

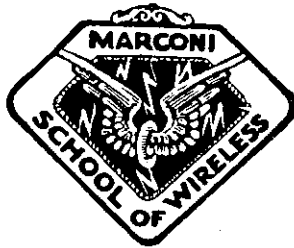
RADIO

THE INDUSTRY OF OPPORTUNITY

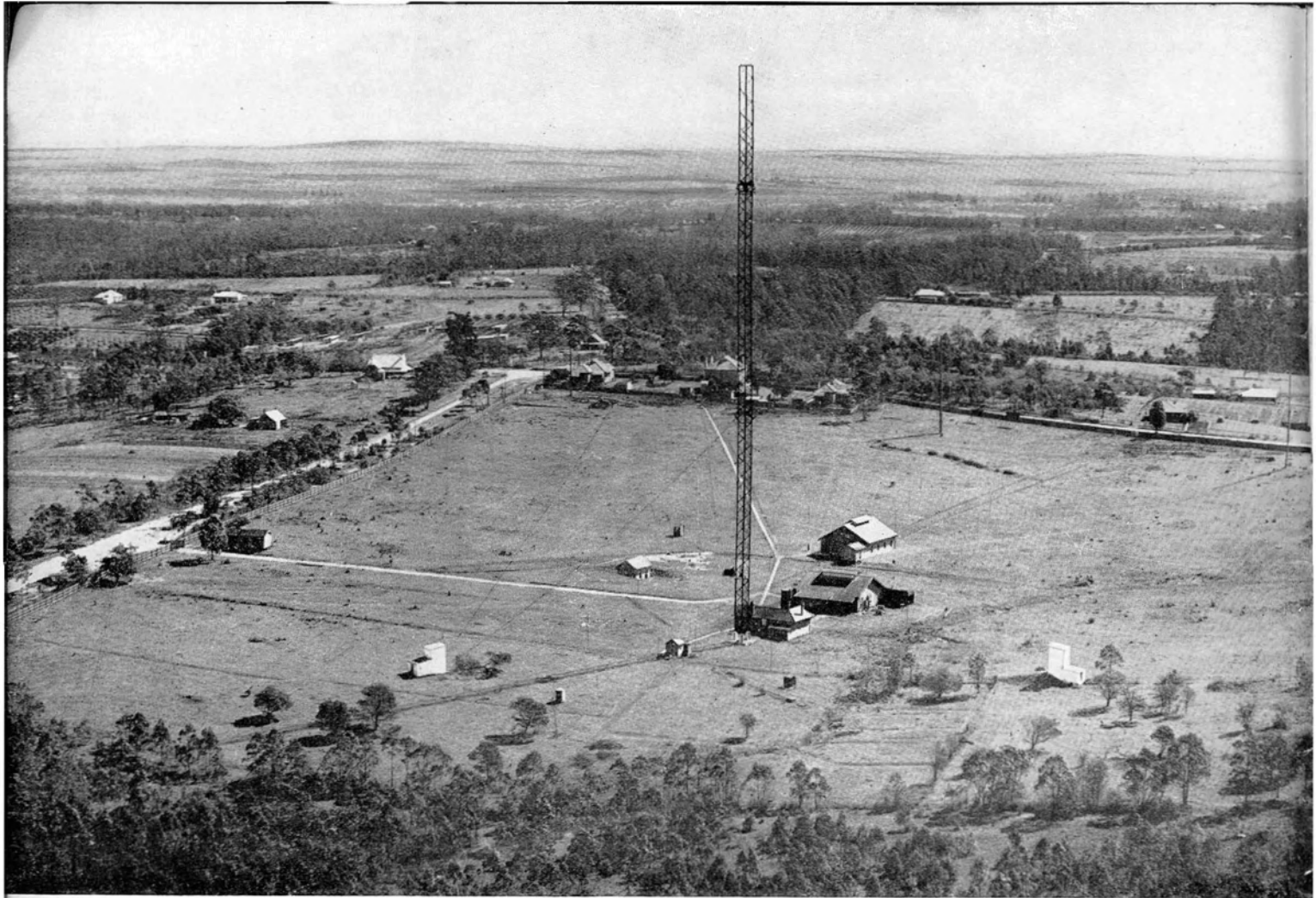


MARCONI SCHOOL OF WIRELESS

**THE
MARCONI SCHOOL
OF
WIRELESS**



CONDUCTED
UNDER THE AUSPICES OF
AMALGAMATED WIRELESS
(ASIA) LTD., SYDNEY



A.W.A. Radio Centre, Pennant Hills,
14 miles from Sydney, New South Wales, Australia.

DO YOU KNOW THESE FACTS of the RADIO INDUSTRY ?

That the Beam Wireless Service between Australia and Great Britain and Australia and North America, the longest and fastest wireless telegraph service in the world, was pioneered by A.W.A.

That the Beam Wireless Transmitting Station at Fiskville and Receiving Station at Rockbank are the largest wireless stations in the Southern Hemisphere!

That by means of the Anglo-Australian telephone service, any one of the half-million telephone subscribers in Australia can speak to 90 per cent. of the 33 million telephone subscribers in the world.

That photographs, drawings and specifications are transmitted from Australia to England, and vice versa, by means of the Beam Wireless Picturegram Service!

That there are nineteen Coastal Radio Stations in Australia maintaining communication with ships at sea, with other Coastal Radio Stations and with Radio Stations in the Pacific Islands! The Australian Coastal Radio Stations operate day and night throughout the year, communicating with ships at sea at distances up to 10,000 miles.

That there are sixteen Radio Stations in Papua, the Mandated Territory of New Guinea, and Fiji, communicating with ships at sea, and with the Australian Coastal Radio stations! That over 470 ships have been equipped by A.W.A. with wireless installations.

That several small interstate vessels are equipped with wireless telephone installations, maintaining communication with similarly equipped stations at Brisbane, Sydney, Melbourne and Adelaide!

That trawlers operating off the New South Wales coast are fitted with wireless telephone transmitting and receiving equipment.

That A.W.A. Coastal Radio Stations broadcast navigation, weather warnings and informa-

tion, totalling 700,000 words per annum, to ships of all nationalities.

That the short-wave stations at A.W.A. Radio Centre, Sydney, maintain communication with ships equipped with short-wave apparatus in the Pacific and Indian Oceans, with liners crossing the Atlantic, with whalers in the Antarctic and with short-wave stations in other countries.

That a regular experimental Overseas Broadcast Service is maintained by A.W.A. short-wave broadcast stations, VK2ME Sydney, VK3ME Melbourne and VK6ME Perth, and that reception is effected in practically all countries of the world.

That Police Patrol Wireless Services are in operation in Sydney, Melbourne, Perth and Brisbane, the police headquarters being in communication with the police patrol cars patrolling the city and suburbs! .

That the manufacture of wireless equipment in Australia is now a soundly established, self-contained industry, producing every type of wireless equipment for use at sea, on land and in the air.

That wireless valves of the highest grade are now manufactured in Australia.

That the sale and servicing of broadcast receivers has become a specialised business.

That radio telephony and telegraphy equipment is being installed in all the principal aerodromes of Australia and upon passenger-carrying planes.

That a series of radio course beacons is also in course of erection along the Australian air-mail routes at intervals of about 200 miles.

That wireless communication is in operation over the Burrenjack Hydro-Electric System; the main station communicating with Auxiliary and portable stations along the reticulation system and that a similar system is in operation at the Lithgow Power House in connection with

the New South Wales Government Railways! That the majority of the larger hospitals in the Commonwealth are wireless equipped, enabling patients to listen to the broadcast programmes!

That ocean newspapers, containing a budget of the latest news transmitted nightly to ships at sea, are published daily by the principal Australian and New Zealand ships!

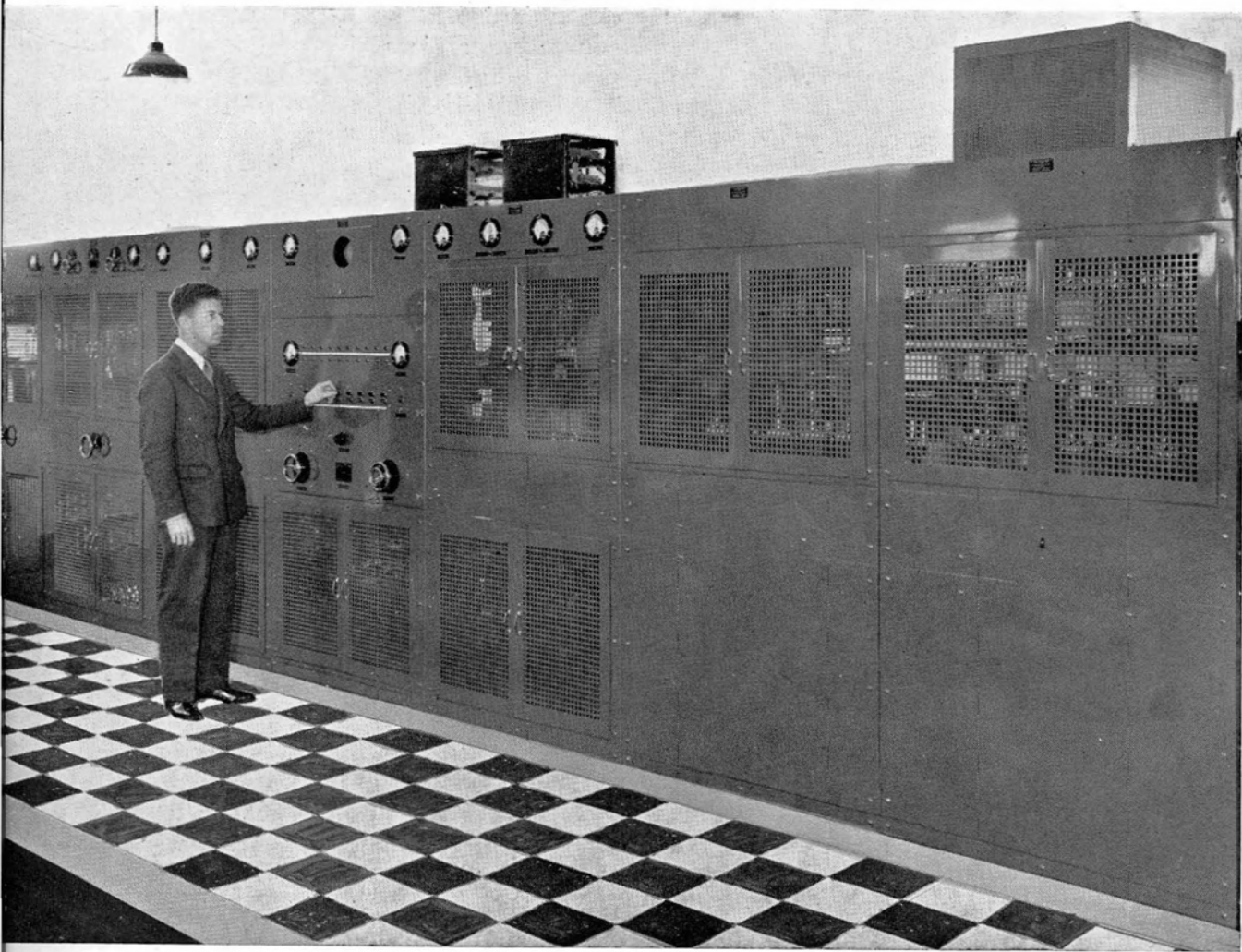
That speeches and music at most large public gatherings, both indoor and outdoor, are to-day amplified by loud-speaking equipment! That several of the principal hotels and clubs are equipped with permanent centralised radio

for paging and for broadcast reception in guest rooms.

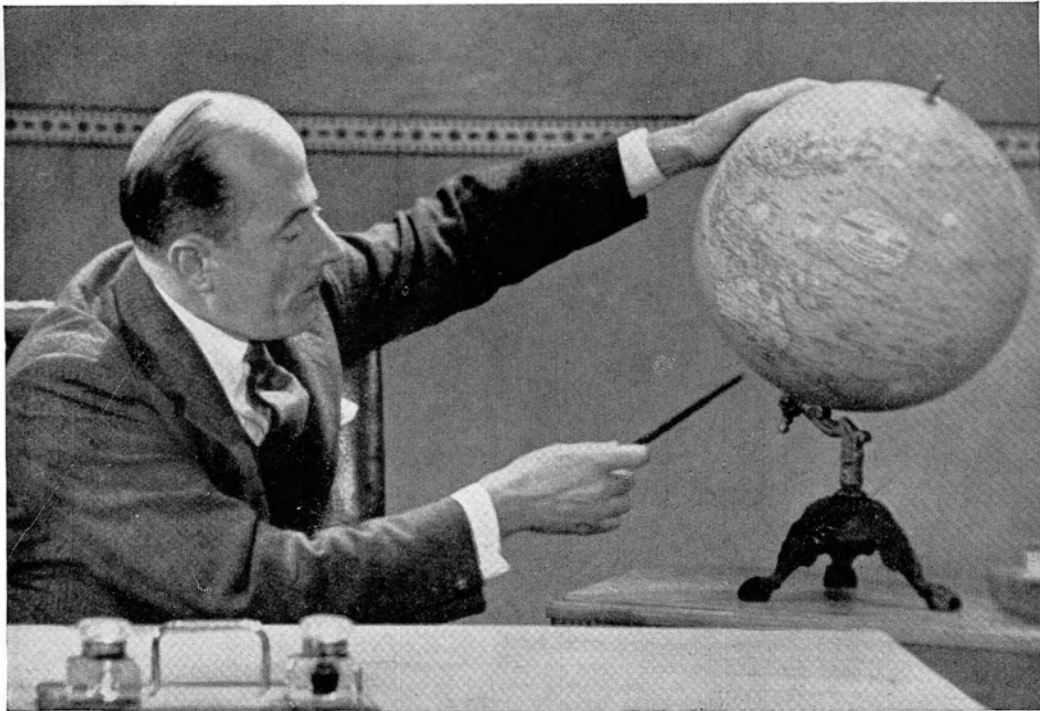
That the research laboratories of Amalgamated Wireless are constantly developing new applications of wireless.

That the enormous progress that has been recorded in wireless during the last decade will be surpassed by its future development during the next ten years.

That the achievements already obtained in wireless science are but stepping stones to far greater developments in every branch of wireless activity.



20 K.W. Short Wave Transmitter at A.W.A. Radio Centre Pennant Hills, for use in Overseas Broadcasting and Telephony. Designed and manufactured by A.W.A.



THE TO-MORROW OF RADIO

Sir Ernest Fisk, F.INST.R.E., A.M.I.E. (Aust.)
Chairman, Amalgamated Wireless (A/sia) Ltd.

Wide public interest, intensive research and commercial enterprise are the principal forces which will ensure further application of the possibilities of radio in future years. The subject itself is regarded to-day as almost inexhaustable and everyone who has an understanding of it regards the future potentialities as being almost without limit.

Let us now move from the general to the particular and try to visualise some of the practical uses likely to arise in future years from the science of radio. This should always be done, because scientific discoveries must be measured in terms of their ultimate value to the human race.

I commence this with the assertion that human affairs, as we know them, or civilisation, as it is termed, must move forward. They cannot stand still and no real benefit is to be expected

from going back. It is my opinion that the so-called science of radio will be unsurpassed in the measure of contribution it will make to the future progress of human affairs. It will carry out important functions in the field of transport, communication, education, entertainment, politics, international affairs, labour-saving, and last, but not least, it will be applied to the prevention and cure of disease and sickness.

The work of Marconi and others towards the close of the 19th Century laid the foundations of this science, which has proved to be the greatest wonder of the 20th Century and might conceivably result, if properly applied, in establishing a millennium in the 21st Century.

Such far-reaching forecasts are not made without reasonable foundation; they are based upon intimate knowledge of the development of

radio from its early times and continuous study of its known scientific principles.

The term "Radio" has not yet been assigned a definite meaning in the world's vocabularies, but among great masses of people it is associated only with modern wireless broadcasting. Some of our advanced physicists, however, use the term in a much wider sense to embrace all the principles and functions of energy radiation through the ether of space, and it is in this sense that I wish to be understood now. In its earlier days, radio was more familiarly known by the term "wireless", and to-day many people incorrectly regard radio communication and wireless communication as different things. Let us here use the term "Radio" to include all the world's knowledge of radiant energy and the future possibilities of that knowledge extended and applied.

On this basis we must accept the idea that all space is filled and all matter is permeated with an invisible substance, through which energy can be sent with enormous velocity. We know that light, heat and the waves from radio stations travel at almost eleven million miles a minute; we also know that the only difference between these various kinds of waves is in their length. Another important piece of modern knowledge is that all material things, such as wood, iron, the human body and so on, in their final analysis are made up of extremely small particles of electricity which are separated from each other and which are constantly in rapid motion.

These fundamental points and the extensive knowledge of complicated detail available to-day, enable us to visualise some of the remarkable future developments which the world will experience as our technical knowledge and skill increase.

