Modern Philosophy

The seventeenth and eighteenth centuries

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Chapter 1

Introduction

How modern is 'Modern' philosophy?

Six 'Modern' philosophers

Is there such a thing as the Modern Age? And if there is, are we in it?

The six philosophers who are the subject of this book are Descartes, Spinoza, Leibniz, Locke, Berkeley and Hume. They are all standardly referred to as 'modern' philosophers, even though the most recent of them died well over 200 years ago. It is a title they used of themselves, and one that was used about them by their contemporaries, but its use today suggests two things, neither of which is obviously true: that there is something which is common to all six of them, and that they are somehow connected to us, but not to the people who went before them – in other words, it suggests that there is such a thing as Modernity, or The Modern Age, to which both we and they belong.

When you come to look at what they actually wrote, though, that suggestion seems hard to sustain. For one thing, they are very different one from another. Not only were they a diverse group in

terms of nationality, language, tradition, religion, politics, social group and personality, but they also lived in very different times and places, and wrote about different subjects. Their lives cover a period of some 180 years, from the birth of Descartes in 1596 to the death of Hume in 1776. One hundred and eighty years is a long time, and a lot happened in the world they knew between those dates. When we come to look at them in detail, we will see that their lives and their ideas overlapped and criss-crossed in a whole variety of different ways. There is no single theory or belief that they all share, and which marks them out as belonging to the same epoch. There is no one clearly stateable question which was the burning issue of that long and eventful period and which they all tried to answer. Instead, we will see theories and questions come and go in their writings, issues sometimes moving into centre stage, and at other times receding into the background. Sometimes they agree on a certain topic, sometimes they disagree; most often they deal with related issues in significantly different ways and with very different emphasis, so that you would be hard pushed to say for certain whether it was the same question they were asking, or a different one.

Not only do they seem to be disparate and diverse, but when you read them they also seem almost impossibly remote from our present lives and concerns. Three of them we read in modern translations, of course, which takes some of the edge off their remoteness, and even with the three who wrote in English we usually have updated typography, spelling and punctuation, which do a lot to make them seem a little less alien. But still their writings seem at best seriously archaic, and sometimes downright bizarre. Their interests, their concerns, their attitudes, their judgements all seem seriously foreign, irrelevant to our lives. What is obvious to them just seems weird to us, and what is obvious to us they have no knowledge of.

For all their diversity and remoteness, though, I think it does still make sense to say that they are all in a significant sense modern thinkers, and that we ourselves are still recognisably of their era. The problem is that, as is often the case with our families and friends, what holds us all together is much less obvious than what divides us. So here is my theory of Modernity, and with it comes a little test for you to apply to yourself, by means of which you can

decide whether you yourself are a Modern thinker, or whether you want to say that, as far as you are concerned, Modernity is a thing of the past.

Appearance and Reality, or two kinds of expert

In the seventeenth century people began to think in a new way.[1] The basis of that new way of thinking was a fundamental distinction, which I am going to call the distinction between Appearance and Reality. Here is an example of it in operation.

Imagine you're sitting in the garden, eating an apple. The weather's decent, the light's good. Your eyes, ears, taste buds and other sensory equipment are in normal working order, and you are not currently under the influence of any distorting passions or of any mind-affecting drugs. You are, however, a philosopher, and so half-way through eating your apple you suddenly stop, and start to think about it.

'Here', you think, 'is this apple. It is round and green and shiny and sweet, and I pulled it off my next-door-neighbour's tree not half an hour since (when she wasn't looking). I can see the apple, I can feel it in my hand, I can smell it and taste it, and I can hear the crunching noise it makes when I bite it. I know where it came from, and I know what kind of apple it is. All in all, I think I know this apple pretty well. But I wonder what it's *really* like, deep down, in itself. I wonder what a scientist would say about it.'

Does that little story make sense to you? If it does, then you understand what it is to be Modern. I think the chief distinguishing feature of the Modern era is that distinction between on the one hand our subjective experience of the world – the way it looks, and feels – and on the other its independent, objective reality – the way it really *is*. The six philosophers in this book are all of them involved in some way or other with defending, explaining, clarifying, using, opposing or re-interpreting some distinction of this kind, and I think it is still a central part of the way that our society understands itself and the world around it. But before the seventeenth century it was not standardly made out in anything like the same way.[2]

It is important to realise that the distinction I am talking about

here is not simply that between real and illusory, actual and non-actual, true and false. It is very hard to imagine people who could live without being able to make out *that* kind of distinction in some form or other.[3] But that is not at all the same as saying that we have to operate with a systematic distinction between Appearance and Reality, subjective and objective, the world as we know it and the world as it really is. Because not only did people before the seventeenth century not standardly make a distinction like that, but we ourselves manage to get along without it in large parts of our lives.

Think, for example, about tables, physicists, and stamp-collectors.

The table in your kitchen (if you have one) is to all intents and purposes solid, brown, wooden and (except when you move it out of the way to hoover) stationary. But as we all know, it isn't *really* like that. *Really*, the physicist tells us, it is in itself a whole world of microscopic and submicroscopic particles, waves, or fields of matter. Those particles are not themselves wooden, but are made of more elemental stuff, and they are not really brown, but invisible; and they are certainly not stationary – in reality, they are whizzing around at high speed, and the whole thing is *really* no more solid than is a cloud of water droplets, or a swarm of bees.[4]

That is a classic example of the Appearance/Reality distinction in operation: the table as it appears to be, as it features in our daily lives, is quite different from the way it really is, as the physicist knows it. Three points in particular to notice:

(1) The properties which objects really possess are in fact radically different from the ones they seem to possess. (The table looked solid, brown and immobile, but is really none of those things.)
(2) But more than that, not only do things seem to be other than they really are, but in fact many (at least) of the properties that things seem to possess turn out not to be possessed by *anything at all*. It isn't that the table, which seems to be brown, is really yellow, or pink, or a tasteful shade of puce; really, as it is in itself, the table isn't *any* colour. Colour has turned out to be a feature not of the world, but our experience of it, so that

not only is the table not brown, but *nothing* (really, in itself) is brown. And really nothing, in itself, is solid or immobile, either.

