

# RADIO

IN AUSTRALIA  
& NEW ZEALAND

VOL. II.

APRIL 2, 1924

No. 27



MARKET REPORTS ARE NOW BEING BROADCASTED!



COMMONWEALTH NATIONAL LIBRARY  
12 JUL 1926



## THE HELSBY WIRING SYSTEM

**Agents: WILLIAM ADAMS & CO. LIMITED**

175 Clarence Street,  
SYDNEY.

Edward and Mary Streets,  
BRISBANE, Q.

53 King Street,  
NEWCASTLE.

### Wireless Experimenters!

Make sure of perfect connections by using

## "CORALINE" Soldering Paste

ECONOMICAL  
NON-CORROSIVE

1/6 per tin.

**William Adams & Co. Limited**

175 Clarence Street, SYDNEY.

# 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.

## CONTENTS

Copyright Registered.

Volume II.	APRIL 2, 1924	Number 1
		PAGE.
Radiatorial—		
Vol. 2. No. 1 .. . . .		3
Highlights of Radio Broadcasting .. . . .		4
Broadcasting .. . . .		6
Radio Jargon .. . . .		8
The Radio Town Crier .. . . .		10
KGO Again: Australian Experimenters' Triumph .. . . .		11
Broadcasting and Listening-In .. . . .		12
. . . . . The Origin of the Call .. . . .		14
Technical Section—		
New Patents .. . . .		16
Meters on Your Set .. . . .		17
The Radio Workshop .. . . .		17
Amateur Transmitting Licenses .. . . .		18
F. L. Moore Relief Fund .. . . .		21
Club Notes and News .. . . .		21
Personalities .. . . .		22
Queries Answered .. . . .		22
Movements of Marine Wireless Officers .. . . .		23
Italy's New Company .. . . .		24

Published by

THE WIRELESS PRESS

422-24 Lt. Collins St.,  
Melbourne.

97 CLARENCE ST.,  
SYDNEY.

Australasia Chambers,  
Wellington, N.Z.

PRICE, 6d. per Copy.

Subscription Rate: 10/- per annum (26 issues) throughout Australia and New Zealand; Foreign Rate, 12/6 (26 issues).

Obtainable from all Booksellers and News Agents, also the  
N.S.W. Bookstall Co., Ltd.—all branches.

Wholesale Distributing Agents:

GORDON & GOTCH (AUSTRALASIA), LTD.,  
Sydney, Melbourne, Adelaide, Brisbane, Launceston, Perth,  
Auckland, Wellington, Christchurch, and Dunedin, N.Z.

Great Britain:

The Wireless Press Ltd.  
12-13 Henrietta St.,  
London, W.C.2.

Canada and U.S.A.:

The Wireless Press Inc.,  
326 Broadway,  
New York City.



Try a  
Quickheat  
Leak.

## To Dealers and Manufacturers

We carry in stock a complete Line of Radio Parts and Accessories, including:

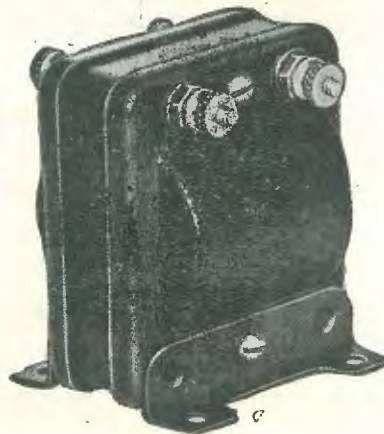
Try a  
Signal Fixed  
Condenser.

**UNITED SIGNAL REMLER FRESHMAN**

**UNITED.....**

UNITED AUDIO  
Type A-1      Ratio 5 to 1

Technically Perfect



**Transformers**

UNITED AUDIO  
Type A-2      Ratio 3½ to 1

Clear Distinct Signals

## United Radio Frequency Transformers

USED BY THE LEADING MANUFACTURERS OF AUSTRALIA

## Radiovox Receiving Sets

ARE SEALED FOR BOTH FARMERS AND BROADCASTERS. SEND FOR CATALOGUE & PARTICULARS NOW READY — Efficient for country use.

We guarantee at any time to change our Sealed Radiovox Sets to an Open Set for £3.

Dealers' Winter orders for Signal, United, Remler and other parts should be placed soon in order to give us an opportunity to protect dealers' requirements. Our sales are now many times larger than expected. Please advise us.

## United Distributing Co. Limited

(WHOLESALE ONLY)

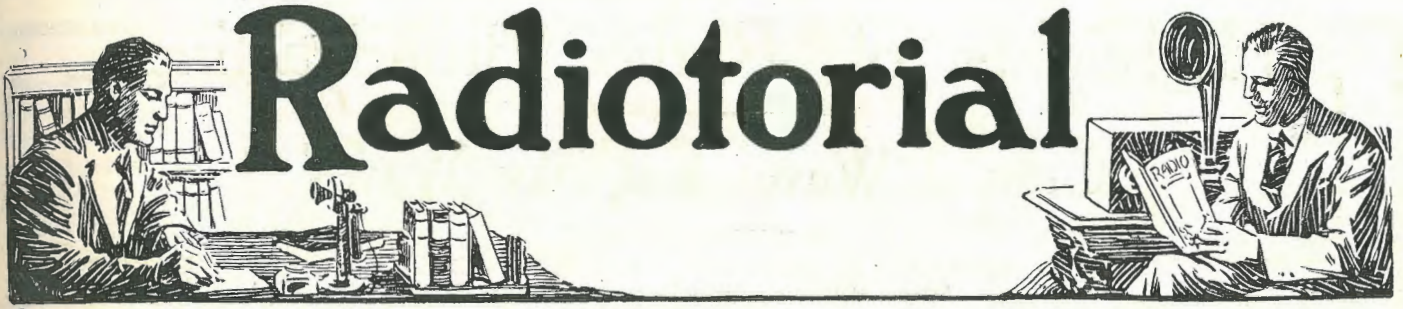
28 CLARENCE STREET, SYDNEY  
BRISBANE

and at

ADELAIDE

592 BOURKE STREET, MELBOURNE  
PERTH





# Radiotorial

## Vol. 2. No. 1

ON April 2, last year, the baby *Radio* made its bow to that section of the Wireless World which is embraced by Australia and New Zealand. It was a very shaky bow and had the babe not taken Wireless as a metaphorical chair-leg to hold on to, there might have been a fall, my countrymen. A course of action had been taken which is perhaps the most hazardous and difficult known to modern journalism—that of completely changing a publication's policy, style, appearance and make-up, and yet endeavouring to set before a large host of readers a journal that, while embracing the New, would not altogether dis-associate itself from the Old; that would combine the virtues of the two and give to subscribers a certain amount of what they have received in the past coupled with those innovations and changes which it was the intention to give them in the future. This was the *modus operandi* of the inauguration of the publication known as *Radio*, and with which was incorporated that undeniably excellent monthly *Sea, Land and Air*.

BUT, as has already been said, the infant *Radio* had three strong legs to stand on, one of which was, so to speak, Wireless, and when, Infant Phenomenon that it was! it learnt to walk and to walk well in its first fortnight, many and dazzling were the hopes and forecasts held out and made for it. Many of those sanguine anticipations have materialised. Many are still to come but *Radio* has already fulfilled a good number of them. To-day, considering the state of wireless in Australia, which, splendid as it is, could be a great deal better, the high cost of production, the circulation, contents, appearance and amount of advertising matter carried, *Radio* can unquestionably claim to be the best wireless and broadcasting publication of its kind in the Commonwealth!

NOR do we take all the credit. Perhaps, there are none to whom *Radio* owes the position it enjoys to-day, so much as to Australian and New Zealand wireless experimenters and amateurs. They have supported it

valiantly and to a man. Among their ranks we have made many enjoyable and, we are proud to claim, lasting friendships. Their interest, help and co-operation have meant a very great deal to us, and we have tried and will continue to try to justify those sentiments we have inspired.

IN *Radio*, "Vo. 1, No. 1," we said that its policy would be, primarily, the advancement of Wireless throughout the Commonwealth, and for that purpose it would cater for the Australasian amateur and experimenter and also that, as an important and logical development of Wireless, broadcasting would be dealt with in an interesting and thorough manner. By the eulogistic letters we receive at every mail not only from home readers, but from those in Europe and America, we feel secure that we have done what we set out to do: *Radio* has kept faith. And none can do more than these two things!

HOWEVER, we do not intend to linger here or in the future on the laurels of the past. There is work to do. Quite a lot. Preparations have insured that a great deal of time and trouble will be taken during the coming issues to make *Radio's* standard even higher. Off our own bat we have no doubt that we can do it. We have done it already. All the same, if we had a little help from another direction we are confident that we could do it better still. Our main difficulty is to accurately gauge the public's taste—strange, conservative, unconventional, changeable, consistent thing it is! Sometimes it is all five; sometimes but a few of these; other times but one; occasionally, none! Surely it is not too much to ask that our readers drop us a line from time to time. Tell us your likes and dislikes concerning *Radio*. No person could be thoroughly satisfied with it. We are not. Self-satisfaction breeds stagnation. After all, Men and Women in the Street, Broadcast Listeners-in, Experts, Amateurs, Enthusiasts and Experimenters, *Radio* is yours. What more natural and logical then, that you should have a word in its compilation?

### **MAKE SURE**

of Receiving "Radio" regularly by placing a standing order with your news agent, or sending 10/- for one year's subscription to:

**THE WIRELESS PRESS, 97 CLARENCE STREET, SYDNEY.**



# Highlights of Radio Broadcasting

## Ground Waves and Sky Waves

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

**V**ERY peculiar things happen sometimes in the receiving of broadcast radio concerts. Every listener, as soon as he gets

1. Late at night he can hear stations hundreds of miles away clearly, while earlier in the evening, or by day, he can hardly hear fifty miles.

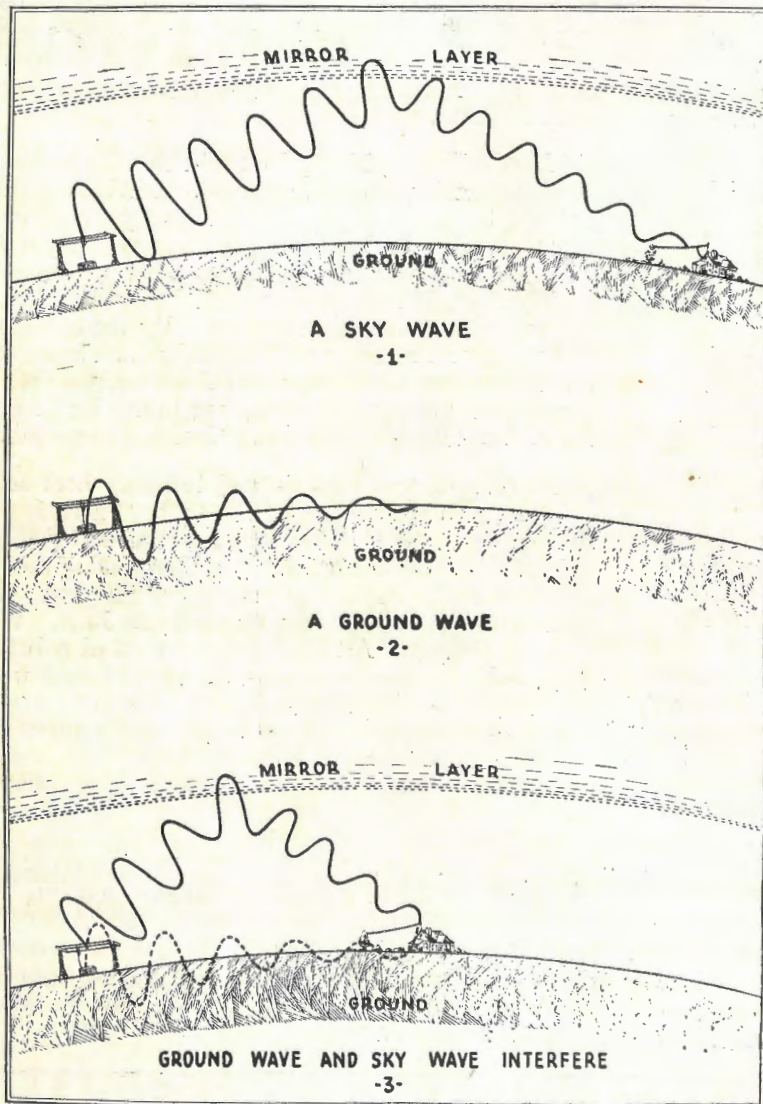
3. Still nearer stations, say twenty-five miles away, will not fade in or out at night or by day.

4. In one part of a city, station 1 in that city will be heard loudly and station 2 in that city hardly at all. In another part of the same city, the reverse will be the case. Outside the city both stations will be about equally loud.

5. A listener in the country will sometimes hear stations hundreds of miles away much better than he will hear stations in a near-by city, say fifty miles away.

