



# Aristotle

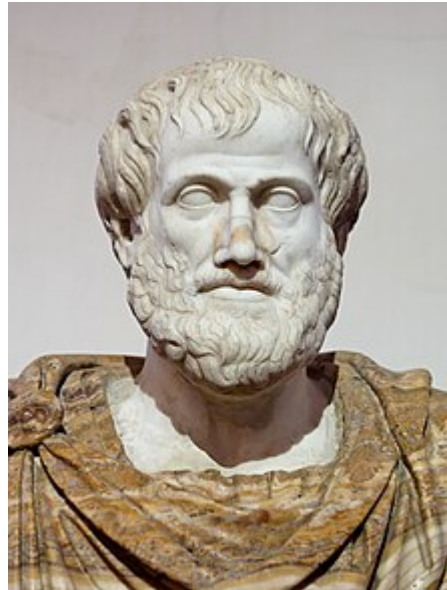
**Aristotle**<sup>[A]</sup> (Attic Greek: Ἀριστοτέλης, romanized: *Aristotélēs*;<sup>[B]</sup> 384–322 BC) was an Ancient Greek philosopher and polymath. His writings cover a broad range of subjects spanning the natural sciences, philosophy, linguistics, economics, politics, psychology, and the arts. As the founder of the Peripatetic school of philosophy in the Lyceum in Athens, he began the wider Aristotelian tradition that followed, which set the groundwork for the development of modern science.

Little is known about Aristotle's life. He was born in the city of Stagira in northern Greece during the Classical period. His father, Nicomachus, died when Aristotle was a child, and he was brought up by a guardian. At around eighteen years old, he joined Plato's Academy in Athens and remained there until the age of thirty seven (c. 347 BC). Shortly after Plato died, Aristotle left Athens and, at the request of Philip II of Macedon, tutored his son Alexander the Great beginning in 343 BC. He established a library in the Lyceum, which helped him to produce many of his hundreds of books on papyrus scrolls.

Though Aristotle wrote many treatises and dialogues for publication, only around a third of his original output has survived, none of it intended for publication. Aristotle provided a complex synthesis of the various philosophies existing prior to him. His teachings and methods of inquiry have had a significant impact across the world, and remain a subject of contemporary philosophical discussion.

Aristotle's views profoundly shaped medieval scholarship. The influence of his physical science extended from late antiquity and the Early Middle Ages into the Renaissance, and was not replaced systematically until the Enlightenment and theories such as classical mechanics were developed. He influenced Judeo-Islamic philosophies during the

## Aristotle Ἀριστοτέλης



Roman copy (in marble) of a Greek bronze bust of Aristotle by Lysippos (c. 330 BC), with modern alabaster mantle

<b>Born</b>	384 BC <u>Stagira</u> , <u>Chalcidian League</u>
<b>Died</b>	322 BC (aged 61–62) <u>Chalcis</u> , <u>Euboea</u> , <u>Macedonian Empire</u>
<b>Education</b>	<u>Platonic Academy</u>
<b>Notable work</b>	<i><u>Organon</u></i> • <i><u>Physics</u></i> • <i><u>Metaphysics</u></i> • <i><u>Nicomachean Ethics</u></i> • <i><u>Politics</u></i> • <i><u>Rhetoric</u></i> • <i><u>Poetics</u></i>
<b>Era</b>	<u>Ancient Greek philosophy</u>
<b>Region</b>	<u>Western philosophy</u>
<b>School</b>	<u>Peripatetic school</u>
<b>Notable students</b>	<u>Alexander the Great</u> , <u>Theophrastus</u> , <u>Aristoxenus</u>
<b>Main interests</b>	<u>Logic</u> • <u>Natural philosophy</u> • <u>Metaphysics</u> • <u>Ethics</u> • <u>Politics</u> • <u>Rhetoric</u> • <u>Poetics</u>

Middle Ages, as well as Christian theology, especially the Neoplatonism of the Early Church and the scholastic tradition of the Catholic Church.

Aristotle was revered among medieval Muslim scholars as "The First Teacher", and among medieval Christians like Thomas Aquinas as simply "The Philosopher", while the poet Dante called him "the master of those who know". He has been referred to as the first scientist. His works contain the earliest known formal study of logic, and were studied by medieval scholars such as Peter Abelard and Jean Buridan. His influence on logic continued well into the 19th century. In addition, his ethics, although always influential, has gained renewed interest with the modern advent of virtue ethics.

## Life

In general, the details of Aristotle's life are not well-established. The biographies written in ancient times are often speculative and historians only agree on a few salient points.<sup>[C]</sup> Aristotle was born in 384 BC<sup>[D]</sup> in Stagira, Chalcidice,<sup>[2]</sup> about 55 km (34 miles) east of modern-day Thessaloniki.<sup>[3][4]</sup> He was the son of Nicomachus, the personal physician of King Amyntas of Macedon,<sup>[5]</sup> and Phaestis, a woman with origins from Chalcis, Euboea.<sup>[6]</sup> Nicomachus was said to have belonged to the medical guild of Asclepiadae and was likely responsible for Aristotle's early interest in biology and medicine.<sup>[7]</sup> Ancient tradition held that Aristotle's family descended from the legendary physician Asclepius and his son Machaon.<sup>[8]</sup> Both of Aristotle's parents died when he was still at a young age and Proxenus of Atarneus became his guardian.<sup>[9]</sup> Although little information about Aristotle's childhood has survived, he probably spent some time in the Macedonian capital, making his first connections with the Macedonian monarchy.<sup>[10]</sup>

At the age of seventeen or eighteen, Aristotle moved to Athens to continue his education at Plato's Academy.<sup>[11]</sup> He became distinguished as a researcher and lecturer, earning for himself the nickname "mind of the school" by his tutor Plato.<sup>[12]</sup> In Athens, he probably experienced the Eleusinian Mysteries as he wrote when describing the sights one viewed at the Mysteries, "to experience is to learn" (παθεῖν

## Notable ideas Aristotelianism

### **Theoretical philosophy**

Aristotelian logic, syllogism

Four causes

Genus and differentia

Hylomorphism, substance,  
essence, accident

Hypokeimenon

Potentiality and actuality

Theory of universals

Unmoved mover

### **Natural philosophy**

Aristotelian biology

Aristotelian physics

Common sense

Eternity of the world

Five wits

*Horror vacui*

Theory of elements, aether

Rational animal

### **Practical philosophy**

Aristotelian ethics

Catharsis

Deliberative, epideictic and  
forensic rhetoric

Enthymeme and Paradeigma

Family as a model for the state

Golden mean

Kyklos

Magnanimity

Mimesis

Natural slavery

Intellectual virtues: sophia,  
episteme, nous, phronesis,  
techne

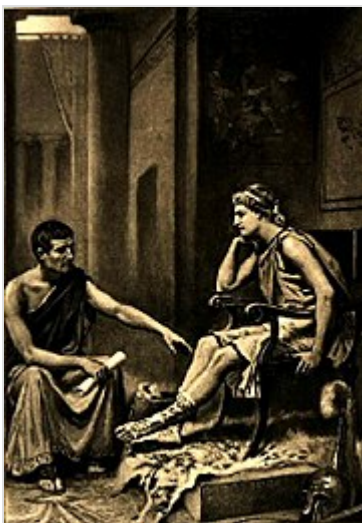
Three appeals: ethos, logos,  
pathos

Views on women

μαθεῖν).<sup>[13]</sup> Aristotle remained in Athens for nearly twenty years before leaving in 348/47 BC after Plato's death.<sup>[14]</sup> The traditional story about his departure records that he was disappointed with the academy's direction after control passed to Plato's nephew Speusippus, although it is possible that the anti-Macedonian sentiments in Athens could have also influenced his decision.<sup>[15][16]</sup> Aristotle left with Xenocrates to Assos in Asia Minor, where he was invited by his former fellow student Hermias of Atarneus; he stayed there for a few years and left around the time of Hermias' death.<sup>[E]</sup> While at Assos, Aristotle and his colleague Theophrastus did extensive research in botany and marine biology, which they later continued at the near-by island of Lesbos.<sup>[17]</sup> During this time, Aristotle married Pythias, Hermias's adoptive daughter and niece, and had a daughter whom they also named Pythias.<sup>[18]</sup>



School of Aristotle in Mieza, Macedonia, Greece



"Aristotle tutoring Alexander"  
(1895) by Jean Leon Gerome  
Ferris

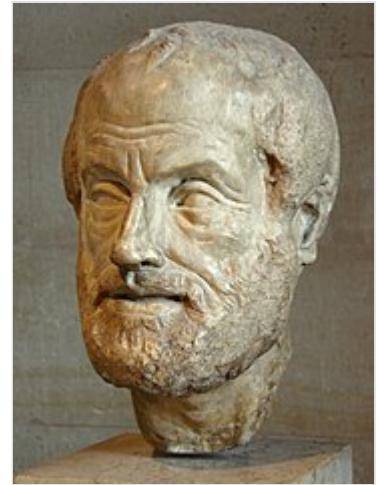
In 343/42 BC, Aristotle was invited to Pella by Philip II of Macedon in order to become the tutor to his thirteen-year-old son Alexander.<sup>[19]</sup> a choice perhaps influenced by the relationship of Aristotle's family with the Macedonian dynasty.<sup>[20]</sup> Aristotle taught Alexander at the private school of Mieza, in the gardens of the Nymphs, the royal estate near Pella.<sup>[21]</sup> Alexander's education probably included a number of subjects, such as ethics and politics,<sup>[22]</sup> as well as standard literary texts, like Euripides and Homer.<sup>[23]</sup> It is likely that during Aristotle's time in the Macedonian court, other prominent nobles, like Ptolemy and Cassander, would have occasionally attended his lectures.<sup>[24]</sup> Aristotle encouraged Alexander toward eastern conquest, and his own attitude towards Persia was strongly ethnocentric. In one famous example, he counsels Alexander to be "a leader to the Greeks and a despot to the barbarians".<sup>[25]</sup> Alexander's education under the guardianship of Aristotle likely lasted for only a few years, as at around the age of sixteen he returned to Pella and was appointed regent of Macedon by his father Philip.<sup>[26]</sup> During this time, Aristotle is said to have gifted

Alexander an annotated copy of the Iliad, which reportedly became one of Alexander's most prized possessions.<sup>[27]</sup> Scholars speculate that two of Aristotle's now lost works, *On kingship* and *On behalf of the Colonies*, were composed by the philosopher for the young prince.<sup>[28]</sup> Aristotle returned to Athens for the second and final time a year after Philip II's assassination in 336 BC.<sup>[29]</sup>

As a metic, Aristotle could not own property in Athens and thus rented a building known as the Lyceum (named after the sacred grove of Apollo Lykeios), in which he established his own school.<sup>[30]</sup> The building included a gymnasium and a colonnade (*peripatos*), from which the school acquired the name *Peripatetic*.<sup>[31]</sup> Aristotle conducted courses and research at the school for the next twelve years. He often lectured small groups of distinguished students and, along with some of them, such as Theophrastus, Eudemos, and Aristoxenus, Aristotle built a large library which included manuscripts, maps, and museum objects.<sup>[32]</sup> While in Athens, his wife Pythias died and Aristotle became involved with Herpyllis of Stagira. They had a son whom Aristotle named after his father, Nicomachus.<sup>[33]</sup> This period in Athens, between 335 and 323 BC, is when Aristotle is believed to have composed many of his philosophical works.<sup>[34]</sup> He wrote many dialogues, of which only fragments have survived. Those works that have

survived are in treatise form and were not, for the most part, intended for widespread publication; they are generally thought to be lecture aids for his students. His most important treatises include Physics, Metaphysics, Nicomachean Ethics, Politics, On the Soul and Poetics. Aristotle studied and made significant contributions to "logic, metaphysics, mathematics, physics, biology, botany, ethics, politics, agriculture, medicine, dance, and theatre."<sup>[35]</sup>

While Alexander deeply admired Aristotle, near the end of his life, the two men became estranged having diverging opinions over issues, like the optimal administration of city-states, the treatment of conquered populations, such as the Persians, and philosophical questions, like the definition of braveness.<sup>[36]</sup> A widespread speculation in antiquity suggested that Aristotle played a role in Alexander's death, but the only evidence of this is an unlikely claim made some six years after the death.<sup>[37]</sup> Following Alexander's death, anti-Macedonian sentiment in Athens was rekindled. In 322 BC, Demophilus and Eurymedon the Hierophant reportedly denounced Aristotle for impiety,<sup>[38]</sup> prompting him to flee to his mother's family estate in Chalcis, Euboea, at which occasion he was said to have stated "I will not allow the Athenians to sin twice against philosophy"<sup>[39]</sup> – a reference to Athens's trial and execution of Socrates.<sup>[15]</sup> He died in Chalcis, Euboea<sup>[40][41]</sup> of natural causes later that same year, having named his student Antipater as his chief executor and leaving a will in which he asked to be buried next to his wife.<sup>[42]</sup> Aristotle left his works to Theophrastus, his successor as the head of the Lyceum, who in turn passed them down to Neleus of Scepsis in Asia Minor. There, the papers remained hidden for protection until they were purchased by the collector Apellicon. In the meantime, many copies of Aristotle's major works had already begun to circulate and be used in the Lyceum of Athens, Alexandria, and later in Rome.<sup>[43]</sup>



Portrait bust of Aristotle; an Imperial Roman (1st or 2nd century AD) copy of a lost bronze sculpture made by Lysippos

## Theoretical philosophy

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### Logic

With the Prior Analytics, Aristotle is credited with the earliest study of formal logic,<sup>[44]</sup> and his conception of it was the dominant form of Western logic until 19th-century advances in mathematical logic.<sup>[45]</sup> Kant stated in the Critique of Pure Reason that with Aristotle, logic reached its completion.<sup>[46]</sup>

### Organon

Most of Aristotle's work is probably not in its original form, because it was most likely edited by students and later lecturers. The logical works of Aristotle were compiled into a set of six books called the Organon around 40 BC by Andronicus of Rhodes or others among his followers.<sup>[49]</sup> The books are:

1. Categories
2. On Interpretation
3. Prior Analytics
4. Posterior Analytics



## 5. Topics

## 6. On Sophistical Refutations

The order of the books (or the teachings from which they are composed) is not certain, but this list was derived from analysis of Aristotle's writings. It goes from the basics, the analysis of simple terms in the *Categories*, the analysis of propositions and their elementary relations in *On Interpretation*, to the study of more complex forms, namely, syllogisms (in the *Analytics*)<sup>[50][51]</sup> and dialectics (in the *Topics* and *Sophistical Refutations*). The first three treatises form the core of the logical theory *stricto sensu*: the grammar of the language of logic and the correct rules of reasoning. The *Rhetoric* is not conventionally included, but it states that it relies on the *Topics*.<sup>[52]</sup>

What is today called *Aristotelian logic* with its types of syllogism (methods of logical argument),<sup>[53]</sup> Aristotle himself would have labelled "analytics". The term "logic" he reserved to mean *dialectics*.

## Metaphysics

The word "metaphysics" appears to have been coined by the first century AD editor who assembled various small selections of Aristotle's works to create the treatise we know by the name *Metaphysics*.<sup>[55]</sup> Aristotle called it "first philosophy", and distinguished it from mathematics and natural science (physics) as the contemplative (*theoretikē*) philosophy which is "theological" and studies the divine. He wrote in his *Metaphysics* (1026a16):

If there were no other independent things besides the composite natural ones, the study of nature would be the primary kind of knowledge; but if there is some motionless independent thing, the knowledge of this precedes it and is first philosophy, and it is universal *in just this way*, because it is first. And it belongs to this sort of philosophy to study being as being, both what it is and what belongs to it just by virtue of being.<sup>[56]</sup>



Plato (left) and Aristotle in Raphael's 1509 fresco, *The School of Athens*. Aristotle holds his *Nicomachean Ethics* and gestures to the earth, representing his view in immanent realism, whilst Plato gestures to the heavens, indicating his Theory of Forms, and holds his *Timaeus*.<sup>[47][48]</sup>

One of Aristotle's types of syllogism<sup>[F]</sup>

In words	In terms <sup>[G]</sup>	In equations <sup>[H]</sup>
All men are mortal.	M a P	$\overline{\exists x: Mx \wedge \overline{Px}}$
All Greeks are men.	S a M	$\wedge \overline{\exists x: Sx \wedge \overline{Mx}}$
$\therefore$ All Greeks are mortal.	S a P	$\Rightarrow \overline{\exists x: Sx \wedge \overline{Px}}$

## Substance

Aristotle examines the concepts of substance (*ousia*) and essence (*to ti ên einai*, "the what it was to be") in his *Metaphysics* (Book VII), and he concludes that a particular substance is a combination of both matter and form, a philosophical theory called hylomorphism. In Book VIII, he distinguishes the matter of the substance as the substratum, or the stuff of which it is composed. For example, the matter of a house is the bricks, stones, timbers, etc., or whatever constitutes the *potential* house, while the form of the substance is the *actual* house, namely 'covering for bodies and chattels' or any other differentia that let us define something as a house. The formula that gives the components is the account of the matter, and the formula that gives the differentia is the account of the form.<sup>[57][55]</sup>

## Immanent realism

Like his teacher Plato, Aristotle's philosophy aims at the universal. Aristotle's ontology places the universal (*katholou*) in particulars (*kath' hekaston*), things in the world, whereas for Plato the universal is a separately existing form which actual things imitate. For Aristotle, "form" is still what phenomena are based on, but is "instantiated" in a particular substance.<sup>[55]</sup>

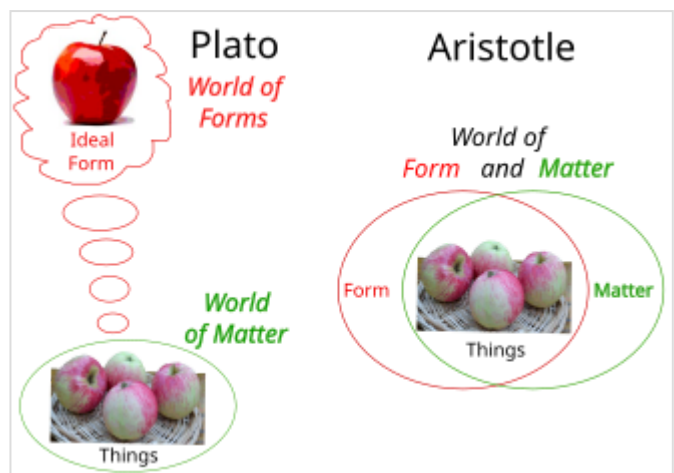
Plato argued that all things have a universal form, which could be either a property or a relation to other things. When one looks at an apple, for example, one sees an apple, and one can also analyse a form of an apple. In this distinction, there is a particular apple and a universal form of an apple. Moreover, one can place an apple next

to a book, so that one can speak of both the book and apple as being next to each other. Plato argued that there are some universal forms that are not a part of particular things. For example, it is possible that there is no particular good in existence, but "good" is still a proper universal form. Aristotle disagreed with Plato on this point, arguing that all universals are instantiated at some period of time, and that there are no universals that are unattached to existing things. In addition, Aristotle disagreed with Plato about the location of universals. Where Plato spoke of the forms as existing separately from the things that participate in them, Aristotle maintained that universals exist within each thing on which each universal is predicated. So, according to Aristotle, the form of apple exists within each apple, rather than in the world of the forms.<sup>[55][58]</sup>

## Potentiality and actuality

Concerning the nature of change (*kinesis*) and its causes, as he outlines in his *Physics* and *On Generation and Corruption* (319b–320a), he distinguishes coming-to-be (*genesis*, also translated as 'generation') from:

1. growth and diminution, which is change in quantity;
2. locomotion, which is change in space; and
3. alteration, which is change in quality.



Plato's forms exist as universals, like the ideal form of an apple. For Aristotle, both matter and form belong to the individual thing (hylomorphism).

