Chapter 2
Galileo and the philosophy of science

When Galileo recanted his Copernicanism in 1633, what did that signify? Was it a victory for religious obscurantism and a defeat for free scientific inquiry? Was it evidence that science and religion are inevitably locked in ideological and institutional combat? Unsurprisingly, there was more to it than that. On all sides of the Galileo case there was agreement that it was proper and rational both to seek accurate knowledge of the world through observation of nature and also to base one's beliefs on the Bible. The conflict was not between empirical science and authoritarian religion but rather between differing views within the Catholic Church about how to interpret nature and scripture, especially when they seemed to disagree. An appreciation of the exact context of Galileo's trial, the shadow cast over it by the Protestant Reformation of the previous century, and the politics of the Papal court at the time all help to explain how these issues took on the dramatic character that they did in 1633, almost a century after Nicolaus Copernicus had argued for a sun-centred astronomy in his book *On the Revolutions of the Heavenly Spheres* in 1543.

Before coming back to this retelling of the Galileo story as a disagreement among 17th-century Catholics about how to read the Bible, it will be useful to look at some general questions about the sources of knowledge. These will help to make sense both of what was at stake in Rome in June 1633 and also of general questions about the philosophy of science that frequently recur in contemporary debates about science and religion.

How do we know anything?

We generally derive our knowledge of the world from four sources: our senses, our powers of rational thought, the testimony of others, and our memory. The first obvious thing to note about all these sources is that they are fallible. Our senses can deceive us, our reasoning can be faulty, other people can knowingly or accidentally mislead us, and most of us know only too well (and increasingly with age) how partial and distorted our memories can be. The whole project of modern science could be summarized as the attempt to weave these individually relatively feeble threads into a more resilient web of knowledge. So the sense experience of one person must be witnessed, corroborated, and repeated by many others before it is accepted. Simple observations of the properties of things must be supplemented by carefully designed experiments which test more precisely how they behave in different circumstances. Human powers of perception on their own may be limited, but the invention of the telescope and the microscope in the early 17th century, and of many other even more sophisticated devices since then, has enormously increased the scope and accuracy of the observations and measurements that can be made. But experiments could not be designed, and observations would not make any sense, without the use of reason. Theoretical hypotheses about the nature of reality, and reasoning about what experimental evidence is needed to support or refute them, are prerequisites of scientific knowledge. Finally, scientific experts must cite the sources of their knowledge and explain the chain of their reasoning if their testimony is to be accepted. And the publication of scientific results in treatises, books, specialist journals, and, now, electronic databases provides us with a collective and well-documented memory greater than anything that would be possible by relying on one person's memory alone.

The knowledge thus produced is a highly prized possession in human societies. It bestows on us the ability to manipulate not only the natural world but also each other. One of the most important advocates of science in 17th-century England, Francis Bacon, wrote that 'human knowledge and human power meet in one; for where the cause is not known the effect cannot be produced'. In other words, an understanding of the secret workings of nature would allow people to produce machines and medicines to improve the human condition. Bacon also wrote, to justify the new knowledge of the period, that 'all knowledge appeareth to be a plant of God's own planting', whose spread and flourishing at that time had been divinely ordained.

Natural philosophers in 17th-century England such as Robert Boyle and Robert Hooke – the new 'virtuosi' of the experimental method, the founders of the Royal Society – were perceived by some as a threat to orthodoxy. Their claims to be able both to discover and to manipulate hidden forces in nature seemed to verge on usurping the role of God. That was why it was important to reassure their readers that in reaping this knowledge they were collecting a harvest which was, in Bacon's words, 'of God's own planting'. In this image, God planted the seed of knowledge and natural philosophers harvested its fruit. According to another popular metaphor, God was imagined not as a kind of cosmic farmer but, as we have noted, as an author of two books – the book of nature and the book of scripture. This metaphor was based on the same idea – that the ultimate source of knowledge was God and that humans had to adopt certain techniques to acquire that knowledge.