Radio engineers have a theory to explain these effects. It can be simply expressed, but it should be remembered that it is not a positively proven theory, but only a very plausible and satisfying explanation of all the puzzling effects just mentioned. It is based on a theory of Sir Oliver Heaviside, the eminent English electrician and mathematician. Heaviside pointed out that, twenty-five or fifty miles up, the air enveloping the earth becomes very rare and is therefore an electrical conductor, just as is the rarefied "violet ray" tubes sold for medical purposes. So that, far up in the sky, there is a layer of conducting air which scientists have called the Heaviside layer. It is also well-known that substances which conduct electricity, such as metals, are good reflectors for radio waves, so that this layer is actually a sort of curved reflector in the sky. It is therefore called the "mirror layer" in this description, for the sake of simplicity.

By day, the mirror layer is spoiled in several ways. In the first place, the brilliant sunlight falling on it causes disturbing air currents and irregularities, so that instead of being a smooth and polished mirror, it becomes a roughened irregular layer of little use as a reflector. Furthermore, sunlight has the property



acquainted with a number of near-by and distant stations, finds that he is puzzled by some of the results he gets. How shall he explain such things as these:—

2. He will hear some stations at night very steadily, and particularly the distant ones, but some other nearer stations will "fade" in and out rapidly and in irregular fashion.



of converting rarefied air into a sort of "fog" which, while clear and transparent to ordinary light, does absorb radio waves vigorously. By day, the mirror layer is rough and mist-covered.

Probably most listeners have never speculated as to whether the radio waves which reach their receiving aerial come sweeping along the ground or whether they are shot down to the aerial wires after reflection from a mirror layer in the sky. Yet actually radio waves arrive by either or both of these dissimilar routes.

In the illustration of this article, part 1 is a general sketch of a sky wave. It leaves the radio transmitting station at the left, passes obliquely up until it strikes the mirror layer far up in the air, and is then reflected back again to the earth, arriving finally at the receiving station to the right. It may be mentioned that these sky waves do not die down very rapidly because their path is entirely through the air and they are but little absorbed or interfered with in their message. So that we should expect sky waves to carry radio messages loudly over great distances, particularly at night when the mirror layer is smoothest and most effective, and when the absorption of the radio waves by the "electrical fog" caused by sunlight is absent.

Part 2 of the illustration is the other sort of wave which may reach a receiving station. It is a ground wave, and clings closely to the earth. Naturally such a ground wave encounters all sorts of energy-absorbing obstacles in its path, which rapidly reduces its power and the loudness of the signals it can produce in the receiver. Such objectionable obstacles are steel-structured buildings, mountains (particularly those containing metal deposits), and to a less extent forests of large trees. The result is that a ground wave rapidly dies away and this has been indicated in the diagram.

To take typical figures, which are very roughly correct for an average broadcasting station in the eastern portion of the United States, the ground waves are very strong near the transmitting station for the first few miles and rapidly die down, becoming relatively quite weak at a distance of a hundred miles or so.

The sky waves, on the other hand, are hardly received at all near the transmitting station since their path is above the earth until after they have been reflected back to the ground. They come back to the ground and begin to be useful at distances of about seventy-five miles from the transmitting station, and beyond that distance they are readily received with good intensity for distances of several hundred miles. It amounts to this, to summarize: for distances up to about seventy-five miles, the listener is depending al-

other. Furthermore, as the mirror layer shifts slightly from moment to moment, the ground waves may sometimes weaken or annul the sky waves, and thus cause fading. We can therefore explain the five puzzling effects mentioned at the beginning of the article as follows:—

1. Night reception over long distances is accomplished by the slightly absorbed sky waves, and these cannot exist by day because of the absence of a smooth mirror layer and the disturbing presence of sunlight "fog." So that day reception is by ground



Although at first sight this might appear as very reminiscent of the "Belle of New York," the picture tells a story of a far more practical nature. English Salvation Army Lassies are now taught to make Radio Apparatus. Here are shown some with the very fine fruits of their labour.

most entirely on the ground waves for his signal. From seventy-five miles to about two hundred miles, he gets both ground waves and sky waves. Beyond two hundred miles, most of his reception is dependent on the sky waves.

For locations where both sky waves and ground waves are received, reception may become very erratic with marked "fading effects." Part 3 of the illustration shows how this may come about. The two sets of waves, arriving at the receiving station by different paths, may help each other or they may actually annul each

waves, which do not reach out powerfully nearly as far as sky waves. This partly explains the superiority of night reception.

2. Night reception from very distant stations is by means of the sky waves only, and is therefore comparatively steady. Night reception from stations roughly from seventy-five to two hundred miles away is by a combination of sky waves and ground waves, and therefore fades in and out as these two sorts of waves interfere with each other.

(Continued on page 24.)



# Broadcasting

## Position Reviewed

(By "Observer.")

IN considering the wireless broadcasting movement, it matters not what view may be expressed regarding the adoption of any particular scheme, the basis on which all discussion must rest is that of finance. The providing of a broadcasting service really amounts to the providing of an amusement and educational ser-

vice in it, is considerably more difficult than is the case with ordinary undertakings.

America, in introducing broadcasting to the public, did so in a manner which was found to be temporarily successful, mainly owing to the huge population of the country and also to the extraordinary manner in which

the entire continent, and millions of pounds' worth of apparatus was sold. The profits made from the sale of this apparatus enabled the radio companies to maintain the stations, but it was only a question of time before the demand slackened, profits decreased and consequently many broadcasting stations closed down. From the point of view of the owner of a receiver, this state of affairs was by no means satisfactory. Latest advices from America have indicated that much discussion is now taking place regarding the manner in which funds must be raised to enable broadcasting to be carried on.

In England, where control was centred in one company and where it was hoped to control the movement by the levying of fees on licence holders, loop-holes were left, and for many months broadcasting was in anything but a healthy condition. This state of affairs existed in spite of the huge population of Great Britain, and when the question was considered in Australia, the view was immediately expressed that with a much smaller population the revenue shortage would also be marked to a very much greater degree. Another point to be considered was the question of the number of stations which would be required. It would obviously have been unfair to demand a broadcasting fee of a dweller in a remote country district and then to erect a station at some distant point and provide a service which would not be audible to him. Several stations would have been necessary, the cost of these would have been very great, and the fees which it would have been necessary to charge would consequently have been too great to enable many people to "listen-in." This then, was the opinion which was expressed at the conference, and was generally taken as being a reflex of the general opinion throughout the wireless world.

At the time that wireless broadcasting was mentioned there was not a



The Broadcasting of "Grand Guignol" drama is now quite a common thing in Europe. Here is shown how the "Effects," so inseparable from Entertainment of this nature, are created by the members of the company to be immediately placed "on the air" and heard by hundreds of thousands of listeners.

vice. The establishing of such a movement costs a good deal of money, its maintenance when once established is also very expensive, and, unlike ordinary amusement or educational undertakings, the manner in which revenue may be secured to finance a broadcast venture and to make it an attractive proposition to the man who is willing to invest capital

the typical American is fired with enthusiasm over a new and novel movement. Big manufacturing companies spent many thousands of pounds in erecting large stations from which, at a great cost to themselves they broadcasted programmes. Everybody was at liberty to "listen-in" and needed to pay no fees. The radio fever spread like wildfire throughout



great demand for it on the part of the experimenters. They were being catered for by fellow-enthusiasts who supplied them with gramophone, and occasionally, orchestral music free of charge. Now, however, it is safe to state that the position has considerably changed, and, although the genuine experimenters are still not wholly taken up with broadcasting, the vast majority of those holding experimental licences to-day may be classed more in the nature of broadcast listeners than experimenters.

The Australian broadcasting scheme which was adopted by the conference, held last year, to specially consider the whole question, was almost unanimously adopted by the representatives of the companies which attended the meeting. It was certainly criticised in circles outside the Australian wireless world. A visiting scientist attacked the scheme through the columns of the press, but the wireless traders as a whole were not prepared to subscribe to his views and were content to view the scheme as satisfactory and one that should be given a fair trial.

During recent weeks, however, a section of those interested in wireless has claimed that the present sealed receiver system is not all that could be desired and that it should be amended and some other plan substituted. The main cause for complaint was that the sealed receivers would not function as well as an open receiver. A test conducted some few days ago showed that a properly constructed sealed set is even more efficient than an open set, and the claim has now been made that the public has not taken to the sealed receiver as well as might be expected. The Moss Vale test was surprising in more ways than one. It demonstrated the fact that, with one or two exceptions, there are very few among the smaller wireless traders to-day who possess the technical knowledge necessary for the construction of an efficient set, and also very few who possess a full understanding of the broadcasting position and who are prepared to display any breadth of vision at all regarding the movement.

To those who have given broadcasting a good deal of thought during recent years the problem is by no means acute or complex. It is now

being recognised more and more each day that if a high-class broadcasting programme is to be maintained, then those who desire to listen to the speech and music must be prepared to pay for the entertainment they receive. The present regulations have been drafted in an attempt to commercialize broadcasting, to make it a proposition which will ensure returns accruing to the man who invests his money in a broadcasting station, and who provides a broadcasting programme. If the system fails, and some other system is to be employed, it must and can only be a system which will ensure the company which has provided the services receiving payment for the entertainment it gives. No reasonable man who pur-



chases a motor car expects the motor company to provide him with free petrol. If a gramophone is bought the owner does not expect free records for ever. Similarly, the buyer of a broadcast receiver, if he desires to obtain regular and high class programmes, must be willing to pay for them.

It is only fair to state that, with hardly an exception, this view is realised and accepted by most broadcast listeners throughout Australia. Furthermore, there seems to be a growing tendency among amateurs to view the matter from the same angle, and during recent weeks it has been quite a common occurrence to hear amateurs who, months ago, would have bitterly opposed any broadcasting charge being imposed on them, openly advocate the allocating of a broadcast fee to all licence-holders. The reason is not hard to find. In

the past the true meaning of broadcasting has not been known to Australia. During recent weeks, however, with the commencement of operations from a broadcasting station on which thousands of pounds have been expended, with the transmission by wireless of lectures, theatrical programmes, band recitals and other features, listeners have realised the vast possibilities of wireless, and have, without any hesitation, agreed that the programmes are worth paying for. The ease with which it has been possible to obtain a licence to listen to this class of broadcasting on an experimental basis and free of charge has, however, led hundreds of persons in this State alone to apply every month.

The Government's position is a difficult one. It must discriminate between the broadcast listener and the experimenter. The former it must compel to pay a fee and to take out a broadcast licence, the latter it must help in every possible way. Examinations have been instituted, but these have been of a very easy nature and many hundreds have received licences.

Whatever system comes or goes, wireless itself is too vast and important a matter to be allowed to become a failure. Those who advocate open receivers may have certain points in their favour, but it must be remembered that small traders, who have not invested any capital in large broadcasting concerns, can hardly expect those who are prepared to build large and efficient stations to provide programmes and so build up a wireless business for them. The matter could, of course, be surmounted by a royalty on the sale of apparatus, but it is questionable whether this would act efficiently. The point of view of the general public should be one of sympathy. It is quite easy to make a sneering remark about "profit-seeking broadcast companies." In the various States in Australia to-day many thousands of pounds have been and are still being expended on wireless services. No return is being secured at present, but the pioneers of so great a movement feel sure that Australia will shortly realise the value of wireless. Surely it is only reasonable to quietly support the efforts of these pioneers rather than to place obstacles in their way.



# Radio Jargon

By GEORGE H. CLARK

Reprinted from "The Wireless Age," America's Foremost Radiophone Review

**T**HERE is nothing more needed in radio to-day than a large dose of common sense. With the advent of the radio listeners, knowing little of the theory of their new play toy, and therefore credulous in the extreme, has come about an era of more or less deliberate hokum in radio which is doing the art a lot of harm.

The press of to-day is filled with a weird jargon as incorrect as it is weird, that would lead the newcomer to believe that variometers and dualateral coils and honeycombs and spider-webs are all as different as

Coils should be described in terms of their inductance in millihenries. Condensers should likewise be referred to in terms of their maximum capacity. Further reference to the two devices as variometers, or variable condensers, is permissible. All this has been standard in the radio art for many years. The newcoming jargon is intended definitely to confuse and fool the vast army of radio beginners. There is no defence for this.