(3) And the third point is just an extension of that second one. Not only does the world not really possess a lot of the properties it appears to have, but it turns out to have a lot of properties which nothing in our experience *does* possess. Valency, for example, or non-locality are contemporary examples of properties which we say that things in themselves do possess, but which we have never directly experienced anything as having.

It is important to realise that we make this distinction in some places, but not in others. Think of stamp collecting as an example. The expert philatelist knows massively more about stamps than does an ignorant person like me. I see a funny-looking green stamp with a picture of some mountains on it and a couple of flags; the expert sees a Swiss two-cent commemorative issued in 1887 to celebrate the visit of Crown Prince Helmut of Bavaria and his wife Pauline, or whatever it might be. The expert knows the stamp's history, the way it was made, and which factory it was printed in. She can tell you its place in the history of the Swiss postal service, its current value, how many examples are known to survive and where they all are, and a whole mass of other stuff that I can't even dream up to use in this example. Is that the same as the physicist's expert knowledge of the table?

It seems to me it's quite different, and the reason it is different is that we don't make any kind of appearance/reality distinction in the case of stamp collecting.

Try it. Does the philatelist know what the stamp is *really* like, while I know only how it *appears*?

No. My knowledge of the stamp is superficial, trivial, limited to what you can see in a cursory inspection, while hers is encyclopaedic, broad and deep and informed by a lifetime of devotion to the subject – but my view of the stamp is not *mistaken*, as my view of the table was. The properties I thought the stamp had are still there in the expert's account, though they are incorporated into a very different context. And the new properties which she detects in it and I don't, like the overprinting of the price or the dodgy perforation, are things which I too can come to see, just as she

does. In general we can say that my understanding of the stamp is preserved in the expert's account – though greatly enhanced and expanded – whereas in the case of the physicist my account was *replaced* by a very different kind of story.

Stamp collecting is not in any way peculiar in not making the kind of systematic Appearance/Reality distinction we saw in physics: the same is true of large areas of our day-to-day knowledge.[5] The point I am making is that before the seventeenth century the distinction was *not* standardly made in relation to the expert's knowledge of nature, but it has been ever since. And that is what I think makes it true to say that our six philosophers, like us, were living in, and trying to come to terms with, the Modern world.

The shock of the old

The fact that the Appearance/Reality distinction is now so familiar makes it hard for us to realise that in the seventeenth century it was anything but. Yet in the time of Descartes the idea of a distinction of this kind was not only not obvious, it was also politically and socially dangerous, theologically unacceptable and intellectually plainly absurd.

That absurdity is not easy for us to see; but try to imagine how crazy it must have appeared when people first began seriously to claim that the sky is not in fact blue, that there is a world of invisible creatures living and dying in the clearest water, and that the earth itself, the solid centre of our world and of our lives, is in reality racing through the heavens and spinning round at enormous speed. When you think about it, any one of those claims would take a great deal of swallowing to anyone who hasn't been brought up to believe it, and who has not been trained since an early age into the Cartesian, Modern belief that the reality of things is not revealed to the casual observer, but is established by the subtle calculations of the expert.

In its religious aspect the shock of the new metaphysic was no less acute. If Descartes and his kind were right, then most people in the world were guilty of a kind of large-scale and seemingly inevitable misunderstanding of the way things really are, and that seemed to call into question people's views of their relation to

the world and to the God who made them. Traditional theology had been made out in terms of traditional metaphysics, and by this time was very strongly Aristotelian in character; if the world was not as it had always been taken to be, then large areas of theological doctrine and biblical interpretation would have to be rethought – a process which was bound to be difficult and dangerous in the context of the ongoing battles over the Reformation.

Politically, too, the new ideas raised problems: traditional learning cannot be questioned without calling into doubt traditional authorities and traditional educational systems. A large-scale error of this kind seemed to make fools of all established authorities, and like the Reformation to invite people to make up their own account of the world, and to recast it anew. Even thinkers like Descartes who were careful not to enter directly into religious or political argument therefore came to be seen for what they were – dangerous radicals with new ideas which if accepted called into question all existing authorities and institutions.

Since that time, of course, we have learned to adjust our political, social and theological opinions in such a way as to preserve the Modern conception of science. Our view of ourselves and of our relations to each other, to nature, to other peoples and to other ages are all of them intimately bound up with the parts played in our lives and in our consciousness by the practice and products of science. And for that reason it is still true to describe us as living in the Modern age which came into being in the seventeenth century. It may well be true (I think myself it is to be hoped) that we are now at the very end of that period, and that the culture we inhabit will soon move into some kind of Post-Modern age; but it hasn't happened yet. And until it does, the attempt to understand and respond to the different carefully worked-out versions of Modernity which were produced by our six thinkers can help us to make sense of the ragbag of disparate Modernist views that we call our contemporary common sense, and which play such a large part in the lives that we lead, and the attitudes and beliefs that we currently inhabit.

So try these six views for size, and see if any of them fits with the kind of life you want to lead, and the kind of views you want to live with. All you will find here is a rough sketch of these philosophers'

thoughts, a broad outline of how they saw the world: I hope it will be enough to give you some sort of a feel of what it would be like to see things the way they seem to have done. Some of their ideas I hope you will find ridiculous, some infuriating, some exciting; some I expect you will find dull. However you find them, I hope they will make sense as genuine alternatives to the attitudes and beliefs you started out with, and that through seeing them and learning to distinguish your own views from them you will come to understand some aspects of your own life a little better.

PART 1
René Descartes

Biography

René Descartes was born in 1596, when Francis Bacon was thirty-five years old, William Shakespeare nearly thirty-two, and Kepler only twenty-four. He was fourteen when Galileo published his epoch-making telescopic observations, and a nervous 37-year-old when Galileo was condemned for his advocacy of a heliocentric system. He died in 1650, a year after the execution of Charles I in England, and two years after the end of the Thirty Years' War. His best-known publications are *Discourse on Method* (1637), *Meditations on First Philosophy* (1641) and *Principles of Philosophy* (1644).

