

has changed the face of mineralogy, and given it all the characters of one of the exact sciences.

(388.) Our means of perceiving and measuring minute quantities, in the important relations of weight, space, and time, seem already to have been carried to a point which it is hardly conceivable they should surpass. Balances have been constructed which have rendered sensible the millionth part of the whole quantity weighed; and to turn with the thousandth part of a grain is the performance of balances pretending to no very extraordinary degree of merit. The elegant invention of the spherometer, by substituting the sense of touch for that of sight in the measurement of minute objects, permits the determination of their dimensions with a degree of precision which is fully adequate to the nicest purposes of scientific inquiry. By its aid an inch may be readily subdivided into ten or even twenty thousand parts; and the lever of contact, an instrument in use among the German opticians, enables us to appreciate quantities of space even yet smaller. For the subdivision of time, too, the perfection of modern mechanism has furnished resources which leave very little to be desired. By the aid of clocks and chronometers, as they are now constructed, a few tenths of a second is all the error that need be apprehended in the subdivision of a day; and for the further subdivision of smaller portions of time, instruments have been imagined which admit of almost unlimited precision, and permit us to appreciate intervals to the nicety of the hundredth, or even the thousandth part of a single second.* When the precision attainable by such means is contrasted with what could be procured a few generations ago, by the rude and clumsy workmanship of even the early part of the last century, it will be no matter of astonishment that the sciences which depend on exact measurements should have made a proportional progress. Nor will any degree of nicety in physical determinations appear beyond our reach, if

* See a description of a contrivance of this kind by Dr. Young, Lectures, vol. i. p. 191.