

Biography: Democritus



Democritus (460 – 370 BC) was a Greek philosopher and thinker. Known as the “laughing philosopher,” he was a supporter of extreme determinism and a main proponent of ancient materialism. Around 430 BC he presented an atomic theory of the cosmos and is now considered to be the “father of the materialist theory of matter and modern science.”

Democritus, like many of his contemporaries, did not leave behind written works. However, from the messages of later Greek authors, we know with some certainty that he was born around 460 BC in Abdera, Thrace, though some historians believe that it was actually closer to the year 490 BC. He died around 370 BC.

When he was young, he was educated by Egyptian priests and Babylonian magicians. In subsequent years, he studied philosophy in Leucippus' school (school of Atomists, 400 BC), where he developed an interest in atomic theory.

He inherited a vast sum of money from his father and was able to travel abroad. He spent many years travelling to Egypt, the Babylonian Empire, India, Persia, and Athens. During his travels he was able to meet many astrologers, Egyptian priests, scholars of Babylon, and philosophers from India. Thanks to them he gained a tremendous amount of knowledge.

We estimate that Democritus wrote about 70 different works, but only a few of them have survived to this day. The majority of his works are about mathematics, biology, sociology, geography, astronomy, meteorology, economics, scenography, and the theory of language.

Although we know little about his life, we have discovered quite a lot about his views.

Unlike the Eleatics, Democritus believed, that besides a state of being, there must be a void (called the vacuum). According to Democritus, all matter consists of tiny, indivisible particles called atoms (from the Greek atom or atomos, meaning “indivisible”), which are moving in a vacuum. The motion of atoms, and their combination and separation, are the basis for every observable phenomenon. Atoms cannot be destroyed, because they are not able to disappear or be created. Therefore, according to his theory, the world does not have a beginning or an end. Democritus believed that the

motion of atoms is not accidental, but subject to the laws of nature. From this it follows that everything that happens has a reason, and every phenomenon is inevitable.

Democritus assumed that different types of atoms exist and by describing these different types, he could explain the differences between objects.

According to him, different objects are made of a different number of various atoms. For example, the soul that animates living objects is made of fire, consisting of smooth, light, and round atoms. In contrast, an evil person is made of heavy, rough atoms. He also thought that liquids consisted of smooth, rounded atoms, which caused them to fall apart. Solid objects, on the other hand, were made of rough, clogged atoms able to hook onto each other. Much like he did with the three states of matter, Democritus used the concept of atoms to explain the differences in what we taste and see. According to his theory, large, rounded atoms gave a sweet taste, and heavy, rough atoms gave a spicy flavor. Colors and shades are also dependent on the position of atoms in a mixture.

Democritus believed that the atoms that make up everything on Earth, as well as all planets and stars, are always and forever the same. Atoms can combine in a void and create everything from rocks, to plants and animals. When the entities die, the atoms are released and combine with each other to create new things. This idea was not appreciated by the scholars of that time, although it was confirmed many centuries later by a French chemist named Antoine Lavoisier. This idea is now one of the basic laws in the natural sciences.

The views circulated by Democritus were not widely accepted, as the popular philosophers at the time (such as Socrates, Plato, and Aristotle) were interested in philosophical concepts and the human body, not in the nature of matter or atoms. Due to this difference in interests, Plato never

mentioned Democritus' name, although he described some of his views. It is believed that Plato even wanted to burn Democritus' works, but the followers of the Pythagorean cult (Cleinius and Amyclas) prevented this from happening.

Aristotle was another philosopher who did not support atomism, but he spoke glowingly of Democritus, believing that Democritus had put thought into his reasoning. He was also impressed by the ample scientific method that Democritus had used.

With the fall of Greek civilization, the theory of atomism did not develop further for a long time. Democritus' ideas were forgotten and were viewed as a false doctrine, or a spurious path leading to atheism.

Alchemy was still present in the second century, but it was collection of nonsensical, fantastic tales, magic formulas, and recipes full of symbols, strange metaphors and quackery. Its main purpose was to abuse uneducated people. In this chaos, it was extremely hard to find reliable data, so we cannot be sure what scientific theories existed in that time. These theories were formulated based on primitive experiments and were connected to philosophical hypotheses of past centuries regarding matter, states, and characteristics.

It was not until the early 19th century that Democritus' hypothesis experienced a renaissance when an English chemist named John Dalton announced his theory of atomism, on a new, more realistic basis.

Scholars throughout history believed that Democritus was not only ingenious, but the most important scholar prior to Aristotle.

References

- Fierz-Dawid, H. E., (1958). *Historia rozwoju chemii*. Warszawa: Państwowe Wydawnictwo Naukowe.
<http://www.encyklopedia.pwn.pl>
<http://www.britannica.com>
<http://www.portalwiedzy.onet.pl>
<http://www.wikipedia.pl>
 Wróblewski, A. K., (2007). *Historia fizyki*. Warszawa: PWN.
 Wróblewski, A. K., (1998). *Wiedza i Życie*.

Biography: Democritus was edited by Stephen Klassen and Cathrine Froese Klassen and is based, in part on **Historical Background: Atoms** written by Peter Heering.

Biography: Democritus was written by Emilia Dobrowolska with the support of the European Commission (project 518094-LLP-1-2011-1-GR-COMENIUS-CMP) and Polish Association of Science Teachers, Poland. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.