

XI

THE AGE OF DESCARTES

THE WARS OF RELIGION

In the first half of the seventeenth century Europe worked out, by political and military means, the consequences of the religious reformation. It was the age of the wars of religion. In France, three decades of civil war between Catholic and Calvinist came to an end in 1598 when the Calvinist leader, Henri de Navarre, having converted to Rome and succeeded to the throne as Henri IV, established by the Edict of Nantes toleration for Calvinists within a Catholic state. In 1618 the Holy Roman Emperor Ferdinand II formed a Catholic League to fight the German Protestant princes; it defeated the Protestant elector Frederick V at the battle of the White Mountain near Prague, and reimposed Catholicism in Bohemia. But this Catholic victory was followed by a succession of Protestant victories won by the Swedish king, Gustavus Adolphus. After his death the Thirty Years War was brought to an end in 1648 by the Peace of Westphalia, which established co-existence in the Empire between the two religions.

In Britain, after the defeat of the Spanish Armada in 1588, and the enthronement in England in 1603 of King James I from Calvinist Scotland, there was little serious chance of England returning to Catholicism, despite the fantasies of the Gunpowder Plotters in 1605. But the English Civil War, which led to the execution of James's son Charles I in 1649, was, in the minds of many participants, a conflict not only between King and Parliament but also between the Church of England and other Protestant sects. But after 1650 it could no longer be said that Europe was divided into two hostile military camps, one Catholic and one Protestant. Indeed, that had already ceased to be true when, in the later stages of the Thirty Years War, the France of Louis XIII, under Cardinal Richelieu, had taken sides with the Protestant king of Sweden against the Austrian Catholic Emperor.

During the wars of religion there appeared the first full-length philosophical treatment of the ethics of war, *On the Rights and Wrongs of War and Peace* by Hugo Grotius, published in 1625. Though there was no longer any international authority universally recognized throughout Europe, Grotius maintained that

THE AGE OF DESCARTES

there was a common law among nations, valid alike in peace and war. War did not terminate, or suspend, moral relationships between the warring parties; war could be justly undertaken, but only if certain moral principles were scrupulously observed.

Though there were medieval precedents, Grotius can claim to be the principal author of the theory of the just war. According to this theory, a war may only be waged in order to right a specific wrong: that is what gives the right to go to war, the *ius ad bellum*. War should be taken up only as a last resort, when other measures of redressing the grievance or preventing aggression have failed. There must be good hope of victory, and the good to be obtained by the righting of the wrong must outweigh the harm which will be done by the choice of war as a means. Finally, one must observe certain rules in the actual conduct of the war: that is, justice in war itself, the *ius in bello*. The deliberate killing of non-combatants and the ill-treatment of prisoners of war will render unjust a war which may have initially begun with solid justification. The system elaborated by Grotius and his successors remains to this day the most satisfactory framework for the discussion of the ethics of war.

THE LIFE OF DESCARTES

Among those who fought on the Catholic side in the Thirty Years War was the most important philosopher of the seventeenth century, René **Descartes**. Descartes was born in 1596, in a village which is now called La-Haye-Descartes. He was educated by the Jesuits and remained a Catholic throughout his life; but he chose to spend most of his adult life in Protestant Holland. He was a man of the world, a gentleman of leisure living on his fortune; he never lectured in a university and commonly wrote for the general reader. His most famous work, the *Discourse on Method*, was written not in academic Latin, but in good plain French, so that it could be understood, as he put it, 'even by women'.

While serving in the Emperor's army, Descartes acquired a conviction of his mission as a philosopher. On a winter's day in 1619 he conceived the idea of undertaking, single-handed, a reform of human learning that would display all disciplines as branches of a single wonderful science. When he went to sleep, full of ardour for his project, he had three dreams that he regarded as prophetic signs of divine vocation.