Descartes was born in the town of Châtellerault[1] in west-central France, some 70 kilometres south of Tours, into a family of provincial gentry. His mother died when he was a baby. He was brought up by his grandmother, and went away to school at the Jesuit college in La Flèche when he was ten years old. As a young man he spent four years as a gentleman soldier in the Netherlands and Germany, but he gave up plans for a legal career and for the rest of his life lived for the most

part on the income he derived from the sale of his share of the family property. Most of his productive life (1628–49) was spent at various addresses in the Netherlands, but at the age of fifty-four he moved to Sweden at the invitation of Queen Christina, only to die of pneumonia within six months. He never married, and his only daughter (her mother was a maid at a house he stayed at in Amsterdam) died at the age of five.

He was persuaded very early on that the traditional learning in which he had been trained was dead, and that truth lay with the new approaches advocated by people like Bacon, Kepler and Galileo. He carried out his own investigations in such fields as optics, meteorology, mechanics and anatomy; but his real achievements were not in his practical inquiries into natural phenomena, but in the theories he produced to accommodate his own and other people's discoveries, and in his literary success as an expositor of and publicist for those views. His written output was huge, from formal Latin treatises dedicated to the learned fathers of the Sorbonne, to more popular French-language pamphlets for the reading public, and countless formal and informal letters to friends and people in power, explaining and defending his views, criticising those of his opponents, and generally doing everything he could to sell his gradually developing revolutionary theory of the nature of the world, of God and of human beings.

His ideas were always controversial, and his works were banned by the Catholic church after his death. This didn't prevent him from being enormously influential in all areas of intellectual inquiry, from physics and biology to politics and art criticism. He came to be seen as the great revolutionary, the great moderniser, the first true champion of the Enlightenment, and his name was invoked with reverence right up to the nineteenth century even by people who knew nothing of what he actually thought and wrote.

Chapter 2

Material Monism or the Great Soup of Being

Descartes' account of the natural world

Overview

I said in the Introduction that what binds our six philosophers together, and to us, is their involvement with and reaction to the distinction between appearance and reality – between the way we subjectively experience the world and the way it objectively is. Descartes is the clearest example of that, and although he is the earliest of the six, and so the most distant from us in time, he is, despite the seeming strangeness of some of his ideas, perhaps the most recognisably modern thinker of them all.

Descartes' whole work is concerned with explaining and defending his idea of science, and with setting up and justifying the distinction between appearance and reality. I shall start by setting out something of what he thought the world is really like when you look beyond the appearance to the reality underneath, looking first at his account of nature (ch. 2), then at the relation of God to that new world (ch. 3), and finally at the place of human beings in it (ch. 4). But among philosophers Descartes is famous as much for

the way he seeks to sell his ideas as for the content of them, so we will then look at the way he tries to persuade you that his is the right view to take and the only way we can establish a secure and lasting understanding of the world and our place in it (ch. 5).

Material Monism: Descartes' universal soup of matter

To begin, then: what, according to Descartes, is the world around us really like? Nowadays, of course, we have our own answer: the world of appearance – the familiar, vital world of colours, objects, values, actions and events – is generated by a hidden world of atoms, molecules, subatomic particles and invisible forces. Descartes' answer was essentially just the same, but it differed in some details.

Strange though it sounds on first hearing, Descartes held that in reality there is only one physical object in existence. Everything that we nowadays call a physical object – from the stars in the heavens to the dust on the top of your wardrobe – Descartes says is really just a part or an area of that one thing, differentiated from other so-called separate things by relative motion. In reality, as it is known to the scientist, the whole physical universe is just one giant object – a vast continuum, like a universal soup of matter which fills up the whole material universe. That infinite soup is uniform and homogeneous, but it is full of motion; it contains eddies, currents, seething whirlpools, lapping waves and quiet lagoons – and those areas of differently moving material stuff are what we perceive as objects in space.[2]

It is a surprising picture, and one which at first sight strikes us as quite bizarre. Why should anyone believe such a thing? The answer is that like our own story of a world of invisible particles, it provides an *explanation* of the world around us; Descartes is claiming that looking at the world in this way provides us with a complete explanation for all natural phenomena. Everything we see around us – the movements of the heavenly bodies, the weather, the tides, the lives of animals, the growth of plants and the workings of the brain – can all be explained scientifically, by a single set of simple laws, because all of them alike are at bottom the results of mechanical interactions between parts of matter in motion.

I am not going to attempt here to set out Descartes' whole physical theory; instead I am going to try to give an idea of what it would be like to see the world as he saw it by explaining what I think are three central features, and then considering a couple of examples of it in operation.

Telling things apart: individuation in a plenum

How could it be that everything in nature is just one huge object? Consider an analogy. All the seas and oceans of the earth are quite clearly in reality one undivided expanse of water: there are no walls or barriers dividing the north Atlantic from the south, and even though the Americas separate the Pacific from the Atlantic, the two are actually linked both to the south and (though the water here is frozen) to the north. Yet the undivided nature of the oceans doesn't prevent us from dividing them up, not only into oceans, but also into a whole array of different seas, bays, straits, channels, inlets, passages, gulfs and even the odd bight.

The distinctions between those different areas of the sea are in one sense perfectly clear. There are unambiguous rules governing the use of such names, and unarguable facts about the differences and relations between them. The Gulf of Mexico, for example, is not the Straits of Melaka, or anything like it; and anyone who is in either one of those watery areas is quite certainly and undeniably not in the South China Sea and is also a very long way from either the Bay of Plenty or that Great Australian Bight.

