

# ARISTOTLE

A Guide for the Perplexed

John A. Vella



---

**ARISTOTLE:  
A GUIDE FOR THE PERPLEXED**

---

## Guides for the Perplexed

Continuum's *Guides for the Perplexed* are clear, concise and accessible introductions to thinkers, writers and subjects that students and readers can find especially challenging. Concentrating specifically on what it is that makes the subject difficult to grasp, these books explain and explore key themes and ideas, guiding the reader towards a thorough understanding of demanding material.

Guides for the Perplexed available from Continuum:

*Adorno: A Guide for the Perplexed*, Alex Thomson  
*Deleuze: A Guide for the Perplexed*, Claire Colebrook  
*Derrida: A Guide for the Perplexed*, Julian Wolfreys  
*Descartes: A Guide for the Perplexed*, Justin Skirry  
*Existentialism: A Guide for the Perplexed*, Stephen Earnshaw  
*Freud: A Guide for the Perplexed*, Celine Surprenant  
*Gadamer: A Guide for the Perplexed*, Chris Lawn  
*Habermas: A Guide for the Perplexed*, Eduardo Mendieta  
*Hegel: A Guide for the Perplexed*, David James  
*Hobbes: A Guide for the Perplexed*, Stephen J. Finn  
*Hume: A Guide for the Perplexed*, Angela Coventry  
*Husserl: A Guide for the Perplexed*, Matheson Russell  
*Kant: A Guide for the Perplexed*, TK Seung  
*Kierkegaard: A Guide for the Perplexed*, Clare Carlisle  
*Levinas: A Guide for the Perplexed*, B.C. Hutchens  
*Leibniz: A Guide for the Perplexed*, Franklin Perkins  
*Merleau-Ponty: A Guide for the Perplexed*, Eric Matthews  
*Nietzsche: A Guide for the Perplexed*, R. Kevin Hill  
*Plato: A Guide for the Perplexed*, Gerald A. Press  
*Quine: A Guide for the Perplexed*, Gary Kemp  
*Ricoeur: A Guide for the Perplexed*, David Pellauer  
*Rousseau: A Guide for the Perplexed*, Matthew Simpson  
*Sartre: A Guide for the Perplexed*, Gary Cox  
*Spinoza: A Guide for the Perplexed*, Charles Jarrett  
*Wittgenstein: A Guide for the Perplexed*, Mark Addis

---

# ARISTOTLE: A GUIDE FOR THE PERPLEXED

JOHN A. VELLA



---

Continuum International Publishing Group  
The Tower Building                      80 Maiden Lane  
11 York Road                              Suite 704  
London                                        New York  
SE1 7NX                                     NY 10038

[www.continuumbooks.com](http://www.continuumbooks.com)

© John A. Vella 2008

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage or retrieval system, without prior permission in writing from the publishers.

First published 2008

**British Library Cataloguing-in-Publication Data**

A catalogue record for this book is available from the British Library.

EISBN 9780826497086

**British Library Cataloguing-in-Publication Data**

A catalogue record for this book is available from the British Library.

**Library of Congress Cataloging-in-Publication Data**

A catalog record for this book is available from the Library of Congress.

Typeset by Servis Filmsetting Ltd, Manchester

---

For my wife Amelia with all my love



---

## CONTENTS

<i>Acknowledgements</i>	ix
<i>Chronology</i>	x
<b>Introduction</b>	1
<b>Chapter 1. Science (<i>episteme</i>)</b>	11
Division of the Sciences According to Aims and Objects	11
Demonstration ( <i>apodeixis</i> )	16
The Axioms of the Sciences	20
<b>Chapter 2. Being or Substance (<i>ousia</i>)</b>	26
Being Before Aristotle	28
Being in the <i>Categories</i>	33
The Science of Being: First Philosophy	46
Being in <i>Metaphysics Zeta (7)</i>	54
<b>Chapter 3. Nature (<i>phusis</i>)</b>	63
Principles of Change	69
The Four Causes or Explanations ( <i>aitiai</i> )	75
Defence of Teleology	80
<b>Chapter 4. Soul (<i>psuche</i>)</b>	87
Soul as Substance, Form and Actuality	90
What the Student of Soul Investigates	96
Perception	99
Thought	105
<b>Chapter 5. Success (<i>eudaimonia</i>)</b>	116
The Practical Science of Ethics	119
The Chief and Final Good for Human Beings	126