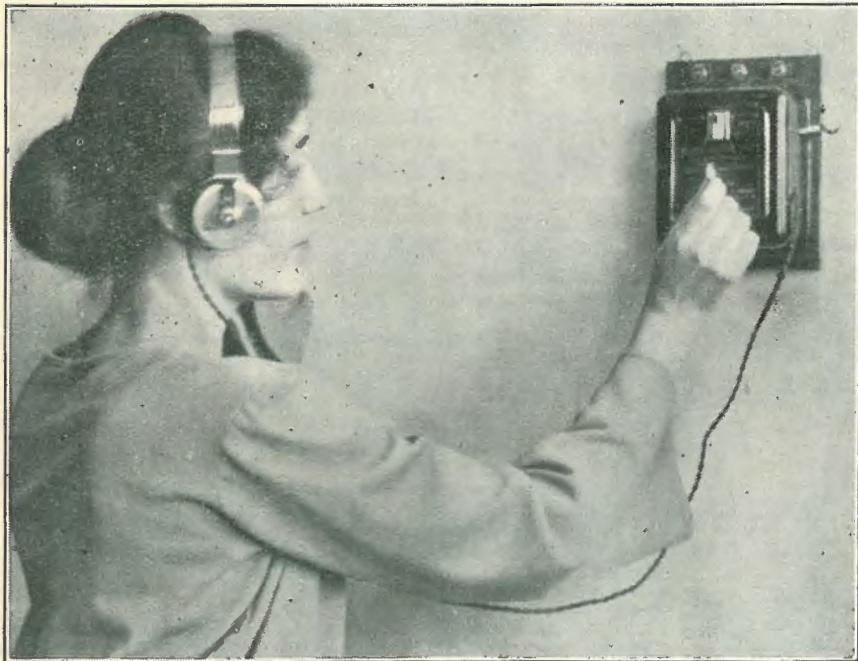
Radio in general is simple. The laws that govern its circuits are all

variocoupler was a piece of apparatus having no feature in common with any other form of inductance. Perhaps the publications have not deliberately aimed at confusing the public, but long contact with the puzzled experimenters who cannot connect up a circuit containing honeycomb coils because their only available diagram shows cylindrical ones has made me clearly see that there must be some conspiracy against the beginner, for no one is trying to lead him out of the obscurity where he is mired.

The magazines are full of freak data concerning antennas. We read of bed-spring antennas; of umbrellas as antennas; of winding a few turns of wire around one's waist and going out as one's own tower and aerial. All these freak antennas convey to the beginner the idea that each has peculiar and special merits, whereas the actual facts are, that each may best be described as having its particular defects.

The actual facts are that it is almost impossible to receive radio signals, if we connect our receiver to any metal object whatever, as long as it is ungrounded. Radio waves are constantly striking our electric light lines, our telephones, the steel structures of our buildings, the Brooklyn Bridge, the "L" structure, the third rail (although no one yet has suggested plugging in on it), every fence wire and metal clothesline in the country; every tree! Some of these are good antennas, some are bad. But the general law that Dr. Austin has pointed out is that the antenna must be well insulated, that it functions better the higher it is, and that for a given wave length it has a certain best length.

What is an antenna? Any insulated conductor which is above ground and which you connect to a receiver. Of course, a bed-spring is an antenna, and you would get as good results if you ran the lead from your set under the bed and did not connect it at all. Of course, the electric light wires are antennas, to some extent. But if a bed-spring antenna will give you



What is she doing? About to treat herself to Three-pennyworth of Radio Concert! It is safe to say Apparatus of this kind will soon be as common in Australia as the Ubiquitous Weighing Machine.

Ford tractors and Peach Melbas. Radio enthusiasts are led to speak of condensers as 47 plate and 23-plate devices, which is as correct as describing a coin by saying it contains silver, and which is reminiscent of the real old days, when nothing was known about electricity, and when a condenser was described as a "quart jar." To-day such loose and in cases incorrect terminology is absolutely indefensible.

well known and there are not many of them. Dr. Austin, the tireless physicist of the Navy Department, has done much to make the fundamentals of radio intelligible to anyone who can read ordinary English, and Professor Pickard, pioneer radio inventor, has done much with his tables which make radio calculation easy. But against these few is the vast army of modern publications which would make it appear that a



signals, a wire running from your attic window to some tree a hundred feet away will give you very much better signals! There is no doubt about this. It is clear and well-known.

Of course, two nails driven in a tree will pick up signals, but if you forget the partial conductivity of the tree and insulate your lead wire at the nail, using the tree as a tower and the wire as an antenna, your signals will be many times louder. So I leave this message. Any wire or metal object that is insulated will receive radio messages. The best antenna is a single wire, run as high as you can run it, and with a length approximating a hundred and fifty feet over all. Mystery here is replaced by common sense.

When we come to circuits, here is confusion! Many years ago, when only the crystal detector and the electrolytic were known, and when Armstrong was playing ball in the back lot, a book was gotten up entitled, "One hundred circuits." Out of this number, twenty-seven were actually inoperative, for simple reasons such as the telephone short circuited and things like that. The others had all available permutations and combinations written into them, in one case the stopping condenser being on the right of the detector and in the next on the left. There were in all only eight circuits that were at all different. To-day, the vast number of circuits that clutter our radio press are merely repeating with Armstrong's aid the mazes of the past.

Professor Pickard has been in radio since radio began. He knows several things that lots of others do not know. One thing he possesses is common

sense. He was considering the Armstrong super-regenerative circuit one day, and he noted that coupling between primary and secondary could be obtained magnetically, capacitatively, by direct coupling, and so on. Likewise the feedback principle could be attained by the ordinary feedback coil, by plate variometers, by the Western Electric two-condenser method, and so on. Lastly, the grid could be biased in different ways. Combining these various degrees of freedom by the ordinary arithmetical laws of combinations, he obtained almost a hundred ways of setting up the Armstrong circuit. More than that, he actually set them up, and found that all were equally operative—and difficult! This number of circuits ought to supply that portion of the radio press that is willing to deceive the public for some weeks. One of these circuits ought to be called, in all due deference, the Pickard circuit!

Then when it comes to schematic diagrams, everyone seems to consider that unless a schematic diagram contains a horde of jacks and double-pole double-throw switches it is not worth printing. There is quite an art in schematic diagram work, the underlying idea being to show the actual features of the circuit in as simple a way as possible. This is apparently unknown to much of the modern radio press.

The real facts of the case are that much of the radio press of to-day is proceeding on the incorrect principle of government by a minority. A couple of years ago, the amateur was in the saddle, and to the amateur complexity is indeed dear. To-day, the ranks of the amateur are about

as unity compared with ten for the radio listener, and the latter is gaining day by day at a far more rapid rate than the former. The amateur, I hope, we will have with us always. He forms the nucleus from which we professional Armstrongs and Godleys graduate. But some one must recognise that for the newcomer, who does not even speak the technical jargon, the present complication in the press merely confuses while it does not enthuse. For him there must be a Moses, leading him out of the wilderness with real facts, simply stated, with the fundamentals of this wonderful new art stated in terms of his understanding. Then, and then only, we will have common sense in radio.

## Lonely Lives

WHAT it means to have a radio outfit and be able still to keep in touch with the world, when one is "buried" in a far away corner of the earth was feelingly told in a letter received by WGY, the Schenectady station of the General Electric Company.

The woman who wrote, stated that she lived on Orr's Island, Me., and that she was looking forward to a long and monotonous winter. There was one other family living near her, but with her's and the other, the total population was only five. Sometimes a week would pass without seeing a soul and, through the fierceness of the weather, being able to talk to even the neighbours.

The set was small and included one lamp, three dry cell batteries and two head sets.

## Burgin Electric Coy. for Quality Goods

### VACUUM TUBES.

Detector-Amplifier	W.D.11 with socket (.25 amp.)	39/-	Detector-Amplifier	U.V.199 (.06 amp.)	42/6
"	" W.D.12 (.25 amp.)	42/6	"	" U.V.200 (1 amp.)	35/-
"	" Mullars "ORA" (.65 amp.)	20/6	Amplifier	U.V.201a (.25 amp.)	42/6
			"	M.O."R" (.6 amp.)	25/-

We have large stocks of De Forest Inductance Coils, etc., also Chelsea Condensers, Vernier Variometers, Variocouplers, Kellogg Rheostats, Tube Sockets, Vernier Variable Condensers, in fact we have a most varied stock.

Call at our Sales Dept., or send for our list to

## BURGIN ELECTRIC COY.

1st FLOOR, CALLAGHAN HOUSE, 391 George Street, SYDNEY.



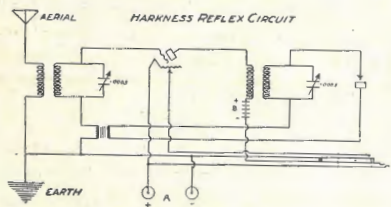
# The Radio Town Crier

**T**HE accompanying illustration shows a gigantic radio loud-speaker which may, in the future, be known as the Municipal Announcer. Mr. H. Gernsback, the editor of *Science and Invention*, New York, writes that experiments carried out during the last few years have shown that by the means of huge horns and vacuum tubes the human voice will be so amplified that it will be possible to hear it over a radius of from three to four miles while every single word will reach the hearer distinctly.

**T**HE idea of the Municipal Loud Speaker is that huge sky-scrapers as shown would be fitted out with a number of non-vibrating metallic horns pointing towards the earth. Being affixed in this position they would direct the sounds towards the streets and lower buildings and would also not allow the entry of rain or snow. Of course, it is not necessary

the whole city would hear every word. It would merely be a matter of opening our window and every word of a mayoral or political speech would come instantly to our ears. **I**N the case of the apprehension of evil-doers the apparatus would be of tremendous utility. If a robbery or a murder were committed police headquarters could immediately

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

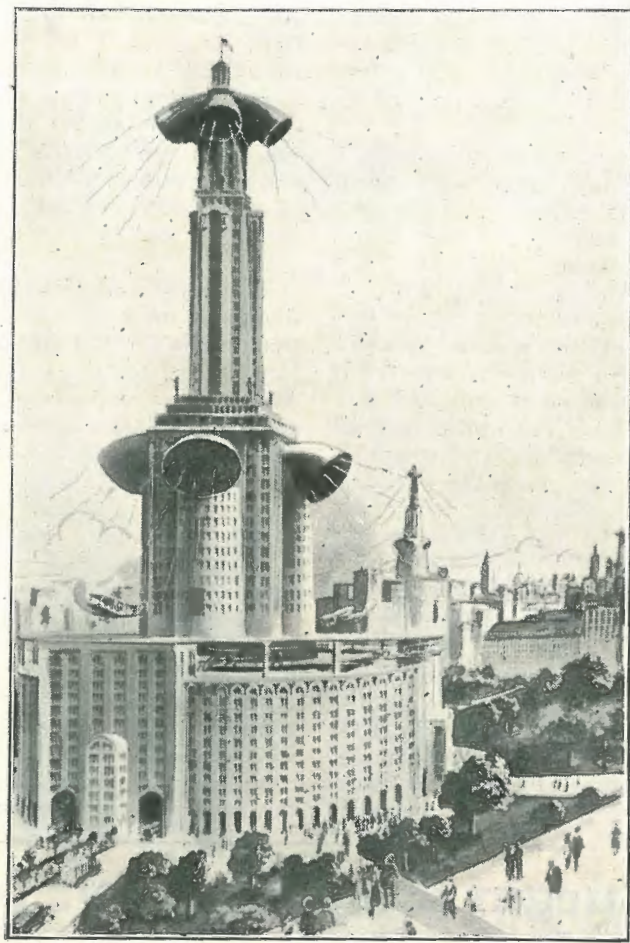


A great deal of interest is now being taken in the famous "Harkness" Circuit. It is simple to operate and very effective, combining the purity of crystal reception with the loudness of the Valve. Mr. Cooke's advice about this Circuit is at your disposal.

The following material is required:—

2 ½ 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.



As the Radio Town Crier of the Future may appear. There will be a good deal of dissimilarity between it and the Crier of Charles Dickens' Time!

that the horns would only be fitted to sky-scrapers, they could be affixed to our present buildings but it is thought likely that a new type of architecture will be evolved. **T**HE uses of these huge speech amplifiers would be legion. Any news, either of civic or national importance could be broadcast so that

broadcast the news of the outrage and a full description of the wanted man so that every householder in the vicinity could be on the strict Q.T. for the law-breaker. The great secret of its undoubted success in this direction would be the fact that the information would be broadcast *instantaneously!*



## KGO Again: Australian Experimenters' Triumph

SINCE "Radio" No. 25 appeared on the news-stands containing the announcement that KGO, a new broadcasting station at Oakland, California, had been "put on the air" and reports were called for from any Australian experimenter who might receive it, most of our time has been spent in reading them!

Those Australian experimenters who have logged KGO are a credit to the movement they support, and so ably represent. It would seem that immediately they became aware exclusively through "Radio" that a large broadcasting station had been opened nearly half round the world away and that there was a possibility that they might "log" it, they simply and quietly set to and did it. How splendidly typical! "Radio" feels very proud of the Commonwealth Wireless Experimenters.

Pressure on our space precludes the publication of all the letters telling of KGO reception, but further reference in another column is made to this matter, while we here append extracts from two typical letters, one from a firm, the Burgin Electric Company of Sydney, and the other from a real dyed-in-the-wool experimenter who, on his "two-bulb-baby," receives almost anything in the air!

Burgin Electric Co.,  
352 Kent Street, Sydney.  
March 19, 1924.

THE Editor,  
"Radio," Sydney.

Dear Sir,—The following report of long-distance wireless broadcast reception will probably be of interest to you.

