

tions were favorable. Only in two or three cases the stations had to be decided upon—if observations were to be made at all—under conditions not the very best. In these cases, however, an additional station was occupied in the same county when possible, or somewhere in the vicinity. The descriptions and locations of the stations are given in another chapter.

#### METHODS OF OBSERVATION.

*The highest refinement possible at any one station was not sought.* It was believed, for example, that it is far more valuable to obtain two declinations to within a few minutes at two stations some distance from each other than to observe one declination at one station to the nearest minute. It is absolute folly, as far as the matter of distribution of declination is concerned, to occupy a station two or three days with the view of determining the declination to the nearest minute and then not observe the declination again to within 25 to 50 miles or more of this first station. Even in undisturbed regions the error made by a linear interpolation between the values at two distant stations is generally much greater than the error of the station observation. In disturbed regions the extremely refined methods, when pursued at the expense of limiting the number of stations, are entirely out of place. In the establishment of *secular variation stations* the utmost refinement should of course be employed.

At the same time it was the aim to arrange the observations at two distant stations in such a way that, while they individually might be in error by several minutes, they would not necessarily both be in error in the same direction, so that in making an adjustment, graphical or otherwise, of all the observations, these station errors would be in the nature of "accidental errors," *i. e.*, some would be plus and others minus. If it had been possible to carry out this scheme perfectly, the isogonics drawn with a free hand, for example, as based on observations defective in this way, might be just as accurate, or nearly so, as those based on observations made with the utmost refinement at an equal number of stations, and would be *more* accurate than those based on refined observations at the number of stations which