Radio communication has already annihilated distance on the face of the earth by such wonders as the beam wireless, overseas telephony and communication with ships at sea. The next important step in this direction will be the development of practical television as an adjunct to oversea communication services, so

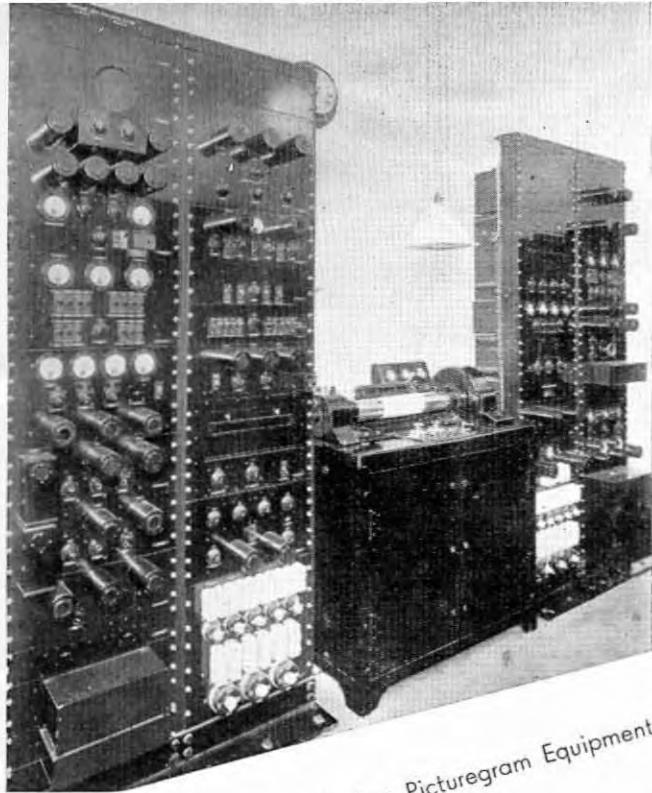
that when the Prime Minister of Australia talks with the Prime Minister of England they will be able to see as well as hear each other; business men will also find this an advantage in consultation, while friends and relatives separated by distances of thousands of miles will find it a great comfort.

This television is a certainty of the future, but a considerable uncertainty at the present time. When perfected it will also enable us to sit at home and watch as well as listen to interesting happenings in various places. It will enable us to broadcast plays and other entertainment simultaneously to millions of people, who will see as well as hear. News of the day will be flashed on to a screen in every house, and at suitable times pictures of manufacturing works in operation or displays in shops and markets will be sent out. I must warn readers, however against expecting these new marvels in the near future; I believe firmly that we still have to wait a considerable number of years before these things will be practicable on a satisfactory basis.

Wireless has done a great deal to assist navigation and to safeguard life and property at sea. During the next ten years it will advance still further in this valuable direction. Marconi demonstrated by means of his micro ray that a vessel can be steered through a narrow and winding channel, even though the helmsman might be blindfolded; by the same agency also, it will be possible to give definite warning of approach to dangerous obstacles or other vessels in fog.

Australia is rapidly becoming air-minded and we are beginning to appreciate what a great amount commercial aviation can do in overcoming Australia's isolation. Modern aerial transport and passenger services can only be successfully established and maintained in alliance with efficient organisation for wireless communication between the ground and aircraft in flight. Wireless will prove to be one of the most valuable factors in developing this new method of transportation and, looking far ahead into the future, I think that some day we may see large, high speed machines

A. W. A. BEAM WIRELESS PICTUREGRAM SERVICE between Australia and England



A.W.A. Beam Wireless Picturegram Equipment.

Beam Wireless Picturegrams transmitted from England to Australia—
 (Top Right) Line Drawing.
 (Right) Balance Sheet.
 (Under) Sheet of Music.

THE T. V. & COMPANY LIMITED
 BALANCE SHEET 31st DECEMBER 1933

SHARE CAPITAL AUTHORIZED AND ISSUED - 20,000 ORDINARY SHARES OF £1 EACH	20,000.00	PREFERRED LAND AND BUILDINGS - PLANS, MACHINERY, FURNITURE AND FIXTURES - AT COST.	13,466.17.9
5,000 6% PREFERENCE SHARES OF £1 EACH	5,000.00	SHARES IN ASSOCIATED COMPANIES - AT COST	10,000.00
GENERAL RESERVE FUND	1,000.00	BRITISH GOVERNMENT SECURITIES - AT COST	3,621.5.6
SUNDRY CREDITORS - AMOUNT DUE TO AN ASSOCIATED COMPANY ON LOAN ACCOUNT	25,000.00	STOCK OF MATERIALS AND CONTRACTS IN HAND	4,348.12.2
OTHER CREDITORS	3,200.00	AMOUNTS DUE FROM ASSOCIATED COMPANIES ON CURRENT ACCOUNT	619.9.4
PROFITORS FOR DIVIDENDS	2,500.00	OTHER DEBITORS	4,162.2.1
ACCUMULATED DIVIDENDS ON PREFERENCE SHARES £150.00	4,164.9.6	CASH AT BANKS AND IN HAND	2,530.15.3
PROPOSED DIVIDENDS ON ORDINARY SHARES	1,000.00		
LESS - INCOME TAX	21,950.00		
PROFIT AND LOSS ACCOUNT - BALANCE BROUGHT FORWARD FROM 1932	487.10.00		
PROFIT FOR THE YEAR 1933	1,462.10.00		
LESS - DIVIDENDS PREFERENCE AND ORDINARY SHARES	2,325.14.8		
	23,542.2.8		
	2,100.00		
	1,442.2.5		
	23,769.2.1		

WE HAVE EXAMINED THE BOOKS OF THE COMPANY FOR THE YEAR ENDED 31st DECEMBER 1933, AND HAVE OBTAINED ALL THE INFORMATION AND DRAWN UP SO AS TO EXHIBIT A TRUE AND CORRECT VIEW OF THE COMPANY'S AFFAIRS.

LONDON, E.C. 4. 26th FEBRUARY 1934

A. SNOW
 R. SMITH
 DIRECTORS

23,769.2.1

THE CURTAIN FALLS

Song.

Words by ARTHUR L. SALMON. Music by GUY D'ARDELLOT.

Adante *allegro*

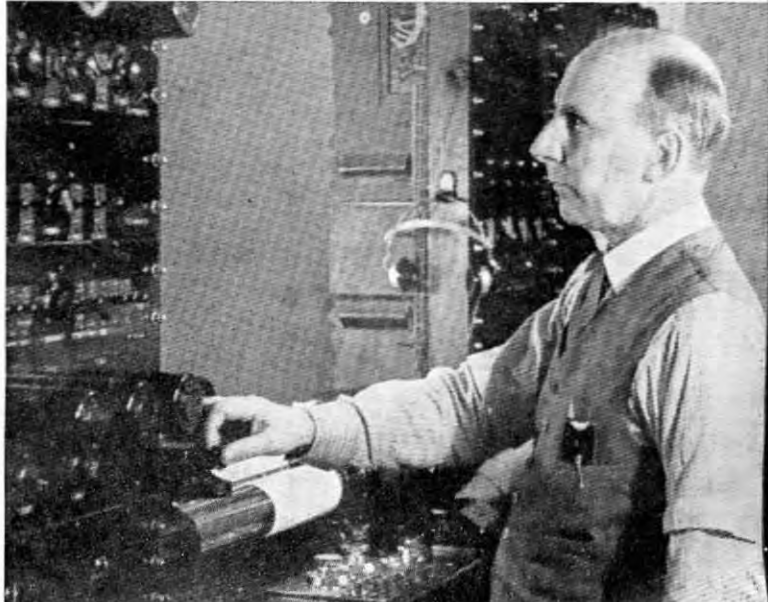
VOICE: Just for a lit-tle while,

PIANO: — we play Our parts, and an-swer to our calls

And...

then, for you and me, some day,

Copyright, MCMXXXIII by Chappell & Coy Ltd.



By courtesy Chappell & Coy, Ltd.

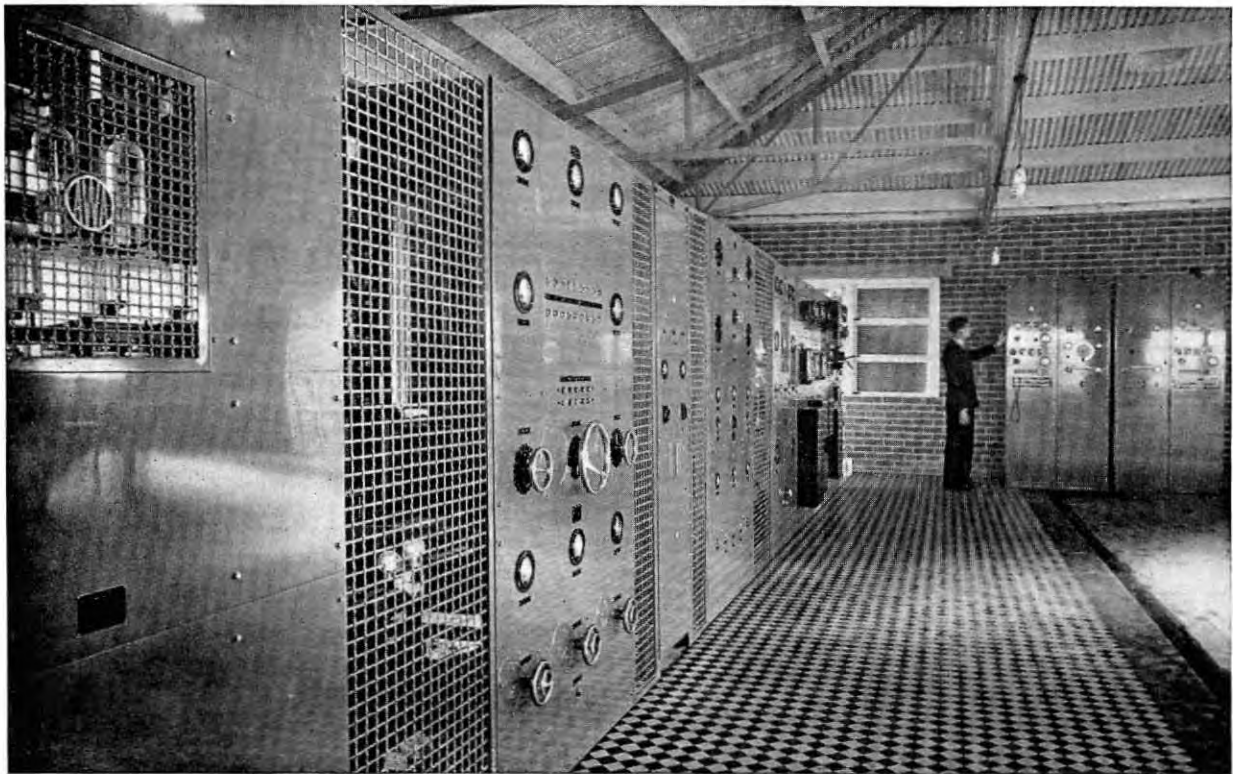
Transmitting a Picturegram to London .

guided across thousands of miles of ocean and land by powerful though invisible wireless beams. Aircraft going in one direction will fly along a beam at a certain fixed height and those going in the opposite direction will fly along a different beam. There will also be more than one beam in each direction for machines of different classes and various speeds. Wireless and aviation will be the messengers of Mercury, the annihilators of distance and time. The latest development of wireless, Marconi's micro ray, will, in a few years, open up quite a new field for various forms of communication. In the densely inhabited cities and suburbs as well as the sparsely populated backblocks of Australia, the micro ray will find scope for valuable service, and we may expect some day to see it applied to the control of railway trains, the landing of aircraft, direction of city traffic, and widely used also by police and fire brigades. It will play an important part in the development of television.

Radio, as I have already pointed out, cannot be limited in its application to telegraphy and telephony. It will go far beyond these and will eventually enter the field of household duties to assist in cooking, lighting and heating, while its use for medical and surgical purposes is already being appreciated. This latter, however, is only in its early infancy. I believe the knowledge that is being obtained from the development of wireless in its many present forms will ultimately lead to entirely new means and methods in the prevention and cure of disease.

It should be understood that I am writing only of the future. These things are not fully developed at the present day and for some of them, we have many years to wait, but I firmly believe that everything I have indicated above is capable of realisation within one or two generations.

High fidelity wide-range Broadcast Transmitter and control panel, at A.W.A. Radio Centre, Pennant Hills.



THE NEED FOR SPECIALISED TRAINING

So rapid has been the development of the art and science of radio in the last few years, so great the amount of scientific data accumulated and so detailed and specialised have the various branches of wireless become, that no one can hope to successfully enter the radio field to-day unless he is systematically trained in the particular branch in which he desires to work.

The meteoric rise of wireless from an experimental science to the magnitude of a "key" industry of national and international importance is nothing less than amazing. The advent of broadcasting, the development of overseas short-wave wireless telegraphy and the inauguration of world-wide broadcasting services has opened up opportunities for trained workers in every direction.

In a great number of professions a distinct limit exists to the scope of one's activities. Not so in wireless. Each day research opens up new methods and new spheres of activity. The experimental work of one year becomes the specialised practice of the next.

In the early days of wireless, transmitting equipment was simple in construction, but compared with the apparatus of to-day, unwieldy in operation. The advent of the thermionic valve, the development of short-wave wireless, and the establishment and operation of modern research laboratories, have revolutionised wireless. To deal with the complex circuits of modern transmitting equipment and the intricate operation of the multi-valve receiver, with its infinitesimal adjustments, an operator must be thoroughly versed in wireless and electrical science.

With the development of the A.C. operated receiver, the circuits have become more involved, and a greater knowledge of radio and electrical science is required by those building such receivers.

The ever-growing popularity of broadcasting and the success that is attending the erection of Class B broadcasting stations throughout Australia, are opening up new fields of opportunity for engineers for broadcasting stations. Executives are required to manage the business side of the stations and studios, experts are in demand to prepare entertainment programmes, while trained announcers are required for the placing of the programmes on the air.

The talking motion picture has opened up a new industry that offers exceptional opportunities for those versed in the principles, practice and characteristics of electronic valves, the various methods of amplification, sound reproduction and acoustics. Only those with a specialised knowledge of these subjects can hope to successfully compete in this new profession.

Great as has been the progress in wireless during the past decade, even greater progress may be looked for during the next few years. The organised research and engineering development that is being carried out in the laboratories of the large wireless organisations throughout the world, is being applied to wider fields. Each new application of the science develops new branches in the industry, with consequent openings for an ever-increasing number of workers.

To take advantage of the opportunities that offer in radio, one must be qualified. The possessor of the Marconi School Diploma bears undoubted evidence of a thorough radio training, carried out on sound principles by a school whose high prestige in the radio industry extends over a period of over twenty-four years.

The Marconi School Diploma is recognised everywhere as the hall-mark of training, entitling its holder to the most favourable consideration by discerning employers.

SINCE 1913 —

AUSTRALIA'S LEADING WIRELESS SCHOOL

Established at Sydney in 1913, the Marconi School of Wireless has played an important part in disseminating and inculcating the practice of wireless in Australia, and by its specialised training has been the means of placing many hundreds of Australians in this new and lucrative industry.

At that time the practice of wireless was confined to a handful of experimenters and to the comparatively small number of operators on ships equipped with wireless. During the following years very definite progress was made in the installation of wireless on Australian and New Zealand ships, and the demand created for trained wireless men to operate ships' wireless equipment was met by the Marconi School.

On the outbreak of the War in 1914, the School rendered useful service to the Empire by training men for the Royal Australian Navy, the Military Wireless Corps and for service as operators on transport ships conveying Australian and New Zealand Forces to New Guinea, Gallipoli, Palestine, Mesopotamia and France.

In 1916 a number of ships were built in Japan to the order of the British Government for the transport of troops, supplies, munitions, etc. The wireless equipment for these ships was manufactured in Australia and shipped to Japan for installation. Each of the operators sent to Japan to take up duty aboard these vessels was a graduate of the Marconi School. During the war, Marconi School graduates performed wireless duties in practically every branch of the fighting services, including the Royal Australian Air Force.

On the return of the A.I.F. to Australia, a great number of the members, by arrangement with the Repatriation Commission, were trained for positions as wireless operators on merchant ships.

On the advent of broadcasting in 1923, a large number of Marconi School graduates entered this new field of radio, occupying positions as technicians at broadcasting stations, radio salesmen and service mechanics.

The development of police wireless stations acting in conjunction with wirelessly-equipped police patrol cars called for trained wireless men, and these again were supplied by the School.

The talking picture field, with its application of electronic valves and speech amplifying equipment opened up new avenues for skilled wireless men, and many Marconi School graduates are to-day filling important positions in the motion picture field throughout Australia. In every branch of wireless in Australia and New Zealand, on ship, shore and broadcasting stations, studios, sales and service departments and police patrols, will be found graduates of the Marconi School.

In the A.W.A. stations in the Pacific Islands, in gold and oil seeking expeditions in New Guinea and Papua are many wireless men who received their training at the School.

In such a science as wireless new developments and new applications grow apace, and much of the success that has attended the Marconi School is due to the fact that its curriculum has kept pace with the progress that characterises the industry.

In 1928 the School inaugurated a class for Radio Mechanics, the first of its kind in Australia, and such has been the success of its efforts that the attendances have taxed the capacity of the School.

In this booklet are incorporated many new and specialised courses in radio engineering, wireless operating, talking pictures, and receiver servicing.



