

Seventeenth Century Thinkers

The European background

Desiderius Erasmus (1466 - 1536) was intensely aware of a need for change and renewal in Church and University, religion and thought. His demand for a "return to the sources" was an expression of dissatisfaction with what he saw around him. In particular, he had inherited from the Italian Humanists an impatience with what was perceived as the closed dogmatism of medieval Scholasticism. His satire of Folly suggested the need for change, stimulating the thinkers of his time to explore new directions.

When **Christopher Columbus** (1451 - 1506) sailed westwards in 1492, it was at least partly because he refused to accept the conventional reasons given for not doing so. He had no idea of the presence of a vast double continent between Europe and Asia, but he saw no reason for not trying to make a journey of exploration in a new direction. His exploit was preceded by **Vasco da Gama's** journey round the Cape of Good Hope into the Indian Ocean and it was followed by the better publicized journeys of **Amerigo Vespucci** westward. Soon **Magellan** would set out on a journey to circum-navigate the world; he died in the Philippines in 1521 but his ship reached home.

The complex events known as the **Reformation** (and the **Counter-Reformation**), provoked mainly by **Martin Luther** followed by **Jean Calvin**, brought about huge changes in European attitudes. The new stress laid on the Bible, and the rejection of Tradition as a basis for believing the Church's teachings, left each individual more or less free to search for new formulations of their faith.

Almost unnoticed in his lifetime, the Polish astronomer **Nicolas Koppernik** (in Latin Copernicus) (1473 - 1543) published in 1543 ideas he had long been maturing, claiming that the earth and other planets revolved about the sun. His *De Revolutionibus* contradicted the theory proposed by the Alexandrian Claudius Ptolemaeus (known as Ptolemy) in the second century A.D. in which the earth was the static centre of the universe, with planets and sun revolving around it. Because Ptolemy's theory had become a vital part of the symbolic cosmology taught by Aquinas and the scholastics, it was dangerous to contradict it. It took the life's work of Galileo to overcome the Catholic Church's fierce hostility, and even he died before it admitted that the earth moved around the sun.

A cultural revolution of radical proportions took place during the 16th and 17th centuries, when old ideas and ways of thought were challenged and replaced at many levels. In philosophy, it evolved mainly out of renaissance humanism, with its rediscovery of Socrates in Plato's works for ever disputing static and unsatisfactory dogmas as to what was true or real. The Greek word for "doubt" or "inquire" is *skepsis*. After Plato, the Academy continued to be known for its "scepticism" while a more extreme form of the same attitude, called Pyrronism after its founder Pyrrho, was formulated by Sextus Empiricus in about 200 A.D. in works widely read in the renaissance in Latin translations. Pyrrhonism does not so much assert the impossibility of knowing anything ("academic scepticism") as refuse to take sides in any argument involving questions of knowledge, always suspending judgement in uncertainty.

The fundamental attitude of academic scepticism denies the possibility of knowing anything for sure. What we perceive with our senses appears to be something, but we may be perceiving it wrongly. Doubt was thought by the sceptics to bring tranquility, because the sceptic knows that he cannot know anything, and does not have to try hard to distinguish illusion and reality. In response, Stoics and Epicureans tried to establish in various ways a "criterion of truth" or of certainty but their solutions failed to satisfy the renaissance.

Scepticism is in some ways a very passive and conservative attitude; as such, it was adopted by Erasmus in his refusal to follow Luther. He said that it was better to follow existing practices in the Church since we cannot know for sure that any other way is better. There can never be a reply to systematic scepticism because it simply repeats itself, challenging the bases of language as well as of knowledge.

At the centre of the philosophical debate, then, is the question of knowing, known as **epistemology**. The basis for knowledge, according to Aristotle, was thought to be "experience", the information derived by our five senses. This was normally accepted in the middle ages. The teaching of the Christian Church about the invisible realities of God and Heaven was not considered to be "knowledge" but faith in propositions made known by divine revelation. There is a famous paradox, derived from a saying by Tertullian (160 - 240) *credo quia absurdum est* (I believe because it is absurd) which has always served to stress the difference between the unquestionable teachings of Christian faith and the information derived from direct experience. Human reason applies itself to the latter, trying to understand; in the end, Aquinas and his followers felt, following Aristotle, the things of God are not accessible to human reasoning.

The scepticism of Sextus Empiricus appealed to **Michel de Montaigne** (1533 - 1592). The division between Catholic and Protestant was by now established and irreconcilable; he himself was Catholic but others in his family were Protestant. His early **Essays** (Books 1 and 2, published 1580) were in a Senecan Stoic vein, designed to produce philosophical fortitude in a vain world, in preparation for the painful death from kidney stones he was doomed to by heredity. But a few years after his "retirement from the world" in 1570, after reading the newly made (1562 and 1569) Latin translations of Empiricus, he had a medal made with the Pyrrhonian motto "*Que sçay-je?*" (What do I know?) and composed his longest essay, *Apologie de Raimond Sebond* which formed part of the Third Book of essays, first published in 1588.

Sebond was a 15th century theologian whose *Theologia naturalis* followed the non-Scholastic tradition of Anselm and Lull, offering rational proofs of God's existence and giving Man a very high position in the created order, quite unlike the Protestants who considered humanity to be totally depraved and corrupt. In the *Apologie*, Montaigne deals less with Sebond than with all forms of dogmatism and intellectual pretension. He is an unsystematic pyrrhonist, but his essay demonstrates how like an animal Man is, weak in reason, his senses unreliable, his morality irrational. The world is full of diversity and difference, the whole universe is characterized by flux and change.

Taken as it stands, the *Apologie* leads to despair. In the essays that followed, for the rest of his life, Montaigne tried to lay the bases for a new understanding of what it was to be human. Old philosophies had failed to find general solutions, a new search was in order, starting with the individual's self-study. Montaigne was convinced that every person is equally and fully human, a mixture of virtue and vice. Since there can be no one perfect system of anything, diversity and tolerance are essential. His later essays dwell carefully on the minute details of his own body and daily life, something that no one before him had done in such "scientific" detail.