The Burgin Electric Co. have received from their agent at Braidwood, N.S.W., Mr. Garnet Maddrell, the following report:—"Last Sunday night, by wireless I heard music and speech from America. I tuned into the above at 6.40 p.m. and listened to an orchestra (an excellent one, too) until 7.5 p.m., when

I heard the following announcement:—"KGO, California, testing. Pacific time, 1.4 a.m. Selections played by — Hotel Orchestra, San Francisco." The name of the orchestra was blotted out by the only small burst of static occurring during the time. I obtained this result on a five-valve set built by Amalgamated Wireless (Australasia), Ltd. The music could be plainly heard on the loud speaker by two or three people in my experimental room."

Yours faithfully,  
Burgin Electric Co.,  
R. BURGIN,  
Manager.

Here is how KGO came through to Mr. A. E. Wright, of Scarborough, on the South Coast of New South Wales:—

Scarborough,  
South Coast, N.S.W.  
March 16, 1924.

Dear Sir,—I again heard KGO from 6.45 p.m. to 7.5 p.m. Orchestral items came in, and I must say I heard some very splendid music. The concert seemed just one long item. No sooner did the announcer call "KGO, Oakland, California," than away went the orchestra at full blast. The series of items ended with "KGO, Oakland, California. This concludes — (static) KGO, Oakland, California, signing off. The time is now 1.4 a.m., Pacific. Good morning." This coincided with 7.5 p.m. local time.

I used only two valves and the way in which everything came in surprised even me—which is saying something where my set is concerned!

This is the fourth time I have heard speech and music from California.

Yours faithfully,  
A. E. WRIGHT.



### STROMBERG-CARLSON

SUPER No. 2-A Radio Headset SENSITIVE

£2/5/-.

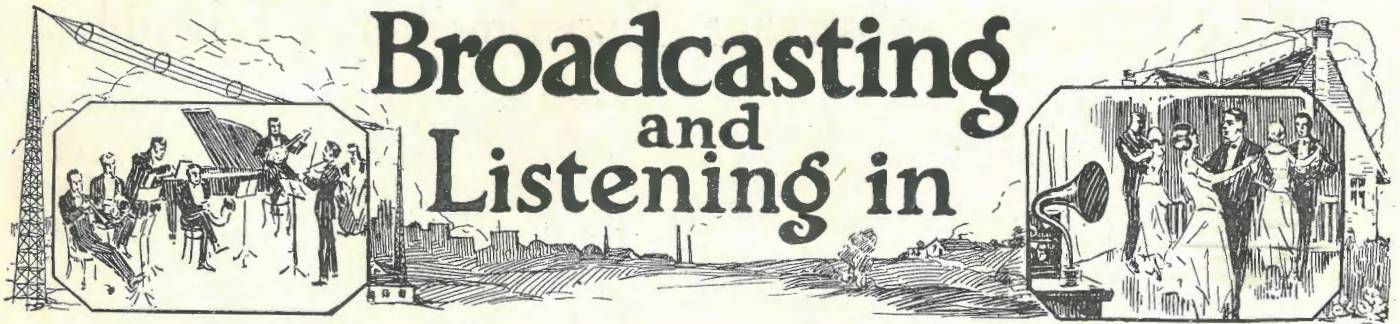
Why buy a cheap inferior set when you can obtain a high efficiency No. 2-A at half the cost of an equal set? It is built by Telephone Manufacturers of 30 years' standing. DURABLE, COMFORTABLE, ACCURATELY REPRODUCES VOICE and MUSIC. Permanent adjustment, unaffected, by climatic and temperature changes.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





Upon the news reaching England of the N.S.W. State Cabinet's acceptance of Messrs. Dorman, Long and Co.'s tender for the building of the North Shore Bridge, it was broadcasted to 2,000,000 people.

During 1923, 1,700 separate broadcasting programmes averaging a length of five hours each have been transmitted from stations in Great Britain.

The latest is the penny-in-the-slot radio receiving set. It consists of an automatic apparatus surmounted by a revolving loop aerial and draws its power from a lighting circuit supply. When the coin is inserted, two valves switch on and the musical item issues from a loud speaker at the instrument's base.

There is now a radio station at Bordeaux that can listen in to Australia. Worked on the arc principal, it is not so flexible but more economical than a valve station.

With an inside aerial and a six-valve set, the London-Birmingham express lately picked up signals from London broadcasting stations. Despite the noise of the train, which was travelling at a speed of 80 miles an hour at the time, concert items were clearly heard by means of a loud speaker.

The *Radio News* calculates that in another three years there will be fifteen million receiving sets in the United States.

A new broadcasting station is planned for Montevideo, South America, supplementing the one at Buenos Ayres.

A touring van containing radio outfits, aerials, etc., is soon to leave Melbourne for the purposes of giving actual radio demonstrations in the country districts. The principal idea underlying the project is to give the

Interests combined in the Broadcasting Company of Australia Pty., Ltd., Melbourne, include J. C. Williamson, J and N. Tait, the Town Hall, the State Conservatorium of Music, the *Herald*, and Carlyon's famous orchestra. A full broadcasting service is expected to commence shortly.

Latest cable advices state that Japan has opened up her territories to private broadcasting indiscriminately. The regulations provided for either foreign or home enterprise and that a continuous wave system may be used while an annual fee of 500 yen is required for broadcasting on wave-lengths of 60 and 385 metres.

Italy grants concessionaires the right to license receiving sets, 50 lire per year for private sets with an added fee for foreign apparatus. Fines are imposed if official messages are divulged.

Permission to erect and operate a broadcasting and receiving station in Chili, South America, for thirty years has been granted to Senors Errazuris Simpson, Jose de la Taille and Siemens Shuckert, Ltd. (If names count for anything, they ought to make the venture a superb success!)

Radio now appears to have entered civic life. On the eleventh of last month, Cr. C. J. Walters, Mayor of Malvern, Melbourne, officially declared open by wireless a begonia display held at the local Town Hall in aid of the Queen Victoria Hospital Appeal. Speaking from Mr. H. K. Love's station (3BM), East Malvern, Cr. Walters addressed over 200 people by means of a loud speaker. A profitable side-attraction was a radio concert received in a smaller hall.

## 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: A'fternoon 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	}	Entertainment.
to		
10.00		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.

rural population an opportunity to see wireless at work at first hand, a chance which, through their remoteness from the big centres, would preclude the possibility.

An American racehorse has been equipped with a radio receiver and is trained to race by commands from the trainer.



## Dark Russia

The radio is a mystery to all Russia, says an exchange. Even electrical experts in that country know less about it than the average Australian schoolboy. The European Student Relief Fund, which reports this state of affairs, explains that it is due to the fact that Russia is ten years behind the times in its knowledge of technical inventions and improvements. The most recent books used in the universities and technical schools are 1914 editions. The organization is trying to remedy this lack by having books and treaties on the radio and other new inventions translated into Russian and sent to the universities.

## New Army Station

At Fort Douglas, near Salt Lake City, U.S.A., the Signal Corps is erecting the largest radio station of the American Army. It will have but one tube—a new ten-kilowatt radio-tube, perfected by the General Electric Co., who are making the equipment.

## Popular Broadcaster

In response to many requests we publish herewith a photograph of Mr. Harold Tollemache, who, to many hun-



Mr. Harold Tollemache.

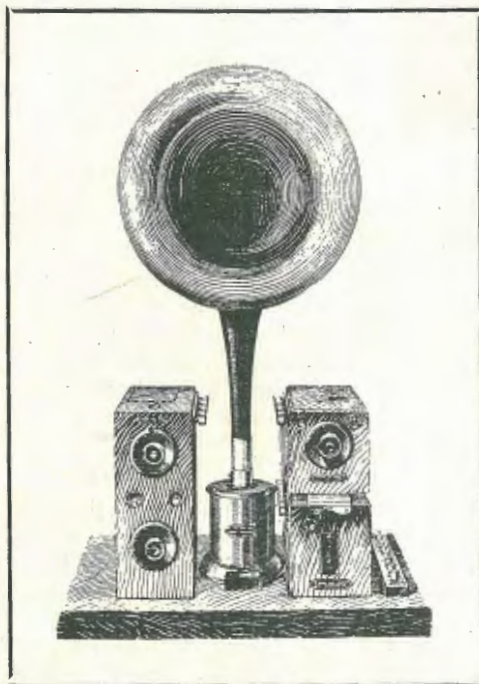
dreds of listeners-in, is known as the popular air-"line" baritone of 2FC (Farmer's Broadcasting Studio).

Apart from his radio activities, to which Mr. Tollemache's fine voice lends itself so admirably, he is also considered to be pre-eminent among the foremost concert artists of Sydney. He has been associated at various times with the Royal Sydney Apollo Club, the State Conservatorium of Music, and he also appeared several times with conspicuous success at the New South Wales State Orchestral Concerts.

Mr. Tollemache is essentially at home as the popular singer of bright and rollicking ballads and he promises to become as famous "on the air" as Peter Dawson has on the phonograph record.

## New Zealanders, Note!

Well-known to Maoriland wireless enthusiasts for many years, Mr. R. F. D. Burrell recently severed his connection with Radio Ltd., Auckland, in order to commence business on his own account at No. 37 Winstane's Building, Queen Street. Mr. Burrell's new locale will no doubt soon be a happy hunting ground for all the old experimenters and many of the new who have taken up wireless.



## 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.



## The Origin of the Call

"HUMPH! That's easy," you say as you read the heading. "Anyone knows that that means 'Save Our Souls!'" As a matter of cold, hard fact, it does not. That meaning in time has become attached to it. In the beginning, the dots and dashes which meant the call for help were merely used in that combination as a matter of expediency and not because of their adaptability to dramatic interpretation. In other words, the letters no more stood for "Save Our Souls!" than CQD, the original call which it

These regulations included a number of double-letter symbols used by operators to facilitate the working of certain circuits, and these always included the letter Q, as it was one of the least used letters of the alphabet, and in the Continental code its dashes and dots are distinctive. Among these groups was the signal CQ. Upon telegraph lines used by more than one station, and when more than one station was working, the operator sending the call CQ meant that he wanted every other station on the line to listen to him.

*It has been brought to our notice that the call "CQ" (all stations), while being satisfactory for general purposes, does not sufficiently express the urgency required in a signal of distress.*

*Therefore, on and after February 1, 1904, the call to be given by ships in distress or in any way requiring assistance, shall be "CQD."*

*This signal must on no account be used except by order of the captain of the ship in distress, or other vessels or stations transmitting the signals on account of the ship in distress.*

*All stations must recognise the urgency of this call, and make every effort to establish satisfactory communication with the least possible delay.*

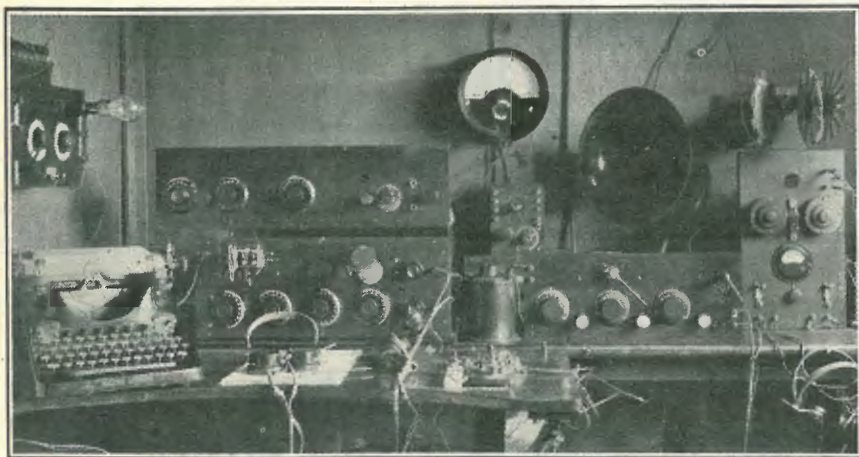
*Any mis-use of the call will result in instant dismissal of the person improperly employing it.*

The original is now framed and exists among the treasures of the Marconi Company. In July, 1908, the supersedence of this came into force by the substitution of the call "SOS" as a signal of distress by the International Radio Telegraphic Convention, sitting at Berlin. As this convention was not completely representative of all nations, the call CQD remained long enough in force to be used in the first great marine disaster in which wireless telegraphy figured.

"SOS" was chosen purely for the unusual grouping of the letters through the unique combination of dashes and dots which make it distinctive from all others. It consists of three dots, three dashes and three more dots.

### Unique!

It would seem that besides their uses as culinary utensils and, sometimes, if one can believe the newspapers, implements of offence, kitchen pots and pans will soon become popular for use as antennae. An American wireless expert recently discovered that a dish-pan serves to make an excellent antenna. He received with it up to 1400 miles!



The Melbourne Station used for reception of American Amateur Stations in the recent Trans-Pacific Tests. This is a "Combination" Station of 3BM, 3JU and 3BY. At top left is 3BY, bottom left 3BM, bottom right 3JU, and at extreme right is 3BM's Transmitter.

superseded, stood for "Come Quickly, Danger!" The first was arrived at by the ordinary course of evolution, while the second was an arbitrary adoption of the first International Radio Telegraph Convention.

When wireless telegraphy first entered into practical commercial use, the cable and ordinary telegraphic systems had reached a high state of efficiency, and the operation of these was controlled by an international convention which regularly gave out the necessary rules and regulations to meet requirements as they from time to time cropped up.