Assembly building, A.W.A. Radio Electric Works, Ashfield

FEATURES OF OUR SERVICE

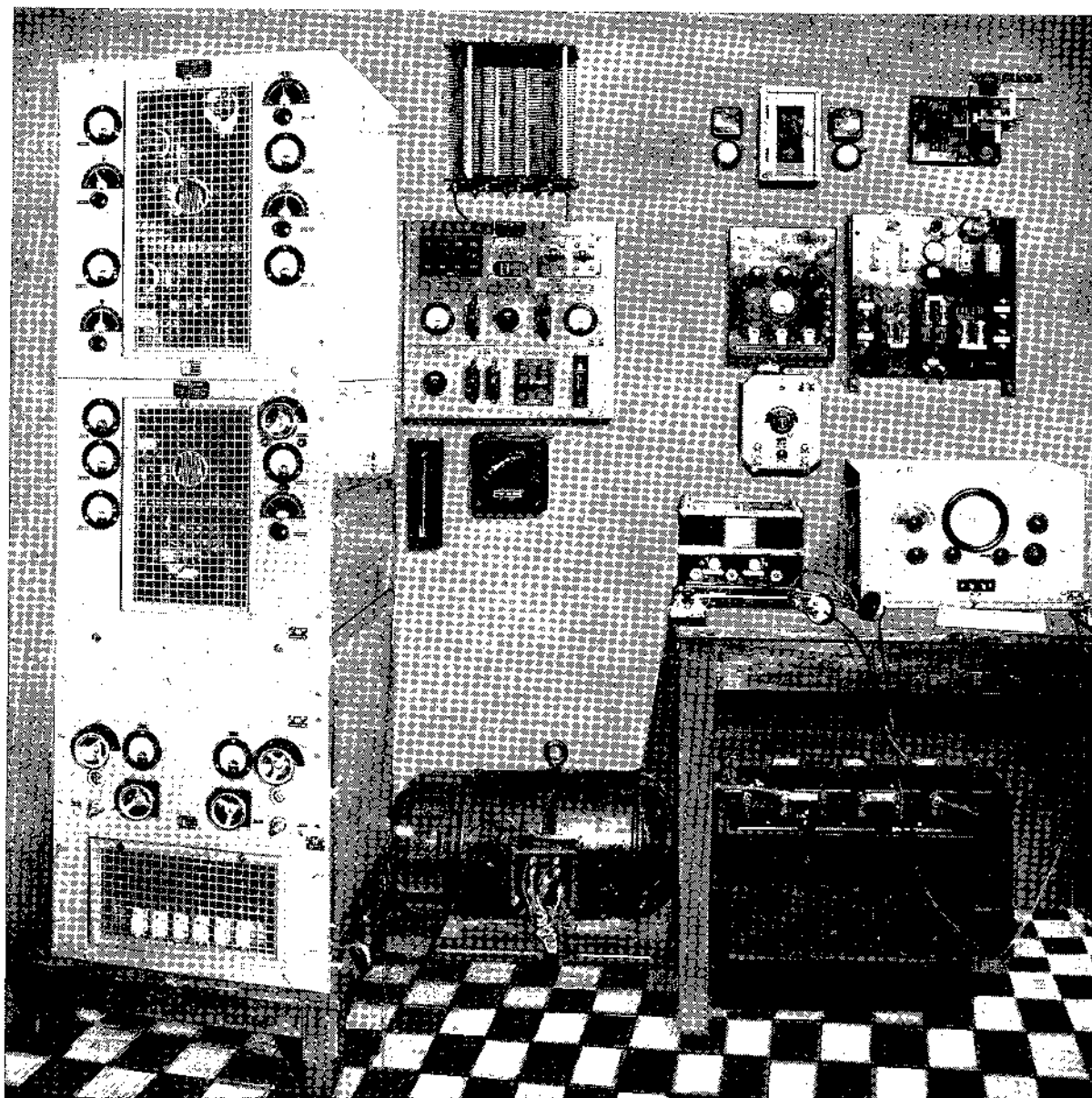
Students of the Marconi School of Wireless enjoy a distinct advantage in having access to some of the principal stations and works of Amalgamated Wireless, the second largest wireless organisation in the British Empire. The facility granted students in thus being able to inspect the Radio-Electric Works and some of the Company's principal wireless stations under actual working conditions, and having the various processes and operations explained to them by experts, is a service afforded by no other school. The Marconi School courses are prepared by experienced radio engineers on the staff of A.W.A. Most of the School instructors have had many years of practical experience in some branch of A.W.A. activity, either in connection with the Beam Wireless Stations, Overseas Radiophone Service, Broadcasting Stations, Coastal Radio or Marine Wireless Stations.

By arrangement with Amalgamated Wireless

the School is in the unique position of being informed from time to time of all new developments in all the phases of wireless. These are incorporated in the instruction papers, and thus the student receives information of the latest developments and the most modern methods of wireless.

The instruction papers are clearly illustrated, logically set out and scientifically graded. Each illustration is designed to give a clear understanding of the adjacent text.

In addition to supplying students with complete instruction papers, the School instructors correct all the homework exercises included in the course and endeavour by personal direction to assist students at all stages of their studies. Further, the instructors, either by correspondence or personally at the School's offices, will be only too pleased to explain any difficult points.



Standard C.W., I.C.W. Marine Transmitter.

MARCONI SCHOOL EQUIPMENT

The School is well provided with an extensive range of modern wireless equipment installed as complete stations. The student thus has at his command equipment similar to that used in Coastal, Ship and Broadcasting Stations. The School equipment comprises the following:—

TRANSMITTING EQUIPMENT.

1. A complete 750 watt short-wave/long-wave I.C.W. standard A.W.A. marine transmitter of the latest type, as installed in modern passenger ships.
2. A complete $1\frac{1}{2}$ k.w. spark transmitter.

3. A 500 watt quenched-gap ship's installation.

4. A 500 watt crystal-controlled radiotelegraph-telephone transmitter, capable of transmitting continuous wave, interrupted continuous wave, or radio telephony. This set may be keyed either by ordinary hand telegraph key or by high-speed automatic tape, and provides practical demonstration of modern radio practice.

5. A complete 250 watt Broadcast transmitter, comprising master oscillator, buffer amplifier and power amplifier, with low and high power modulation. This set is particularly designed for the instruction of Engineering and Technician students, who make various tests and adjustments with different systems of modulation.

RECEIVING EQUIPMENT.

1. Commercial receiver for ship stations.
2. Commercial receiver for coast stations.
3. Direction-finding receiver—Bellini-Tosi system.
4. Auto-alarm, distress calling apparatus.
5. Broadcast receivers of the latest design, including loud speakers of all types.

WORKSHOP.

There is a well-equipped workshop for use by students taking particular courses.

EQUIPMENT FOR TELEGRAPH INSTRUCTION.

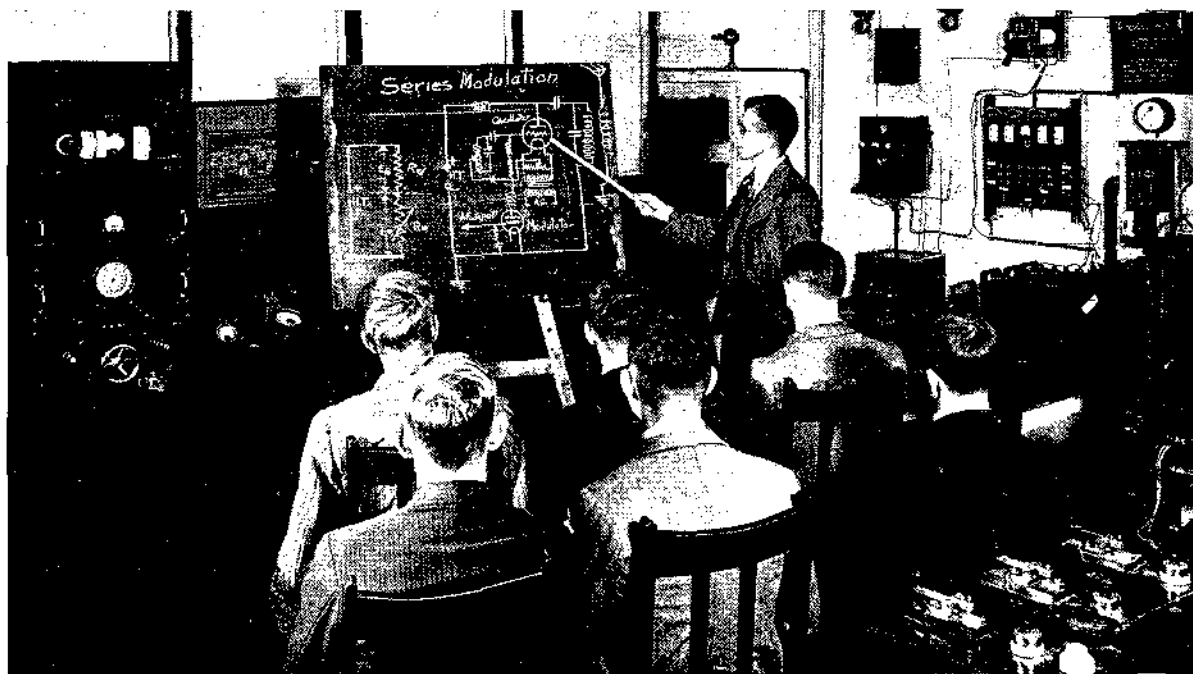
For instruction in telegraphy the School is equipped with apparatus enabling the most modern methods to be employed. Reception is effected by means of headphones actuated by valve audio frequency oscillators, which give a good clear note. These oscillators are operated by the usual Morse key for hand sending, or by a Wheatstone transmitter when automatic transmission is desired.

With the aid of the apparatus mentioned above, it will be seen that the School is in a position to impart the most efficient practical instruction on the operation and assembly of modern radio apparatus and for the conducting of experiments, measurements and calibrations in connection therewith.

Since its establishment in 1913, the Marconi School has carried on instruction by both oral and correspondence tuition and has found that best results are obtained by means of instruction papers and correspondence tuition. However, not *all* the instruction can be imparted by correspondence, so that the School has judiciously *combined* both these methods of instruction. Thus the groundwork of the student's knowledge is taught by correspondence, and later he attends the School in order to put his theoretical knowledge into practice.

The first portion of the course being taught to the student in his own home places him on an equal footing with students resident in Sydney. Furthermore, not only does this method involve less expense than personal attendance throughout the whole period of the course, but the time otherwise occupied in travelling can be devoted to profitable study.

The student has at his disposal a complete, carefully graded series of written lectures, to which he can constantly refer. Expert instructors are also available from whom he may obtain technical advice and explanations on any difficult point. Having every facility available, the progress the student makes in his studies is wholly dependent on himself.

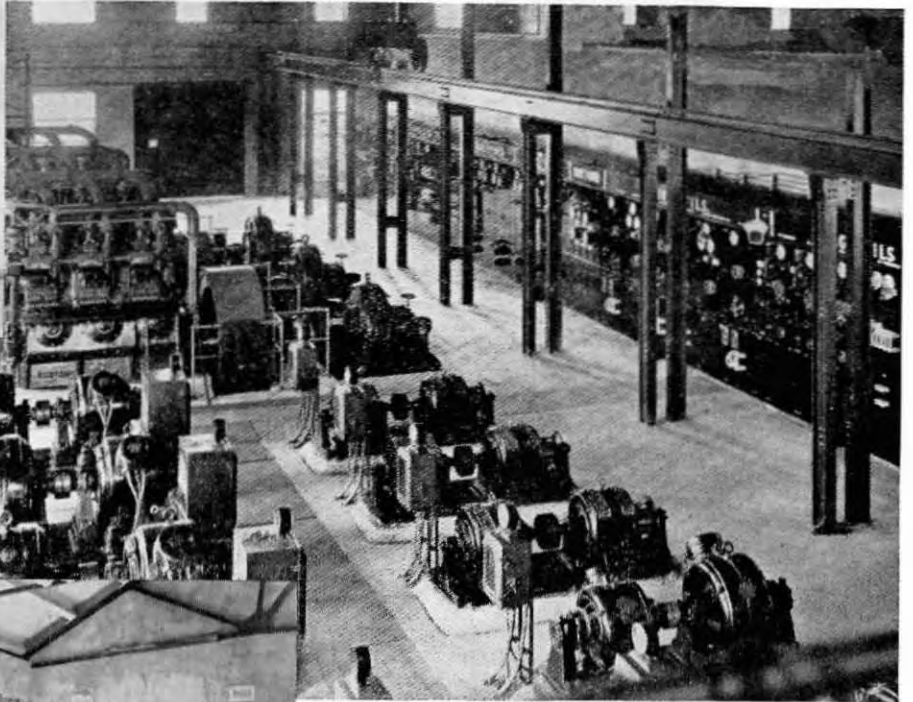


Section of Class Room, Marconi School.

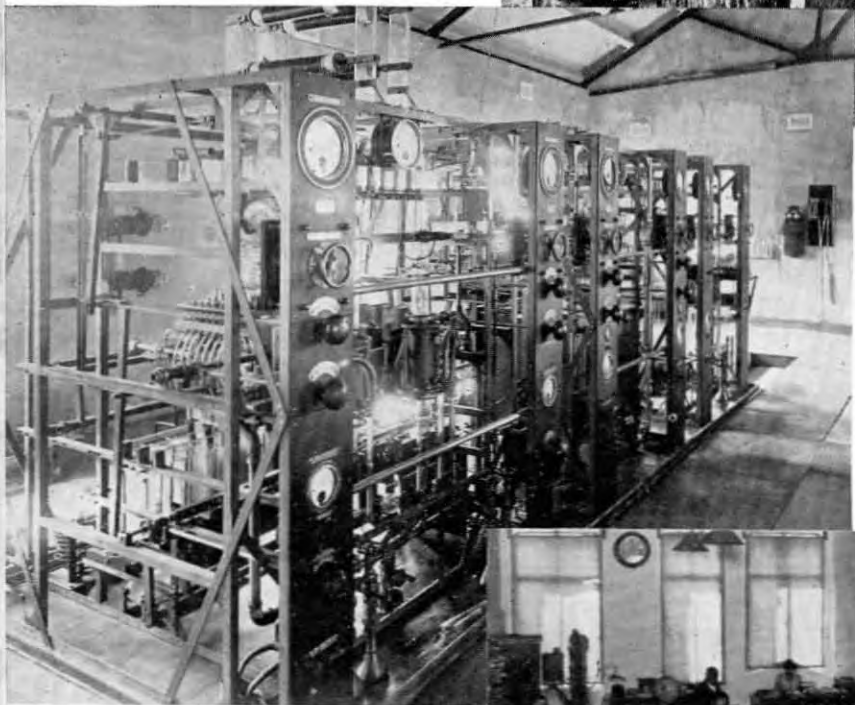
BEAM WIRELESS SERVICE



Beam Aerial Masts,
at Fiskville, Victoria



Power Generating Plant at
Fiskville, Transmitting Station.



Thermionic Valve Transmitter
at Beam Wireless Station,
Fiskville, Victoria.



Operators handling Beam traffic at
Central Radio Office, Melbourne.

INTRODUCTION TO COURSE "A" RADIO ENGINEERING

PREPARATORY COURSE.

The course in Radio Engineering can be taken only by persons holding specific qualifications. The School has made provision by correspondence for preparatory courses for training in the necessary educational subjects, commencing from different standards, as shown hereunder:—

A person holding the Qualifying Certificate (or permit to enrol) obtained at a Primary School, will be required to take:

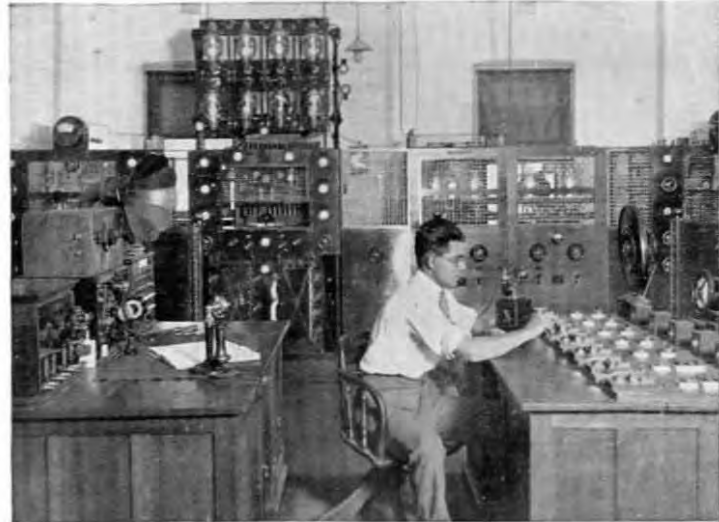
- (a) A preparatory course in the essential Intermediate certificate subjects, English, Mathematics I. and II., Physics and Chemistry. Average duration of course, 1 year. A knowledge of these subjects will be tested by examination.
- (b) A preparatory course in the essential Leaving Certificate subjects English, Mathematics I. and II., Physics and Chemistry. Average duration of course, 1 year. A knowledge of these subjects will be tested by examination.
- (c) The complete radio engineering course.

A person holding the Intermediate Certificate, who has passed in English, Mathematics I. and II., Physics and Chemistry, or the combined course in Physics and Chemistry known as Elementary Science, will commence with the preparatory course (b) outlined above. If the I.C. examination has been passed in only some of these subjects, a preparatory course must be taken in the remainder of the subjects.