At the same time, though, the divisions are in a sense arbitrary. First, there is no correct answer to the question of just how many of these watery objects there really are. Take the Pacific, for example: is it one ocean, or two? Sailors and map-makers tend to separate the north Pacific and the south Pacific, but no-one talks of the east Pacific and the west Pacific – not because north and south are really separate in some way that east and west are not, but just because they have down the years found it convenient to make the one distinction and not the other (largely, I suppose, because of the significance of the Equator in respect of weather systems and ocean currents). Second, not only is it not at all

clear how many seas, oceans etc. there really are, but also the boundaries between any two of them are very vague. If for example you are sailing from the North Sea into the Baltic, it is clear that you will have to pass through the Skagerrak and the Kattegat in order to do so. For each of those areas there will be times when you are unambiguously in the one and not in the other; but there will also be a lengthy period when you are rounding the top of Denmark when there is no clear answer to the question of which you are in. The same is true of any such pair of sea areas – in fact Skagerrak and Kattegat are relatively clearly defined cases; the area of uncertainty between, say, Arabian Sea, Indian Ocean and Southern Ocean is many times larger, so large that in the time of wind-powered ships, when most of these terms were invented, you could travel for days without being able to give any clear answer as to which area you were currently passing through.

The uncertain and ill-defined nature of these maritime distinctions – the uncertainty over how many there really are, and the vagueness of the boundaries between them – reveals only what we knew all along: that the different areas of the oceans are not really separate things, but only conventionally defined areas which we invent for our convenience when talking about sea travel. In Cartesian language, they are none of them different 'substances', but ultimately only different 'modes' or 'modifications' of the one mass of water.[3] The distinction between such things is not a 'real' distinction – a distinction between different things – but only a 'modal' one – a difference in the *way* something is.[4] And Descartes' physical theory consists in saying that the differences we ordinarily make between objects in the world – between my head and my hat, between a fish and a flea, between the sun and the stars and the earth and all the so-called things they contain – are at bottom merely modal distinctions. Just like the seas and the straits and the sounds, they are not really separate things, but only modes, or conventionally individuated areas which we invent for convenience in our daily lives.

Our seafaring analogy in fact breaks down when we realise that sea areas are typically defined by the land masses that surround them. The Cook Straits, for example, separate the two main islands of New Zealand; the Bay of Biscay is the area between Brittany and Spain, etc. With Cartesian matter, by contrast, there is no

comparable thing outside the one extended substance which could serve as a reference point for individuating physical objects. A better analogy in this respect would be not the seas but the ocean currents. Currents are stable, enduring things with their own names and distinguishing characteristics, but they are separated from each other and from the waters around them only by the fact of their shared *movement* – that the particles of water that we call part of the current all tend to move together, in a certain direction and with a certain speed, relative to the particles of water around them. Whirlpools and tornadoes are good examples of the same kind. In a whirlpool the water is exactly the same as that in the calmer waters around it; yet the whirlpool can be identified, named, and separated from other whirlpools and from non-whirlpools by the mere fact that the particles of water within it tend to stay together, and to move very rapidly with respect to the water around them. According to Descartes, the common-sense distinctions we make between, say, my table, the air around it and the floor it stands on, and indeed between all the so-called objects in the world, are of exactly the same kind as that between a whirlpool and the water around it.

The idea seems a little less strange when you think about it, and especially if you take it, as Descartes did, to the microscopic level, when the same kind of arbitrariness we saw in the case of the seas becomes apparent.[5] How many objects, after all, is a table? Is it just one, or should we count the top and the four legs as separate? And what if the top is made up of several different planks joined together? And then there are the screws and nails that hold it together . . . and the particles of glue . . . and the varnish, and the coffee stains, and the dust – not to mention all the individual atomic and subatomic particles that go to make it up. And the boundaries between the table and its surroundings, which seem so clear to common sense, are they really any more clear-cut than those between the Bristol Channel and the Irish Sea? Looked at through a suitably powerful microscope, after all, you can see particles of floor attached to the table legs, and bits of the legs rubbed off onto the floor; and the surface of the table has dents and ridges and hollows which are filled with dirt and dust and air and coffee and cat hairs which are engrained with varying degrees of firmness into its pores, as well, of course, as the particles of air,

water and who knows what besides which exist within the structure of the wood itself. Is there really a clear line to be drawn between what is the table and what is not? On a day-to-day level, of course, there is – but then in the same way the map-maker can and does draw a neat line between Tokyo Bay and the rest of the Pacific.

The difference here seems to be only one of scale: we are aware of the conventionality and even arbitrariness of geographical distinctions, whether on sea or land (how thick is the USA/Canada border?), but not of those between familiar objects, just because of our relative size. But all we have to do is to imagine ourselves transformed into dust mites to begin to see the table/floor distinction as being as gross and arbitrary as our sea areas, when compared to what we would then regard as the clear, sharp boundary between one speck of dust and another. And then, of course, the philosophers of the dust mite world will gleefully point out that a particle of dust is in reality no more separate from another than is a table from a chair; and what their dust mite readers would have to do in order to see that would be to imagine themselves transformed into creatures which stand to dust mites as dust mites stand to people, and then they would see that . . . and so on and so on, without end. Whatever level you go to, all you have to do is to ratchet up the degree of magnification a few more thousand times, and you can raise the same old questions all over again: since space is an infinitely divisible continuum, any boundary you draw must in the end be an arbitrary one.[6]

So perhaps Descartes' story is not as crazy as it looks. Notice also another strength: when we ordinarily make the distinction between table and surroundings we seem to do so, just as Descartes said, on the basis of relative motion. Thus the dust on top of the table we say is not a part of it because you can wipe it off, whereas the varnish we *do* regard as part of the table because it's stuck on – i.e. in Cartesian terms the varnish is at rest relative to the other bits which we regard as part of the table, whereas the dust is sometimes (whenever it's dusted, for example) in motion with respect to them.

At this point an objection may be occurring to you. Perhaps it is true that, at the microscopic level at least, there is no hard and fast boundary to be drawn between the table and the air around it; and

perhaps it is even true that the distinction we normally make is one which would more or less coincide with a distinction based on relative motion. But surely it is also true that there is a further distinction between them, and one which also plays a part in how we tell them apart: that the table is made of wood, and the air is made of – well, just air!