One of the useful things about these metaphors of agriculture and of reading is that they draw attention to the fact that human knowledge (at least of the natural kind) is made rather than simply found. Seeds do not become plants and bear fruit unless they are sown in the right conditions, are watered and fed, and are harvested in the right way. Texts do not generally have obvious meanings, but rather these must be teased out through the collective efforts of many readers using different historical and literary techniques. Even if one decides to approach a text in search of its 'literal' meaning, that is by no means a simple matter. It is also well known among literary scholars that the project of discerning an author's intentions in a text is a difficult and controversial one. The histories of science and religion reveal that these difficulties have been experienced in full measure in relation to both of God's books. Neither nature nor scripture offers a transparent account of its author's intentions. Some have gone further, of course, and denied that either is a work of divine authorship at all. Some read the book of nature as an autobiography and the scriptures as purely human works.

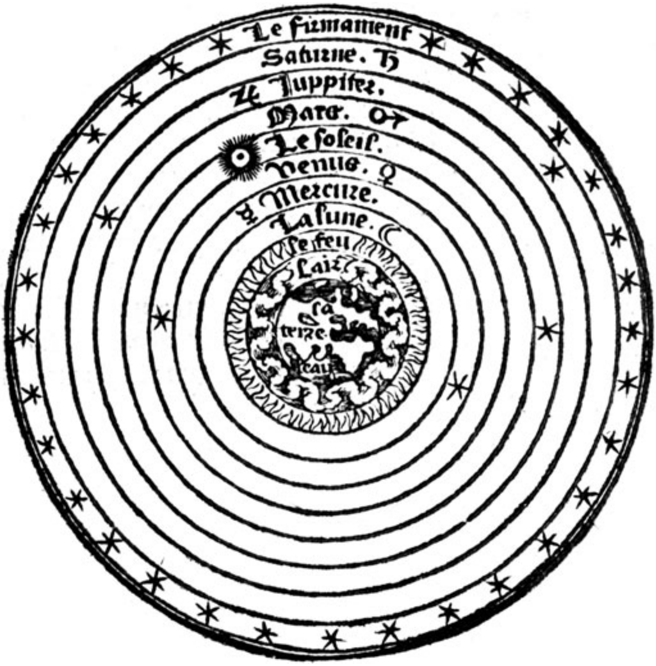
This brings us to the question of whether, in addition to the four sources of knowledge already mentioned – sense, reason, testimony, and memory – a fifth needs to be added, namely revelation. It is a belief shared by Jews, Christians, and Muslims that God's authorship can be detected both in nature and in scripture (the Torah, the Bible, or the Quran, respectively). While the natural world reveals the power, intelligence, and goodness of its Creator, the scriptures reveal God's plans for his chosen people and the legal and moral basis according to which they should live. Corresponding to this idea is the subtly different distinction between natural and revealed forms of knowledge. Natural knowledge is produced by the exercise of the natural human faculties of sense and reason (these faculties can be engaged in reasoning about scripture as well as about the natural world). Revealed knowledge is produced by a supernatural uncovering of the truth – either through the medium of scripture or by a direct revelation of God to the individual believer. Natural theology, then, as opposed to revealed theology, is a form of discourse about God based on human reason rather than on revelation. This includes theological works making inferences about God from the design apparent in the natural world – as in William Paley's famous *Natural Theology* (1802) – but it also includes more purely philosophical works about God's existence and attributes. Modern books arguing for belief in 'Intelligent Design' on the basis of the 'irreducible complexity' of nature are within this same tradition, as we will see in Chapter 5.

