

Deviations from normal direction.	Number of disturbances.
3.'6 to 10.'8	2189
10.'8 to 18.'1	147
18.'1 to 25.'3	18
25.'3 to 32.'6	3
Beyond,	0

It should be recalled that the period of sun-spot minimum occurred in the midst of this series; otherwise the disturbances would have been more frequent and greater. Mr. Schott cites the following maximum deflections:

At Key West, between 1860 and 1866.....	0° 21.'4
At Madison, Wis., on Oct. 12, 1877 .....	0 48
At Madison, Wis., on May 28, 1877 .....	0 24
At Lady Franklin Bay, during great storm in November, 1892, Greely noted a deflection of..	20 28

Mr. G. R. Putnam, Assistant of the Coast and Geodetic Survey, cites<sup>1</sup> a change of over three degrees in twenty minutes at Niantilik on September 18, 1896. "At 7h. 35m. A. M. local mean time, the needle pointed 60° 35' W. of N., while at 7h. 55m. it pointed 63° 50' W. of N., and the total range for the day was over four and a half degrees. On this date there was an unusual magnetic disturbance, the extreme range in declination at Washington being 38' of the entire day, and 19' for the portion of the day corresponding to the interval during which observations were made at Niantilik. It will be noted that the range in declination was nearly fifteen times as great as at Washington during the same interval." The geographical position of Niantilik is 64° 53.'5 N. and 66° 19.'5 W. of Greenwich, and the dip on September 18, 1896, was 83° 54.'8.

#### THE SECULAR VARIATION.

This is the variation that concerns the surveyor most intimately. How much to allow for the *change* in the direction of the magnetic

<sup>1</sup>The Scientific Work of the Boston Party on the Sixth Peary Expedition to Greenland, Report II, by G. R. Putnam, Technology Quarterly (Massachusetts Institute), March, 1897, p. 79.