In pursuit of his goal Descartes was an innovator in many disciplines. Nowadays it is his philosophical works which are most read: in his own time his reputation rested as much on his mathematical and scientific works. He was the founder of analytical geometry, and the Cartesian co-ordinates which enable arithmetical and geometrical methods to be combined derive their name from his Latin surname, Cartesius. In his thirties he wrote a significant treatise on dioptrics, the result of careful theoretical and experimental work on the nature of the eye

and of light. He also composed one of the first scientific treatises on meteorology, in which he put forward a theory of the nature of rainbows.

The culmination of his early scientific work was a treatise called *The World*. In it he set out to give an exhaustive scientific account of the origin and nature of the universe, and of the working of the human body. Like Galileo he adopted the hypothesis that the earth revolved round the sun; but before the work was complete he learnt of Galileo's condemnation. He decided against publication and henceforth kept his heliocentrism private. This decision was undoubtedly motivated by caution, not conviction; but there is no need to doubt the genuineness of his fundamental religious beliefs.

In 1637 he decided to publish three shorter treatises, on dioptrics, geometry, and meteorology, which he prefaced with a brief *Discourse on Method*. The three scientific treatises are now read only by specialists in the history of science; but the preface has been translated into more than a hundred languages, and is still read with pleasure by millions. It is written in the style of an autobiography, and presents in miniature a summary of his scientific system and his philosophical method. It is an excellent illustration of Descartes' gift for presenting complicated philosophical doctrines so elegantly that they appear fully intelligible on first reading and yet still provide matter for reflection to the most advanced specialists. He prided himself that his works could be read 'just like novels'. Indeed, his main ideas can be so concisely expressed that they could be written on the back of a postcard; and yet they were so revolutionary that they changed the course of philosophy for centuries.

If you wanted to put Descartes' main ideas on the back of a postcard you would need just two sentences: man is a thinking mind; matter is extension in motion. Everything, in Descartes' system, is to be explained in terms of this dualism of mind and matter. Indeed, we owe to Descartes that we think of mind and matter as the two great, mutually exclusive and mutually exhaustive, divisions of the universe we inhabit.

For Descartes, a human being is a thinking substance. He rejected the Aristotelian doctrine that the soul was the form of the body, with the corollary that disembodied existence, if possible at all, was something incomplete. Whereas, for a medieval Aristotelian, man was a rational animal, for Descartes, man's whole essence is mind. In the *Discourse* he says 'I recognised that I was a substance whose whole essence or nature is to think, and whose being requires no place and depends on no material thing.' In our present life, he agreed, our minds are intimately united with our bodies, but it is not our bodies that make us what we really are. Moreover, in Descartes' system the mind is conceived in a new way: the essence of the human mind is not intelligence but consciousness, the awareness of one's own thoughts and their objects.

Contrasted with mind is matter. For Descartes, matter is extension in motion. By 'extension' is meant what has the geometrical properties of shape, size, divisibility

THE AGE OF DESCARTES



Figure 25 Portrait of Descartes by Jan Baptist Weenix (c.1647).
(Central Museum, Utrecht)

and so on; these were the *only* properties which Descartes attributed, at a fundamental level, to matter. In his suppressed treatise on the World, and in the revised elements of it which he published in his lifetime, he offered to explain all of the phenomena of heat, light, colour, and sound in terms of the motion of small particles of different sizes and shapes.

Like Bacon, Descartes compared knowledge to a tree; but for him the tree's roots were metaphysics, its trunk was physics, and its fruitful branches were the moral and useful sciences. His own writings, after the *Discourse*, followed the order thus suggested. In 1641 he wrote his metaphysical *Meditations*, in 1644 his *Principles of Philosophy* (an edited version of *The World*), and in 1649 a *Treatise*

on the Passions which is largely an ethical treatise. The 1640s were the final, most philosophically fruitful, decade of his life.