John Florio (1553 - 1625) was born in London of an Italian Protestant father; he translated Montaigne's essays into English in a creative way, publishing them first in 1603. Shakespeare read them closely, and was surely influenced by them in many ways. In *King Lear* there are many echoes of Florio's vocabulary, while *The Tempest* is in part inspired by Montaigne.

Another of the modern world's pioneer thinkers was born, like Shakespeare, in 1564, but lived far longer. **Galileo Galilei** (1564 - 1642) was born in Pisa (Italy) and it is mainly thanks to him that the Copernican vision of the universe was finally accepted despite fierce opposition from the scholastics who dominated the Catholic Church. The famous "recantation" in 1633, where he is said to have declared that the earth was the centre of the universe and did not move, only to murmur "eppur si muove" (yet it does move), was prompted by his *Dialogue Concerning the Two World Systems* of 1632 where he affirms the truth of Copernicanism. In 1994, the Catholic Church rather belatedly lifted its condemnation of Galileo's ideas.

At the heart of the dispute, that marks the end of the ancient world and the start of the modern, is a confrontation between two different understandings of "truth" and the ways in which humanity can know it. Aquinas, like Aristotle, was an intense idealist, not interested in pragmatic verification. For the ancient Greeks, irregular motion was always seen as a sign of the imperfection of matter. Under the teaching of the old system, the Moon and all the "bodies" above it (planets and stars) were considered perfect in matter, spherical in shape and gliding in perfectly circular orbits, moving not in search of a greater perfection but

guided by an Intelligence (angel or Mover) in order to accomplish some end by influencing events in the imperfect world below.

Galileo was not the first to notice that there was something wrong in the sky, that the planets did not in fact move as they were supposed to. His response was stronger because he looked through his telescope and saw comets coming and going, declared that there was change in the heavens, and rejected the old idea that heavenly bodies and the earth were essentially different. The earth, he said, belonged among the heavenly bodies because there was change there as here. What Aristotle said was simply not true.

Another point where Galileo differed from Aristotle lay in his atomist theories, according to which all matter is composed of the same basic particles (atoms) arranged in different ways. For the Catholic Church this was a threatening idea because Aristotle had assumed (following Plato's theory of forms) that each kind of body had its own essential "substance" (the "breadness" that distinguishes bread from cake) distinct from the "accidents" of colour, appearance, taste. The Scholastics had used this to "explain" the meaning of Jesus's words "This is my Body, this is my Blood" repeated during the Mass to consecrate the bread and wine. The Catholic doctrine of Transubstantiation depended entirely on the idea that there was a "substance" in bread, distinct from its appearance, that could be changed into the Body of Christ by a priest repeating Christ's words.

Galileo stood for empirical observation of things, he practiced measuring the motion of slowly falling bodies (metal balls rolling in grooves down a sloping surface), he established mathematical formulae to represent the laws he found them following. He was the first to state that once a body is moving, the law of *inertia* means that it will continue to move until some new force either stops it or changes its motion. There was no need to imagine Intelligences pushing the stars to keep them moving.

Galileo has become the symbol of the modern spirit of free enquiry. His was a mind full of mechanical curiosity, always wanting to understand the mechanics of things. Until his age, "explanations" of things seen in the universe were given in terms of God's will and providence. Galileo's question was not Why? but How? How does it work? It was a revolutionary question but contained the dangerous assumption that things and phenomena are ends in themselves. The "scientific" question never enquires about the ultimate meaning of a phenomenon; to "explain" becomes merely giving a mathematical account of the way things happen. God has no place in the methods underlying this enquiry.

In France, the response to Montaigne's challenge to intellectual certainty came a generation later. **René Descartes** (or Des Cartes, whence the adjective "Cartesian") (1596 - 1650) devoted his first published work to the role of scepticism in the search for truth. His *Discours de la Méthode* ("Discourse on the method of rightly conducting reason and reaching the truth in the sciences") was published in 1637. It is cast partly in a personal, autobiographical style. Descartes tells how he realized after a scholastic education at school that truth could not be found in the books he had read, or in the old Aristotelian categories; people had to think anew for themselves. He decides to try to assume nothing, to establish by systematic doubt what things are completely self-evident and to build on them by reasoning.

If all knowledge depends on sense-data and reasoning, the integrity of the individual subject is central. Descartes reached a point where he found himself convinced of his own existence as a reliable subject: "Je pense, donc je suis" (in Latin, *cogito, ergo sum*). The subject's consciousness of being engaged in rational thought is Descartes's touchstone of reality and truth. This thought, he believed he could prove, is a non-physical activity, the work in the body of the mind or soul, the immaterial "thinking substance" that exists in union with the body yet is totally independent of it and can exist without it. The Cartesian "dualism" of body and mind has been much debated.

Then follows his most controversial point: since the mind can conceive of a perfect being, although the human subject cannot claim to be perfect, there must be a perfect being, God. Like every thinker in the seventeenth century, Descartes found himself unable and unwilling to deny the existence of God. Only now God has become the image of our human idea of the Perfect, and serves to guarantee the validity of sense experience. Because God exists, truth exists and can be reached by the use of our God-given reason. Out of

this comes the essence of Descartes's "Method": experiment and deduction.

In 1644 Descartes published his great *Principles of Philosophy* in which his main system was developed to the full. The main importance of Descartes does not lie in his epistemological ideas; the *cogito*, the argument for God, the dualism of non-dimensional mind and physical body, have all been more or less rejected. But Descartes was the first person to assume that matter is the same and always obeys the same laws everywhere in the universe. The physical laws governing the universe can be stated in mathematical-style formulae that owe nothing at all to human sense-data, and will be equally valid everywhere. By matter, he means anything that has "extension" (length, breadth, height) although the particles composing it may be of differing kinds in different states. Descartes saw too that motion was a fundamental property of matter that might be varied but never lost.

