

occurred are rejected. In this discussion the latter method has been adopted, as the remarks of the observing officers as to days of disturbance seem to indicate a more accurate means of defining a disturbance than the selection of a separating value for certain hours.

The following remarks are taken from the "Discovery's" journal of magnetic observations, showing the days of disturbance noted :—

1875, October 31.—Disturbance at 22 hours, lasting until 7 hours November 1st.

November 1.—Great disturbance at 21 hours, lasted 7 hours, the needle constantly to the westward of the normal.

12.—Disturbance at 22 hours, until 4 hours of November 13th.

29.—Disturbance at 21 hours, until 7 hours of November 30th.

December 1.—Great disturbance at 21 hours, lasting 7 hours.

2.—Disturbance from 21 hours to Noon.

5.—Great disturbance in the forenoon, increasing during the afternoon, moderating at 6 hours of the 6th, increasing again during the night, and ending at 3 hours of the 7th.

17.—Disturbance at 21h. 25m., lasting till 5½ hours of 18th.

20.—Disturbance from 21½ hours, until 3 hours of 21st.

24. }

25. } All disturbed days at various times.

26. }

1876, January 4.—Disturbance at 22 hours, continuing for 9 hours.

13.—Great disturbance from 9 hours, until 15 hours.

14.—Disturbance from 21 hours until 7 hours of 15th.

22.—Disturbances from 22 hours until 7 hours of 23rd.

30.—Disturbances during the night.

February 19.—Great disturbance from 2 hours to 21 hours.

25.—Slight disturbance from 2 hours to 5½ hours.

28.—Very great disturbance at Midnight.

March 12.—Disturbance from 22 hours to 7 hours of 13th.

24.—Disturbance at 20 hours, lasting 11 hours.

We have here 22 days of undoubted disturbance. From an examination of the hourly scale readings at the above dates, it was found that the motion of the magnet was very irregular from hour to hour, and that there were other occasions (not noted in the previous list) when similar movements took place and might likewise be considered days of disturbance. It was further remarked that on all these days the daily range exceeded 60' of arc; therefore the excess of this value on any given day was accepted as the criterion of its being one of disturbance.

The rejection of the assumed days of disturbance has the following result, as shown in Table IV. In the monthly values the time of extreme westerly deflection is very little altered, but the easterly extreme is attained at hours varying between 9 p.m. and 4 a.m. The mean values for the whole period, as recorded in Table III., are—

Westerly extreme	{ 1 p.m., 10 a.m. and 1 p.m., 11 am.	Van Rensselaer Harbour, Floeberg Beach, Discovery Bay,	{ 2 a.m., 1 a.m., Midnight,	Easterly extreme.
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The general effect, therefore, of disturbance is to accelerate the arrival of the magnet at its points of extreme deflection by one hour, in addition to producing a much larger range in the diurnal variation. Thus, with disturbances included, the range is 35'·6; with their rejection it is only 16'·3 at Discovery Bay.

Curves illustrating Tables II., III., and IV. are appended. In diagram No. 3 the curves of the "Discovery" show the effects of disturbance very clearly in the difference between the red and black lines. The times of the magnet reaching its mean position are also sharply defined.

In Table V. are shown the values of that part of the mean diurnal variation of the declination which is produced by disturbances. In these, the effects of westerly disturbances are greater at certain hours than the easterly, but the latter are longer sustained.

ANALYSIS OF THE DISTURBANCES.

Although differential observations of the magnetic declination and analyses of the disturbances have been made at numerous stations on the North American continent, these have been generally at places where some connexion was assumed between appearances of the aurora and disturbances of the magnetic elements.