

intellectual activity scientific pursuits were transplanted to the more congenial soils of Egypt and Arabia. A division of the people of the latter country preserved this knowledge through the middle ages.

The most striking feature of the doctrines of the ancients is that they are not so much the science or study of nature as the opinions and theories of philosophers. Science was thought to be the speculation upon theories rather than the observation of facts. Knowledge, instead of being applied to practical use, was made an exercise of the intellect.

The ancient grasped at general truths aided by observation; but he did not attempt to verify his results by experiments. Induction was used by him, but subordinately. It was not fully analyzed; yet, he dimly saw that it was the only method by which new scientific truth could be acquired.

During the greater part of the middle ages the Moors were the leaders in scientific pursuits. They discovered many important facts, yet they made no attempt to connect the links, but were content with the truths discovered.

They took the method of investigation and knowledge of the Greeks, but they did not advance beyond it, except slight modifications which they made.

Toward the latter part of the middle ages there was an awakening in the scientific world. But it is the sixteenth century that forms the most notable period in the history of science. Then science began to be methodically studied, and with a definite end in view. The authority of Aristotle was shaken, and many of his theories were proved to be without foundation; and the final overthrow was given to scholastic philosophy by showing how to study nature.

It is a mistake to suppose that Bacon invented the new process of arriving at truth, which is called the "inductive method," as men had been using it for ages, since it is the natural way of procedure in all things. He was the first, however, to analyze this method with minuteness and accuracy; and to reduce to a systematic form those principles, which had never before been viewed in their mutual relation and dependence. It was the old method of Aristotle enlarged by adding experimental verification as one of the necessary principles.

He presented it to the world in a work entitled, "The Novum Organum." In this work he designed to replace the scholastic logic, represented in the

Novum Organum of Aristotle, by a new method, in which the true and solid principle of investigation should supplant the method of a mere verbal process of reasoning. He taught that study, instead of being employed in wearisome and useless speculations, should be engaged in mastering the secrets of nature and life, and applying them to practical use. His method for attaining this end was rigid and pure observation, assisted by experiment and fructified by induction. Instead of hypotheses he demanded facts, gathered from the observation of nature's silent revolutions, skilfully extorted by experiments. From these facts conclusions were to be carefully formed, and these rigidly tested. The world of the unknown was to be studied through the known. With Bacon the modern scientific spirit had its beginning. He did not attempt to make discoveries, but merely to point out the way by which they could be made. In doing this he compared himself to a trumpet, which sounds a charge but takes no part in the fight. He stripped science of that theosophical character which it had during the middle ages; and in pointing out the avenue of almost all modern discoveries, he prepared the way for Newton and Lavoisier.

The true service rendered to science by Bacon does not wholly consist in the completeness of his analysis of inductive reasoning, but in his clear comprehension and firm declaration of the principle, that induction is the only basis upon which scientific truth can rest. The investigators of nature, since his time, have had a definite end in view, and a method by which to accomplish that end. This new character imparted to science gives importance to his work.

The progress of science during the first century after Bacon's time did not by any means verify his predictions; yet an impulse had been given which could not but produce an effect, which was more fully shown in the eighteenth century. The art of scientific investigation had to be developed, and its growth was gradual.

While observation lays the foundation, generalization raises the structure; the one gives us facts, the other forms the science. By further observation we become enabled to acquire a "conception of the universe as a vast union of sciences organized into one whole through harmonious relations and controlling laws."

The nineteenth century has been one of the most