Primary Sources

The Discourse on Method

René Descartes

Seventeenth-century science needed new philosophical and methodological standards for truth to replace those traditionally used to support scientific assumptions. These were forcefully provided by René Descartes (1596–1650) in his Discourse on Method *(1637). Born and educated in France, but spending his most productive years in Holland, Descartes gained fame as a mathematician, physicist, and metaphysical philosopher. The following excerpt from his* Discourse *contains the best-known statement of his approach to discovering truth.*

CONSIDER: *The ways in which Descartes' approach constitutes a break with traditional ways of ascertaining the truth; the weaknesses of this approach and how a modern scientist might criticize this method; how this approach reflects Descartes' background as a mathematician.*

In place of the multitude of precepts of which logic is composed, I believed I should find the four following rules quite sufficient, provided I should firmly and steadfastly resolve not to fail of observing them in a single instance.

The first rule was never to receive anything as a truth which I did not clearly know to be such; that is, to avoid haste and prejudice, and not to comprehend anything more in my judgments than that which should present itself so clearly and so distinctly to my mind that I should have no occasion to entertain a doubt of it.

The second rule was to divide every difficulty which I should examine into as many parts as possible, or as might be required for resolving it.

The third rule was to conduct my thoughts in an orderly manner, beginning with objects the most simple and the easiest to understand, in order to ascend as it were by steps to the knowledge of the most composite, assuming some order to exist even in things which did not appear to be naturally connected.

The last rule was to make enumerations so complete, and reviews so comprehensive, that I should be certain of omitting nothing.

Those long chains of reasoning, quite simple and easy, which geometers are wont to employ in the accomplishment of their most difficult demonstrations, led me to think that everything which might fall under the cognizance of the human mind might be connected together in a similar manner, and that, provided only one should take care not to receive anything as true which was not so, and if one were always careful to preserve the order necessary for deducing one truth from another, there would be none so remote at which he might not at last arrive, nor so concealed which he might not discover. And I had no great difficulty in finding those with which to make a beginning, for I knew already that these must be the simplest and easiest to apprehend; and considering that, among all those who had up to this time made discoveries in the sciences, it was the mathematicians alone who had been able to arrive at demonstrations—that is to say, at proofs certain and evident—I did not doubt that I should begin with the same truths which they investigated.

SOURCE: René Descartes, *The Discourse on Method,* in *The Philosophy of Descartes,* ed. and trans. Henry A. P. Torrey (New York: Henry Holt, 1982), pp. 46–48.

Letter to Christina of Tuscany: Science and Scripture

Galileo Galilei

The most renowned scientist at the beginning of the seventeenth century was the Italian astronomer, mathematician, and physicist Galileo Galilei (1564–1642). His discoveries

about gravity, velocity, and the movement of astronomical bodies were grounded in a scientific method that ran contrary to the accepted standards for truth and authority. In the following excerpt from a letter to the Grand Duchess Christina of Tuscany (1615), Galileo defends his ideas and delineates his view of the correct line between science and scriptural authority.

CONSIDER: *According to Galileo's view, the kinds of topics or questions that are appropriately scientific and those that are appropriately theological; how Galileo's views compare with those of Descartes; why Galileo's views are so crucial to the Scientific Revolution.*

I think that in discussions of physical problems we ought to begin not from the authority of scriptural passages, but from sense-experiences and necessary demonstrations; for the holy Bible and the phenomena of nature proceed alike from the divine Word, the former as the dictate of the Holy Ghost and the latter as the observant executrix of God's commands. It is necessary for the Bible, in order to be accommodated to the understanding of every man, to speak many things which appear to differ from the absolute truth so far as the bare meaning of the words is concerned. But Nature, on the other hand, is inexorable and immutable; she never transgresses the laws imposed upon her, or cares a whit whether her abstruse reasons and methods of operation are understandable to men. For that reason it appears that nothing physical which sense-experience sets before our eyes, or which necessary demonstrations prove to us, ought to be called in question (much less condemned) upon the testimony of biblical passages which may have some different meaning beneath their words. For the Bible is not chained in every expression to conditions as strict as those which govern all physical effects; nor is God any less excellently revealed in Nature's actions than in the sacred statements of the Bible. . . .

From this I do not mean to infer that we need not have an extraordinary esteem for the passages of holy Scripture. On the contrary, having arrived at any certainties in physics, we ought to utilize these as the most appropriate aids in the true exposition of the Bible and in the investigation of those meanings which are necessarily contained therein, for these must be concordant with demonstrated truths. I should judge that the authority of the Bible was designed to persuade men of those articles and propositions which, surpassing all human reasoning, could not be made credible by science, or by any other means than through the very mouth of the Holy Spirit.

Yet even in those propositions which are not matters of faith, this authority ought to be preferred over that of all human writings which are supported only by bare assertions or probable arguments, and not set forth in a demonstrative way. This I hold to be necessary and proper to the same extent that divine wisdom surpasses all human judgment and conjecture.

But I do not feel obliged to believe that that same God who has endowed us with senses, reason, and intellect has intended to forgo their use and by some other means to give us knowledge which we can attain by them.

The Papal Inquisition of 1633: Galileo Condemned

Not surprisingly, Galileo found his views under attack from a variety of corners, including important groups within the Church. Ultimately his defense of Copernicanism, which held that the earth was not the center of the universe, was formally condemned by the Church. When he argumentatively summarized these ideas again in his Dialogue Concerning the Two Chief World Systems *(1632), he was brought before the Papal Inquisition, forced to recant his views, and confined to a villa on the outskirts of Florence. The following are some of the main charges against Galileo during his trial for heresy before the Inquisition in 1633.*

CONSIDER: *Why Galileo's views were so threatening to the Church; some of the long-range consequences of such a stance by the Church toward these views.*

We say, pronounce, sentence, and declare that you, the said Galileo, by reason of the matters adduced in trial, and by you confessed as above, have rendered yourself in the judgment of this Holy Office vehemently suspected of heresy, namely, of having believed and held the doctrine—which is false and contrary to the sacred and divine Scriptures—that the Sun is the center of the world and does not move from east to west and that the Earth moves and is not the center of the world; and that an opinion may be held and defended as probable after it has been declared and defined to be contrary to the Holy Scripture; and that consequently you have incurred all the censures and penalties imposed and promulgated in the sacred canons and other constitutions, general and particular, against such delinquents. From which we are content that you be absolved, provided that, first, with a sincere heart and unfeigned faith, you abjure, curse, and detest before us the aforesaid errors and heresies and every other error and heresy contrary to the Catholic and Apostolic Roman Church in the form to be prescribed by us for you.