Coming-to-be is a change where the substrate of the thing that has undergone the change has itself changed. In that particular change he introduces the concept of potentiality (*dynamis*) and actuality (*entelecheia*) in association with the matter and the form. Referring to potentiality, this is what a thing is capable of doing or being acted upon if the conditions are right and it is not prevented by something else. For example, the seed of a plant in the soil is potentially (*dynamei*) a plant, and if it is not prevented by something, it will become a plant. Potentially, beings can either 'act' (*poiein*) or 'be acted upon' (*paschein*), which can be either innate or learned. For example, the eyes possess the potentiality of sight (innate – being acted upon), while the capability of playing the flute can be possessed by learning (exercise – acting). Actuality is the fulfilment of the end of the potentiality. Because the end (*telos*) is the principle of every change, and potentiality exists for the sake of the end, actuality, accordingly, is the end. Referring then to the previous example, it can be said that an actuality is when a plant does one of the activities that plants do.<sup>[55]</sup>



Aristotle argued that a capability like playing the flute could be acquired – the potential made actual – by learning.

For that for the sake of which (*to hou heneka*) a thing is, is its principle, and the becoming is for the sake of the end; and the actuality is the end, and it is for the sake of this that the potentiality is acquired. For animals do not see in order that they may have sight, but they have sight that they may see.<sup>[59]</sup>

In summary, the matter used to make a house has potentiality to be a house and both the activity of building and the form of the final house are actualities, which is also a final cause or end. Then Aristotle proceeds and concludes that the actuality is prior to potentiality in formula, in time and in substantiality. With this definition of the particular substance (i.e., matter and form), Aristotle tries to solve the problem of the unity of the beings, for example, "what is it that makes a man one"? Since, according to Plato there are two Ideas: animal and biped, how then is man a unity? However, according to Aristotle, the potential being (matter) and the actual one (form) are one and the same.<sup>[55][60]</sup>

## Epistemology

Aristotle's immanent realism means his epistemology is based on the study of things that exist or happen in the world, and rises to knowledge of the universal, whereas for Plato epistemology begins with knowledge of universal Forms (or ideas) and descends to knowledge of particular imitations of these.<sup>[52]</sup> Aristotle uses induction from examples alongside deduction, whereas Plato relies on deduction from a priori principles.<sup>[52]</sup>

## Natural philosophy

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Aristotle's "natural philosophy" spans a wide range of natural phenomena including those now covered by physics, biology and other natural sciences.<sup>[61]</sup> In Aristotle's terminology, "natural philosophy" is a branch of philosophy examining the phenomena of the natural world, and includes fields that would be regarded today as physics, biology and other natural sciences. Aristotle's work encompassed virtually all

facets of intellectual inquiry. Aristotle makes philosophy in the broad sense coextensive with reasoning, which he also would describe as "science". However, his use of the term *science* carries a different meaning than that covered by the term "scientific method". For Aristotle, "all science (*dianoia*) is either practical, poetical or theoretical" (*Metaphysics* 1025b25). His practical science includes ethics and politics; his poetical science means the study of fine arts including poetry; his theoretical science covers physics, mathematics and metaphysics.<sup>[61]</sup>

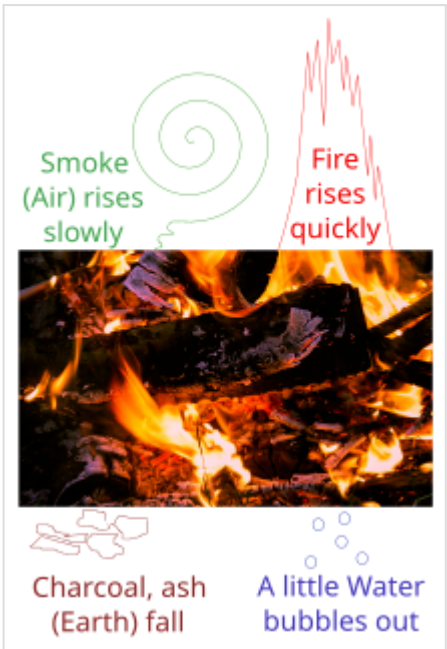
## Physics

### Five elements

In his *On Generation and Corruption*, Aristotle related each of the four elements proposed earlier by Empedocles, earth, water, air, and fire, to two of the four sensible qualities, hot, cold, wet, and dry. In the Empedoclean scheme, all matter was made of the four elements, in differing proportions. Aristotle's scheme added the heavenly aether, the divine substance of the heavenly spheres, stars and planets.<sup>[62]</sup>

Aristotle's elements<sup>[62]</sup>

Element	Hot/Cold	Wet/Dry	Motion	Modern state of matter
<u>Earth</u>	Cold	Dry	Down	<u>Solid</u>
<u>Water</u>	Cold	Wet	Down	<u>Liquid</u>
<u>Air</u>	Hot	Wet	Up	<u>Gas</u>
<u>Fire</u>	Hot	Dry	Up	<u>Plasma</u>
<u>Aether</u>	(divine substance)	—	Circular (in heavens)	<u>Vacuum</u>



The four classical elements (fire, air, water, earth) of Empedocles and Aristotle illustrated with a burning log. The log releases all four elements as it is destroyed.

### Motion

Aristotle describes two kinds of motion: "violent" or "unnatural motion", such as that of a thrown stone, in the *Physics* (254b10), and "natural motion", such as of a falling object, in *On the Heavens* (300a20). In violent motion, as soon as the agent stops causing it, the motion stops also: in other words, the natural state of an object is to be at rest,<sup>[63][I]</sup> since Aristotle does not address friction.<sup>[64]</sup> With this understanding, it can be observed that, as Aristotle stated, heavy objects (on the ground, say) require more force to make them move; and objects pushed with greater force move faster.<sup>[65][J]</sup> This would imply the equation<sup>[65]</sup>

$$F = mv,$$

incorrect in modern physics.<sup>[65]</sup>

Natural motion depends on the element concerned: the aether naturally moves in a circle around the heavens,<sup>[K]</sup> while the 4 Empedoclean elements move vertically up (like fire, as is observed) or down (like earth) towards their natural resting places.<sup>[66][64][L]</sup>



In the *Physics* (215a25), Aristotle effectively states a quantitative law, that the speed,  $v$ , of a falling body is proportional (say, with constant  $c$ ) to its weight,  $W$ , and inversely proportional to the density,<sup>[M]</sup>  $\rho$ , of the fluid in which it is falling:;<sup>[66][64]</sup>

$$v = c \frac{W}{\rho}$$

Aristotle implies that in a vacuum the speed of fall would become infinite, and concludes from this apparent absurdity that a vacuum is not possible.<sup>[66][64]</sup> Opinions have varied on whether Aristotle intended to state quantitative laws. Henri Carteron held the "extreme view"<sup>[64]</sup> that Aristotle's concept of force was basically qualitative,<sup>[67]</sup> but other authors reject this.<sup>[64]</sup>

Archimedes corrected Aristotle's theory that bodies move towards their natural resting places; metal boats can float if they displace enough water; floating depends in Archimedes' scheme on the mass and volume of the object, not, as Aristotle thought, its elementary composition.<sup>[66]</sup>

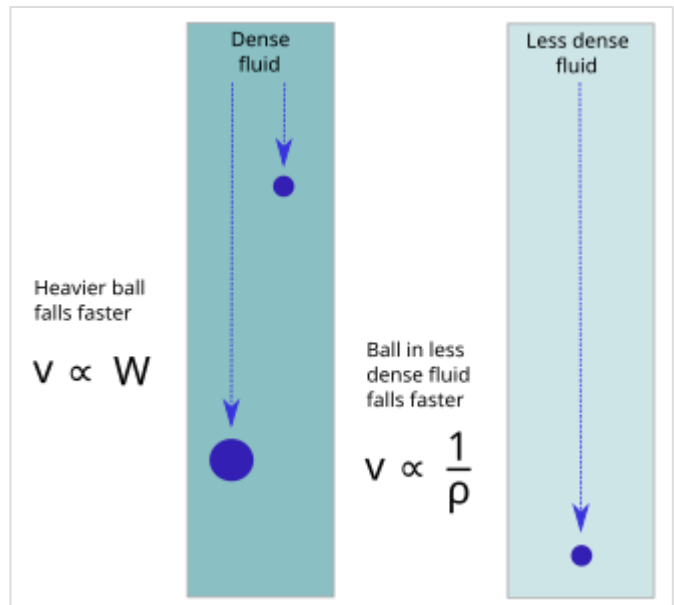
Aristotle's writings on motion remained influential until the Early Modern period. John Philoponus (in Late antiquity) and Galileo (in Early modern period) are said to have shown by experiment that Aristotle's claim that a heavier object falls faster than a lighter object is incorrect.<sup>[61]</sup> A contrary opinion is given by Carlo Rovelli, who argues that Aristotle's physics of motion is correct within its domain of validity, that of objects in the Earth's gravitational field immersed in a fluid such as air. In this system, heavy bodies in steady fall indeed travel faster than light ones (whether friction is ignored, or not<sup>[66]</sup>), and they do fall more slowly in a denser medium.<sup>[65][N]</sup>

Newton's "forced" motion corresponds to Aristotle's "violent" motion with its external agent, but Aristotle's assumption that the agent's effect stops immediately it stops acting (e.g., the ball leaves the thrower's hand) has awkward consequences: he has to suppose that surrounding fluid helps to push the ball along to make it continue to rise even though the hand is no longer acting on it, resulting in the Medieval theory of impetus.<sup>[66]</sup>

## Four causes

Aristotle suggested that the reason for anything coming about can be attributed to four different types of simultaneously active factors. His term *aitia* is traditionally translated as "cause", but it does not always refer to temporal sequence; it might be better translated as "explanation", but the traditional rendering will be employed here.<sup>[69][70]</sup>

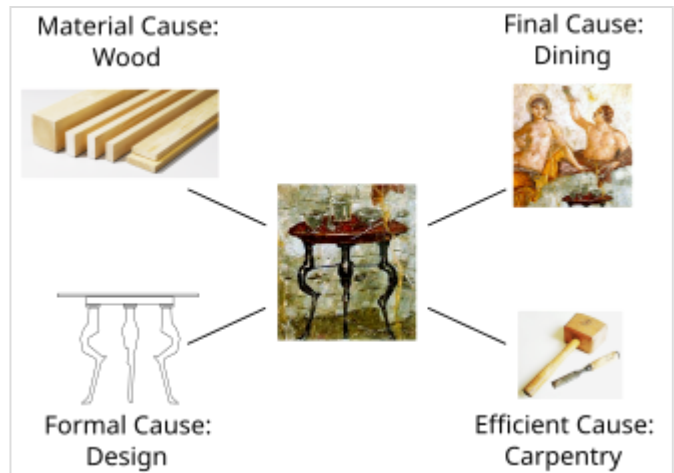
- Material cause describes the material out of which something is composed. Thus the material cause of a table is wood. It is not about action. It does not mean that one domino



Aristotle's laws of motion. In *Physics* he states that objects fall at a speed proportional to their weight and inversely proportional to the density of the fluid they are immersed in.<sup>[64]</sup> This is a correct approximation for objects in Earth's gravitational field moving in air or water.<sup>[66]</sup>

knocks over another domino.<sup>[69]</sup>

- The formal cause is its form, i.e., the arrangement of that matter. It tells one what a thing is, that a thing is determined by the definition, form, pattern, essence, whole, synthesis or archetype. It embraces the account of causes in terms of fundamental principles or general laws, as the whole (i.e., macrostructure) is the cause of its parts, a relationship known as the whole-part causation. Plainly put, the formal cause is the idea in the mind of the sculptor that brings the sculpture into being. A simple example of the formal cause is the mental image or idea that allows an artist, architect, or engineer to create a drawing.<sup>[69]</sup>
- The efficient cause is "the primary source", or that from which the change under consideration proceeds. It identifies 'what makes of what is made and what causes change of what is changed' and so suggests all sorts of agents, non-living or living, acting as the sources of change or movement or rest. Representing the current understanding of causality as the relation of cause and effect, this covers the modern definitions of "cause" as either the agent or agency or particular events or states of affairs. In the case of two dominoes, when the first is knocked over it causes the second also to fall over.<sup>[69]</sup> In the case of animals, this agency is a combination of how it develops from the egg, and how its body functions.<sup>[71]</sup>
- The final cause (*telos*) is its purpose, the reason why a thing exists or is done, including both purposeful and instrumental actions and activities. The final cause is the purpose or function that something is supposed to serve. This covers modern ideas of motivating causes, such as volition.<sup>[69]</sup> In the case of living things, it implies adaptation to a particular way of life.<sup>[71]</sup>



Aristotle argued by analogy with woodwork that a thing takes its form from four causes: in the case of a table, the wood used (material cause), its design (formal cause), the tools and techniques used (efficient cause), and its decorative or practical purpose (final cause).<sup>[68]</sup>

## Optics

Aristotle describes experiments in optics using a camera obscura in *Problems*, book 15. The apparatus consisted of a dark chamber with a small aperture that let light in. With it, he saw that whatever shape he made the hole, the sun's image always remained circular. He also noted that increasing the distance between the aperture and the image surface magnified the image.<sup>[72]</sup>

## Chance and spontaneity

According to Aristotle, spontaneity and chance are causes of some things, distinguishable from other types of cause such as simple necessity. Chance as an incidental cause lies in the realm of accidental things, "from what is spontaneous". There is also more a specific kind of chance, which Aristotle names "luck", that only applies to people's moral choices.<sup>[73][74]</sup>

## Astronomy

In astronomy, Aristotle refuted Democritus's claim that the Milky Way was made up of "those stars which are shaded by the earth from the sun's rays," pointing out partly correctly that if "the size of the sun is greater than that of the earth and the distance of the stars from the earth many times greater than that of the sun, then... the sun shines on all the stars and the earth screens none of them."<sup>[75]</sup> He also wrote descriptions of comets, including the Great Comet of 371 BC.<sup>[76]</sup>

## Geology and natural sciences

Aristotle was one of the first people to record any geological observations. He stated that geological change was too slow to be observed in one person's lifetime.<sup>[77][78]</sup> The geologist Charles Lyell noted that Aristotle described such change, including "lakes that had dried up" and "deserts that had become watered by rivers", giving as examples the growth of the Nile delta since the time of Homer, and "the upheaving of one of the Aeolian islands, previous to a volcanic eruption."<sup>[79]</sup>



Aristotle noted that the ground level of the Aeolian islands changed before a volcanic eruption.

*Meteorologica* lends its name to the modern study of meteorology, but its modern usage diverges from the content of Aristotle's ancient treatise on meteors. The ancient Greeks did use the term for a range of atmospheric phenomena, but also for earthquakes and volcanic eruptions. Aristotle proposed that the cause of earthquakes was a gas or vapor (*anathymiaseis*) that was trapped inside the earth and trying to escape, following other Greek authors Anaxagoras, Empedocles and Democritus.<sup>[80]</sup>

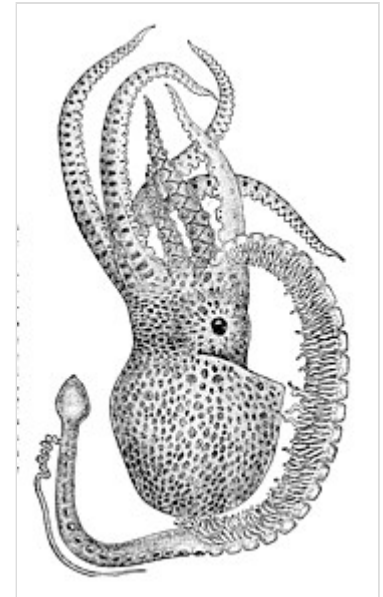
Aristotle also made many observations about the hydrologic cycle. For example, he made some of the earliest observations about desalination: he observed early – and correctly – that when seawater is heated, freshwater evaporates and that the oceans are then replenished by the cycle of rainfall and river runoff ("I have proved by experiment that salt water evaporated forms fresh and the vapor does not when it condenses condense into sea water again.")<sup>[81]</sup>

## Biology

### Empirical research

Aristotle was the first person to study biology systematically,<sup>[82]</sup> and biology forms a large part of his writings. He spent two years observing and describing the zoology of Lesbos and the surrounding seas, including in particular the Pyrrha lagoon in the centre of Lesbos.<sup>[83][84]</sup> His data in *History of Animals*, *Generation of Animals*, *Movement of Animals*, and *Parts of Animals* are assembled from his own observations,<sup>[85]</sup> statements given by people with specialized knowledge, such as beekeepers and fishermen, and less accurate accounts provided by travellers from overseas.<sup>[86]</sup> His apparent emphasis on animals rather than plants is a historical accident: his works on botany have been lost, but two books on plants by his pupil Theophrastus have survived.<sup>[87]</sup>

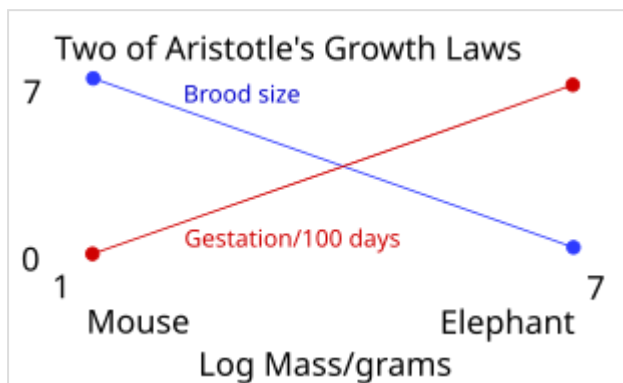
Aristotle reports on the sea-life visible from observation on Lesbos and the catches of fishermen. He describes the catfish, electric ray, and frogfish in detail, as well as cephalopods such as the octopus and paper nautilus. His description of the hectocotyl arm of cephalopods, used in sexual reproduction, was widely disbelieved until the 19th century.<sup>[88]</sup> He gives accurate descriptions of the four-chambered fore-stomachs of ruminants,<sup>[89]</sup> and of the ovoviviparous embryological development of the hound shark.<sup>[90]</sup>



Among many pioneering zoological observations, Aristotle described the reproductive hectocotyl arm of the octopus (bottom left).

He notes that an animal's structure is well matched to function so birds like the heron (which live in marshes with soft mud and live by catching fish) have a long neck, long legs, and a sharp spear-like beak, whereas ducks that swim have short legs and webbed feet.<sup>[91]</sup> Darwin, too, noted these sorts of differences between similar kinds of animal, but unlike Aristotle used the data to come to the theory of evolution.<sup>[92]</sup> Aristotle's writings can seem to modern readers close to implying evolution, but while Aristotle was aware that new mutations or hybridizations could occur, he saw these as rare accidents. For Aristotle, accidents, like heat waves in winter, must be considered distinct from natural causes. He was thus critical of Empedocles's materialist theory of a "survival of the fittest" origin of living things and their organs, and ridiculed the idea that accidents could lead to orderly results.<sup>[93]</sup> To put his views into modern terms, he nowhere says that different species can have a common ancestor, or that one kind can change into another, or that kinds can become extinct.<sup>[94]</sup>

## Scientific style



Aristotle inferred growth laws from his observations on animals, including that brood size decreases with body mass, whereas gestation period increases. He was correct in these predictions, at least for mammals: data are shown for mouse and elephant.

