

mathematics might be educed from these data. The former are ascertained by observation—after which no further aid is required from observation, while we prosecute that reasoning which often brings the most weighty and important discoveries in its train. It is well to consider how much can be achieved by mathematics in this process, and how distinct its part is from that of wide and distant observation; insomuch that by the light which it strikes out in the little chamber of one's own thoughts, we are enabled to proceed from one doctrine and discovery to another. From three distant points in the firmament, a triangle may be formed to which the very mathematics are applicable that we employ upon a triangle constructed upon paper by our own fingers. Whether they be the positions and the distances that lie within the compass of a diagram, or the positions and distances that obtain in wide immensity, it is one and the same geometry which, from a few simple and ascertained data, guides the inquirer to the various and important relations of both. After that observation hath done its office, and made over to mathematics the materials which it hath gathered—this latter science can guide the way to discoveries and applications innumerable; and without one look more upon the heavens, with nought but the student's concentrated regard on the lines and the symbols that lie in little room upon his table, might the whole mystery and mechanism of the heavens be unravelled.

14. Let those things, then, be rightly distinguished which are distinct from one another. They were not the objects of the science which gave the