THE DOUBT AND THE *COGITO*

Descartes insisted that the first task in philosophy is to rid oneself of all prejudice by calling in doubt all that can be doubted. The second task of the philosopher, having raised these doubts, is to prevent them leading to scepticism. This strategy comes out clearly in Descartes' *Meditations*. As the title suggests, the work is not intended to be read as an academic treatise. It is meant to be followed in the frame of mind of a religious retreat, such as St Ignatius Loyola's *Spiritual Exercises*. It is to provide a form of thought therapy, detaching the mind from false approaches to the truth in the way that religious meditation detaches the soul from the world and the flesh.

In this intellectual discipline, the deliverances of the senses are called in question, first by considerations drawn from sense-deception, and then by an argument from dreaming.

What I have so far accepted as true *par excellence*, I have got either from the senses or by means of the senses. Now I have sometimes caught the senses deceiving me; and a wise man never entirely trusts those who have once cheated him.

But although the senses may sometimes deceive us about some minute or remote objects, yet there are many other facts as to which doubt is plainly impossible, although these are gathered from the same source; e.g. that I am here, sitting by the fire, wearing a winter cloak, holding this paper in my hands, and so on.

A fine argument! As though I were not a man who habitually sleeps at night and has the same impressions (or even wilder ones) in sleep as these men do when awake! How often in the still of the night, I have the familiar conviction that I am here, wearing a cloak, sitting by the fire – when really I am undressed and lying in bed!

But even if the senses are deceptive, and waking life is as illusory as a dream, surely reason can be relied on, and the knowledge of a science such as mathematics is secure!

Whether I am awake or asleep, two and three add up to five, and a square has only four sides; and it seems impossible for such obvious truths to fall under a suspicion of being false.

But there has been implanted in my mind the old opinion that there is a God who can do everything, and who made me such as I am. How do I know he has not brought it about that, while in fact there is no earth, no sky, no extended objects, no shape, no size, no place, yet all these things should appear to exist as they do now?

THE AGE OF DESCARTES

Moreover, I judge that other men sometimes go wrong over what they think they know perfectly well; may not God likewise make me go wrong, whenever I add two and three, or count the sides of a square, or do any simpler thing that might be imagined? But perhaps it was not God's will to deceive me so; he is after all called supremely good.

But even if God is no deceiver, how do I know that there is not some evil spirit, supremely powerful and intelligent, who does his utmost to deceive me? If I am to avoid the possibility of assenting to falsehood, I must consider that all external objects are delusive dreams, and that I have no body but only a false belief in one.

These doubts are brought to an end by Descartes' famous argument for his own existence. However much the evil genius may deceive him, it can never deceive him into thinking that he exists when he does not. 'Undoubtedly I exist if he deceives me; let him deceive me as much as he can, he will never bring it about that I am nothing while I am thinking that I am something.' 'I exist' cannot but be true when thought of; but it has to be thought of to be doubted. Once this is seen 'I exist' is indubitable, because whenever I try to doubt it I automatically see that it is true.

Descartes' argument is usually presented in the terser form he used in the *Discourse: Cogito, ergo sum*: 'I am thinking, therefore I exist'. From these few words Descartes not only derives a proof of his existence, but also seeks to discover his own essence, to demonstrate the existence of God, and to provide the criterion to guide the mind in its search for truth. No wonder that every word of the *cogito* has been weighed a thousand times by philosophers.

'I am thinking'. What is 'thinking' here? From what Descartes says elsewhere, it is clear that any form of inner conscious activity counts as thought; but of course the thought in question here is the self-reflexive thought that he is thinking. How important is the 'I' in 'I am thinking'? In ordinary life the word 'I' gets its meaning in connection with the body which gives it utterance; is someone who doubts whether he has a body entitled to use 'I' in a soliloquy? Some critics have thought that he should really have said only 'There is thinking going on'.