Aristotle did not do experiments in the modern sense.<sup>[95]</sup> He used the ancient Greek term *pepeiramenoi* to mean observations, or at most investigative procedures like dissection.<sup>[96]</sup> In *Generation of Animals*, he finds a fertilized hen's egg of a suitable stage and opens it to see the embryo's heart beating inside.<sup>[97][98]</sup>

Instead, he practiced a different style of science: systematically gathering data, discovering patterns common to whole groups of animals, and inferring possible causal explanations from these.<sup>[99][100]</sup> This style is common in modern biology when large amounts of data become available in a new field, such as genomics. It does not result in the same certainty as experimental science, but it sets out testable hypotheses and constructs a narrative

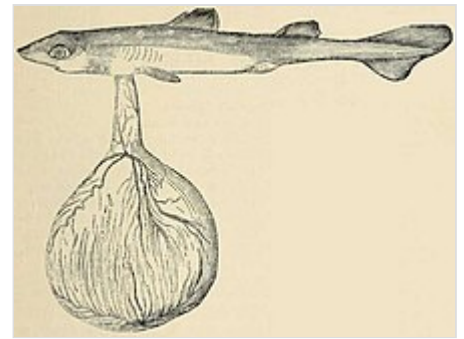
explanation of what is observed. In this sense, Aristotle's biology is scientific.<sup>[99]</sup>



From the data he collected and documented, Aristotle inferred quite a number of rules relating the life-history features of the live-bearing tetrapods (terrestrial placental mammals) that he studied. Among these correct predictions are the following. Brood size decreases with (adult) body mass, so that an elephant has fewer young (usually just one) per brood than a mouse. Lifespan increases with gestation period, and also with body mass, so that elephants live longer than mice, have a longer period of gestation, and are heavier. As a final example, fecundity decreases with lifespan, so long-lived kinds like elephants have fewer young in total than short-lived kinds like mice.<sup>[101]</sup>

## Classification of living things

Aristotle distinguished about 500 species of animals,<sup>[103][104]</sup> arranging these in the *History of Animals* in a graded scale of perfection, a nonreligious version of the scala naturae, with man at the top. His system had eleven grades of animal, from highest potential to lowest, expressed in their form at birth: the highest gave live birth to hot and wet creatures, the lowest laid cold, dry mineral-like eggs. Animals came above plants, and these in turn were above minerals.<sup>[105][106]</sup> He grouped what the modern zoologist would call vertebrates as the hotter "animals with blood", and below them the colder invertebrates as "animals without blood". Those with blood were divided into the live-bearing (mammals), and the egg-laying (birds, reptiles, fish). Those without blood were insects, crustacea (non-shelled – cephalopods, and shelled) and the hard-shelled molluscs (bivalves and gastropods). He recognised that animals did not exactly fit into a linear scale, and noted various exceptions, such as that sharks had a placenta like the tetrapods. To a modern biologist, the explanation, not available to Aristotle, is convergent evolution.<sup>[107]</sup> Philosophers of science have generally concluded that Aristotle was not interested in taxonomy,<sup>[108][109]</sup> but zoologists who studied this question in the early 21st century think otherwise.<sup>[110][111][112]</sup> He believed that purposive final causes guided all natural processes; this teleological view justified his observed data as an expression of formal design.<sup>[113]</sup>



Aristotle recorded that the embryo (fetus pictured) of a dogfish was attached by a cord to a kind of placenta (the yolk sac), like a higher animal; this formed an exception to the linear scale from highest to lowest.<sup>[102]</sup>

Aristotle's *Scala naturae* (highest to lowest)

Group	Examples (given by Aristotle)	Blood	Legs	Souls (Rational, Sensitive, Vegetative)	Qualities (Hot–Cold, Wet–Dry)
Man	Man	with blood	2 legs	R, S, V	Hot, Wet
Live-bearing tetrapods	Cat, hare	with blood	4 legs	S, V	Hot, Wet
Cetaceans	Dolphin, whale	with blood	none	S, V	Hot, Wet
Birds	Bee-eater, nightjar	with blood	2 legs	S, V	Hot, Wet, except Dry eggs
Egg-laying tetrapods	Chameleon, crocodile	with blood	4 legs	S, V	Cold, Wet except scales, eggs
Snakes	Water snake, Ottoman viper	with blood	none	S, V	Cold, Wet except scales, eggs
Egg-laying fishes	Sea bass, parrotfish	with blood	none	S, V	Cold, Wet, including eggs
(Among the egg- laying fishes): placental selachians	Shark, skate	with blood	none	S, V	Cold, Wet, but placenta like tetrapods
Crustaceans	Shrimp, crab	without	many legs	S, V	Cold, Wet except shell
Cephalopods	Squid, octopus	without	tentacles	S, V	Cold, Wet
Hard-shelled animals	Cockle, trumpet snail	without	none	S, V	Cold, Dry (mineral shell)
Larva-bearing insects	Ant, cicada	without	6 legs	S, V	Cold, Dry
Spontaneously generating	Sponges, worms	without	none	S, V	Cold, Wet or Dry, from earth
Plants	Fig	without	none	V	Cold, Dry
Minerals	Iron	without	none	none	Cold, Dry

## Psychology

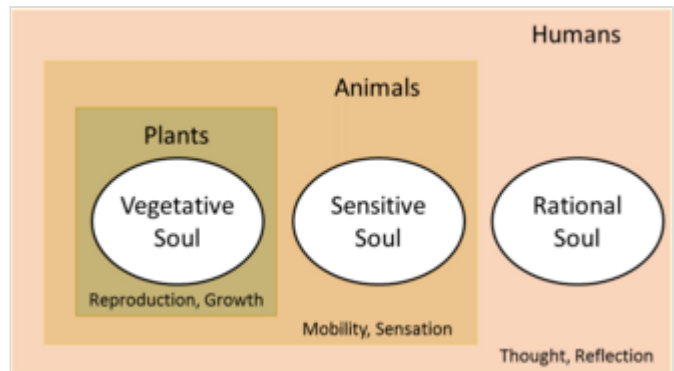
### Soul

Aristotle's psychology, given in his treatise *On the Soul* (*peri psychēs*), posits three kinds of soul (*psyches*): the vegetative soul, the sensitive soul, and the rational soul. Humans have all three. The vegetative soul is concerned with growth and nourishment. The sensitive soul experiences sensations and movement. The unique part of the human, rational soul is its ability to receive forms of other things and to compare them using the *nous* (intellect) and *logos* (reason).<sup>[114]</sup>

For Aristotle, the soul is the form of a living being. Because all beings are composites of form and matter, the form of living beings is that which endows them with what is specific to living beings, e.g. the ability to initiate movement (or in the case of plants, growth and transformations, which Aristotle considers types of movement).<sup>[115]</sup> In contrast to earlier philosophers, but in accordance with the Egyptians, he

placed the rational soul in the heart, rather than the brain.<sup>[116]</sup> Notable is Aristotle's division of sensation and thought, which generally differed from the concepts of previous philosophers, with the exception of Alcmaeon.<sup>[117]</sup>

In *On the Soul*, Aristotle famously criticizes Plato's theory of the soul and develops his own in response. The first criticism is against Plato's view of the soul in the *Timaeus* that the soul takes up space and is able to come into physical contact with bodies.<sup>[118]</sup> 20th-century scholarship overwhelmingly opposed Aristotle's interpretation of Plato and maintained that he had misunderstood him.<sup>[119]</sup> Today's scholars have tended to re-assess Aristotle's interpretation and been more positive about it.<sup>[120]</sup> Aristotle's other criticism is that Plato's view of reincarnation entails that it is possible for a soul and its body to be mis-matched; in principle, Aristotle alleges, any soul can go with any body, according to Plato's theory.<sup>[121]</sup> Aristotle's claim that the soul is the form of a living being eliminates that possibility and thus rules out reincarnation.<sup>[122]</sup>



Aristotle proposed a three-part structure for souls of plants, animals, and humans, making humans unique in having all three types of soul.

## Memory

According to Aristotle in *On the Soul*, memory is the ability to hold a perceived experience in the mind and to distinguish between the internal "appearance" and an occurrence in the past.<sup>[123]</sup> In other words, a memory is a mental picture (phantasm) that can be recovered. Aristotle believed an impression is left on a semi-fluid bodily organ that undergoes several changes in order to make a memory. A memory occurs when stimuli such as sights or sounds are so complex that the nervous system cannot receive all the impressions at once. These changes are the same as those involved in the operations of sensation, Aristotelian 'common sense', and thinking.<sup>[124][125]</sup>

Aristotle uses the term 'memory' for the actual retaining of an experience in the impression that can develop from sensation, and for the intellectual anxiety that comes with the impression because it is formed at a particular time and processing specific contents. Memory is of the past, prediction is of the future, and sensation is of the present. Retrieval of impressions cannot be performed suddenly. A transitional channel is needed and located in past experiences, both for previous experience and present experience.<sup>[126]</sup>

Because Aristotle believes people receive all kinds of sense perceptions and perceive them as impressions, people are continually weaving together new impressions of experiences. To search for these impressions, people search the memory itself.<sup>[127]</sup> Within the memory, if one experience is offered instead of a specific memory, that person will reject this experience until they find what they are looking for. Recollection occurs when one retrieved experience naturally follows another. If the chain of "images" is needed, one memory will stimulate the next. When people recall experiences, they stimulate certain previous experiences until they reach the one that is needed.<sup>[128]</sup> Recollection is thus the self-directed activity of retrieving the information stored in a memory impression.<sup>[129]</sup> Only humans can remember

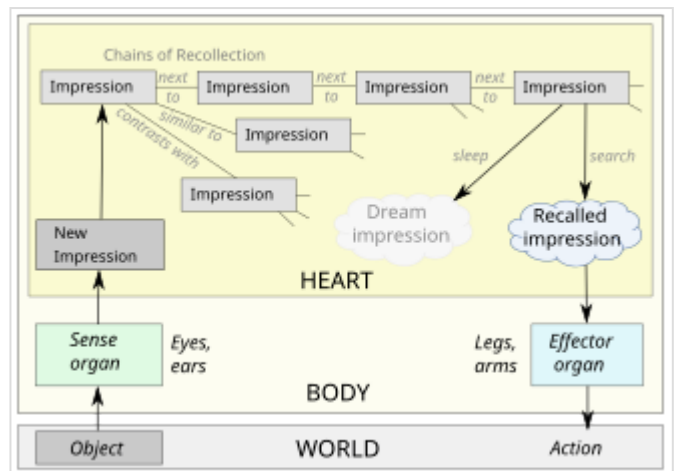
impressions of intellectual activity, such as numbers and words. Animals that have perception of time can retrieve memories of their past observations. Remembering involves only perception of the things remembered and of the time passed.<sup>[130]</sup>

Aristotle believed the chain of thought, which ends in recollection of certain impressions, was connected systematically in relationships such as similarity, contrast, and contiguity, described in his laws of association. Aristotle believed that past experiences are hidden within the mind. A force operates to awaken the hidden material to bring up the actual experience. According to Aristotle, association is the power innate in a mental state, which operates upon the unexpressed remains of former experiences, allowing them to rise and be recalled.<sup>[131][132]</sup>

## Dreams

Aristotle describes sleep in *On Sleep and Wakefulness*.<sup>[133]</sup> Sleep takes place as a result of overuse of the senses<sup>[134]</sup> or of digestion,<sup>[135]</sup> so it is vital to the body.<sup>[134]</sup> While a person is asleep, the critical activities, which include thinking, sensing, recalling and remembering, do not function as they do during wakefulness. Since a person cannot sense during sleep, they cannot have desire, which is the result of sensation. However, the senses are able to work during sleep,<sup>[136]</sup> albeit differently,<sup>[133]</sup> unless they are weary.<sup>[134]</sup>

Dreams do not involve actually sensing a stimulus. In dreams, sensation is still involved, but in an altered manner.<sup>[134]</sup> Aristotle explains that when a person stares at a moving stimulus such as the waves in a body of water, and then looks away, the next thing they look at appears to have a wavelike motion. When a person perceives a stimulus and the stimulus is no longer the focus of their attention, it leaves an impression.<sup>[133]</sup> When the body is awake and the senses are functioning properly, a person constantly encounters new stimuli to sense and so the impressions of previously perceived stimuli are ignored.<sup>[134]</sup> However, during sleep the impressions made throughout the day are noticed as there are no new distracting sensory experiences.<sup>[133]</sup> So, dreams result from these lasting impressions. Since impressions are all that are left and not the exact stimuli, dreams do not resemble the actual waking experience.<sup>[137]</sup> During sleep, a person is in an altered state of mind. Aristotle compares a sleeping person to a person who is overtaken by strong feelings toward a stimulus. For example, a person who has a strong infatuation with someone may begin to think they see that person everywhere because they are so overtaken by their feelings. Since a person sleeping is in a suggestible state and unable to make judgements, they become easily deceived by what appears in their dreams, like the infatuated person.<sup>[133]</sup> This leads the person to believe the dream is real, even when the dreams are absurd in nature.<sup>[133]</sup> In *De Anima* iii 3, Aristotle ascribes the ability to create, to store, and to recall images in the absence of perception to the faculty of imagination, *phantasia*.<sup>[115]</sup>



Senses, perception, memory, dreams, action in Aristotle's psychology. Impressions are stored in the sensorium (the heart), linked by his laws of association (similarity, contrast, and contiguity).



One component of Aristotle's theory of dreams disagrees with previously held beliefs. He claimed that dreams are not foretelling and not sent by a divine being. Aristotle reasoned naturalistically that instances in which dreams do resemble future events are simply coincidences.<sup>[138]</sup> Aristotle claimed that a dream is first established by the fact that the person is asleep when they experience it. If a person had an image appear for a moment after waking up or if they see something in the dark it is not considered a dream because they were awake when it occurred. Secondly, any sensory experience that is perceived while a person is asleep does not qualify as part of a dream. For example, if, while a person is sleeping, a door shuts and in their dream they hear a door is shut, this sensory experience is not part of the dream. Lastly, the images of dreams must be a result of lasting impressions of waking sensory experiences.<sup>[137]</sup>

## Practical philosophy

Aristotle's practical philosophy covers areas such as ethics, politics, economics, and rhetoric.<sup>[61]</sup>

### Ethics

Aristotle considered ethics to be a practical rather than theoretical study, i.e., one aimed at becoming good and doing good rather than knowing for its own sake. He wrote several treatises on ethics, most notably including the *Nicomachean Ethics*.<sup>[139]</sup>

Aristotle taught that virtue has to do with the proper function (*ergon*) of a thing. An eye is only a good eye in so much as it can see because the proper function of an eye is sight. Aristotle reasoned that humans must have a function specific to humans, and that this function must be an activity of the *psuchē* (*soul*) in accordance with reason (*logos*). Aristotle identified such an optimum activity (the virtuous mean, between the accompanying vices of excess or deficiency<sup>[35]</sup>) of the soul as the aim of all human deliberate action, *eudaimonia*, generally translated as "happiness" or sometimes "well-being". To have the potential of ever being happy in this way necessarily requires a good character (*ēthikē aretē*), often translated as moral or ethical virtue or excellence.<sup>[140]</sup>

Virtues and their accompanying vices<sup>[35]</sup>

Too little	Virtuous mean	Too much
Humbleness	High-mindedness	Vainglory
Lack of purpose	Right ambition	Over-ambition
Spiritlessness	Good temper	Irascibility
Rudeness	Civility	Obsequiousness
Cowardice	Courage	Rashness
Insensibility	Self-control	Intemperance
Sarcasm	Sincerity	Boastfulness
Boorishness	Wit	Buffoonery
Callousness	Just resentment	Spitefulness
Pettiness	Generosity	Vulgarity
Meanness	Liberality	Wastefulness

Aristotle taught that to achieve a virtuous and potentially happy character requires a first stage of having the fortune to be habituated not deliberately, but by teachers, and experience, leading to a later stage in which one consciously chooses to do the best things. When the best people come to live life this way their practical wisdom (*phronesis*) and their intellect (*nous*) can develop with each other towards the highest possible human virtue, the wisdom of an accomplished theoretical or speculative thinker, or in other words, a philosopher.<sup>[141]</sup>

## Politics

In addition to his works on ethics, which address the individual, Aristotle addressed the city in his work titled *Politics*. Aristotle considered the city to be a natural community. Moreover, he considered the city to be prior in importance to the family, which in turn is prior to the individual, "for the whole must of necessity be prior to the part".<sup>[142]</sup> He famously stated that "man is by nature a political animal" and argued that humanity's defining factor among others in the animal kingdom is its rationality.<sup>[143]</sup> Aristotle conceived of politics as being like an organism rather than like a machine, and as a collection of parts none of which can exist without the others. Aristotle's conception of the city is organic, and he is considered one of the first to conceive of the city in this manner.<sup>[144]</sup>

The common modern understanding of a political community as a modern state is quite different from Aristotle's understanding. Although he was aware of the existence and potential of larger empires, the natural community according to Aristotle was the city (*polis*) which functions as a political "community" or "partnership" (*koinōnia*). The aim of the city is not just to avoid injustice or for economic stability, but rather to allow at least some citizens the possibility to live a good life, and to perform beautiful acts: "The political partnership must be regarded, therefore, as being for the sake of noble actions, not for the sake of living together." This is distinguished from modern approaches, beginning with social contract theory, according to which individuals leave the state of nature because of "fear of violent death" or its "inconveniences".<sup>[O]</sup>

Government	True (good of all)	Perverted (good of one section)
of one	ROYALTY	TYRANNY (the tyrant)
of a few	ARISTOCRACY	OLIGARCHY (the rich)
of many	CONSTITUTIONAL GOVERNMENT	DEMOCRACY (the poor)

less perverted  
↓

Aristotle's classifications of political constitutions

In *Protrepticus*, the character 'Aristotle' states:<sup>[145]</sup>

For we all agree that the most excellent man should rule, i.e., the supreme by nature, and that the law rules and alone is authoritative; but the law is a kind of intelligence, i.e. a discourse based on intelligence. And again, what standard do we have, what criterion of good things, that is more precise than the intelligent man? For all that this man will choose, if the choice is based on his knowledge, are good things and their contraries are bad. And since everybody chooses most of all what conforms to their own proper dispositions (a just man choosing to live justly, a man with bravery to live bravely, likewise a self-controlled man to live with self-control), it is clear that the intelligent man will choose most of all to be intelligent; for this is the function of that capacity. Hence it's evident that, according to the most authoritative judgment, intelligence is supreme among goods.<sup>[145]</sup>

As Plato's disciple Aristotle was rather critical concerning democracy and, following the outline of certain ideas from Plato's *Statesman*, he developed a coherent theory of integrating various forms of power into a so-called mixed state:

It is ... constitutional to take ... from oligarchy that offices are to be elected, and from democracy that this is not to be on a property-qualification. This then is the mode of the mixture; and the mark of a good mixture of democracy and oligarchy is when it is possible to

speak of the same constitution as a democracy and as an oligarchy.

