

observation, by affording to the undistracted attention of the observer, numerous bisections of the same star during its passage across the field of the instrument; thus progressively refining, as the learned Professor explained to us, in order to attain results more and more exact; or to still more minute fractions of a second of time. To those who may not have given some consideration to the subject, the importance of this refinement may not at the first glance be apparent; but it is readily understood when we apply it as a check upon extensive trigonometrical and other measurements on the ground, requiring the extreme care and precision of those appertaining to a great national undertaking, like the Coast Survey of the United States, now in progress. It is proportionally important in surveys of a smaller extent. Now we ordinarily regard a second of time as an exceedingly small space, the smallest indeed that we trouble ourselves to notice: but when we apply it to the lineal measurement of the earth's rotation, it is found to represent on a parallel at the equator an extent of 1521 feet nearly. This distance, of course, diminishes on every parallel successively towards either pole, proportionally to the sine of the co-latitude. In the latitude of Fredericton it represents 1077 feet nearly—that is to say, in an east and west direction; and a tenth of this, corresponding to one tenth of a second of time, would be about 108 feet. We therefore perceive that whilst we are refining in this method of ascertaining longitude, so as to be exact, with tolerable certainty, to one-tenth of a second in time, this means that we are still certain only within a range of 100 to 150 feet, lineal measurement, according to the latitude of the place. But in a properly conducted trigonometrical survey, an error no greater than this, in an extended system of triangles, would be inadmissible and perhaps exceedingly perplexing; and the value of the electro-magnetic method of ascertaining longitude would be in promptly detecting in what meridian of the system such an error had occurred. Prior to this method of ascertaining longitude, I feel justified in saying that the results of the ordinary methods are nearly valueless where a reliable check on the