'Therefore'. This word makes the *cogito* look like an argument from a premiss to a conclusion. Elsewhere Descartes speaks as if his own existence is something he intuits immediately. Accordingly, there has been much discussion whether the *cogito* is an inference or an intuition. Probably Descartes meant it to be an inference, but an inference that was immediate, rather than one which presupposed some more general principle such as 'Whatever is thinking exists'.

'I exist'. If the premiss should have been 'thinking is going on', should the conclusion be only 'existing is going on'? Critics have argued that the doubting Descartes has no right to draw the conclusion that there is an enduring, substantial self. Perhaps he should have concluded rather to a fleeting subject for a transient thought; or perhaps, even, there can be thoughts with no owners. Can

THE AGE OF DESCARTES

Descartes assume that the 'I' revealed by the methodical doubt is the same person who, unpurified by doubt, answered to the name of 'René Descartes'? Once the link has been severed between body and mind, how can anyone be certain of the identity of the thinker of the *Meditations*?

These questions have been pressed with great force in the philosophy of the last two centuries. In Descartes' own time, it was asked how 'I am thinking, therefore I exist' differs from 'I am walking, therefore I exist'. Descartes' answer is that as an argument the one is as good as the other; but the premiss of the first is indubitable, whereas the premiss of the second is vulnerable to doubt. If I have no body, then I am not walking, even if I believe I am; but however much I doubt, then by the very fact of doubting, I am thinking. But 'I think I am walking, therefore I exist' is a perfectly valid form of the *cogito*.

THE ESSENCE OF MIND

In the rest of the *Meditations* Descartes proceeds to answer the question 'What am I, this I whom I know to exist?' The immediate answer is that I am a thing which thinks (*res cogitans*). 'What is a thing which thinks? It is a thing which doubts, understands, conceives, affirms, denies, wills, refuses, which also imagines and feels.' 'Think' is being used in a wide sense: for Descartes, to think is not always to think *that* something or other, and thinking includes not only intellectual meditation, but also volition, emotion, pain, pleasure, mental images, and sensations. No previous author had used the word with such a wide extension. But Descartes did not believe that he was altering the sense of the word: he applied it to the new items because he believed that if they were properly understood, they could be seen to possess the feature which was the most important characteristic of the traditional items if *they* were properly understood. This feature was immediate consciousness, which for him was the defining feature of thought. 'I use this term to include everything that is within us in such a way that we are immediately conscious of it. Thus, all the operations of the will, the intellect, the imagination and the senses are thoughts.'

The thing which thinks is a thing which 'understands, conceives'. The mastery of concepts and the formulation of articulate thoughts are, for Descartes as for medieval philosophers, operations of the intellect, and thoughts or perceptions which are both clear and distinct are for him operations of the intellect *par excellence*. However, Descartes makes a much sharper distinction than his predecessors did between intellection and judgement. Descartes does not regard the mind's consciousness of its own thoughts as a case of judgement; simply to register the contents of the mind, an idea or set of ideas, is not to make a judgement.

Understanding the proposition '115 + 28 = 143' is a perception of the intellect; but making the judgement that the proposition is true, asserting that 115

plus 28 makes 143, is an act not of the intellect, according to Descartes, but of the will. The intellect provides the ideas which are the content on which the will is to judge. In many cases, the will can refrain from making a judgement about the ideas which the intellect presents; but this is not so when the intellectual perception is clear and distinct. A clear and distinct perception is one which forces the will, a perception which cannot be doubted however hard one tries. Such is the perception of one's own existence produced by the *cogito*.

In addition to understanding and perceiving, then, a thinking being affirms and denies, wills and refuses. The will says 'yes' or 'no' to propositions (about what is the case) and projects (about what to do). The human will is, in a certain sense, infinite in power. 'The will, or freedom of choice, which I experience in myself is so great that the idea of any greater faculty is beyond my grasp.' Because of this infinity it is the will which in human beings is the especial image and likeness of God.