—Aristotle. *Politics*, Book 4, 1294b.10–18

## Economics

Aristotle made substantial contributions to economic thought, especially to thought in the Middle Ages.<sup>[146]</sup> In *Politics*, Aristotle addresses the city, property, and trade. His response to criticisms of private property, in Lionel Robbins's view, anticipated later proponents of private property among philosophers and economists, as it related to the overall utility of social arrangements.<sup>[146]</sup> Aristotle believed that although communal arrangements may seem beneficial to society, and that although private property is often blamed for social strife, such evils in fact come from human nature. In *Politics*, Aristotle offers one of the earliest accounts of the origin of money.<sup>[146]</sup> Money came into use because people became dependent on one another, importing what they needed and exporting the surplus. For the sake of convenience, people then agreed to deal in something that is intrinsically useful and easily applicable, such as iron or silver.<sup>[147]</sup>

Aristotle's discussions on retail and interest was a major influence on economic thought in the Middle Ages. He had a low opinion of retail, believing that contrary to using money to procure things one needs in managing the household, retail trade seeks to make a profit. It thus uses goods as a means to an end, rather than as an end unto itself. He believed that retail trade was in this way unnatural. Similarly, Aristotle considered making a profit through interest unnatural, as it makes a gain out of the money itself, and not from its use.<sup>[147]</sup>

Aristotle gave a summary of the function of money that was perhaps remarkably precocious for his time. He wrote that because it is impossible to determine the value of every good through a count of the number of other goods it is worth, the necessity arises of a single universal standard of measurement. Money thus allows for the association of different goods and makes them "commensurable".<sup>[147]</sup> He goes on to state that money is also useful for future exchange, making it a sort of security. That is, "if we do not want a thing now, we shall be able to get it when we do want it".<sup>[147]</sup>

## Rhetoric

Aristotle's *Rhetoric* proposes that a speaker can use three basic kinds of appeals to persuade his audience: ethos (an appeal to the speaker's character), pathos (an appeal to the audience's emotion), and logos (an appeal to logical reasoning).<sup>[148]</sup> He also categorizes rhetoric into three genres: epideictic (ceremonial speeches dealing with praise or blame), forensic (judicial speeches over guilt or innocence), and deliberative (speeches calling on an audience to decide on an issue).<sup>[149]</sup> Aristotle also outlines two kinds of rhetorical proofs: enthymeme (proof by sylogism) and paradeigma (proof by example).<sup>[150]</sup>

## Poetics

Aristotle writes in his *Poetics* that epic poetry, tragedy, comedy, dithyrambic poetry, painting, sculpture, music, and dance are all fundamentally acts of mimesis ("imitation"), each varying in imitation by medium, object, and manner.<sup>[151][152]</sup> He applies the term mimesis both as a property of a work of art and also as the product of the artist's intention<sup>[151]</sup> and contends that the audience's realisation of the mimesis is vital to understanding the work itself.<sup>[151]</sup> Aristotle states that mimesis is a natural instinct of humanity

that separates humans from animals<sup>[151][153]</sup> and that all human artistry "follows the pattern of nature".<sup>[151]</sup> Because of this, Aristotle believed that each of the mimetic arts possesses what Stephen Halliwell calls "highly structured procedures for the achievement of their purposes."<sup>[154]</sup> For example, music imitates with the media of rhythm and harmony, whereas dance imitates with rhythm alone, and poetry with language. The forms also differ in their object of imitation. Comedy, for instance, is a dramatic imitation of men worse than average; whereas tragedy imitates men slightly better than average. Lastly, the forms differ in their manner of imitation – through narrative or character, through change or no change, and through drama or no drama.<sup>[155]</sup>

While it is believed that Aristotle's *Poetics* originally comprised two books – one on comedy and one on tragedy – only the portion that focuses on tragedy has survived. Aristotle taught that tragedy is composed of six elements: plot-structure, character, style, thought, spectacle, and lyric poetry.<sup>[157]</sup> The characters in a tragedy are merely a means of driving the story; and the plot, not the characters, is the chief focus of tragedy. Tragedy is the imitation of action arousing pity and fear, and is meant to effect the catharsis of those same emotions. Aristotle concludes *Poetics* with a discussion on which, if either, is superior: epic or tragic mimesis. He suggests that because tragedy possesses all the attributes of an epic, possibly possesses additional attributes such as spectacle and music, is more unified, and achieves the aim of its mimesis in shorter scope, it can be considered superior to epic.<sup>[158]</sup> Aristotle was a keen systematic collector of riddles, folklore, and proverbs; he and his school had a special interest in the riddles of the Delphic Oracle and studied the fables of Aesop.<sup>[159]</sup>



*The Blind Oedipus Commending his Children to the Gods* (1784) by Bénigne Gagneraux. In his *Poetics*, Aristotle uses the tragedy *Oedipus Tyrannus* by Sophocles as an example of how the perfect tragedy should be structured, with a generally good protagonist who starts the play prosperous, but loses everything through some hamartia (fault).<sup>[156]</sup>

## Gender and sexuality

Aristotle never wrote a specific work on women. However, he asserted the existence of differences between men and women throughout his biological, political, and ethical works.<sup>[160]</sup> For most female animals, including human women, Aristotle maintains that they are for the most part physically smaller and of a more cowardly constitution.<sup>[161]</sup>

From these comments in his biological works, he often connects the idea that women are inferior with their need to be ruled over by men.<sup>[162]</sup> Proponents of feminist philosophy question the extent to which Aristotle's philosophy relies on misogynistic and sexist tenets.<sup>[163][164]</sup> Within the same works, however, there is still concern for women's happiness<sup>[P]</sup> and participation within the city. For instance, women are meant to be consulted on household decisions, are praised for their tenderness to children, and expected to participate in religious festivals.<sup>[160]</sup>



Aristotle, like other Greek philosophers such as Plato and Xenophon, rejected homosexuality, believing that it could lead people to become immoral due to the fact that he believed it went against nature's purpose.<sup>[166]</sup>

## Transmission

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More than 2300 years after his death, Aristotle remains one of the most influential people who ever lived.<sup>[167][168][169]</sup> He contributed to almost every field of human knowledge then in existence, and he was the founder of many new fields. According to the philosopher Bryan Magee, "it is doubtful whether any human being has ever known as much as he did".<sup>[170]</sup> Aristotle has been regarded as the first scientist.<sup>[171][172]</sup>

Among countless other achievements, Aristotle was the founder of formal logic,<sup>[173]</sup> pioneered the study of zoology, and left every future scientist and philosopher in his debt through his contributions to the scientific method.<sup>[40][174][175]</sup> Taneli Kukkonen, observes that his achievement in founding two sciences is unmatched, and his reach in influencing "every branch of intellectual enterprise" including Western ethical and political theory, theology, rhetoric, and literary analysis is equally long. As a result, Kukkonen argues, any analysis of reality today "will almost certainly carry Aristotelian overtones ... evidence of an exceptionally forceful mind."<sup>[175]</sup> Jonathan Barnes wrote that "an account of Aristotle's intellectual afterlife would be little less than a history of European thought".<sup>[176]</sup>



Preface to Argyropoulos's  
15th century Latin translation  
of Aristotle's *Physics*

Aristotle has been called the father of logic, biology, political science, zoology, embryology, natural law, scientific method, rhetoric, psychology, realism, criticism, individualism, teleology, and meteorology.<sup>[178]</sup>

The scholar Taneli Kukkonen notes that "in the best 20th-century scholarship Aristotle comes alive as a thinker wrestling with the full weight of the Greek philosophical tradition."<sup>[175]</sup> What follows is an overview of the transmission and influence of his texts and ideas into the modern era.

## His successor, Theophrastus

Aristotle's pupil and successor, Theophrastus, wrote the *History of Plants*, a pioneering work in botany. Some of his technical terms remain in use, such as carpel from *carpos*, fruit, and pericarp, from *pericarpion*, seed chamber.<sup>[179]</sup> Theophrastus was much less concerned with formal causes than Aristotle was, instead pragmatically describing how plants functioned.<sup>[180][181]</sup>

## Later Greek philosophy

The immediate influence of Aristotle's work was felt as the Lyceum grew into the Peripatetic school. Aristotle's students included Aristoxenus, Dicaearchus, Demetrius of Phalerum, Eudemos of Rhodes, Harpalus, Hephaestion, Mnason of Phocis, Nicomachus, and Theophrastus. Aristotle's influence over Alexander the Great is seen in the latter's bringing with him on his expedition a host of zoologists, botanists, and researchers. He had also learned a great deal about Persian customs and traditions from his

teacher. Although his respect for Aristotle was diminished as his travels made it clear that much of Aristotle's geography was clearly wrong, when the old philosopher released his works to the public, Alexander complained "Thou hast not done well to publish thy acroamatic doctrines; for in what shall I surpass other men if those doctrines wherein I have been trained are to be all men's common property?"<sup>[182]</sup>

## Hellenistic science

After Theophrastus, the Lyceum failed to produce any original work. Though interest in Aristotle's ideas survived, they were generally taken unquestioningly.<sup>[183]</sup> It is not until the age of Alexandria under the Ptolemies that advances in biology can be again found.

The first medical teacher at Alexandria, Herophilus of Chalcedon, corrected Aristotle, placing intelligence in the brain, and connected the nervous system to motion and sensation. Herophilus also distinguished between veins and arteries, noting that the latter pulse while the former do not.<sup>[184]</sup> Though a few ancient atomists such as Lucretius challenged the teleological viewpoint of Aristotelian ideas about life, teleology (and after the rise of Christianity, natural theology) would remain central to biological thought essentially until the 18th and 19th centuries. Ernst Mayr states that there was "nothing of any real consequence in biology after Lucretius and Galen until the Renaissance."<sup>[185]</sup>

## Revival

Following the decline of the Roman Empire, Aristotle's vast philosophical and scientific corpus lay largely dormant in the West. However, his works underwent a remarkable revival in the Abbasid Caliphate.<sup>[186]</sup> Translated into Arabic alongside other Greek classics, Aristotle's logic, ethics, and natural philosophy ignited the minds of early Islamic scholars.<sup>[187]</sup>

Through meticulous commentaries and critical engagements, figures like Al-Farabi and Ibn Sina (Avicenna) breathed new life into Aristotle's ideas. They harmonized his logic with Islamic theology, employed his scientific methodologies to explore the natural world, and even reinterpreted his ethics within the framework of Islamic morality. This revival was not mere imitation. Islamic thinkers embraced Aristotle's rigorous methods while simultaneously challenging his conclusions where they diverged from their own religious beliefs.<sup>[188]</sup>

## Byzantine scholars

Greek Christian scribes played a crucial role in the preservation of Aristotle by copying all the extant Greek language manuscripts of the corpus. The first Greek Christians to comment extensively on Aristotle were Philoponus, Elias, and David in the sixth century, and Stephen of Alexandria in the early seventh century.<sup>[189]</sup> John Philoponus stands out for having attempted a fundamental critique of Aristotle's views on the eternity of the world, movement, and other elements of Aristotelian thought.<sup>[190]</sup> Philoponus questioned Aristotle's teaching of physics, noting its flaws and introducing the theory of impetus to explain his observations.<sup>[191]</sup>



Frontispiece to a 1644 version of Theophrastus's *Historia Plantarum*, originally written c. 300 BC

After a hiatus of several centuries, formal commentary by Eustratius and Michael of Ephesus reappeared in the late eleventh and early twelfth centuries, apparently sponsored by Anna Comnena.<sup>[192]</sup>

## Medieval Islamic world

Aristotle is considered the most influential figure in the history of Arabic philosophy and was one of the most revered thinkers in early Islamic theology.<sup>[194]</sup> Most of the still extant works of Aristotle,<sup>[195]</sup> as well as a number of the original Greek commentaries, were translated into Arabic and studied by Muslim philosophers, scientists, and scholars. Averroes, Avicenna, and Alpharabius, who wrote on Aristotle in great depth, also influenced Thomas Aquinas and other Western Christian scholastic philosophers. Alkindus greatly admired Aristotle's philosophy,<sup>[196]</sup> and Averroes spoke of Aristotle as the "exemplar" for all future philosophers.<sup>[197]</sup> Medieval Muslim scholars regularly described Aristotle as the "First Teacher".<sup>[195]</sup> The title was later used by Western philosophers (as in the famous poem of Dante) who were influenced by the tradition of Islamic philosophy.<sup>[198]</sup>



Islamic portrayal of Aristotle (right) in the *Kitāb naʿt al-ḥayawān*, c. 1220.<sup>[193]</sup>

## Medieval Europe

With the loss of the study of ancient Greek in the early medieval Latin West, Aristotle was practically unknown there from c. CE 600 to c. 1100 except through the Latin translation of the *Organon* made by Boethius. In the twelfth and thirteenth centuries, interest in Aristotle revived and Latin Christians had translations made, both from Arabic translations, such as those by Gerard of Cremona,<sup>[199]</sup> and from the original Greek, such as those by James of Venice and William of Moerbeke.

After the Scholastic Thomas Aquinas wrote his *Summa Theologica*, working from Moerbeke's translations and calling Aristotle "The Philosopher",<sup>[200]</sup> the demand for Aristotle's writings grew, and the Greek manuscripts returned to the West, stimulating a revival of Aristotelianism in Europe that continued into the Renaissance.<sup>[201]</sup> These thinkers blended Aristotelian philosophy with Christianity, bringing the thought of Ancient Greece into the Middle Ages. Scholars such as Boethius, Peter Abelard, and John Buridan worked on Aristotelian logic.<sup>[202]</sup>

According to scholar Roger Theodore Lafferty, Dante built up the philosophy of the *Comedy* with the works of Aristotle as a foundation, just as the scholastics used Aristotle as the basis for their thinking. Dante knew Aristotle directly from Latin translations of his works and indirectly through quotations in the works of Albert Magnus.<sup>[203]</sup> Dante even acknowledges Aristotle's influence explicitly in the poem, specifically when Virgil justifies the Inferno's structure by citing the *Nicomachean Ethics*.<sup>[204]</sup> Dante famously refers to him as "he / Who is acknowledged Master of those who know".<sup>[205][206]</sup>

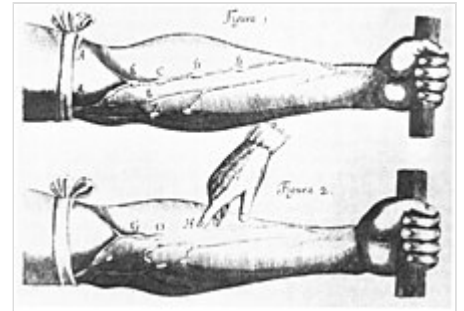
## Medieval Judaism

Moses Maimonides (considered to be the foremost intellectual figure of medieval Judaism)<sup>[207]</sup> adopted Aristotelianism from the Islamic scholars and based his *Guide for the Perplexed* on it and that became the basis of Jewish scholastic philosophy. Maimonides also considered Aristotle to be the greatest philosopher that ever lived, and styled him as the "chief of the philosophers".<sup>[208][209][210]</sup> Also, in his

letter to Samuel ibn Tibbon, Maimonides observes that there is no need for Samuel to study the writings of philosophers who preceded Aristotle because the works of the latter are "sufficient by themselves and [superior] to all that were written before them. His intellect, Aristotle's is the extreme limit of human intellect, apart from him upon whom the divine emanation has flowed forth to such an extent that they reach the level of prophecy, there being no level higher".<sup>[211]</sup>

## Early Modern science

In the early modern period, scientists such as William Harvey in England and Galileo Galilei in Italy reacted against the theories of Aristotle and other classical era thinkers like Galen, establishing new theories based to some degree on observation and experiment. Harvey demonstrated the circulation of the blood, establishing that the heart functioned as a pump rather than being the seat of the soul and the controller of the body's heat, as Aristotle thought.<sup>[212]</sup> Galileo used more doubtful arguments to displace Aristotle's physics, proposing that bodies all fall at the same speed whatever their weight.<sup>[213]</sup>



William Harvey's *De Motu Cordis*, 1628, showed that the blood circulated, contrary to classical thinking.

## 18th and 19th-century science

The English mathematician George Boole fully accepted Aristotle's logic, but decided "to go under, over, and beyond" it with his system of algebraic logic in his 1854 book *The Laws of Thought*. This gives logic a mathematical foundation with equations, enables it to solve equations as well as check validity, and allows it to handle a wider class of problems by expanding propositions of any number of terms, not just two.<sup>[214]</sup>

Charles Darwin regarded Aristotle as the most important contributor to the subject of biology. In an 1882 letter he wrote that "Linnaeus and Cuvier have been my two gods, though in very different ways, but they were mere schoolboys to old Aristotle".<sup>[215][216]</sup> Also, in later editions of the book "On the Origin of Species", Darwin traced evolutionary ideas as far back as Aristotle;<sup>[217]</sup> the text he cites is a summary by Aristotle of the ideas of the earlier Greek philosopher Empedocles.<sup>[218]</sup>

## Present science

The philosopher Bertrand Russell claims that "almost every serious intellectual advance has had to begin with an attack on some Aristotelian doctrine". Russell calls Aristotle's ethics "repulsive", and labelled his logic "as definitely antiquated as Ptolemaic astronomy". Russell states that these errors make it difficult to do historical justice to Aristotle, until one remembers what an advance he made upon all of his predecessors.<sup>[219]</sup>

The Dutch historian of science Eduard Jan Dijksterhuis writes that Aristotle and his predecessors showed the difficulty of science by "proceed[ing] so readily to frame a theory of such a general character" on limited evidence from their senses.<sup>[220]</sup> In 1985, the biologist Peter Medawar could still state in "pure seventeenth century"<sup>[221]</sup> tones that Aristotle had assembled "a strange and generally speaking rather tiresome farrago of hearsay, imperfect observation, wishful thinking and credulity amounting to downright gullibility".<sup>[221][222]</sup>



## Surviving works

First page of a 1566 edition  
of the *Nicomachean Ethics* in  
Greek and Latin

Some time later, the Kingdom of Pergamon began conscripting books for a royal library, and the heirs of Neleus hid their collection in a cellar to prevent it from being seized for that purpose. The library was stored there for about a century and a half, in conditions that were not ideal for document preservation. On the death of Attalus III, which also ended the royal library ambitions, the existence of Aristotelian library was disclosed, and it was purchased by Apellicon and returned to Athens c. 100 BC.<sup>[247]:5–6</sup>

Apellicon sought to recover the texts, many of which were seriously degraded at this point due to the conditions in which they were stored. He had them copied out into new manuscripts, and used his best guesswork to fill in the gaps where the originals were unreadable.<sup>[247]:5–6</sup>

When Sulla seized Athens in 86 BC, he seized the library and transferred it to Rome. There, Andronicus of Rhodes organized the texts into the first complete edition of Aristotle's works (and works attributed to him).<sup>[248]</sup> The Aristotelian texts we have today are based on these.<sup>[247]:6–8</sup>

## Depictions in art

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### Paintings

Aristotle has been depicted by major artists including Lucas Cranach the Elder,<sup>[249]</sup> Justus van Gent, Raphael, Paolo Veronese, Jusepe de Ribera,<sup>[250]</sup> Rembrandt,<sup>[251]</sup> and Francesco Hayez over the centuries. Among the best-known depictions is Raphael's fresco *The School of Athens*, in the Vatican's Apostolic Palace, where the figures of Plato and Aristotle are central to the image, at the architectural vanishing point, reflecting their importance.<sup>[252]</sup> Rembrandt's *Aristotle with a Bust of Homer*, too, is a celebrated work, showing the knowing philosopher and the blind Homer from an earlier age: as the art critic Jonathan Jones writes, "this painting will remain one of the greatest and most mysterious in the world, ensnaring us in its musty, glowing, pitch-black, terrible knowledge of time."<sup>[253][254]</sup>



*Aristotle*, mosaic from a Roman villa in Cologne



*Nuremberg Chronicle* anachronistically shows Aristotle in a medieval scholar's clothing. Ink and watercolour on paper, 1493



*Aristotle* by Justus van Gent. Oil on panel, c. 1476



*Phyllis and Aristotle* by Lucas Cranach the Elder. Oil on panel, 1530



*Aristotle* by Paolo Veronese, Biblioteca Marciana. Oil on canvas, 1560s



*Aristotle and Campaspe*,<sup>[1]</sup> Alessandro Turchi (attrib.) Oil on canvas, 1713



*Aristotle* by Jusepe de Ribera. Oil on canvas, 1637



*Aristotle with a Bust of Homer* by Rembrandt. Oil on canvas, 1653



*Aristotle* by Johann Jakob Dörner the Elder. Oil on canvas, 1813



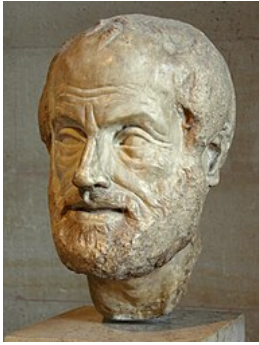
*Aristotle* by Francesco Hayez. Oil on canvas, 1811



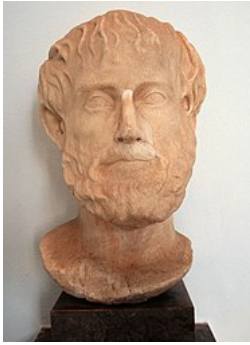
By Charles Laplante "That most enduring of romantic images, Aristotle tutoring the future conqueror Alexander".<sup>[175]</sup> 1866



## Sculptures



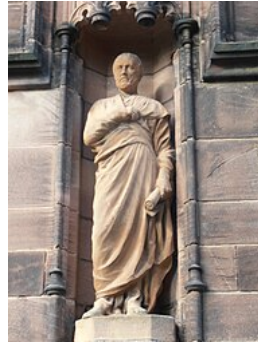
Roman copy of 1st or 2nd century from original bronze by Lysippos. Louvre Museum



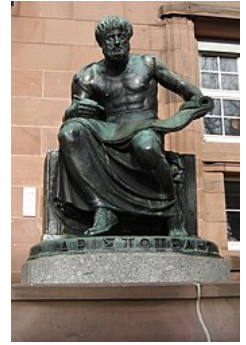
Roman copy of 117-138 AD of Greek original. Palermo Regional Archeology Museum



Relief of Aristotle and Plato by Luca della Robbia, Florence Cathedral, 1437–1439



Stone statue in niche, Gladstone's Library, Hawarden, Wales, 1899



Bronze statue, University of Freiburg, Germany, 1915

## Eponyms

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The Aristotle Mountains in Antarctica are named after Aristotle. He was the first person known to conjecture, in his book Meteorology, the existence of a landmass in the southern high-latitude region, which he called Antarctica.<sup>[255]</sup> Aristoteles is a crater on the Moon bearing the classical form of Aristotle's name.<sup>[256]</sup> (6123) Aristoteles, an asteroid in the main asteroid belt is also bearing the classical form of his name.<sup>[257]</sup>

## See also

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- Aristotelian Society
- Conimbricenses
- Perfectionism

## References

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### Notes

A. /ˈæɹɪstətəl/ ARR-ih-stot-əl<sup>[1]</sup>

B. pronounced [aristotélɛːs]

C. See Shields 2012, pp. 3–16. Blits 1999, p. 58 writes that most information about Aristotle's life derives from Diogenes Laertius' *Lives and Opinions of Eminent Philosophers*, which in turn borrows material from earlier, now mostly lost, sources. Düring 1957 covers ancient biographies of Aristotle.