In the history of European thought, Descartes occupies a central place. He laid the foundations of the entire "scientific" process that is still fundamental to today's world. The cosmic vision the scholastics inherited from Aristotle and the Bible was an ancient one, never subject to verification by experimentation. Descartes's "natural philosophy" was essentially a mechanical view of nature, in which every aspect could be "explained" by mathematical laws.

Francis Bacon

In England, Descartes was preceded by an almost equally impressive and important writer, **Francis Bacon** (1561 - 1626). For England, Bacon was the great herald of the scientific revolution. This was in great part because he was a wonderful writer, a master of prose style. His parents were in the court, and he himself was very ambitious. His mother's sister was the wife of Lord Burghley, the most powerful man in Elizabeth's administration, but he did not help Bacon much. Instead, he was encouraged by the Earl of Essex during the 1590s. He turned against Essex after the rebellion. Under King James he rose rapidly in the legal administration until in 1618 he became lord chancellor. Yet in 1621 he was forced to admit that he had taken bribes as a judge and had to retire from public life in disgrace. His public career tells nothing about his enduring significance.

Bacon was schooled in the old rhetorical tradition, memorizing many quotations from the classics, learning how to use them in disputations, developing a style marked by many aphorisms (short sayings). His legal training only encouraged him to develop the art of using rhetoric to persuade others to think in a particular way, while concealing the opinions of the lawyer as an individual person. Bacon was a master of words, but was not interested in expressing personal opinions or experience in the way that Montaigne was. Montaigne invented the word "essay" for this kind of writing, suggesting as it does words like "experiment, trial, test". Erasmus's Latin *Adagia* were a major influence.

Bacon's *Essays* are his most widely-read work yet they are often disconcerting. He first published a collection of ten essays in 1597, under the title (in the original spelling) *Essayes. Religious Meditations. Places of perswasion and disswasion*. He continued to write and to revise his earlier work, as Montaigne did. In 1612 a second edition appeared, with the simpler title *The Essaies*, containing thirty-eight essays, including nine from the first edition. The final edition, published in 1625 with the title *The Essayes or Counsels, Civil and Morall*, contained fifty-eight essays, twenty of them new and most of the essays from the 1612 edition much revised.

Bacon, like Erasmus, liked to define himself by opposition to the old Scholasticism, which for him represented error, confused thinking, and superstition. Yet in the *Essays* he is following the scholastic method of debate, which consisted basically in presenting aphorisms from various authorities (classical, biblical, or patristic) to support or attack a given topic. Bacon's elaborate Elizabethan style lends great elegance and complexity to what are in fact a series of mutually contradictory aphorisms buried in his text; the contradictions are not given any direct resolution, the reader must think and judge the issues.

The most well-known quotation from the *Essays*, and a key to reading them, is the opening of the first essay, *Of Truth*:

What is truth? said jesting Pilate, and would not stay for an answer.

The reference is to St John's Gospel where Pontius Pilate is judging Jesus who has just said, "I came into the world to bear witness to the truth". Pilate's question is doubly ironic, suggesting that there is no ultimate truth at the very moment when he is in the presence of Jesus who is believed by Christian's to be God's own Truth. No one is going to find anything in Bacon's essays if they cannot echo the words spoken by Pilate without the irony. In the face of so many contradictory opinions, what is the truth about Death, or Religion, or Love, or any of the other topics covered by Bacon? The danger is that, like Pilate, we rush to the wrong opinion and stick there, not "staying" (taking the time) to see the whole picture.

Bacon summarizes the heart of the problem:

But it is not only the difficulty and labour which men take in finding out of truth, nor again that when it is found it imposeth upon men's thoughts, that doth bring lies in favour, but a natural though corrupt love of the lie itself. One of the later school of the Greecians examineth the matter and is at a stand to think what should be in it, that men should love lies where neither they make for pleasure, as with poets, not for advantage, as with the merchant, but for the lie's sake. But I cannot tell. This same truth is a naked and open daylight that doth not show the masques and mummeries and triumphs of the world half so stately and daintily as candlelights. Truth may perhaps come to the price of a pearl, that showeth best by day; but it will not rise to the price of a diamond or carbuncle, that showeth best in varied lights.

This mixture of hard-to-find truth and attractive lies is the challenge of life. The essay *Of Truth* ends with another Gospel question, only Bacon changes Christ's words from Luke into a certain prophecy that "He shall not find faith upon the earth". Bacon makes Christ foresee that people will prefer lies to truth, and in his own life Bacon certainly seems to have been more untruthful than many. The main appeal of his essays is the delight of many striking expressions:

The joys of parents are secret, and so are their griefs and fears: they cannot utter the one, nor they will not utter the other. Children sweeten labours, but they make misfortunes more bitter: they increase the cares of life, but they mitigate the remembrance of death. (*Of Parents and Children*)

He that hath wife and children hath given hostages to Fortune, for they are impediments to great enterprises, either of virtue or mischief. Certainly the best works, and of greatest merit for the public, have proceeded from the unmarried or childless men, which both in affection and means have married and endowed the public. (*Of Marriage and Single Life*)

The stage is more beholding to love than the life of man. For as to the stage, love is ever matter of comedies and now and then of tragedies; but in life it doth much mischief, sometimes like a siren, sometimes like a fury. (*Of Love*)

The *Essays* fall under the kind of writings considered today as "literature" but they are not Bacon's main work. His *The Advancement of Learning* (1605) and the *Novum Organum* (1620) are the two works by which he influenced his age and became known as one of the fathers of modern scientific method. He consciously and conspicuously turned his back on the past and looked towards the future. The *Advancement* was first published in English, but Bacon later revised it and translated it into Latin to give it a European readership as

De Dignitate et Augmentis Scientiarum (1623) which was in turn re-translated into English and published in Oxford in 1640. In it Bacon attacks the ignorance and superstition of the astrologer-magicians, of the scholastics, and even of the humanists, because they remain content with flawed and imperfect knowledge, instead of striving to gain a better understanding of God's works. His basic argument is that before the Fall, Adam in Paradise possessed "pure and immaculate Natural Knowledge" by God-given intuition. That instinctive knowledge had given him the mastery over the Creation he had needed when he gave names to everything but which was lost with Adam's original perfection at the Fall.

