

notice for the extension of the services, or for the replacement of existing equipment, which might be damaged or destroyed.

What may be regarded as the most interesting development undertaken by A.W.A., is their organisation and maintenance of their many broadcasting stations through Australia. The A.W.A. were pioneers in this respect in Australia, and as far back as 1920 Mr. Fisk gave a public demonstration of wireless broadcasting. Late in the same year, he arranged a complete public broadcast concert in the Queen's Hall, Melbourne, and in January, 1921, a weekly broadcast service was inaugurated at Melbourne. The high standard maintained by the principal Australian broadcasting stations to-day is primarily due to the research and experimental work carried out by the engineers of the A.W.A.

**PHOTOGRAPH 2** shows the transmitting equipment of the A.W.A.'s new station **SEX**. This equipment is a popular feature of the All-Australia Exhibition, Melbourne, and appreciative letters regarding the performance of this station every evening have been received from listeners situated as far distant as West Australia and Otago. The power of this station is 500 watts, the wavelength 240 metres (1250 k.c.), and transmissions take place every evening, excepting Sundays. A show room is maintained also by the A.W.A. at this Exhibition for displaying their extensive range of Radiola receiving sets. The introduction of the new all-electric Radiola is the result of extensive research on the part of A.W.A. engineers, and it is regarded by experts as an instrument years ahead of its time.

Such headway in all branches of wireless could not have been made had the company not established efficient manufacturing facilities. The company's radio electric works at Sydney are replete with a full range of the most modern types of machinery, specially lead out for the production of wireless apparatus of every description, for use on land, at sea, or in the air. Their efficient world-wide services were built up and maintained solely by the use of apparatus which is everywhere recognised by experts as being the equal in design and performance to equipment produced overseas.

By the production of such high-grade equipment and by the varied activities of the A.W.A., Australia's one real disadvantage, that of isolation, is being eliminated. In the near future direct wireless telegraph, direct wireless telephone, and wireless picture services will be established with every important centre in the world, and at the same time Australia will probably become the wireless centre of the Southern Pacific. No other country has so much to gain from the full development of wireless communication, and its invention is the greatest gift science can give to Australia.

## Radio on the Bremen

### A Comprehensive Equipment

**THE** new German liner, the Bremen, which recently took the coveted Blue Riband from the Mauretania by establishing a new trans-Atlantic speed record, is equipped with the most modern type of radio apparatus. Usually the wireless installation on a ship is fitted in an ordinary cabin, but on the Bremen wireless has been regarded as an integral part of the ship's organisation. Hence, on the top deck, two spacious cabins have been provided for the power installations. One of these houses all the generators and similar apparatus, together with a workshop for running repairs to be carried out at sea. The other cabin contains the high and low-tension accumulators.

Apart from these power cabins, there are five main operating rooms. The first contains the main wireless transmitters and receivers; the second is specially devoted to long-distance reception; the third is the office in which one or more operators are always in attendance for dealing with the delivery and acceptance of radio telegrams from passengers; and the fourth cabin is another office for passengers to hand in their telegrams direct to the wireless operator on duty.

There is also another room, sound-proof, where passengers can speak direct by wireless telephone to their friends on any passing ships or to their friends on shore. For this purpose, the Bremen has been fitted with a special wireless telephone set, so that passengers in mid-Atlantic can be connected by land-lines to almost any part of the civilised world.

On her maiden voyage, the Bremen carried six wireless operators, but traffic during the trip was so heavy that the number has now been increased to ten. These operators have their own cabins connected by telephone to the main wireless office, while the chief operator is in direct communication with the captain and other chief officers of the vessel.

All the generators and motors on the top deck are controlled by automatic starters operated from the main wireless cabin by a push button control box, so that no sound or interference caused by the motors can penetrate to the control cabins.

The transmitter, which is of the oscillator-driven type, is readily adapted to give continuous wave, interrupted continuous wave and telephony. Wavelengths of from 500 to 3000 metres are provided, and the aerial energy is 3 kilowatts. The circuit arrangement permits of exact calibration of the master oscillator, and wavelength changes are effected in less than thirty seconds. Direct current at 4000 volts is taken from a rotary machine. In addition to the main transmitting

equipment are three other transmitters. One of these is a short-wave long-distance set using 700 watts power. Provision is made for telephony transmission with this short-wave set, and in order to comply with the requirements of the Washington Convention, long-distance telephony transmissions will shortly be transferred from the main transmitter to this equipment.

A medium-wave transmitter is also installed for handling traffic at short range, and consists of a modulated continuous wave set with a wave range of 580 to 830 metres, and an aerial power of about 200 watts. Finally, there is the  $\frac{1}{2}$  kilowatt emergency equipment, an accumulator-driven spark set which is independent of the ship's power supply.

Each of these transmitters is provided with a separate receiving set, each set can be worked independently or otherwise, as desired. Duplex working can be carried out by two operators working at the same time on the main set, while simultaneously a third operator can receive Press, weather, or time signal reports.

The Bremen is also fitted with a direction-finding set and an electric depth-finding apparatus. By means of these two important aids to navigation, ship's officers can calculate the exact position of the ship in any weather.

Two of the motor-driven lifeboats of the Bremen are equipped for both transmission and reception. Collapsible masts support a small two-wire aerial, and power is derived from a 24-volt accumulator applied to an alternating current generator.

## Radio Abroad

**AS** a result of conferences between British and American broadcasting representatives, regular exchange programmes will be commenced shortly on both sides of the Atlantic. Within a year it is probable that millions of listeners in America will be able to hear the roar of seaplanes competing for the Schneider Trophy, or perhaps the clash of arms at one of London's huge military reviews. Radio engineers of two prominent British companies are now engaged in perfecting a short-wave transmission system which will enable owners of even the weakest of sets to receive these trans-Atlantic programmes. Because of possible defects in transmission, however, no attempt will be made to broadcast any items of a musical nature.

**LISTENERS** to station WGY, Schenectady, were entertained recently by a very novel broadcast, which consisted of the noise made by flying atoms as they passed through a sheet of aluminium. Radium and other radioactive elements continually emit streams of atomic particles flying with the amazing speed of approximately ten thousand miles per second; and several years ago a German scientist named Geiger invented an apparatus to collect and count these shooting atoms. Each tiny particle passes through a thin window of aluminium, the speed of the atom being so great that it shoots through without being stopped. The atomic projectile electrifies gas atoms contained in a inner chamber, and thus the gas for an instant becomes a conductor of electricity. The tiny pulse of electric current produced by the arrival of the atomic bullet is then amplified millions of times, until it is able to actuate a loud-speaker. The resultant noise, as of hail pattering against a window pane, provided a unique and interesting broadcast.

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