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WIRELESS STATION Installation of New Apparatus Range Greatly Increased

The Hobart commercial wireless station was erected in 1912 on the Domain as part of a defence scheme for Australia, and since then has been operating continuously, exchanging traffic between ships at sea, the islands round Tasmania and mainland stations. Several times it has proved useful in cases of ships in distress, and commercially its value has increased until now the station handles anything up to 50 messages a day.

lt had been realised for some time that the station had become obsolete with the passage of time, and attempts have been made to modernise it, and the stat¡on has now been up[graded] to the same standard as the remainder of the coastal stations round Australia controlled by the Amalgamated Wireless Co. By the installation of the continuous wave and the interrupted continuous wave valve transmitter the possible range of the station has been very greatly extended. Communication can now be effected up to 2,000 miles. Another advantage of the new installation which will be greatly appreciated by wireless listeners-in is the non-interference with their broadcasting programmes. Tho old spark transmitter broke through very often, and caused considerable annoyance.

HISTORY OF STATION.

The history of the Hobart commercial station has been uneventful since it was installed in 1912 by a wireless engineer who had devised his own wireless system. This was Mr. Balsillie, and he had the contract to establish nearly a dozen stations at the principal coastal outposts in Australia. The stations were designed by the Government to exchange commercial traffic, and to act as a valuable defence unit in case of war. The station at Hobart was more or less of an experiment, and was used to communicate with Macquarie Island when Mawson's exploring expedition ventured South. Meteorological reports were sent to Macquarie Island from Hobart, and an exchange of news was effected. Later in 1914, when the Great War broke out, the station was taken over by the Australian Navy, and for the first time served the purpose for which it was originally designed. Barbed wire entanglements were put up all round it, and the remains of them may be seen to-day. Exciting stories are told of how sentries stationed on the hill were fired at in the darkness, and of how attempts were made by spies to blow the mast up.

When the Navy took the station over they altered the apparatus in accordance with their ideas of how the station should be operated, and this was the second stage in its modernisation. The first apparatus was supplied from the city mains with direct current, and a motor generator was used to convert it to alternating current, which was then supplied to a high tension transformer. The authorities eliminated the motor generator, and had the transformers supplied direct from the city mains. Now the Australian company which controls all the coastal stations in Australia has modernised the station once more, and installed valve apparatus.

The whole of the original apparatus has been discarded except the old aerial and mast. In reality a complete new station has been installed, as the old aerial is only used for transmitting, a small single wire has been fixed half-way up the mast at one end and to a tree at the other, and this picks up the waves for the receiving set. The old transmitting aerial is of a style in vogue at the time Mr. Balsillie installed the apparatus, and is like a large umbrella supported in the middle by the mast. This form of aerial is certainly not used by the most up-to-date wireless stations, but it is quite efficient enough for any requirements on a coastal station, and the cost of erecting another would not be justified at present.

THE RECEIVING SET.

The receiving set is much the same as the conventional type of broadcast receiver. It is mounted in a cabinet on a large insulating panel, and employs four valves. Two of these valves amplify the signals just as they are received, the next detects them, and the last amplifies them after they have been detected. The resultant signals are very loud, and ship stations 1,000 miles away can often be read with the head phones on the operating table. In order that any combination of valves can be used, a plugging system is employed, which enables the changes to be made immediately. The reason for this is that ships and stations close to the receiver do not need so much amplification as those further away, and some of the valves are cut out to reduce the amplification.

The single wire aerial used with the receiver is designed to give the set selectivity, and takes the form of a large T, the lead-in being in the middle. The smaller aerial also reduces the atmospherics, which is a very important consideration in the summer time, when such interference is particularly bad. In Tasmania the single wire receiving aerial is, perhaps, not so necessary as at some of the tropical stations, but the apparatus which has been installed in all the coastal stations in Australia is standardised, and for this reason the receiving aerial at a tropical station like Broome is similar to that used at Hobart.