Bacon insists that knowledge of the universe was not the cause of Adam's Fall, and that "the Divine nature took delight to hide his works, to the end that they might be found out. Therefore it is God's will that humanity should strive to come to an ever more nearly perfect, unified understanding of every aspect of the natural world. Bacon's fundamental programme of study he termed "The Great Instauration". It was to be based on experimentation and step-by-step induction as a scientific method allowing an ever more perfect form of learning to come into being and be transmitted.

Until now, the "authorities", the received writers of past ages, had been seen as the giants on whose shoulders the modern dwarfs stood. It was Bacon who overturned the giants and said that everything remained to be discovered. This was an intellectual revolution and recent studies have stressed Bacon's importance in the whole social revolution of his time. His rejection of the past and his proclamation of a New Age of science leads directly to the belief in Progress that has so marked the scientific age.

Yet Bacon built on Aristotle. The *Organon* (instrument) was the name given to Aristotle's six treatises on formal and scientific logic based on the syllogism. Bacon denounces the syllogistic method of speculative deduction and advocates in its place a new methodology, a "new instrument" based on scientific deduction, itself based on direct observation of phenomena.

Bacon distrusted words and he distrusted the mind; he was in many ways a sceptic. He demanded that people's minds should be purified (like the pagan temples at the coming of Christianity) by removing the various idols that stood for false notions of the truth. This is the most famous part of the *Novum Organum*:

(51) The human understanding is of its own nature prone to abstractions and gives a substance and reality to things which are fleeting. But to resolve nature into abstractions is less to our purpose than to dissect her into parts.... Matter rather than forms should be the object of our attention, its configurations and changes of configuration, and simple action, and law of action or motion; for forms are figments of the human mind, unless you will call those laws of action forms.

(52) Such then are the idols which I call *Idols of the Tribe*...

Bacon's *Idols of the Tribe* represent the general tendency of people to mistake words for reality and to think that an abstraction is a reality; he is recalling the medieval conflict between nominalists and realists, and his position has some parallels with the English nominalist William Ockham (1285 - 1347).

Bacon's second set of idols are the *Idols of the Cave*, by which he means the wrong conclusions reached by individuals on account of their personal prejudices and limited experience. He reveals in his writings that he was by no means free of these himself. His distrust of words underlies the third class:

(59) But the *Idols of the Marketplace* are the most troublesome of all: idols which have crept into the understanding through the alliances of words and names. For men believe that their reason governs words; but it is also true that words react on the understanding; and this it is that has rendered philosophy and the sciences sophistical and inactive....

(60) The idols imposed by words on the understanding are of two kinds. They are either names of things which do not exist (...), or they are names of things which exist, but yet confused and ill-defined, and hastily and irregularly derived from realities. Of the former kind are Fortune, the Prime

Mover, Planetary Orbits, Element of Fire, and like fictions which owe their origin to false and idle theories....

Bacon reserves his fiercest attack for the *Idols of the Theatre*, false ideas which result from speculative thought unchecked by reference to any kind of empirical evidence or experimentation:

(61) But the *Idols of the Theatre* are not innate, nor do they steal into the understanding secretly, but are plainly impressed and received into the mind from the play-books of philosophical systems and the perverted rules of demonstration.

Bacon was firmly rooted in the Scholastic tradition that he denounced so strongly. One of his main achievements was to propose a clear distinction between Nature and the "supernatural" realm perceived only by Faith. Here he follows Aristotle and Aquinas but the result of his distinction was to deny that faith had anything to say about the physical universe. Knowledge of God comes from the Bible: "Sacred theology must be drawn from the word and oracles of God, not from the light of Nature or the dictates of Reason".

The world of Nature which is accessible to observation, measurement, and mechanical description becomes a quite separate thing. Bacon describes Nature as "God's second book" as Christian thinkers have often done since Augustine. Galileo also used the idea that to study and seek to understand Nature is a duty we owe to God. The "laws" governing nature are felt to resemble those given by God in the Bible. This suggests that God's laws are reasonable and consistent, the source of harmony and order. Bacon insisted that by making this division between nature and faith he was preserving the particular claims of each one. In his time, no one thought of doubting the existence of God.

Yet by putting the observable universe at the centre of his attention and isolating the things of faith from the claims of reason, Bacon was preparing the way for the secularization of learning. Very soon, the regularity of the laws of nature was felt to be so absolute a law that even God was bound by them to such an extent that even miracles were impossible.

In 1623 George Herbert's elder brother **Edward, Lord Herbert of Cherbury**, finished writing his *De Veritate* (On Truth). After the Royalist defeat in the Civil War he also published *De Causis Errorum* (On the cause of errors) and *De Religione Laici* (On the faith of a layman). Herbert's view of reasonable religion was to become very general in the eighteenth century: God exists, and should be worshipped; worship means living a virtuous life and repenting of sin, living in piety, because after we die there are rewards and punishments. The usual name for such a minimal system is Deism. It is striking that in this view of religion there is no place for the Bible. Less than a hundred years after the Reformation we find a great disaffection with the Bible among thinkers. At the same time as we find writers turning away from the old fables of classical mythology, we find more and more that a lot of them are also ill at ease with the tales found in the Bible. Miracles are felt to be childish tales, superstitious inventions; direct divine intervention in human affairs has ceased to be a credible proposition. The Bible can only be read for moral instruction, which is often found by interpreting its stranger parts in allegorical, symbolic ways.

