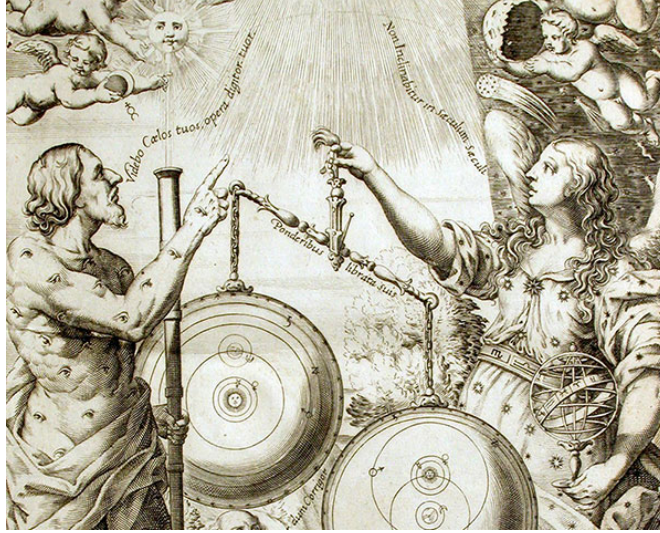


# THE GREAT IDEAS ONLINE

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*Philosophy is Everybody's Business*

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Frontispiece from *New Almagest* (1651), by the Italian astronomer and Jesuit priest Giovanni Battista Riccioli.

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## THE VIRTUE OF SCIENTIFIC THINKING

Steven Shapin

### *Can science make you good?*

Part 1 of 2

Of course it can't, some will be quick to say—no more than repairing cars or editing literary journals can. Why should we think that science has any special capacity for moral uplift, or that scientists—by virtue of the particular job they do, or what they know, or the way in which they know it—are morally superior to other sorts of people? It is an odd question, maybe even an illogical one. Everybody knows that the prescriptive world of ought—the moral or the good—belongs to a different domain than the descriptive world of is.

This dismissal may capture the way many of us now think about the question, if indeed we think about it at all. But there are several reasons why it may be too quick.

First, there are different ways of understanding the question, and different modern sensibilities follow from the different senses such a question might have. Some ways of understanding it do lead to the glib dismissal, but other ways powerfully link science to moral matters. Here are just a few of the ways we might think about the relationship between science and virtue, about whether aspects of science have the power to make us good:

- Is there something about what scientists know that makes them better people than the normal run of humankind? Are different sorts of scientists—physicists, mathematicians, engineers, biologists, sociologists—more or less virtuous? And do some sorts of scientific expertise count as moral expertise?
- Are scientists recruited from a section of humankind that is already better than the norm?
- Is there something scientists know that, were it widely shared with non-scientists, would make the rest of us better? Or is there something about how scientists come to their knowledge—call it the scientific method—that would make the practices of non-scientists better, were they to master it? Would wide application of the scientist’s way of knowing make our society fairer, more just and flourishing?
- Is there something about scientists that qualifies them to intervene in social and political affairs and make decisions about all sorts of things, including, but not confined to, the social uses of their knowledge? Is a philosopher-king, or a scientist-politician, an anomaly, an absurdity, or a highly desirable state of affairs? Would a world governed by scientists be not only more rational but also more just?

The ideas and feelings informing the tendency to separate science from morality do not go back forever. Underwriting it is a sensibility close to the heart of the modern cultural order, brought into being by some of the most powerful modernity-making forces. There was a time—not long ago, in historical terms—when a different “of course” prevailed: of course science can make you good. It should, and it does.

A detour through this past culture can give us a deeper appreciation of what is involved in the changing relationship between knowing about the world and knowing what is right. Much is at stake. Shifting attitudes toward this relationship between is and

ought explain much of our age's characteristic uncertainty about authority: about whom to trust and what to believe.

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It is rarely a bad idea to start with the Greeks.

“All men by nature desire to know” is the first sentence of Aristotle's *Metaphysics*. The drive for knowledge, from this point of view, marks what it is to be human, making people both happy and good.

This notion went out of fashion with early Christianity, when curiosity became a vice, related to pride. But Protestantism had a more favorable view of knowledge than did Catholicism. The Protestants studied by the German sociologist Max Weber wanted to know, in particular, whether they were saved or damned, but the seventeenth-century English Puritans studied by the American sociologist Robert Merton wanted to know about the natural world.

Natural theology rendered science moral.  
It was a powerful cultural form.

There were several reasons why the Puritans thought the human desire for knowledge of the world fulfilled a religious duty. One was that the human body was God's temple: God endowed it with its capacities, with the divine intention that they be used. Because the God-given faculties of reason and observation lifted us above the beasts, making us a little like the angels, their use should not be restricted. There could not be such a thing as too much knowledge, since our capacity to know whatever we could know was a divine gift. That drive to knowledge—a religious drive—could be directed anywhere: anything that one could legitimately know, one should know. But it was understood with special religious force when the object of knowledge was nature—that is, when one was doing observational or experimental science.

The trope that expressed this attitude best was the Book of Nature, the second of the two books written by God to make His attributes and intentions accessible to man. (The first book, of course, was Scripture.) The figure appears, possibly for the first time, with Saint Augustine in the fourth century. It endures throughout the Middle Ages, but it acquires new and powerful meaning in the seventeenth and eighteenth centuries, when it is invoked by many writers on many subjects. Galileo famously used it to prescribe how nature should be studied:

Philosophy is written in that great book which ever lies before our eyes—I mean the universe—but we cannot understand it if we do not first learn the language and grasp the symbols, in which it is written. This book is written in the mathematical language, and the symbols are triangles, circles and other geometrical figures, without whose help it is impossible to comprehend a single word of it.