Debates about science and religion virtually always involve disagreements about the relative authority of different sources of knowledge. This is true of debates about the relative weight to be given to testimony and to experience when considering claims about miracles, as we will see in Chapter 3. It is also true of the 18th-century clash between Deism and Christianity. Thomas Paine's objection to Christian philosophers was not that they found God in nature – he did too – but that they thought they could also find God through his self-revelation in the Bible. For Paine, the only possible kind of revelation was from God directly to an individual. If God ever did act in this way, it was revelation 'to the first person only, and hearsay to every other'. The scriptures were therefore no more than mere human testimony and the rational reader was not obliged to believe them. Advocates of creationism in the 20th century took the opposite approach to Paine's. For them, the word of God as revealed in the Bible was the most reliable form of knowledge and anything that seemed to contradict their interpretation of scripture had to be rejected. This included mainstream scientific theories of evolution. Some creationists were even moved to re-read the book of nature and produce their own 'Creation Science' which harmonized geology with Genesis. While rationalists have rejected revelation altogether, and fundamentalists have insisted that all forms of knowledge be tested against the Bible, many more have looked for ways to reconcile their readings of God's two books without doing violence to either.

The rise and fall of Galileo

Galileo belonged to this last category of believers seeking harmony between the Bible and knowledge of nature. He endorsed the view that the Bible is about how to go to heaven and not about how the heavens go. In other words, if you wanted to know about matters pertaining to salvation you should consult scripture, but if you were interested in the detailed workings of the natural world, then there were better starting points – namely empirical observations and reasoned demonstrations. This was not a particularly unorthodox view in itself, but Galileo failed to persuade the authorities that it was a principle that could be applied to his case. Although the church was certainly not opposed in general to the study of mathematics, astronomy, and the other sciences, there were limits to how far the authority of the Bible and of the church could be challenged by an individual layman like Galileo. He went beyond those limits. There were three central characters in the story of how he did so – the telescope, the Bible, and Pope Urban VIII.

At the beginning of the 17th century, Galileo was one of only a tiny handful of natural philosophers who thought it likely that the Copernican astronomy was an accurate description of the universe. The majority of those who took an interest in such questions, including the mathematicians and astronomers working within the Roman Catholic Church, held to the system of physics and cosmology associated with the ancient Greek philosopher Aristotle. There were two elements in this existing Aristotelian science which would be challenged by Galileo. First, there was the earth-centred model of the cosmos produced by the 2nd-century Greek astronomer Ptolemy. This was the standard astronomical model and, despite certain complexities and technical problems, it worked as well as the Copernican model as a device for calculating the positions of the stars and planets, and had the considerable advantage of according with the common-sense intuition that the earth was not in motion. The second Aristotelian principle that would come under attack was the division of the cosmos into two regions – the sublunary and the superlunary. The sublunary region consisted of everything within the orbit of the moon. This was the region of corruption



2. A 16th-century illustration of Ptolemy's earth-centred astronomical system. At the centre is the world, composed of the four elements of earth, water, air, and fire, surrounded by the spheres of the moon, Mercury, Venus, the sun, Mars, Jupiter, Saturn, and finally the sphere of the fixed stars. This Ptolemaic system had been endorsed by Aristotle and was still accepted by almost all natural philosophers at the start of the 17th century.

and imperfection and of the four elements of earth, water, air, and fire. In the superlunary region, the domain of all the celestial bodies, everything was composed of a fifth element, ether, and was characterized by perfect circular motion.

Galileo's great contribution to astronomy was to use a newly invented optical instrument – named the 'telescope' in 1611 – to provide observations with which to challenge this Aristotelian and

Ptolemaic theory. Galileo did not invent the telescope himself, but as soon as he heard of its invention he set about making his own superior version. The earliest telescopes, made in the Netherlands, magnified only by a factor of three. Galileo developed an instrument with magnifying power of about twenty times, which he turned towards the heavens with spectacular results. These results were published in two books, *The Starry Messenger* in 1610 and his *Letters on Sunspots* in 1613, which established his reputation as a brilliant observational astronomer and as one of the leading natural philosophers in Europe. These works also made it clear that Galileo favoured the Copernican astronomy.