It would be wrong, however, to think of Descartes as an indeterminist, like the Jesuit believers in liberty of indifference. The form of freedom which Descartes most valued was not liberty of indifference, but liberty of spontaneity, which is defined as the ability to do what we want, the ability to follow our desires. Clear and distinct perception, which leaves the will with no alternative but to assent, takes away liberty of indifference but not liberty of spontaneity. 'If we see very clearly that something is good for us it is very difficult – and on my view impossible, as long as one continues in the same thought – to stop the course of our desires.' The human mind is at its best, for Descartes, when assenting, spontaneously but not indifferently, to the data of clear and distinct perception.

Finally, the *res cogitans* 'imagines and feels'. Imagination and sensation are understood by Descartes sometimes broadly and sometimes narrowly. Taken in the broad interpretation, sensation and imagination are impossible without a body, because sensation involves the operation of bodily organs, and even imagination, at least as conceived by Descartes, involves the inspection of images in the brain. But taken in the narrow sense – as they are in the definition of the *res cogitans* – sensation and imagination are nothing other than modes of thought. As Descartes puts it, as he emerges from his doubt: 'I am now seeing light, hearing a noise, feeling heat. These objects are unreal, for I am asleep; but at least I seem to see, to hear, to be warmed. This cannot be unreal, and this is what is properly called my sensation.' Descartes here isolates an indubitable immediate experience, the seeming-to-see-a-light which cannot be mistaken, the item that is common to both veridical and hallucinatory experience. It is this which is, for Descartes, 'sensation strictly so called' and which is a pure thought. It does not involve any judgement; on the contrary, it is a thought which I can have while refraining, as part of the discipline of Cartesian doubt, from making any judgements at all.

GOD, MIND, AND BODY

The upshot of the Cartesian doubt and the *cogito* is Descartes' conclusion that he is a thing that thinks, a conscious being. But is that *all* he is? Well, at this stage, this is all that he is certain of. 'There is thought: of this and this only I cannot be deprived. I am, I exist; that is certain. For how long? For as long as I am thinking; maybe if I wholly ceased to think, I should at once wholly cease to be. For the present I am admitting only what is necessarily true; I am, with this qualification, no more than a thinking thing.' Later, Descartes concludes 'my essence consists solely in the fact that I am a thinking thing'.

Now of course not being certain that I have any essence other than thought is not at all the same thing as being certain that I do not have any essence other than thought. Scholars still debate whether Descartes failed to distinguish between the two. But in his *Meditations*, for his last word on the relation between mind and body, we have to wait until he has considered the existence and nature of God.

In the *Fifth Meditation* Descartes tells us that he finds in himself the idea of God, of a supremely perfect being, and that he clearly and distinctly perceives that everlasting existence belongs to God's nature. This perception is just as clear as anything in arithmetic or geometry; and if we reflect on it, we see that God must exist.

Existence can no more be taken away from the divine essence than the magnitude of its three angles together (that is, their being equal to two right angles) can be taken away from the essence of a triangle; or than the idea of a valley can be taken away from the idea of a hill. So it is not less absurd to think of God (that is, a supremely perfect being) lacking existence (that is, lacking a certain perfection), than to think of a hill without a valley.

One's first reaction to this argument (usually called Descartes' 'ontological argument' for the existence of God) is that it is a simple begging of the question of God's existence. But Descartes clearly thought that theorems could be proved about triangles, whether or not there was actually anything in the world that was triangular. Similarly, therefore, theorems could be stated about God in abstraction from the question whether there exists any such being. One such theorem is that God is a totally perfect being, that is, he contains all perfections. But existence itself is a perfection; hence, God, who contains all perfections, must exist.

Before Descartes published his *Meditations*, he arranged for the manuscript to be circulated to a number of savants for their comments, which were eventually printed, along with his responses, in the published version. One of the critics, the mathematician Pierre Gassendi, objected that existence could not be treated in this way.