Well, yes and no. Air and wood are certainly different, in the sense that they have very different properties, so that we can easily tell them apart – you can sit on the one and not the other, for example, breathe the other and not the one, and so on, and so on. But the question to ask is *why* they have different properties. Is it because the particles of the air are themselves essentially airy, whereas the particles of the wood are very wooden? To give that answer would be to offer no explanation at all for the differences between the two. (In fact, it would be an answer of just the kind that Descartes and his contemporaries were so critical of when offered by then contemporary Aristotelians – (see Box 15.1). Descartes' answer is much more rational, much more scientific, and holds out the possibility of a real explanation for all the differences we observe. According to him, the particles of the wood are only different from those of the air in the sense that they are differently organised. The wood is hard ultimately for the same reason as a very fast-moving whirlpool feels hard to the touch and the water around it doesn't: because at the submicroscopic level the particles which make it up are moving together at the same speed and so are very difficult to separate, whereas those in the air are moving randomly in various directions, and so are easily pushed apart.[7]

I am not trying to persuade you to adopt Descartes' material monism as a true account of what the physical world is like, only to show you what it means, and to suggest that whether or not you want to accept it, it is certainly not the stupid and archaic story it might seem at first sight. (And in fact it is no more ridiculous – though it may be less true – than the scientific pluralism we have been brought up on.) The question of its viability will depend at least in part on whether or not you can accept his denial of the existence of atoms, and also of the possibility of a vacuum.[8] But we can't go into those things here.

Moving things around: the nature of motion in a plenum

In the Cartesian world, then, the difference we make between objects is a conventional one based on relative motion. And the difference between the molecular parts which make them up is of the same kind; and so is that between the parts of the molecules, and the parts of those parts, . . . and so on as far as you may want to go. But if the whole universe is full of this matter in motion, how does it ever manage to move at all? Surely the possibility of motion itself depends on the possibility of an empty space for things to move into? Otherwise the matter of the world would be like snooker balls in a triangle – none of them can move around until you take one out.

Descartes says this is not so. All the motion in the world is what he calls 'circular': i.e. not a simple matter of object A's moving from one place to another, but a very complex exchange of positions by large numbers of distinguishable areas of the continuum. After all, it is not in fact true that the balls in the triangle can't move until you take one out: if only you could push them hard enough without destroying the triangle they *would* move – the balls would break up, and the resulting dust and lumps would push through the gaps between the remaining balls, displacing the air that was there before; and if the snooker triangle were a closed system like the physical universe, the air molecules would themselves move round to fill the space created by the original collapsing ball to complete a 'circle' of relative positional changes.

According to Descartes, that is the kind of process that is going on when a planet moves around the sun – it shoulders its way through the dense crowd of very fine and very mobile particles which lie in its path, which of course instantly shove one another around to fill the space it has vacated – in the way that the particles of water in a river move around behind a fish that swims through it. The same process is occurring when a leaf falls off a tree – you can see it twisting and turning as it navigates its way through the air around it, pushed downwards by the gravitational flow of invisible particles which are streaming out from the earth, and which force any unsupported object such as the leaf down behind them; and in so doing the leaf shoves the air particles

around so as to fill the space which it has vacated. According to Descartes, every natural physical process is basically this kind of 'circular' motion. Why does the wind blow? Because the turning earth sets up 'circular' motions in the air. Why do the trees grow? Because particles from the soil are pulled in at their roots and pushed along the channels within the fabric of the tree, causing the matter of the tree to bulge out under mechanical pressure at the weak points in its surface which we call the buds.

How matter moves: the laws of motion and the mathematisation of nature

We are beginning to see how Descartes conceives of all the phenomena of the natural world as in reality nothing but patterns of motions within the universal soup of material substance. The crucial point to grasp about this story – indeed in many ways its whole point – is that those motions are not random, but are all, however complex and involved, very rigidly governed by deterministic physical laws. Every one of the uncountably many complex circles of interaction which go to make up even so simple a thing as stirring a cup of cocoa with a spoon is covered by strict rules. Given the shape of the spoon, the way it is moved and the structure of the sides of the cup, there is only one possible path for each particle of milk, sugar, cocoa and dust, only one possible path to be travelled by each air bubble, micro-organism, trace of washing-up liquid or particle of dandruff in the cup, and only one possible outcome of all the uncountably many collisions which take place between all these things when the cocoa is stirred. And what goes for the cup of cocoa, of course, goes for the whole of creation, which is nothing but a giant cup of cocoa, stirred up at creation and continuing to swirl around in all its beauty and complexity and variety until the coming of the Day of Judgement. It is an astonishing vision; yet according to Descartes the whole process is governed by just three simple mechanical laws.

(1) *Inertia*[9] The first and most basic principle is that even though all the works of nature are the mechanical productions of matter in motion, nevertheless in itself that matter is

completely inert and capable of nothing. It will not move, unless it is pushed; and once it is started into motion, it will not stop until something comes along and stops it. 'Every particular thing remains as far as it can in the same state, and never changes except as a result of running into others.'[10] There is therefore no portion of matter in all the universe that has an attractive power over other matter, or a tendency to move in this way or that, or any kind of affinity for being in one place rather than another. All such powers, sympathies, virtues and potentialities beloved of his predecessors are banished from nature by this first and most basic law.

(2) *Rectilinear motion* This powerlessness or inertia of matter means that when once something has started it moving it will move in the simplest, least complicated way possible – in a straight line. It cannot of itself tend either to right or to left, either up or down, and will deviate only if something shoves it in one direction rather than another. Thus any non-rectilinear motion – such as that of the moon around the earth, for example – must be a composite one, the result of two or more impulses driving it in different directions – like a stone whirling round in a sling before release, which is both pushed out in a straight line away from the centre, and simultaneously pulled back by the restraining string.

(3) *Conservation* The final law is a law of collisions: that when objects collide, motion is passed between them; but any gain of motion by one body is exactly matched by a loss of motion in the other(s).[11]

With those three very simple laws, Descartes aims to explain everything that happens in nature, because everything that happens is the result of the mechanical interaction of parts of the continuum; and with those three laws we can in theory, if only we have enough information about the objects in question, work out in advance exactly what they will do. What he is offering us, therefore, is nothing less than a complete science of nature, encompassing everything from medicine to meteorology, astronomy to agronomy, chemistry, physics and biology – an account of the world as it really is, behind the way it appears in our experience of it.

