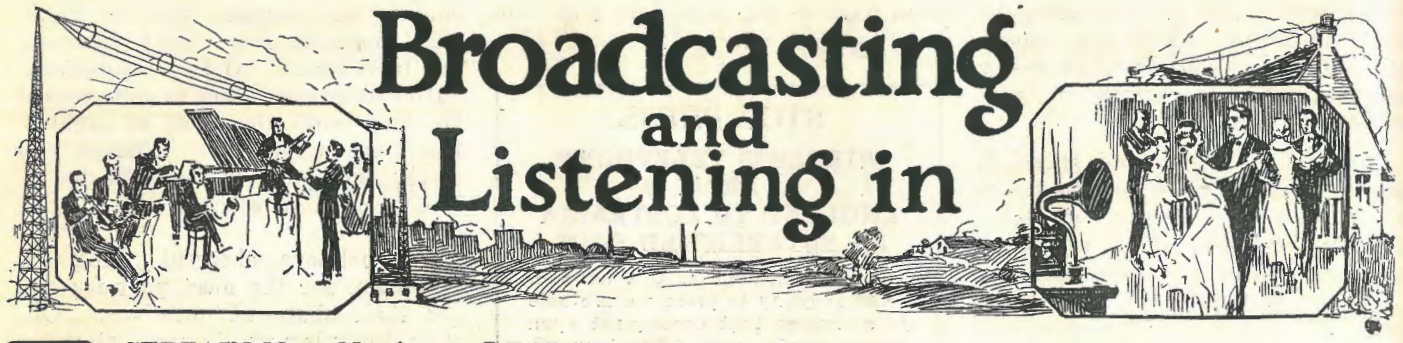
The locks at Sault St. Marie, monster 1,200-foot affairs, which yearly handle more tonnage than the Panama Canal locks, never fail to fascinate the travellers. And the questions! "How long does it take to go through? Do they work the locks at night?" But here is the prize—"Which end of the ship goes in the locks first?" The proper answer to that is, of course, "Yes."

The bellboys, cheerful young college men, for the most part used to get their share of questions. One chap, hurrying up the main stairway with more bags than you would think anyone could carry in one instalment, was stopped by their conversational owner: "Do you ever get tipped?" she inquired naively. I hope he replied "Not as often as we should like, ma'am," but history does not record just what he did say.

How the amateurs do convince their relatives! One woman wrote out a message to her brilliant nephew (she admitted it) and when I looked at the address, she had his amateur call and that was all!



This photograph shows Mr. E. M. Bain, the well-known Senior Operator of the Union S.S. Co.'s R.M.S. "Tahiti," copying press messages for publication in "The Wireless News." Mr. Bain has worked record distances with the "Tahiti's" installation. On one occasion messages were exchanged with San Francisco at a distance of 5,977 miles direct.



Broadcasting and Listening in

A CERTAIN Mme. Martinez, who lives in Vanves, a suburb of Paris, is one of those up-to-date citizens who realize the advantage of being entertained at home, for next to nothing, by wireless telephony. The other evening, the hour for the usual concert having come, she applied the 'phones to her ears, but not a sound could she hear. She opened the box containing the apparatus and was astonished to find it was crammed with pieces of her best linen. She also discovered a much-treasured doll, a relic of her childhood. She summoned her maid, to whom she had given notice that very morning, and the girl admitted that having taken a fancy to the linen and the doll, she concealed them in the wireless cabinet—the use of which she did not know—until she should find an opportunity of removing them from the house. The police have her case in hand. Thus does the march of modern science make the way of the transgressor hard.

* * *

A RADIOGRAM has been received from Rabaul, New Britain, stating that Farmer's Broadcasting Service, Sydney, was received there perfectly on the evening of May 5. The programme including the chimes, the children's bedtime stories, and the musical numbers of the opera "Ma Mie Rosette," came in exceptionally well, the applause of the audience being clearly heard. The distance covered was over 1,800 miles.

* * *

THE latest London novelty is moonlight broadcasting. The first experiment in this direction occurred recently when a crowd at Hampstead Heath one evening heard with ease a programme disseminated from a London broadcasting station.

LEADING Australian vocalists with the ready adaptability which is so typical of them are quickly realising that broadcasting opens up great possibilities before them, and they recognise that it is worth their while to study production from the broadcasting point of view, which, after all, is only accustoming themselves to singing in the deadened and "damped-out" studio in the same way as they would on the ordinary concert platform. This may sound paradoxical, but so unused are some of them to broadcasting conditions that when they commence to sing in the studio with its dead flatness and lack of resonance, they think that they are not singing up to their usual standard or have not their ordinary volume and immediately proceed to force the voice, which, for broadcasting purposes is fatal. Broadcasting apparatus is delicate, and as such must be treated with respect and consideration!

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 little town of Herrick, the terminus of the North-Eastern railway, has lately been enjoying wireless entertainments at Longwood, the residence of Mr. and Mrs. Harold Brumby, using a two-valve experimental set constructed by Mr. B. V. Barnett, of Launceston. Farmer's (Sydney) broadcasting was picked up, and an enjoyable two hours' entertainment provided, the programme including several items from Her Majesty's Theatre by Gladys Moncrieff and Claude Fleming, a baritone solo, a reading from "Oliver Twist," and Farmer's orchestra in a number of items as well as a jazz band.

* * *

WIRELESS has even entered Westminster Abbey. Last month a sermon was picked up by a microphone placed in front of the pulpit and disseminated in various parts of the building by loud speakers.

* * *

ACCORDING to a statement made at the annual convention of the Canadian Land Surveyors' Association, radio is revolutionising exploration and survey work in the Far North. Where formerly the surveyors had to carry a chronometer with which to obtain the correct time to make accurate astronomical observations, always fearing the chronometer might go wrong, they now carry a radio set and get the correct time from Arlington, Annopolis, the Suez Canal, Bordeaux (France), Santiago, Tokio and Nauen.

Melbourne's Big Radio Show

A Triumph for Experimenters and Dealers

THE radio exhibition held by the Victorian Division of the Wireless Institute of Australia at the Melbourne Town Hall last month was a pronounced success and reflected great credit on all concerned in its taking place.

Lasting for five days in which the general public was given every opportunity to familiarise itself with most branches of wireless some important functions were also held and these included a convention of executive officers of Victorian radio clubs, a federal gathering of representatives of all divisions of the Institute in the Commonwealth, an annual dinner and a demonstration and lecture on "The Position of Empire Wireless."

Much interest was aroused by the display of home-made wireless sets—the fine work of many experimenters.

United Distributing Coy., Ltd.

The amateur exhibits themselves were, in a great many cases, made especially for the display and the wiring methods and general design of the sets were entirely in accord with the most modern principles of wireless practice.

Great interest in the trade exhibitors' stands was evinced by the public and among those which called forth most favourable comment were those of "Homecrafts," Messrs. P. A. Morris & Co., Pty., Ltd., Alexander G. Naughton and Norris & Skelly.

A particularly fine display was that of New System Telephone Pty., Ltd., whose stand was an extremely creditable example of all that is best in broadcast receivers while United Distributing Coys., Ltd. exhibited some wonderful designs in "Radiovox" listening-in sets.