The transmitter, which is really the most important part of the whole station, is remarkably simple and can be controlled completely from the operator's desk. To transmit a message he has simply to move several switches and send the message by means of the Morse key at his elbow. Different meter dials on the set show him how it is operating, and he can hear the note sent out in the head receivers which he wears all the time. At the completion of the transmission of a message he simply turns the switches off, moves another on the receiver, and if the wave length is correct he is able to listen in to the answering signal from the station to which he has been transmitting. Slight adjustment of the wave length of the receiver is easily made by means of vernier tuning dials. If it is necessary to alter the wave length of the receiver considerably coils wound for different wave lengths have to be inserted in plugs. By this means the receiver will cover all the wave lengths used commercially. It has a reception range from about 200 to 20,000 metres, and Rugby, which operates near the latter wave length, can be tuned in very loudly.

HOW A MESSAGE IS SENT.

When the message is handed in at the counter of the General Post Office for transmission to a ship at sea, it is handed to a telegraph operator in the post office, who transmits it by land line telegraph to the wireless station. It is received there by an operator on an ordinary telegraph sounder, is written down on a form, and forwarded by means of the wireless apparatus to the ship as soon as communication can be effected. When a ship is wanted the station sends out the call letters of the ship wanted, and if the operator on the ship hears the call he answers it immediately and signals that he is ready to take the message. It is sent to him in a series of longs and shorts - dots and dashes of the Morse code - and he copies it down on a pad of special wireless message forms and sends it to the passenger to whom it is addressed. If there were no hitch in getting in touch with the ship, the message could be, in the hands of the addressee within five minutes of its being handed in at the telegraph office.

TECHNICAL DESCRIPTION.

The transmitter is one of the most up-to-date type which is being installed in coastal stations for communicating with ships. The power used is in the vicinity of two kilowatts, and the transmitting range of the station is estimated at about 2,000 miles for all working.

The apparatus is divided into three sections. The first is the radio frequency circuit, which consists of two large tuning coils or helixes of wire, which determine the wave length on which the transmitter radiates. In order to alter this wave length, plug sockets and wandering leads are provided, and to alter the wave length requires but a momentary alteration of the connections. To avoid losses the coils are wound on ebonite frames, and consist of very thick bare copper wire. Several large oil immersed condensers are also fitted to this unit. Oil is a very good insulating medium, and the immersion in oil insulates the plates of the condensers.

The oscillator panel, which makes up the second section of the transmitter, contains the valves, which are of the Marconi M.T.6 type, each valve being capable of handling 1-2 k.w. in its plate circuit.

The whole of the power supply is obtained directly from the supply mains at a voltage of 200 and 50 cycles. Specially designed transformers change the voltage of supply to a suitable value for use in the plate supply and filament circuits, this being 10,000 and 15.5 volts respectively. A fine adjustment of the voltage is provided for by the use of a variable iron cored choke, inserted in the primary of each of the transformers, These chokes are accommodated on the third section of the transmitter control panel, which is situated within easy reach of the operator.

The high tension transformer has a split secondary winding, with a centre tap, each half being capable of delivering 10,000 volts. This unsmoothed or raw A.C. voltage is applied to the plates of the two M.T.6 valves through the two radio frequency chokes, the centre tap being connected to earth. This arrangement permits of full wave self rectification, but no smoothing devices are used. In order to permit of the transmitted signal being received by a crystal or non oscillating valve receiver, a variable speed chopper wheel is provided. This is used in conjunction with a special uncoupling coil. The latter coil is mounted on the same frame and between the aerial inductance and coupling coil. The function of the uncoupling coil is to prevent a transfer of energy from the coupling coil to the aerial. This occurs during the periods when the brushes of the chopper motor are on insulating segments. The coupling and uncoupling coils are then connected in series, and being wound in opposing directions, no energy is transferred to the aerial. During the period when the brushes are on conducting segments, the uncoupling coil is short circuited and transfer of energy takes place.

Keying can be accomplished either by inserting the key in the coupling-uncoupling coil circuit or in the primary of power transformer. The latter method is preferable on account of its not being necessary to carry radio frequency leads to the operating table.

The interior of Hobart Commercial Radio Station, showing the new apparatus installed recently. The control panel may be seen at the left of the picture and the receiving set In front of the operator.

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