---

**CONTENTS**

Virtues of Character	133
Virtues of Intellect	149
<b>Conclusion</b>	158
<i>Notes</i>	159
<i>Bibliography</i>	163
<i>Index</i>	165

---

## ACKNOWLEDGEMENTS

My greatest debt is to those teachers from whom I have learned so much about Aristotle. Professor Grace Ledbetter at Swarthmore College and Professor Georgios Anagnostopoulos at the University of California at San Diego have both been invaluable as teachers of Ancient Philosophy generally and Aristotle in particular. I am also indebted to Greg Shirley and Matt Egan for reading earlier drafts and making helpful suggestions. Any errors that remain are of course my own. I would also like to thank the editorial staff at Continuum Publishing; Sarah Douglas, Tom Crick and Adam Green have all provided assistance from the earliest to the final stages of this project.

I am also grateful to Princeton University Press for permission to quote from the Revised Oxford Translation of the following texts: *Metaphysics*, *Physics*, *On the Soul* and *Nicomachean Ethics*, all found in J. Barnes, *The Complete Works of Aristotle*. Ó (1984, The Jowett Copyright Trustees). Reprinted by permission of Princeton University Press.

---

## CHRONOLOGY

- 470 BC Birth of Socrates at Athens
- 428 Birth of Plato at Athens
- 399 Death of Socrates by suicide; Socrates had been sentenced to death on charges of impiety and corrupting the young
- 387 Plato founds the Academy in Athens
- 384 Birth of Aristotle at Stagira in northern Greece
- 367 At age 17, Aristotle moves to Athens and joins Plato's Academy
- 347 Death of Plato; Aristotle leaves Athens and settles at Assos
- 343 Philip of Macedon invites Aristotle to tutor Alexander
- 336 Philip of Macedon killed; Alexander crowned
- 335 At age 49, Aristotle returns to Athens and founds the Lyceum
- 323 Death of Alexander; in a strongly anti-Macedonian mood, the Athenians bring formal charges of impiety against Aristotle
- 322 Aristotle leaves Athens for Chalcis. He dies at age 62.

---

## INTRODUCTION

In his fourteenth-century masterpiece *The Divine Comedy*, Dante Alighieri created the most famous and enduring literary image of Aristotle. As the poet Virgil guides Dante's pilgrim, the two come upon a scene in the first circle of hell, often referred to as Limbo. Our pilgrim describes seeing numerous figures from the ancient world. Here is his account of seeing the philosophers and scientists of antiquity:

I raised my eyes a little, and there he was,  
Who is called Master of those who know,  
Sitting in a philosophic family  
Who look upon him and do him honour.  
I saw nearest to him Plato and Socrates. (*Inferno*, Canto IV.130–5)<sup>1</sup>

Our pilgrim continues by naming the individuals who surround the Master in this philosophic family. The only person who is not named is the one who does not need to be named. Everyone in Dante's world knew exactly to whom the pilgrim referred. Only one man could be called *Master of those who know* and *The Philosopher*. That man is of course Aristotle.

