

and arguments on both sides of each question.”¹ It is quite a different process of investigation and method of thought from that which the abstract sciences use, where every agency is first considered in its isolated action and mathematically calculated, and a complex effect is rightly looked upon as merely the resultant of specific, well-defined forces, compounded according to rigid dynamical formulæ. That the whole of nature, as well as all observable phenomena, are in reality only the result of such a composition of definite simple actions, and can be studied as such, may be quite correct; but that this method, however useful in isolated cases, and especially however fruitful in the application to artificial mechanisms, will never lead to a just comprehension of any large cluster of phenomena, or to an appreciation of the totality of things which surrounds us, must be evident to any one who at once appreciates the rigidity and universality of mathematical calculations, and sees how soon they fail to become of practical use when we attempt to attack any complex problem through them. Now, all processes in nature herself, as distinguished from the laboratory, are eminently complex, and far transcend the powers and grasp of the mathematical calculus, so far as the human mind is able to employ it. In fact, the outdoor naturalist must attack the problem of nature and life by quite a different method: he must, like a judge, confront and appreciate the evidence of many witnesses who are speaking on all sides to him, and he must, with an open and unbiassed mind, judiciously combine such evidence in the sentences which he passes or the

¹ ‘Origin of Species,’ 1st ed., p. 2.