There is one further aspect of the story which it is worthwhile to bring out here, and that is the extent to which Descartes' mechanistic science is also a *mathematical* science. Galileo had said that the book of nature is written in the language of mathematics,[12] and Descartes' mechanism is the ultimate expression of that line of thought.[13] For Descartes, as we have seen, every event is the deterministic outcome of precisely stateable laws, such that if we knew the exact quantities involved we could in theory predict with certainty the outcome of everything that happens. For Descartes that alternative, mathematical description of the event is not simply a useful calculating tool, it is *the only true description* of what is really going on. What the uneducated person who lives in the World of Appearance sees in gross physical terms as the crashing together of two separate lumps of stuff – with often dangerous and unpredictable consequences – consists in reality of a stately transformation of number sequences in accordance with perfect and unchanging laws. That is what every event in nature really consists in, when stripped of the crude physical categories in terms of which it is seen by the material eye of corrupt and fallen man; but as Descartes is going to show us, we are not trapped for ever in that view, and can through the kind of study we now call science escape to a purer, more intellectual understanding of things.

Examples

Descartes doesn't stop at this outline of the theory of mechanism. He is not content merely to work out the theoretical basis of his new view of the world, but in order to show that his mechanical science can work he sets about outlining, often in some detail, the way it will work in fields such as meteorology, anatomy, chemistry, optics, dynamics, astronomy and many more. I am not going to attempt to summarise that work here, but will outline briefly two examples he himself gives in order to illustrate the way the new metaphysic of nature was intended to work.

Example 1: creation of the Earth and the solar system

Descartes was a convinced Copernican,[14] but afraid to admit it. He wrote a naturalised, non-biblical account of how the Earth came into existence, but presented it as a kind of science fiction fantasy: in order to avoid denying that the Earth was actually created by God in six days and set at the centre of the universe, he instead presents us with a fable, which shows how a world *exactly like* our own *could* have come into existence in another way. (Unfortunately when he heard of the condemnation of Galileo he abandoned even this indirect account. His treatise was never finished, but large parts of it were published after his death.)

In what we have of the treatise Descartes conceives of the giant soup of matter as having been stirred up at creation, and thereafter following out its determined course in accordance with the three laws above. At the time of creation, there was Chaos – a vast confused swirling of matter with no settled shapes or patterns discernible in it. Yet behind that seeming confusion the three laws of motion were in operation, and gradually out of their repeated operation in the vast welter of collisions that ensued there came to be an order emerging, and over time the universe as we know it slowly began to develop. The constant bumping and grinding together of parts of matter eventually resulted in three different kinds of particle. They are not different kinds of stuff, of course, since all of them are merely matter; but that universal matter has shaped itself into parts of different sizes – rather in the way that the continued action of water on rock results in boulders, pebbles and sand.

The first kind of matter is large, slow-moving lumps, which are pushed together by the constant jostlings of matter around them to form large aggregations. The second kind is small, rounded particles which tend not to cohere together, and move around easily, and the third kind is extremely small, highly energetic particles which move around very quickly indeed.

Matter of the first kind, which Descartes, using the traditional terminology of his day but redefining it to suit his new theory, calls 'earth', makes up the planet Earth and all the other planets in the sky, and also makes up all the lesser objects which we normally refer to as material objects. Matter of the second kind – called 'air'

– is much less obvious to our senses than the first, but is what in fact fills most of the universe. It fills the air, it makes up what we now call gases of all kinds, and it also comprises the more rarefied airs which fill the spaces between the planets. The third kind of matter – the 'element of fire' – we encounter in the extremely energetic particles which make up flames, and also in electricity and nerve impulses. And streams of such particles also make up what uneducated and superstitious people think of as mysterious and apparently immaterial forces, such as gravity and magnetism.

The solar system, then, is an arrangement of those three kinds of particle that has resulted from the operation of the laws of motion on the original chaos. The sun is a mass of fire particles of immense energy; the air which swirls around it carries the Earth and the other planets around as leaves are carried in a stream; and the intense activity of the sun's fire particles pressing on the interplanetary air is the lines of mechanical pressure which we know as rays of light, pressing down on the Earth, which is an old star which has hardened and cooled over time.

Example 2: the human body

Descartes' account of the human body is included in his fantasy of the alternative world parallel to our own, but also – since he saw it as less controversial – occurs in his published works.[15] He sees the human body (we will see later – ch. 4 – that there is more than this to a human being) as being just like any other physical object – a mechanical system governed by the three laws of motion. The 'life' of a human body, like that of any animal or plant, is not a mysterious principle which animates it, but the purely mechanical consequence of the operation of the 'fire' particles within it. Fire particles are extremely small and extremely energetic. In the course of the process of digestion and the circulation of the blood around the body, these particles are extracted from the blood by a kind of distillation process which takes place in the brain, and from there they travel out along the nerves, filling the muscles and causing the limbs to move by a kind of hydraulic process.

The story sounds quaint and archaic, but is in fact strikingly

similar to our own, except that where Descartes talks of fire particles or 'animal spirits', we might talk of 'neural impulses' and the like. When I put my foot too close to a fire, the fast-moving particles in the fire attack the flesh of my foot and start to break down the organisation of its particles (to burn it). That process sends a kind of shock wave along the nerves of the foot, via the spinal cord to the brain, where the pressure opens various channels in the brain which allow the animal spirits to flow with incredible rapidity (as fast, you might say, as an electrical impulse) along the relevant nerves to expand various muscles and contract others in such a way that the foot pulls away from the fire, the head turns to let the pressure waves from the fire fall on the eyes so that I can see what the problem is, and the legs move in such a way as to carry me to safety.

Reading

Descartes' philosophy of nature is set out in his major work, the *Principles of Philosophy* (1644), especially parts 2–4. For a shorter and more accessible presentation, read the incomplete *The World* and *Treatise on Man* – parts of a projected work which Descartes abandoned after the condemnation of Galileo. Both are summarised in very compressed form in Part 5 of *Discourse on Method*.