By “philosophy” Galileo meant “natural philosophy,” but this term does not translate simply into our modern notion of science, or even physics. Galileo was speaking of two ways of knowing that at the time were generally taken to be distinct, the one called philosophy and the other mathematics.

The aim of philosophy was knowledge of causes and of the nature of things—what makes bodies move in certain ways, for example, and what they are made of. The aim of mathematics, on the other hand, was predictive knowledge—where you could expect to find Jupiter at any given time, say, rather than knowledge of what caused it to move in the heavens or what it was made of. Galileo understood and worked with this distinction, as did Isaac Newton in his 1687 *The Mathematical Principles of Natural Philosophy*. Their work is celebrated by many as the origins of modern science, but both Galileo and Newton puzzled some of their contemporaries, who thought that they had slipped into a confusion of disciplines. The subsequent career of this distinction is worth bearing in mind as we consider the moral bearings of scientific work: the natural philosopher occupied terrain shared with the theologian; the mathematician did not.

The trope of nature’s book was available in the seventeenth and eighteenth centuries to justify science to anyone who thought that it might make people irreligious. But there was little cause for worry. Robert Boyle, Robert Hooke, and Newton were far from alone among scientific practitioners who argued that their studies could not possibly have such an effect. Reading the Book of Nature, finding the expert interpretative code to do so, was precisely like reading Scripture. It was a way to God and to godliness. Boyle said he worked in his laboratory on Sundays because he saw his scientific work as a form of divine worship.

The movement “from Nature up to Nature’s God,” as Alexander Pope wrote in the 1730s, became one of the great cultural institutions of the period between the seventeenth and nineteenth centuries. Known as natural theology, some of its basic texts were read

at Cambridge by the young Charles Darwin, who was deeply impressed by the power of the crucial “argument from design.” Take apart a watch, observe the superb adaptation of complex structure to function, and you cannot but conclude that it is the product of a designing intelligence. Reasoning in the same way about a natural structure, such as the eye of an insect, the natural theologian likewise concludes that such a thing must have been designed—but by divine, rather than human, intelligence.

For those who accepted natural theological modes of reasoning, science was a God-proving activity because it uncovered the evidence of intelligent design. It uplifted not only those who practiced it but also those who encountered its picture of the world in books and classrooms: they too learned to see divine design all about them. Inquiry within this framework rendered theology rational at the same time that it rendered science moral. It was a powerful and persistent cultural form.

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Mathematical practice, as opposed to natural philosophy, did not participate in this theologically flavored enterprise. Even Galileo was able to insist on the difference between what he was doing and the proper and particular concerns of the Church. Under pressure from the Inquisition, he defended his Copernicanism by claiming that the heliocentric system might be mathematically useful even if it was not philosophically true. Calculating planetary positions simply went better on the Copernican model. He likewise marked the distinction between mathematics and theology when he said that the purpose of astronomy was to teach people the way the heavens go, not to teach them how to go to heaven.

The most philosophically consequential attack on these sensibilities relating science and virtue came from David Hume in the 1730s. He read a lot of theology and what we would now call sociology and was puzzled by how arguments in those fields tended to go. The writers would be describing social arrangements or the existence of God—following, Hume said, “ordinary ways of reasoning”—and then, all of a sudden, and without remarking on it, there would be an “imperceptible” change: the author would move from writing about what is or is not to writing about what ought to be or ought not be. But the is and the ought belong to different orders; it is “altogether inconceivable” that you could deduce the one from the other. The wider implications of Hume’s argument were obvious enough. If you can’t go from is to ought, then natural theology has no logical foundation: you can’t reason your way from nature

to morality.

A similar strain of thinking emerged much later, in the early twentieth century, when philosophers formally identified the so-called naturalistic fallacy: the logical mistake of defining what is moral or good through such properties as pleasantness or desirability or instrumental advantage or, indeed, the natural itself. (Think, for example, of utilitarianism and its modern econometric progeny.) You can't logically deduce the right thing to do by reducing it to properties that don't belong to moral discourse.

The source of the Hume-like sentiments with which social scientists and historians are likely to be most familiar is Weber's lecture "Science as a Vocation," delivered in 1917 in Munich. The world, Weber said, has become "disenchanted." In principle, everything can be known by rational calculation; there is nothing that is not calculable. Scientists may have once believed that they could show you the way to God or discover the "meaning" of creation, but not anymore, Weber said. "Except for some big children" still to be found in academic science departments, no one believed that science could be a way to God; it is in its very nature an "irreligious power." If the sciences teach us anything about meaning, it is that we cannot get there from here. And if there is such a thing as the meaning of the world, there is no scientific way to discover it.

Weber represented what he was doing as science. He put himself in the same institutional and cultural boat as chemists and zoologists. Addressing the Munich students who were his audience, he said that people like them expected people like him to tell them what to do. But they were making a mistake. There was nothing in what he knew as a scientist that gave him any authority to define moral action, the right thing to do. If he did so, he would be abandoning the very thing that gave his calling its meaning. Putting himself professionally on the fact side of the fact-value distinction, Weber suggested that the only morality or meaning arising from the practice of science was the manly embrace of amorality and meaninglessness. Allying himself with Leo Tolstoy, he insisted that science gives no answer to the question "how to live"—or, as the existentialists later liked to say, "Everything has been figured out, except how to live."

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