When the Marconi company began commercial operation over twenty years ago, most of these symbols were incorporated. CQ was particularly adapted to radio use because any vessel at sea hearing it would answer and thus affect communication with the ship sending out the call.

As the system developed, a number of minor emergency calls were evolved, and it was soon found that CQ was not sufficiently distinct for purposes of pressing necessity. Resultantly, the famous "Circular No. 57" was issued by the company on January 7, 1902:—



# WIRELESS

TEN years ago a few people in Australia had faith in the value and possibilities of wireless communication. They went to England, America, France and Germany, where the great wireless inventions were being developed, and secured the right for all time to the results of scientific research, the technical knowledge, the practical experience and inventions of the world-leaders in this great science.

They did not remain content with the profits to be derived from importing apparatus. They laid down a comprehensive policy of importing scientific knowledge for the purpose of building up an Australian industry.

To-day Amalgamated Wireless (A/sia) Limited is carrying on a public service at more than 300 wireless telegraph stations ashore and afloat. It gives continuous employment to more than 800 Australians, who receive in salaries and wages the sum of £150,000 per annum.

Amalgamated  Wireless  
(Australasia) Ltd.







# Technical Section

## New Patents

By GEORGE APPERLEY  
(Radio Engineer)

No. 11015/23.—Application, J. B. Bolitho, England, describes a method of reducing the effects of atmospheric or other interfering signals in a receiver by substantially balancing the parasitic signals in one circuit against those in a second circuit, whilst the desired signals remain unaffected. The aerial circuit (1), Fig. 1, including an inductance (2) is tuned to the desired signals. This circuit also includes an inductance (3) of low resistance and capacity (4), the values of which are so

series of valves (17 to 23) arranged for almost a periodic amplification is connected across the inductance (3) and capacity (4).

For the reason previously stated this circuit receives substantially no signals corresponding in frequency to the desired signal, but receives and amplifies certain components of the atmospheric, which are of different frequencies. In the grid circuit of the valve (2) is connected an inductance (26) and capacity (27) shunted by a high resistance leak (28), the induct-

provided and arrangements are described for balancing as shown in the figure.

No. 11016/23. Applicant: Societe des Etablissements Gaumont, France, relates to an electromagnetic device for the production of sounds in air or water, and also suitable for use as a microphone transmitter in either medium. Fig. 2 illustrates one form of the invention in which a conical diaphragm to which is fixed a conductor winding in the form of a spiral terminating at k.l. is disposed in the air gap d, e, g, between the pole-pieces a, b. The pole-pieces are electro-magnetically energised by the coil P and air ducts are provided in the upper pole-piece to convey the sound produced upon the concave side of the diaphragm through the channel u to the projecting mouthpiece V. In another form, the mouthpiece is eliminated the sound being emitted through orifices in the upper pole-piece or in the sides of the device.

No. 11991/23.—Inventor, E. Y. Robinson, England, has for its object improved circuit arrangements, whereby the efficiency of detection or demodulation of a modulated carrier wave is increased.

The envelope of a modulated carrier wave usually corresponds to the modulating wave, and in telephony the latter is complex, the component frequencies varying from  $f_1$  to  $f_2$ . If the frequency of the carrier wave is represented by the resultant, component frequencies of the modulated wave will therefore vary from  $(n + f_1)$  to  $(n - f_2)$ , which is known as the lower side band. According to this invention the carrier wave being of constant frequency is amplified in an efficient manner by means of low decrement circuits and the side bands which are of a varying frequency are similarly treated by aperiodic circuits, the two waves being combined before or during demodulation. Fig. 3 illustrates one method of applying the invention. The received signals flow through the inductance coil (15) in the aerial circuit. The carrier waves induced in the circuit (16), are amplified by means of the valves (17) and passed to the circuit (18), which is given a low decrement by virtue of the reactive coupling from the valve (19). The side band fre-

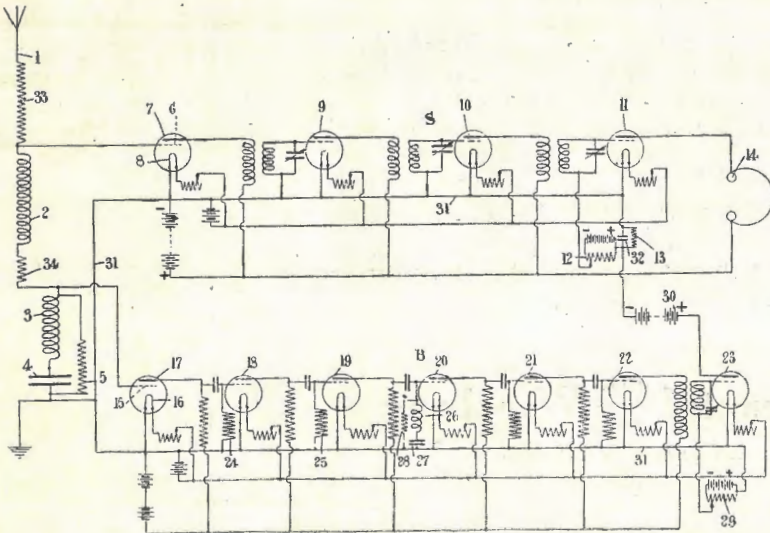


Fig. 1.

adjusted that the reactive electromotive forces set up in them by the signal frequency neutralise at the points where connection is made to the high resistance leak (5) which is provided for the purpose of completing the grid circuits of the first valve of each amplifying series.

A series of valves (7, 9, 10 and 11) constituting three stages of high frequency amplification employing grid tuning receives the desired signals and certain components of the atmospheric impulses, rectification being effected in the last valve by the grid potentiometer method. A second

ance and capacity being adjusted in value to further reduce the amplification of the desired signal frequency. Rectification is effected by the valve (23), which is so connected to the valve (11) as to counteract the effect of atmospheric in the telephone receivers (14). The completeness of the neutralising effect of the atmospheric is therefore obtained by adjusting the magnification of the two-valve series. For the purpose of increasing the aerial circuit resistance which is desirable, resistances 33 and 34 are added. Means for reducing interference from other stations are also



## Meters on Your Set

ANYTHING that increases the better working of a set should never be lightly neglected. How many amateurs at the beginning of their wireless activities have, after purchase and installation of their set, together with all accessories, sat back with a sigh of relief and murmured, "Thank Heaven, that's done!"?

But was it? No. There was a small matter of meters to run the set.

To turn the rheostats to the exact point where the best results can be obtained is infinitely better than to have them "about right." The novice would do well to take a leaf from the book of his more advanced brother and note that a transmitting set is of small use without the addition of indicators and meters.

For ordinary results it is not necessary, but practically all parts of the current can be metered. Only two meters are necessary and they need not be at all expensive, as we are not very actively concerned with the precise values of our current and voltage. What we want the meter for is to show us when we have duplicated a previous condition. For instance, the meter might easily be

from five to 100 per cent. off and yet suit all requirements. It is absurd to advocate the purchase of cheap, unreliable apparatus, but, at the same time, the buying of an expensive meter is totally unnecessary when used for this purpose.

Two are required; a voltmeter, reading from 0 to 100 or more, and an ammeter, reading from 0 to 3 amperes. The regular type of switch-board meters are the most suitable, but if the pocket type is bought, it can be mounted so that only the scale shows through a peep-hole in the panel. It would be as well to remember that the meter's scale should be about twice the rate or pressure to be measured, as this brings the pointer at approximately the centre of the scale, which is generally the most accurate part.

The circuits to be metered are the detector B battery voltage, the amplifier B battery voltage, and the amperage in the A battery circuit. A meter might be installed in the A battery circuit to indicate this battery's voltage, but we already have a meter for this in the form of the hydrometer, while the ammeter is a check on the voltage of this battery.

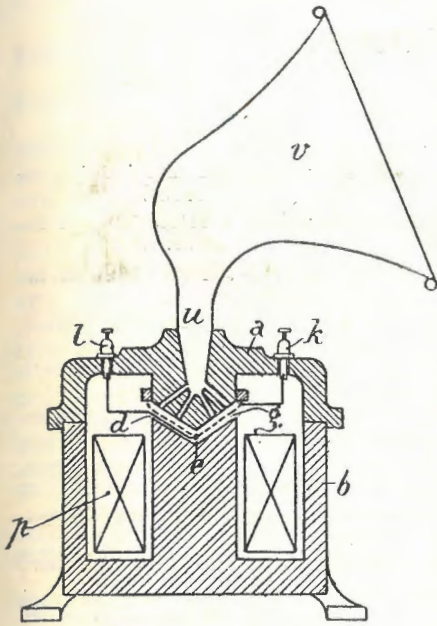


Fig. 2.

quencies are amplified by means of the valve (2), which, with the resistance (21), constitutes an aperiodic amplifier. The carrier wave oscillations are recombined with the side band oscillations by means

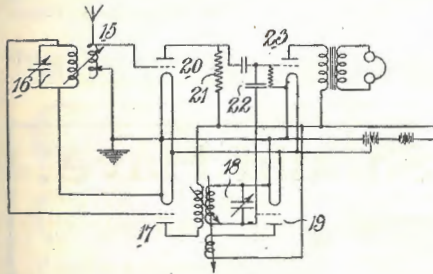


Fig. 3.

of the condenser (22) and detection effected by the valve (23) in the usual manner. In modifications the invention provides for application to modulated high frequency currents transmitted over wires and to wireless receiving apparatus when the frequency of the carrier waves and the side band waves are both amplified by common valves.

## Amateurs' Examination

In connection with the issue for experimental wireless licenses in Adelaide, the Deputy Postmaster-General, Mr. J. W. Kitto, has stated that the qualifications of applicants will be ascertained as far as this is possible by examination. At out-of-the-way places where no inspector is handy the applicant will have to present himself to the local postmaster for examination. No fee will be charged.

## The Radio Workshop

FOR those radio enthusiasts who are continually making new circuits and experiments—and who are not?—a complete workshop is an absolute necessity.

It is our intention here to give a list of the handiest and most used tools that will prove most useful to the experimental amateur.

Pliers are perhaps the most-used of all, and so one should have them both small and large; long-nosed ones for getting at inaccessible points and also a pair of cutting pliers with the sharp edge running right to the end.

Files should be of diversified patterns, say, three sizes of the rat-tail kind, three of the three-corner type, and last, but by no means least, the flat variety; two are enough of these, but one large one will never be amiss.

Drills should be of all sizes, as there is no limit to their numberless uses.

A box full of nuts and bolts of all sizes and threads will assist consider-

ably in the speedy assembling of a set. Both brass and nickel-plated wooden screws are important, as brass screws are used for back-panel work and nickel-plated for the front. Nickel-plated bolts are handy to have.

Tap holders of 6-32, 8-32 and 4-32 size are necessary and will enable the constructor to give his apparatus quite the professional touch by tapping his composition tubes. To eliminate the chance of the rheostats coming loose, they should be tapped in the holes used for mounting, as the bolt used to clamp them on a panel cannot work loose, as is often the case when a bolt and nut are used.

In conclusion, the efficiency and general convenience of the workshop can be considerably added to, by a switch panel, upon which can be placed a number of binding posts and suitable switches for altering the aerial to different parts of the table and also the storage battery on charge or on different sets.