Corbett Derham and Co.'s display consisted of Crossby Radio Apparatus. The chief feature was a very compact four valve cabinet (about 15in. x 7in.), and frame aerial with "Timmons Talker" loud speaker, which brought in speech from nearby transmitters with remarkable clearness. The point of interest to the public was the simplicity of control, all adjustments being made by one

(*Continued overleaf.*)

Corbett, Derham & Coy., Pty., Ltd.

variable condenser. Associated Radio Co. of Australia Ltd. had on display an attractive-looking cabinet (type 4-valve set), although they seemed to concentrate efforts more to the advertising of their daily broadcast transmissions, the reception of which was greatly appreciated right throughout the exhibition. Norris and Skelly's Atlas Loud Speakers were conspicuous amongst an excellent display of general radio and electrical accessories. A "Parosovox" cabinet receiver, using four De Forrest dull emitters provided onlookers with good telephony from the various broadcasting stations. A special feature of this receiver was the "Radion" panel, which was of stained ebonite, giving it the appearance of walnut or polished blackwood. P. A.

Associated Radio Coy. of Australia, Ltd.

W. Cumming & Coy.

and four valve sets were on show. United Distributing Co., Ltd. specialised in "Radiovox" cabinet sets, and were demonstrating the reception of telephony with a very complete range of highly finished and attractive cabinet receivers. New System Telephones Pty., Ltd.: The comfort of visitors to the exhibition was well catered for by this company, whose stall was arranged in the form of a lounge, where no less than twelve different types of receiving sets were demonstrated by obliging and capable attendants. These sets varied in design from a crystal receiver to a special De Luxe cabinet set, using five valves. Louis Coen Wireless Pty., Ltd.: This comparatively new firm of radio dealers had an excellent and complete display of radio accessories, prominent amongst which were Morris and Co.: This firm specialised in Kellogg "Symphony" receiving sets, and displayed a complete range of two, three and four valve cabinets. "Homecrafts," P. H. McElroy: This well-known establishment had an attractive display of radio accessories, the chief attraction being an elaborate cabinet, the "Homecra Model Grand," which without aerial or earth has a guaranteed range of 1,000 miles. Eight dull emitter valves operated a loud speaker, which formed a separate unit. Alex. G. Nauton: The unique feature of this stall was that all apparatus exhibited was of Australian manufacture, and it was pleasing to note that it compared very favourably with the most expensive imported apparatus. All accessories and complete one, two, three

P. A. Morris & Coy.

"Radiola" and "Gecaphone" complete cabinet sets and Amplion Loud Speakers.

Prizes were given for the best amateur-made sets and these competitions resulted in the following winners:—Class 1—Best Piece of Apparatus: J. Williams, Ivanhoe (short wave tuner). Class 2—Best Crystal Receiver: J. H. Jackson, Sunshine. Class 3—Best Set Employing Valves: A. J. Stocks, Canterbury, 1; C. Cox, St. Kilda, 2. Class 4—Best Complete Station: J. Hollan, St. Kilda (3JH), 1; N. Chaffer, Essendon (3XF), 2.

One of the most interesting sections, to the lay mind, was that in which many "freak" sets were shown. Considerable interest and amusement was caused by sets which were contained in such articles as a box smaller than that containing matches or in the form of a length of wire wrapped round a pencil to which a crystal was attached!

On the final night of the exhibition the annual dinner of the Division was held at Sargent's Cafe and there amateurs from all parts of the Commonwealth were present.

The controller of wireless (Mr. J. Malone) congratulated the experimenters on the formation of a Federal Council, and stated that this step had been desired by the department. The department wished to promote experimental wireless in every possible way, and would welcome suggestions from the experimenters for the improvement of their conditions.

Mr. L. A. Hooke, Melbourne manager for Amalgamated Wireless (Australasia) Ltd., said that the display of amateur apparatus at the exhibition was one of the most wonderful that he had seen. Research work done by Australian experimenters during the last year had been of the utmost value, and the low-powered tests had surprised the engineers of his company.

On the last night of the Exhibition the Institute's Annual Dinner was held, at which wireless amateurs attended from all parts of the Commonwealth.

Wireless Institute of Australia

NEW SOUTH WALES DIVISION.

AT a general meeting held at the Royal Society's Hall recently, Dr. W. G. Woolnough, D.Sc., delivered an interesting lecture on "Waves, Electrical and Otherwise." He first dealt with water waves and clearly demonstrated the basic principle of periodic motion, namely, that there must be two forces acting at right angles both in direction and time. He pointed out that wave forms might be either simple or complex, and be due either to forced or free vibrations.

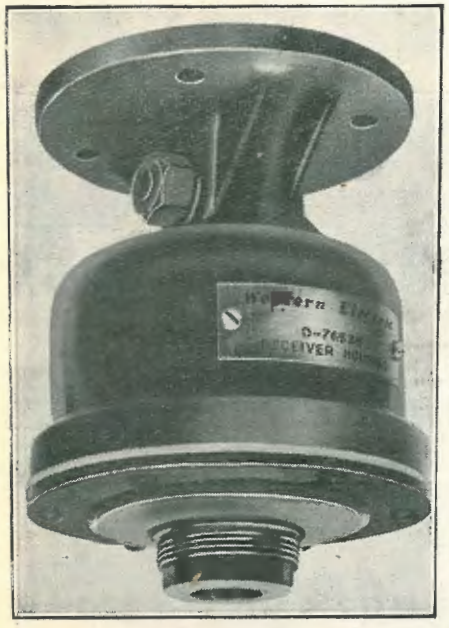
After dealing exhaustively with water waves, he took up the subject of earth waves and followed this by air waves and sound waves. From this point, Dr. Woolnough proceeded to show the composition of waves including harmonics and demonstrated the value and effects of resonance. Here it is interesting to note that it is impossible to play certain notes on the Town Hall organ for any lengthy period without endangering the stability of the roof.

From sound waves the next step was to electro-magnetic waves of which the most common and best understood are the ordinary light waves. He pointed out that the wavelengths which have been investigated with reference to these electro-magnetic waves, vary from 30,000 metres for the longest wireless waves to .00000001 m.m. for the Gamma rays. Beyond this range instruments have not yet been perfected which will detect the vibrations.

Western Electric Coy.'s Public Address System

Heard in Australia for the First Time

PUBLIC speaking plays such an important part in the lives of every community be it Social or Commercial, that in the past it has frequently happened an important speech or address has been unheard by thousands because of the limitation of the speaker's voice to a comparatively small area.



Holder for horn projector.