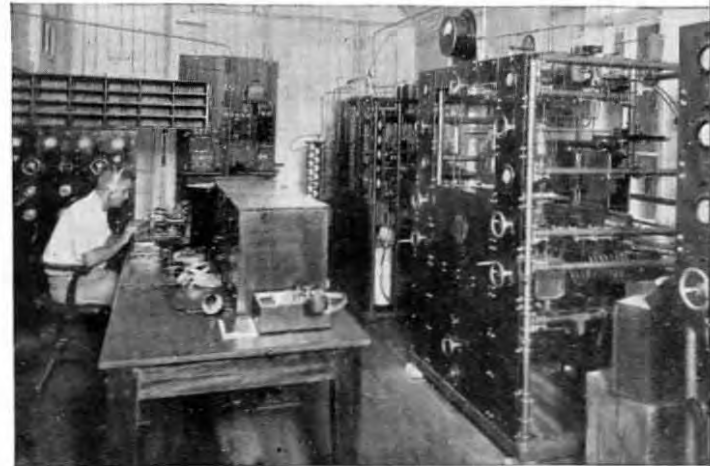
A person holding the Leaving Certificate, who has passed in English, Mathematics I. and II., Physics and Chemistry, may commence the radio engineering course which occupies five years. If only some of the above subjects have been passed at the L.C. examination, a preparatory course must be taken in the remainder of the subjects.

Any person who can satisfy the school authorities that his standard of education is equivalent to a pass in the above examination will be regarded as having passed them. This applies more particularly to students outside New South Wales.

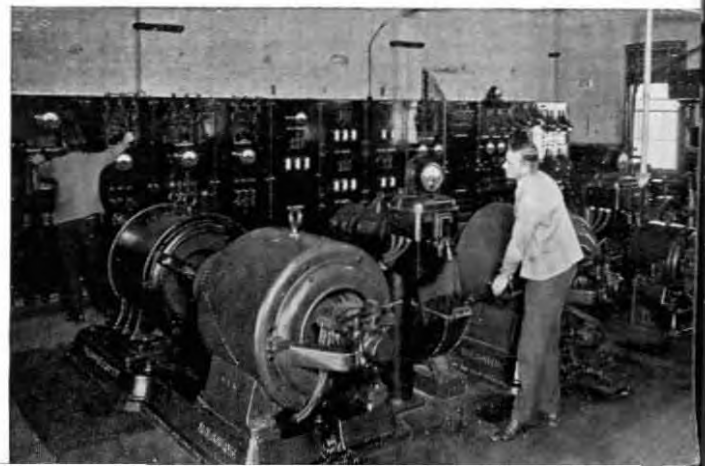
A person who has passed in the essential L.C. subjects and has undergone a course of training in electrical engineering subjects at any technical school may commence the radio engineer's course at subject E; the duration of the course will then be $4\frac{1}{2}$ years.



Section of Transmitting Room
AWA Radio Centre, Pennant Hills.



Transmitting Room of AWA Island Station at Suva, Fiji.
(Below) Engine Room and Switchboards of
AWA Radio Centre, Pennant Hills.



COURSE "A"

RADIO ENGINEERING

THE RADIO ENGINEER AND HIS QUALIFICATIONS.

The Radio Engineer must have a sound knowledge of electrical engineering, and be capable of applying that knowledge to the highly specialised science of radio engineering.

In order to understand and efficiently solve the numerous problems which arise from time to time in the course of his work, it is essential that the Radio Engineer should possess a thorough knowledge of mathematics.

Further, he must have a working knowledge of the design, manufacture and operation of all types of transmitting and receiving equipment and the component parts of same.

The Radio Engineer should also be capable of designing and preparing specifications of all types of transmitting and receiving installations and be thoroughly conversant with all types of measuring instruments as used in radio laboratories and versed in their various uses and applications.

Further, he should be qualified to supervise the erection of radio stations and to carry out tests efficiently of the apparatus before the stations are handed over for commercial operation. In order that he may effectively carry out tests between various telegraph stations, it is necessary that he be an efficient Morse operator.

FIRST YEAR.

During the first year of study, instruction will be imparted by means of the home study or correspondence method.

The technical instruction imparted during the first year deals with general electric subjects. One instruction paper will be forwarded each week, accompanied by an examination paper containing questions relevant to the subjects discussed in the instruction paper.

In addition, one paper will be forwarded every three weeks dealing with advanced mathematics; these will also be accompanied by examination papers.

At the commencement of the first year's studies, the student will be supplied with a portable gramophone, two sets of Morse training records, also a key and buzzer set, for the purpose of enabling him to practice the transmission and reception of Morse telegraphy at home.

SECOND YEAR.

The second year's instruction deals mainly with the theory of Electronic Valves, Valve Transmitters, Aerials, Reception, Amplification, Studio Design and Equipment, and Marine Equipment. The advanced mathematics course is also continued.

After the first nine months of this year's study, the student should attend the School, if possible, in order to obtain practical instruction; however, his personal attendance can be deferred till the commencement of his third year, if it is not convenient for him to attend at this juncture. When the student has begun attendance at the School, the whole of this time must be given up to the course, so that employment is no longer possible.

Practice in Morse telegraphy is continued at home until the student attends the School.

THIRD YEAR.

The student has now reached a stage where it will be compulsory for him to attend the School personally for practical instruction.

He will now be enabled to continue the practice of Telegraphy at the School in order that he may be qualified to sit for the First Class P.M.G. Certificate of Proficiency.

The third year's technical instruction deals mainly with Direction Finding, Commercial and Broadcast Transmitters, and Talking Picture Equipment, and Advanced Mathematics.

A student who has obtained his First Class Operator's Certificate will not be required to devote any further time to Morse practice, although he may attend for practice if he so desires during the whole period covered by his course.

FOURTH YEAR.

This portion of the course can only be taken after the student is in possession of his First Class Certificate of Proficiency.

Practical training is given at various centres of activity of the Company. Six months are spent at the A.W.A. Radio-Electric Works at Ashfield, and three months at a radio transmitting station. One week is spent at a broadcasting studio.

Instruction is given by correspondence papers in Television and Facsimile Transmission, Line Telegraphy, Engines and Structures, Surveying, and on applications of advanced mathematics to electricity and radio. Practical instruction is given at the School and in the field in surveying and field intensity measurement.

FIFTH YEAR.

During the fifth year, three months will be spent at a commercial receiving station, and three months at the A.W.A. Laboratory at Ashfield. The remainder of the time will be spent at the Marconi School, in preparing specifications for transmitters, and components. Lectures will be given during this period, on business principles affecting engineering and other miscellaneous subjects.

Subjects Included in "A" Course RADIO ENGINEERING

SUBJECT.

- A.—Constitution of Matter and Electron Theory.
- B.—Theory of Electricity (18 papers).
- C.—Alternating Current Theory (7 papers).
- D.—Rectifiers (8 papers).
- E.—Radio Frequency (19 papers).
- F.—Theory of the Thermionic Valve (5 papers).
- G.—Theory of Valve Transmitters (5 papers).
- H.—Aerials (5 papers).
- I.—Theory of Reception (6 papers).
- J.—Amplification (3 papers).
- K.—Receivers—Broadcast Type (7 papers).
- L.—Keying of Transmitters (1 paper).
- M.—Modulation (7 papers).
- N.—Studio Design (3 papers).
- O.—Studio Equipment (3 papers).
- P.—Outside Broadcasts (2 papers).
- Q.—The Wavemeter (2 papers).
- R.—Quartz Crystals (1 paper).
- S.—Marine Equipment (14 papers).
- T.—Direction Finding (12 papers).
- U.—Commercial Transmitters (5 papers).
- V.—Broadcast Transmitters (2 papers).
- W.—Power Valves (1 paper).
- X.—Structures.
- Y.—Engines.
- Z.—The Power Supply (4 papers).
- AA.—Sound Reproducers (2 papers).
- BB.—Talking Picture Equipment (12 papers).

In addition, papers will be given on Facsimile Transmission, Television, Line Telegraphy, and Surveying.

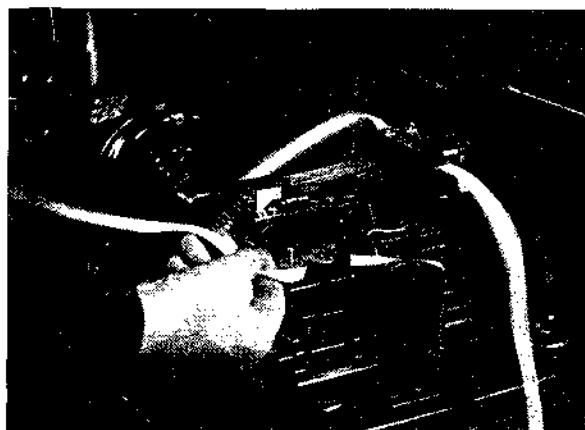
The subjects dealt with in the Advanced Mathematics Course include Higher Algebra, Trigonometry, Co-ordinate Geometry, Differential and Integral Calculus, Statics and Dynamics, Vector Analysis, Differential Equations, and applications of mathematics to electricity and radio.

SCHEDULE OF FEES

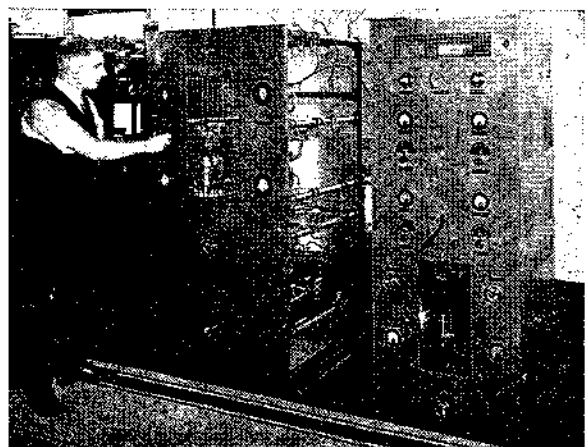
Preparatory Courses & Radio Engineer's Course



Perforating morse tape for high speed transmission of Beam messages from Australia.



Printing Beam wireless messages received from England.



Monitoring Australian-New Zealand Wireless Telephone Service Transmitter.

- (a) A Preparatory Course in the essential Intermediate Certificate subjects.
Duration of course, one year. Fee, £21 payable £2/2/- per month in advance.
- (b) A Preparatory Course in the essential Leaving Certificate subjects.
Duration of course, one year. Fee, £21 payable £2/2/- per month in advance.
- (c) The complete Course in Radio Engineering.
Duration of course, five years. Full cash fee, £151/4/-. By instalments: £168, payable as under: Deposit, £10/10/-; 50 monthly instalments of £3/3/-.

A person holding an Intermediate Certificate and who obtained a pass in English, Mathematics, Physics and Chemistry, or a person who can satisfy the School authorities that he can pass in essential Intermediate Certificate subjects, will be required to take:

- (a) A Preparatory Course in the essential Leaving Certificate subjects.
Duration of course, one year. Fee, £21 payable £2/2/- per month in advance.
- (b) The complete Course in Radio Engineering.
Duration of course, five years. Full cash fee, £151/4/-. By instalments: £168, payable as under: Deposit, £10/10/-; 50 monthly instalments of £3/3/-.

A person holding a Leaving Certificate and who obtained a pass in English, Mathematics, Physics and Chemistry, or a person who can satisfy the School authorities that he can pass in the essential Leaving Certificate subjects, may commence the Radio Engineer's Course, which will occupy five years.

Full cash fee, £151/4/-. By instalments: £168, payable as under: Deposit, £10/10/-; 50 monthly instalments of £3/3/-.

A person who can satisfy the School authorities that (a) he can pass in the essential Leaving Certificate subjects, and (b) has undergone a course of training in Electrical Engineering subjects at any Technical School, will commence the Radio Engineer's Course at Subject E, and the duration of his course from this point will be four years.

Full cash fee, £141/15/-. By instalments: £157/10/-, payable as under: Deposit: £10/10/-; 46 monthly payments of £3/3/- and one payment of two guineas.

COURSE "B"

THE RADIO TECHNICIAN

QUALIFICATIONS.

This course covers the work necessary to obtain the P.M.G. Broadcast Operator's Certificate of Proficiency. In addition, instruction is given in broadcast transmitters, studio design, acoustics, and broadcasting from points outside the studio.

The requisite qualifications of the Radio Technician comprise a sound theoretical and practical knowledge of modern radio and auxiliary apparatus.

His duties comprise the operating of broadcast transmitters, the supervision of the control room at the broadcasting studio and the technical operation of high-power radio telegraph stations. He should be able to locate faults in the apparatus under his control and efficiently carry out any necessary repairs.

A knowledge of all types of receivers also comes within his activities.

A knowledge of telegraphy, although not essential, is a decided advantage to him.

DESCRIPTION OF COURSE.

This course is designed to enable the student to acquire a sound knowledge of theory and practice in connection with modern radio equipment, but not necessarily as extensive a knowledge as would be required by the radio engineer.

The stage in the course at which the student will commence his studies will largely depend upon his previous education. The student who has already taken the radio operator's course and wishes to take up the technician's course, will only need to take up the subjects not previously taken in the operator's course.

Intending students must possess a knowledge of Mathematics embracing Algebra and Trigonometry as received in at least two years of High School. When such knowledge is lacking, the student is strongly advised to take the appropriate portions of the Intermediate Certificate Preparatory Course. Details of this will be supplied on request.

The Radio Technician's full Course covers a period of two years. Practical tuition occupies the last three to five months, during which short visits are made to the A.W.A. Radio Centres at Pennant Hills and La Perouse, and to a broadcast station studio.

HOME STUDY.

Home study Instruction Papers constitute the major part of the Course, and cover both direct and alternating current theory and most aspects of radio communication. These papers have a question paper attached to each, and answers to these are forwarded to the School for comment and correction. When the student has satisfactorily completed subject M, he is then required to attend the School for practical instruction. For this purpose, certain definite hours are appointed, depending on whether the student is domiciled in Sydney, or is obliged to come to Sydney especially to attend.

PRACTICAL WORK.

This comprises the following items:—

1. Assembly and testing of representative types of modern receivers.
2. Testing and fault-finding on a selection of modern factory-built receivers.
3. Selectivity, sensitivity and fidelity tests on receiver. A screened-room is available for these tests.
4. Adjusting and operating two complete transmitters incorporating practically all modern circuit arrangements.
5. Adjustment and termination of a Radio Frequency Transmission Line.
6. Operation of a short-wave, low-powered transmitter.

At the completion of this practical instruction, arrangements are made for the student to spend one week at the A.W.A. Radio Centre at Pennant Hills, and a further week divided between a city broadcasting studio and the Radio Centre, La Perouse.

During the progress of the practical tuition, the student is required to continue answering the remaining Home Study Papers. On completion of the entire course, an examination will be arranged for a date and time to suit the student's convenience. Success in this will entitle the student to the Marconi School "Technician's Diploma".

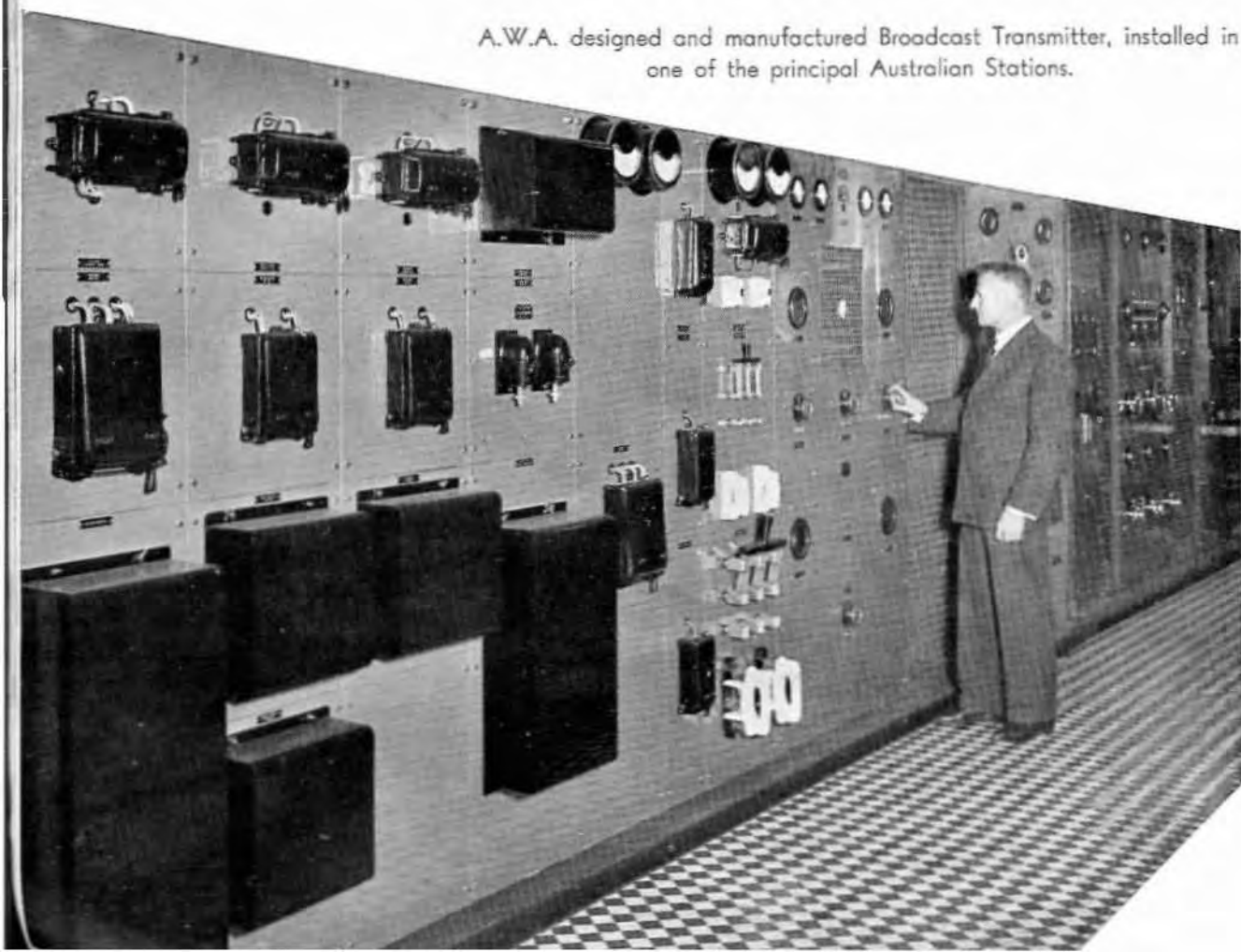
Instruction in Telegraphy is NOT included in the Technician's Course, but can be arranged on payment of an additional fee of 25 guineas.