- D. That these dates (the first half of the Olympiad year 384/383 BC, and in 322 shortly before the death of Demosthenes) are correct was shown by August Boeckh (*Kleine Schriften* VI 195); for further discussion, see Felix Jacoby on *FGrHist* 244 F 38. Ingemar Düring, *Aristotle in the Ancient Biographical Tradition*, Göteborg, 1957, p. 253
- E. Nussbaum & Osborne 2014, p. 73 write that Hermias died in 345 BC; Hazel 2013, p. 37 places Hermias' death in 342 BC, the same year as Aristotle's trip back to Macedon, while Nawotka 2009, p. 40 mentions that Hermias got arrested in 341 BC.
- F. This type of syllogism, with all three terms in 'a', is known by the traditional (medieval) mnemonic Barbara.<sup>[53]</sup>
- G. M is the Middle (here, Men), S is the Subject (Greeks), P is the Predicate (mortal).<sup>[53]</sup>
- H. The first equation can be read as 'It is not true that there exists an x such that x is a man and that x is not mortal.'<sup>[54]</sup>
- I. Rhett Allain notes that Newton's First Law is "essentially a direct reply to Aristotle, that the natural state is *not to change* motion."<sup>[63]</sup>
- J. Leonard Susskind comments that Aristotle had clearly never gone ice skating or he would have seen that it takes force to stop an object.<sup>[65]</sup>
- K. For heavenly bodies like the Sun, Moon, and stars, the observed motions are "to a very good approximation" circular around the Earth's centre, (for example, the apparent rotation of the sky because of the rotation of the Earth, and the rotation of the moon around the Earth) as Aristotle stated.<sup>[66]</sup>
- L. Drabkin quotes numerous passages from *Physics* and *On the Heavens* (*De Caelo*) which state Aristotle's laws of motion.<sup>[64]</sup>
- M. Drabkin agrees that density is treated quantitatively in this passage, but without a sharp definition of density as weight per unit volume.<sup>[64]</sup>
- N. Philoponus and Galileo correctly objected that for the transient phase (still increasing in speed) with heavy objects falling a short distance, the law does not apply: Galileo used balls on a short incline to show this. Rovelli notes that "Two heavy balls with the same shape and different weight do fall at different speeds from an aeroplane, confirming Aristotle's theory, not Galileo's."<sup>[66]</sup>
- O. For a different reading of social and economic processes in the *Nicomachean Ethics* and *Politics* see Polanyi, Karl (1957) "Aristotle Discovers the Economy" in *Primitive, Archaic and Modern Economies: Essays of Karl Polanyi* ed. G. Dalton, Boston 1971, 78–115.
- P. "Where, as among the Lacedaemonians, the state of women is bad, almost half of human life is spoilt."<sup>[165]</sup>
- Q. "When the Roman dictator Sulla invaded Athens in 86 BC, he brought back to Rome a fantastic prize – Aristotle's library. Books then were papyrus rolls, from 10 to 20 feet long, and since Aristotle's death in 322 BC, worms and damp had done their worst. The rolls needed repairing, and the texts clarifying and copying on to new papyrus (imported from Egypt – Moses' bulrushes). The man in Rome who put Aristotle's library in order was a Greek scholar, Tyrannio."<sup>[238]</sup>
- R. Aristotle: *Nicomachean Ethics* 1102a26–27. Aristotle himself never uses the term "esoteric" or "acroamatic". For other passages where Aristotle speaks of *exōterikoi logoi*, see W.D. Ross, *Aristotle's Metaphysics* (1953), vol. 2 pp= 408–410. Ross defends an interpretation according to which the phrase, at least in Aristotle's own works, usually refers generally to "discussions not peculiar to the Peripatetic school", rather than to specific works of Aristotle's own.
- S. "*veniet flumen orationis aureum fundens Aristoteles*", (Google translation: "Aristotle will come pouring forth a golden stream of eloquence").<sup>[242]</sup>
- T. Compare the medieval tale of Phyllis and Alexander above.



## Citations

1. Collins English Dictionary.
2. Anagnostopoulos 2013, p. 3; Shields 2012, p. 3; Blits 1999, p. 58; Aristotle (Greek philosopher)
3. McLeisch 1999, p. 5; Hazel 2013, p. 36
4. Aristoteles-Park in Stagira.
5. Ogden 2024, p. 32; Anagnostopoulos 2013, p. 3; Shields 2012, p. 5; Nussbaum & Osborne 2014, p. 73; Hazel 2013, p. 36; Nawotka 2009, p. 40
6. Anagnostopoulos 2013, pp. 4; Shields 2012, p. 5; Hazel 2013, pp. 36–37; Reeve & Miller 2015, p. 250
7. Anagnostopoulos 2013, pp. 4–5; Shields 2012, p. 5; Nussbaum & Osborne 2014, p. 73; Lloyd, Brunschwig & Pellegrin 2000, p. 554
8. Lloyd, Brunschwig & Pellegrin 2000, pp. 554–555; Hall 2018
9. Hall 2018, p. 14; Anagnostopoulos 2013, p. 4; Shields 2012, p. 5
10. Anagnostopoulos 2013, p. 4; Hazel 2013, p. 37; Shields 2012, p. 5
11. Nussbaum & Osborne 2014, p. 73; Blits 1999, p. 58
12. Hazel 2013, p. 37.
13. Evans 2006, p. 18.
14. Nussbaum & Osborne 2014, p. 73; Hazel 2013, p. 37
15. Nussbaum & Osborne 2014, p. 73.
16. Aristotle 1984, pp. Introduction.
17. Shields 2012, p. 6; Nussbaum & Osborne 2014, p. 73; Hazel 2013, p. 37
18. Shields 2012, p. 6.
19. Wu 2022, p. 71; Worthington 2014b, pp. 69–70; Nussbaum & Osborne 2014, p. 73; Shields 2012, pp. 6–7; Nawotka 2009, p. 39; Green 1991, p. 54
20. Ogden 2024, p. 32; Shields 2012, p. 5; Nawotka 2009, pp. 39–40; Lloyd, Brunschwig & Pellegrin 2000, p. 555
21. Ogden 2024, p. 32; Worthington 2014a, p. 34; Shields 2012, p. 7; Nawotka 2009, p. 39
22. Wu 2022, p. 71; Nawotka 2009, p. 40
23. Hornblower 2002, p. 91; Hazel 2013, p. 37
24. Worthington 2014a, pp. 34–35; Nawotka 2009, pp. 41–42; Green 1991, pp. 58–59
25. Green 1991, pp. 58–59; Worthington 2014b, p. 96
26. Worthington 2014b, p. 97; Hazel 2013, p. 37
27. Ogden 2024, p. 32; Worthington 2014b, pp. 97, 186; Nawotka 2009, p. 40
28. Ogden 2024, p. 32; Hazel 2013, p. 37 provides the alternative translations *On Monarchy and Colonists*
29. Shields 2012, p. 7.
30. Nussbaum & Osborne 2014, p. 73; Hazel 2013, p. 37; Shields 2012, p. 7
31. Nussbaum & Osborne 2014, p. 73; Hazel 2013, p. 37
32. Shields 2012, p. 7; Nussbaum & Osborne 2014, p. 73; Hazel 2013, p. 37
33. Shields 2012, p. 7; Hazel 2013, p. 37
34. Shields 2012, p. 7; Russell 1972
35. Humphreys 2009.
36. Wu 2022, pp. 72–74.
37. Green 1991, p. 460.
38. Filonik 2013, pp. 72–73.

39. Jones 1980, p. 216; Gigon 2017, p. 41; Düring 1957, p. T44a-e
40. Aristotle (Greek philosopher).
41. Britton, Bianca (27 May 2016). "Is this Aristotle's tomb?" (<https://www.cnn.com/2016/05/27/europe/greece-aristotle-tomb/index.html>). *CNN*. Retrieved 21 January 2023.
42. Haase 1992, p. 3862.
43. Hazel 2013, p. 38; Nussbaum & Osborne 2014, p. 73
44. Degnan 1994, pp. 81–89.
45. Corcoran 2009, pp. 1–20.
46. Kant 1787, pp. Preface.
47. School of Athens.
48. Stewart 2019.
49. Pickover 2009, p. 52.
50. Prior Analytics, pp. 24b18–20.
51. Bobzien 2015.
52. Smith 2017.
53. Lagerlund 2016.
54. Predicate Logic.
55. Cohen 2000.
56. Aristotle 1999, p. 111.
57. Metaphysics, pp. VIII 1043a 10–30.
58. Lloyd 1968, pp. 43–47.
59. Metaphysics, p. IX 1050a 5–10.
60. Metaphysics, p. VIII 1045a–b.
61. Wildberg 2016.
62. Lloyd 1968, pp. 133–139, 166–169.
63. Allain 2016.
64. Drabkin 1938, pp. 60–84.
65. Susskind 2011.
66. Rovelli 2015, pp. 23–40.
67. Carteron 1923, pp. 1–32 and passim.
68. Leroi 2015, pp. 88–90.
69. Lloyd 1996, pp. 96–100, 106–107.
70. Hankinson 1998, p. 159.
71. Leroi 2015, pp. 91–92, 369–373.
72. Lahanas.
73. Physics, p. 2.6.
74. Miller 1973, pp. 204–213.
75. Meteorology, p. 1. 8.
76. Meteorology.
77. Moore 1956, p. 13.
78. Meteorology, p. Book 1, Part 14.
79. Lyell 1832, p. 17.
80. Udias, Agustin; Buforn, Elisa (2018). *Principles of Seismology*. Cambridge University Press. p. 1.

81. Aristotle (1952). *Meteorologica, Chapter II* (<http://archive.org/details/L397AristotleMeteorologica>). Translated by Lee, H. D. P. (Loeb Classical Library ed.). Cambridge, Massachusetts: Harvard University Press. p. 156. Retrieved 22 January 2021.
82. Leroi 2015, p. 7.
83. Leroi 2015, p. 14.
84. Thompson 1910, p. Prefatory Note.
85. "Darwin's Ghosts, By Rebecca Stott" (<https://www.independent.co.uk/arts-entertainment/books/reviews/darwins-ghosts-by-rebecca-stott-7808310.html>). *The Independent (UK)*. 2 June 2012. Retrieved 19 June 2012.
86. Leroi 2015, pp. 196, 248.
87. Day 2013, pp. 5805–5816.
88. Leroi 2015, pp. 66–74, 137.
89. Leroi 2015, pp. 118–119.
90. Leroi 2015, p. 73.
91. Leroi 2015, pp. 135–136.
92. Leroi 2015, p. 206.
93. Sedley 2007, p. 189.
94. Leroi 2015, p. 273.
95. Taylor 1922, p. 42.
96. Leroi 2015, pp. 361–365.
97. Leroi 2011.
98. Leroi 2015, pp. 197–200.
99. Leroi 2015, pp. 365–368.
100. Taylor 1922, p. 49.
101. Leroi 2015, p. 408.
102. Leroi 2015, pp. 72–74.
103. Bergstrom & Dugatkin 2012, p. 35.
104. Rhodes 1974, p. 7.
105. Mayr 1982, pp. 201–202.
106. Lovejoy 1976.
107. Leroi 2015, pp. 111–119.
108. Lennox, James G. (2001). *Aristotle's Philosophy of Biology: Studies in the Origins of Life Science*. Cambridge: Cambridge University Press. p. 346. ISBN 0-521-65976-0.
109. Sandford, Stella (3 December 2019). "From Aristotle to Contemporary Biological Classification: What Kind of Category is "Sex"?" (<https://doi.org/10.33134%2Frds.314>). *Redescriptions: Political Thought, Conceptual History and Feminist Theory*. **22** (1): 4–17. doi:10.33134/rds.314 (<https://doi.org/10.33134%2Frds.314>). ISSN 2308-0914 (<https://search.worldcat.org/issn/2308-0914>). S2CID 210140121 (<https://api.semanticscholar.org/CorpusID:210140121>).
110. Voultsiadou, Eleni; Gerovasileiou, Vasilis; Vandepitte, Leen; Ganiyas, Kostas; Arvanitidis, Christos (2017). "Aristotle's scientific contributions to the classification, nomenclature and distribution of marine organisms" (<https://doi.org/10.12681/mms.13874>). *Mediterranean Marine Science*. **18** (3): 468–478. doi:10.12681/mms.13874 (<https://doi.org/10.12681%2Fmms.13874>). ISSN 1791-6763 (<https://search.worldcat.org/issn/1791-6763>).

111. von Lieven, Alexander Fürst; Humar, Marcel (2008). "A Cladistic Analysis of Aristotle's Animal Groups in the "Historia animalium" " (<https://www.jstor.org/stable/23334371>). *History and Philosophy of the Life Sciences*. **30** (2): 227–262. ISSN 0391-9714 (<https://search.worldcat.org/issn/0391-9714>). JSTOR 23334371 (<https://www.jstor.org/stable/23334371>). PMID 19203017 (<https://pubmed.ncbi.nlm.nih.gov/19203017>).
112. Laurin, Michel (3 August 2023). *The Advent of PhyloCode: The Continuing Evolution of Biological Nomenclature (section 1.1.3)* (<https://books.google.com/books?id=-P3BEAAAQBAJ&pg=PA1>). Boca Raton, FL: CRC Press. pp. xv + 209. ISBN 978-1-00-091257-9.
113. Mason 1979, pp. 43–44.
114. Leroi 2015, pp. 156–163.
115. Shields 2016.
116. Mason 1979, p. 45.
117. Guthrie 2010, p. 348.
118. *On the Soul* I.3 406b26-407a10. For some scholarship, see Carter, Jason W. 2017. 'Aristotle's Criticism of Timaeus Psychology' *Rhizomata* 5: 51–78 and Douglas R. Campbell. 2022. "Located in Space: Plato's Theory of Psychic Motion" *Ancient Philosophy* 42 (2): 419–442.
119. For instance, W.D. Ross argued that Aristotle "may well be criticized as having taken [Plato's] myth as if it were sober prose." See Ross, William D. ed. 1961. *Aristotle: De Anima*. Oxford: Oxford University Press. The quotation is from page 189.
120. See, e.g., Douglas R. Campbell, "Located in Space: Plato's Theory of Psychic Motion," *Ancient Philosophy* 42 (2): 419–442. 2022.
121. *On the Soul* I.3.407b14–27. Christopher Shields summarizes it thus: "We might think that an old leather-bound edition of Machiavelli's *The Prince* could come to bear the departed soul of Richard Nixon. Aristotle regards this sort of view as worthy of ridicule." See Shields, C. 2016. *Aristotle: De Anima*. Oxford: Oxford University Press. The quotation is from page 133.
122. There's a large scholarly discussion of this dialectic between Plato and Aristotle here: Douglas R. Campbell, "The Soul's Tool: Plato on the Usefulness of the Body," *Elenchos* 43 (1): 7–27. 2022.
123. Bloch 2007, p. 12.
124. Bloch 2007, p. 61.
125. Carruthers 2007, p. 16.
126. Bloch 2007, p. 25.
127. Warren 1921, p. 30.
128. Warren 1921, p. 25.
129. Carruthers 2007, p. 19.
130. Warren 1921, p. 296.
131. Warren 1921, p. 259.
132. Sorabji 2006, p. 54.
133. Holowchak 1996, pp. 405–423.
134. Shute 1941, pp. 115–118.
135. Holowchak 1996, pp. 405–23.
136. Shute 1941, pp. 115–18.
137. Modrak 2009, pp. 169–181.
138. Webb 1990, pp. 174–184.
139. Kraut 2001.
140. Nicomachean Ethics Book I. See for example chapter 7.
141. Nicomachean Ethics, Book VI.

142. Politics, pp. 1253a19–124.
143. Aristotle 2009, pp. 320–321.
144. Ebenstein & Ebenstein 2002, p. 59.
145. Hutchinson & Johnson 2015, p. 22.
146. Robbins 2000, pp. 20–24.
147. Aristotle 1948, pp. 16–28.
148. Garver 1994, pp. 109–110.
149. Rorty 1996, pp. 3–7.
150. Grimaldi 1998, p. 71.
151. Halliwell 2002, pp. 152–159.
152. Poetics, p. I 1447a.
153. Poetics, p. IV.
154. Halliwell 2002, pp. 152–59.
155. Poetics, p. III.
156. Kaufmann 1968, pp. 56–60.
157. Poetics, p. VI.
158. Poetics, p. XXVI.
159. Aesop 1998, pp. Introduction, xi–xii.
160. Connell, Sophia M. (2021). *Aristotle on Women: Physiology, Psychology, and Politics* (<https://www.cambridge.org/core/elements/abs/aristotle-on-women/CE1C3E1A094FA90F26C0A0DC753C4031>). *Elements in Ancient Philosophy*. Cambridge University Press. doi:10.1017/9781108581950 (<https://doi.org/10.1017%2F9781108581950>). ISBN 978-1-108-58195-0.
161. Henderson, Jeffrey. "Aristotle Historia Animalium: Book VIII: Chapter I" ([https://www.loebclassics.com/view/aristotle-history\\_animals/1965/pb\\_LCL439.219.xml](https://www.loebclassics.com/view/aristotle-history_animals/1965/pb_LCL439.219.xml)). *Loeb Classical Library*. Retrieved 1 February 2025.
162. Leunissen, Mariska (28 September 2017). Leunissen, Mariska (ed.). "The Natural Character and Moral Deficiencies of Women" (<https://academic.oup.com/book/4555/chapter-abstract/146653470?redirectedFrom=fulltext>). *From Natural Character to Moral Virtue in Aristotle*. Oxford University Press. p. 0. ISBN 978-0-19-060221-5. Retrieved 1 February 2025.
163. Freeland, Cynthia, ed. (1998). *Feminist interpretations of Aristotle*. Re-reading the canon. University Park: Pennsylvania State University Press. ISBN 978-0-271-01730-3.
164. Morsink, Johannes (1 March 1979). "Was Aristotle's biology sexist?" (<https://link.springer.com/article/10.1007/BF00128136>). *Journal of the History of Biology*. **12** (1): 83–112. doi:10.1007/BF00128136 (<https://doi.org/10.1007%2FBF00128136>). ISSN 1573-0387 (<https://search.worldcat.org/issn/1573-0387>). PMID 11615776 (<https://pubmed.ncbi.nlm.nih.gov/11615776>).
165. Rhetoric, p. Book I, Chapter 5.
166. "How the ancient Greeks viewed pederasty and homosexuality" (<https://bigthink.com/the-past/pederasty-homosexuality-ancient-greece/>). *Big Think*. 13 January 2023. Retrieved 22 July 2024.
167. Leroi 2015, p. 8.
168. Aristotle's Influence 2018.
169. Garner., Dwight (14 March 2014). "Who's More Famous Than Jesus?" (<https://web.archive.org/web/20210401095825/https://www.nytimes.com/2014/03/16/magazine/whos-more-famous-than-jesus.html>). *The New York Times*. Archived from the original (<https://www.nytimes.com/2014/03/16/magazine/whos-more-famous-than-jesus.html>) on 1 April 2021.
170. Magee 2010, p. 34.