Sir Thomas Browne

Born in the year that Bacon published his *Advancement of Learning*, **Sir Thomas Browne** (1605 - 1682) lived a very simple kind of life. After the traditional classical education at Winchester College and Oxford he travelled in Ireland, then studied medicine in France, Italy, and the Netherlands at a time when the old book-learning was being slowly challenged by the new experimental approaches.

He realized that tensions had arisen between science (or natural philosophy, as it was known) and religious faith. After returning to England in 1633 he began to compose (in English) a book discussing and

trying to help solve those tensions. He settled in Norwich to practice medicine in about 1637 and *Religio Medici* was first published without his name or permission in 1642. It was very popular and in 1643 an official edition appeared. It was translated into several European languages and was widely read, not always with approval among dogmatic churchmen. Browne explores religious divisions and hostilities; then he goes on to expound a universal love for humanity in all its diversities. Biblical ideas are supported by many classical references and a great display of wit.

Browne had read widely in many areas, he was a true "Metaphysical" in being able to draw metaphors from many sources, classical, biblical, scientific, and he wrote in as complex a style as Bacon. He was fascinated by the search for greater truth and during the years of the Civil War he composed *Pseudodoxia Epidemica: or Enquiries into Very many received Tenents and commonly presumed Truths* often known as *Vulgar Errors* published in 1646 but several times revised and augmented later. Here he is directly following in the footsteps of Bacon, who was always critical of the way wrong ideas were taken for truth. He starts by analyzing the various reasons for error in ways similar to Bacon's idols: sin, gullibility, fallacy, credulity, authority, Satan. Then follow six books in which he examines over a hundred familiar errors in various scientific and historical disciplines.

The *Pseudodoxia* established Browne's reputation as a very learned man, capable of informed debate in almost every aspect of learning. During the 1650s, he wrote *Hydriotaphia, or Urn Burial* (published 1658) which is now his most widely admired work. Starting with the discovery of some prehistoric urns containing human ashes, he meditates on the ways different cultures have treated their dead. This leads to a meditation on the fragility of monuments, the power of time, and culminates in a realization that only the Christian hope of Resurrection offers a solution to the threat of oblivion. The high style of *Hydriotaphia* makes it one of the finest pieces of English prose ever written. Browne published *Hydriotaphia* accompanied by *The Garden of Cyrus*, a kind of witty showpiece about the use of certain numerical motifs employing the number five in classical buildings and gardens. He also wrote a number of tracts and his private letters are also popular reading.

Browne's voice is one of those raised to resist the excessive materialism of Bacon's views, and to insist that faith remains central to a right understanding of nature since to measure and observe is not the same as to understand truly. One of the most famous passages of *Religio Medici* (Part I section 9) stresses the need for a sense of religious wonder:

As for those wingy mysteries in divinity and airy subtleties in religion which have unhinged the brains of better heads, they never stretched the *pia mater* (skin around the brain) of mine; methinks there be not impossibilities enough in religion for an active faith; the deepest mysteries ours contains have not only been illustrated, but maintained by syllogism and the rule of reason: I love to lose myself in a mystery, to pursue my reason to an *o altitudo* ("O the depths..." Romans 11:33). 'Tis my solitary recreation to pose my apprehension with those involved enigmas and raffles of the Trinity, with incarnation and resurrection. I can answer all the objections of Satan, and my rebellious reason, with that odd resolution I learned of Tertullian, *Certum est quia impossibile est* (It is certain because it is impossible). I desire to exercise my faith in the difficultest points, for to credit ordinary and visible objects is not faith, but persuasion.

It was the continuing human need for the dimension of wonder expressed in Browne's *o altitudo* that led thinkers later in the seventeenth and in the eighteenth centuries to stress the experience of the sublime.

The style that Browne employed for *Religio Medici* reaches its finest heights in the fifth chapter of *Urn Burial*. This starts with a meditation on the way the carefully buried bones of the famous are lost while the unknown ashes in the urns survived:

Now since these dead bones have already outlasted the living ones of Methuselah, and in a yard

underground and thin walls of clay outworn all the strong and specious buildings above it, and quietly rested under the drums and trappings of three conquests, what prince can promise such diurnity unto his relics... Time which antiquates antiquities and hath an art to make dust of all things hath yet spared these minor monuments. In vain we hope to be known by open and visible conservatories, when to be unknown was the means of their continuation and obscurity their protection.

It ends in a great showpiece of style:

Pyramids, arches, obelisks were but the irregularities of vainglory and wild enormities of ancient magnanimity. But the most magnanimous resolution rests in the Christian religion, which trampleth upon pride and sits on the neck of ambition, humbly pursuing that infallible perpetuity unto which all others must diminish their diameters, and be poorly seen in angles of contingency.

Pious spirits who passed their days in raptures of futurity made little more of this world than the world that was before it, while they lay obscure in the chaos of preordination and night of their fore beings....

To subsist in lasting monuments, to live in their productions, to exist in their names and predicament of chimeras was large satisfaction unto old expectations, and made one part of their Elysiums. But all this is nothing in the metaphysics of true belief. To live indeed is to be again ourselves, which being not only an hope but an evidence in noble believers, 'tis all one to lie in St Innocent's churchyard as in the sands of Egypt, ready to be anything, in the ecstasy of being over, and as content with six feet as the moles of Adrianus.

It should not be thought that Sir Thomas Browne (he was knighted by Charles II in 1671) was merely a playful stylist. He created the language that expressed what he wanted to say. Among the words that he was the first to use in English are 'medical', 'literary', 'electricity', 'precarious', 'hallucination'. He followed Bacon in his enthusiasm for the new age of experiment and discovery. It is the personal authenticity and breadth of vision that speak through Browne that have endeared him to generations of readers. Not surprisingly, he was a friend of many of the leading researchers of his time.