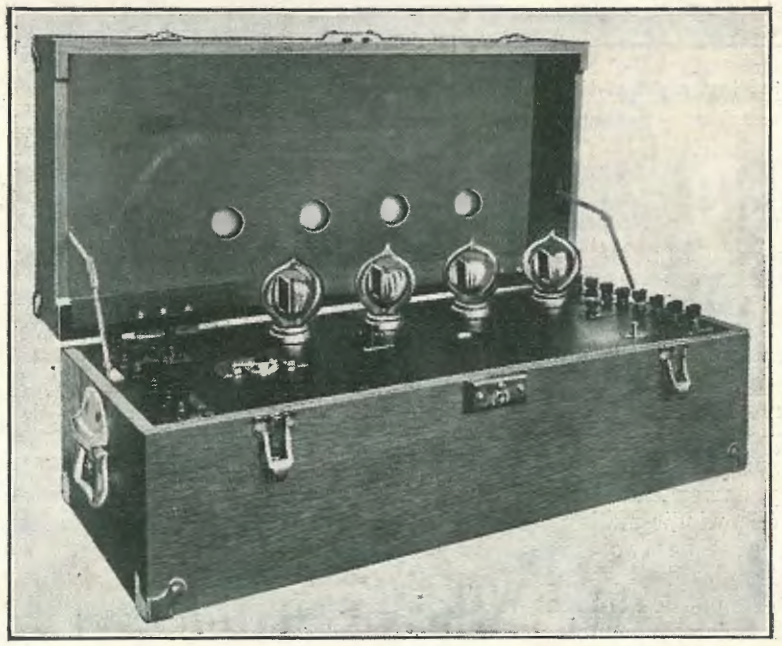
Men and women who have vital messages for the public can always be assured of audiences. As we have stated, the size of such audiences has always been limited by the relation existing between the carrying power of the speaker's voice and the size and acoustic properties of the auditorium; indoors or in the open air. Now, the introduction of the Western Electric Public Address Systems of voice amplification has definitely removed these limitations. This was strikingly demonstrated at the official opening of the Mosman Anzac Memorial Hall by His Excellency the Governor-General, on Sunday, May 4.

A gathering of people, estimated at about two thousand, being unable to obtain accommodation within the Hall remained outside in Military Road. Although under ordinary circumstances they would have been deprived of participating in the Dedication Service, yet, through the use of the Western Electric No. 3 Public Address System, they heard every word, even every inflexion of the voice of His Excellency, and the other speakers, quite as clearly and easily as those persons only a few seats away from those on the platform inside the hall.

An impressive incident connected with the demonstration was the military Guard of Honour, drawn up on the roadway presenting arms, as the Last Post, rendered by buglers inside the hall, was conveyed through the loud speaking projectors to the crowds in the street outside, with such volume as to be clearly heard at the Spit several hundred yards away.

The demonstration at Mosman was unique, for, although the Public Address Systems are very extensively used in England and the U.S.A., this was the first occasion that one had been publicly demonstrated in Australia. The varied programme, which included community singing of hymns, the intonation of prayers and scripture reading, and also a special octette rendition of "Comrades in Arms," in addition to the addresses of the various speakers, admirably demonstrated the scope of the apparatus, which although primarily designed for voice amplification, is not restricted to that alone. It can be used just as successfully for transmitting music from one part of a building to another—in hotels for example—or in conjunction with a suitable radio receiving set it can be used to amplify and distribute broadcasting entertainments, either in large indoor auditoriums or in the open air.

The system used at Mosman, and described in this article, is the smallest of three Public Address Systems developed by the Western Electric Company. The largest is capable of projecting a speaker's voice, with sufficient volume to enable 125,000 people assembled in the open air to hear distinctly, and the second largest covering a distance of one half mile. Despite the enormous volume that can be obtained from these Public



The Amplifier used in the Western Electric Public Address System.

Address Systems, an outstanding characteristic is that the amplified voice or music is perfectly natural and entirely free from distortion. A description of this remarkable system of amplification follows and will doubtless be of interest.

The Western Electric No. 3 Public Address System comprises a sensitive microphone, a vacuum tube amplifier with a control system, loud speaking projectors, and batteries to supply electrical energy.

The microphone, which is exactly similar to that recently used by His Majesty the King at Wembley on the occasion of the opening of the British Empire Exhibition, and as used by Messrs. Farmer and Company's Broadcasting Station, 2FC, for both studio concerts and theatrical programmes, is of the double-button stretched-diaphragm type. It transmits both speech and music with great fidelity, as it is designed to be equally sensitive to all the pitches contained in the musical range. It is so sensitive that it is operated satisfactorily by the voice of a speaker standing from four to six feet away. This gives him ample freedom of movement. Because of its extreme sensitiveness the microphone is mounted in a special housing which protects it from mechanical vibrations which would otherwise be transmitted through the base of the instrument and be emitted as noise by the loud speaking projectors.

The loud speaking projectors used as part of the No. 3 Public Address System consist of a receiver element and a horn. These projectors will give an audible sound from very weak currents. At the same time,

(*Continued overleaf.*)

Note the Microphone on the table.

The Public Address System as used at the opening of the Mosman (Sydney) Anzac Memorial Hall. Note the projectors suspended from the windows.

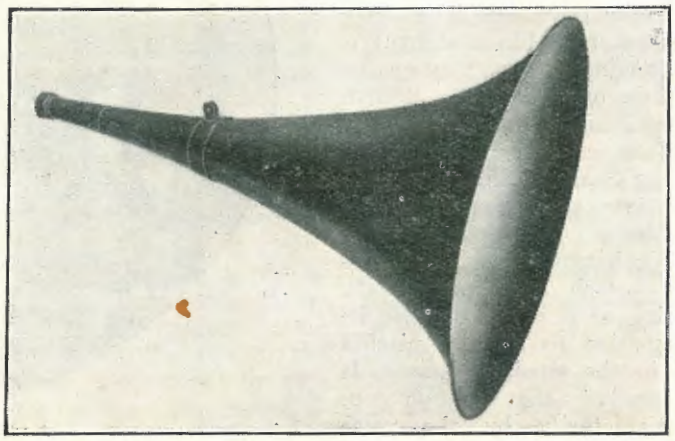
they are capable of handling without distortion a large amount of energy at voice frequencies. This is accomplished by the use of a balanced armature receiver. The energy operating the loud speaking projectors is obtained from a vacuum tube amplifier which magnifies the voice frequency current produced by the microphone so that by the time it reaches the projectors its energy has been enormously increased.

The Microphone.

The amplifier has been especially designed to minimise frequency distortion, and to obtain the requisite amplification throughout the essential range of frequencies without sacrifice of the quality of reproduction. One important feature which contributes to the absence of distortion is the employment of a special arrangement of vacuum tubes and coils for the final stage of the amplifier, two separate vacuum tubes being used in what is commonly called a "push-pull" circuit.

The Public Address System is controlled by means of three switches which are mounted on the front of the amplifier panel. They regulate the current supply to the microphone and from it the flow of the amplifier, the supply for the amplifier itself and the current flow from the amplifier to the projectors.

The company is to be warmly congratulated for its enterprise in providing this demonstration.



A Projector Horn.

"Wireless House" Dance

THE "Wireless House" Social Club has arranged a series of dances for the staff of Amalgamated Wireless Ltd. and their friends. The first function will take place on July 1, at St. James' Hall, Sydney. The arrangements for this first dance are in the very capable hands of Misses F. Coy., T. Wall and Messrs. K. M. Spinney and H. J. Coy.

SUBIACO (W.A.) RADIO SOCIETY.

AT the last general meeting the President, Mr. W. B. Phipps, was awarded the prize of radio goods to the value of 10/- donated by the club's treasurer, Mr. Howard Hiddlestone, for the most members brought along during a given period. *Radio* extends its deepest sympathy to the parents of Mr. Wilfred Gilwhite, a member, who crossed the bar a few days ago.

Take Warning!

THE first prosecution for non-registration took place in the Auckland Magistrate's Court recently, when a lad of 15 years, whose name was not made public, was charged with failing to apply for a license. Defendant pleaded guilty. The Government Radio Inspector stated that the boy had a spark-transmitting set and had failed to apply for a license. It had been decided to prosecute all set owners, both receiving and transmitting, if their plant was not registered. As the present case had been brought as a warning to others, he asked that a penalty should not be imposed.