171. Kullmann, Wolfgang (1991). "Aristotle as a Natural Scientist" (<https://www.jstor.org/stable/24591937>). *Acta Classica*. **34**: 137–150. ISSN 0065-1141 (<https://search.worldcat.org/issn/0065-1141>). JSTOR 24591937 (<https://www.jstor.org/stable/24591937>).
172. Lo Presti, Roberto (21 August 2014). "History of science: The first scientist" (<https://www.nature.com/articles/512250a>). *Nature*. **512** (7514): 250–251. Bibcode:2014Natur.512..250L (<https://ui.adsabs.harvard.edu/abs/2014Natur.512..250L>). doi:10.1038/512250a (<https://doi.org/10.1038%2F512250a>). ISSN 0028-0836 (<https://search.worldcat.org/issn/0028-0836>).
173. Guthrie 1990, p. 156.
174. Durant 2006, p. 92.
175. Kukkonen 2010, pp. 70–77.
176. Barnes 1982, p. 86.
177. Leroi 2015, p. 352.
178. \* "the father of logic": Wentzel Van Huyssteen, *Encyclopedia of Science and Religion: A–I*, p. 27
  - "the father of biology": S. C. Datt, S. B. Srivastava, *Science and society*, p. 93.<sup>[177]</sup>
  - "the father of political science": N. Jayapalan, *Aristotle*, p. 12, Jonathan Wolff, *Lectures on the History of Moral and Political Philosophy*, p. 48.
  - the "father of zoology": Josef Rudolf Winkler, *A Book of Beetles*, p. 12
  - "the father of embryology": D. R. Khanna, *Text Book Of Embryology*, p. 2
  - "the father of natural law": Shellens, Max Solomon (1959). "Aristotle on Natural Law" ([https://scholarship.law.nd.edu/cgi/viewcontent.cgi?article=1039&context=nd\\_naturallaw\\_forum](https://scholarship.law.nd.edu/cgi/viewcontent.cgi?article=1039&context=nd_naturallaw_forum)). *Natural Law Forum*. **4** (1): 72–100. doi:10.1093/ajj/4.1.72 (<https://doi.org/10.1093%2Fajj%2F4.1.72>). ISSN 0065-8995 (<https://search.worldcat.org/issn/0065-8995>).
  - "the father of scientific method": Shuttleworth, Martyn. "History of the Scientific Method" (<https://explorable.com/history-of-the-scientific-method/>). *Explorable.*, Riccardo Pozzo (2004) *The impact of Aristotelianism on modern philosophy* (<https://books.google.com/books?id=vayp8jxcPr0C&pg=PA41>). CUA Press. p. 41. ISBN 0-8132-1347-9
  - "the father of psychology": Margot Esther Borden, *Psychology in the Light of the East*, p. 4
  - "the father of realism": Russell L. Hamm, *Philosophy and Education: Alternatives in Theory and Practice*, p. 58
  - "the father of criticism": Nagendra Prasad, *Personal Bias in Literary Criticism*: Johnson, Matthew Arnold, T. S. Eliot, p. 70. *Lord Henry Home Kames, Elements of Criticism*, p. 237.
  - "the father of meteorology": "What is meteorology?" (<https://www.metoffice.gov.uk/about-us/what/what-is-meteorology>). *Meteorological Office*. "94.05.01: Meteorology" (<https://web.archive.org/web/20160721205842/http://www.yale.edu/ynhti/curriculum/units/1994/5/94.05.01.x.html>). Archived from the original (<http://www.yale.edu/ynhti/curriculum/units/1994/5/94.05.01.x.html>) on 21 July 2016. Retrieved 16 June 2015.
  - "the father of individualism": Allan Gotthelf, Gregory Salmieri, *A Companion to Ayn Rand*, p. 325.
  - "the father of teleology": Malcolm Owen Slavin, Daniel H. Kriegman, *The Adaptive Design of the Human Psyche: Psychoanalysis, Evolutionary Biology, and the Therapeutic Process*, p. 292.
179. Hooker 1831, p. 219.
180. Mayr 1982, pp. 90–91.
181. Mason 1979, p. 46.
182. Plutarch 1919, p. Part 1, 7:7.
183. Annas 2001, p. 252.

184. Mason 1979, p. 56.
185. Mayr 1985, pp. 90–94.
186. Gutas, Dimitri (1998). *The Graeco-Arabic Translation Movement in Baghdad and Early 'Abbasid Society* (1st English ed.). Harvard University Press. ISBN 978-0-415-06133-9.
187. Admin (13 February 2017). "The Reception of Aristotelian Science in Early Islam: A Historical Account" (<https://www.ihc.ucsb.edu/reception-of-aristotelian-science/>). *Interdisciplinary Humanities Center UCSB*. Retrieved 27 January 2024.
188. Fakhry, Majid (1987). *A History of Islamic Philosophy* (2nd ed.). Columbia University Press. ISBN 978-0-231-05533-8.
189. Sorabji 1990, pp. 20, 28, 35–36.
190. Sorabji 1990, pp. 233–724.
191. Lindberg 1992, p. 162.
192. Sorabji 1990, pp. 20–21, 28–29, 393–406, 407–408.
193. Contadini, Anna (1 January 2012). *A World of Beasts: A Thirteenth-Century Illustrated Arabic Book on Animals (the Kitāb Na't al-Ḥayawān) in the Ibn Bakhtīshū' Tradition* ([https://doi.org/10.1163/9789004222656\\_005](https://doi.org/10.1163/9789004222656_005)). Brill. p. 75. doi:10.1163/9789004222656\_005 ([https://doi.org/10.1163%2F9789004222656\\_005](https://doi.org/10.1163%2F9789004222656_005)).
194. Alwishah, Ahmed; Hayes, Josh (2015). *Aristotle and the Arabic Tradition* ([https://books.google.com/books?id=\\_QXPDAQAQBAJ&pg=PA1](https://books.google.com/books?id=_QXPDAQAQBAJ&pg=PA1)). Cambridge University Press. p. 1. ISBN 978-1-107-10173-9.
195. Kennedy-Day 1998.
196. Staley 1989.
197. Averroes 1953, p. III, 2, 43.
198. Nasr 1996, pp. 59–60.
199. Hasse 2014.
200. Aquinas 2013.
201. Kuhn 2018.
202. Lagerlund.
203. Lafferty, Roger. "The Philosophy of Dante (<https://www.jstor.org/stable/pdf/40165857.pdf?refreqid=excelsior%3A55f6bfc22f02768d5dc92005228933>)", pg. 4
204. *Inferno*, Canto XI, lines 70–115, Mandelbaum translation.
205. *Inferno*, Canto IV, lines 115–16 trans., 131 original, Robert Pinsky translation (1994); note to line, p.384
206. Kukkonen 2010, p. 74.
207. "Moses Maimonides" (<https://www.britannica.com/biography/Moses-Maimonides>). *Britannica*. 26 March 2023.
208. Levi ben Gershon, The Wars of the Lord: Book one, Immortality of the soul, p. 35.
209. Leon Simon, Aspects Of The Hebrew Genius: A Volume Of Essays On Jewish Literature And Thought (1910), p. 127.
210. Herbert A. Davidson, Herbert A. Jq (Herbert Alan) Davidson, Professor of Hebrew Emeritus Herbert Davidson, Moses Maimonides: The Man and His Works, p. 98.
211. Menachem Kellner, Maimonides on Judaism and the Jewish People, p. 77.
212. Aird 2011, pp. 118–29.
213. Machamer 2017.
214. Boole 2003.
215. Wilkins, John (2009). *Species: a history of the idea*. Berkeley: University of California Press. p. 15. ISBN 978-0-520-27139-5. OCLC 314379168 (<https://search.worldcat.org/oclc/314379168>).

216. Pasipoularides, Ares (2010). *The heart's vortex: intracardiac blood flow phenomena*. Shelton, Connecticut: People's Medical Publishing House. p. 118. ISBN 978-1-60795-033-2. OCLC 680621287 (<https://search.worldcat.org/oclc/680621287>).
217. Darwin 1872, p. xiii (<http://darwin-online.org.uk/content/frameset?viewtype=text&itemID=F391&pageseq=18>)
218. Aristotle. "Physics" (<http://classics.mit.edu/Aristotle/physics.2.ii.html>). translated by Hardie, R. P. and Gayle, R. K. and hosted by MIT's Internet Classics Archive. Retrieved 23 April 2009.
219. Russell 1972, Chapter 19 "Aristotle's Metaphysics".
220. Dijksterhuis 1969, p. 72.
221. Leroi 2015, p. 353.
222. Medawar & Medawar 1984, p. 28.
223. Ogilvie, Brian W. (2010). "Zoology". In Grafton, Anthony; Most, Glenn W.; Settis, Salvatore (eds.). *The Classical Tradition*. Harvard University Press. pp. 1000–1001. ISBN 978-0-674-07227-5.
224. Forbes, Peter (2009). *Dazzled and Deceived: Mimicry and Camouflage*. Yale University Press. pp. 236–239. ISBN 978-0-300-12539-9.
225. Leroi 2015, pp. 137–138.
226. "A History of the Study of Marine Biology" (<http://marinebio.org/oceans/history-of-marine-biology/>). MarineBio Conservation Society. Retrieved 19 November 2016.
227. Rigato, Emanuele; Minelli, Alessandro (28 June 2013). "The great chain of being is still here" (<http://www.evolution-outreach.com/content/6/1/18>). *Evolution: Education and Outreach*. **6** (18): 1–6. doi:10.1186/1936-6434-6-18 (<https://doi.org/10.1186%2F1936-6434-6-18>). ISSN 1936-6434 (<https://search.worldcat.org/issn/1936-6434>).
228. Leroi 2015.
229. MacDougall-Shackleton 2011, pp. 2076–2085.
230. Hladký & Havlíček 2013.
231. Panchen, A. L. (1999). "Homology—History of a Concept". *Novartis Foundation Symposium* 222 – *Homology*. Novartis Foundation Symposia. Vol. 222. pp. 5–18, discussion 18–23. doi:10.1002/9780470515655.ch2 (<https://doi.org/10.1002%2F9780470515655.ch2>). ISBN 978-0-470-51565-5. PMID 10332750 (<https://pubmed.ncbi.nlm.nih.gov/10332750>).
232. Held, Lewis I. (February 2017). *Deep Homology?: Uncanny Similarities of Humans and Flies Uncovered by Evo-Devo*. Cambridge University Press. p. viii. ISBN 978-1-316-60121-1.
233. Voultsiadou, Eleni; Vafidis, Dimitris (1 January 2007). "Marine invertebrate diversity in Aristotle's zoology" (<https://doi.org/10.1163/18759866-07602004>). *Contributions to Zoology*. **76** (2): 103–120. doi:10.1163/18759866-07602004 (<https://doi.org/10.1163%2F18759866-07602004>). ISSN 1875-9866 (<https://search.worldcat.org/issn/1875-9866>). S2CID 55152069 (<https://api.semanticscholar.org/CorpusID:55152069>).
234. Ganas, Kostas; Mezarli, Charikleia; Voultsiadou, Eleni (November 2017). "Aristotle as an ichthyologist: Exploring Aegean fish diversity 2,400 years ago" (<https://doi.org/10.1111/faf.12223>). *Fish and Fisheries*. **18** (6): 1038–1055. Bibcode:2017AqFF...18.1038G (<https://ui.adsabs.harvard.edu/abs/2017AqFF...18.1038G>). doi:10.1111/faf.12223 (<https://doi.org/10.1111%2Ffaf.12223>). ISSN 1467-2960 (<https://search.worldcat.org/issn/1467-2960>).
235. Laurin, Michel; Humar, Marcel (2022). "Phylogenetic signal in characters from Aristotle's History of Animals" (<https://doi.org/10.5852%2Fcr-palevol2022v21a1>). *Comptes Rendus Palevol* (in French). **21** (1): 1–16. doi:10.5852/cr-palevol2022v21a1 (<https://doi.org/10.5852%2Fcr-palevol2022v21a1>). S2CID 245863171 (<https://api.semanticscholar.org/CorpusID:245863171>).
236. Barnes 1995, p. 9.
237. *Aristotelis Opera*.

238. When libraries were 2001.
239. Barnes 1995, p. 12.
240. House 1956, p. 35.
241. Irwin & Fine 1996, pp. xi–xii.
242. Cicero 1874.
243. Barnes & Griffin 1999, pp. 1–69.
244. Anagnostopoulos 2013, p. 16.
245. Barnes 1995, pp. 10–15.
246. Strabo. *Historical Sketches*. Vol. XIII.
  - Plutarch. "Life of Sulla". *Lives of the Noble Greeks and Romans*.
247. Aristotle (1885). "On the Nicomachean Ethics, in relation to the other Ethical Writings included among the Works of Aristotle". In Grant, Alexander (ed.). *The Ethics of Aristotle, Illustrated with Essays and Notes* (<https://archive.org/details/ethicsof aristotl01arisuoft>). Vol. 1 (4th ed.). Longmans, Green & Co.
248. Porphyry. *The Life of Plotinus*. 24.
249. Lucas Cranach the Elder.
250. Lee & Robinson 2005.
251. Aristotle with Bust 2002.
252. Phelan 2002.
253. Held 1969.
254. Jones 2002.
255. Aristotle Mountains.
256. Aristoteles.
257. "IAU Minor Planet Center" ([https://minorplanetcenter.net/db\\_search/show\\_object?object\\_id=6123](https://minorplanetcenter.net/db_search/show_object?object_id=6123)). *minorplanetcenter.net*. Retrieved 1 July 2024.

## Sources

- Aesop (1998). *The Complete Fables By Aesop* (<https://books.google.com/books?id=ZB-rVxPvtPEC&pg=PR3>). Translated by Temple, Olivia; Temple, Robert. Penguin Classics. ISBN 978-0-14-044649-4.
- Aird, W. C. (2011). "Discovery of the cardiovascular system: from Galen to William Harvey" (<https://doi.org/10.1111%2Fj.1538-7836.2011.04312.x>). *Journal of Thrombosis and Haemostasis*. **9**: 118–129. doi:10.1111/j.1538-7836.2011.04312.x (<https://doi.org/10.1111%2Fj.1538-7836.2011.04312.x>). PMID 21781247 (<https://pubmed.ncbi.nlm.nih.gov/21781247>). S2CID 12092592 (<https://api.semanticscholar.org/CorpusID:12092592>).
- Allain, Rhett (21 March 2016). "I'm So Totally Over Newton's Laws of Motion" (<https://www.wired.com/2016/03/im-totally-newtons-laws-motion/>). *Wired*. Retrieved 11 May 2018.
- Anagnostopoulos, Georgios (2013). *A Companion to Aristotle*. Wiley. ISBN 978-1-118-59243-4.
- Annas, Julia (2001). *Classical Greek Philosophy*. Oxford University Press. ISBN 978-0-19-285357-8.
- Aquinas, Thomas (2013). *Summa Theologica* (<https://books.google.com/books?id=YiJCBAQAQBAJ>). e-artnow. ISBN 978-80-7484-292-4.
- Aristoteles (31 January 2019) [1831]. Bekker, Immanuel (ed.). "Aristotelis Opera edidit Academia Regia Borussica Aristoteles graece" ([http://archive.org/details/bub\\_gb\\_jMz9zVYu9Q0C](http://archive.org/details/bub_gb_jMz9zVYu9Q0C)). apud Georgium Reimerum. Retrieved 31 January 2019 – via Internet Archive.

- "Aristoteles" (<https://planetarynames.wr.usgs.gov/nomenclature/SearchResults;jsessionid=B8F9834B709207DDD5D36EFA5506C7F>). *Gazetteer of Planetary Nomenclature*. United States Geological Survey. Retrieved 19 March 2018.
- "Aristoteles-Park in Stagira" (<http://www.dimosaristoteli.gr/en/sights/aristotle-park>). Dimos Aristoteli. Retrieved 20 March 2018.
- "Aristotle (Greek philosopher)" (<https://www.britannica.com/EBchecked/topic/34560/Aristotle>). *Britannica.com*. Britannica Online Encyclopedia. Archived (<https://web.archive.org/web/20090422103155/https://www.britannica.com/EBchecked/topic/34560/Aristotle>) from the original on 22 April 2009. Retrieved 26 April 2009.
- Aristotle. "Metaphysics" (<http://classics.mit.edu/Aristotle/metaphysics.html>). *classics.mit.edu*. The Internet Classics Archive. Retrieved 30 January 2019.
- Aristotle. "Meteorology" (<http://classics.mit.edu/Aristotle/meteorology.html>). *classics.mit.edu*. The Internet Classics Archive. Retrieved 30 January 2019.
- Aristotle. "Nicomachean Ethics" (<http://classics.mit.edu/Aristotle/nicomachaen.html>). *classics.mit.edu*. The Internet Classics Archive.
- Aristotle. "On the Soul" (<http://classics.mit.edu/Aristotle/soul.html>). *classics.mit.edu*. The Internet Classics Archive. Retrieved 30 January 2019.
- Aristotle. "Physics" (<http://classics.mit.edu/Aristotle/physics.html>). *classics.mit.edu*. The Internet Classics Archive. Retrieved 31 January 2019.
- Aristotle. "Poetics" (<http://classics.mit.edu/Aristotle/poetics.html>). *classics.mit.edu*. The Internet Classics Archive. Retrieved 30 January 2019.
- Aristotle. "Politics" (<http://classics.mit.edu/Aristotle/politics.html>). *classics.mit.edu*. The Internet Classics Archive. Retrieved 30 January 2019.
- Aristotle. "Prior Analytics" (<http://classics.mit.edu/Aristotle/prior.html>). *classics.mit.edu*. The Internet Classics Archive.
- Aristotle. "Rhetoric" (<https://web.archive.org/web/20150213075039/http://rhetoric.eserver.org/aristotle/rhet1-5.html>). Translated by Roberts, W. Rhys. Archived from the original (<http://rhetoric.eserver.org/aristotle/rhet1-5.html>) on 13 February 2015.
- "Aristotle Mountains" ([https://data.aad.gov.au/aadc/gaz/scar/display\\_name.cfm?gaz\\_id=137410](https://data.aad.gov.au/aadc/gaz/scar/display_name.cfm?gaz_id=137410)). *SCAR Composite Antarctic Gazetteer*. Programma Nazionale di Ricerche in Antartide. Department of the Environment and Energy, Australian Antarctic Division, Australian Government. Retrieved 1 March 2018.
- Aristotle (1948). Monroe, Arthur E. (ed.). *Politics-Ethics, In Early Economic Thought: Selections from Economic Literature Prior to Adam Smith*. Harvard University Press.
- Aristotle (1984). Lord, Carnes (ed.). *The Politics* (<https://archive.org/details/politics0000aris>). University of Chicago Press. ISBN 978-0-226-92184-6.
- Aristotle (2009) [1995]. *Politics*. Translated by Ernest Barker and revised with introduction and notes by R. F. Stalley (1st ed.). Oxford University Press. ISBN 978-0-19-953873-7.
- Aristotle (1999). *Aristotle's Metaphysics*. Translated by Sachs, Joe. Green Lion Press.
- "Aristotle definition and meaning" (<https://www.collinsdictionary.com/dictionary/english/aristotle>). *www.collinsdictionary.com*. Collins English Dictionary.
- "Aristotle with a Bust of Homer, Rembrandt (1653)" (<https://www.theguardian.com/culture/2002/jul/27/art.homer>). *The Guardian*. 27 July 2002. Retrieved 23 March 2018.
- Averroes (1953). Crawford, F. Stuart (ed.). *Commentarium Magnum in Aristotelis De Anima Libros*. Mediaeval Academy of America. OCLC 611422373 (<https://search.worldcat.org/oclc/611422373>).
- Barnes, Jonathan (1982). *Aristotle: A Very Short Introduction*. Oxford University Press. ISBN 978-0-19-285408-7.