There are a few points I would like to highlight regarding this remarkable image. First, we can note that Dante's pilgrim has to raise his eyes to gaze upon Aristotle and his philosophical family. Though the pilgrim's journey through hell involves endless descents, that pattern is broken in the case of Aristotle. Even in hell, one must look up to see Aristotle; even in hell, Aristotle is at the summit. We can also note that the historical order of these philosophers of antiquity is inverted in this image. Socrates was a

teacher of Plato, and Plato was a teacher of Aristotle; in Dante's vision, the last pupil in this historical sequence represents the highest achievement among these men. In life, Aristotle studied under Plato; in the afterlife, Plato, Socrates and indeed all learned men look to Aristotle and pay him homage. Dante's scene thus suggests extraordinary admiration for Aristotle; we almost forget that Aristotle and his philosophic family are in the outermost circle of hell. While much of the *Inferno* is filled with what Jeffers has called Dante's 'dirty / Political hatreds', this scene is exceptional for its compassion and respect for Aristotle and the philosophers of antiquity.<sup>2</sup>

There is no mystery as to why Dante held Aristotle in high esteem. No human being before or since has towered over human wisdom as Aristotle did. From his death in 322 BC until the rediscovery of Plato's works during the Renaissance, Aristotle reigned supreme and unchallenged as the master of those who know. Aristotle's intellectual range is absolutely astonishing; he wrote in every field of human inquiry, and he was considered the ultimate authority in nearly every subject. Centuries of philosophical and scientific scholarship focused entirely on expounding and interpreting the writings of Aristotle. It is difficult for us to fathom Aristotle's intellectual stature and influence. We live in a highly specialized age in which even the most intellectually ambitious among us can only hope to master our specialty. A survey of the geniuses of our age confirms this trend toward specialization: consider Einstein's mastery of physics or Freud's understanding of the human psyche. Rare is the individual who makes significant contributions to more than one field; rarest of all is the individual who makes defining contributions to every field. Such a man was Aristotle. To be sure, Aristotle mastered human knowledge and inquiry at a time when both were still in their infancy. Nevertheless, his achievements defined the known world for nearly two millennia.

Aristotle's stature and influence today are not due to his mastery of facts or theories. Much of what he took to be facts has been disproved; most of his theories are now widely regarded as false. Rather, Aristotle is a giant of philosophy and science because of the awesome power of his *method*. Aristotle was utterly relentless in his pursuit of knowledge; his life was ruled by an overwhelming desire to know. In his pursuit of knowledge, he developed a

---

## INTRODUCTION

powerful and fertile method of analysis that is part of the very fabric of all subsequent philosophical and scientific thought. Aristotle bequeathed to us a rich conceptual apparatus through which we can continue his inquiries. Thus as we read Aristotle we should be concerned not only with the doctrines that he seems to endorse; we should also attend to the questions he asks and the methods by which he attempts answers to those questions. Even though many of Aristotle's theories have been proven false, his method endures.

I here wish to highlight a key point about Aristotle's philosophical and scientific method. Aristotle is guided in his inquiries by a common-sense empiricism. For Aristotle, the stated goal of scientific explanation is to 'save the phenomena'. The phenomena are the appearances that we experience; the phenomena are the way things seem to our senses. It may sound uncontroversial to seek to save the phenomena, but Aristotle's approach is quite radical when compared with the rationalist tradition in Greek philosophy. Whereas other philosophers, notably Socrates, Plato and Parmenides, often explained away the phenomena or appearances as being unreal or false, Aristotle seeks to preserve the appearances and to explain how and why the appearances are the way they are. Aristotle's philosophy is thus guided by the intuition that our experiences of the world are largely true; thus our investigations of the world should begin with our investigations of the phenomena or appearances. This intuition is directly opposed to the rationalist intuition that the world of the senses is largely false, while reason reveals the real and true nature of things. Socrates, Plato and Parmenides all discredited appearances and insisted that we rely on reason alone to understand the world. If reason suggests something contrary to the appearances, then it is reason that should be trusted. Plato and Parmenides argue that the world is actually quite different from the way it seems to us.