Among Browne's acquaintances was **William Harvey** (1578 - 1657) who studied at Padua and became the physician (doctor) of kings James I and Charles I. In 1628 Harvey published *De motu cordis* (only translated from Latin into English in 1653) which for the first time in human history offered an accurate account of the mechanical function of the heart and the circulation of the blood. He also produced radically new work on the growth of the human embryo. Harvey rejected the extremely mechanical approach to physical reality and employed a symbolism which brought him close to such arcane poets as Vaughan.

Other figures related to Browne include **Sir Kenelm Digby** (1603 - 1665) who first established that plants need oxygen to live, wrote an early criticism of *Religio Medici*, and was one of the first members of the Royal Society. Another of the 17th century's great antiquaries who was fascinated by relics of the past was **Sir Robert Cotton** (1571 - 1631) whose great library of medieval manuscripts saved from monasteries survived a fire in 1731 to become part of the British Library's collection. It includes the manuscripts of *Beowulf*, and *Sir Gawain and the Green Knight*.

Another writer contemporary with Browne is **Robert Burton** (1577 - 1640). Burton is famous for his only work, the difficult and remarkable *Anatomy of Melancholy*. First published in 1621, this complex study of human psychology was enlarged with each new edition until the final version appeared in 1651. Burton suffered from melancholy, a form of psychological distress, and was a very learned man. His work is personal, and at the same time full of references to classical and modern writings. Burton insists that everyone is slightly tinged by melancholy and that the only solution is to avoid solitude and idleness. He writes in an amused satirical tone about the failures of human learning and action. After discussing the

causes and possible cures of melancholy he studies love-melancholy and religious melancholy in detail.

While Browne was pursuing his quiet life in Norwich, in France another great man lived and died. **Blaise Pascal** (1623 - 1662) was equally a polymath, interested by many topics including mathematics, physics and mechanics, morality and religion. The difference between Browne and Pascal reflects the differences between the intellectual and religious worlds of England and France. Pascal did major work in mathematics and physics, he even invented a calculating machine that anticipated the modern computer. Yet his fame rests on two religious works, *Les Provinciales* (1656-7, translated into English in 1657) against the Jesuits, and *Les Pensées*, incomplete thoughts on how best to defend Christianity published in 1670 after his death. Pascal was deeply influenced in his last years by the spiritual movement in the French Catholic church known as Jansenism.

Thomas Hobbes

The main concern of all the thinkers of this age was truth. The quest for truth went in two main directions. The truth about the external world was now seen to be a matter of measurement, while faith and ethics were inward truths discovered by some kind of inner light and supported by Reason. Descartes divided reality into Extension (the material world with its dimensions in space) and Thought (mind or soul). What could be described and defined mathematically was considered real in the truest sense. Reality was material, extended in space and moving in various ways. At the same time, Galileo's atomic theories and Copernicus's heliocentric model suggested strongly that the impressions received by the senses (sense-data) might be quite misleading.

The result of this in Descartes was a division between body and mind (spirit or soul) that could never be bridged. The two essential certainties that Descartes reached by intuition, that I and God truly exist, have nothing in common with the mechanical laws governing the objects that the mind perceives outside of itself. Since the senses are deceitful, they should not be given room to interfere with the operations of the thinking mind, of Reason. Descartes's approach is not poetic or symbolic.

This, pushed to its ultimate extremes, leads to the position stated by Hobbes in Chapter 46 of his *Leviathan*:

The universe, that is, the whole mass of all things that are, is corporeal, that is to say, body, and hath the dimensions of magnitude, namely length, breadth, and depth; also, every part of body is likewise body, and hath the like dimensions, and consequently every part of the universe is body, and that which is not body is no part of the universe; and because the universe is all, that which is no part of it is nothing, and consequently nowhere.

In these words, using concepts such as "corporeal" or "body" which he never really queries or defines, Hobbes is rejecting every kind of speculative approach and every suggestion that there is more to existence than matter and motion. Although he was in name a Christian, his arguments lead straight to atheism. Hobbes had little in common with the concerns and sympathies of Sir Thomas Browne.

After an education at Oxford, in the 1620s **Thomas Hobbes** (1588 - 1679) was close to Sir Francis Bacon and even worked as a kind of secretary for him. He knew Ben Jonson and, later, Abraham Cowley; during travels in Europe he met Galileo and Descartes. In 1647 he was appointed mathematical tutor to the future king Charles II in exile in France but in 1652 he returned to England and submitted to the Commonwealth Council of State. This did not prevent him receiving a pension at the Restoration.

Hobbes's philosophical writings have generally provoked intense hostility, both on account of their contents and also because of the emotions of hatred or fear inspiring much of them. Hobbes's tone is mostly very gruff, with none of the charm of Sir Thomas Browne's. He really hates the scholastics and churchmen

with their abstract speculations, while he fears the chaos that selfish human passions bring to society. Therefore his philosophy is mostly expressed in political terms, pleading for strong government and absolute rule in a society devoid of any transcendent Being or metaphysical system, that might challenge the rule of law.

From 1650 onwards, he published a variety of works devoted to matter, human nature, and society, in both English and Latin. By far the most significant is *The Leviathan, or the Matter, Form and Power of a Commonwealth, Ecclesiastical and Civil* (1651). Hobbes's power lies in his willingness to take his arguments to their logical conclusion with intense single-mindedness, irrespective of what this does to generally received opinions or systems. He demands answers as firmly based in logic as his own arguments, and he remains a fundamental master of tight thinking. In Hobbes, the desire for simple solutions to complex questions reaches new extremes.

