THE MAGNETIC STORM OF MAY 13-16, 1921, AT APIA OBSERVATORY, SAMOA.

In the following Greenwich Civil Mean Time is used. The geographic coördinates of the Samoa Observatory are: $13^{\circ} 48' \text{ S.}$; $171^{\circ} 46'$, or $11^{\text{h}} 27^{\text{m}}.1 \text{ W.}$ The motions of north end of the magnet to east and downward are reckoned positive. $D = 1'$ corresponds to 10γ . The approximate mean values of the magnetic elements during five quiet days preceding the storms are: $H = 0.35263$; $D = 10^{\circ} 12.5'$; E ; $Z = -0.20380$.

Preliminary Disturbance.—May 12, 6^{h} , gradual increase in H begins; $8^{\text{h}} 13^{\text{m}}.5$, sudden commencement, $\Delta H = +20\gamma$; $8^{\text{h}} 14^{\text{m}}$, maximum in H ; 12^{h} , minimum in H ; max. — min. = 100γ .

First Storm.—May 13, $13^{\text{h}} 09^{\text{m}}$, sudden commencement, $\Delta H = +70\gamma$, $\Delta D = +1'$; $\Delta Z = -20\gamma$; May 13, $13^{\text{h}} 09^{\text{m}}$, maximum in H ; May 14, $5^{\text{h}} 53^{\text{m}}$, minimum in H ; max. — min. = 210γ .

Second and Main Storm.—May 14, $22^{\text{h}} 13^{\text{m}}$, sudden commencement of the principal storm, with a sine-curve motion in H and Z of about two hours' duration. Amplitude in H , -50γ , in Z , $+100\gamma$. May 15, $0^{\text{h}} 15^{\text{m}}$, beginning of the fall to a minimum in H ; at this time, $H = 0.35220$, $Z = -0.20350$. $5^{\text{h}} 30^{\text{m}}$, min. $H = 0.34300$. $4^{\text{h}} 42^{\text{m}}$, min. $Z = 0.20270$. $5^{\text{h}} 30^{\text{m}} - 5^{\text{h}} 45^{\text{m}}$ sudden fall in Z , $\Delta Z = -65\gamma$. $5^{\text{h}} 30^{\text{m}}$, beginning of recovery. $16^{\text{h}} 30^{\text{m}}$, change of velocity in recovery and beginning of a comparatively quiet period. On May 15, between max. at $0^{\text{h}} 15^{\text{m}}$ and min. at $5^{\text{h}} 30^{\text{m}}$, $\Delta H = 920\gamma$ and $\Delta Z = -75\gamma$.

Third Storm (repetition of the main storm).—May 16, $1^{\text{h}} 27^{\text{m}}$, sudden commencement, $\Delta H = +20\gamma$, $\Delta Z = -10\gamma$. $10^{\text{h}} 0^{\text{m}}$ min. $H = 0.35875$. 13^{h} , beginning of a quiet period. ΔH , max. $(2^{\text{h}}) - \text{min. } (10^{\text{h}}) = 160\gamma$. ΔZ , min. $(2^{\text{h}}) - \text{max. } (7^{\text{h}}) = -60\gamma$.

Ranges, May 13-16.— H , max., $13^{\text{d}} 13^{\text{h}} 9^{\text{m}}$, $H = 0.35305$; min., $15^{\text{d}} 5^{\text{h}} 30^{\text{m}}$, $H = 0.34300$; $\Delta H = 1005\gamma$. Z , max., $15^{\text{d}} 4^{\text{h}} 42^{\text{m}}$, $Z = -0.20270$, min., $15^{\text{d}} 10^{\text{h}} 40^{\text{m}}$, $Z = -0.20427$; $\Delta Z = 157\gamma$.

On May 15, $5\frac{3}{4}^{\text{h}} - 6\frac{1}{2}^{\text{h}}$ Greenwich ($6\frac{1}{4} \text{ P. M.} - 7 \text{ P. M.}$, evening May 14 local time) a display of the *Aurora Australis* was observed at the Observatory. There is a range of mountains from 600-700 meters high to the south distant about 10 km., and above this the light could be seen in the form of a segment of a circle and reaching to an altitude of 22 degrees, determined from star positions noted. It covered probably an arc of about 25 degrees along the horizon, and the center was apparently close to the magnetic meridian. In spite of the moonlight (first quarter) and a little twilight as well, the light was very conspicuous and of a glowing red color. The point of the greatest intensity appeared to move from E. to W. at about $6^{\text{h}} 20^{\text{m}}$ Greenwich time, and traces of a brighter yellow colored streamer were noticed at the same time. The sky was quite free of cloud at this hour; later on some small fracto-cumulus were experienced, but no cirrus clouds were seen. No signs of the light were seen after 7 P. M.

Reports from Tongatabu, seven degrees south of Samoa, state that the light was observed there also to the south. A very bright display was also seen in New Zealand.

The wireless station in Samoa was in communication with New Zealand during the time of the aurora, and the conditions were considered to be unusually good.

At local noon on May 14, three spots were observed on the Sun, two of them close to the center. This time is near that of commencement of the greatest disturbance. Two of them were certainly large spots, but were not thought to be of the largest type.

On May 20, a period of thunderstorms exceptionally frequent and heavy rain began here and continued for more than a week. This is unusual in Samoa, especially at this time of year.

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THE MAGNETIC CHARACTER OF THE YEAR 1920.

The annual review of the "Caractère magnétique de chaque jour" for 1920 has been drawn up in the same manner as for the preceding years. Thirty-nine observatories contributed to the quarterly reviews, 36 of them having sent complete data.

Table II of the annual review, containing the mean character of each day and each month, the list of calm days and the days recommended for reproduction, are reprinted here.

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