

ANCIENT GREEKS AND MODERN SCIENCE:
Who Discovered the Heliocentric System?

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The theory that the Earth revolves around the Sun was a truly revolutionary scientific advance. It also provided great impetus to the development of the modern scientific method, which was finally liberated in the middle of the 16th century from the constraints of dogma and nonscientific considerations. This breakthrough is often but mistakenly attributed to the great Polish astronomer Nicholas Copernicus, and despite indisputable evidence to the contrary, the true discoverer of the theory, the astronomer Aristarchos of Samos that lived in the 3rd century BC in Alexandria, is still sometimes denied his due credit.

A case in point is a book published in 2004 by the American astronomer Owen Gingerich that received much publicity including National Public Radio, the Chicago Tribune and the Boston Globe. The book attempts to track the history of Copernicus's seminal treatise "*De Revolutionibus Orbium Celestium*" in which he presented the theory of the heliocentric system. Yet Mr Gingerich does not even mention Aristarchos's contribution! Moreover, the publishers of the book on their web site state that it was Copernicus who first suggested that the Sun was the center of the Universe; and the author in interviews has maintained that no other cultures had put forth heliocentric ideas!

Over the years, we have witnessed time and again attempts, perhaps out of ignorance, that question, diminish and even deny important ancient Greek contributions to the development of modern science and civilization. A recent offensive example has been the attempt of so-called Afro-centrists to claim that Aristotle and other notable Greeks stole their ideas from African sources. Serious scholarship has of course debunked these absurd and unfounded assertions. Especially noteworthy in this endeavor have been the efforts of the distinguished classicist Mary Lefkowitz, whose two books *Not Out of Africa* and *Black Athena Revisited*, have been invaluable in restoring the truth among those less well informed.

The case of the origin of the theory of the heliocentric solar system has been particularly vexing given its importance, but also because the evidence is so overwhelming. Copernicus (who was quite fluent in classical Greek) himself has written that he was familiar with the extensive Greek ideas of heliocentricity from the Pythagoreans to Aristotle to Aristarchos. Yet, by a peculiar and very puzzling action of his, he contributed to this persisting misconception.

Just before Copernicus sent his manuscript to be published in 1543, he removed two pages from the submitted manuscript that acknowledged his indebtedness to the ancient Greeks. However, he kept the two pages in his own personal copy, which was not discovered until 300 years later, towards the end of the 19th century.

Professor Edward Rosen, a leading scholar on Copernicus, has addressed the issue. Rosen quotes the passage that Copernicus deleted from the published manuscript, but kept in his autograph: '...Philolaus believed in the earth's motion for these and similar reasons. This is plausible because Aristarchus of Samos too held the same view according to some people, who were not motivated by the argumentation put forward by Aristotle and rejected by him.'

Scholarship has recognized the importance of the passage for a long time, since Copernicus himself clearly states that he knew that the theory had been proposed by Aristarchos. George Sarton, the distinguished professor at Harvard University, has written in his monumental "A History of Science": "Aristarchos had conceived what we call the Copernican universe, eighteen centuries before Copernicus. The name that has been given to him in modern times, "The Copernicus of Antiquity", is fully deserved, because Aristarchos's other treatise proves that he was a conscientious astronomer".

Sir Thomas Heath has written in his definitive study on Aristarchos: "Copernicus himself admitted that the theory was attributed to Aristarchus, though this does not seem to be generally known..... But it is a curious fact that Copernicus did mention the theory of Aristarchus in a passage which he afterwards suppressed".

And another distinguished scholar, Herbert Westren Turnbull, has written as follows: ".....Aristarchus, the friend of Archimedes, who supposed that the Earth travels around the Sun. When, therefore, Copernicus superseded the Ptolemaic theory by his own well-known system, centered on the Sun, he was restoring a far older theory to its rightful place".

Some critics have contended that Aristarchos merely proposed the heliocentric system. That in itself was quite revolutionary preceding as it did by 1800 years the Copernicus theory. But Aristarchos in fact not only proposed the idea, but wrote a volume on the subject expanding and developing suggestions of the Pythagoreans, who were loath to write down their ideas, and preferred oral transmission to their initiates. We know of Aristarchos's volume from the writing of his younger contemporary Archimedes, who wrote to Gelon II, King of Syracuse, sometime before 216 BC in the *Sand Reckoner*: "... Aristarchos of Samos brought out a book consisting of hypotheses, wherein it appears, as a consequence of assumptions made, that the [real] universe is many times greater than the one just mentioned. His hypotheses are that the fixed stars and the Sun remain unmoved, that the Earth revolves about the Sun..."

This book of Aristarchos is unfortunately lost, as were many thousands of books from the great Library of Alexandria. A key word in the Greek text of Archimedes is "*graphas*", which is the plural, and thus indicates multiple writings and drawings. This is another clear indication that the Aristarchos proposal was much more fully developed, as George Sarton has stated, even though the idea was so revolutionary and it went against the scientific canon of the times. So it is high time to recognize the historical truth and give Aristarchos his due. Perhaps what is known popularly as the Copernican System should really be called the "Aristarchean System".

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