He takes the Cartesian idea that the material universe is composed of extended matter in motion and insists that there is no need to postulate a separate realm of "thought" or "spirit" as Descartes did. All our perceptions, thoughts, and feelings he considers to be the result of matter in movement in our bodies and brains. In particular, Hobbes denied that there was a distinct "soul", a non-corporeal "I" that could exist without a physical body. Like Milton, he professed "mortalism".

Hobbes suggests that all human actions begin as *endeavour*, a tension of the will, either an *appetite* straining towards something that is expected to cause pleasure or an *aversion* straining away from what may cause pain. In his introduction to the *Leviathan* Hobbes claims that introspection shows this to be true. The desire for pleasure, or to keep the pleasure we have, and the dislike of pain and death, direct every activity of all except those rare people who by very special education have learned to be altruistic and self-sacrificing.

All human actions, he claims in the most famous portion of *Leviathan*, are prompted by self-interest or by fear (self-preservation). Having established selfishness as an almost universal fact, he deduces that social peace and order are constantly threatened by "quarrel" or strife. He suggests three reasons for strife between people: "competition", "diffidence" (distrust), and "glory" (reputation or pride):

Hereby it is manifest that during the time men live without a common power to keep them all in awe, they are in that condition which is called war; and such a war as is of every man against every man. For war consisteth not in battle only, or in the act of fighting, but in a tract of time wherein the will to contend by battle is sufficiently known; and therefore the notion of time is to be considered in the nature of war, as it was in the nature of weather. For as the nature of foul weather lieth not in a shower or two of rain, but in an inclination thereto of many days together; so the nature of war consisteth not in actual fighting, but in the known disposition thereto, during all the time there is no assurance to the contrary. All other time is peace.

Whatsoever therefore is consequent to a time of war, where every man is enemy to every man, the same is consequent to the time wherein men live without other security than what their own strength and their own invention shall furnish them withal. In such condition there is no place for industry, because the fruit thereof is uncertain, and consequently no culture of the earth; no navigation, nor use of the commodities that may be imported by sea; no commodious building; no instruments of moving, and removing, such things as require much force; no knowledge of the face of the earth; no account of time; no arts; no letters; no society; and, which is worst of all, continual fear, and danger of violent death; and the life of man, solitary, poor, nasty, brutish, and short.

That last epigrammatic phrase has provoked immense debate and helped many thinkers clarify their fundamental opinion about the meaning and value of human existence.

Hobbes offers a very simple solution. All people need do to avoid strife is to submit to a single absolute ruler whose laws are decisive in every matter. For Hobbes, even religious truth is true only because the sovereign's law declares it to be so. The "social contract" is the name of this topic, and it developed in

17th century Europe in part as a result of protestant attempts to apply the biblical idea of "Covenant" to human society in general. Because Hobbes has such a negative view of human life (he always insisted that he was born early because his mother was terrified by news of the Spanish Armada in 1588!) he proposes a form of contract that sounds like a prison sentence.

Yet the main historical interest of Hobbes's work is not his concept of absolute dictatorship, which only found its unfortunate fruition in the 20th century, but the expression he gives to extreme materialist explanations of sensation and thought. In the epistemological debate about knowledge and perception, Hobbes's denial of any non-material essential "I" led him to look for entirely mechanical explanations of the way we see and respond to the outside world. All perception is the echo inside of our bodies of motions and vibrations outside of them. Hobbes did not explain "consciousness" at all but felt no need to postulate an immaterial soul as an explanation of anything. For Hobbes, the soul belonged to the same category as ghosts, and he hated ghost stories, considering them to be utter "nonsense".

The Cambridge Platonists

In the history of thought, the great battles are often fought in teams, not always by extraordinary individuals. A response to Hobbes's materialism was formulated in the various writings of a group of men associated with Cambridge University during the Commonwealth and Restoration: Benjamin Whichcote, John Smith, Henry More, and Ralph Cudworth whose *The True Intellectual System of the Universe* was the most important expression of the group's ideas.

While they were opposed to Hobbes, they were also distressed by the irrational fanaticism and extremist controversy that was tearing the Church apart. While they reasserted Plato's notion of Forms printed in the soul enabling us to interpret reliably the appearances perceived outside ourselves, they believed that human Reason, the Order of the Universe, and Divine Revelation were in harmony; therefore to seek for Truth with our reason is to seek for God and to understand the Order of the universe is to know the mind of God its Author.

Like Milton, they did not accept the pessimistic Calvinistic doctrine of "total depravity" by which no one could know anything about God without special saving Grace. Instead, they optimistically believed that human beings could advance to perfection by using their Reason, which at the same time would show them how to live virtuously in society. Truth and Goodness were both natural possibilities for ordinary people in general. Their calm, reasonable attitude with its appeal to Plato and cool reason helped prepare the way for the Deism of the 18th century's religious thinkers.

The Royal Society

Bacon never finished writing his fable *The New Atlantis* modelled on More's *Utopia*. In it he describes an imaginary Pacific island of Bensalem with its "Solomon's House" or "The College of the Six Days' Work" which is a kind of college for the sciences, "dedicated to the study of the works and creatures of God". He imagines a new academic society to unite all those concerned to explore the new learning. At the time, the universities of Oxford and Cambridge were only concerned to teach the old forms of philosophy and saw the formation of Christian ministers as their main function.

An independent college had been founded near London in the 1580s by a London merchant, Sir Thomas Gresham. It had developed a practical curriculum that included Astronomy, mathematics, anatomy, physics for adult citizens who wanted to learn more in areas that could help them in their work. When Oxford came under Puritan control in the later 1640s, teachers formed at Gresham were brought in to develop the study of the "natural sciences" there.