Neither in God nor in anything else is existence a perfection, but rather that without which there are no perfections. . . . Existence cannot be said to exist in a thing like a perfection; and if a thing lacks existence, then it is not just imperfect or lacking perfection; it is nothing at all.

Descartes had no ultimately convincing answer to this objection. The non-question-begging way of stating the theorem about triangles is to say: if anything is triangular, then it has its three angles equal to two right angles. Similarly, the non-question-begging way of stating the theorem about perfection is to say that if anything is perfect, then it exists. That may perhaps be true: but it is perfectly compatible with there being nothing that is perfect. But if nothing is perfect, then nothing is divine and there is no God, and so Descartes' proof fails.

The argument which we have just presented and criticized seeks to show the existence of God by starting simply from the content of the idea of God. Elsewhere, Descartes seeks to show God's existence not just from the content of the idea, but from the occurrence of an idea with that content in a finite mind like his own. Thus, in the *Third Meditation*, he argues that while most of his ideas – such as thought, substance, duration, number – may very well have originated in himself, there is one idea, that of God, which could not have himself as its author. I cannot, he argues, have drawn the attributes of infinity, independence, supreme intelligence, and supreme power from reflection on a limited, dependent, ignorant, impotent creature like myself. But the cause of an idea must be no less real than the idea itself; only God could cause the idea of God, so God must be no less real than I and my idea are. Here the weakness in the argument seems to lie in an ambiguity in the notion of 'reality' (as in 'Zeus was not real, but mythical' vs. 'Zeus was a real thug').

Descartes' proofs differ from proofs like Aquinas' Five Ways which argue to the existence of God from features of the world we live in. Both of the *Meditations* arguments are designed to be deployed while Descartes is still in doubt whether anything exists besides himself and his ideas. This is an important matter, since the existence of God is an essential step for Descartes towards establishing the existence of the external world. It is only because God is truthful that the appearances of bodies independent of our minds cannot be wholly deceptive. Because of God's veracity, we can be sure that whatever we clearly and distinctly perceive is true; and if we stick to clear and distinct perception, we will not be misled about the world around us.

Antoine Arnauld, one of those who were invited to submit comments on the *Meditations*, thought he detected a circle in Descartes' appeal to God as the guarantor of the truth of clear and distinct perception. 'We can be sure that God exists, only because we clearly and evidently perceive that he does; therefore, prior to being certain that God exists, we need to be certain that whatever we clearly and evidently perceive is true.'

There is not, in fact, any circularity in Descartes' argument. To see this we must make a distinction between particular clear and distinct perceptions (such as that I exist, or that two and three make five) and the general principle that what we clearly and distinctly perceive is true. Individual intuitions cannot be doubted as long as I continue clearly and distinctly to perceive them. But prior to proving God's existence it is possible for me to doubt the general proposition that whatever I clearly and distinctly perceive is true.

Again, propositions which I have intuited in the past can be doubted when I am no longer advertent to them. I can wonder now whether what I intuited five minutes ago was really true. Since simple intuitions cannot be doubted while they are before the mind, no argument is needed to establish them; indeed, for Descartes, intuition is superior to argument as a method of attaining truth. It is only in connection with the general principle, and in connection with the round-about doubt of the particular propositions, that appeal to God's truthfulness is necessary. Hence Descartes is innocent of the circularity alleged by Arnauld.

In the *Sixth Meditation* Descartes says that he knows that if he can clearly and distinctly understand one thing without another, that shows that the two things are distinct, because God at least can separate them. Since he knows that he exists, but observes nothing else as belonging to his nature other than that he is a thinking thing, he concludes that his nature or essence consists simply in being a thinking thing; he is really distinct from his body and could exist without it.