FEES.

TECHNICIAN'S COURSE COMPLETE.

Cash Fee	— — — —	£42/10/6
Fee by instalments	— —	£47/5/0
Deposit	— — — —	£6/6/0
Instalments	— — — —	£3/3/0 per month.

A.W.A. designed and manufactured Broadcast Transmitter, installed in one of the principal Australian Stations.



THEORY PORTION OF COURSE ALONE.

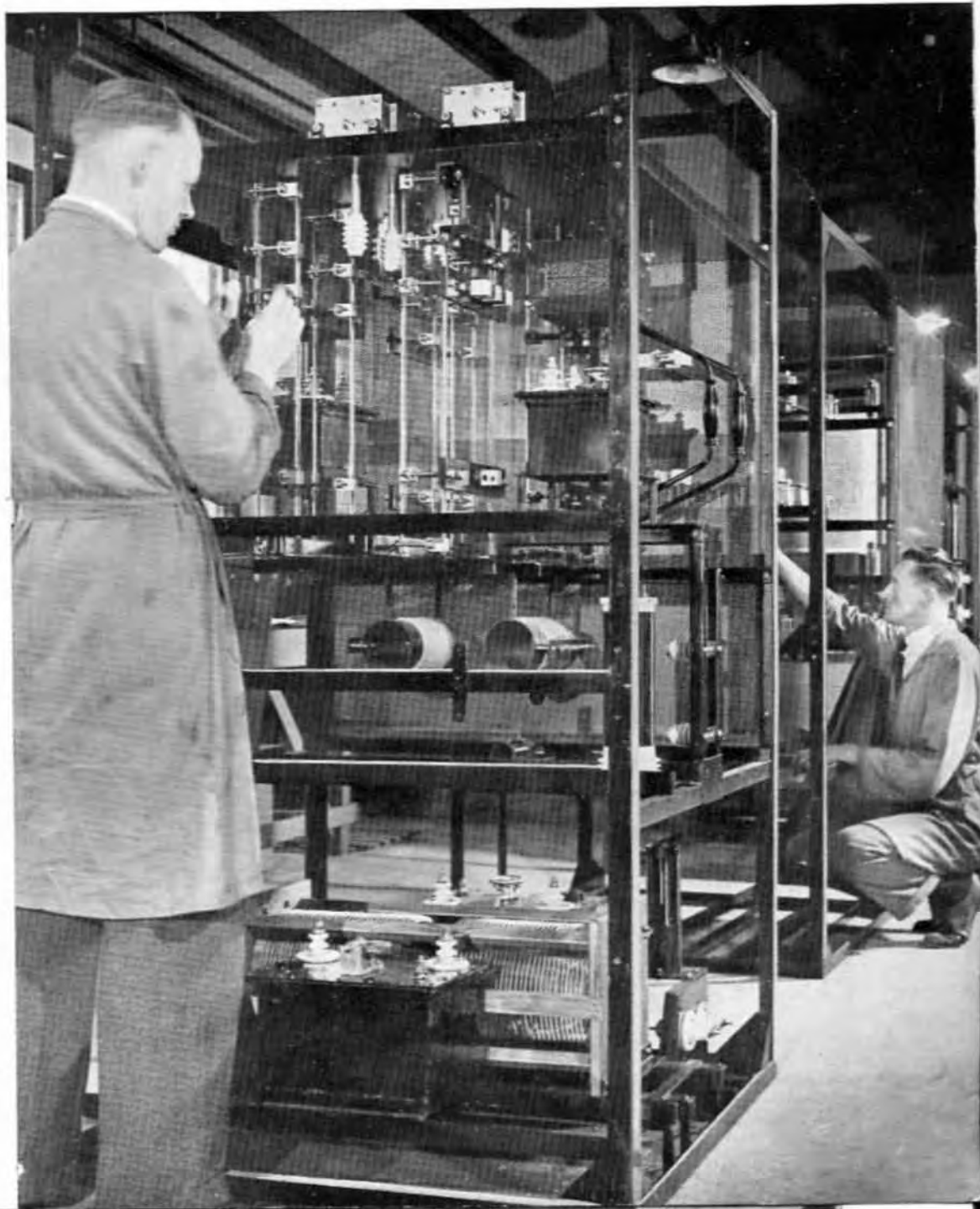
Cash fee	— — — —	£32/0/0
Fee by instalments	— —	£35/0/0
Deposit	— — — —	£5/0/0
Instalments	— — — —	£2/0/0 per month.

Payment of the additional fee for Telegraphy also entitles the student to those instruction papers which are included in the Radio Operator's Course but not in the Technician's Course. In addition he receives the extra practical in-

struction on Marine and Direction-finding Equipment necessary to qualify for the P.M.G. Certificate of Proficiency. Thus, he has the equivalent of Courses "B" and "C" combined.

COMBINED "B" AND "C" COURSES.

Cash fee	— — — —	£66/3/0
Fee by instalments	— —	£73/10/0
Deposit	— — — —	£10/10/0
Instalments	— — — —	£3/3/0 per month.



10,000 Watt
Broadcasting
Transmitter
in course of
construction
at A.W.A.
Radio-Electric
Works.



Preparing Beam Messages at Central Radio Office, Sydney, for despatch to London.



Operator at Beam Receiving Station, Rockbank, Victoria, maintaining communication with an aeroplane.



Receiving traffic at Beam Wireless Offices.



Monitoring the Anglo-Australian Wireless Telephone Channel at A.W.A. Receiving Centre, La Perouse.



Wireless Officer receiving press traffic for publication in the "Ocean News".

A.W.A. WIRELESS OPERATORS ON DUTY

COURSE "C" RADIO OPERATOR

QUALIFICATIONS.

Before a person can become eligible to operate a Wireless Telegraph installation at an Australian Coastal Radio Station or on a ship of the Australian Mercantile Marine, he must have obtained the first or second class Certificate of Proficiency in wireless, which is issued by the Postmaster-General's Department after he has passed the requisite examination.

These examinations are conducted every three months by the Radio Inspector, P.M.G. Department, in each of the capital cities of the Commonwealth.

If the candidate fails to pass the examination a period of three months must elapse before he can sit again. A candidate must be 18 years of age before he is entitled to make application to be examined.

The qualifications of a Commercial Radio Operator are defined in Article 10 of the General Radiocommunication Regulations annexed to the International Telecommunication Convention of Madrid 1932 and are briefly as follows:—

FIRST CLASS CERTIFICATE.

In order to qualify for the First Class Certificate, candidates will be required:—

- (a) To have a knowledge of the general principles of electricity, of the theory of radiotelegraphy and radiotelephony and of the practical adjustment and operation of all apparatus (Spark, C.W., I.C.W. and Direction Finding) and all necessary apparatus used in the marine service.
- (b) To receive by ear and transmit messages in plain language at a speed of 25 words a minute and in code groups at a speed of 20 groups a minute.
- (c) To send and receive spoken messages clearly by radiotelephone apparatus.
- (d) To have a detailed knowledge of the regulations applying to the exchange of radiotelegraphic traffic, of the documents relative to the charges for radiotelegrams, and of the Radio Telegraph part of the "Regulations for the Safety of Life at Sea."
- (e) To have a knowledge of the principal maritime navigation routes and of the most important wire and wireless routes of the world.

SECOND CLASS CERTIFICATE.

Candidates for the Second Class Examination will be required:—

- (a) To have an elementary theoretical and practical knowledge of electricity and radiotelegraphy, as well as a knowledge of the practical adjustment and operation of spark, C.W. and I.C.W. apparatus and accessory apparatus used in the ship's service.
- (b) To transmit and receive by ear messages in plain language at a speed of 20 words per minute and code groups at a speed of 16 groups a minute.
- (c) A knowledge of the regulations applying to the exchange of radiotelegraph traffic, of the documents relative to the charges for radiotelegrams and of the radiotelegraph part of the "Regulations for the Safety of Life at Sea."
- (d) To have a knowledge of the principal maritime navigation routes, and of the most important wire and wireless routes of the world.

All the above subjects and requirements are fully and adequately covered in our Radio Operator's Course.

DESCRIPTION OF COURSE.

This course is designed to enable the student to qualify for first or second class Certificate of Proficiency, which is awarded by the Post-master-General's Department after the student has passed the prescribed examination.

Instruction is given in the following subjects, viz.:—

- Telegraphy.
- Theory.
- Practical Work.
- International Regulations.

FIRST YEAR.

During the first year the student's instruction is carried out by the Home Study method and 52 Instruction Papers will be forwarded to him with their relative Question Papers.

A knowledge of elementary mathematics is necessary, and prospective students who have not reached the equivalent standard of first year High School should take the Elementary Mathematics Course in addition to the Operator's Course.

Upon enrolment, the student is supplied with his first Instruction Paper, a portable gramophone, two sets of Morse Training Records and a key and buzzer set, also a book of instructions for the use of same.

The gramophone and records are for the purpose of reproducing Morse signals and messages, so that the student may obtain practice in Morse reception at home.

The key and buzzer set, together with a dry cell to operate same, are provided to enable telegraph transmission to be practised at home. The instruction book gives full information regarding the use of the above apparatus. After one year's systematic practice at home, the average student attains an operating speed of approximately fifteen words a minute; some, indeed, can receive at 20 words a minute, solely by the use of the special training records.

The technical subjects dealt with during the first year are as follows:—

Constitution of Matter, Theory of Electricity, Alternating Current Theory, Rectifiers, Radio Frequency, Valves, Theory of Valve Transmitters, Aerials, Reception.

SECOND YEAR.

For the first three months in this year the subjects studied are Amplification, Sound Reproducers, Receivers, Keying Methods, Modulation.

At this stage students intending to take practical instruction may now attend the School where a series of lectures on Marine and Auxiliary equipment will be given.

While attending personally, the student will be required to study papers on the following subjects:—

Microphones, Wavemeters, Marine Equipment, Direction Finding, Power Valves, Power Supply.

The School will be open day and evening, and students may attend either session as desired.

TELEGRAPH TUITION.

Upon arrival at the School the student is tested in Telegraphy, and will continue his practice in this subject at the School. Morse instruction is carried out by means of head telephones used in conjunction with valve audio frequency oscillators.

Students are given weekly tests in sending and receiving Morse signals under examination conditions, and marks will be awarded. By this means students are able to gauge their progress and form an idea as to how they will fare at their final examination in Telegraphy.

Our instructors are qualified radio telegraphists with many years' experience in commercial radio stations, and in addition the School is equipped with an automatic transmitter by means of which students can obtain practice in telegraphy at any speed desired.

PRACTICAL TUITION.

The student will be instructed how to locate and remedy faults in standard commercial spark and valve transmitters and emergency apparatus and to make the necessary adjustments of wave length, power, etc.

He will receive practical instruction on Auto-Alarm Distress Call Apparatus installed in the School, and will be instructed in the operation of Direction Finding Equipment.

If circumstances permit, students will be conducted to the A.W.A. Radio Electric Works at Ashfield for the purpose of observing the assembly of standard marine equipment.

During the second year of his studies the student will attend lectures dealing with the regulations governing the handling of radio-telegraph traffic, as contained in the British Postmaster-General's Handbook.

Provided that the student studies his course consistently, then after fifteen months home study he should have reached a stage where he can take practical instruction on standard Marine equipment which is installed in the School.

Three months personal instruction by daily attendance should enable him to gain his 2nd class Postmaster General's Certificate of Proficiency, while a further three months should be allowed in order to obtain the 1st class Certificate.

As a practical knowledge of standard Marine and auxiliary equipment and also of Direction Finding and commercial Broadcast Transmitters forms part of the examination for the 1st class P.M.G. Certificate, course C cannot be successfully studied solely by correspondence. Students therefore should enrol for the complete Operator's Course, which includes correspondence and practical instruction and should be prepared to spend at least three (3) months in the School in Sydney.

FEES:

FULL COURSE, including Theoretical and Practical instruction—

Cash: £47/5/0.

Terms: £52/10/0 payable by deposit of £10/10/0 and instalments of £3/3/0 monthly.

Note: The above fee includes the cost of portable gramophone, two sets of Morse records, buzzer and battery which become the property of the student.

The Combined Key and Buzzer Set consists of a light Morse key and a high-toned buzzer mounted on a polished wooden base. A dry cell is also supplied to actuate the buzzer. By means of this Buzzer Set students are enabled to practice the transmission of Morse signals, and by systematic practice, carefully endeavouring to attain correct formation and spacing of the characters, the Buzzer Set will prove an invaluable aid to the mastering of the art of telegraph operating.

Should a student intending to enrol for either A or C courses be a qualified telegraphist, he will not require the gramophone, records, buzzer set, etc., and, in this case, an adjustment of the fee for either of these courses can be made.

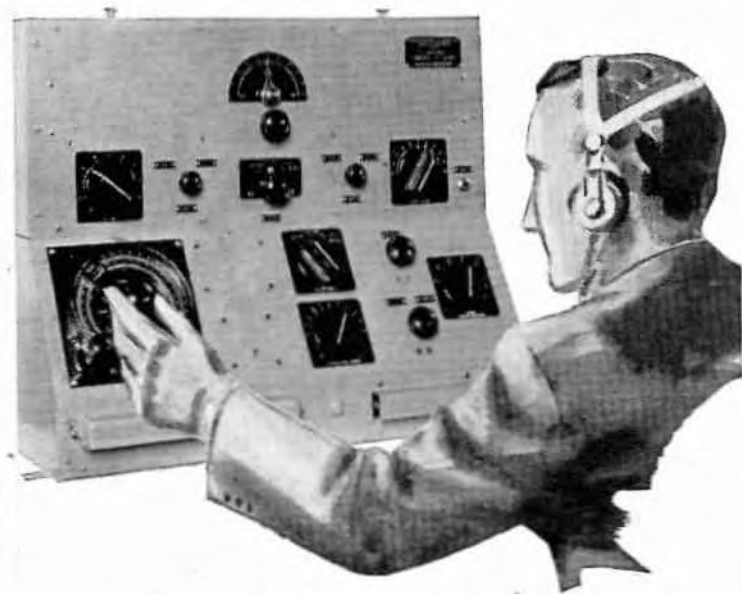
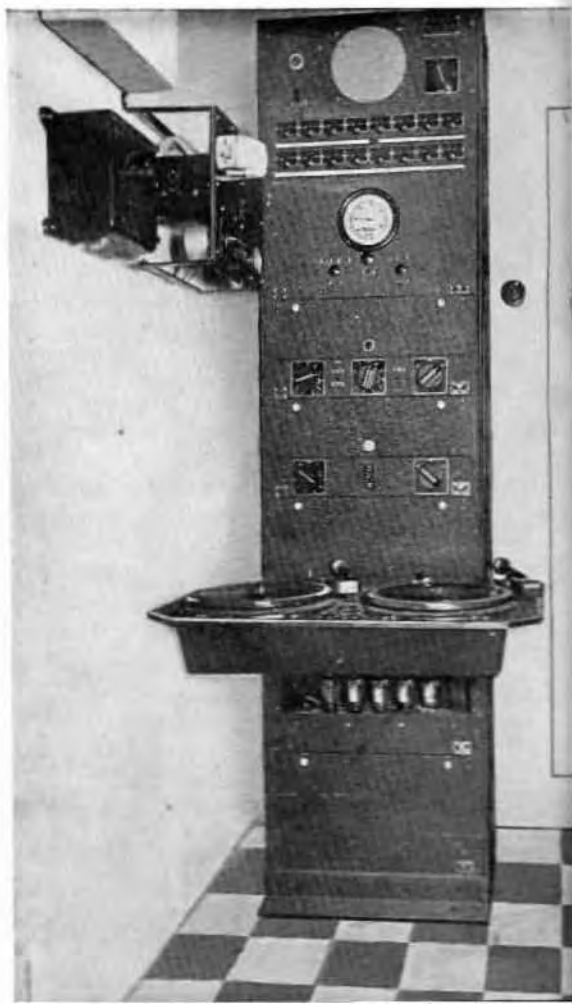


