Miletus, who discovered in amber subjected to friction. the property of attracting light bodies. Previous to him, the natural philosophers thoroughly imbued with the mythology of the Orientals, explained all natural phenomena through the interference of some fabulous deity. The most noted physicist after Thales was Pythagoras, who invented the monochord, from which he deduced some of the laws of the vibrations of strings. After Pythagoras we find the most renowned mechanician of antiquity, Archimedes, to whom we are indebted for several hydraulic machines and who discovered the principles so much applied in Physics,—that on which depends specific gravity. About the same time as Archimedes, Hero of Alexandria also flourished. This physicist was distinguished for his investigations in pneumatics. Ptolemy, the latest philosopher of antiquity, discovered the refraction of light, and proved the earth to be a globe.

These are the most celebrated philosophers of ancient times, and these the results of their labor. Though their progress was not rapid, nor their science profound, still enough was done to show us, that, even in the earliest ages there were intelligent observers of physical phenomena, men who delighted to pry into the nature and causes of the effects witnessed. The slow progress of the ancients was not due to insufficient observation; for in Greece, the birthplace of science, the climate and soil had furnished ample means of procuring the necessaries of life with little toil and labor; but to their deficiency in the process of induction. They were too hasty in assigning as general causes, such as covered only special cases

Nor, proceeding to the middle ages, do we find them marked by any great progress. During this time, science was in the hands of the alchemists, who, infatuated in the search for the "philosopher's stone,"—the conversion of the base into the precious metals, of carbon into diamond—neglected altogether what did not tend to their end.

However, in the sixteenth century, we notice a change. Bacon of Verulam, in his "Instauratio Magna" reviewed the whole field of the sciences, seeking for the causes which opposed their progress, and, as a remedy, advocating observation and induction. From this time, science, long dormant, seems to have awakened with renewed vigor, and patient observation and deep reflection were the order of the day, showing by the results that the method of Bacon, though fallacious and impotent when applied to the speculative sciences, found its proper sphere in the natural.

One great effect of the impulse given by Bacon to the study of the natural sciences was the invention of the telescope, which brought man into closer relations with the mighty works of his Creator. This paved the way for the greatest achievement of human genius in modern times,—an achievement which shows clearly the superiority of the modern mind in scientific research, —the principle of universal gravitation. The immense disparity between the origin of this discovery—the falling of an apple in his garden, and its application —the revolutions of the planets in their orbits, marks at once the depths of Newton's genius, who, in the words of the poet, was "a pure intelligence, lent to men by God in order to explain His works." Spurred on to more zealous efforts by Newton's success, and given new fields of research by his discoveries, physicists devoted their whole lives to their works.

The object of this brief paper is to show the latest work of man's mind in the study of the natural sciences :—the reduction to unity of all the phenomena of nature.

Till within a few decades of years, the lovers of these phenomena had lent themselves zealously to their work, and discovery followed discovery, invention succeeded invention till now, when we consider the slow, tortoise-like mode of living of our ancestors, we wonder what sort of people they were, and how they managed to live without railroads and telegraph.

II.

But here we must notice a change in the scientific world. By their experiments and applications, physicists had acquired a vast amount of knowledge and now seemed to rest from their labors. But this halt was only apparent; for the mind was busy in digesting and reflecting on the information obtained, trying to establish order in things that seemed totally different from each other: in fine, knowing that science could not be considered perfect till its various phenomena were reduced to unity, in accordance with the adage "unity gives perfection," they sought for this great principle, they made it their sole object, far more precious than the philosopher's stone of the middle ages.

In our days fresh vigor has been infused into this movement, in consequence of Joule and Hirn having demonstrated beyond all uncertainty that heat is a motion, that it produces work, that there exists a certain ratio between work and heat. The other natural agents, or at least the most known of them, sound and light, were already considered as motions, sound from the remotest ages, and light from the time of Young and Huyghens. Led on by this information intelligent observers began to inquire into the nature of these various motions which produced effects so different,— with what results we shall shortly see, in following the reasoning of these men.

Sound, they said, is the sensation produced in the organ of hearing by vibrations transmitted to the membrane of the ear from the sounding body; in other words, when a violin string, for example, vibrates, it transmits its vibrations to the air, this conveys them to the drum of the ear, whence they proceed to the sensorium. Light, to the time of Huyghens and Young, was generally regarded as matter, which, emitted from the luminous body and penetrating into the eye,