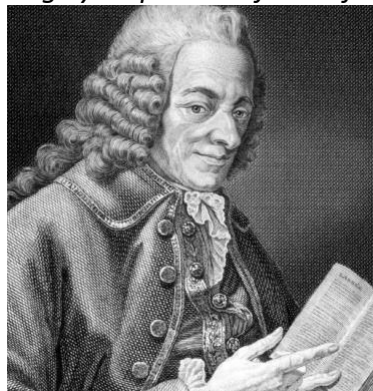


Voltaire on the Importance of Isaac Newton

Although England was gradually becoming more literate, prosperous, and democratic during the 18th century (the 1700s) France was at this time considered the wealthiest and most civilized nation in Europe. The popular French writer **Voltaire** (1694-1778) played a crucial role in spreading Isaac Newton's ideas among the rising middle class in both France and England, among the growing population of non-aristocratic but well-to-do citizens who were literate, educated, and ready to believe that science and reason, not faith and religion, could satisfactorily explain the universe. Newton was the first scientific "superstar," and Voltaire was largely responsible for his fame among non-scientists.



By leaving out the mathematics and data sets, and explaining Newton's theories of motion, gravity, and light in simple words, Voltaire highlighted their philosophical implications. He traced Newton's interest in the empirical scientific method back to Francis Bacon and others, and showed how Newton combined Bacon's emphasis on experimental data with the universalizing power of Descartes's emphasis on mathematical theory. Voltaire was also the first to relate the anecdote about the apple, making it a permanent part of the folklore of early science. (DF)

[above] **Voltaire, whose sharp and sarcastic wit sometimes got him into trouble with the authorities**

Voltaire, from "Essay on Epic Poetry" (1728):

Translated from the French by David Fenimore (2018)

... Sir Isaac Newton was resting in the country near Cambridge [University], and one day walking in his garden he saw some fruits falling from a tree and fell into deep thought on this gravity [*pesanteur*], for which scientists [*philosophes*] had long and in vain looked for the cause.



Isaac Newton God damned apple fell out of a tree and hit me on the head.

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Isaac Newton Whoa, wait a second...

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Voltaire, from *Elements of the Philosophy of Newton* (1738)

Translated by William F. Fleming (1901); edited by David Fenimore (2018)

In a word, there was not a man who had any idea of experimental philosophy before Chancellor [*Francis*] Bacon; and of an infinity of experiments which have been made since his time, there is hardly a single one which has not been pointed out in his book [*Novum Organum*]. He had even made a good number of them himself. He constructed several pneumatic machines, by which he discovered the elasticity of the air; he had long brooded over the discovery of its weight, and was even at times very near to calculating it, until it was done [*in 1643*] by [*the inventor of the barometer, Italian physicist Evangelista*] Torricelli. A short time after, experimental physics began to be cultivated in almost all parts of Europe. This was a hidden treasure, of which Bacon had some glimmerings, and which all the philosophers whom his promises had encouraged made their utmost efforts to investigate. We see in his book mention made in specific terms of that new attraction of which Newton passes for the inventor. “We must inquire,” said Bacon, “whether there be not a certain magnetic force, which operates reciprocally between the earth and other heavy bodies, between the moon and the ocean, between the planets, etc.” In another place he says: “Either heavy bodies are impelled toward the center of the earth, or they are mutually attracted by it; in this latter case it is evident that the nearer falling bodies approach the earth, the more forcibly are they attracted by it. We must try,” continues he, “whether the same pendulum clock goes faster on the top of a mountain, or at the bottom of a mine. If the force of the weight diminishes on the mountain, and increases in the mine, it is probable the earth has a real attracting quality.”

After numerous centuries [*since antiquity, whose scientific advances Voltaire has been cataloguing*] appeared the great Newton—Are you at all acquainted with Newton? Did you ever hear, that after calculating the square of the progress of the moon in its orbit during the space of a minute, and dividing that square by the diameter of that orbit, he found the quotient to be fifteen feet? that he thence demonstrated that the moon gravitates towards the earth three thousand six hundred times less than if she were near the earth? that he afterwards demonstrated that its attractive force is the cause of three-fourths of the elevation of the sea by the tide, and that the force of the sun is the cause of the remaining fourth? You appear perfectly astonished. You never read anything like this in the “*Christian Pedagogue*.” Endeavor henceforward, both you and your fellow churchgoers, never to speak about things of which you have not even the slightest idea. ...

It is then by the laws of gravitation, combined with those of the centrifugal force, that the real form of the earth must be shown. Newton had such confidence in this theory that he did not hesitate to argue that experiments on weight [*i.e. in the laboratory*] were a surer means of knowing the form of the earth than any geographical measurement. ...

The great Newton has demonstrated that there is a void in nature [*i.e. that a vacuum is possible, which the Cartesians had denied, and that interplanetary space is a vacuum*]; but what philosopher could demonstrate to me that God is in this void; that He touches it; that He fills it? How, limited as we are, can we attain to the knowledge of these mysteries?

... how, in so many empty spaces [*i.e. between the planets*], do you extend a chain connecting the whole? There can certainly be no other than that which Newton discovered—that which makes all the globes of the planetary world gravitate one towards another in the immense void.

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Every period of history has its politicians and war heroes, writes Voltaire, but only once in 1000 years does a Newton come along.

It is not long since the ridiculous and threadbare question was agitated in a celebrated assembly; who was the greatest man, Cæsar or Alexander, Tamerlane or Cromwell? Somebody said that it must undoubtedly be Sir Isaac Newton [*pictured at left*]. This man was certainly in the right; for if true greatness consists in having received from heaven the advantage of a superior genius, with the talent of applying it for the interest of the possessor and of mankind, a man like Newton—and such a one is hardly to be met with in ten centuries—is surely by much the greatest; and those statesmen and conquerors which no age has ever been without, are commonly but so many illustrious villains. It is the man who sways our minds by the prevalence of reason and the native force of truth, not they who reduce mankind to a state of slavery by brutish force and downright violence; the man who by the vigor of his mind, is able to penetrate into the hidden secrets of nature, and whose capacious soul can contain the vast frame of the universe, not those who lay nature waste, and desolate the face of the earth, that claims our reverence and admiration. ...

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