

that it appeared in the same year as John Stuart Mill's 'Logic.' It may therefore be permitted to bring it into a line with that reaction to which I referred at the end of the last chapter, the probably unconscious reaction against what we may now term the mechanical view of nature, the attempt to limit the study of nature to the recognition of certain recurring uniformities, such uniformities being primarily conceived as comprised in the formula of cause and effect, but latterly more and more reduced to a mere repetition of successions in time. The earlier upholders of the scientific study of nature, when they desired to do more than accumulate and arrange facts and observations, laid stress, consciously or unconsciously, on that side of the conception of cause which in their minds was not purely mechanical.<sup>1</sup> This implied that the effect was not purely mechanical either, but shared in the ideal or spiritual nature of the cause from which it ultimately sprang: it exhibited a definite end or a purpose. These

<sup>1</sup> This remark is only fully correct if we look at the mathematical or exact sciences, and does not apply to the organic or biological sciences. The latter utilised for the purposes of classification and arrangement the conception of plan or archetype. To have destroyed this latter idea, replacing it by a conception of change or evolution mechanically proceeding, and by doing so to have converted some of the natural sciences into exact sciences, is one of the great achievements of the Darwinian revolution of Thought. It should, however, not be overlooked that purely deductive reasoning from definite beginnings is not possible;

such beginnings must always be a matter of hypothesis or invention. They are hypothetical in all the sciences which deal with a variety of molar and molecular, and still more in those that deal with organic, phenomena; and they are a matter of invention or choice in dealing with purely mathematical configurations. This has been more and more recognised in the course of the nineteenth century, and has resulted in a comparatively recent science,—the mathematics of arrangement as distinguished from the mathematics of quantity. This I tried to show in the last chapter of the first section of this History.