Bacon had justified his programme of The Great Instauration by reference to a restoration of the perfection Adam had enjoyed in the Earthly Paradise. This theological vision coincided exactly with the optimistic millenarianism that was being promoted in the early 1640s by Samuel Hartlib, Gabriel Plattes (in the Utopian work *Macaria* of 1641), John Dury, and Jan Amos Comenius. Comenius called his vision "Pansophia", it was to be the dawn of a new enlightenment spread across Protestant Europe by which material benefits would accrue from increased knowledge about the universe. Like Milton and many others, they were convinced that if England led the way, this new perfection of learning in society would encourage God to bring in the Reign of Christ and vanquish the old ignorance.

Throughout the Commonwealth, the Baconian vision and the millenarian optimism of many Puritans worked together to promote the growth of experimental sciences. Even when the Commonwealth failed, the sense of being promised an ever brighter future continued, and the very word "Restoration" spoke of much more than the return of a king. It was felt to allude to the Restoration of Paradise, the Golden Age often related to the time of Augustus, a time of peace, progress, and reason.

Finally the Royal Society of London for the Improving of Natural Knowledge was given its charter in 1662. Not all its members were scientists, they included Dryden, Cowley, Waller, as well as Sir Christopher Wren (architect of St Paul's Cathedral after the great fire of 1666). The Royal Society is generally credited with having encouraged its members to employ a simple plain style of writing. In this it helped the English language pass from the elegance of Sir Thomas Browne to a more modern austerity. It also reflects the way in which poetry, marked by metaphor and wit, was being marginalized and rejected in favour of a lucid, "prosaic" means of expression.

John Locke

Although Locke's work and influence really belong to the period beyond the scope of this book, it would be foolish to omit one of the most influential thinkers England ever produced. John Locke (1632 - 1704) was educated in the traditional way at Westminster School and at Christ Church, Oxford. He was given positions in the university and in public service, he was also interested in medicine and was physician to the earl of Shaftesbury but much of his time was spent in study and writing.

In 1690 he published his greatest work, the *Essay concerning Human Understanding* that remains one of the fundamental texts in the philosophical analysis of "mind". In the same year, he published two *Treatises of Government* in which he insists that there is no divine or absolute right of kings. Contradicting Hobbes, he insists that the king in a state is bound by the social contract, that the people's consent to his rule may be withdrawn and a new ruler chosen if the king fails to serve the best interests of the nation.

He was writing at the time before 1685 when people were trying to prevent the Catholic prince James Stuart from succeeding his brother Charles II. After this failed, the events of 1688 forced James into exile but he did not surrender the crown. Locke was closely associated with William of Orange and published the *Treatises* in support of the argument that the title of king was given by popular consent and could be taken back by regular process. Many in England had been troubled by the idea of recognizing Parliament's right to make and unmake kings; Locke writes to justify this course of action.

In 1695, Locke published another major text, *The Reasonableness of Christianity*, expressing a form of natural religion without fixed creeds or traditions. He was opposed to Catholicism but wished for a very tolerant attitude towards the various forms of Protestantism. Locke was a leader in the development of rational Deism. His *Thoughts concerning Education* (1693) were immensely popular in the following century and influenced Rousseau's ideas on the subject expressed in *Emile*.

The *Essay concerning Human Understanding* underwent further development in various later editions, until the fifth in 1706. Locke believes that God has made us with the capacity to know certain things in certain ways, which knowledge must be for our good since God wishes us to have it. "My purpose,"

writes Locke, is "to enquire into the original, certainty, and extent of human knowledge; together, with the grounds and degrees of belief, opinion, and assent." The style is very different from the florid style of Bacon or the harshness of Hobbes.

Locke's fundamental assertion is that we are born with our minds a blank, like an empty sheet of paper, *tabula rasa*; we receive impressions from outside which our reason then transforms into knowledge. There is no in-born knowledge. Locke is an empiricist and a rationalist: "Reason must be our last judge and guide in everything." In many matters Locke is prepared to say that we cannot know or cannot be sure of knowing rightly about the outside world. One important word for Locke is *idea* which he does not use in the Platonic sense but in Descartes's manner, to signify "the object of the understanding when a man thinks", mind-dependant.

It was Locke who, after Descartes, decided the direction and concerns of modern European philosophy. For the writers and thinkers of the 18th century, Locke was fundamental reading, though perhaps more for his political views on society than for his difficult theories of knowledge. If the 18th century is known commonly as the Age of Enlightenment or the Age of Reason, it is very largely thanks to John Locke. The work of Lessing and Kant, of Voltaire and Diderot, and many others, derives from ideas first developed in England. The successors to Locke in England are George Berkeley (1685 - 1753), David Hartley (1705 - 1757) and David Hume (1711 - 1776)

Sir Isaac Newton

The 18th century looked back with gratitude to the century that produced Milton, Locke, and Newton. *Paradise Lost* was the only European epic that stood comparison with Homer or Virgil. Locke had established Reason as the basis for all knowledge. Newton was the third great founder of the Age of Reason. Newton (1642 - 1727) was born into a humble family, but was able to study at Cambridge and stayed there from 1661 until 1696, when he was given the post of master of the Royal Mint and president of the Royal Society. He never married.

Newton was one of the greatest geniuses that Europe ever produced. His pioneering work in mathematics, dynamics, astro-physics, astronomy, optics, cosmology is still a fundamental reference today. Only in the matter of relativism (Einstein) has he been shown to have been lacking. Yet he wrote major studies in areas such as prophecy and alchemy, as well as theology and biblical chronology, where today these subjects are not part of a scientist's normal concerns.

Newton's cosmic view ("Newtonianism") is expressed in three major works: *Philosophiae naturalis principia mathematica* (1687), the *Optiks* (1704) on the nature of light, and *Arithmetica universalis* (1707). He established firmly that the cosmos was governed by perfectly rational laws "of nature" that kept it in a marvelous pattern under God its Maker whose glory was manifest in its great universal harmonies. This became the leading ideology of the Enlightenment. Contemporary with Newton, and in conflict with him in some areas, was the great German Gottfried Wilhelm Leibnitz (1646 - 1716).