Just a couple of examples will give a sense of how Galileo wielded his telescope against Aristotelian science. Perhaps the most telling single discovery made by Galileo was that Venus, when viewed through the telescope, could be seen to display phases. In other words, like the moon, its apparent shape varied between a small crescent and a full disc. This strongly suggested that Venus orbited the sun. If the Ptolemaic system had been true and Venus, which was known always to be close to the sun in the sky, described an orbit closer to the earth than the sun's, then it should have appeared always as a thin crescent. Secondly, Galileo was able to deploy a number of key observations against the strong commitment of the Aristotelians to the division of the cosmos into distinct sublunary and superlunary regions. His telescope revealed that the moon was a rocky satellite with craters and mountains – more like the earth than like an ethereal and perfect heavenly body. He also showed that Jupiter had four satellites or moons. This helped defeat a common objection to the Copernican theory. On the Ptolemaic theory, the earth's moon was treated as the closest of several planets, all of whose orbits centred on the earth. If Copernicus were right, then the moon would have to orbit the earth, while the earth in turn went around the sun. Was it possible that a celestial body could move in an orbit with a centre other than the centre of the cosmos? The discovery that Jupiter was accompanied in its orbit (whether that was around the earth or around the sun) by four satellites established that such motion was indeed possible. Finally, Galileo's discovery of sunspots further undermined the Aristotelian distinction between perfect heavenly bodies and a changeable and imperfect earth.

It was largely thanks to Galileo's publications that Copernicanism became such a live issue in the 1610s. Galileo was aware that his advocacy of the new astronomy was arousing both theological and scientific objections. One of the reasons for the former was the apparent inconsistency between Copernican astronomy and the Bible. Several Old Testament passages referred to the movement of the sun through the heavens and the immobility of the earth. An often-quoted passage was from the Book of Joshua, which referred to God stopping the sun and the moon in the sky to light the earth while the Israelites took vengeance on the Amorites. Seeking to forestall biblical objections to the view that the earth moves, Galileo wrote his *Letter to the Grand Duchess Christina* in 1615 in which he articulated his views about how to deal with apparent conflicts between natural and revealed knowledge. He relied heavily on the views of the Fathers of the Catholic Church, especially St Augustine. The central idea was the principle of accommodation. This stated that the Bible was written in language accommodated to the limited knowledge of the relatively uneducated people to whom it was initially revealed. Since the readers of the Book of Joshua believed that the earth was stationary and the sun moved around it, God's word was couched in terms that they would understand. All agreed that biblical references to God's 'right hand' or to God's experience of human passions such as anger should not be taken literally but were accommodations to common understanding. Galileo argued that the same attitude should be taken to biblical passages referring to the movement of the sun. The other general principle Galileo adopted, mentioned above, was that the Bible should only be given priority in matters relating to salvation. In matters of natural knowledge, if the text seemed to contradict the best available science, then it would need to be reinterpreted.

All of this was indeed in tune with St Augustine's 4th-century approach to scripture. However, Galileo was writing at a time when more conservative views were in the ascendancy thanks to the crisis of the Protestant Reformation, which had started in the early decades of the 16th century in Germany and England, and continued to divide Europe both politically and religiously in the 17th century. One of the central tenets of Protestant forms of Christianity was the importance of scripture and the right of each individual to read the Bible in their own language, rather than encountering Christian teaching only through the mediation of priests and the doctrinal pronouncements of Church Councils. The Catholic Church's principal response to the Reformation came in the form of a series of meetings which comprised the Council of Trent (1545–63). One of the declarations of that Council was that, in matters of faith and morals,

> no one, relying on his own judgement and distorting the Sacred Scriptures according to his own conceptions, shall dare to interpret them contrary to that sense which Holy Mother Church, to whom it belongs to judge their true sense and meaning, has held and does hold, or even contrary to the unanimous agreement of the Fathers.