None the less, he does have a body closely attached to him; but his reason for believing this is that he now knows there is a God, and that God cannot deceive. God has given him a nature which teaches him that he has a body which is injured when he feels pain, which needs food and drink when he feels hunger or thirst. Nature teaches him also that he is not in his body like a pilot in a ship, but that he is tightly bound up in it so as to form a single unit with it. If these teachings of nature were false in spite of being clear and distinct, then God, the author of nature, would turn out to be a deceiver, which is absurd. Descartes concludes therefore that human beings are compounded of mind and body.

However, the nature of this composition, this 'intimate union' between mind and body, is one of the most puzzling features of the Cartesian system. The matter is made even more obscure when we are told that the mind is not directly affected by any part of the body other than the pineal gland in the brain. All sensations consist of motions in the body which travel through the nerves to this gland and there give a signal to the mind which calls up a certain experience.

The transactions in the gland, at the mind-body interface, are highly mysterious. Is there a causal action of matter on mind or of mind on matter? Surely not, for the only form of material causation in Descartes' system is the communication of motion; and the mind, as such, is not the kind of thing to move around in space. Or does the commerce between mind and brain resemble intercourse between one human being and another, with the mind reading off messages and symbols

THE AGE OF DESCARTES



Figure 26 Descartes' sketch of the mechanism whereby pain is felt by the soul in the pineal gland.

(*Principia Philosophiae*; photo: akg-images)

presented by the brain? If so, then the mind is in effect being conceived as a homunculus, a man within a man. The mind-body problem is not solved, but merely miniaturized, by the introduction of the pineal gland.

THE MATERIAL WORLD

Descartes' *Meditations* brought him fame throughout Europe. He entered into correspondence and controversy with most of the learned men of his time, especially through the intermediary of a learned Franciscan, Marin Mersenne. Some

of his friends began to teach his views in universities; and in the *Principles of Philosophy* he set out his metaphysics and his physics in the form of a textbook. Other professors, seeing their Aristotelian system threatened, subjected the new doctrines to violent attack. However, Descartes did not lack powerful friends and so he was never in real danger.

One of his correspondents was Princess Elizabeth of the Palatine, the niece of King Charles I of England. She presented a number of shrewd objections to Descartes' account of the interaction of mind and body, to which he was unable to give a satisfactory answer. Out of their correspondence grew the last of his full-length works, the *Passions of the Soul*. When it was published, however, this book was dedicated not to Elizabeth but to another royal lady who had interested herself in philosophy, Queen Christina of Sweden. Against his better judgement Descartes was persuaded to accept appointment as court philosopher to Queen Christina, who sent an admiral with a battleship to fetch him from Holland. The Queen insisted on being given her philosophy lessons at 5 o'clock in the morning. Under this regime Descartes, a lifelong late riser, fell victim to the rigours of a Swedish winter and died in 1650.

Some of the most important of Descartes' doctrines were not fully spelt out in his published works, and only became clear when his voluminous correspondence was published after his death. One such is his doctrine of the creation of the eternal truths; another is the theory that animals are unconscious automata.

In 1630 Descartes wrote to Mersenne:

The mathematical truths which you call eternal have been laid down by God and depend on Him entirely no less than the rest of his creatures. Indeed to say that these truths are independent of God is to talk of Him as if He were Jupiter or Saturn and to subject him to the Styx and the Fates. Please do not hesitate to assert and proclaim everywhere that it is God who has laid down these laws in nature just as a king lays down laws in his kingdom. . . . It will be said that if God had established these truths He could change them as a king changes his laws. To this the answer is 'Yes he can, if His will can change'. 'But I understand them to be eternal and unchangeable' – 'I make the same judgment about God' 'But His will is free.' – 'Yes, but His power is incomprehensible.'

It was an innovation to make the truths of logic and mathematics depend on God's will. It was not that previous philosophers thought such truths were totally independent of God; according to most thinkers, they were independent of God's will, but dependent upon, indeed in some sense identified with, his essence. Descartes was the first to make the world of mathematics a separate creature, dependent, like the physical world, upon God's sovereign will.

