

witness to facts than a philosopher, inasmuch as his mind may be more free from bias, and more ready to see and record things exactly as they appear.

A note in Dawson's *Archæia*, p. 43, is so apt on this point that I cannot forbear quoting it. He says:—

"Much that is very silly has been written as to the extent of the supposed 'optical view' taken by the Hebrew writers: many worthy literary men appearing to suppose that *scientific* views of nature must necessarily be different from those which we obtain by the evidence of our senses. The very contrary is the fact, and so long as any writers state correctly what they observe, without insisting on any fanciful hypotheses, science has no fault to find with them. What science most detests is the ignorant speculations of those who have not observed at all, or have observed imperfectly. It is a leading excellence of the Hebrew Scriptures that they state facts without giving any theories to account for them. It is, on the contrary, the circumstance that unscientific writers will not be content to be 'optical,' but must theorise, that spoils much of our modern literature, especially in its descriptions of nature."

It is found that experiment cannot, as Bacon would have had it, be made to drive theory from the field. Neither Bacon's rules nor any rules that can possibly be given, will enable an unskilful person to know what experiments to institute, and even if he performs the right experiments he will not, generally speaking, be able, with the help of Bacon's or any other rules, to draw correctly the conclusions to which they lead. In this class of investigations, rules can never be made to supersede the exercise of intelligence, and genius still retains all its old superiority.

In *another* respect Bacon overrated the power of common sense. He thought his method would supersede all occasion for the use of mathematics in physical science, whereas the contrary has notably been the fact, so that several departments of physical science are now ranked under the head of "applied Mathematics." More correct views on the relation of Mathematics to Natural Philosophy were entertained by Bacon's namesake—Roger, who flourished some three centuries earlier, and whose works, treating chiefly on physical science, still remain. In reference to this subject the *Athenæum* of Feby. 4, 1860, has the following very just remarks:—

"Suppose a person purposely kept ignorant of history, were to be deeply educated in Physics as it stands, and then introduced to the writings of the two Bacons; to Roger, teaching that all knowledge of natural laws must be sought by aid of mathematics, applied to observation; and to Francis, laying it down that nothing is to be done, least of all by mathematics, until all practical observation has been made. What must this person conclude, if he were told that the mass, even of experimentalists, look up to Francis as their chief, and think little of Roger? He would be strongly inclined to suspect that a confusion had taken place—that the general run of physical inquirers knew little of history.....