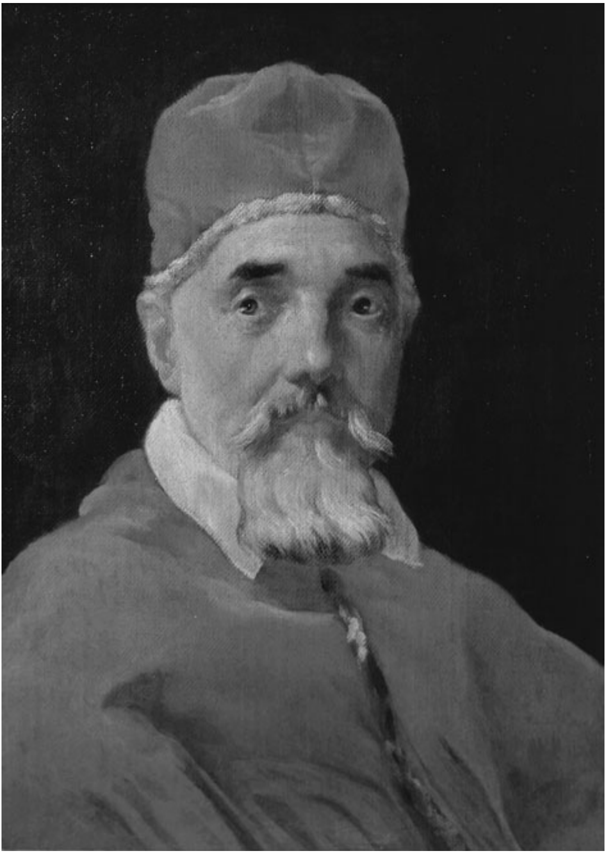
In the context of these Counter-Reformation teachings, Galileo's suggestion in his *Letter to the Grand Duchess Christina* that he, an individual layman, had the authority to tell the 'Holy Mother Church' which parts of scripture needed to be reinterpreted, and how, smacked both of arrogance and of dangerous Protestant leanings. The fact that in 1632 he would publish his *Dialogue* in vernacular Italian rather than scholarly Latin would add further to that impression.

When a committee was asked to report on the question of Copernicanism to the Inquisition in 1616, it declared it to be both false and absurd as scientific doctrine, and additionally to be contrary to the teachings of scripture and thus formally heretical. Galileo was personally summoned into the presence of Cardinal

Robert Bellarmine, who instructed him that he must not hold or defend the Copernican astronomy. At the same time, Copernicus's *On the Revolutions of the Heavenly Spheres*, which had been largely ignored since its appearance in print, was now suspended from publication, pending 'correction'. By drawing new attention to Copernicanism and to the Church's attitude to scripture, Galileo had succeeded in having the former declared heretical and in seeing the latter hardened and entrenched in a more conservative position.

The election in 1623 of Cardinal Maffeo Barberini as Pope Urban VIII must have seemed to Galileo like the answer to his prayers. Barberini was an educated and cultured Florentine. Even better, since 1611 he had been an admirer and active supporter of Galileo's work, even composing a poem, *Adulatio Perniciosa* ('In Dangerous Adulation') in 1620, expressing his admiration for Galileo's telescopic discoveries. In 1624, Galileo had several meetings with Urban VIII, during which he was assured that he could discuss the Copernican theory in his work but only as one hypothesis among others. Urban argued that God, in his omnipotence, could make the heavens move in any way he wished, and so it would be presumptuous to claim to have discovered the precise manner in which this end was achieved by the divine will. Galileo nevertheless left Rome reassured and was soon at work on the book that would be published in 1632 as his *Dialogue Concerning the Two Chief World Systems*.