The Magistrate: Are many of the sets unregistered?

The Inspector: There appear to be a fair number. The majority of transmitting sets are registered.

In admonishing defendant, Mr. F. K. Hunt, S.M., remarked that the wireless enthusiast who failed to apply for a license should remember that he was liable to a fine of £500.

David Jones' 86th Anniversary

Celebration Broadcasted

BY way of introducing what is perhaps the most novel experience that listeners-in and experimenters have been able to avail themselves of, for the first time in the history of Wireless Broadcasting in Australia, let it be stated that an entertainment in which some 3,000 participated was the other evening sent out on the air. The function was the 86th Anniversary of the foundation of the firm of David Jones Limited, of George Street, Sydney, which took the form of a dance and general night of revelry, at the Palais Royal, Moore Park, Sydney, a hall of immense dimensions and particularly high—entirely unsuitable in any way as a broadcasting studio, but nevertheless, this hall was used for such a purpose on May 28, the date of the function. For a month past, Messrs. Broadcasters Limited had been making preparations for the sending out of the programme, and in that connection, installed a land line from the Palais, to their studio in Phillip Street. It was thus possible with the kind permission of the management of the Palais Royal and Station 2BL for David Jones' to "tell the world about it," and let them participate in the wonderful night which their employees held. Music, singing, the shuffling of dancing feet, the many remarks passed, the clapping of hands, and in fact, every sound and movement at the Palais on this night went out. "Uncle George," of 2BL, looked after the interests of listeners-in at the Palais Royal, saw that the microphone was in a good position, and generally kept in touch with the broadcasting studio in order that there should not be a lax moment in the transmission. Speech and music were both amplified at the Palais and also at the studio, and in order that announcements could be heard clearly, these were made direct from the studio. Another interesting feature of the night, was the installation of a loud speaking apparatus in the body of the hall, for the purpose of permitting those present to hear distinctly and clearly from all parts, speeches, singing and announcements that took place during the night.

The credit for this novel arrangement known as the Public Address System is due to the Western Electric Co., who kindly installed the complete apparatus and placed it at the disposal of Messrs. David Jones in charge of their engineer, Mr. Bone.

It is gratifying to know, that in spite of the task being beset by such tremendous difficulties as transmitting a complete entertainment such as this, that the reception was particularly clear and plain. Many 'phone messages were received by 2BL congratulating them on this entirely unique entertainment.

Broadcasting Station for Perth

PUBLIC enthusiasm and local interest have been considerably increased during the last few days on account of the completion of the two 120 feet masts erected by the Westralian Farmers Limited for their five k.w. broadcasting station 6WF, which is expected to be in operation within a few weeks. The two masts are of steel, and are erected on the top of the Westralian Farmers Limited fine building in Wellington Street, Perth. The edifice itself is approximately 80 feet high, thus giving an aerial height of about 200 feet all told. The distance between the two masts is approximately 170 feet. It is understood that the studio has been almost completed. Great care has been taken in the construction, and no expense spared to utilise every invention and device for the elimination of echoes and the minimising of distortions.

N.Z. Company Forming

NEGOTIATIONS are in course of operation for the formation of a Dominion Broadcasting Company to put radio telephony on a sound and permanent basis. The prospectus of a firm with a capital of £60,000 is expected to be shortly issued. Under Government regulations the profits of the concern will be limited; their revenue being derived from a portion of the license fees collected by the Post and Telegraph Department from owners of listening-in sets.

Low Loss Tuners

By S. KRUSE
Technical Editor of "QST."

(Reprinted from "QST")

HERE has developed a most remarkable amount of interest in the design of good tuners lately, but the past few years most of us have been using very, very poor tuners—and most of us would not even believe that they were poor.

WHAT IS A GOOD TUNER?

Let us decide at the start what a good tuner must do—then we can start thinking of the ways to make it do those things. Very well, a good tuner must—

1. Cover the right wave-length range; 2. tune sharply; that is, cut out unwanted signals; 3. be simple and have few controls; 4. not send out a strong carrier wave when receiving C.W. with an oscillating tube; 5. be absolutely reliable, so that the same dial settings will give the same result every time; 6. be low-priced and easy to build.

These are six things that we are going to demand of our tuner. We will now think them over, but at the start I will tell you that, when we are done with requirements No. 1 and No. 2, we will automatically have taken care of the rest.

WAVE-LENGTH RANGE.

The average broadcast receiver fits the broadcast waves. The average amateur tuner is a joke that starts at 180 or 190 metres and goes up (not down) to 700 metres or so. Recently I found that one of the strongest amateur stations in Illinois for years had been using a tuner that would not go below 195 metres; the Heavens know what its upper limit was! Yet the owner of this thing was sure that "the short waves are no good—they never get to us!"

Why is this? Partly it is a "hang-over" from the times when amateurs had a 375 metre special wave-length, and partly it is just plain carelessness.

The effect of over-large coils and condensers is a very bad one. Not only are all short-wave stations tuned in at the bottom of the condenser scale but the extra hardware introduces needless resistance. Note that in the tuners pictured in this article the range does not go above what is actually needed.

If you don't want to make a new tuner then peel some of the extra wire

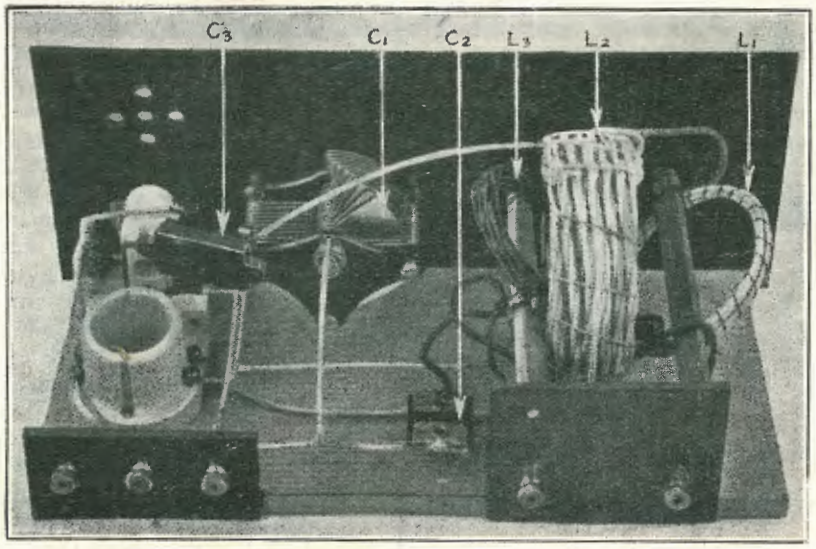


Fig. 1.

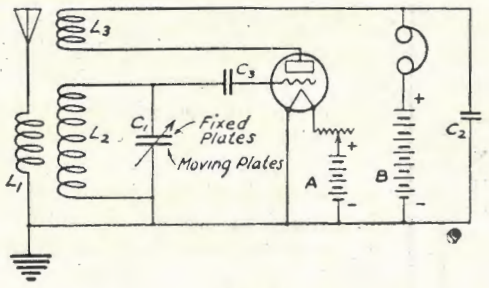
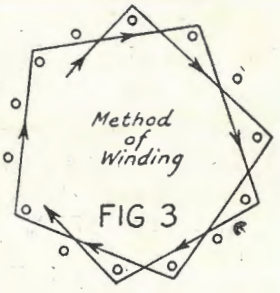


Fig. 2.