# Amateur Transmitting Licenses

Issued to December 23, 1923

## VICTORIA.

- 3AM Dohrmann, G. S., 2 Hopetoun Avenue, Canterbury.
- 3AP Morris, R. D., 6 Bealiba Road, Caulfield.
- 3AY Jenvy, W. W., 12 Lord Street, East Caulfield.
- 3BC Brighton Radio Club (R. P. Whalley), Wilson Hall, Brighton.
- 3BD Cox, E. H., 5 Gibson Street, Elsternwick.
- 3BG Osborne, L., Terang.
- 3BH Whitelaw, C. R., Mooroolbark.
- 3BL Fitchett, J. C., Salisbury Street, Balwyn.
- 3BM Love, H. K., "Lindum," Ferncroft Avenue, East Malvern.
- 3BP Hood, J. H., 6 Alexandra Street, East St. Kilda.
- 3BQ Howden, W., Hill Street, Box Hill.
- 3BU Connelly, D. A., "Larnokk," Balaclava Road, East St. Kilda.
- 3BY Holst, H., 27 Bambra Road, Caulfield.
- 3CB Sievers, W. F., 30 Leaney Street, East Richmond.
- 3CC University of Melbourne, Melbourne.
- 3CH Clarke, F. W., 165 Cardigan Street, Carlton.
- 3DB Hobart-Duff, 27 Westgarth Street, East Malvern.
- 3DD Osborne, L. F. G., "Louisville," Darling Road, East Malvern.
- 3DF Short, F. D., 2 Mozart Street, St. Kilda.
- 3DL Fells, L. C., North Road, Caulfield.
- 3DM Chambers and Co. (N. Culliver), 57 Simpson Street, East Melbourne.
- 3DV Beattie, H. S., 1 Bishop Street, Box Hill.
- 3DX Van Cooth, J. R., Wattletree Road, East Malvern.
- 3EC Y.M.C.A. Am. Wireless Society, Cr. Short and High Streets, Bendigo.
- 3EL Boyd, N. J., 100 Orrong Road, Elsternwick.
- 3EM Doudney, H. W., Holy Trinity Vicarage, 7 Dickens Street, Balaclava.
- 3EN Leonard, A. B., Drouin.
- 3EP Givens, J., 19 Logan Street, Canterbury.
- 3ER Rivers, E. R., St. Kinnord Street, Essendon.
- 3FA Abrahams, F., c/o Mrs. Solomons, Murphy Street, South Yarra.
- 3FH Hall, R. F., Glindabourn Avenue, Toorak.
- 3FM Decrespigny, R. C., 20 Black Street, Middle Brighton.
- 3GB Glover, M. A., 24 Victoria Road, Camberwell.
- 3GH Hale, W. M., "Ben Nevis," Harvey Street, Essendon.
- 3HE Kruger, F., Camp Street, Carlton.
- 3HH Maughan, F. H., 15 Staniland Avenue, Malvern.
- 3HQ Good, E. J., "Rock Grove," Private Mail, Glenrowan.
- 3JD Dane, J. E., Toorak Road, Hawthorn.
- 3JH Holland, F. H. J., "Cotswold," St. Kinnord Street, Essendon.
- 3JP Mitchell, H., Kean Street, Caulfield.
- 3JR Dunstan, W. J., 7 Cameron Street, Ballarat East.
- 3JU Hull, R. A., 38 Charnwood Road, St. Kilda.
- 3JZ Whalley, R. P., "Enmore," Bridge Street, Sandringham.
- 3LM Malvern District Branch Wireless Institute (E. J. Masters), 16 Sutherland Road, Armadale.
- 3LQ Downey, W. E., Hopkins House, Hopkins River, Warrnambool.
- 3LS Busch, R. T., 30 Wordsworth Street, Moonee Ponds.
- 3LW Heam, C., 222 Carlisle Street, St. Kilda.
- 3MA Amalgamated Wireless Ltd., 422 Little Collins Street, Melbourne.
- 3MB Amalgamated Wireless Ltd., Koo-wee-rup.
- 3MC Amalgamated Wireless Ltd., Canterbury.
- 3MD Amalgamated Wireless Ltd., in the vicinity of Melbourne.
- 3ME Amalgamated Wireless Ltd., in the vicinity of Melbourne.
- 3MF Amalgamated Wireless Ltd., in the vicinity of Melbourne.
- 3MP Hosken, S. V., 42 Melville Street, Hawthorne.
- 3NS Norris and Skelley, 211 Elizabeth Street, Melbourne.
- 3OK Conry, W. H., 32 Irving Avenue, Armadale.
- 3PO Roberts, A. H., 103 Bent Street, Northcote.
- 3QW Muir, J. A., 10 Young Street, Brighton.
- 3RF Cordingley, C. H., 77 Bank Street, E. Ascot Vale.
- 3RG Homberg, S. G., Waverley Road, E. Malvern.
- 3RY Wilson, W. A. G., 4 Webster Street, Ballarat.
- 3SM Gay, A. H., Warragul.
- 3SW Gadsen, S. W., 5 Miller Grove, Kew.
- 3SX Steane, G. W., Earle Street, Mont Albert.
- 3TM Buck, A. H., 750 Glenhuntly Road, Glen Huntly.
- 3TU Leckie, R. C., Bamfield Street, Sandringham.

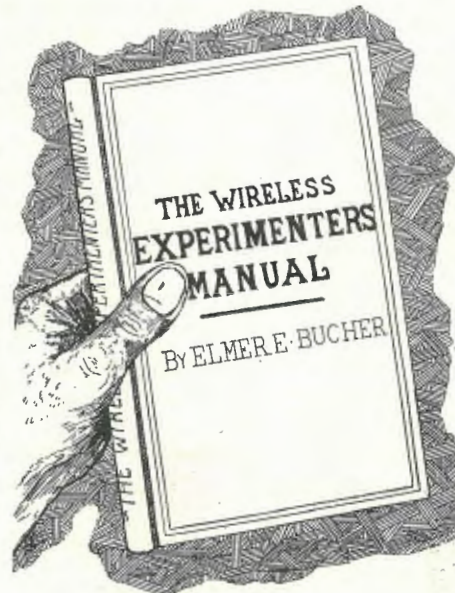
## The Book You Should Have!

### CONTENTS:

Construction of Transformers, High Voltage Condensers, Spark Gaps, Aerials, Masts, Receiving sets for long and short wave length reception.

Construction and Operation of Regenerative Receivers, Cascade Amplifiers.

Preferred Circuits for long and short wave receivers.



### CONTENTS

(Continued).  
Direction Finders;  
Underground Aerials and the use of WEAGANT'S Static Eliminator for amateurs.

CLOTH BOUND  
with  
340 PAGES.

Fully Illustrated.

PRICE

12/6.

Postage, 6d. extra.

OBTAINABLE FROM ALL LEADING BOOKSELLERS

OR

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



- 3UI Dalton, R. M., San Mateo Avenue, Mildura.
- 3VR Abbot, R. N., "Fleur-de-lis," St. Elmo Avenue, Alphington.
- 3VS Philpott, O. J., 26 Lumeah Road, Caulfield.
- 3XF Chaffer, M., 41 Norwood Crescent, Moonee Ponds.
- 3XN Leaney, W. G., 12 Henry Street, Northcote.
- 3YW Edgar, J. M., 12 Henry Street, East Geelong.
- 3YY Bush, A. M., 54 Brougham Street, Bendigo.
- 3YZ McKeown, A., 54 Yarra Street, Alphington.
- 3ZA Bardin, W. F., 226 Station Street, North Carlton.
- 3ZB Dixon, R. H., 1 Hopetoun Avenue, Canterbury.
- 3ZC Brock, H. E. E., 8 Ngarveno Street, Moonee Ponds.
- 3ZD Taylor, C. F., 133 High Street, Kew.
- 3ZE McGregor, K. W. A., 23 Molesworth Street, Armadale.
- 3ZI Barbour, K. H., 1 Irving Avenue, Armadale.
- 3ZJ Lempriere, C. L., Terrara Road, Vermont.
- 3ZK Bradley, P. R., Beach Crescent, Sandringham.
- 3ZL New System Telephones, 25-27 Queens Bridge Street, South Melbourne.
- 3ZM Owen, C., 22 Kendall Street, South St. Kilda.

- 3ZN Israel, M. S., 53 Blessington Street, St. Kilda.
- 3ZO Johnson, E. H., 105 Moorabool Street, Geelong.
- 3ZP George, H. A., 195 Ballarat Road, Footscray.
- 3ZQ Ballarat Radio Club (J. Matthews), Y.M.C.A., Ballarat.
- 3ZR Snaith, S. L., 1 Byron Street, Footscray.

- 4GF Fortescue, G., Arthur Street, Toowoomba.
- No. 1217 Hobler, H. L., Lennox Street, Rockhampton.

**SOUTH AUSTRALIA.**

- 5AI Lloyd, H. K., 16 Trinity Street, College Town.
- 5BI S.A. School Mines and Industries (W. Honnor), North Terrace, Adelaide.
- 5DN Jones, L. C., 146 Rundle Street, Adelaide.
- 5DO St. Peter's College Radio Club (F. B. Oldfield), St. Peter's College, Adelaide.

**WESTERN AUSTRALIA.**

- 6AF Silby, A., 38 Park Street, North Perth.
- 6CZ Saar, A., Grey Street, Northam.
- 6DD Bishop, C. E., Grey Street, Northam.
- 6DY Thomas, H., 26 Third Avenue, Inglewood.
- 6DZ Burrows, E. W., Station House, Eleanor Street, Geraldton.
- 6WP Phipps, W. R., 97 Rupert Street, Subiaco.

**TASMANIA.**

- 7AL Scanlon, W. L., 37 Hill Street, West Hobart.
- 7BE Stipek, J., St. Helen's Hotel, St. Helens.
- 7BN Sheldrick, E. C., 59 West Tamar Road, Launceston.



- 3ZS McMahon, G., Edinburgh Street, Diamond Creek.
- No. 2430 Kells, A. C. E., 366 Ascot Vale, Moonee Ponds.

**QUEENSLAND.**

- 4CC Stephen, A N., Railway Parade, Clayfield, Brisbane.
- 4CK Norris, E. L., Hume Street, Toowoomba.
- 4GE Fortescue, C., Arthur Street, Toowoomba.

# Columbia Radio Batteries Are the Best

COLUMBIA Radio Batteries have proven to be the best batteries for radio receiving sets that money can buy. They are made in different styles suitable for every radio equipment and will give more satisfaction than any other make.

**Columbia Dry Cell "A"**

COLUMBIA Dry Cell "A" Batteries for vacuum tubes of low amperage are made especially for this work. They will withstand the slow steady drain required and give satisfactory results for a much longer period of time than any other similar type of battery.

**Columbia Storage "A"**

For vacuum tubes of one-half ampere or over, the COLUMBIA "A" Storage Battery is ideal. It is shipped dry and charged and filled when sold, thus assuring a fresh, powerful battery. It is tightly sealed and contained in an attractive mahogany finished box with handles.

**Columbia "B"**

COLUMBIA "B" Batteries are made in 22½ and 45-volt sizes. They are equipped with Fahnestock Spring Clip Connectors to insure easy, secure connections. They are thoroughly insulated and waterproofed. They are portable, powerful and long lasting.

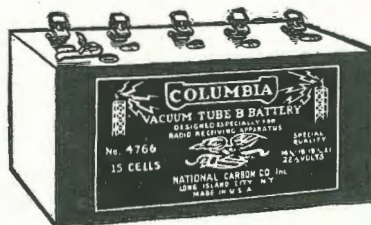
**Columbia "Three"**

COLUMBIA "Three" Batteries are designed so that under certain conditions they can be used as an "A," "B" or "C" Battery. They are made of extra large sized cells, and are used as an "A" Battery for light, portable sets using UV-199 tubes; as a "B" Battery for obtaining additional plate voltage; as a "C" Battery for grid biasing.

**COLUMBIA Radio Batteries for Every Radio Requirement**

**NATIONAL CARBON COMPANY, Inc.**

30 EAST 42nd STREET, NEW YORK, N. Y., U. S. A.





## Trans-Pacific Tests

**O**N the voyage between Sydney and Wellington Mr. Chas. Maclurcan and Master Jack Davis, the Australian amateurs operating the Experimental Station 2CDM on board the R.M.S. "Tahiti," made special observations of the reception of Australian Amateur Transmitting stations, and some interesting results are now available.

**MR.** Maclurcan, by means of an audibility meter, took his ten watt station at Strathfield (2CM) as the standard station, and rated the signal strength of 2CM at 20.

**THE** following Australian Amateur Transmitting stations were heard, and the number alongside each call sign indicates the relative strength:—

1AA, 7; 2AE, 7; 1AO, 7; 2AP, 17; 2IJ, 7; 2JM, 7; 2DS, 8-9; 2FA, 8; 2KC, 8; 2YL, 4-5; 3AD, 3-4; 3BD, 3; 3EM, 9; 3BG, 6; 3JU, 7; 5BC, 7.

**IT** is very interesting to note that when receiving the above stations all reception was accomplished on two valves.

**DURING** the time that 2CM at Strathfield was working on a power of 100 watts the signals were received at maximum strength on one valve on board the "Tahiti" at night time on the voyage between Sydney and Wellington.

**2CDM** copied complete messages from 2CM when the latter was transmitting on a power of 10 watts at a distance of 600 miles daylight.

*Learn the "MORSE CODE"  
the "NEW" way.*

## THE "TAPOGRAPH" MORSE INSTRUCTOR

will definitely teach you the Morse code at home, in your own time, with the least possible expense. No need for you to spend weeks and months de-coding the indifferent sending of another amateur or in attending classes of instruction.

The Tapograph will make you an efficient operator in a few weeks. A carefully designed series of machine-perforated tapes, containing perfectly-shaped signals, is used in combination with a buzzer or sounder. Each tape may be used hundreds of times, and contains from 1000 to 2000 signals, commencing with single letters at a slow rate and ending with complicated telegrams, radio calls, press and coded messages at a fast rate. Endorsed, used and recommended by Wireless Operators, Telegraphists, Post-office and Railway Officials everywhere.

Mr. WIRELESS AMATEUR, get this outfit at once. Do not be content to listen to broadcasting only. Tap the world's wireless messages and experience the thrills of catching messages from ships at sea, Australian, Coastal, American and Continental stations.

TELEGRAPHISTS and OPERATORS, begin right by learning to receive perfectly-timed signals in your spare time at home.

PARENTS, encourage your boy to take an interest in things electrical. The Tapograph is a most acceptable gift; it will amuse and instruct.

Price, complete with tape, high-toned buzzer, also valuable charts and instructions for learning the Morse code.

30s. each. Postage 6d. extra.

Obtainable from dealers  
or direct from

**G. E. BRAY**

Manufacturer's Agent, Box 781,  
Somerset House, Martin Place, Sydney.