This was when the real trouble started. Although the *Dialogue* was presented as an even-handed discussion among three characters – an Aristotelian, a Copernican, and a common-sensical everyman – it was perfectly clear to most readers that the arguments given in favour of the Copernican system were very much stronger than those made in defence of the old earth-centred astronomy, and that Galileo had in effect produced a pro-Copernican piece of propaganda, thus breaching the conditions of the 1616 injunction and the instructions given by



3. Maffeo Barberini, Pope Urban VIII, painted by Gian Lorenzo Bernini in 1632, the year that Galileo's *Dialogue* was published, in which the Pope's views were put in the mouth of the Aristotelian philosopher Simplicio

Urban in 1624. That was not all. The Aristotelian character was named 'Simplicio'. This was the name of a 6th-century Aristotelian philosopher but also one that hinted at simple-mindedness. Even more provocatively, one of the arguments put forward by simple Simplicio was the one that had been put to Galileo by Urban himself in 1624 – namely that God could have produced natural effects in any way he chose, and so it was wrong to claim necessary truth for any given physical hypothesis about their causation. This apparent mockery of the Pope added personal insult to the already grave injury delivered by Galileo's disobedience. And the timing could not have been worse. The *Dialogue* arrived in Rome in 1632 at a moment of great political crisis. Urban was in the midst of switching his allegiance from the French to the Spanish during the Thirty Years War and was in no mood for leniency. He needed to show his new conservative allies that he was a decisive and authoritative defender of the faith. So Galileo was summoned to Rome to be tried before the Inquisition.

As with the Scopes trial in America three centuries later, the trial of Galileo in 1633 was one in which the outcome was never in doubt. Galileo was found guilty of promoting the heretical Copernican view in contravention of the express injunction not to do so that he had received in 1616. It was for disobeying the Church, rather than for seeking to understand the natural world through observation and reasoning, that Galileo was condemned. Galileo's political misjudgement of his relationship with Pope Urban VIII played as much of a role in his downfall as did his over-reaching of himself in the field of biblical interpretation. Galileo's work was to be one key contribution to the eventual success of the Copernican theory, which, when modified by further scientific insights such as Kepler's replacement of circular by elliptical orbits, and Newton's discovery of the law of gravitation, was virtually universally accepted. However, in 1632 there was sufficient doubt about the relative merits of the Copernican system and the alternatives (including Tycho Brahe's compromise according to which the sun orbited the earth but all the other planets orbited the sun) that an objective observer would have pronounced the scientific question an open one, making it even harder to decide how to judge between the teachings that the Church declared to be contained in the book of scripture and those which Galileo had read through his telescope in the book of nature.