A BEAUTIFULLY SIMPLE COUPLER, BUILT BY PERRY O. BRIGGS AND USED AT 1BGF (U.S.A.)

Note the special shape of the condenser plates, suggested by Mr. Hassel; and also the low-resistance secondary coil. This rig has defeated and replaced several expensive tuners.

L1—Primary coil, six turns of No. 12 D.C.C. wire wound on 3in. tube and then tied together with thread to make it self-supporting. The coil is secured to a shaft so that the coupling to the secondary can be varied by tilting the primary coil.

L2—Secondary coil, basket wound around 14 steel wire pegs set into a board on a 4½in. circle. The coil looks as if the wires are twisted together but this is not correct; the winding is made by passing the No. 12 D.C.C. wire outside of one peg and then inside of two as shown in the small sketch. The wire pegs are 3/32in. thick. Before removing the winding from them the turns are secured with waxed thread.

L3—Tickler coil, 12 turns No. 18 bell wire wound on 14 pegs set in 2¾in. circle. This coil is hinged also, being tilted by the tickler shaft.

C1—THE ONLY TUNING CONTROL, Fada variable condenser originally having capacity of 500 micromicrofarads (.0005 mf.), but with moving plates cut as suggested by Hassel.

C2—Fixed mica condenser, capacity 1,000 micromicrofarads or .001 microfarads.

C3—Dubilier grid condenser—no leak used.

Wave-length range with the windings shown is 95-370 metres covering all amateurs and most broadcasting. To raise the range to cover all broadcasts increase the turns in L2 to about 40; the exact number needed will vary, as basket-wound coils cannot be made uniform by hand when using heavy wire. At the same time, it may be necessary to increase the number of tickler turns slightly to make the tube regenerate well on the upper waves.

off your coil and get rid of the extra condenser plates, until the wave-metre tells you that you are just reaching up to 220 metres—then you can get down to 100 without trouble.

RESISTANCE AND SHARP TUNING.

A high resistance circuit will not tune sharply. There are no exceptions to this rule—a high resistance circuit *will not tune sharply*. Put that down as rule A—the first commandment in making any tuner that will be worth using. Just to get it down good and solid let's say it once more, in capitals—A HIGH RESISTANCE CIRCUIT WILL NOT TUNE SHARPLY!!

Both amateur and commercial tuner-makers seem to be having an awful time in learning to believe that simple fact. They do all manner of weird things to get around it, they add more tubes, put in needless controls, invent curious circuits, and very rarely do the simple and sensible thing they should have started with—cut down the resistance of the tuned circuit. But interference increases all the time and even the slowest are now admitting that we must have sharper tuners. And quite a few are beginning to admit that the way to make sharper tuners is to use the same old circuits with lower resistances.

WHAT CAUSES THE RESISTANCE?

Before one can cut down resistances one has to know where they come from. One can divide the resistances that occur in a tuned receiving circuit into four general classes: the coil resistance, the condenser resistance, the resistance caused by things connected to the tuned circuit, and the resistance that is "coupled into the circuit."

COIL RESISTANCE.

About the worst defect of most tuners lies in the high resistance of the coils used. This resistance is not generally in the wire, at least not in the cases where wire larger than No. 16 A.W.G. (B. & S.) is used. The resistance is in the things that are near the wire—the tube on which the wire is wound, the varnish with which the coil is painted, sometimes even the insulation of the wire itself. A perfect coil would be one wound on air and insulated with air. We can't make such a thing but we can come pretty close to it by using wedge-shaped strips as shown in the Reinartz-type tuner of Fig. 4, or by making "basket" coils as shown in the other two tuners. If you absolutely must wind the wire right on a tube, then at least follow the methods given by Mr. Hassel's article (*QST* for December); they are very much worth while. Above all things, avoid heavy varnishes, stranded or "Litz" wires, and soldering pastes. Use good heavy solid wires, tie them into place mechanically instead of pasting them down, use resin for soldering, and keep the coils at least two inches clear of all other parts of the set—panels, condensers and rheostats included.

TAPS FROM COILS.

Tapped coils in the tuned circuit are always poor business; only careful engineering will enable you to avoid trouble. Try to cover the wavelength range with a single coil and if you do not succeed use a separate loading coil, not too close to the main coil.

CONDENSER RESISTANCE.

As long as one uses a poor coil (like those of most tuners) it does not make much difference whether the variable condenser is good or bad. But as soon as one uses a really good coil there is a big difference between a not-very-good condenser and a really good one. This difference does not show up as a great increase on strong signals but in the form of a lot of new signals that were never heard before. In one particular case we found that we could read 6PL very nicely with a single tube when using a good condenser (a Cardwell in this particular test) but could barely hear him with a condenser having thick moulded composition ends. A General Radio 247 condenser gave about the same results as the Cardwell, while it was entirely impossible to hear the signals when using a fibre-insulated condenser.

WHAT MAKES A GOOD CONDENSER?

It is rather hard to set down air-tight rules for recognizing a good condenser by looking at it. In general a good variable condenser is of the air type and is built so that leakage must go through long paths in material that is not too thick or wide. In the case of condensers with end-plates this means that the stator bolts should be far from the rotor bearing and that the end plates

(*Continued overleaf.*)

should be as thin as possible. Where insulating bushings are used they should be large and be turned spool-shaped (as in the large Coto-coil condenser) so that only the rims will touch. Naturally the use of thin insulating washers or small diameter bushings will result in a poor condenser; it will have high resistance and the zero capacity will be high. In any case, the insulating material must be good—black fibre and low-grade compositions are never good, while hard rubber or Pyrex glass can always be trusted. Moulded bakelite is also good, if carefully used, but sheet bakelite does not seem to show up quite as well, although much superior to fibre and compositions.

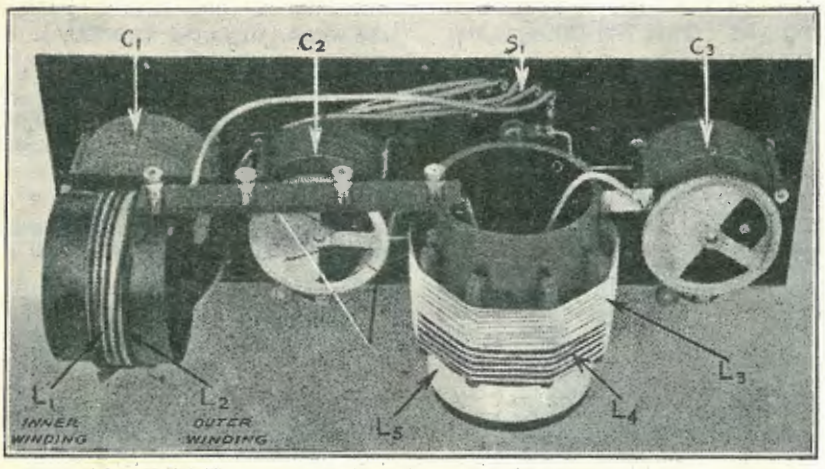


Fig. 4.

Fig. 5.