Aristotle, however, claims that the world *is* largely as it *appears* to us. The philosophy and science that emerge from these competing intuitions are quite different. The rationalist tradition focuses on the intelligible rather than the sensible realm. For the rationalists, philosophy and science are primarily mathematical in form. These early rationalists even call into question the possibility of natural science. Aristotle is generally unimpressed by rational explanations unless they can save the phenomena. While the rationalists discredit natural

science, for Aristotle natural science is a core part of the philosophical and scientific enterprise. This is not to suggest that Aristotle completely dismisses the rationalist tradition; to the contrary, he draws on that tradition and makes use of it where appropriate. But for Aristotle, reason must be relied upon to explain the appearances, not to explain away the appearances as unreal or false. The rationalist and empiricist intuitions reflect fundamentally different orientations towards the world. These orientations form the foundation for each philosopher's outlook on the world. For the rationalist, we begin with reason and follow it wherever it leads. For the empiricist, we begin with the phenomena and we employ reason to explain and save the phenomena.

#### THE LIFE OF ARISTOTLE

Aristotle was born in 384 BC in Stagira, a small town in northern Greece. His father, Nicomachus, was a physician; it is possible that the young Aristotle's interest in biology and anatomy began during his early acquaintance with his father's work. At age 17, Aristotle migrated to Athens to join Plato's Academy. The Academy offered the finest education in all of Greece, and Plato held the young Aristotle in high favour. The primary intellectual influence in Aristotle's life was Plato's philosophy. Aristotle was an excellent pupil, and his keen mind was already developing forceful criticisms of Plato's philosophy. Aristotle also made significant contributions to the Academy as a scholar. Many Platonists confined their inquiries to mathematics and geometry; Aristotle brought the pursuit of natural science to the Academy.

Upon the death of Plato in 347 BC, Aristotle left Athens and settled in Assos. His reasons for leaving Athens are not entirely clear. It has been suggested that the stewardship of the Academy after Plato represented to Aristotle the worst tendencies of Platonism; the Academy became more mathematical in its approach to philosophy. It is also likely that the changing political climate in Athens spurred Aristotle to leave. Though he was Greek, Aristotle was not an Athenian by birth. His father had connections to Macedon, and a rising tide of anti-Macedonian sentiment in Athens may have made life there uncomfortable for Aristotle. In Assos and later in Lesbos, Aristotle surrounded himself with learned individuals; he also undertook the greater portion of his biological inquiries during this

time. He wrote extensively on natural history and the anatomy of animals.

In 343 BC, Aristotle's connections to Macedon resulted in an invitation from Philip of Macedon to tutor the young Alexander, then 13 years old. Aristotle accepted the invitation and the tremendous responsibility of educating a future ruler. Very little is known about the course of study in which Aristotle instructed his young pupil. There are suggestions of an intense romance between teacher and pupil, and also suggestions of considerable disagreements. Aristotle counselled against young Alexander's focus on action and imperial conquest. Aristotle's tutelage of Alexander ended in 340 BC when Alexander was appointed regent for his father. Aristotle likely settled in his hometown of Stagira until he returned to Athens in 335 BC.

Aristotle's return to Athens marks the beginning of the most fruitful period of his intellectual life. Just outside of Athens, Aristotle founded his own school, called the Lyceum. The Lyceum catered to both scholars and the general public. In the mornings, the Lyceum offered lectures on specialized and profound questions of philosophy and science. In the afternoons, there were lectures that appealed to a wider audience. Aristotle was not the only person who lectured at the Lyceum, but as the school's founder, he was the most accomplished lecturer. He also devoted himself to establishing a library at the Lyceum; hundreds of manuscripts were collected, and this library became the model for future great libraries. Aristotle contributed an enormous quantity of his own writings to this collection. It is generally agreed among scholars that most of Aristotle's extant works are from this period of 12 or 13 years during his leadership of the Lyceum. During this time he laid out the broad outlines of scientific inquiry, and he advanced many sciences beyond the points that had previously been attained.