Questions to ask

(1) In the seventeenth century it was widely held that there could be no 'action at a distance': the moon, for example, could not cause effects on earth – such as tides – unless there were some medium through which it operated. Is that true? If so, what do you take to be the medium in the case of gravity? If not, how is action at a distance possible?
(2) Descartes claims that a vacuum is impossible, because if there were literally nothing between the stars, for example, then they would be touching. Does that argument work? If not, is that because you believe in Absolute Space – you think of it as

an independently existing container, within which objects are arranged?

(3) Descartes thinks the question of whether or not there are atoms and vacuums can be settled a priori, by arguments such as that above. If contemporary science believed in atoms and/or vacuums, would that show he was wrong?

Chapter 3

The possibility of atheism

Descartes and God

God and the world

In the last chapter we sketched out Descartes' new account of the hidden reality of the natural world. But traditional science was inseparable from traditional theology. Did he want to throw out the one as well as the other?

Well, it depends how you read him. Most of the time he plays safe by avoiding theological issues and concentrating on the science, leaving it to others to decide how to fit them together, and that gives rise to the familiar picture which I shall refer to as God the clock-maker. But later on in life he does suggest a theological reading of his world view which may have been just a sop to the authorities, but which if taken seriously points to a different, stranger, and more interesting story which I shall call the God of Science. This chapter will focus on strictly metaphysical issues, on the question of how Descartes thinks of God and of God's relation to creation. In Chapter 5 we will look at the question of whether we have any good reason to believe there is such a thing as God at all.

God the clock-maker

According to the first picture, the God of Descartes is quite familiar. He is omnipotent, omniscient, eternal, and all-good. He created the universe, and all that is in it: i.e. in Cartesian terms he created the original soup of inert matter, set up the first chaos of disordered motion, and laid down the three laws by means of which that soup would in time – as he of course foresaw – come to develop into the world as we know it. Human beings he creates separately, and individually (see ch. 4), and to them alone he gives the power not only to react to the world around them, but also to understand something of the way it works. He also gives to each individual human being the power of free will.

The important thing to realise about this account of things is that once the world is created, God's involvement in it is fairly limited. He conserves it in being from moment to moment, and he watches over and cares for all the people he has created, but his direct involvement is slight: he allows the laws he has laid down to generate by mechanical means the consequences he has foreseen, and he allows the people to exercise their free will. His direct interventions are relatively minor: he creates human souls, and he communicates directly and indirectly with human beings – hearing our prayers, and inspiring the prophets, for example. On rare occasions he also acts directly in the natural world to produce what we see as a miracle. And of course he sent his son to redeem mankind, and one day will come to judge both the quick and the dead.

That is now a fairly traditional account of God's way with the world: the idea of God as the divine clock-maker, who wound up the mechanism of the world at creation, and leaves it to run its course with only minor interventions, powered, in Descartes' case, by an unending series of pushes and pulls and impacts between the different areas of the continuum, which goes on rattling around until Judgement Day.

There are two aspects to this familiar story of God's relation to the world. From the point of view of *ontology* – of what there is – God is revealed as the first cause and ultimate reason for nature, but he is essentially separate from it, not intimately involved with it on a day-to-day basis. It is his work, as the pot is the work of the

potter, and if God were somehow to cease to exist, the world he had created would remain as a pointless and purposeless repetition of mechanical processes.

From the point of view of *epistemology* – of our knowledge – again the story is one of separation. A knowledge of God is essential for our salvation and for our moral development, and also for an understanding of the ultimate purpose and ground of the world around us, of its first cause and of the possibility of human knowledge. But there is *no need at all* to refer to God for practical purposes, or for an understanding of the operations of nature. The life of the atheist may, from the Christian point of view, be empty and desperate, but she will be no more likely than is the Christian to walk into buildings or fall under buses, because a knowledge of God is not necessary for our physical survival. The atheist's learning may leave her with no understanding of the point of life, or of the origin of existence, but she will be no better and no worse than the Christian at giving an account of why the rain falls when it is cloudy, why the tides turn, and what keeps the planets moving in their orbits, because a knowledge of God is not necessary for an understanding of nature.

This ontological and epistemological separation of God from our practical and scientific lives is of course historically very significant. If God and the practical world are separate, then there is no reason for the Man of Business to be a man of religion: providing he knows enough of God to know his duties in life, he is free to concentrate on his commercial activities, and can leave the religious dimension to the specialists, and to his Sundays off. And in just the same way the Woman of Science need have no involvement in the world of religion, either. Providing she does not interfere in religious matters, she is free to inquire into the workings of nature, secure in the knowledge that nothing she finds there will contradict the teachings of the church, because, as Galileo said in defence of his freedom to inquire into astronomy without church interference, the Bible teaches us how to go to heaven, but not how the heavens go.[1]

There is a great deal in Descartes to support the idea that this is indeed his position. The whole structure of the physical apparatus we have seen seems to us to lend itself easily to this kind of

reading: the natural world is an independent, law-governed system which, once brought into being and started into motion, must rattle on regardless under the influence of the laws of inertia and conservation. This view is supported by Descartes' own scientific works, which contain few references to the nature or existence of God, and seem to show that all that is required for a complete science of nature is an understanding of matter and of the laws which govern it – both of which, of course, were divinely created, but both of which for all practical and scientific purposes can be understood purely naturalistically. Descartes does offer proofs of God's existence (see pp. 54–6) and as we will see he says that any rational person can see simply by thinking about it that God does and indeed must exist. But in fact those proofs themselves tend to strengthen the idea of God as external, and *additional* to the natural system: the mere fact that God's existence has to be proved can itself be taken to suggest that it is something we could live without believing – and the nature of the proofs he offers, which most readers (both today and at the time) find less than persuasive, strengthens the idea that theism is not the only option for someone who accepts Descartes' view of the world. In fact, some people have suggested that Descartes was himself a closet atheist, and that his Christianity is mere lip service to a powerful religious establishment which he did not dare to offend. There is no doubt that he moved to the Dutch Republic and suppressed publication of his works in order to avoid religious persecution for his views, and there is no denying that for fear of church censure he often obscures his real opinion (e.g. the way he presents his account of nature as a description of a new world, not of this one), and sometimes says things which on any account of his position he simply does not believe.[2]

The God of science

But there is another way to read this story, which may be nothing more than a smokescreen which Descartes throws up to deflect attention from the radical implications of his work. On this second account Descartes' position is perhaps harder to grasp, because less familiar to us. It is certainly a stranger, more mysterious

conception of God; I think it is also a richer, more subtle, and more attractive one.

