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however, was more concerned with the original state of the cosmos than atomism (Curd, 1), and he was exiled from Athens for his association with Pericles. One hundred years after Democritus, Aristotle established beliefs in the four classical elements: fire, air, earth and water. The search for a new way to look at the physics of the natural world was courageous for its time.

It was a group of ancient Greek philosophers who explored the theory of atomism: Leucippus (flourished 5th century BC), Democritus, and their followers Epicurus (341–270 BC) and Lucretius (c. 99 BC–c. 55 BC). This group was influenced by Democritus, and through discussion with the following ancient Greeks and Romans for the next 1000 years: Aristotle (384–322 BC), Marcus Tullius Cicero (106 BC–43 BC), Galen of Pergamon (129 AD–210 CE), Alexander of Aphrodisias (flourished 200 AD), Themistius (317–c. 390 AD), Simplicius of Cilicia (c. 490–c. 560), Joannes Stobaeus (flourished 5th-century CE), and John Philoponus (flourished 6th century) (Taylor, 69–90). Into modern times, even today, the ancient atomist theory and Democritus are discussed by scientists in their books. Many new books on theoretical physics, string theory, and astrophysics start with astrophysics, metaphysics, and extraterrestrial life. *The Copernicus Complex* by Columbia University Professor Caleb Scharf credits Democritus with the idea of matter being made up of smaller parts in the beginning of his book (Scharf, 13).

So why is this important? Why was Democritus so learned? He grew up in Thrace, which was on the edge of ancient Greece and bordered the powerful Persian Empire. His wealthy father received the Persian King Xerxes on his march through Abdera. In gratitude, Xerxes left behind some of his wise men, who taught Democritus astronomy and theology. Upon the death of his

Democritus was correct about much of this theory. According to some remaining fragments of the work of ancient Greek philosophers which still remain, Democritus is credited as the first to have discussed how things form and fade away, and he does this in a new way: while the other philosophers have no detailed accounts of what the creation and destruction of things truly are, Democritus and Leucippus hypothesized that atoms separate, join together, and change their arrangements to change the forms of things. Democritus was also correct when he theorized that if one small thing changes among the atoms, the result could be different from what would happen if other arrangements of atoms were used. This early Greek scientist postulated that the void, or space, is infinite, which modern day theoretical physicists believe could be correct according to current mathematical calculations. Democritus also correctly theorized that the most fundamental substances are too small to sense, and knew this to be true without the use of extra equipment such as modern day electron microscopes. In addition, everything (not only nonliving materials) comes together and breaks apart to form new things, which humanity now knows to be correct, because the same atoms are sometimes used to form different molecules. For example, charcoal and diamond are both made of the same atom (carbon). The only difference is that diamond requires much more energy along with the carbon to create it as compared to charcoal. Plus, the ingenious Democritus accurately theorized that atoms have weight, which is true, although the weight of an atom is very, very tiny relative to the weight of any larger object composed of millions of atoms (Taylor, 69-90). Democritus was right about many of his theories and very forward-thinking for his time.

spread through others around the

--over 1000 years later, in

universe, which Albert Einstein and Stephen Hawking worked on. This is because theoretical physicists come up with and refine theories of what the world truly is, similarly to how

the theoretical physicist field, in both modern and ancient times, Democritus would come up with a theory about a natural phenomenon which is unprovable and not verifiable, and subsequently try to gather data to prove it. The only difference between the modern and ancient definitions of a theoretical physicist is that in modern times, one must utilize math in the proof of their theory, while in ancient times, it was rare to see math proving a scientific theory (The Worst, 1).

Some, however, may argue that Democritus was not a theoretical physicist due to the lack developed as others. For example, algebra and calculus were not in existence for at least another 1,000 years. In ancient times, theories were not usually backed up using math and the field of science was still categorized as philosophy. Two millennia later, that all changed and hence appeared the modern day definition of theoretical physics that includes the use of math. For example, Albert Einstein came up with thought experiments that were later backed up by math,

In his exploration of atomism, Democritus could have also used the modern day electron microscope. Just like in the early 20th century, Einstein could have used many observatories and data from around the world to prove his theory that there really are stars moving around black holes. Unfortunately, these amenities were not available in the lifetime of these great thinkers.

To conclude, Democritus had no idea how correct he had been by believing in atomism and how much of an effect his atomist theory had over the following 2000 plus years.

Throughout history, scientists have exchanged Demo

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