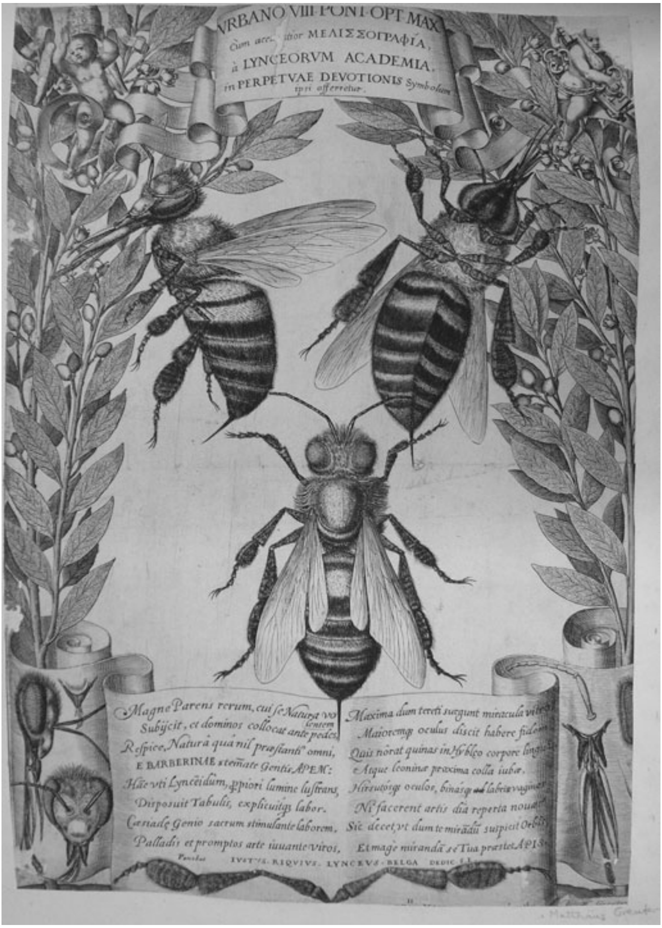
Appearance and reality

Historians have shown that the Galileo affair, remembered by some as a clash between science and religion, was primarily a dispute about the enduring political question of who was authorized to produce and disseminate knowledge. In the world of Counter-Reformation Rome, in the midst of the Thirty Years War, which continued to pit the Protestant and Catholic powers of Europe against each other, Galileo's claim to be able to settle questions about competing sources of knowledge through his own individual reading and reasoning seemed the height of presumption and a direct threat to the authority of the Church.

The case can also be used to illustrate one further philosophical question that has been central to modern debates about science and religion, namely the issue of realism. Arguments about realism particularly arise in connection with what scientific theories have to say about unobservable entities such as magnetic fields, black holes, electrons, quarks, superstrings, and the like. To be a realist is to suppose that science is in the business of providing accurate descriptions of such entities. To be an anti-realist is to remain agnostic about the accuracy of such descriptions and to hold that science is in the business only of providing accurate predictions of observable phenomena. Urban VIII was not alone among theologians and philosophers in the 16th and 17th centuries in taking an anti-realist or 'instrumentalist' approach to astronomy. On that view, the Ptolemaic and Copernican systems could be used to calculate and predict the apparent motions of the stars and planets, but there was no way to know which system, if either, represented the way that God had in fact chosen to structure the heavens. Indeed, when Copernicus's *On the Revolutions of the Heavenly Spheres* was first published, it had attached to it a preface written by the Lutheran Andreas Osiander stating that the theory was intended purely as a calculating device rather than as a physical description.

Galileo, on the other hand, took a realist attitude – indeed, it was his insistence on arguing the case for the physical reality of the sun-centred system which resulted in his trial before the Inquisition. Galileo was a member of one of the earliest scientific societies, the Academy of Lynxes, founded in 1603 by Prince Cesi. The lynx was thought to be able to see in the dark and so to perceive things invisible to others. Using new scientific instruments such as the telescope and the microscope in conjunction with the power of reason and the language of mathematics, Galileo and his fellow 'lynxes' aimed not just to find useful models for predicting observable phenomena but explanations of those phenomena in terms of the invisible structures and forces of the universe. They seemed to be succeeding. In addition to Galileo's telescopic and astronomical discoveries, the microscope was opening up a different kind of previously unseen world. Using an instrument sent to him by Galileo, Prince Cesi made the first known microscopic observations in the 1620s. Cesi's observations of bees were recorded in engravings by Francesco Stelluti and used as a device to seek approval for the Academy of Lynxes from Urban VIII, whose family coat of arms featured three large bees.

Debates between realists and anti-realists continue to form a lively and fascinating part of the philosophy of science. Each side rests on a very plausible intuition. The realist intuition is that our sense impressions are caused by an external world that exists and has properties independently of human observers, so that it is reasonable to try to discover what those properties are, whether the entities in question are directly observable by us or



4. Francesco Stelluti's *Melissographia* (1625), produced using a microscope provided by Galileo, and dedicated to Pope Urban VIII

not. The anti-realist intuition is that all we ever discover, either individually or collectively, is how the world appears to us. We live in an endless series of mental impressions, which we can never compare with the nature of things in themselves. We cannot, even for an instant, draw back the veil of phenomena to check whether our descriptions of reality are right. We can have no knowledge of the world beyond the impression it makes on us, and so, the anti-realist concludes, we should remain agnostic about the hidden forces and structures which scientists hypothesize about in their attempts to explain those impressions.