When Aristotle's former pupil Alexander died in 323 BC, Aristotle's position in Athens again became untenable. Alexander had conquered the known world, though many of the Greek city-states bristled at being subsumed under Alexander's Greek Empire. Athens had always been a fiercely independent city-state, and upon Alexander's death another rising tide of anti-Macedonian sentiment overtook Athens. Aristotle's Macedonian connections again aroused the suspicions of the Athenians, and Aristotle was soon charged with impiety. Impiety was the precise charge upon which Socrates was



convicted and sentenced to execution in 399 BC. Socrates was an Athenian, and if he could draw the ire of the Athenians, Aristotle seems to have felt that he as an outsider could not remain in Athens. Claiming that he would not allow Athens to commit a second crime against philosophy, Aristotle left Athens for Chalcis, where he died in 322 BC.

Such was the course of Aristotle's intellectual and public life. It is remarkable that a man devoted to intellectual pursuits felt twice compelled to leave the intellectual centre of Greece. As for Aristotle's private life, we know little. His will is often cited as evidence of his care and affection for others.<sup>3</sup> In his will, he made careful and generous provisions for his relatives and for his slaves. He ensured that his common-law wife and his teenage children would be cared for in a manner befitting a family of their status. His will guarded against his slaves being sold, and his will also arranged for the emancipation of several of his slaves. These are certainly indications of a gentle and caring nature. Aristotle lived too long ago for us to truly know what he was like as a person. From surviving documents, we are able to conclude that he was thoughtful and considerate, and that his life was ruled by a desire to know and inquire. Beyond this, it is difficult to reach any sure conclusions regarding the character of this extraordinary man.

#### THE WORKS OF ARISTOTLE

Of Aristotle's vast and diverse literary works, only about a fifth has survived. Even though most of his life's works are lost to us, we are still able to develop a fair idea of Aristotle's literary activities. The first point to note about the extant works of Aristotle is that most of them were never intended to be read or published. Scholars are now generally agreed that what has survived are most likely Aristotle's own lecture notes. Many of these are writings that he composed and edited over a number of years. These notes seem to be primarily for his use rather than for a reading public. In addition, though we read books of Aristotle as continuous treatises, he did not write them in this way. This is true of many of Aristotle's most famous works. For example, he did not organize his logical writings under the single heading of the *Organon*. Later editors did this. The *Metaphysics* is a collection of 14 different treatises arranged by a later editor under a single heading; we do not know if Aristotle would have consented to

this editorial choice. The *Nicomachean Ethics* is a collection of Aristotle's ethical writings under a single title, perhaps arranged by one of Aristotle's sons. This helps to explain why many of Aristotle's works jump from one topic to another without explanation or transition; later editors tried to group his writings according to topics, but we have no way of knowing how Aristotle wanted his works to be presented.

These points about Aristotle's writings have a profound effect on our experience of reading Aristotle. Many people come to Aristotle's writings after reading Plato's dialogues, and they are often confused by Aristotle's style. The comparison with Plato is not fair to Aristotle. The difference between reading finished works and unfinished notes is immense. Plato's dialogues are finished works that were intended for publication and a reading audience. What is more, in Plato we have perhaps the finest writer in all of philosophy. Plato made it easy and enjoyable for us to read him; the philosophy is difficult, to be sure, but the literary form and style offer unparalleled joys. To read Aristotle, we must do some work and change our expectations.

One of the best ways to read Aristotle is to imagine yourself in the context of a lecture. Consider the different experiences of listening to a lecture and of giving a lecture. Reading Aristotle sometimes demands that you put yourself in each of these positions. It is sometimes helpful to imagine that you had to lecture from Aristotle's writings.<sup>4</sup> There are gaps and transitions that may need to be filled in; there are arguments and examples that may need elaboration and explanation. Some material may be central and require emphasis; other material may be treated as an aside or a tangent. A lecture is also more fluid than a finished treatise. Points of emphasis and the order of presentation can be varied. Lecturers can experiment with their raw material.