MARINE WIRELESS EQUIPMENT

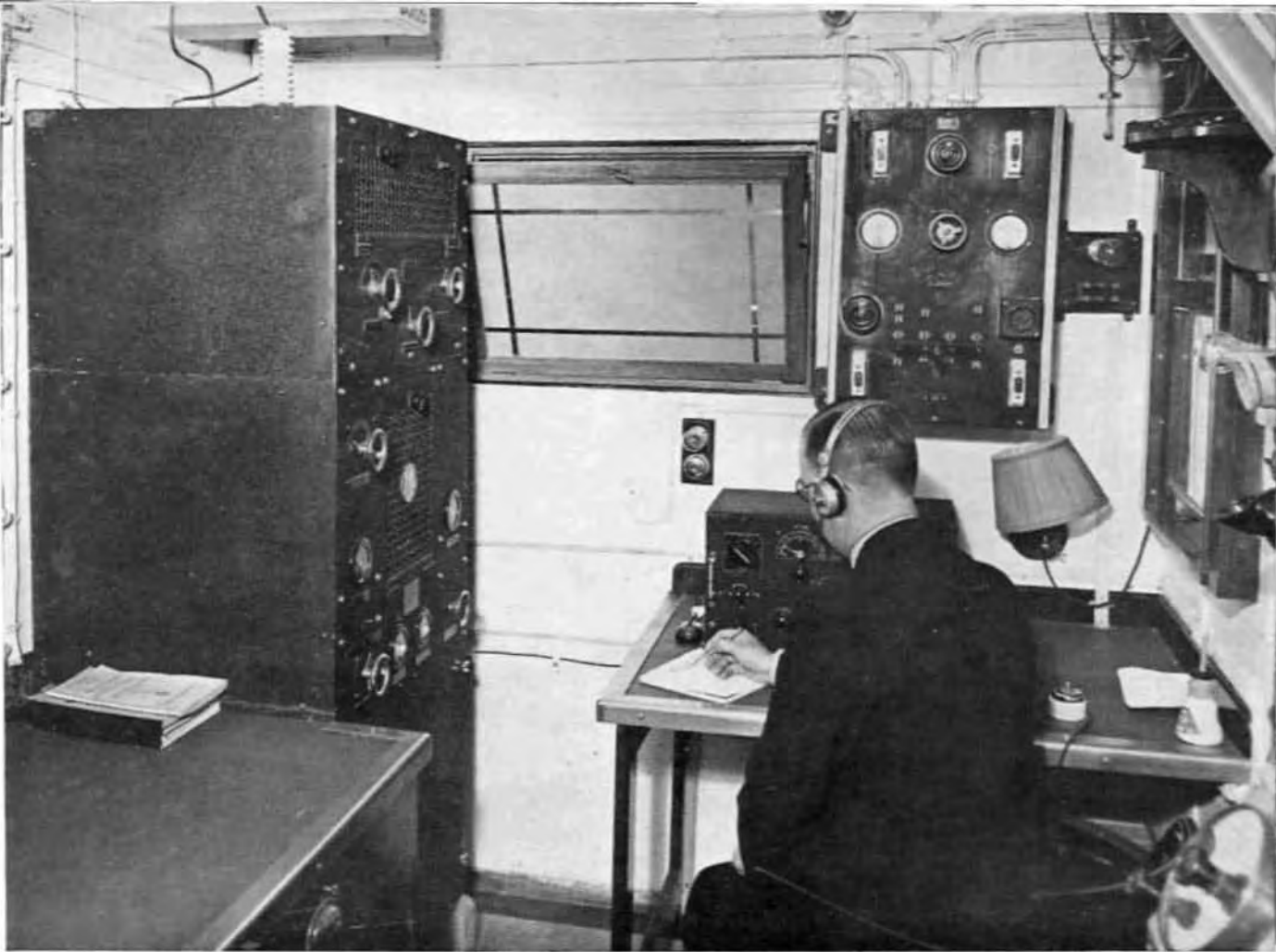
Shielded Loop Aerial of
Direction Finder



Amplifier for the reproduction of speech and
music throughout a ship, by means of loud
speakers installed at various parts of the vessel.



Operator taking bearings on latest type
of Direction Finding
Equipment.



Operator on duty on Interstate Liner. Modern $1\frac{1}{2}$ k.w. medium and short wave valve installation.



Depth Sounding Apparatus installed on Trans-Tasman Liner.

MORSE CODE PRACTICE APPARATUS.

Apparatus supplied to the students taking Courses A and C, in order to enable them to practice Telegraph Transmission and Reception at home, are as follows:—

A Portable Gramophone.

1 Set (6) Marconi Official Training Records, Series 1.

1 Set (6) Marconi Official Training Records, Series 2.

1 Combined Key and Buzzer Set.

1 Dry Cell.

These items become the student's personal property, their cost being included in the fee charged for the course.

The portable gramophone is of neat appearance and of good quality, and is fitted with a compartment to carry six records.

Besides playing the Morse Records the machine will also reproduce ordinary musical records, thus study can be judiciously combined with pleasure.

The records are His Master's Voice 10-inch double sided, and are classified in two series, each of six (6) records. In the first series, the first record gives a reproduction of the Morse alphabet, sent slowly and carefully so that the student may observe and endeavour to imitate the perfect transmission of the Morse characters. From the second record to the last record in Series 1, the speed of sending is graduated from very slow up to about twenty words per minute. Of course, the speed of Morse can be varied within narrow limits by varying the speed at which the machine is run. The second series consists mainly of reception in foreign languages, which forms excellent practice for the student. The correct procedure for handling traffic from a vessel in distress is also given, and another record gives excellent practice in the reception of signals through interference. The speed of Morse on the

second series of records varies from about 15 to 30 words per minute.

The contents of the records are shown hereunder:—

MARCONI DISC RECORDS.

Series I.

- B625 International Morse Code Signals. Practice in difficult letters, etc.
- 626 Press (slow).
Press (medium).
- 627 Messages (slow).
Assorted messages (medium).
- 628 Commercial messages (medium).
Code and cypher messages.
- 629 Foreign messages (fast).
Assorted messages (fast).
- 630 Press and press jamming.
Messages and press jamming.

Series 2.

- 789 Sounder record—Morse code.
Sounder record—Press.
- 790 French press.
Italian press.
- 791 Spanish press.
Portuguese press.
- 792 Press with interruptions.
Figures and fractions.
- 793 Calling-up procedure, time-rush, etc.
Distress working.
- 794 Messages and French jamming.
Messages and French jamming.

Should a student already possess a gramophone and therefore not require the machine supplied by the School, an allowance of £3 will be made and the fee adjusted accordingly. At the same time, it might be mentioned, however, that to practice Telegraphy, one needs concentration, and with a portable machine the student can adjourn to some quiet room free from interruption, or distractions, and so practice more efficiently.



San Francisco



Regent St., London



The Waterfront at Hong Kong



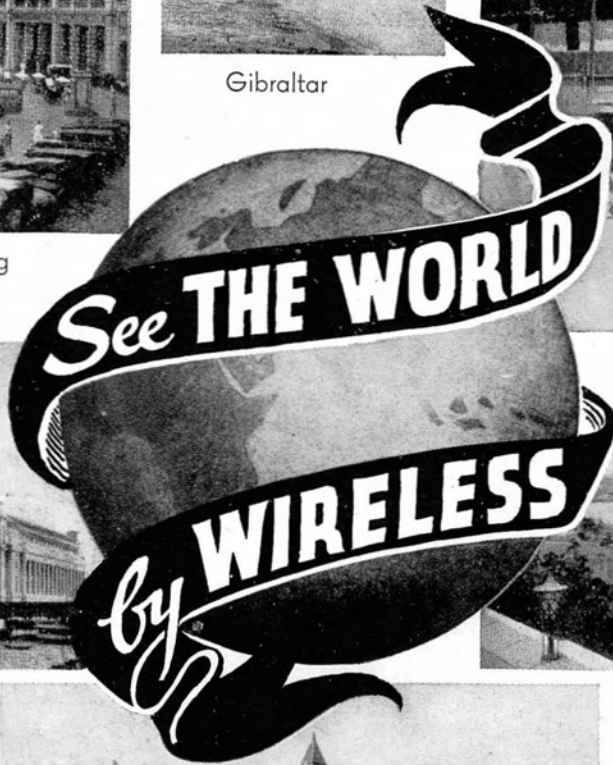
Gibraltar



Native Quarter, Port Said



Singapore



The Harbour, Yokohama



New York



The Bund, Shanghai



La Porte de Aix, Marseille

COURSE "D"

THE TALKING PICTURE OPERATOR

QUALIFICATIONS.

The Talking Picture Operator, in addition to being fully qualified to operate "silent" picture projectors, should be able to efficiently operate and control talking picture apparatus. This equipment combines the projection of "pictures" with the reproduction and amplification of sound, which is synchronised with the picture.

The efficient operation of talking picture equipment and the ability to locate and repair faults that develop requires the possession of a good knowledge of electricity and magnetism, electrical machinery, electronic valves, the photo-electric cell and sound reproducers, such as loud speakers, also acoustics as applied to motion picture theatres.

Course D is designed to efficiently impart theoretical and practical instruction on the above subjects.

The new field of Talking Pictures opens up positions for those already engaged in radio work, or for those who have had no previous experience in radio, provided they are properly trained.

The sound portion of the apparatus is closely allied to radio, employing, as it does, thermionic valves, audio frequency amplification and sound reproduction by means of loud speakers. The majority of men employed in installing and carrying on maintenance work in connection with talking picture equipment in Australia are graduates of the Marconi School. When talking pictures were first introduced into Australia, our students were eagerly sought after, on account of their training in the principles of amplification, etc., and some now hold responsible positions in this class of employment.

These men were sent to every State in Australia, to New Zealand, and to the East to instal the new apparatus, and we understand that their services are considered highly efficient. Men already engaged as operators at motion picture theatres can become thoroughly conversant with their equipment and the principles governing its action, also how to obtain the best results in practice when they undergo a specialised course of training in this subject.

DESCRIPTION OF COURSE.

This is a course for students who wish to qualify for the position of Operator in a Talking Picture Theatre.

This course is conducted partly by means of Home Study Papers and partly by personal tuition of a practical nature.

No previous experience of a technical nature will be required of the student, although such experience would be an advantage.

The full course will extend over a period of one year. Practical tuition is given on a complete talking picture installation with which the school is equipped. For the benefit of those students who are unable to attend at the School for practical instruction, a Talking Picture Course by correspondence is available, the duration of which is also one year.

PRACTICAL INSTRUCTION.

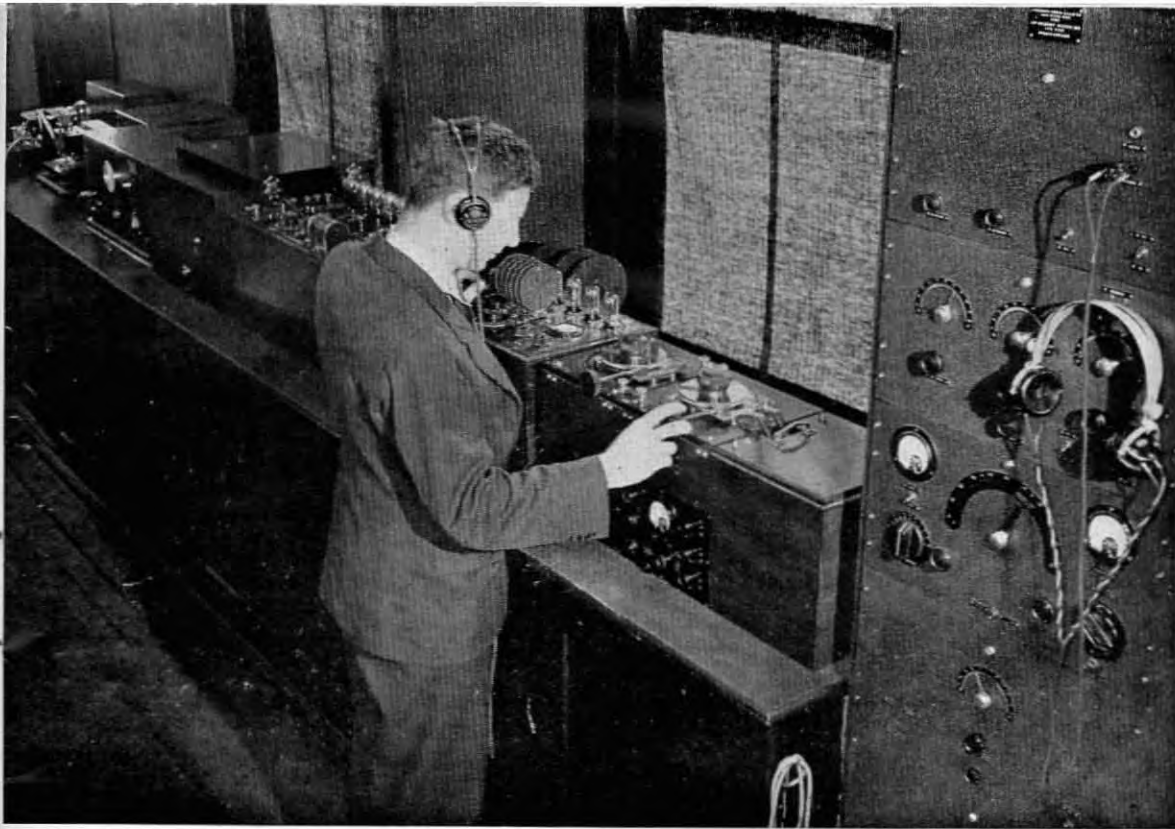
The practical instruction will consist of personal instruction on the operation and maintenance of talking picture apparatus, also continuity and insulation testing together, with continuity and emission tests for valves.

FEES: Combined practical and theoretical course, Cash Fee £18-18-0, or by instalments, £21. Terms: Deposit £3; instalments £3 per month for six months.

Theoretical Course:

Cash Fee £14, or by instalments £16.

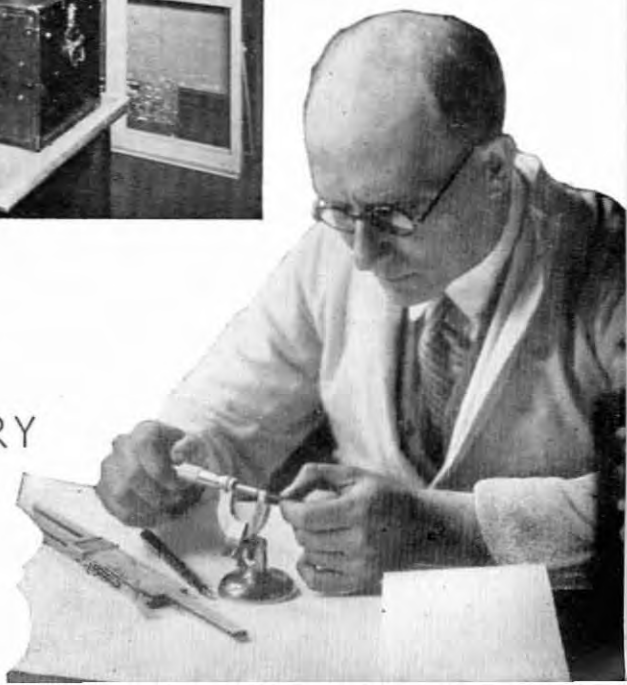
Terms: Deposit £2; instalments £2 per month for seven months.



Standard Frequency
Set-up.



Laboratory.
Sub-Standards



AWA
WIRELESS RESEARCH LABORATORY
AT ASHFIELD, SYDNEY

COURSE "E"

THE RADIO MECHANIC

QUALIFICATIONS

A Radio Mechanic should have a theoretical and practical knowledge of the construction and operation of broadcast receivers and their component parts.

His knowledge need not be as extensive as that of the Radio Technician since he is not required to operate or maintain transmitting apparatus.

A Radio Mechanic is defined as one who assembles, installs, and "services" broadcast receivers. Therefore, he must be able to follow circuit diagrams, or blue-prints, with thorough understanding of the symbols used. He must be so familiar with the functions of individual components as to be able to diagnose rapidly a variety of receiver troubles. Furthermore, he should be able to align and test receivers, both when in production in the factory and when encountered in his servicing work.

To install receivers it is necessary for him to be conversant with the types of power supply and the Fire Underwriters' Rules and Regulations.

A knowledge of the most effective ways of minimizing interference from local electrical machinery is also of advantage.

Finally, a Radio Mechanic should be able to use indicating meters such as voltmeters, ammeters and milliammeters, output meters, and also more elaborate equipment such as a modulated-oscillator. In addition, he must also be able to make practical calculations involving Ohm's Law, frequency and wavelength, power ratings, etc.

DESCRIPTION OF COURSE.

The duration of the Course depends to a great extent on the student's natural ability and education, the minimum time being fifteen months. After satisfactorily reaching subject K in the Course, involving approximately twelve months of Home Study Instruction Papers, the student attends at the School for practical tuition. This consists of assembling and testing standard types of receivers, and occupies some three months. Certain of these receivers are changed frequently in order that they shall represent the most up-to-date practice. A "screened-room" is used by students when aligning the receivers.