Modern debates about scientific realism have centred on the question of the success of science. Realists argue that the success of scientific theories – quantum physics, for instance – that posit unobservable entities in explaining physical phenomena, in intervening in nature to produce new effects, and in providing ever more detailed and accurate predictions, would be a miracle unless those entities, such as electrons, actually existed and had the properties scientists ascribed to them. Anti-realists have a couple of good responses to this. First, they can point out that the history of science is a graveyard of now-abandoned theories which were once the most successful available but which posited entities we now do not believe existed. This would apply to the 18th-century theory of combustion, according to which a substance known as 'phlogiston' was given off when things burned. Another example is the 'ether' of 19th-century physics – a physical medium that was supposed to be necessary for the propagation of electromagnetic waves. Since theories we now take to be untrue have made successful predictions in the past (including also Ptolemaic astronomy, which was hugely successful for many centuries), there is no reason to suppose that today's successful theories are true. Both true and untrue theories can produce accurate empirical predictions.

A second anti-realist argument was put forward by two influential philosophers of science in the 20th century – Thomas Kuhn and Bas van Fraassen. Kuhn's book, *The Structure of Scientific Revolutions*, first published in 1962, has become a classic in the field and one of the most widely read books about scientific knowledge. The book focused on what Kuhn called 'paradigm shifts' in the history of science, when one dominant world view was replaced by another, as in the case of Copernican astronomy replacing the Ptolemaic theory, or Einsteinian physics replacing pure Newtonianism. Kuhn portrayed scientific progress as a Darwinian process of variation and selection. He did not think that the improved accuracy and predictive power of later theories showed that they had progressed further towards true descriptions of reality, but rather that they had been chosen by the scientific community from among the various proposed theories because of their improved instrumental power and puzzle-solving ability. Bas van Fraassen, in his 1980 book *The Scientific Image*, also made use of this 'Darwinian' explanation of the success of science. Since scientists will discard theories that make false predictions (as nature discards non-adaptive variations) and keep hold of those that make successful predictions, he argued, the fact that as time goes on their predictions get better is no surprise at all, let alone a miracle. They were selected for precisely that instrumental success, and there is no need for a further appeal to unobservable realities to explain that success.

Science and religion have a shared concern with the relationship between the observable and the unobservable. The Nicene Creed includes the statement that God made 'all that is, seen and unseen'. St Paul wrote in his letter to the Romans that 'since the creation of the world God's invisible qualities – his eternal power and divine nature – have been clearly seen, being understood from what has been made'. However, there are anti-realists among theologians too. The intuition here is similar to that of the scientific anti-realist. We have no way (at least not yet) to check our ideas about God against divine reality, and so propositions about God derived from scripture, tradition, or reason should not be treated as literally true but only as attempts to make sense of human experiences and ideas. At one extreme, theological anti-realism can seem akin to atheism. There is also a more orthodox tradition of mystical and 'negative' theology which emphasizes the gulf between the transcendence of God and the limited cognitive powers of mere humans, and draws the conclusion that it would be presumptuous to suppose any human formulation could grasp divine reality. One problem with this is that if human reason is too weak to make any true statements at all about the attributes of God, then it would seem that the statement that God exists does not amount to much. For that reason, many have continued to try to look beyond the seen to the unseen, hoping to succeed in the apparently impossible task of drawing back the veil of phenomena to discover how things really are.

Among those who believe they have succeeded in seeing behind the veil, there are conflicting accounts of what is to be found there – an impersonal cosmic machine, a chaos of matter in motion, a system governed by strict natural laws, or an omnipotent God acting in and through his creation. Which should we believe?