

ARISTOTLE

Aristotle was born in 384 BC, and because his father was the personal physician to the Macedonian king, Amyntas II, Aristotle enjoyed considerable privilege and an exceptional education. He studied under Plato for 20 years, then after Plato's death, traveled and studied independently for several years. He eventually became the tutor of Amyntas II's grandson Alexander (later Alexander the Great). Aristotle was one of the finest biologists ever to live, and this proved both a blessing and a curse — his best work advanced science while his mistakes stifled progress.



The ideas of Plato and Aristotle often enjoyed opposite fortunes. Plato argued for a better world generally beyond the human senses, and this "more real" world held special appeal in times of violence and uncertainty. Aristotle's confidence in the world we can readily perceive around us fared better in times of prosperity and cultural optimism. Around the time the Roman Empire crumbled, Augustine penned *The City of God*, rejecting Aristotelian ideas for Platonic ones. Over the next several centuries, Greek and Muslim scholars preserved (sometimes with their own distinctive interpretations) many of Aristotle's works, passing them on to medieval European scholars by the year 1200.

Legend holds that medieval Europe blindly embraced Aristotle's ideas despite the challenges they posed to Christian doctrine, but the reality was more complicated. A series of papal bans in the 13th century forbade the teaching of Aristotle's ideas, though some of the bans acknowledged the utility of his work and allowed it to be studied after "errors" were removed. (The Condemnation of 1277, for instance, took issue with his assertion that some phenomena were, by nature, impossible. God, medieval theologians insisted, could do whatever He wanted.) Bans were often only regionally enforced; at one point, the University of Toulouse attracted students by advertising that they could learn about the Aristotelian ideas currently banned in Paris. Discussion of Aristotle's work eventually became mandatory in many university lectures.

Included in Aristotle's legacy were the mistaken beliefs of spontaneous generation, an inorganic origin of fossils, and an eternal and unchanging earth. (Although the age of the earth is immeasurable by human standards, it still had a beginning, and the Judeo-Christian doctrine of creation actually spurred scholars to examine the planet's past — something they might not have done had Aristotle's views prevailed.)

Besides his conviction that women were essentially deformed men, one of Aristotle's longest-lived ideas was of a *scala naturae*, also known as the Great Chain of Being, which persisted well into the 19th century. Aristotle realized that many possible classification systems existed for all the organisms on earth, and he didn't advocate lumping everything into a single system. For animals, however, he did propose an ascending scale with zoophytes at the bottom and man at the top. Centuries later, the Great Chain would be used exuberantly to emphasize differences between "lesser" and "better" human races.

Much of Aristotle's influence, however, is due to what he got right, and his achievements in biology alone were amazing. In *History of Animals*, he described more than 500 animal species, incorporating meticulous observations of their behaviors, and results of dissections. He established the classifications of viviparous and oviparous quadrupeds, as well as marine mammals, birds, fish, mollusks, insects and crustaceans. Aristotle also included in this work various anecdotes and animal legends, but like those who would follow him, he was passing along what his readers would consider useful information. "All men by nature desire to know," he wrote.

Judged by modern standards, much of Aristotle's work would not be considered rigorous science. Compared to those who preceded him, however, he was remarkable, and there is probably no scientist alive today whose work could, in its entirety, survive unscathed for 24 centuries.