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Philosophy

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# The Rise of Science

Renaissance philosophers made exciting new discoveries in a variety of fields, including medicine, astronomy, and chemistry. These discoveries contributed to the rise of what we now call modern science.

Modern science, a new way to study observable reality, was greatly encouraged by new technological developments of the Renaissance, which, in turn, greatly encouraged many more technological developments right up to this day.

But it was a gradual process, this development of modern science. In the early days of the seventeenth century, science was a mixed bag—a little religion, a little magic, a bit of philosophy, some social influences, and, of course, some new scientific ideas. At this time, science began slowly separating itself from some of these other areas and moved closer to focusing itself on the physical, or material, world.

## In This Chapter

- Why some philosophers didn't like science
- How people tend to get hold of mistaken ideas
- Descartes's thoughts about the mind and the passions
- How ideas about the mind are related to ideas about government
- Newton's application of math to the study of physical things

## Bacon

One of the main factors in the rise of science as a distinct, systematic approach to finding out about reality was the work of the English philosopher Francis Bacon (1561–1626).

Bacon was interested in knowledge in general, especially knowledge about the natural world. Like other philosophers before him, he recognized that knowledge could be extremely useful, more useful than anyone had yet imagined. This concept got Bacon very interested in knowledge for its own sake. He believed that the more we know, the more we will be able to help ourselves in the long run. For this reason, we ought to learn all we can, regardless of whether or not we see an immediate need for the knowledge.

## Rectifying Knowledge

Bacon's interest in the possibilities for knowledge gave him a new perspective on the importance of avoiding mistakes. According to Bacon, being wrong was not just something that could interfere with your personal, individual well-being; it could prevent everybody from taking advantage of the potentially wonderful uses of knowledge. Bacon wanted everyone who took the time and effort to think about things to be right, and on the same wavelength, so to speak, so that everyone would be able to share in the same mission—putting knowledge to good use.

Because he had such big plans for knowledge, Bacon was extremely critical of all the learning that he saw as wrong. In particular, he criticized the Scholastic, Aristotelian philosophers, or “school-men” as he called them, for believing and teaching a lot of ideas based solely on words, rather than on a scientific investigation of material things in the natural world.



### FASCINATING FACT

Many early scientists adopted the motto, *nullius in verba*, “nothing in words,” to show how unimportant they considered words to be in the study of reality.

## Bacon's Idols

More generally, Bacon noticed that people tended to cling to mistaken ideas for a variety of reasons. He called these mistaken ideas “idols of the mind,” suggesting that people worshipped their false beliefs as if they were false gods. He identified four different kinds of these mental “idols”:

- **Idols of the tribe.** Mistakes caused by human nature. As people, we are a “tribe” whose perceptions and emotions are inherently unreliable.
- **Idols of the cave.** Mistakes caused by tendencies of the individual. Different people have different ways of understanding things. As individuals, we all live inside our own “cave” where we see things in our own way.



- **Idols of the marketplace.** Mistakes caused by convention. When we communicate with one another, we often agree on things that have nothing to do with the truth. Instead, we “buy and sell” ideas because they seem socially valuable.
- **Idols of the theater.** Mistakes caused by philosophical authorities. Philosophers like to show off and “play act” as sages who dispense wisdom, even though they may not have a clue what they’re talking about.

Bacon believed that the “idols of the mind” had confused people so much that there was more mistaken knowledge around than good, reliable knowledge. So he said that we should just throw all the stuff that passed for philosophy out the window and start over again, focusing this time on nature rather than words.



#### FASCINATING FACT

Bacon exaggerated the differences between his philosophy and Aristotle's. Even though Bacon complained that Aristotle's logic was wrong, many of his own ideas were actually based on Aristotle's way of seeing things. Both philosophers were firm believers in the importance of making careful observations of the natural world.

### Questioning Authority

Bacon reacted against the popular tendency of the times to take everything that was written down as truth, or knowledge. Many books on geography, history, and natural history, for example, written in the Middle Ages were a combination of facts and myths. People read them without making any distinction between truth and fiction. It was all the same to them.

Bacon argued that we need to resist the temptation to say things we don't know to be true. Instead, we should be content to say only what little we do know in the hopes of someday being able to build on that. We should also be careful in our use of words by assigning them consistent, clear definitions. Then we should make sure we use our ideas logically, and test their accuracy by performing experiments. In Bacon's words, “If a man begins with certainties, he will end in doubts, but if he will be content to begin with doubts, he shall end in certainties.”

Bacon's campaign was a bold one: people must pool their efforts to learn more about the natural world. They must sift out the tons of misinformation that had accumulated over the centuries. Thanks to Bacon, philosophy began to clean up its act and set the stage for the beginning of modern science.