- Barnes, Jonathan (1995). "Life and Work" (<https://books.google.com/books?id=WBqQOqM5dfsC>). *The Cambridge Companion to Aristotle*. Cambridge University Press. ISBN 978-0-521-42294-9.
- Barnes, Jonathan; Griffin, Miriam Tamara (1999). *Philosophia Togata: Plato and Aristotle at Rome. II* (<https://books.google.com/books?id=r18BAAAACAAJ>). Clarendon Press. ISBN 978-0-19-815222-4.
- Bergstrom, Carl T.; Dugatkin, Lee Alan (2012). *Evolution* (<https://books.google.com/books?id=SeaEZwEACAAJ>). Norton. ISBN 978-0-393-92592-0.
- Blits, Kathleen C. (15 April 1999). "Aristotle: Form, function, and comparative anatomy" (<http://doi.org/10.1002%2F%28SICI%291097-0185%2819990415%29257%3A2%3C58%3A%3AAID-AR6%3E3.0.CO%3B2-I>). *The Anatomical Record*. **257** (2): 58–63. doi:10.1002/(SICI)1097-0185(19990415)257:2<58::AID-AR6>3.0.CO;2-I (<https://doi.org/10.1002%2F%28SICI%291097-0185%2819990415%29257%3A2%3C58%3A%3AAID-AR6%3E3.0.CO%3B2-I>). PMID 10321433 (<https://pubmed.ncbi.nlm.nih.gov/10321433>).
- Bloch, David (2007). *Aristotle on Memory and Recollection* ([https://books.google.com/books?id=QwTHng\\_5RqAC&q=Aristotle+on+Memory+and+Recollection&pg=PR9](https://books.google.com/books?id=QwTHng_5RqAC&q=Aristotle+on+Memory+and+Recollection&pg=PR9)). Brill. ISBN 978-90-04-16046-0.
- Bobzien, Susanne (2015). "Ancient Logic" (<https://plato.stanford.edu/archives/win2016/entries/logic-ancient/>). In Zalta, Edward N. (ed.). *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University – via Stanford Encyclopedia of Philosophy.
- Boole, George (2003) [1854]. *The Laws of Thought* (<https://books.google.com/books?id=nUEQAQAIAAJ>). Prometheus Books. ISBN 978-1-59102-089-9.
- Carruthers, Mary (2007). *The Book of Memory: A Study of Memory in Medieval Culture* (<https://books.google.com/books?id=dntrAnqflasC&q=The+book+of+memory:+the+study+of+memory+in+medieval+times&pg=PR8>). Cambridge University Press. ISBN 978-0-521-42973-3.
- Carteron, Henri (1923). *Notion de Force dans le Systeme d'Aristote* (in French). J. Vrin.
- Cicero, Marcus Tullius (1874). "Book II, chapter XXXVIII, § 119". In Reid, James S. (ed.). *The Academica of Cicero 106–43 BC*. Macmillan.
- Cohen, S. Marc (8 October 2000). "Aristotle's Metaphysics" (<https://plato.stanford.edu/archives/win2016/entries/aristotle-metaphysics/>). *Stanford Encyclopedia of Philosophy* (Winter 2016 ed.). Retrieved 14 November 2018.
- Corcoran, John (2009). "Aristotle's Demonstrative Logic". *History and Philosophy of Logic*. **30**: 1–20. CiteSeerX 10.1.1.650.463 (<https://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.650.463>). doi:10.1080/01445340802228362 (<https://doi.org/10.1080%2F01445340802228362>). S2CID 8514675 (<https://api.semanticscholar.org/CorpusID:8514675>).
- Darwin, Charles (1872). *The Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* (<http://darwin-online.org.uk/content/frameset?itemID=F391&viewtype=text&pageseq=1>) (6th ed.). London: John Murray. Retrieved 9 January 2009.
- Day, J. (2013). "Botany meets archaeology: people and plants in the past" (<https://doi.org/10.1093%2Fjxb%2Fert068>). *Journal of Experimental Botany*. **64** (18): 5805–5816. doi:10.1093/jxb/ert068 (<https://doi.org/10.1093%2Fjxb%2Fert068>). PMID 23669575 (<https://pubmed.ncbi.nlm.nih.gov/23669575>).
- Degnan, Michael (1994). "Recent Work in Aristotle's Logic". *Philosophical Books*. **35** (2 (April 1994)): 81–89. doi:10.1111/j.1468-0149.1994.tb02858.x (<https://doi.org/10.1111%2Fj.1468-0149.1994.tb02858.x>).
- Dijksterhuis, Eduard Jan (1969). *The Mechanization of the World Picture*. Translated by C. Dikshoorn. Princeton University Press.
- Drabkin, Israel E. (1938). "Notes on the Laws of Motion in Aristotle". *The American Journal of Philology*. **59** (1): 60–84. doi:10.2307/290584 (<https://doi.org/10.2307%2F290584>). JSTOR 90584 (<https://www.jstor.org/stable/90584>).

- Durant, Will (2006) [1926]. *The Story of Philosophy*. Simon & Schuster. ISBN 978-0-671-73916-4.
- Düring, Ingemar (1957). *Aristotle in the Ancient Biographical Tradition*. By Ingemar Düring (<https://books.google.com/books?id=MnKAQwAACAAJ>). Almqvist & Wiksell in Komm.
- Ebenstein, Alan; Ebenstein, William (2002). *Introduction to Political Thinkers*. Wadsworth Group.
- Evans, Nancy (2006). "Diotima and Demeter as Mystagogues in Plato's Symposium". *Hypatia*. **21** (2): 1–27. doi:10.1111/j.1527-2001.2006.tb01091.x (<https://doi.org/10.1111%2Fj.1527-2001.2006.tb01091.x>). ISSN 1527-2001 (<https://search.worldcat.org/issn/1527-2001>). S2CID 143750010 (<https://api.semanticscholar.org/CorpusID:143750010>).
- Filonik, Jakub (2013). "Athenian impiety trials: a reappraisal" (<https://doi.org/10.13130%2F1128-8221%2F4290>). *Dike*. **16** (16): 72–73. doi:10.13130/1128-8221/4290 (<https://doi.org/10.13130%2F1128-8221%2F4290>).
- Freeland, Cynthia A. (1998). *Feminist Interpretations of Aristotle*. Penn State University Press. ISBN 978-0-271-01730-3.
- Garver, Eugene (1994). *Aristotle's Rhetoric: An Art of Character* (<https://books.google.com/books?id=J2ldWwIQhHwC&q=Aristotle+ethos+pathos+logos>). University of Chicago Press. ISBN 978-0-226-28425-5.
- Gigon, Olof (2017) [1965]. *Vita Aristotelis Marciana* (<https://books.google.com/books?id=a3ldDwAAQBAJ>). Walter de Gruyter. ISBN 978-3-11-082017-1.
- Green, Peter (1991). *Alexander of Macedon* (<https://archive.org/details/alexanderofmaced0000gree>). University of California Press. ISBN 978-0-520-27586-7.
- Grimaldi, William M. A. (1998). "Studies in the Philosophy of Aristotle's *Rhetoric*" (<https://books.google.com/books?id=sMihW5GdDzoC&q=Aristotle+paradeigma+and+enthymeme&pg=PA71>). In Enos, Richard Leo; Agnew, Lois Peters (eds.). *Landmark Essays on Aristotelian Rhetoric*. Vol. 14. Lawrence Erlbaum Associates. p. 71. ISBN 978-1-880393-32-1.
- Guthrie, W. (2010). *A History of Greek Philosophy Vol. 1*. Cambridge University Press. ISBN 978-0-521-29420-1.
- Guthrie, W. (1990). *A history of Greek philosophy Vol. 6: Aristotle: An Encounter* (<https://books.google.com/books?id=8EG0yV0cGoEC>). Cambridge University Press. ISBN 978-0-521-38760-6.
- Haase, Wolfgang (1992). *Philosophie, Wissenschaften, Technik. Philosophie (Doxographica [Forts. ])* (<https://books.google.com/books?id=ifqGuiHo6eQC&pg=PA3862>) (in German). Walter de Gruyter. ISBN 978-3-11-013699-9.
- Hall, Edith (2018). *Aristotle's Way: How Ancient Wisdom Can Change Your Life*. The Bodley Head. ISBN 978-1-84792-407-0.
- Halliwell, Stephen (2002). "Inside and Outside the Work of Art" (<https://books.google.com/books?id=R8wctGFg12MC&q=Aristotle+mimesis>). *The Aesthetics of Mimesis: Ancient Texts and Modern Problems*. Princeton University Press. pp. 152–59. ISBN 978-0-691-09258-4.
- Hankinson, R. J. (1998). *Cause and Explanation in Ancient Greek Thought*. Oxford University Press. doi:10.1093/0199246564.001.0001 (<https://doi.org/10.1093%2F0199246564.001.0001>). ISBN 978-0-19-823745-7.
- Hasse, Dag Nikolaus (2014). "Influence of Arabic and Islamic Philosophy on the Latin West" (<https://plato.stanford.edu/entries/arabic-islamic-influence/>). In Zalta, Edward N. (ed.). *Stanford Encyclopedia of Philosophy*.
- Hazel, John (2013) [1999]. *Who's Who in the Greek World* (<https://books.google.com/books?id=46ay-fpRVCKC>). Taylor & Francis. ISBN 978-1-134-80223-4.
- Held, Julius (1969). *Rembrandt's Aristotle and Other Rembrandt Studies* (<https://archive.org/details/rembrandtsaristo0000held>). Princeton University Press. ISBN 978-0-691-03862-9.

- Hladký, V.; Havlíček, J. (2013). "Was Tinbergen an Aristotelian? Comparison of Tinbergen's Four Whys and Aristotle's Four Causes" ([http://ishe.org/wp-content/uploads/2015/04/HEB\\_2013\\_28\\_4\\_3-11.pdf](http://ishe.org/wp-content/uploads/2015/04/HEB_2013_28_4_3-11.pdf)) (PDF). *Human Ethology Bulletin*. **28** (4): 3–11.
- Holowchak, Mark (1996). "Aristotle on Dreaming: What Goes on in Sleep when the 'Big Fire' goes out" (<http://www.pdcnet.org/ancientphil/Ancient-Philosophy>). *Ancient Philosophy*. **16** (2): 405–423. doi:10.5840/ancientphil199616244 (<https://doi.org/10.5840%2Fancientphil199616244>).
- Hooker, William Jackson (1831). *The British Flora: Comprising the Phaenogamous, Or Flowering Plants, and the Ferns* (<https://books.google.com/books?id=v-IYAAAAYAAJ&pg=PA219>). Longman. OCLC 17317293 (<https://search.worldcat.org/oclc/17317293>).
- House, Humphry (1956). *Aristotle's Poetics* (<https://archive.org/details/aristotlespoetic032945mbp>). Rupert Hart-Davis.
- Hornblower, Simon (2002). *The Greek World, 479–323 BC*. Routledge. ISBN 0-415-16326-9.
- Humphreys, Justin (2009). "Aristotle (384–322 B.C.E.)" (<http://www.iep.utm.edu/aristotl>). *Internet Encyclopedia of Philosophy*.
- Hutchinson, D. S.; Johnson, Monte Ransome (2015). "Exhortation to Philosophy" (<http://www.protrepticus.info/protr2017x20.pdf>) (PDF). *Protrepticus*. p. 22.
- Irwin, Terence; Fine, Gail, eds. (1996). *Aristotle: Introductory Readings* (<https://books.google.com/books?id=Tx8zjmHZ2NMC>). Hackett Pub. ISBN 978-0-87220-339-6.
- Jones, Jonathan (27 July 2002). "Aristotle with a Bust of Homer, Rembrandt (1653)" (<https://www.theguardian.com/culture/2002/jul/27/art.homer>). *The Guardian*. Retrieved 23 March 2018.
- Jones, W. T. (1980). *The Classical Mind: A History of Western Philosophy*. Harcourt Brace Jovanovich. ISBN 978-0-15-538312-8.
- Kant, Immanuel (1787). *Critique of Pure Reason* (Second ed.). OCLC 2323615 (<https://search.worldcat.org/oclc/2323615>).
- Kaufmann, Walter Arnold (1968). *Tragedy and Philosophy* (<https://books.google.com/books?id=NTk9-180NbsC&q=Aristotle+Oedipus+the+King>). Princeton University Press. ISBN 978-0-691-02005-1.
- Kennedy-Day, Kiki (1998). "Aristotelianism in Islamic philosophy". *Routledge Encyclopedia of Philosophy*. Taylor and Francis. doi:10.4324/9780415249126-H002-1 (<https://doi.org/10.4324%2F9780415249126-H002-1>). ISBN 978-0-415-25069-6.
- Knight, Kelvin (2007). *Aristotelian Philosophy: Ethics & Politics from Aristotle to MacIntyre*. Polity Press. ISBN 978-0-7456-1977-4.
- Kraut, Richard (1 May 2001). "Aristotle's Ethics" (<https://plato.stanford.edu/entries/aristotle-ethics/>). *Stanford Encyclopedia of Philosophy*. Retrieved 19 March 2018.
- Kuhn, Heinrich (2018). "Aristotelianism in the Renaissance" (<https://plato.stanford.edu/entries/aristotelianism-renaissance/>). In Zalta, Edward N. (ed.). *Stanford Encyclopedia of Philosophy*.
- Kukkonen, Taneli (2010). Grafton, Anthony; et al. (eds.). *The classical tradition*. Belknap Press of Harvard University Press. ISBN 978-0-674-03572-0.
- Lagerlund, Henrik (2016). "Medieval Theories of the Syllogism" (<https://plato.stanford.edu/entries/medieval-syllogism/>). In Zalta, Edward N. (ed.). *Stanford Encyclopedia of Philosophy*.
- Lagerlund, Henrik. "Medieval Theories of the Syllogism" (<https://plato.stanford.edu/entries/medieval-syllogism/>). In Zalta, Edward N. (ed.). *Stanford Encyclopedia of Philosophy*.
- Lahanas, Michael. "Optics and ancient Greeks" (<https://web.archive.org/web/20090411051535/http://www.mlahanas.de/Greeks/Optics.htm>). *Mlahanas.de*. Archived from the original (<http://www.mlahanas.de/Greeks/Optics.htm>) on 11 April 2009. Retrieved 26 April 2009.
- Lee, Ellen Wardwell; Robinson, Anne (2005). *Indianapolis Museum of Art: Highlights of the Collection*. Indianapolis Museum of Art. ISBN 978-0-936260-77-8.

- Leroi, Armand Marie (3 May 2011). "Aristotle's Lagoon: Embryo Inside a Chicken's Egg" (<https://www.bbc.co.uk/programmes/p00gqlyy>). BBC. Retrieved 17 November 2016.
- Leroi, Armand Marie (2015). *The Lagoon: How Aristotle Invented Science*. Bloomsbury. ISBN 978-1-4088-3622-4.
- Lindberg, David (1992). *The Beginnings of Western Science* (<https://archive.org/details/beginningsofwest00lind>). University of Chicago Press. ISBN 978-0-226-48205-7.
- Lloyd, G. E. R. (1968). "Aristotle: The Growth and Structure of His Thought". *The critic of Plato*. Cambridge University Press. ISBN 978-0-521-09456-6.
- Lloyd, G. E. R. (1996). "Adversaries and Authorities: Investigations into ancient Greek and Chinese science". *Causes and Correlations*. Cambridge University Press. ISBN 978-0-521-55695-8.
- Lloyd, E. R. G.; Brunschwig, Jacques; Pellegrin, Pierre (2000). *Greek Thought, A Guide to Classical Knowledge* (<https://books.google.com/books?id=kAFUjmNoQNEC>). Harvard University Press. ISBN 978-0-674-00261-6.
- Lovejoy, Arthur O. (31 January 1976). *The Great Chain of Being: A Study of the History of an Idea*. Harvard University Press. ISBN 978-0-674-36153-9.
- "Lucas Cranach the Elder| Phyllis and Aristotle" (<http://www.sothebys.com/en/auctions/ecatalogue/2008/important-old-master-paintings-including-european-works-of-art-n08404/lot.78.html>). Sotheby's. 2008. Retrieved 23 March 2018.
- Lyell, Charles (1832). *Principles of Geology* (<https://archive.org/details/principlesgeolo01unkngoog>). J. Murray, 1832. OCLC 609586345 (<https://search.worldcat.org/oclc/609586345>).
- MacDougall-Shackleton, Scott A. (27 July 2011). "The levels of analysis revisited" (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3130367>). *Philosophical Transactions of the Royal Society B: Biological Sciences*. **366** (1574): 2076–2085. doi:10.1098/rstb.2010.0363 (<https://doi.org/10.1098/rstb.2010.0363>). PMC 3130367 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3130367>). PMID 21690126 (<https://pubmed.ncbi.nlm.nih.gov/21690126>).
- Machamer, Peter (2017). "Galileo Galilei" (<https://plato.stanford.edu/entries/galileo/>). In Zalta, Edward N. (ed.). *Stanford Encyclopedia of Philosophy*.
- Magee, Bryan (2010). *The Story of Philosophy*. Dorling Kindersley. ISBN 978-0-241-24126-4.
- Mason, Stephen F. (1979). *A History of the Sciences* (<https://books.google.com/books?id=PLIMAAAMA AJ>). Collier Books. ISBN 978-0-02-093400-4. OCLC 924760574 (<https://search.worldcat.org/oclc/924760574>).
- Mayr, Ernst (1982). *The Growth of Biological Thought* (<https://archive.org/details/growthofbiologic00mayr>). Belknap Press. ISBN 978-0-674-36446-2.
- Mayr, Ernst (1985). *The Growth of Biological Thought*. Harvard University Press. ISBN 978-0-674-36446-2.
- McLeisch, Kenneth Cole (1999). *Aristotle: The Great Philosophers* (<https://archive.org/details/s/aristotle00mcle>). Routledge. ISBN 978-0-415-92392-7.
- Medawar, Peter B.; Medawar, J. S. (1984). *Aristotle to Zoos: a philosophical dictionary of biology*. Oxford University Press. ISBN 978-0-19-283043-2.
- Miller, Willard M. (1973). "Aristotle on Necessity, Chance, and Spontaneity". *New Scholasticism*. **47** (2): 204–213. doi:10.5840/newscholas197347237 (<https://doi.org/10.5840/newscholas197347237>).
- Modrak, Deborah (2009). "Dreams and Method in Aristotle". *Skepsis: A Journal for Philosophy and Interdisciplinary Research*. **20**: 169–181.
- Moore, Ruth (1956). *The Earth We Live On* (<https://archive.org/details/earthwewliveonsto00moor>). Alfred A. Knopf. OCLC 1024467091 (<https://search.worldcat.org/oclc/1024467091>).

- Morsink, Johannes (Spring 1979). "Was Aristotle's Biology Sexist?". *Journal of the History of Biology*. **12** (1): 83–112. doi:10.1007/bf00128136 (<https://doi.org/10.1007/bf00128136>). JSTOR 4330727 (<https://www.jstor.org/stable/4330727>). PMID 11615776 (<https://pubmed.ncbi.nlm.nih.gov/11615776>). S2CID 6090923 (<https://api.semanticscholar.org/CorpusID:6090923>).
- Nasr, Seyyed Hossein (1996). *The Islamic Intellectual Tradition in Persia*. Curzon Press. ISBN 978-0-7007-0314-2.
- Nawotka, Krzysztof (2009). *Alexander the Great* (<https://books.google.com/books?id=NRQaBwAAQBAJ>). Cambridge Scholars Publishing. ISBN 978-1-4438-1811-7.
- Nussbaum, Martha C.; Osborne, Catherine (2014). "Aristotle". In Hornblower, Simon; Spawforth, Antony; Eidinow, Esther (eds.). *The Oxford Companion to Classical Civilization* (2nd ed.). Oxford University Press. ISBN 978-0-19-954556-8.
- Ogden, Daniel (2024). *The Cambridge Companion to Alexander the Great* (<https://books.google.com/books?id=LyDkEAAAQBAJ>). Cambridge University Press. ISBN 978-1-108-84099-6.
- Phelan, Joseph (September 2002). "The Philosopher as Hero: Raphael's The School of Athens" (<http://www.artcyclopedia.com/feature-2002-09.html>). ArtCyclopedia. Retrieved 23 March 2018.
- Pickover, Clifford A. (2009). *The Math Book: From Pythagoras to the 57th Dimension, 250 Milestones in the History of Mathematics* (<https://books.google.com/books?id=JrslMKtgSZwC&pg=PA52>). Sterling. ISBN 978-1-4027-5796-9.
- "Plutarch – Life of Alexander (Part 1 of 7)" ([https://penelope.uchicago.edu/Thayer/e/roman/texts/plutarch/lives/alexander\\*/3.html](https://penelope.uchicago.edu/Thayer/e/roman/texts/plutarch/lives/alexander*/3.html)). *penelope.uchicago.edu*. Loeb Classical Library. 1919. Retrieved 31 January 2019.
- "Predicate Logic" (<https://www.cs.utexas.edu/~schrum2/cs301k/lec/topic04-predicateLogic.pdf>) (PDF). University of Texas. Archived (<https://web.archive.org/web/20180329221535/http://www.cs.utexas.edu/~schrum2/cs301k/lec/topic04-predicateLogic.pdf>) (PDF) from the original on 29 March 2018. Retrieved 29 March 2018.
- Reeve, C. D. C.; Miller, Patrick L. (2015) [2006]. *Introductory Readings in Ancient Greek and Roman Philosophy*. Hackett. ISBN 978-1-62466-354-3.
- Rhodes, Frank Harold Trevor (1974). *Evolution* (<https://books.google.com/books?id=EWGt0bff8agC>). Golden Press. ISBN 978-0-307-64360-5.
- Robbins, Lionel (2000). Medema, Steven G.; Samuels, Warren J. (eds.). *A History of Economic Thought: The LSE Lectures*. Princeton University Press.
- Rorty, Amélie Oksenberg (1996). "Structuring Rhetoric" (<https://books.google.com/books?id=vd7fEb1wOmYC&q=Aristotle+deliberative+forensic+and+epideictic&pg=PA6>). In Rorty, Amélie Oksenberg (ed.). *Essays on Aristotle's Rhetoric* (<https://archive.org/details/essaysonaristotl0000unse>). University of California Press. ISBN 978-0-520-20227-6.
- Rovelli, Carlo (2015). "Aristotle's Physics: A Physicist's Look". *Journal of the American Philosophical Association*. **1** (1): 23–40. arXiv:1312.4057 (<https://arxiv.org/abs/1312.4057>). doi:10.1017/apa.2014.11 (<https://doi.org/10.1017/apa.2014.11>). S2CID 44193681 (<https://api.semanticscholar.org/CorpusID:44193681>).
- Russell, Bertrand (1972). *A history of western philosophy* (<https://books.google.com/books?id=RZc3AAAAIAAJ>). Simon and Schuster. ISBN 978-0-671-31400-2.
- Sedley, David (2007). *Creationism and Its Critics in Antiquity* (<https://books.google.com/books?id=SgRuJEfzUG8C>). University of California Press. ISBN 978-0-520-25364-3.
- Shields, Christopher (2012). *The Oxford Handbook of Aristotle* (<https://books.google.com/books?id=vTVsrl0mnH4C>). Oxford University Press. ISBN 978-0-19-518748-9.
- Shields, Christopher (2016). "Aristotle's Psychology". In Zalta, Edward N. (ed.). *Stanford Encyclopedia of Philosophy* (Winter 2016 ed.).



