

Marine chronometer No. 140 (two-day), made by D. McGregor and Co., Glasgow: This chronometer was purchased; it is used as a check on the clocks. On two occasions when earthquakes stopped the standard clock the chronometer was of use until observations for time were obtained and the standard clock correctly started again.

Automatic Switch on Chronograph.—An automatic switch has been put on the barrel chronograph. As this instrument, driven by an electric motor, can be run at fast speeds, an automatic switch was necessary to protect the mechanism. The barrel is 50 cm. in circumference, and can be run at one revolution per minute, one revolution in ten seconds, or one revolution in one second.

Edison Storage Cells.—A much-needed addition to the storage battery was made by the purchase of twenty-five Edison storage cells, type B 4, 80 ampere hours capacity.

Charging Plant for Storage Battery.—An order has been placed for a mercury arc rectifier charging plant.

Wireless.—An aerial has been erected at the Observatory for the receipt of wireless time-signals. It consists of two wires, each 230 ft. long and 4 ft. 6 in. apart, and about 50 ft. above the ground. A trial was made with satisfactory results with receiving-apparatus borrowed from the Telegraph Department.

Meridian Marks.—These are erected of temporary materials, and the south one has already shown signs of moving. Designs for more permanent marks in reinforced concrete have been prepared, and the marks should be erected as soon as possible.

King Equatorial Telescope.—This 5 in. telescope, by Grubb, of Dublin, was presented to the Wellington Philosophical Society for the use of the Astronomical Section by Miss King as a memorial to her late brother, Mr. Thomas King. The telescope is temporarily stored in the cellar until the Astronomical Section can arrange to erect a building for it.

Cooke Equatorial Telescope.—This 5 in. telescope has been available to the public on fine Tuesday evenings, when members of the Astronomical Section have freely given their services in allowing the public to make use of it.

Transit Instrument.—The micrometer-screw of the transit micrometer has shown irregularities in action due to wear. It will be necessary to replace the micrometer-screw in the near future.

Standard Mercurial Barometer.—The leather bag holding the mercury broke. After repairs were made Mr. P. W. Burbidge, Lecturer on Physics at the Victoria University College, filled the barometer again. Thanks are due to Mr. Burbidge for his assistance in this delicate operation.

WIRELESS TIME-SIGNALS.

The establishment of a wireless time service in New Zealand has been strongly urged on many occasions, but beyond the erection of an aerial at the Observatory nothing further has been done in this important matter. The need for such a service has been recognized by most other British possessions, and many wireless time services have been established within the last two years. New Zealand occupies a unique position in the Pacific Ocean for the establishment of a regular wireless time service, so it is hoped that steps may now be taken to complete the installation at the Observatory. The cost would not be great, provided arrangements can be made with the Telegraph Department for the use of the existing wireless stations in sending the signals.

Occasional time-signals have been received at the Observatory with apparatus loaned by the Telegraph Department. On the 19th May, 1916, the Melbourne time-signals were received by the operator at the Awarua Radio-station, and were transmitted by hand signals over the land line and cable to the Observatory, where they were recorded on the barrel chronograph, which was run at a speed of one revolution in ten seconds, so that one second was 5 cm. on the record. Twenty-four signals were recorded. The difference between the clocks at the Melbourne and Hector Observatories was $-0.38 \text{ s.} \pm 0.045 \text{ s.}$ This difference includes the personal equation of the operator at the Awarua Radio-station and any lag on the circuit between the Observatories. Again, on the 1st June, 1916, time-signals were received from Melbourne under similar conditions. The difference between the clocks was $+0.12 \text{ s.} \pm 0.029 \text{ s.}$

For preliminary experimental determinations these results are satisfactory. Naturally, however, greater precision should be obtained if the signals are received direct at the Observatory, and this should now be possible with the aerial at the Observatory as soon as suitable receiving-apparatus is installed. These signals were received at a very inconvenient hour—1.30 a.m.—which corresponds to midnight at Melbourne. They afford a valuable check on the clocks when bad weather prevents observations being obtained, so that steps should be taken to arrange for their regular receipt.

Wireless Time-signals sent to Tahiti.—A request was received from the Governor of Tahiti that facilities be given for the transmission of wireless time-signals from Awanui to Papeete to enable the longitude of that place to be determined. Mr. H. F. Johnston, an officer of the Department of Research in Terrestrial Magnetism of the Carnegie Institution of Washington, was then at Tahiti, and he offered to receive the signals and to take observations for local time. Accordingly with the co-operation of the Telegraph Department steps were taken to comply with this request, and on Friday, the 30th June, 1916, signals were sent by the standard clock over the land lines to the Awanui Radio-station, thence by wireless to Tahiti. A relay was used at Awanui to work the sending-key, so that the whole process was automatic. Signals of one second duration were sent. Each signal began at 0 s. and ended at 1 s. of each minute of Greenwich mean time. Eight signals were sent, the first one at 21 h. 55 m. 0 s. and the last one at 22 h. 2 m. 0 s., G.M.T. Mr. Johnston reported from Papeete, 2nd July, 1916: "We received the eight signals of time very clearly. All came exactly at the same time except the third, which seemed to be about $\frac{1}{10}$ second ahead of the other seven. I determined local mean time with a theodolite, the probable error being about ± 0.5 second of time. From the signals I can give as a preliminary result the longitude of Point Venus as $149^{\circ} 30' 01''$ west. The longitude usually quoted is $149^{\circ} 29' 15''$ west, and thus there is a correction of only about three seconds of time to the westward."

The third signal referred to by Mr. Johnston left the Observatory on time, as is shown by the record on the chronograph. Any irregularity, therefore, must be due to causes outside the Observatory. The probable error of the time determination at the Observatory was about $\pm 0.05 \text{ s.}$ This is, so far as I am aware, the first time the longitude of Tahiti has been determined by wireless.