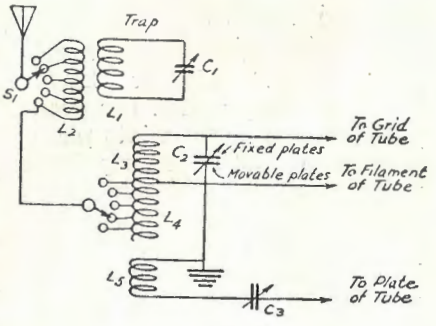


Fig. 6

A CAREFULLY DESIGNED REINARTZ-TYPE TUNER BUILT BY BOYD PHELPS AND USED AT 1HX—1OA—1XAQ (U.S.A.)

A WAVE TRAP IS BUILT INTO THIS TUNER.

L1—Secondary of the wave trap. Thirteen turns of No. 16 D.C.C. wound on a 3¾in. tube.

L2—Primary of the wave trap. Five turns of light single-conductor lamp cord wound directly over L1 and tapped at each turn to the upper switch on the panel. This switch changes the coupling of the trap to the antenna, or cuts the trap out when it is not wanted.

L3—12-turn secondary coil, wound of No. 16 D.C.C. wire over wedge-shaped wooden strips ⅜in. high. These strips rest on the surface of a bakelite tube 3¾in. in diameter. The turns of this coil are slightly spaced.

L4—Five-turn primary coil, wound of the same piece of wire as L3. Turns are spaced so that taps can be taken easily to the lower switch on the panel. This switch does NOT tune but adjusts the antenna coupling.

L5—Plate coil. Eighteen turn of No. 16 D.C.C. wire wound closely on the bakelite tube ½in. below the primary.

C1—Trap-tuning condenser. 1,000 micromicrofarads (.001 microfarads).

C2 and C3—General Radio type 247 panel-mounting condensers with geared verniers. Capacity, 500 micromicrofarads (.0005 microfarads).

Wave-length range with the windings shown is 90-225 metres, no secondary taps being needed for the amateur range. The tuning is practically unchanged with different antennas. Wave-length range of the trap is from 80 to 310 metres, allowing it to cut out troublesome 300 metres sparks such as NAO. To change this tuner to fit the broadcast range, increase the turns of the secondary coil L3 to about 50. Increase the turns of the trap coil L1 to about 30.

MEASURED RESISTANCES.

Different manufacturers measure their condenser resistances at all sorts of frequencies—the result being that no one knows anything. When writing to a maker ask what the resistance is at 1000 cycles, a convenient value which ought to be standard. A 500 micromicrofarad (.0005 mf.) condenser, set at full capacity, should not have a resistance of over 60 ohms at 1000 cycles: a really excellent condenser will not have resistance of more than 20 or 25 ohms at 1000 cycles; assuming the same capacity.

MOUNTING THE CONDENSER.

Always connect the condenser so that the wire to the grid-leak and grid condenser comes from the stationary plates, and the wire to the filament comes from the rotary plates. It is then possible to tune in signals without trouble from "hand capacity," one of the most exasperating things in radio. This connection puts the stationary plates at high voltage, hence the screws that hold the condenser to the panel must not connect to the stationary plates. If they do, get a different condenser. Do not, however, make the mistake of throwing out a condenser, just because it has metal end plates. This construction is perfectly o.k. as long as the metal end plate is not connected to the stationary plates.

RESISTANCES "CONNECTED INTO" THE CIRCUIT.

We have finished when we have made a good coil, mounted it carefully, and connected it to a good variable condenser. The whole affair can be ruined by connecting in a "moulded mud" socket or a camswitch of poor construction. In general, stick to the idea of not having any switches at all in the tuned circuit—it is a bad practice. Avoid composition sockets—they save 6d. and ruin the tuner. Get a good socket that is made of porcelain, hard rubber or moulded bakelite. If you are in doubt as to your socket, write to the maker and ask him what the material is.

When running leads from the "high" side of the coil to the stationary plates of the condenser, and from there to the tube, run them up in the air. Nine times out of ten it makes no difference at all, but make sure.

RESISTANCE "COUPLED INTO" THE CIRCUIT.

When one is finished assembling a good coil, a good condenser and a good socket into a tuned circuit, the whole result can be entirely ruined

by too-close coupling to another circuit which has high resistance. Now an antenna circuit always has resistance that is very high; as a usual thing the resistance is 10 or more times that of a good circuit such as the one suggested. Naturally it will spoil our beautiful secondary to couple closely to such a bad circuit—the signals will be louder but the sharpness of tuning will be entirely spoiled. The closest possible coupling is that obtained in a single circuit tuner—which is enough to account for the well-known broad tuning of that ancient circuit.

There are still other ways of coupling resistance into a circuit; any piece of metal placed near a coil will raise the resistance, so will any large piece of insulating material. Therefore, keep the coils well in the clear as stated before.

SHIELDING THE CABINETS.

Several experimenters complain that their sets do not work as well when in the cabinets as when outside. This simply means that the cabinets fit too closely—they violate the rule that coils must be kept in the clear.

Shielding around the shafts is usually worse than needless—it raises the resistance of the tuned circuits and it is quite needless if the tuner was properly designed. Where the purpose of shielding is to keep out static and such noises the cabinet should be made very large and lined with sheet copper, all parts of this lining being kept at least two inches from the tuner coils.

(*Continued overleaf.*)

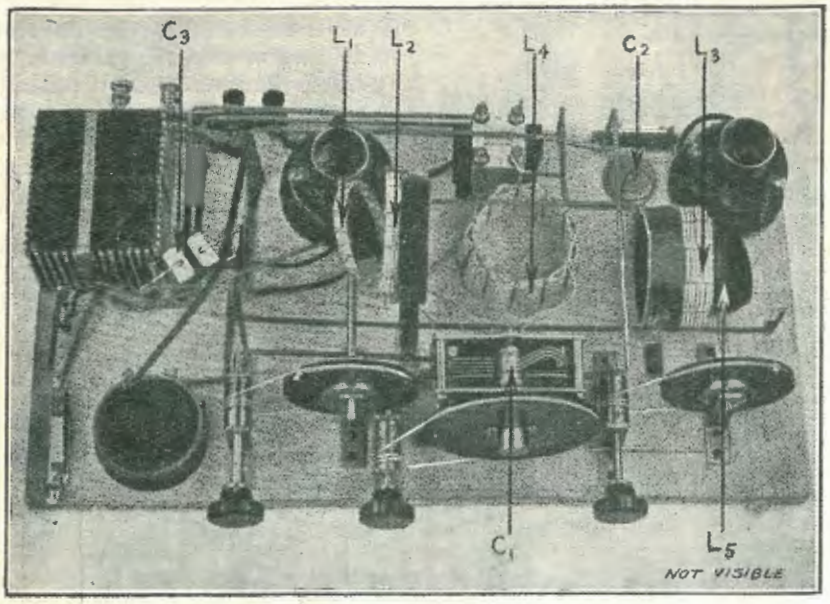


Fig. 7.

A RADICALLY DIFFERENT LOW-LOSS COUPLER BUILT BY F. H. SCHNELL AND USED AT 1MO—1BHW—1XW (U.S.A.).

L1—Antenna coil, five turns, 2½in. diameter wound and mounted as in 1BGF tuner.

