

a list of more or less disturbed days from July to December of last year, as furnished by the Toronto Magnetic Observatory, we have:

In July . . . . .	17 more or less disturbed days.
August . . . . .	20
September . . .	19
October . . . . .	14
November . . .	9
December . . . .	8

Fortunately for the surveyor, about 75-90 per cent of these disturbances were either small or they occurred at times when they would not appreciably affect his work.

It is due largely to these irregular disturbances, the coming of which we cannot as yet predict, that it is not possible to give accurate reductions of an observed declination to the mean value for the day by a general system of rules.

The duration of the irregular fluctuations may be but an instant, a few hours or several days. They generally reveal their presence by a sudden and marked departure of the needle from its true normal position. While these fluctuations make their appearance apparently at random, nevertheless, when they are treated statistically it is found that they exhibit well-marked periodicities in their occurrences. Thus they are more frequent and more violent in the years of maximum sun-spots and less frequent and less violent in years of minimum sun-spots. In November, 1882, during the period of maximum sun-spots, a magnetic storm occurred which caused the magnetic needle at Los Angeles, California, to move over  $1\frac{1}{3}^{\circ}$  out of its normal position. The actual deviation beyond  $1\frac{1}{3}^{\circ}$  was lost because the photographic trace of the needle's fluctuation went beyond the sensitized sheet. Then again they appear subject to short periodic variations, such as the daily and the annual. They seem to occur more frequently towards evening. Perhaps the best idea of the frequency and magnitude of the irregular disturbances is obtained from Mr. Schott's table.<sup>1</sup> The table is based on the observations made every two hours at Philadelphia, under Bache, between the six years 1840 to 1845.

<sup>1</sup> Coast and Geodetic Survey Report for 1888, App. 7.