

BOOK REVIEW OF

Title: Aristotle's *Μετεωρολογικά*, Meteorology then and now

Authors: Anastasios A. Tsonis and Christos Zerefos

Summary

This insightful book, reviews part of Aristotle's (the ancient Greek philosopher) work, belonging to diverse array of sciences such as astronomy, geometry, optics, geography, seismology, volcanology, chemistry and weather forecasting, the latter being the main aim of meteorology nowadays. The eminent scientists who author the book, Anastasios A. Tsonis and Christos Zerefos, focus on parts of the four books of Aristotle that are relevant to meteorological phenomena. They compare Aristotle's views with the current knowledge of meteorology, not by simply stating the differences of the past and the present, but by highlighting the remarkable ability of Aristotle to make scientific inferences based mainly on non-instrumental observations and logic.

In book A from *Μετεωρολογικά*, the authors start by analyzing Aristotle's view of the Universe, which is fundamental for his discussions in *Meteorological* as well as in other of his studies. Aristotle developed the idea of a spherical earth and the model of the universe he suggested was geocentric. The Book A is divided into 14 chapters, in which Aristotle reviews some of the main aspects of meteorology. For instance, in chapter 1, a definition of meteorology is given and a reference to the first element "aether" is provided. In the following chapters, a discussion on the four principles (*hot, cold, dry, and moist*) and their combination that results in the four elements (*fire, air, water, and earth*) takes place. Then, topics like the distribution of the elements in the Aristotle's universe, precipitation and the phenomenon of *exhalation* are pointed out. Based on the themes of these chapters and by reporting the current status of meteorology, the authors list similarities and differences of Aristotle's inferences with today's meteorology knowledge.

Book B from *Μετεωρολογικά* consists of chapters that refer to water in association with the seas, earthquakes, winds and other weather phenomena such as thunder, lightning and storms. Aristotle tries to explain all meteorological phenomena through his observations and logic. For instance, interestingly, based on his axioms of moist and dry exhalations, and since the former connects to the hydrological cycle, the dry exhalation should form the wind. Similarly to the analysis of the Book A, the authors consider each such statement of Aristotle's in contrast with today's knowledge of these issues. These comparisons allow us to find out any similarities or differences between different time of periods and how climate change affects crucial observations. For instance, Aristotle believed that regions with mild and moderate climate are

more habitable. However, this needs to be reconsidered as changes in Earth's climate will have different effects in different areas of the world.

In book C from *Μετεωρολογικά*, a discussion of the four atmospheric optical phenomena, namely, halos, rainbows, sundogs and light pillars, is provided, and according to Aristotle the common process behind the formation of all four phenomena is reflection. By developing also his general theory of colour, which states that light and darkness, or white and black, when mixed, produce other colours, he tried to explain the above phenomena. Several predictions for various phenomena by Aristotle are very close to the current scientific knowledge about them.

Book D from *Μετεωρολογικά*, although not having direct relevance to meteorology, it includes the notion of (thermodynamic) “equilibrium”. The four principles (cold, warm, dry, and moist), that Aristotle observed, are behind many atmospheric processes and constitute the basic ingredients of atmospheric thermodynamics.

Value of the book

A must read, science-based popular book, written for non-specialists, that allows mass audiences to become aware of the yet unmatched contribution of Aristotel to science and scientific thought, in general, and Meteorology in particular. In times of multiple crises like ours (including the climate crisis) increased public awareness of the value of science-driven solution pathways is instrumental for shaping a sustainable future.

Recommendation to others

I highly recommend this book for everyone who wants to discover how Aristotle (384 BC – 322 BC), remarkably established the standards on Meteorology as we know it today. Apart from that and beside his failure to explain some phenomena mainly due to the lack of the proper scientific equipment, the reader clearly can see Aristotle’s deductive logic and his ability to filter and manage any kind of information enabling him to provide accurate explanations and inferences in meteorological phenomena. A great mind in ancient Greece, a great “Ἐπιστήμων”, specialized not in one but in plenty of subjects.

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