

reached the stage of a deductive science. For a very wide range of celestial phenomena we possess the primary law, and we can announce what is, from our knowledge of what ought to be, the fact. But it is seldom remembered that this scientific knowledge reposes upon an enormous mass of observations, which were accumulated through long generations of mankind. From the ancient Babylonians and Egyptians the heritage of these facts descended through tens of centuries to Greece and Rome; and fifteen centuries more of the Christian Era had to pass before they were sufficiently sifted, arranged, and tested, for a scientific conclusion to be drawn from them. Looking out upon the heavens on some starlight night, there seems something even more wonderful than the triumphs of modern astronomy in the fact that patient watching of those innumerable and apparently confused orbs should have enabled men to disentangle them, to discover a fixed order in their movements, and eventually to know them so well as to be able to predict those movements with more unerring certainty than we can feel with respect to any other occurrences. Mr. Darwin's observations have not yet, as we think, placed us in a position to form a trustworthy scientific theory respecting the natural history of species, similar to the law of gravitation respecting the heavenly bodies. But he has, perhaps—and that in great measure by his own herculean labors—placed us in much the same position as that to which astronomy was brought when Kepler had shown, by the laborious observations to which his genius inspired him, that the planets moved in ellipses. We now know, as it were, in what orbits species have moved, and we know, within certain limits, the methods of their variation. To this extent it may be said that we know the fact of evolution. But what are its causes, what is the law which impels the variation of species in known directions—whether it is by an inherent principle of development, like that which determines the growth of an individual, or by the pressure of external circumstances, or by both combined, that the observed results are produced—this, as it seems to us, is as unknown as was the law of gravitation before Newton divined it. But it is