A knowledge of elementary mathematics is necessary and prospective students who have not reached the equivalent standard of first year High School would be well advised to take the Elementary Mathematics Course, the fee for which is £1/10/0.

At the conclusion of Course E, an examination will be arranged at a date and time convenient to the student. Students successful in this will receive the Marconi School "Certificate of Proficiency".

SYNOPSIS OF RADIO MECHANIC'S COURSE.

Construction of Matter.
The Electron Theory.
Theory of Electricity and Magnetism.
Alternating Current Theory.
Rectification.
Radio Frequency Theory.
The Thermionic Valve.
Aerials.
Detection and Radio Frequency Amplification.
Audio Frequency Amplification.
Receivers.
Power Supply Equipment.
Fire Underwriters' Rules and Regulations.
Sound Reproduction.
Loudspeakers.
Apparatus for Testing and Adjusting Receivers.
Trouble-finding in Receivers.

FEES:

FULL COURSE, THEORETICAL AND PRACTICAL TRAINING.

Cash £18/18/-.

Terms £21 payable by instalments of £2/2/- per month.

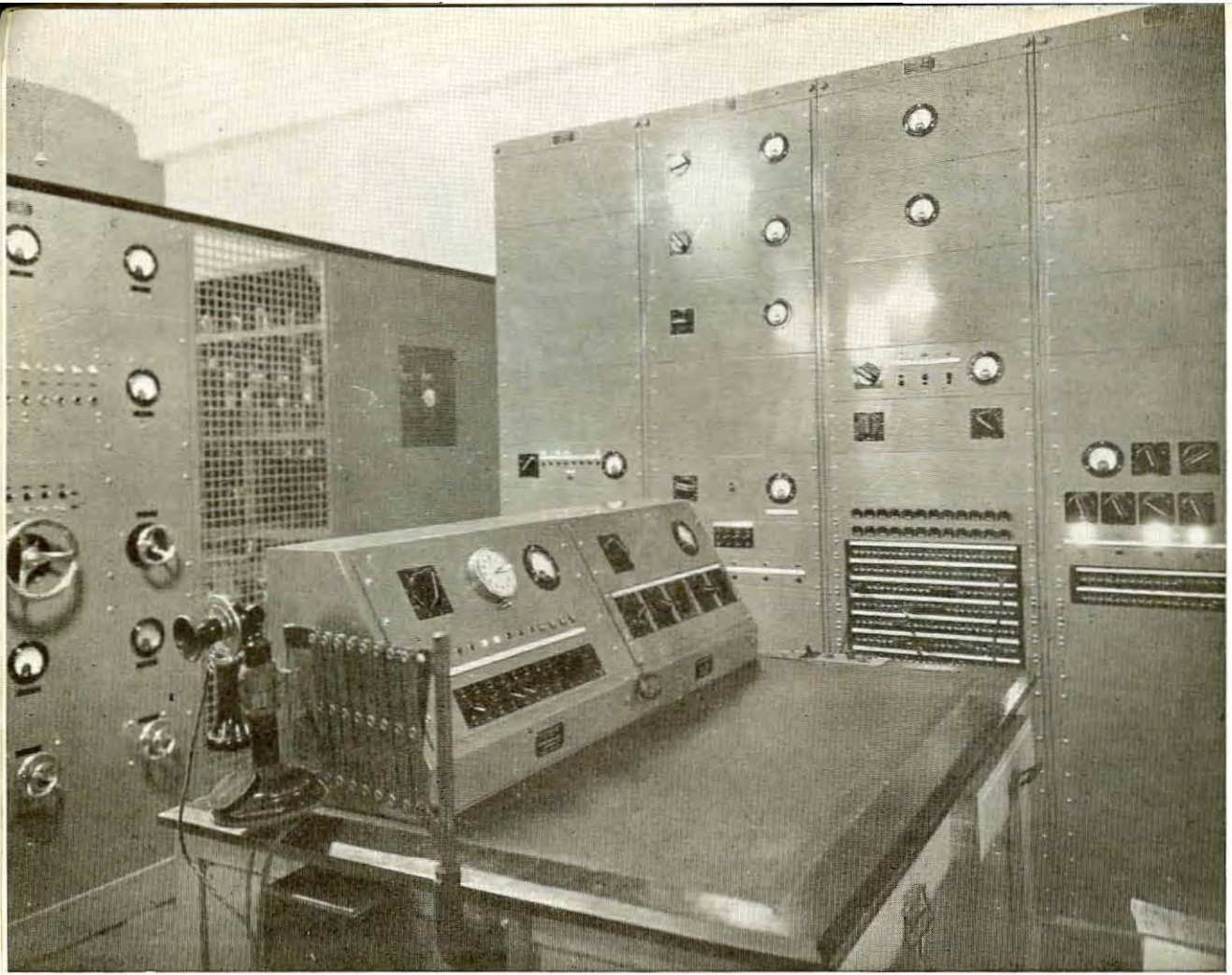
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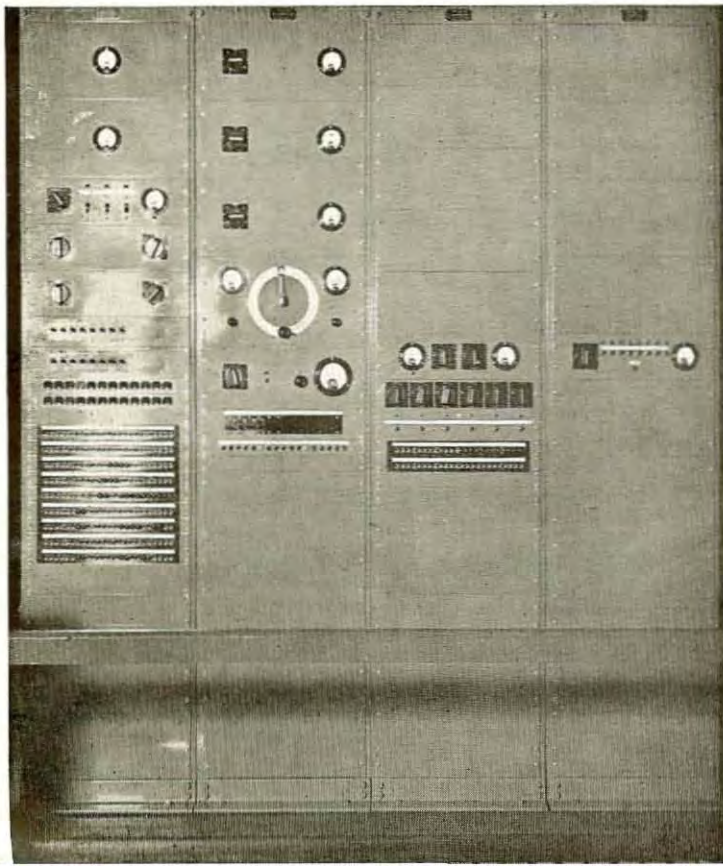
Terms - £15 payable by seven monthly instalments of £2, and one payment of £1.

Marconi School student servicing an all-wave receiver in special screen room.



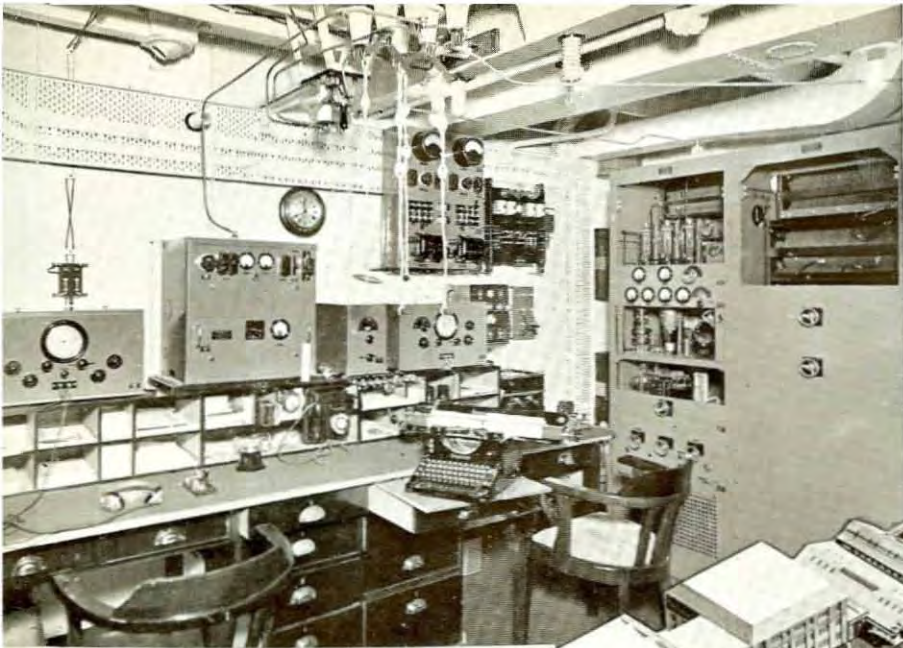


Modern Broadcasting Transmitter
manufactured by A.W.A.



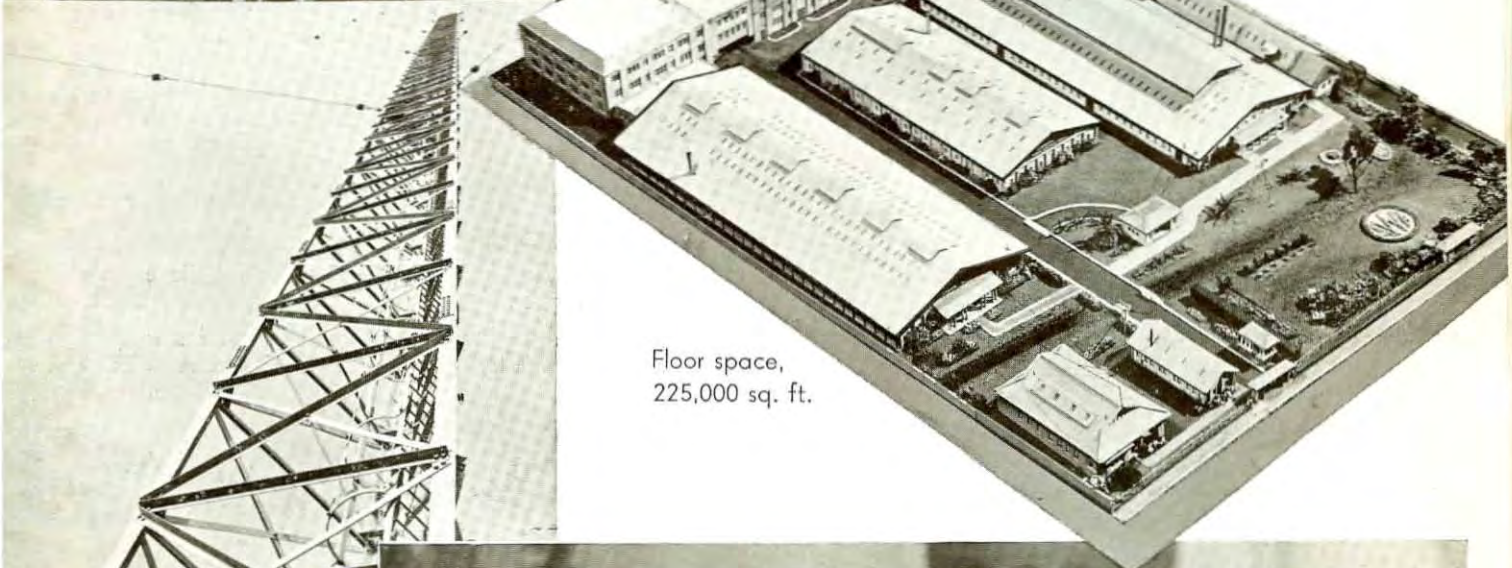
MODERN BROADCASTING STATION EQUIPMENT

A.W.A. Broadcasting Studio
Control Equipment.

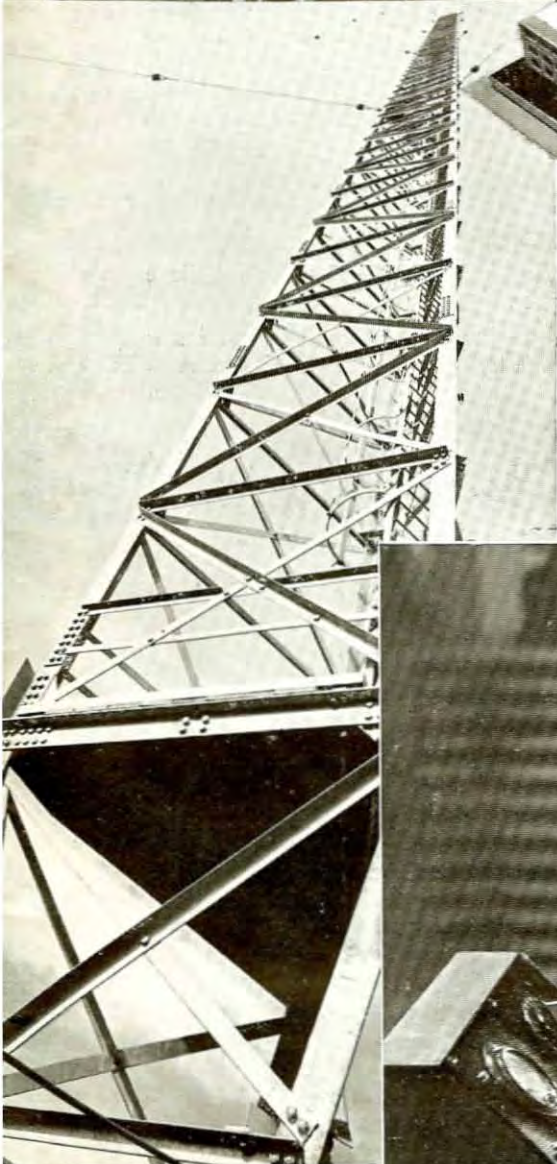


Section of latest type of A.W.A. marine equipment on board trans-Tasman liner.

A.W.A. Radio-Electric Works, Ashfield Sydney.



Floor space, 225,000 sq. ft.



Announcer of A.W.A. world-wide short-wave broadcasting station telling the world of Australia's attractions and resources.



Mr. H. E. BUIK
Principal, Marine Section.



Dr. W. G. BAKER
Principal, Engineering Section.



MR. R. C. V. HUMPHERY



MR. S. W. OWEN



MR. P. GRAVES



MR. L. G. PALMER



MR. H. QUODLING

MARCONI SCHOOL INSTRUCTIONAL STAFF

INSTRUCTIONAL STAFF OF THE MARCONI SCHOOL

Mr. H. E. BUIK

Principal, Marine Section.

Mr. Buik has been associated with wireless since 1911, being among the first to qualify for the P.M.G. first-class certificate of proficiency, his certificate being the tenth issued by the Department.

Joining the Marconi Company in 1911 he served for two years as a marine operator of that company and entered the Marine Service of Amalgamated Wireless at the inception of the Company in 1913. Mr. Buik served in the S.S. "Grantala", "Mataram", "Maitai", "Warimoo", "Indarra", "Moeraki", "Wyreema", "Victoria".

During the war he served on H.M.A. Fleet Auxiliary "Aorangī", also on H.M. Transport Ships "Port Lincoln" and "Armadale".

In 1918 Mr. Buik was appointed to the instructional staff of the Marconi School of Wireless as Principal of the Marine Section, and during the intervening years has been instrumental in training several hundred students for positions as operators.

MR. S. W. OWEN

A graduate at the Marconi School of Wireless, Mr. Owen served as operator on several vessels, and was for two years officer in charge of the Guinea Airways Ltd. Station at Wau. He is now engaged as instructor of the Marine and Mechanical Section of the Marconi School.

MR. P. J. GRAVES

Mr. Graves has had a long and varied experience in wireless engineering. He served in the Standards Laboratory, Transmitter Test Section, Engineering Dept., Service Dept., and at Sydney Receiving Centre and Sydney Transmitting Centre of A.W.A. He holds the Sydney Technical College Diploma in Electrical Engineering.

MR. L. G. PALMER

Graduating from the Marconi School in London in 1918, Mr. Palmer served as Wireless Officer for 19 years on various passenger and cargo ships of the British, Indian, and Australian Mercantile Marines. He studied advanced technical wireless with the Marconi School of Wireless, Sydney.

W. G. BAKER, B.SC., B.E., D.SC. ENG.

Principal, Engineering Section.

Entered Sydney University Engineering Course 1918. Gained Deas-Thomson Scholarship for Physics 1920. Graduated Bachelor of Science 1921 with University Medal for Mathematics and Honours in Mathematics and Physics. Graduated Bachelor of Engineering 1923 with first class Honours and University Medal Science Research Scholar 1923-4. Gained the Walker & Eliza Hall Engineering Travelling Fellowship, 1924-27. Attached to General Electric Co., Schenectady, N.Y., U.S.A. Research Laboratory, and later to British Thomson-Houston Co.'s Research Laboratory, Rugby, England. Hon. Lecturer, Electrical Engineering, University of Sydney, 1927. 2FC Wireless Research Fellow 1927-8. Radio Research Officer, Council of Scientific and Industrial Research 1928-31. Joined Amalgamated Wireless 1931. Graduated Doctor of Science in Engineering, Sydney University, 1932. Appointed to Marconi School, November, 1934.