- Shute, Clarence (1941). *The Psychology of Aristotle: An Analysis of the Living Being*. Columbia University Press. OCLC 936606202 (<https://search.worldcat.org/oclc/936606202>).
- Smith, Robin (2017). "Aristotle's Logic" (<https://plato.stanford.edu/entries/aristotle-logic/>). In Zalta, Edward N. (ed.). *Stanford Encyclopedia of Philosophy*.
- Smith, William George (2007) [1869]. *Dictionary of Greek and Roman Biography and Mythology* (<http://archive.org/details/dictionarygreek09smitgoog>). J. Walton. Retrieved 30 January 2019 – via Internet Archive.
- Sorabji, R. (2006). *Aristotle on Memory* (2nd ed.). Chicago: University of Chicago Press. p. 54. "And this is exactly why we hunt for the successor, starting in our thoughts from the present or from something else, and from something similar, or opposite, or neighbouring. By this means recollection occurs..."
- Sorabji, Richard (1990). *Aristotle Transformed*. Duckworth. ISBN 978-0-7156-2254-4.
- Staley, Kevin (1989). "Al-Kindi on Creation: Aristotle's Challenge to Islam". *Journal of the History of Ideas*. **50** (3): 355–370. doi:10.2307/2709566 (<https://doi.org/10.2307%2F2709566>). JSTOR 2709566 (<https://www.jstor.org/stable/2709566>).
- Susskind, Leonard (3 October 2011). "Classical Mechanics, Lectures 2, 3" (<http://theoreticalminimum.com/courses/classical-mechanics/2011/fall/lecture-2>). *The Theoretical Minimum*. Retrieved 11 May 2018.
- Taylor, Henry Osborn (1922). "Chapter 3: Aristotle's Biology" (<https://web.archive.org/web/20060327222953/http://www.ancientlibrary.com/medicine/0051.html>). *Greek Biology and Medicine*. Archived from the original (<http://www.ancientlibrary.com/medicine/0051.html>) on 27 March 2006. Retrieved 3 January 2017.
- "The School of Athens by Raphael" (<http://www.visual-arts-cork.com/famous-paintings/school-of-athens.htm>). Visual Arts Cork. Retrieved 22 March 2018.
- Stewart, Jessica (2019). "The Story Behind Raphael's Masterpiece 'The School of Athens'" (<https://mymodernmet.com/school-of-athens-raphael/>). *My Modern Met*. Retrieved 29 March 2019. "Plato's gesture toward the sky is thought to indicate his Theory of Forms. ... Conversely, Aristotle's hand is a visual representation of his belief that knowledge comes from experience. Empiricism, as it is known, theorizes that humans must have concrete evidence to support their ideas"
- Tangian, Andranik (2020). *Analytical theory of democracy. Vols. 1 and 2*. Studies in Choice and Welfare. Cham, Switzerland: Springer. doi:10.1007/978-3-030-39691-6 (<https://doi.org/10.1007%2F978-3-030-39691-6>). ISBN 978-3-030-39690-9. S2CID 216190330 (<https://api.semanticscholar.org/CorpusID:216190330>).
- Thompson, D'Arcy (1910). Ross, W. D.; Smith, J. A. (eds.). *Historia animalium – The works of Aristotle translated into English* (<https://web.archive.org/web/20190809140240/https://ebooks.adelaide.edu.au/a/aristotle/history/index.html>). Clarendon Press. OCLC 39273217 (<https://search.worldcat.org/oclc/39273217>). Archived from the original (<http://ebooks.adelaide.edu.au/a/aristotle/history/index.html>) on 9 August 2019. Retrieved 19 March 2018.
- Warren, Howard C. (1921). *A History of the Association of Psychology* (<https://books.google.com/books?id=D4IXAAAYAAJ&q=The+history+of+the+association+of+psychology&pg=PA3>). C. Scribner's sons. ISBN 978-0-598-91975-5. OCLC 21010604 (<https://search.worldcat.org/oclc/21010604>).
- Webb, Wilse (1990). *Dreamtime and dreamwork: Decoding the language of the night* (<http://archive.org/details/dreamtimedreamwo00kriprich>). Jeremy P. Tarcher. ISBN 978-0-87477-594-5.
- "When libraries were on a roll" (<https://www.telegraph.co.uk/culture/4723624/When-libraries-were-on-a-roll.html>). *The Telegraph*. 19 May 2001. Archived (<https://ghostarchive.org/archive/20220110/https://www.telegraph.co.uk/culture/4723624/When-libraries-were-on-a-roll.html>) from the original on 10 January 2022. Retrieved 29 June 2017.
- Wildberg (2016). "John Philoponus" (<https://plato.stanford.edu/entries/philoponus/>). In Zalta, Edward N. (ed.). *Stanford Encyclopedia of Philosophy*.

- Worthington, Ian (2014a) [2004]. *Alexander the Great: Man and God* (<https://books.google.com/books?id=xnQABAAQBAJ>). Routledge. ISBN 978-1-317-86644-2.
- Worthington, Ian (2014b). *By the Spear: Philip II, Alexander the Great, and the Rise and Fall of the Macedonian Empire* (<https://books.google.com/books?id=vnGVAAwAAQBAJ>). Oxford University Press. ISBN 978-0-19-992986-3.
- Wu, Yuchen (2022). "The Relationship Between Aristotle and Alexander the Great". *Proceedings of the 2021 International Conference on Public Art and Human Development (ICPAHD 2021)*. Vol. 638. Paris, France: Atlantis Press. doi:10.2991/assehr.k.220110.015 (<https://doi.org/10.2991/assehr.k.220110.015>). ISBN 978-94-6239-523-7. ISSN 2352-5398 (<https://search.worldcat.org/issn/2352-5398>).
- Zalta, Edward N., ed. (2018). "Aristotle's Influence" (<https://plato.stanford.edu/entries/aristotle-influence/>). *Stanford Encyclopedia of Philosophy* (Spring 2018 ed.).

## Further reading

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The secondary literature on Aristotle is vast. The following is only a small selection.

- Ackrill, J. L. (1997). *Essays on Plato and Aristotle*, Oxford University Press.
- Ackrill, J. L. (1981). *Aristotle the Philosopher*. Oxford University Press.
- Adler, Mortimer J. (1978). *Aristotle for Everybody*. Macmillan.
- Ammonius (1991). Cohen, S. Marc; Matthews, Gareth B. (eds.). *On Aristotle's Categories*. Cornell University Press. ISBN 978-0-8014-2688-9.
- Aristotle (1908–1952). *The Works of Aristotle Translated into English Under the Editorship of W. D. Ross, 12 vols.* Clarendon Press. These translations are available in several places online; see External links.
- Bakalis, Nikolaos. (2005). *Handbook of Greek Philosophy: From Thales to the Stoics Analysis and Fragments*, Trafford Publishing, ISBN 978-1-4120-4843-9.
- Bocheński, I. M. (1951). *Ancient Formal Logic*. North-Holland.
- Bolotin, David (1998). *An Approach to Aristotle's Physics: With Particular Attention to the Role of His Manner of Writing*. Albany: SUNY Press. A contribution to our understanding of how to read Aristotle's scientific works.
- Burnyeat, Myles F. et al. (1979). *Notes on Book Zeta of Aristotle's Metaphysics*. Oxford: Sub-faculty of Philosophy.
- Cantor, Norman F.; Klein, Peter L., eds. (1969). *Ancient Thought: Plato and Aristotle*. Monuments of Western Thought. Vol. 1. Blaisdell.
- Chappell, V. (1973). "Aristotle's Conception of Matter". *Journal of Philosophy*. **70** (19): 679–696. doi:10.2307/2025076 (<https://doi.org/10.2307/2025076>). JSTOR 2025076 (<https://www.jstor.org/stable/2025076>).
- Code, Alan (1995). Potentiality in Aristotle's Science and Metaphysics, *Pacific Philosophical Quarterly* 76.
- Cohen, S. Marc; Reeve, C. D. C. (21 November 2020). "Aristotle's Metaphysics" (<https://plato.stanford.edu/archives/win2020/entries/aristotle-metaphysics/>). *Stanford Encyclopedia of Philosophy* (Winter 2020 ed.).
- Ferguson, John (1972). *Aristotle* (<https://archive.org/details/aristotle0000ferg>). Twayne Publishers. ISBN 978-0-8057-2064-8.
- De Groot, Jean (2014). *Aristotle's Empiricism: Experience and Mechanics in the 4th century BC*, Parmenides Publishing, ISBN 978-1-930972-83-4.
- Frede, Michael (1987). *Essays in Ancient Philosophy*. Minneapolis: University of Minnesota Press.


- Fuller, B. A. G. (1923). *Aristotle*. History of Greek Philosophy. Vol. 3. Cape.
- Gendlin, Eugene T. (2012). *Line by Line Commentary on Aristotle's De Anima* (<http://www.focusing.org/aristotle/>) Archived (<https://web.archive.org/web/20170327012857/http://www.focusing.org/aristotle/>) 27 March 2017 at the *Wayback Machine*, Volume 1: Books I & II; Volume 2: Book III. The Focusing Institute.
- Gill, Mary Louise (1989). *Aristotle on Substance: The Paradox of Unity*. Princeton University Press.
- Guthrie, W. K. C. (1981). *A History of Greek Philosophy*. Vol. 6. Cambridge University Press.
- Halper, Edward C. (2009). *One and Many in Aristotle's Metaphysics, Volume 1: Books Alpha – Delta*. Parmenides Publishing. ISBN 978-1-930972-21-6.
- Halper, Edward C. (2005). *One and Many in Aristotle's Metaphysics, Volume 2: The Central Books*. Parmenides Publishing. ISBN 978-1-930972-05-6.
- Irwin, Terence H. (1988). *Aristotle's First Principles* (<http://www.cyjack.com/cognition/Aristotle%27s%20first%20principles.pdf>) (PDF). Oxford: Clarendon Press. ISBN 0-19-824290-5.
- Jaeger, Werner (1948). Robinson, Richard (ed.). *Aristotle: Fundamentals of the History of His Development* (2nd ed.). Clarendon Press.
- Jori, Alberto (2003). *Aristotele*, Bruno Mondadori (Prize 2003 of the "International Academy of the History of Science"), ISBN 978-88-424-9737-0.
- Kiernan, Thomas P., ed. (1962). *Aristotle Dictionary*. Philosophical Library.
- Knight, Kelvin (2007). *Aristotelian Philosophy: Ethics and Politics from Aristotle to MacIntyre*, Polity Press.
- Lewis, Frank A. (1991). *Substance and Predication in Aristotle*. Cambridge University Press.
- Lord, Carnes (1984). *Introduction to The Politics, by Aristotle*. Chicago University Press.
- Loux, Michael J. (1991). *Primary Ousia: An Essay on Aristotle's Metaphysics Z and H*. Ithaca, NY: Cornell University Press.
- Maso, Stefano (Ed.), Natali, Carlo (Ed.), Seel, Gerhard (Ed.) (2012) *Reading Aristotle: Physics VII. 3: What is Alteration? Proceedings of the International ESAP-HYELE Conference*, Parmenides Publishing. ISBN 978-1-930972-73-5.
- McKeon, Richard (1973). *Introduction to Aristotle* (2nd ed.). University of Chicago Press.
- Owen, G. E. L. (1965c). "The Platonism of Aristotle". *Proceedings of the British Academy*. **50**: 125–150. [Reprinted in J. Barnes, M. Schofield, and R. R. K. Sorabji, eds.(1975). *Articles on Aristotle* Vol 1. Science. London: Duckworth 14–34.]
- Pangle, Lorraine Smith (2002). *Aristotle and the Philosophy of Friendship*. doi:10.1017/CBO9780511498282 (<https://doi.org/10.1017%2FCBO9780511498282>). ISBN 978-0-511-49828-2.
- Plato (1979). Allen, Harold Joseph; Wilbur, James B. (eds.). *The Worlds of Plato and Aristotle*. Prometheus Books.
- Reeve, C. D. C. (2000). *Substantial Knowledge: Aristotle's Metaphysics*. Hackett.
- Rose, Lynn E. (1968). *Aristotle's Syllogistic*. Charles C. Thomas.
- Ross, David (1995). *Aristotle* (6th ed.). Routledge.
- Scaltsas, T. (1994). *Substances and Universals in Aristotle's Metaphysics*. Cornell University Press.
- Strauss, Leo (1964). "On Aristotle's *Politics*", in *The City and Man*, Rand McNally.
- Swanson, Judith (1992). *The Public and the Private in Aristotle's Political Philosophy* (<http://archive.org/details/publicprivateina00swan>). Cornell University Press. ISBN 978-0-8014-2319-2.
- Veatch, Henry B. (1974). *Aristotle: A Contemporary Appreciation*. Indiana University Press.
- Woods, M. J. (1991b). "Universals and Particular Forms in Aristotle's Metaphysics". *Aristotle and the Later Tradition*. *Oxford Studies in Ancient Philosophy*. Vol. Suppl. pp. 41–56.

## External links

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- Aristotle (<https://philpapers.org/browse/aristotle>) at [PhilPapers](#)
- 2553 Aristotle (<https://www.inphoproject.org/thinker/>) at the [Indiana Philosophy Ontology Project](#)
- At the [Internet Encyclopedia of Philosophy](#):
  - Aristotle (general article) (<https://www.iep.utm.edu/aristotl/>) · Biology (<https://www.iep.utm.edu/aris-bio/>) · Ethics (<https://www.iep.utm.edu/aris-eth/>) · Logic (<https://www.iep.utm.edu/aris-log/>) · Metaphysics (<https://www.iep.utm.edu/aris-met/>) · Motion and its Place in Nature (<https://www.iep.utm.edu/aris-mot/>) · Poetics (<https://www.iep.utm.edu/aris-poe/>) · Politics (<https://www.iep.utm.edu/aris-pol/>)
- At the [Internet Classics Archive](http://classics.mit.edu/Browse/index.html) (<http://classics.mit.edu/Browse/index.html>)
- From the [Stanford Encyclopedia of Philosophy](#):
  - Aristotle (general article) (<https://plato.stanford.edu/entries/aristotle>) · Aristotle in the Renaissance (<https://plato.stanford.edu/entries/aristotelianism-renaissance/>) · Biology (<https://plato.stanford.edu/entries/aristotle-biology/>) · Causality (<https://plato.stanford.edu/entries/aristotle-causality/>) · Commentators on Aristotle (<https://plato.stanford.edu/entries/aristotle-commentators/>) · Ethics (<https://plato.stanford.edu/entries/aristotle-ethics/>) · Logic (<https://plato.stanford.edu/entries/aristotle-logic/>) · Mathematics (<https://plato.stanford.edu/entries/aristotle-mathematics/>) · Metaphysics (<https://plato.stanford.edu/entries/aristotle-metaphysics/>) · Natural philosophy (<https://plato.stanford.edu/entries/aristotle-natphil/>) · Non-contradiction (<https://plato.stanford.edu/entries/aristotle-noncontradiction/>) · Political theory (<https://plato.stanford.edu/entries/aristotle-politics/>) · Psychology (<https://plato.stanford.edu/entries/aristotle-psychology/>) · Rhetoric (<https://plato.stanford.edu/entries/aristotle-rhetoric/>)
- Turner, William (1907). "Aristotle" ([https://en.wikisource.org/wiki/Catholic\\_Encyclopedia\\_\(1913\)/Aristotle](https://en.wikisource.org/wiki/Catholic_Encyclopedia_(1913)/Aristotle)). *Catholic Encyclopedia*. Vol. 1.
-  Laërtius, Diogenes (1925). "The Peripatetics: Aristotle" ([https://en.wikisource.org/wiki/Lives\\_of\\_the\\_Eminent\\_Philosophers/Book\\_V#Aristotle](https://en.wikisource.org/wiki/Lives_of_the_Eminent_Philosophers/Book_V#Aristotle)). *Lives of the Eminent Philosophers*. Vol. 1:5. Translated by [Hicks, Robert Drew](#) (Two volume ed.). Loeb Classical Library.

## Collections of works

- Works by Aristotle in eBook form (<https://standardebooks.org/ebooks/aristotle>) at [Standard Ebooks](#)
- At [Massachusetts Institute of Technology](#) (<http://classics.mit.edu/Browse/index-Aristotle.html>)
- Works by Aristotle (<https://www.gutenberg.org/ebooks/author/2747>) at [Project Gutenberg](#)
- Works by or about Aristotle (<https://archive.org/search.php?query=%28%28subject%3A%22Aristotle%22%20OR%20creator%3A%22Aristotle%22%20OR%20description%3A%22Aristotle%22%20OR%20title%3A%22Aristotle%22%29%20OR%20%28%22384-322%22%20AND%20Aristotle%29%29%20AND%20%28-mediatype:software%29>) at the [Internet Archive](#)
- Works by Aristotle (<https://librivox.org/author/602>) at [LibriVox](#) (public domain audiobooks) 
- Works by Aristotle (<https://www.biodiversitylibrary.org/creator/16679>) at the [Biodiversity Heritage Library](#)
- Works by Aristotle (<https://openlibrary.org/authors/OL22105A>) at [Open Library](#)
- Perseus Project (<https://www.perseus.tufts.edu/cgi-bin/perscoll?.submit=Change&collection=Any&type=text&lang=Any&lookup=Aristotle>) at [Tufts University](#) (in English and Greek)

- At the University of Adelaide (<https://web.archive.org/web/20071017211048/http://ebooks.adelaide.edu.au/a/aristotle/>)
  - P. Remacle (<http://remacle.org/bloodwolf/philosophes/Aristote/table.htm>) (in Greek and French)
  - The 11-volume 1837 Bekker edition of *Aristotle's Works* in Greek (PDF (<http://isnature.org/Files/Aristotle/>) Archived (<https://web.archive.org/web/20221124034819/http://isnature.org/Files/Aristotle/>) 24 November 2022 at the Wayback Machine · DJVU ([https://web.archive.org/web/20050816192647/http://grid.ceth.rutgers.edu/ancient/greek/aristotle\\_greek/](https://web.archive.org/web/20050816192647/http://grid.ceth.rutgers.edu/ancient/greek/aristotle_greek/)))
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