Particulars Post Free on Request.



# F. L. Moore Relief Fund

DONATIONS intended for the alleviation of the sad circumstances surrounding this needy and pathetic case continue to come in. Unfortunately, they are not being received as quickly as the cause deserves. It should be remembered that Mrs. Moore and her children have been left in very needy circumstances and that monetary assistance, no matter how little, is urgently needed. What makes this appeal one that should readily strike a sympathetic note in the hearts of all connected with wireless in either a business or a pleasure sense is that the dependants are those of a man who did a great deal for the

advancement of wireless and in the end unfortunately laid down his life for it. No man can do more than that for a cause.

To date, the following donations have been received:—

### F. L. MOORE RELIEF FUND.

	£	s.	d.
Radio Magazine .. ..	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. Maclurean .. ..	2	2	0
Neutral Bay Radio Club ..	1	1	0
Q.S.A. Crystals .. .. .	1	1	0
Bacon and Co., Ltd. .. .	2	2	0
Hyde, Gluck and Co. .. .	0	10	0

Total to date .. .. £35 3 0

## Chances to Sing at 2FC

Those amateur artists who are competent and talented enough to render items for broadcasting programmes have now a golden opportunity to prove their suitability. Messrs. Farmer and Co., Ltd., Sydney, are receiving applications through the Manager of their Broadcasting Department (to whom all such letters should be addressed) and trials are held every Monday and Thursday at the Studio (Roof Garden, entrance corner of Market and Pitt Streets) at 2.15 p.m. Applications for an appointment must be in writing. Vocalists of both sexes will find this a good chance, while it is also desired to engage elocutionists and humourists of a high standard.

## Fixing Catwhisker

To retain a crystal detector in perfect and permanent adjustment, first discover the most sensitive spot by means of a buzzer test. When the catwhisker has been properly placed, drop some hot beeswax round it. In this manner the whisker can be kept in the right spot for months, and the necessity of seeking the sensitive spot every time the set is to be used is obviated.



### WESTERN SUBURBS AMATEUR WIRELESS ASSOCIATION.

At the last meeting of the Club, Mr. Calver came all the way from Blaxland to tell the members about his three-valve set which he works on a three-foot loop aerial and receives Sydney telephony well enough to work his loud speaker. The rest of the meeting was taken up by a lecture on accumulators, their use and care and various methods of charging, given by the Association's hon. secretary, Mr. G. R. Challenger. The next meeting will be held on April 3.

### NORFOLK WIRELESS CLUB.

This Association is now busily enrolling members and gleaning information in order to successfully instal a receiving set. It is hoped that it will be one with a 400-mile radius so that Melbourne broadcasters may be picked up. If the committee's plans are finalised, a visit by members of the Tasmanian division of the W.I.A. will be made to the club and an address on the potentialities of such instruments and radio in general will be given.

### NEWCASTLE DISTRICT R.C.

The usual bi-monthly meeting at which Mr. Seward, the President, occupied the chair, was held at the club rooms, Hamilton, on March 12. Several letters were received, among which was one from the Sydney Radio Inspector, stating that the Chief Manager was in sympathy with the club's suggestion that the use of full regeneration should be allowed on the reception of wave-lengths in excess of 8,000 metres, and that any application lodged for permission to do so would be dealt with on its merits. Some assurance, however, would have to be given that the use of regeneration would not be made on wave-lengths below this limit. As the result of a letter from the secretary of the F. L. Moore Relief Fund, it was decided to donate £1/10/-. An arrangement has been entered into whereby interesting items concerning the club's activities will be forwarded to the Newcastle "Daily Telegraph." A letter from the N.S.W. branch of the W.I.A. concerning the forthcoming conference was received, and one from Mr. N. Gilmour (2ZU), saying that he would be pleased to act as the club's delegate at that gathering. It was decided to formulate several suggestions for Mr. Gilmour to place before the meeting. One new member was elected. Mr. Cooper, of the Marine Radio Service, attended the meeting and demonstrated the reception of 2FC on a crystal set he had built himself. Suva radio came through strongly. A Mr. C. Whitelaw, of Mooroolbark, Victoria, in writing to the club said that he had logged them in good strength on several occasions.

### FOR SALE

#### HIGH TENSION BATTERIES

with multiple Control Switches, Accumulator Battery, consisting of 80 small cells (Glass or Ebonite test tubes). Battery is subdivided into four sections joined in Series. Total potential: 160 volts.

PRICE, £1/10/-.

AMALGAMATED WIRELESS (A'SIA), LTD.,

97 Clarence Street, SYDNEY.

## BACON & Co. Ltd.

PROCESS  
ENGRAVERS  
and  
ILLUSTRATORS

31a PITT STREET  
SYDNEY

'Phone: B 3368



## PERSONALITIES

MR. E. S. RALLS, lately of Radio Ltd., Auckland, N.Z., has severed his connection with that firm and taken over the managership of Messrs. Turnbull and Jones in the same city.

THE Radio Society of Queensland has lost one of its most energetic workers in Mr. W. Finney, a foundation member of the body. His resignation was announced at a recent meeting as he has accepted a position in the Commonwealth Wireless Branch. Since the day when the Queensland Radio Relay League was inaugurated and from which was later developed the Radio Society, Mr. Finney has identified himself with every movement which tended to the progress of wireless. As a mark of appreciation of his services to the Society and the science generally, Mr. Finney was unanimously elected the first honorary member at the same meeting at which his resignation was regretfully accepted. Mr. N. B. Harper was elected in place of Mr. Finney.

RECENTLY, at the Ambassadors, Sydney, Mr. George A. Taylor, who is well-known in Australian wireless circles, was tendered a farewell luncheon by the Association for Developing Wireless in Australia, New Zealand and Fiji. Mr. Taylor, who is president of the Association, is leaving for Geneva to attend the Peace Conference. Among those pre-

sent at the farewell, at the conclusion of which many eulogistic references were made to Mr. Taylor in connection with radio, the A.I.F., the North Shore Bridge and other activities, were the Lord Mayor, Alderman Gilpin, Mr. Ball, Minister for Works, General Sir Granville Ryrie, M.P., and Mr. Marr, M.P.

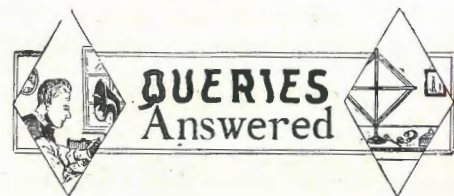
## KGO Logged Again

THIS time a Maorilander has done it. Mr. W. S. Gillies, of Tokaanu, Lake Taupo, recently heard KGO twice in one week. He reports that he heard the Oakland, California station at times between 7 and 8.30 p.m., when music came in strongly and through the use of a loud speaker could be heard all over the house. When signing off the announcer said: "Pacific time is 1 a.m.," which coin-

### GOOD WORK.

Using a De Forest three-valve wireless set, Mr. R. F. Haycock, of Hamilton, Waikato, N.Z., picked up KHJ, Los Angeles, and listened-in to an orchestral concert given at the Hotel Grosvenor in the same city. He also heard a similar concert broadcasted from 6XJ, Oakland, California. Speeches and musical items disseminated from Sydney, Auckland and Wellington were also plainly heard, despite that atmospheric conditions were not of the best.

ecided to 8.3 p.m. local time. Mr. Gillies states that the carrier wave was as strong as any New Zealand one. To hear KGO, a three-valve set with a power amplifier working the loud speaker was used.



C. O'B. (Broken Hill), referring to Mr. Marsden's receiving circuit published in *Radio*, No. 16, asks: (1) Most suitable size honeycomb coils for receiving Adelaide broadcasting on 800 metres, also commercial 600 metres. (2) Most suitable valves. (3) Are 9 to 1 ratio transformers correct?

*Answer:* (1) For both 600 and 800 metre wave-lengths, use a primary of 75 turns, Secondary and Reaction 100 turns each. (2) Use "R" valves with 40 volts on the detector and either 40 or 60 on the amplifiers. A negative grid bias will be a great improvement as regards reception of telephony. (3) Yes, on the first valve but use a lower ratio on the second.

*Young Experimenter* (Granville) submits particulars and diagram of crystal receiver and asks why he cannot receive Farmer's broadcasting.

*Answer:* The data regarding your inductance coil, although rather scant, points to the fact that it is too small to tune to 1100 metres. Its inductance is approximately 430 microhenries when all turns are being used, giving you a maximum wave of about 70 metres. To enable you to tune in on 1100 metres, use a loading coil of similar diameter with 180 turns tapped in three places. This will add 1,000 microhenries to the circuit, which in conjunction with the aerial capacity of about 0.00025 microfarads will tune to 1400 metres. If you construct your coils in accordance with the article on page 438, issue *Radio* No. 18, you will be able to tune from 250 to 2,000 metres.

G. P. N. (St. Kilda) submits particulars and diagram of three-valve receiver and asks for circuit and particulars of additional apparatus required to receive Farmer's Sydney station.

*Answer:* We cannot undertake to specify the apparatus necessary to bring in 2FC as loud as you want, at your distance from Sydney, as so much depends upon local and intervening conditions.

## Broadcasting is Here. We are Ready!

CRYSTAL SETS—  
 £3/10/- 25/10/- 27/10/-  
 VALVE SETS—SINGLE:  
 £10 £15 £20

VALVE SETS—TWO: £25  
 £17/10/- £20  
 VALVE SETS—THREE: £35  
 £27/10/- £30

Complete with Aerial Wire, 'Phones, Batteries, and All Accessories.

We can supply all parts to build your own if required.

ORDER NOW AND AVOID THE RUSH.

Catalogue, 50 Winning Diagrams, 9d.

## ELECTRICITY HOUSE

387 George Street, Sydney.

J. S. MARKS (Radio 2GR), General Manager.

We are the accredited Agents for all Broadcasting Companies. Service fees on application.

## EDWARD WATERS & SONS

(Established 1859.)

PATENT and TRADE MARK ATTORNEYS,

Cathcart House,

11-13 Castlereagh Street, Sydney.

Tel.: B 5937.

(And at Melbourne.)

## STERLING PLATING & MFG. CO

(Late Stokes & Sons)

225 CLARENCE ST., SYDNEY.

ELECTRO, SILVER, NICKEL AND BRASS  
 PLATERS.

All kinds of Lacquering, Gilding, Bronzing  
 and Oxidising Done.

'Phone: City 6086.



# How to Save! "Radio" will help YOU!

Did you get your last number of "Radio?"

You did not?

You did not have time to buy it on the date of publication, and when you did get along your newsagent had sold out?

Or——

You were away from the city, and the local agent did not stock it?

Or——

You forgot it—worse luck?

Or——

You have decided to save money this year?

Listen!

You can save money and buy "Radio" too.

By buying "Radio" weekly at your newsagents it costs you 13/- a year. To this outlay you must add the risk of possible disappointment, and if you are interested in radio you cannot afford to miss a single issue of this publication.

If you order your copy direct from us you save MONEY, TIME, and DISAPPOINTMENT.

MONEY, in that "Radio" sent for 12 months to any address in Australia and New Zealand, post free, will only cost you 10/-.

TIME, in that "Radio" will be safely in your hands on the very date of publication.

And——

DISAPPOINTMENT, in that we have an efficient staff whose sole business it is to see that you are NOT disappointed, either in contents, appearance or delivery.

To save these three things, then, fill out this coupon and mail it NOW!

The Circulation Manager,  
"Radio,"

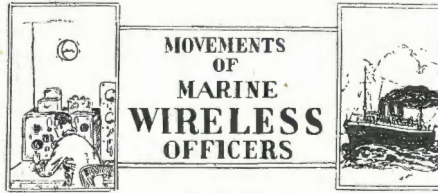
97 Clarence Street, Sydney, N.S.W.

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

Signed .....

Full address .....

Date.....



### MARCH.

Mr. F. M. Basden signed off s.s. *Yarra*, at Sydney, 3rd.

Mr. T. M. Alexander signed off s.s. *Wear*, at Melbourne, 4th, and proceeded on Home Port Leave

Mr. M. Webb-Watts signed on s.s. *Dumosa*, at Melbourne, 6th.

Mr. H. Wormwell signed off s.s. *Period*, at Melbourne, 3rd.

Mr. N. M. Leeder signed on s.s. *Lameroo*, at Sydney, 10th.

Messrs. N. D. Wedgewood and R. G. C. Roberts signed off s.s. *St Albans* as 2nd and 3rd Operators, at Sydney, 11th.

Mr. J. Ridler relieved Mr. R. G. C. Roberts as 3rd Operator on s.s. *Moreton Bay*, at Sydney, 10th.

Mr. T. Laidlaw signed off s.s. *Aldinga*, at Sydney, 12th.

Mr. L. C. Farnsworth signed off s.s. *Alabama*, at Melbourne, 10th, and signed on s.s. *Karori*, at Melbourne, 12th.

Mr. T. M. Alexander signed on s.s. *Alabama*, at Melbourne, 10th.