L2—First section of secondary, six turns, No. 16 D.C.C. wire, basket-wound as shown below, diameter 3¼in.

L3—Second section of secondary, 12 turns wound same as L2.

L4—Secondary loading coil, 30 turns, wound like L2 and L3. Other positions for this loading coil were tried but it disturbs the tickler action if not out in where indicated. A really satisfactory switching system has not been found; still the results are excellent over the entire range.

L5—Tickler coil, 11 turns No. 28 D.C.C., 2½in. diameter, arranged to be turned by tickler shaft.

C1—Allen D. Caldwell, condenser, three rotary, four stationary plates, capacity about .0002 microfarads.

C2—Grid Condenser mica, capacity, 1,000 micro-microfarads (.001 microfarads).

C3—Mica by-pass condenser, capacity .001 microfarads.

Ratio of belted verniers is 6¼:1 on the secondary tuning condenser, but 4¼:1 on the tickler and the primary coil.

The two-part secondary completely avoids interaction between the tickler and the antenna-coupling. Either one of them can be moved without causing the note to slide around, as is the annoying habit of ordinary tuners.

The grid leak has a resistance of four megohms as a UV-201-A tube is used. Short wave range 63 to 123 metres; long wave range, 113 to 227 metres. For broadcast range L2 should have 12 turns; L3, 20 turns; L5, 22 turns; and C1 a capacity of .0005 microfarads. Other values and dimensions unchanged.

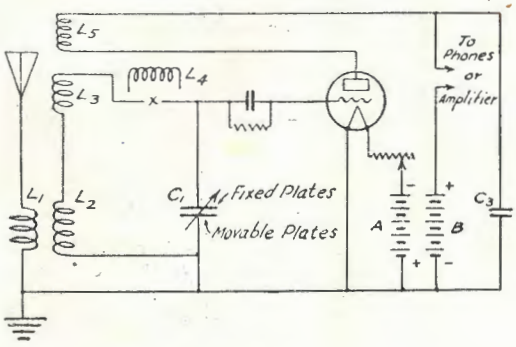


Fig. 8.

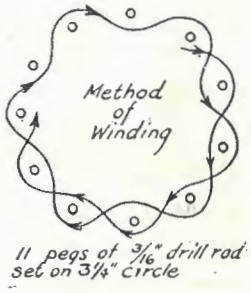


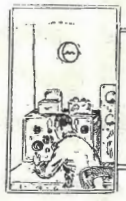
Fig. 9.

CUTTING DOWN RESISTANCE BY REGENERATION.

We are told by text books that regeneration has the effect of reducing the resistance of a poor input circuit. Ballantine does not agree with this and says (page 209, 1st edition) "The fact that the tickler coupling, or rather the feed-back energy, does not compensate for the actual resistance of the grid circuit, at least so far as signal response is concerned..... is also shown by the several curves, representing the effects of various inserted resistances in the tuned grid circuit."

Those who are interested in the theory of the matter may look up Ballantine's Fig. 117. It is only necessary to say that some dozens of us have experimentally checked Ballantine's statement and find that in

(*Concluded on page* 144.)



MOVEMENTS OF MARINE WIRELESS OFFICERS

MAY.

M R. H. A. GREEN, signed off s.s. *Yankalilla* at Sydney, 7th.

Messrs. H. A. Green and R. E. Mann signed on s.s. *Victoria* as 2nd and 3rd operators respectively at Sydney, 7th.

Mr. V. P. Rippingale signed on s.s. *Barwon* at Sydney, 7th.

Mr. F. G. Lewis signed on s.s. *Aeon* at Mebourne, 8th.

Mr. H. M. Watson signed off s.s. *Dongarra* at Melbourne, 7th, and relieved Mr. G. R. Hore on s.s. *Eugowra,* same date.

Mr. C. H. Kidman relieved Mr. E. F. Hayes on s.s. *Wyreema* at Sydney, 19th.

Mr. E. F. Hayes signed on s.s. *Aroona* at Sydney, 12th.

Mr. J. Elmore signed on s.s. *Age* at Newcastle, 10th.

Mr. J. H. Carty signed off s.s. *Merriwa* at Melbourne, 9th, and signed on s.s. *Ellaroo,* same date.

Mr. F. T. Neal signed off s.s. *Emita* at Sydney, 13th.

Messrs. F. T. Neal and A. Truscott signed on s.s. *Arafura* as 2nd and 3rd operators respectively at Sydney, 13th.

Mr. H. Taylor signed off s.s. *Ascanius* at Sydney, 14th, and signed on s.s. *Milluna,* same date.

Mr. C. E. Robison signed on s.s. *Bombala* at Sydney, 20th.

Mr. A. R. Catford signed off s.s. *Bombala* at Sydney, 20th, and signed on s.s. *Moira,* same date.

Mr. A. J. Byrne signed off s.s. *Moorabool* at Melbourne, 10th, and signed on s.s. *Loongana,* 13th.

Mr. N. H. Stuart signed off s.s. *Nairana* at Melbourne, 15th.

Mr. G. J. Flynn signed off s.s. *Chronos* at Melbourne, 15th, and signed on s.s. *Merriwa,* same date.

Mr. G. W. Roland signed on s.s. *Chronos* at Melbourne, 16th.

Mr. H. J. Byrne signed off s.s. *Loongana* at Melbourne, 16th, and signed on s.s. *Burwah,* same date.

Mr. E. S. Bailes signed off s.s. *Burwah* at Melbourne, 16th, and signed on s.s. *Loongana* at Melbourne, same date.

Mr. C. W. Donne was relieved by Mr. R. W. Barnes on s.s. *Oonah* at Melbourne, 19th.

Mr. W. C. Lucas signed off s.s. *Moira* at Sydney, 20th.

Logs WBAP

MR. LES WHITE, of Auckland, New Zealand, recently logged five American stations within an hour. One of these was WBAP, Fort Worth, Texas, which came in quite clearly in vocal and instrumental items.

Queries Answered

A.A.McC. (Sydney): Following is data for transformer to deliver 300 and 12 volts, with primary of 240 volts:—Construct a laminated core with a cross-section of 1½ x 1½ sq. ins. inside winding window, 3 x 3 ins. and outside dimensions, 6 x 6 ins. The primary should be wound with 800 turns of No. 22 d.c.c. on a former and taped with Empire Cloth tape before slipping on to the core. The two secondary windings, if intended for use with Kenotrons as rectifiers, should have a terminal voltage of about 500 to allow for the internal drop. For this voltage, wind two sections with 1700 turns of No. 30 d.s.c. This will give a 1000 volt winding with a centre tap. If a lower voltage is required use proportionately less turns on the secondary. The 12-volt filament lighting winding should contain two sections of 40 turns of No. 18 d.c.c. This will give two 6-volt sections and provide for the centre tapped 12-volt winding. For practical data regarding the construction of transformers refer to previous articles in the "Experimenters' Corner" of *Radio*.

H. J. F. (Adelaide). Q.: Please supply complete winding data for a transformer from 200 volts A.C. down to six volts with taps for 12 volts and 20 volts, used with an iron core.

A.: You should use a closed core transformer as the open core variety requires a very large magnetising current and will heat badly if used continuously. Assuming that you do not require more than about 100 watts output, construct a laminated iron core one inch cross-section, outside dimensions, 4 x 4 ins. and inside winding window, 2in. x 2in. For the primary, wind on 1800 turns of No. 26 enamel and nine turns of No. 18 d.c.c. for every volt required by the secondary.