This doctrine, Descartes said, was the necessary foundation of his physical theory. He rejected, systematically, the Aristotelian apparatus of real qualities and substantial forms, both of which he regarded as chimerical entities. The essences of

things, he maintained, are not forms as conceived by Aristotle; they are simply the eternal truths, which include the law of inertia and other laws of motion as well as the truths of logic and mathematics. Now in the Aristotelian system it was the forms and essences that provided the element of stability in the flux of phenomena which made it possible for there to be universally valid scientific knowledge. Having rejected essences and forms, Descartes needed a new foundation for the certain and immutable physics that he wished to establish. If there are no substantial forms, what connects one moment of a thing's history to another? Descartes' answer is: nothing but the immutable will of God. And to reassure ourselves that the laws of nature will not at some point change, we have once again to appeal to the veracity of God, who would be a deceiver if he let our inductions go astray.

In Descartes' system we have a world of physics governed by deterministic laws of nature, and we have the mental world of the solitary consciousness. Human beings, as compounds of mind and body, straddle both worlds uncomfortably. Where do non-human animals fit in?

According to most thinkers before Descartes, animals differ from human beings by lacking rationality, but resemble them in possessing the capacity for sensation. But Descartes' account of the nature of sensation makes it difficult to attribute it to animals in the same sense as we attribute it to human beings. In a human, according to Descartes, there are two elements in sensation: on the one hand, there is a thought (e.g. a pain, or an experience as it were of seeing a light), and on the other hand, there are the mechanical motions in the body which give rise to that thought. The same mechanical motions may occur in the body of an animal as occur in the body of a human, and if we like we can, in a broad sense, call these sensations; but an animal cannot have a thought, and it is thought in which sensation, strictly so called, consists. It follows that, for Descartes, an animal cannot have a pain, though the machine of its body may cause it to react in a way which, in a human, would be the expression of a pain. As Descartes wrote to an English nobleman:

I see no argument for animals having thoughts except the fact that since they have eyes, ears, tongues, and other sense-organs like ours, it seems likely that they have sensations like us; and since thought is included in our mode of sensation, similar thought seems to be attributable to them. This argument, which is very obvious, has taken possession of the minds of all men from their earliest age. But there are other arguments, stronger and more numerous, but not so obvious to everyone, which strongly urge the opposite.

This doctrine did not seem quite as shocking to Descartes' contemporaries as it does to most people nowadays; but they reacted with horror when some of his disciples claimed that human beings, no less than animals, were only complicated machines.

Descartes' two great principles – that man is a thinking substance, and that matter is extension in motion – are radically misconceived. In his own lifetime

phenomena were discovered which were incapable of straightforward explanation in terms of matter in motion. The circulation of the blood and the action of the heart, as discovered by the English physician William Harvey, demanded the operation of forces such as elasticity for which there was no room in Descartes' system. None the less, his scientific account of the origin and nature of the world was fashionable for a century or so after his death; and for a while other, more fruitful, scientific conceptions of nature felt obliged to define their position in relation to his.

Descartes' view of the nature of mind endured much longer than his view of matter: indeed, throughout the West, it is still the most widespread view of mind among educated people who are not professional philosophers. As we shall see, it was later to be subjected to searching criticism by Kant, and was decisively refuted in the twentieth century by Wittgenstein, who showed that even when we think our most private and spiritual thoughts we are employing the medium of a language which cannot be severed from its public and bodily expression. The Cartesian dichotomy of mind and matter is, in the last analysis, untenable. But once grasped, its influence can never wholly be shaken off.

More than any other philosopher, Descartes stands out as a solitary original genius, creating from his own head a system of thought to dominate his intellectual world. It is true that there is hardly a philosophical argument in his works which does not make its appearance, somewhere or other, in the writings of earlier philosophers whom he had not read. But no one else ever displayed the ability to combine such thoughts into a single integrated system, and offer them to the general reader in texts which can be read in an afternoon, but which provide material for meditation over decades.