MR. R. C. V. HUMPHERY

Studied marine engineering and wireless in College Mariette, in France.

In 1915 Mr. Humphery joined the A.I.F. and saw service at the Western Front. Returning to Australia he graduated at the Marconi School, and became wireless officer on various ships, viz.—"Calula", "Victoria", "Eastern", "Cantara", "Changsha", "Iron Crown", "Urilla", "Iron Master", "Taiuan", "Uulooloo".

In 1925 he was transferred to the Engineering Department of Amalgamated Wireless where he served for the next six years. Later he was appointed to the Marconi School, for the purpose of compiling new engineering courses, afterwards becoming a school instructor. He is the author of the text book entitled "The Concise Radio Handbook", and is a Lieutenant of the Australian Corps of Signals.

MR. H. N. QUODLING

Educated at the Sydney Technical High School, Mr. Quodling obtained his First Class Certificate at the Marconi School of Wireless, in 1923.

He spent two years as laboratory and field assistant in experimental geophysical surveying on various silvermining fields. After serving on trawlers as radiotelephone operator, he joined the A.W.A. Marine Service, serving in a number of coastal and overseas ships.

In January, 1937, he was appointed to the Marconi School Staff.



Wireless Telegraphy Regulations.

First-class Commercial Operator's Certificate of Proficiency

This is to certify that Edward Martin Chaffer has satisfied the Postmaster-General that he possesses the knowledge and qualifications specified hereunder, namely:—

- (a) a knowledge of the general principles of electricity, of the theory of wireless telegraphy and wireless telephony, and of the regulation and practical working of the types of apparatus used in the mobile service.
- (b) a theoretical and practical knowledge of the working of the apparatus referred to in paragraph (a) of this Certificate.
- (c) the ability to effect, with the means available on board ship, repairs to damage which may occur to the wireless telegraph or wireless telephone installation during a voyage.
- (d) the ability to send correctly, and to receive correctly by ear, in Morse code, code groups at a speed of 20 groups per minute, and a message in plain language at a speed of 25 words per minute.
- (e) the ability to send and receive messages correctly by telephone.
- (f) a detailed knowledge of—
 - (i) such of the Radiocommunication Regulations annexed to the Telecommunication Convention as relate to the exchange of radiocommunications and the assessment of charges in the mobile service; and
 - (ii) that portion of the Safety Convention which relates to radiotelegraphy.
- (g) a knowledge of the general geography of the world, especially the principal navigation routes and the most important cable, telegraph, wireless telegraphy and wireless telephony routes.

The holder of this Certificate has made a Statutory Declaration that he will preserve the secrecy of wireless communications.

Dated this eighth day of November, 1937

Certifying Officer— J. M. [Signature] Chief Inspector (Wireless). (Date) 8-11-37

By direction of the Postmaster-General— [Signature] Director-General, Posts and Telegraphs.



CONTROLLED BY AMALGAMATED WIRELESS (A'SIA) LTD

This is to Certify that

A. M. Browning

has completed the prescribed course for Radio Technician

and has passed all the required Examinations of the Marconi School of Wireless, in token whereof the Seal of the School has been hereunto affixed:

SUBJECTS

- Practical.
- Electrical and Radio.
- Theory.

Radio Transmitters, Receivers and Broadcast Studio Technique.

Dated at Sydney this second day of April, 1937.



[Signature] W. Parker, B.Sc., B.E. Principal

ANSWERS TO QUESTIONS OFTEN ASKED

ALTHOUGH we have tried to make this booklet as complete in information as possible, there are, no doubt, some questions in your mind regarding the courses, and we think the answers given to the series of questions hereunder will be useful.

Q.—Having had no previous technical training or experience, shall I be able to understand the instruction given in the papers?

A.—The instructional matter given in the papers is couched in simple language, and, wherever a technical term is used, a full explanation of the term is given. Moreover, you are invited to ask questions in connection with your papers, and such questions will gladly be answered by the instructors, whose chief aim is to see that you obtain a clear understanding of the course. We assume that students enrolling for all courses are beginners, and they are instructed accordingly.

Q.—When I have completed my course and am fully qualified, will you guarantee to find me a position?

A.—No instructional institution is able to guarantee employment, but naturally it is to our advantage to assist our students wherever possible to obtain suitable employment. This School has a reputation throughout Australia for thoroughness of tuition, and employers, recognising the high standard of instruction given by us, are prepared to give most favourable consideration to holders of the Marconi School's Certificate of Proficiency.

Q.—May I change from one course to another?

A.—Yes, students may change from one course to another if they so desire, or may even take two courses concurrently. Special arrangements can be made in this regard upon application to the Superintendent.

Q.—I am a radio dealer, and I wish to improve my technical knowledge of broadcasting receivers. Which course would you advise me to take?

A.—You should enrol for the Radio Mechanic's Course, as this course deals exclusively with the assembly, installation and maintenance of broadcast receivers and theoretical subjects pertaining thereto.

Q.—I am already in a position as a Radio Mechanic, what benefit can I gain by taking your Service Mechanic's Course?

A.—Few men can say that they know all there is to be known concerning their work. If you are a good mechanic, our course can make you a better mechanic. We can help you to improve your knowledge of radio, as a means to further advancement in the industry which you have chosen as your profession.

Q.—When attending the School personally, am I entitled to any concession with regard to train and tram fares whilst travelling to and from the School each day?

A.—Yes, the Marconi School is registered with the N.S.W. Government Railways, and also with the Tramway Department, so that *bona fide* students of the School are granted concession rates on trains and trams, provided that they are not in employment nor in receipt of any remuneration.

Q.—If I should be compelled to discontinue my studies temporarily through illness or other causes, what is my position?

A.—If we are advised promptly, we will suspend your lessons and defer monthly instalments for any reasonable period, until you are again able to proceed with your studies.

Q.—Is there any age limit for students joining the School?

A.—No; but students enrolling for the Radio Operator's Course (C) are reminded that the regulations under which the P.M.G. Certificate is issued, stipulate that a person must be 18 years of age before he is eligible to sit for the Certificate. Allowing for the course to occupy two years, he should not enrol for the course until he is 16 years of age.

Q.—How can I enrol?

A.—By completing an enrolment form and forwarding it to us with the necessary deposit. The first lessons, together with full instructions, will then be forwarded to you by return mail.

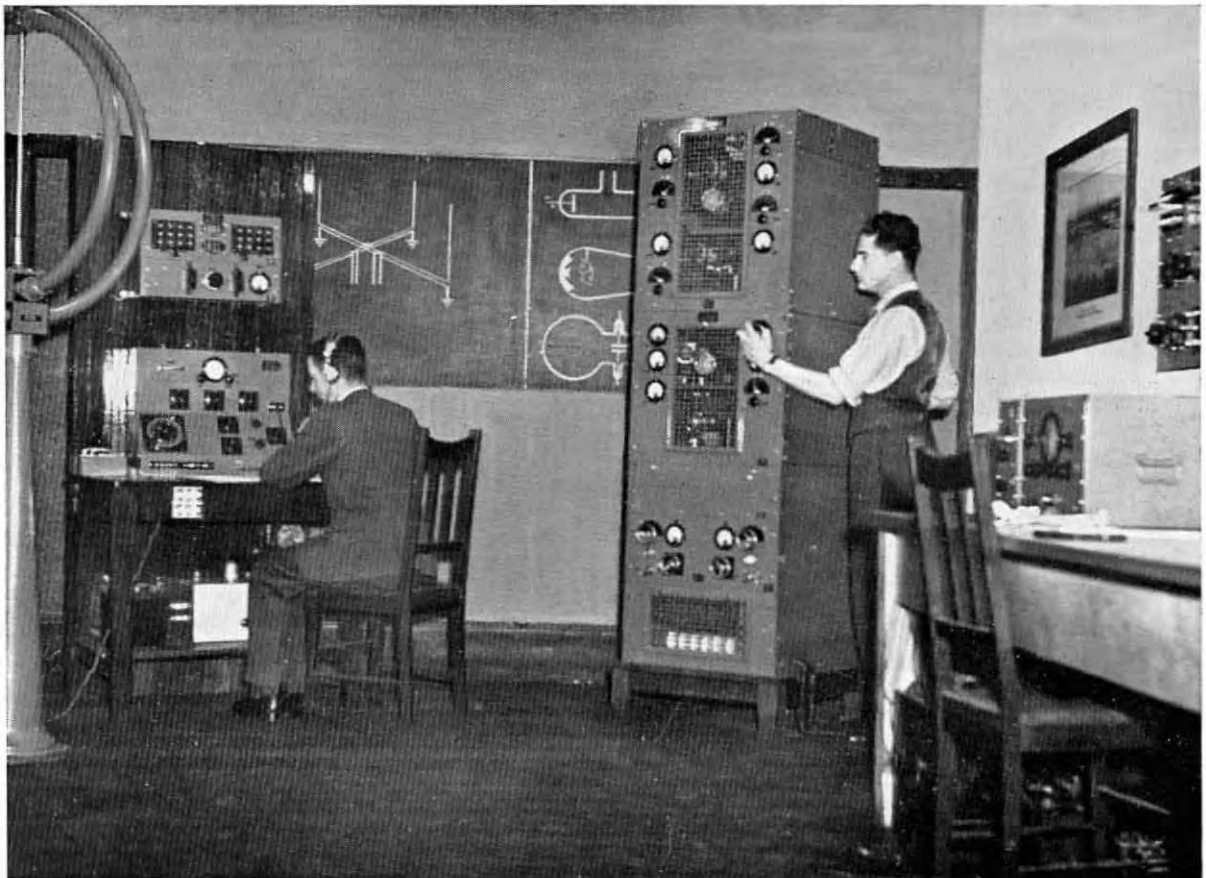
Q.—How are the fees to be paid?

A.—They may be paid in a lump sum at the time of enrolment, or you may take advantage of our extended payment plans, as outlined in this booklet. Payments should be made by cheque, with exchange added; postal notes or money orders. Please cross cheques "Not Negotiable" and make payable to order of "Marconi School of Wireless." When sending postal notes, it is advisable to cross them as you would a cheque. Bank notes may be sent, but must be registered.

Q.—Does the School make provision for accommodation?

A.—The School does not provide residential facilities on the premises, but at all times will assist students to find suitable accommodation.

Section of equipment room at Marconi School of Wireless, showing at left a complete Direction Finding Receiver, switchboard, and screened loop; and at right 600 metre and short-wave transmitter unit of standard marine installation.



Positions held by Marconi School Graduates

Since the year 1913 when the Marconi School was established, 700 of its graduates have obtained employment in the radio industry.

Over 70% of the men carrying on the Australian Wireless services of Amalgamated Wireless (A'sia) Ltd., are graduates of the Marconi School of Wireless. You will find them engaged in executive positions in large wireless companies; as engineers designing wireless transmitting and receiving equipment; as research engineers at wireless laboratories; and as technicians at the Beam Wireless Stations and at the Overseas Wireless Telephony Stations. The majority of the operators at the Australian Coastal Radio Stations and the Island Radio Stations at Papua, New Guinea and Fiji, and on the ships of the Australian Mercantile Marine, as well as on the trawlers operating off the N.S.W. coast, are Marconi School trained men.

In all the principal Australian broadcasting stations, as well as in the sales and service departments of radio stores throughout Australia, will be found graduates of the Marconi School.

Many of the principals and much of the practice of moving picture equipment and its operation is based on wireless science, and this accounts to a large extent for the number of students of the Marconi School who have taken advantage of the opportunities afforded by the advent of the talking motion picture.

Graduates of the School will also be found occupying responsible positions in the Wireless Section of the Commonwealth Military Forces and in the Royal Australian Air Force. Some of the positions held by Marconi School graduates are as follows:—

L. A. Hooke, General Manager, Amalgamated Wireless (A'sia) Ltd.

H. Johnson, Airadio Department, Amalgamated Wireless (A'sia) Ltd.

A. F. Vipan, Sales Department, Amalgamated Wireless (A'sia) Ltd.

C. Southwell, Manager, Radio Department, Australian General Electric Ltd.

P. Renshaw, President, The Wireless Institute of Australia, N.S.W. Division.

V. E. Stanley, Acting Officer-in-Charge, A.W.A. Radio Centre, Pennant Hills.

R. C. V. Humphrey, Instructor at Marconi School.

Captain F. Hutley, who employed radio in his explorations in New Guinea and in aerial flights.

V. M. Brooker, Manager, Broadcasting Department, Amalgamated Wireless (A'sia) Ltd.

Ray Allsop, Director and Chief Engineer, Rayophone Ltd., Sydney.

S. M. Newman, Sales Engineer, Amalgamated Wireless (A'sia) Ltd.

T. W. Bearup, Federal Technical Supervisor, Australian Broadcasting Commission.

G. U. Allen, Qantas Imperial Airways.

G. Williams, Marine Inspector, Amalgamated Wireless (A'sia) Ltd.

Major P. J. Manley, Managing Director, Amplion (Australasia) Ltd.

W. H. C. Phillips, Marine Superintendent, Amalgamated Wireless (A'sia) Ltd.

M. C. Hoad, Service Superintendent, Western Electric Co. (Australia) Ltd.

S. Elliott, Victorian District Manager, Western Electric Co. (Australia) Ltd.

E. J. Risely, Service Engineer, Western Electric Co. (Australia) Ltd.

A. L. Longstaff, London Representative, Amalgamated Wireless (A'sia) Ltd.

F. M. Basden, Manager, 4CA (Cairns).

H. Lewis, Manager, 2GN (Goulburn).

What the School has done for *others* it can do for *you*

A large number of the Marconi School graduates have gained the P.M.G.'s. 1st and 2nd Class Certificate of Proficiency and are to-day employed in the Coastal Radio, Pacific Islands and Marine Services of A.W.A. Others are engaged in varied wireless activities ashore. The important positions held by Marconi School graduates in the wireless industry to-day is proof of the efficiency of the teaching methods of the School.

The School is conducted under the auspices of Amalgamated Wireless, and has at its disposal the very latest technical information of that Company.

Files containing many hundreds of letters from satisfied students are available at the School for those who wish to see them. Many letters testify to the co-operation and invaluable assistance afforded them by the School in their studies. A large majority of the School graduates have been men of average ability desirous of gaining a livelihood and have chosen the wireless profession. Having passed the necessary examinations, their qualifications and training have been the means of their obtaining a position in one of the various branches of wireless.

What the School has done for others it can also do for you. It can train you for a profession that is practically unlimited in its scope and which is developing at an amazing rate. Wireless is destined to play a wonderful part in communications and entertainment in the future and as a young man it is the future that mostly concerns you. What you will be doing five or ten years hence is of vital importance to you. To a large extent, your success or failure depends upon how you are preparing yourself for a career.

The Marconi School places before you an opportunity to enter a stabilised, profitable profession of unlimited development and of entrancing interest. It is an opportunity of which you should avail yourself.

Call in and see the School representative at 97 Clarence Street, Sydney, and talk the matter over with him. His knowledge and helpful advice may prove as advantageous to you as it has to others who are now engaged in the wireless industry.

APPLICATION FORM

.....193.....

MARCONI SCHOOL OF WIRELESS,
97 Clarence Street,
SYDNEY, N.S.W.

Dear Sirs,

I desire you to enrol me as a student for your

.....Course,
as outlined in your Syllabus, and accept the conditions of enrolment set out on the back hereof as a basis of enrolment. I understand that my total liability under this course is £ / / , of which I am remitting herewith £ / / , being Full Cash Fee in advance (or)* First Instalment on account. The remaining instalments of £ / / monthly will be remitted regularly each month.

Signed.....

Address.....

** Strike out words not applicable.*

NOTE.—Please cross cheques "Not Negotiable" and make payable to order of the "Marconi School of Wireless". Exchange should be added to country and inter-State cheques.

The Marconi School of Wireless does not guarantee employment.

CONDITIONS OF ENROLMENT

1. The School will be closed for fourteen days at Christmas and for seven days at Easter.
2. All Instruction Papers (and apparatus as supplied with Courses A and C) become the Student's own personal property and are therefore retained by him. The student agrees, however, not to give, lend, sell, or otherwise dispose of these papers to any other person or persons.
3. A Student wishing to become a Marine Wireless Operator is required to supply a medical certificate stating that he has the full use of his limbs, has no organic defects and that his hearing is normal. Any qualified medical practitioner's certificate will be accepted. He must also be of British parentage or a son of naturalised British parents.
4. Instalments of fees are due on the first day of each month, and should a Student wish to discontinue his Course for any reason, he should immediately notify the School; he will then be liable only for any instalments of fees in arrears at the time of such notification. Lacking such notification he will continue to become liable for the fees as charged every month.
5. The maximum period allowed for the completion of the various Courses is shown hereunder:—

Radio Engineer	-	-	-	-	-	-	6 years
Radio Technician	-	-	-	-	-	-	3 years
Radio Operator	-	-	-	-	-	-	3 years
Talking Picture Operator	-	-	-	-	-	-	18 months
Radio Mechanic	-	-	-	-	-	-	18 months
6. It is understood that the School does not undertake to obtain employment for its Students.