

27.
The astro-
nomical
view.
Cosmical,
molar, and
molecular
phenomena.

sidering nature a great impetus. As we have seen, it was entirely an outcome of Newton's great discovery.

It is sometimes useful to distinguish between cosmical, molar, and molecular phenomena; it is, however, well to note that this distinction is a popular or practical, not a scientific one. The question, in how far pure magnitude affects the appearance and relations of the parts or elements of which the universe is composed, is indeed of great scientific interest, but it has not yet received a definite answer. In the meantime we can use the term cosmical for such magnitudes of space, mass, or time as far transcend our own powers of direct measurement by the foot-rule, the balance, and the timepiece, and still more, our powers of direct action: those dimensions compared with which our own homes and actions absolutely disappear. We will call molar those masses which we can handle directly, those dimensions in which we build our own homes and pass our own lives. And we will call molecular those sizes and masses which on the other side are so small that the utmost powers of the microscope and the dividing machine fail to make them directly visible, still less tangible or manageable for our active powers. The lines which limit these three regions are indeed neither fixed nor fixable; the middle region, which

mathematics, and his knowledge of astronomy was mainly derived from books. . . . Thus Faraday was debarred from following the course of thought which had led to the achievements of the French philosophers, and was obliged to explain the phenomena to himself by means of a symbolism which he could understand, instead of adopting what had hitherto been the only tongue

of the learned" (Clerk Maxwell, "Action at a Distance," 'Proceedings of the Royal Institution,' vol. vii. Reprinted in 'Scientific Papers,' Cambridge, 1890, vol. ii. p. 317 sq. Cf. also vol. i. p. 156). Du Bois-Reymond uses the term "astronomical knowledge" in a somewhat wider sense in his discourse "Ueber die Grenzen des Naturerkennens" ('Reden,' vol. i. p. 120).