ready spoken, possessed by that portion of physical science whose origin is familiar to us, and is connected with our earthly existence. The physical description of celestial bodies, from the remotely-glimmering nebulæ with their suns, to the central body of our own system, is limited, as we have seen, to general conceptions of the volume and quantity of matter. No manifestation of vital activity is there presented to our senses. It is only from analogies, frequently from purely ideal combinations, that we hazard conjectures on the specific elements of matter, or on their various modifications in the different planetary bodies. But the physical knowledge of the heterogeneous nature of matter, its chemical differences, the regular forms in which its molecules combine together, whether in crystals or granules; its relations to the deflected or decomposed waves of light by which it is penetrated; to radiating, transmitted, or polarized heat; and to the brilliant or invisible, but not, on that account, less active phenomena of electro-magnetism—all this inexhaustible treasure, by which the enjoyment of the contemplation of nature is so much heightened, is dependent on the surface of the planet which we inhabit, and more on its solid than on its liquid parts. I have already remarked how greatly the study of natural objects and forces, and the infinite diversity of the sources they open for our consideration, strengthen the mental activity, and call into action every manifestation of intellectual progress. These relations require, however, as little comment as that concatenation of causes by which particular nations are permitted to enjoy a superiority over others in the exercise of a material power derived from their command of a portion of these elementary forces of nature.

If, on the one hand, it were necessary to indicate the difference existing between the nature of our knowledge of the Earth and of that of the celestial regions and their contents, I am no less desirous, on the other hand, to draw attention to the limited boundaries of that portion of space from which we derive all our knowledge of the heterogeneous character of matter. This has been somewhat inappropriately termed the Earth's crust; it includes the strata most contiguous to the upper surface of our planet, and which have been laid open before us by deep fissure-like valleys, or by the labors of man, in the bores and shafts formed by miners. These labors*

* In speaking of the greatest depths within the Earth reached by human labor, we must recollect that there is a difference between the *absolute depth* (that is to say, the depth below the Earth's surface at that