Mr. J. G. S. Flanagan signed off s.s. *Karori*, at Melbourne, 12th, and signed on s.s. *Period*, at Melbourne, 14th.

Messrs. T. Laidlaw, B. A. Taylor and G. J. Fox signed on s.s. *Fordsdale*, as Senior and 3rd Operators respectively, at Sydney, 17th.

Messrs. A. C. Jackson and M. Sherwood-King signed off s.s. *Taiyuan*, as 2nd and 3rd Operators respectively, at Sydney, 17th.

Mr. A. C. Jackson relieved Mr. C. A. Olsson on s.s. *Junce*, at Newcastle, 17th. Mr Olsson terminated service.

## Care of the Battery

With a little care and thought it is surprising how much longer a battery will last than without these attentions. Most batteries have a notice attached to them giving particulars as to their care, but how many people pay any attention to them? Filtered water must be added frequently, so as to keep the plates covered all the time. This attention is often let to slide, with the result that the poor battery man is blamed, while the real fault lies with the neglectful owner. Water should always be added to the battery before charging, as the action of this will make it evaporate a little. Do not read from the hydrometer immediately after adding the water as it will not be accurate. It is better, too, to recharge the battery at regular intervals and not only when it has run down altogether. In conclusion, do not test the charge by shortening the poles, use a meter, or, better still, a hydrometer.

## HUGHES & CO.

HIGH-CLASS

CIVIL and NAVAL TAILORS

Our civil Suits are perfection in STYLE FIT, DURABILITY and PRICE. TAILOR-MADE on the premises under our own supervision. OUR NAVAL UNIFORMS and GOLD LACE work speak for themselves. CAPS, LACE, BADGES, UNIFORM BUTTONS always in stock. ONE Quality only — THE BEST.

70-72 Erskine Street, SYDNEY  
PHONE: City 77.

Telephone: 1180 City

For Service

## The RAPID FREIGHT DESPATCH CO.

CUSTOMS, SHIPPING &  
FORWARDING AGENTS  
Broughton House, King Street  
SYDNEY

## WIRELESS MAPS OF THE WORLD

AS PUBLISHED IN

YEAR BOOK

OF

## Wireless Telegraphy and Telephony

PRICE, 2/- EACH,

OR

COMPLETE WITH YEAR BOOK,

1914 to 1919 Edition,

PRICE, 4/- POSTAGE, 1/-

Obtainable only from

THE WIRELESS PRESS,  
97 CLARENCE STREET, SYDNEY.



## Highlights of Radio Broadcasting

(Continued from page 4.)

3. Reception from stations nearer than seventy-five miles is chiefly by ground waves only and is therefore reasonably steady.

4. Reception in a city from near-by stations is by ground waves, which are very badly absorbed by the steel structures of the city. A mile or two of city buildings will so weaken the signals from a city station, as received by a city listener, that reception may become very poor. As a result, in those parts of the city where the signals have first to plough through miles of steel to reach the listener, reception from that station will be poor. In other parts of the city the reception will be excellent. Far outside the city, reception will be by the sky waves and about equally good from all comparable stations within the city.

5. A listener in the country will get signals from the city fifty miles away almost entirely on weak ground waves, but will get distant signals on the powerful sky waves. Thus the distant signals are sometimes astonishingly loud in comparison with the near-by signals.

It adds another chapter to the romance of radio to know that the concerts from distant cities have travelled up to the sky on their way to the broadcast listeners, and that an enormous mirror in the upper layers of the earth's atmosphere is chiefly responsible for the enjoyment of distant concerts.

## Italy's New Company

IN Italy, under the name of the Societa Anonima "Italo Radio" per Servizi Radioelettrici, a new company has been formed, which will specialise in the manufacture of radio apparatus and the operation of stations. It is thought that the new enterprise is a combination of the Radio Itala di Roma and the Societa Radio Elettrica per lo Sviluppo dell' Industria Radio-telegrafica in Italia. Authorised capital is stated as seven million lire, of which the two companies will hold stock at a par value of one million lire. The balance of five million will be utilised to secure licenses for use in Italy of patents of the Telefunken Company of Germany and the Compagnie Generale de Telegraphie Sans Fils, of France. The concession secured allows the right to construct, maintain and operate radio stations

throughout Italy and its colonies, and also in foreign countries.

The opinion generally held in Italy, although it is based a good deal on conjecture, is that an attempt is being made to provide a big manufacturing and operating organization similar to that of the Marconi Company of England and the Radio Corporation of America. Since wireless activities have existed in Italy, she has been largely dependant on England, France and Germany for her international radio service, and so, in view of her colonial possessions situated at great distances from Rome, high-power wireless communication is as necessary to Italy as it is to England.

## Lille

BROADCASTING from London, Cardiff, Paris and Glasgow is regularly heard at Lille. The Parisian concerts are sent on a wave-length of from 1,000 to 1,500 metres, while the British transmit at 200 metres. Lille is naturally very interested in radio. Receiving sets can be operated upon permission being obtained from the Postes-Telegraphes-Telephones Administration and there is no reason why listening-in should not gain as tight a grip on its inhabitants as in other parts of the world.

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.

SHEPHERD & NEWMAN LTD.  
COMMONWEALTH & HUNT STS.

200  
CITY  
1870



**SHEPHERD  
& NEWMAN**

COMPLETE PRINTING SERVICE

TYPOGRAPHIC ARTISTS  
COMMERCIAL COLOR AND  
HALF TONE PRINTERS.

INSURE WITH

# The Liverpool and London and Globe Insurance Co. Ltd.

**ASSETS EXCEED £20,000,000**

**LOWEST RATES**

**FIRE - ACCIDENT - MARINE**

Head Office for Australasia: 62 PITT STREET, SYDNEY

C. DANVERS, Manager for Australasia  
W. B. CLARKE, Local Manager for New South Wales

P. HEATH, Assistant Manager for Australasia  
T. M. DOUGLAS, Deputy Assistant Manager for Australasia



**FREE  
Practice  
Set**

**FREE  
Gramo-  
phone**

✱

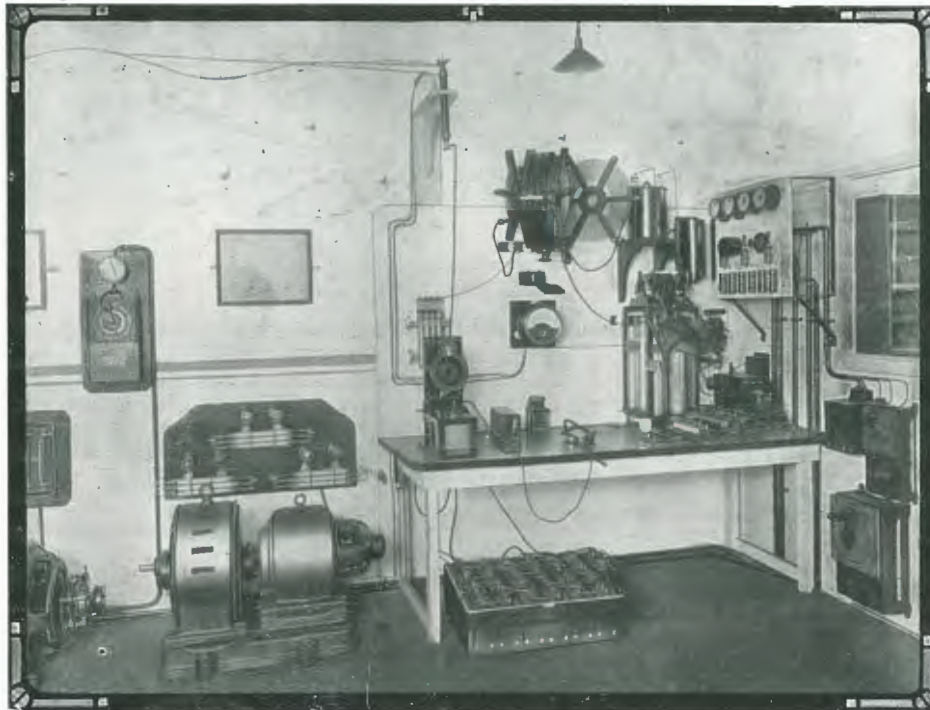
✱

**Service**

**FREE  
Books**

✱

✱



MARCONI STUDENTS OPERATE THIS TYPE OF STATION.

# WIRELESS

Owing to the increased Organisation which will be required in the near future for

**HIGH POWER STATIONS, BROADCASTING, ETC.,  
WIRELESS OPERATORS ARE URGENTLY WANTED,  
both AFLOAT and ASHORE.**

A Wonderful Opportunity to  
TRAVEL ALL OVER THE WORLD  
is opened up with  
A SPLENDID CAREER to follow.

Write urgently TO-DAY to

## Marconi School of Wireless

97-99 Clarence Street, SYDNEY, N.S.W.

and

GLOUCESTER HOUSE, 44 MARKET STREET, MELBOURNE.



# NEW SYSTEM WIRELESS

## To Get Distance—and Get it Clearly!

It is supremely essential that you possess a

### NEW SYSTEM TrueMusic RECEIVING SET.

as by so doing, you cannot fail to get the best reception results possible of attainment, when listening-in to broadcasted programmes.

The same is true as regards New System T.M.C. Headphones, Handphones, and Loud-speakers.

### NEW SYSTEM T.M.C. LOUD-SPEAKER.

No receiving set is better than its re-producer.

Our Loud-Speakers are foremost in design, pattern and efficiency; for clarity of voice production, freedom from distortion and low cost of maintenance, they cannot be equalled.

They are clear, mellow toned, resonant and sonorous, acoustically perfect, fairly priced and unreservedly guaranteed. Their sound-producing elements respond easily to the many tones of the human voice and all musical instruments.

The apparatus can be connected to your own Wireless Set, of whatever design and construction.

PRICE, £9/-/-. Carriage extra.

### NEW SYSTEM T.M.C. "DE LUXE" HEADPHONES.

These Headphones are extraordinarily sensitive; they remarkably enhance the clearness and range of the Radio-Receiver. You judge a Radio-Receiver by what you hear. If your receiving set is not equipped with New System "De Luxe" Headphones, you are not doing justice either to yourself or your receiver (2,000 and 4,000 ohms).

ONLY 40/- PER PAIR. Postage extra.

### N.S.T. AND T.M.C. DOUBLE HANDPHONES— FOR THE LADIES.

The advantages inherent in these Double Handphones will be readily apparent. Using them, ladies do not disarrange their hair; they are more easily adjusted than Headphones, and in many other respects are a boon to lady "Listeners-in."

They are light, artistically fashioned, and mounted on polished ebonite handle, with flex. Resistance, 4000 ohms.

PRICE, £2/15/-. Postage extra.

### T.M.C. 3-VALVE LOUD-SPEAKING RECEIVING SET.

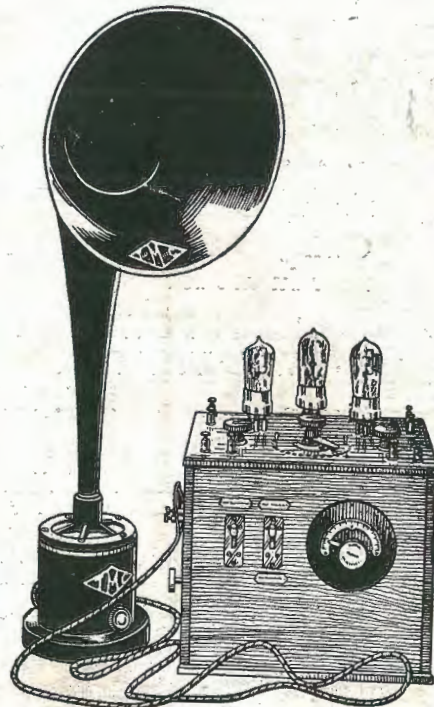
#### DESCRIPTION:

This model stands alone in high-class receivers with its high efficiency, distinctive appearance and unique features, chief of which is the Loud-Speaker device which is contained in the receiver cabinet. Special terminals are provided for an extra Loud-Speaker and two pairs of Head Telephones without alteration of connecting wires. This set has been designed to comply with the Government Regulations for sealed wave-lengths. It may be adjusted by the manufacturers to receive any one or all the Broadcast stations within reasonable distance. The cabinet is built of well-seasoned, highly finished walnut. All fittings and terminals are of polished brass and lacquered, except at points of electrical contact. Overall dimensions, 10in. x 10in. x 7in.

PRICE, £48/10/-.

With built-in Loud-Speaker, which does not include extra Loud-Speaker, and accessories. Carriage extra.

No Loud-Speaker need be purchased with this Set, and no extra amplifiers are necessary. It is a complete receiving set, suitable for Broadcast reception up to 400 miles.



Model illustrated with extra T.M.C. Loud-Speaker.

Type approved by Postmaster-General. Under normal conditions this set will give efficient service up to a distance of approximately 350 to 450 miles.

## New System Telephones Pty. Ltd.

25-27 Queen's Bridge Street,  
MELBOURNE.

Tels.: Cent. 11130 and 1761.

280 Castlereagh Street,  
SYDNEY.

Tel.: M 3230.