Q.: Is sketch submitted correct for using the "electric light aerial"?

A.: Yes.

Q.: How does, this aerial affect the wavelength compared with a single wire aerial of about 60-100 ft. long, and would it make any difference being 1000 yards or three miles from the power station?

A.: The equivalent aerial would have a capacity very nearly equal to that of the blocking condensers used in the "electric light aerial." The distance from the sub-station makes very little difference.

H. S. (Forbes). *Q.*: Having a Crystal License, is it necessary to pass twelve-words-a-minute Morse test to obtain a Valve License?

A.: You should write to the Radio Inspector, Macdonnell House, Sydney, and state your case. Considering your distance from commercial stations we do not think you will have much trouble in obtaining the valve endorsement.

PLEASE NOTE.

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.

H. L. H. (Rockhampton). *Q.*: What make of loud speaker would you recommend?

A.: The Amplion is a good all-round loud speaker for domestic use.

Q.: Can you give me some good transmitting circuits as used by some of the experimenters testing with Mr. Maclurcan during his recent trip to America?

A.: See Mr. Maclurcan's report published in *Radio* No. 30, for the latest in transmitting circuits, also last issue's "Experimenters' Corner."

H. H. J. C. (Malvern). *Q.*: Can you give me table showing number of turns for honeycomb coils of various wave-lengths?

A.: See table published in *Radio* No. 15.

W. H. S. P. (Lindfield). *Q.*: Is circuit submitted regenerative, if so, what alterations are necessary to make it comply with the regulations?

A.: If balanced correctly the circuit will be non-regenerative, but by careless handling it can be made to generate self-oscillations similar to every other "anti" oscillation circuit.

A. W. C. (Beaumaris). *Q.*: What gauge wire is mostly used for connecting the various parts of a receiver?

A.: Use either No. 20 gauge bell wire, or No. 16 bare wire, covered with cambric tubing. Several firms sell square tinned bus-bar wire specially for this purpose.

N. W. R. (Leura). *Q.*: Can a bell ringing transformer be used with a combination of electrolytic rectifiers to charge a six-volt, 60 amp. hr. accumulator, charging rate 4½ amp. hours?

A.: You will burn out the winding of the bell transformer if you attempt to draw so heavy a current for any length of time. The continuous maximum for this type of transformer is about 1 to 1.5 amps. If you intend to build a special transformer see answers in these columns. Allow about 15 to 20 volts for the secondary winding to charge a six-volt storage battery. To pass 4.5 amps the plates must not be less than 45 to 50 square inches in area.

H. M. C. (Glenelg). *Q.*: What is the long wave-length station signing XYZ?

A.: You have evidently tuned in on some long wave station carrying out tuning tests, as we have no record of the signals you mention.

Q.: Which is the long wave station which sends each letter twice and uses the old Morse code—apparently very close?

A.: PKX often transmits very slowly in Dutch.

Q.: Using 1 H.F. and 1 Det. valve, LY, POZ, PKX, SUC, etc., can be heard on the large coils. By obtaining smaller coils, could many high-power stations be received?

A.: With smaller coils you will be able to hear stations in India, etc., working on waves from 3000 metres upwards.

Q.: Would erecting a double wire instead of a wire aerial, or adding a counterpoise, improve reception?

A.: The only way in which to get louder signals on the long wave-lengths is to increase the height as well as the capacity of the aerial.

R. V. T. (Rose Bay). *Q.*: I can read and send Morse at eighteen words per minute also I have a fair knowledge of the theoretical side of the subject, am I eligible for position of junior operator?

A.: No.

Q.: What is the salary paid to junior operators?

A.: £12 per month to commence.

Q.: To whom should I apply for appointment?

A.: The Traffic Manager, Amalgamated Wireless (A/sia.) Ltd., 97 Clarence Street, Sydney.

F. G. C. (South Brisbane). *Q.*: Please give number of turns, size of former and gauge of wire for winding primary, secondary and re-action coils from 200-2000 metres.

A.: It would not be efficient to make a single tuning element to cover so great a range. Use honeycomb coils. Two hundred metre work can be done with 25 turn coils and 2000 metres will require about 200 to 250 turns. The other wave-lengths will be in proportion.

Low Loss Tuners

(*Continued from page* 140.)

practice he is entirely correct—regeneration does not make a poor secondary into a good one. The signal strength can be brought up by regeneration but it will never be as high as with a good secondary. Neither will the tuning ever be as sharp as if we had started with a low-resistance secondary; and, finally, the good secondary will bring into audibility some stations that cannot be heard with the poor secondary. These statements are, of course, beyond doubt when operating non-regenerative, but I am insisting that they are also true when operating regenerative and when operating with the tube oscillating.

About the worst form of the "compensation - of - resistance - by-regeneration" idea is the business of attempting to turn the antenna itself into a low-resistance circuit by regenerating into it. In the first place, the desired result does not take place—the thing never tunes sharply—and in addition there is sent out a carrier wave that makes life miserable for a five-mile radius around, for anyone who happens to listen on the same wave-length.

SHORTENING UP THE CONVERSATION.

We have been talking about our two most important points—Wavelength Range and Sharp Tuning. This leaves four more points, but luckily we do not have to take them up; they will take care of themselves, as we shall see.

PLANNING A GOOD TUNER.

If we are to use the lessons learned above it would be a good idea to start by trying them on a very simple tuner; perhaps it will be so much improved that we do not need a more complicated one. The simplest tuner of all is the "single circuit"—but I draw the line at that. It is entirely too good a sending set when it starts oscillating, and it never can be made to tune really sharply, as I have stated above. The next most simple tuner is a two-circuit tuner in which the antenna is not tuned. This has no more adjustments than the single-circuit, but it does tune much more sharply, and it does not transmit so strongly. Then we may add regeneration by means of a tickler or a variometer in the plate. Personally, I prefer a tickler as it has much less effect on the secondary tuning, also because it is far less "tricky" in handling.

WHAT IS NEW ABOUT IT?

What is there new about a loose coupler with a tickler? Not a thing—not a thing in the world. But just the same there will be something very new and different in your radio shack if your coupler is re-built along the lines suggested in this paper. That something will be the results obtained. You will hear stations not heard before, you will forget interference that was terrible in the past. This is not mere talk, it has been plentifully proven by a large group of our members. The old "loose coupler with a tickler" is still with us, and doing beautifully in its new form. In broadcast reception also we can so improve the plain two-circuit regenerative tuner that it will make most of the elaborate new circuits look rather small.

THE OTHER FOUR POINTS.

The other four requirements have now been taken care of, for we have a tuner that is (3) equipped with very few controls, (4) does not send out a strong carrier, because the antenna coupling is low, (5) is absolutely reliable in operation, and (6) is about the cheapest receiver in existence.

Keep this Date Open

THE date for Mr. Alec Hector's lecture on "Radio-activity—Its Educational Value," before the members of the Wireless Institute (N.S.W. Division) has been fixed for Friday, July 4, at the Assembly Hall, Education Department's Building, Sydney, at 8 p.m. All experimenters and members of radio clubs are cordially invited to attend and it is hoped to make this meeting an unqualified success. This early notification of the date is given so that every one may have the opportunity of keeping the evening free.

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