It can also be helpful to imagine that one is hearing a lecture as one reads Aristotle. Hearing a lecture is a very different experience, with different expectations, from reading a finished work. One cannot hope to grasp everything that one hears in a lecture; some points may require further research and reading; other points may leap out at you as being of vital importance. Ultimately the goal of a lecture is not to persuade the audience of a particular view, but rather to educate the audience on a subject and to inspire the audience to pursue the matter further. In this respect, Aristotle's writings are a resounding success.

Nearly every reader will find a passage or two on almost every page that spurs him or her to further study. Reading Aristotle sometimes feels like the whole world of learning and inquiry is opening up before you. You may not reach a sure conclusion reading Aristotle, but you will have a thorough sense for the intellectual terrain he discusses. Aristotle's writings invite us to join him in his pursuit of knowledge; his enthusiasm for learning is infectious. Aristotle is not just a great knower; he is a great teacher.

This book treats a selection of Aristotle's writings that are fundamental to his philosophical and scientific enterprise. This book is structured around five concepts that are basic to Aristotle, and hence, to the rest of philosophy: science, substance, nature, soul, and human flourishing. The first chapter treats Aristotle's notion of science (*episteme*); in the *Posterior Analytics*, Aristotle develops an account of the nature of scientific knowledge. The remaining four chapters treat specific sciences that conform in their structure and character to the vision of science laid out in the *Posterior Analytics*. Our second concept is substance or being (*ousia*); this concept is treated in Aristotle's *Metaphysics* and in the *Categories*. Before we can read anything else in the Aristotelian corpus, we must grapple with his treatment of substance. The science of substance, i.e. first philosophy or metaphysics, informs all other scientific endeavours. Our third concept is nature (*phusis*). Aristotle was an accomplished natural scientist, and in the *Physics* he lays out his views regarding nature and the science of nature. Our fourth concept is life or soul (*psuche*). For Aristotle, the most important distinction in the natural world is between that which lives and that which does not. He investigates that most wondrous of all natural phenomena – life – in his work *On the Soul*. Finally, after we progress through the preceding concepts, we are in a position to explore the science of human happiness or flourishing. This is the heart of Aristotle's ethics as developed in the *Nicomachean Ethics*. This is perhaps the richest of all of Aristotle's contributions to philosophy. These five concepts – science, substance, nature, soul, and human flourishing – will anchor our study of Aristotle.

These five concepts are not arcane or highly specialized subjects. Rather, they are subjects that should prove interesting and accessible to general readers of philosophy, history and science. Everyone has something to learn from Aristotle. Everyone can learn to think more clearly about any subject by reading Aristotle and engaging

with his arguments. Anyone who wishes to learn more can surely benefit from an encounter with the man who desired to learn perhaps more than any other human being. Aristotle is often spoken of, sometimes derisively, as a common-sense philosopher. Aristotle is not a common-sense philosopher in the respect that his views are facile or merely popular. Rather, his philosophy is common sense in that it treats issues that are common to all human wondering and curiosity. Aristotle has the skills of a specialist, to be sure, but his motivation arises from a universal human curiosity. We can never hope to achieve what Aristotle accomplished in scholarship, but we can be encouraged by the fact that however great his achievements, he was like the rest of us in that he wondered about the world in which he lived.

We thus embark upon a most magnificent journey, guided by one of the greatest intellectual giants humanity has ever produced. This book is intended as a companion to Aristotle's writings. As such, I recommend the following editions of Aristotle's works, all of which are included in the bibliography. Ackrill has edited a compact edition of Aristotle's works in *A New Aristotle Reader*, published by Princeton University Press. McKeon has edited a more expansive collection entitled *The Basic Works of Aristotle*, published by Modern Library. Finally, Irwin and Fine have edited a collection entitled *Aristotle: Selections*, published by Hackett. Each of these collections is well organized and includes excellent translations. All of the works discussed in this book are included in each of these editions of Aristotle's works. If you suspect you may begin a lifelong affair with Aristotle's writings, you may wish to invest in *The Complete Works of Aristotle*, edited by Barnes and published by Princeton University Press. The point here is that one cannot understand Aristotle only through second-hand accounts; there is simply no substitute for reading Aristotle. The goal of this book is to help you develop the skills to read Aristotle on your own. In order for Aristotle to open up the known world for you, it is sometimes necessary to have help in opening up the world of Aristotle. It is my hope that this book provides its readers with direct access to the unrivalled works of Aristotle.

Aristotle's works are cited using the Bekker pages from the 1831 edition prepared by Immanuel Bekker. The Bekker pages are cited according to the following code: page number, column and line. Hence 1055a6–12 refers to Bekker page 1055, column a, lines 6–12.

These pages are printed in the margins of every scholarly edition of Aristotle's works, and this is the standard way of referring to Aristotle's works. Whatever edition of Aristotle's works you settle on, be sure that the Bekker pages are printed in the margins.

---

## CHAPTER 1

### SCIENCE (*EPISTEME*)

#### DIVISION OF THE SCIENCES ACCORDING TO AIMS AND OBJECTS

We begin by orienting ourselves with respect to the vast body of human knowledge. As we noted in the introduction, Aristotle wrote on every area of human inquiry, so if we attempt to trace Aristotle's various scientific investigations, we shall surely be overwhelmed. We shall find ourselves studying diverse and seemingly unconnected phenomena. But for Aristotle, as for Plato before him, science is not a random or haphazard amassing of facts. Rather, science is structured in a specific and logical way; scientific knowledge is structured according to the aims of the sciences and according to the objects being investigated. The full body of scientific knowledge pursues every possible aim and studies every possible object; by following such a scientific programme, Aristotle hopes to arrive at a complete account of reality. Each specific science studies a certain aspect of the world. When all of the specific sciences are assembled together, they form a unified body of knowledge that exhaustively explains reality.

There are three aims of scientific inquiry which gives rise to a threefold division of the sciences.<sup>1</sup> Let us examine these aims in the order in which they arose in human history. According to Aristotle, the first sciences to develop aimed at production, i.e. making things. In order to survive, human beings needed to produce certain things, and as they did, they began to acquire experience and understanding of how to produce things. These productive aims led to sciences such as agriculture, shipbuilding, carpentry and so on. Aristotle also includes among the productive sciences the fields of art and rhetoric; art is the science of producing beautiful objects and rhetoric is the

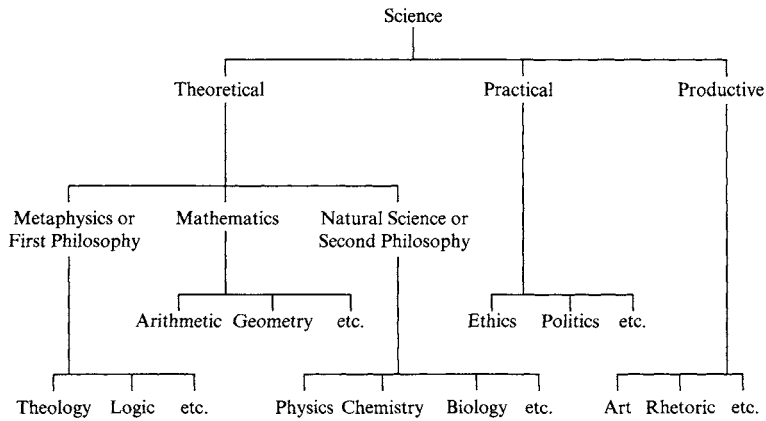
science of producing fine speeches. Note then how each science can be characterized according to its aim and the objects it studies. The productive sciences all aim at making something; the objects they produce determine the specific domain of that science.

Following the emergence of the productive sciences came the practical sciences, i.e. the sciences of action. The practical sciences do not result in any physical product. Instead, these sciences aim at prescribing the means for acting well. The science that studies action with respect to individual human happiness is the science of ethics. The goal of ethics, according to Aristotle, is acting well with respect to what is good for a human being. The science of politics aims at producing excellent actions with respect to human societies and their governance. Both ethics and politics aim at fine action; they differ in that the former studies action with respect to individuals while the latter studies action with respect to societies. They thus share an aim but differ according to their objects.

Finally, once all of our basic needs were satisfied, humans could aim at something other than action or production. According to Aristotle, we began to aim at understanding and truth for no other reason than understanding; we began to seek knowledge for its own sake. Aiming at truth and understanding characterizes the theoretical sciences. In Aristotle's view, there is no loftier or nobler aim than to seek knowledge for its own sake; though theoretical sciences arose last in human history, they are the pinnacle of human scientific achievement.<sup>2</sup> These sciences do not aim at guiding action, nor do they aim at producing some object. Among the theoretical sciences are included the fields of logic, metaphysics, mathematics and the natural sciences. This threefold division of the sciences is represented in Figure 1. To be sure, it is entirely possible that sciences with different aims may overlap. For example, a knowledge of geometry may be of some assistance to a carpenter building a house; the carpenter and the geometer may apply some of the same ideas regarding figure. But while there is some overlap, it is clear that their goals are distinct. The geometer aims at understanding figure while the carpenter aims at the production of a house.

Let us consider some of the features of theoretical science. In Aristotle's view there are three types of entities that theoretical sciences study. First, there are entities that are separable and unchangeable. By separable, Aristotle means that these entities do not depend on anything else for their existence; they are self-subsistent and

## SCIENCE (EPISTEME)



**Figure 1. A representation of the structure of the sciences according to Aristotle.**

capable of existing separately. For example, we need not invoke anything other than the planet to explain the existence of that planet. But for a quality such as a colour, we need to invoke something that is coloured; colour only exists insofar as there is a coloured thing. Colour is thus not self-subsistent and separable because some other thing must be invoked to explain the existence of colour. Entities such as planets, animals and others – what Aristotle calls substances – exist on their own, without invoking anything else. Unchangeable entities are those that are not subject to change; they are not generated or destroyed, nor are they modified in any way. For Aristotle, the heavenly bodies are separable and unchangeable. The heavenly bodies undergo the same circular motion for all eternity; they are also composed of an element not found in our world, i.e. the ether.<sup>3</sup> We now recognize that Aristotle was in error in his theory of the heavenly bodies, but it is clear what line of reasoning led him to his theory. In his view, the motion of the heavenly bodies is fundamentally different from motion on earth; the motion of heavenly bodies is in circles, whereas motion on earth is rectilinear, i.e. up and down or side-to-side. Aristotle also invoked observational evidence of the heavens to support his claim that the heavenly bodies undergo unceasing circular motions.

The theoretical science that studies separable and changeable objects is called first philosophy, or as it is now often referred to,



- [click The Secret Portal \(The Secret Portal, Book 1\)](#)
- [Storey's Guide to Raising Ducks: Breeds, Care, Health \(2nd Edition\) here](#)
- [download online Managing Risks in the European Periphery Debt Crisis: Lessons from the Trade-off between Economics, Politics and the Financial Markets](#)
- [School of Fire \(Starfist, Book 2\) pdf](#)
- [read Launch vehicles conceptual design and structural analysis: an integrated approach via FEM online](#)
  
- <http://flog.co.id/library/The-Secret-Portal--The-Secret-Portal--Book-1-.pdf>
- <http://conexdx.com/library/Tu-hijo--tu-espejo.pdf>
- <http://www.experienceolvera.co.uk/library/Hildegard-of-Bingen-s-Unknown-Language--An-Edition--Translation--and-Discussion--The-New-Middle-Ages-.pdf>
- <http://schroff.de/books/Strokes-of-Genius-4---The-Best-of-Drawing--Exploring-Line.pdf>
- <http://patrickvincitore.com/?ebooks/Satyajit-Ray-on-Cinema.pdf>