The key point to grasp here is Descartes' claim that God is the one true substance. What does that mean? We saw earlier that according to Descartes a physical object – a small fish, to take a random example – is in the final analysis not a 'substance' but only a 'mode'; it is not an independently existing object, but only a temporary and conventionally defined aggregation of matter, in the way that the different seas of the world are not really separate things, but only conventionally defined areas of a bigger thing, namely the waters of the Earth. Now we discover that according to Descartes matter itself, the universal soup of physical being, is in its own turn not a real substance either: matter stands to God, he claims, in a way which is somehow analogous to the way the fish stands to matter in general.

If we take this literally, then, Descartes is claiming that just as the fish is only a manifestation, a 'mode' or 'modification' of the underlying matter, so in a similar way matter itself is only a consequence or an expression of God – not a thing in itself, but only a manifestation, a way of being, of something else, i.e. of God. What is real, what, ultimately, there is in existence, is God; and everything else that in any sense exists is not *another* thing, *in addition* to God, but only an *expression* of God, a way in which God manifests himself, or something that God *is doing*.

The insubstantiality of everything except God is an explicit part of Descartes' metaphysics, which is stated quite unambiguously – though how sincerely is open to dispute. God is the only true substance; matter, like a human mind (see ch. 4), can be *called* a substance, but not in the same sense as God is a substance.[3] Matter is substantial in the sense that it is *more* of a substance, closer to being a substance, than any individual material thing; it is not a real thing, but it is more of a thing, more 'thinglike' or 'real' than they are (cf. ch. 2 footnote 4, p. 270). More than that, it is very close to being a substance in the sense that it doesn't depend on anything else other than God for its existence, whereas any individual thing depends also on matter.

Now, if all that makes any sense at all, then it seems to point to an account of God and his relation to the world which is very

different from that of the divine clock-maker. On the clock-maker model, the world is a *product* of God, like the potter's pot, or the baker's loaf. But if God is the only true substance, then the relation between God and the world is very much closer and more immediate than that; the world is an *expression* of God, not a product; it is analogous not to the potter's pot, but to her pot-making activity. On the clock-maker model, as we saw, if God could cease to be, the world would remain as pointless and absurd, but as no less real than before. On this account, what becomes of the world if God could cease to exist? The answer is the same as what would happen to my house if suddenly there were no matter; or what would happen to pot-making if suddenly there were no potters: without God, its underlying reality, the world would be like a smile without a face, or a thought without a thinker – it would be nothing at all.

There are other aspects of Descartes' account of God which fit in with this reading. He says that God's activity of conserving the world is identical to his creation of it – i.e. that God doesn't simply make the world, and then let it run, but rather he is *continually* creating it from moment to moment, so that any change in the world – for example, a leaf's falling off a tree – is not simply a matter of the operation of the divine clockwork, but is rather to be understood as God's creating the world anew, replacing the world with the leaf on the tree by a world in which they are separate.[4] It is still of course true that there is a mechanical explanation of the fall of the leaf in terms of the weakening of the stem when the matter which makes it up withdraws into the tree in response to the change of season, but such mechanical explanations are now seen as descriptive not of the nature of matter, but of the activity of God, whose constant recreations of the world around us are not random and unpredictable, but follow simple, intelligible rules.[5]

What we have in these remarks of Descartes', in other words, is not the modern, naturalistic story of the divine clock-maker, but a mechanised, mathematicised version of the traditional notion of creation as a process of 'emanation'. The world, on this view, streams out from God, as light streams out from the sun. God is not identical with that material world, any more than the sun is identical with its light (base, corrupt and corrupting matter can be

no part of the divine essence); but he is its source, its basis, its underlying reality; it is his expression, his activity, his appearance. And just as the sun is itself too bright for us to look at, but we perceive it indirectly because everything we see we see by its light, so God himself is beyond our comprehension, but we understand him indirectly, through his creation.

On this reading what Descartes has done is not to replace this older tradition with the God of mechanism, but to provide a mechanical, mathematical interpretation of it. If God is the reality of which nature is the appearance, then a mechanical understanding of nature is a knowledge of God. In particular, as we have seen, an understanding of natural laws is not an understanding of God's *product*, but an understanding of his *behaviour*. Thus each of the three mechanical, naturalistic laws is capable of a religious reading. Descartes' belief in the conservation of motion is his belief that God sustains his creation from moment to moment, and that each state of the world corresponds perfectly to the previous one: nothing is lost in the recreation of the world from one moment to the next. Similarly, the principle of inertia is his belief that nothing God does is done without a reason: anything he does at one moment follows on naturally and rationally from what he had done before. The principle of straight-line motion is an interesting case, where the theological dimension is less obvious but equally real. The world as we know it, of course, contains *no* straight-line motion: any motion we ever observe – the flight of an arrow, the fall of a leaf, the rotation of the planets – is to some degree curved. The reason, of course, is that a motion such as the flight of a cannonball is a *complex* one, made up of the thrust of the powder, the downward weight of the ball, the resistance of the air, and so on. For Descartes this exemplifies the way that the divine perfection – straight-line motion – is unattainable under the circumstances in which we live: but it nevertheless underlies all the motions of earthly objects as their origin and their explanation.[6]

The point here is not simply that the Cartesian laws of motion are capable of being given a theological interpretation, or that there is some kind of analogy between mechanical and divine explanation; the point is that on this account, unlike the clockmaker story, there is *no separation* between Descartes' mechanics

and his theology. This is clearer if we bear in mind what we saw at the end of the previous section. I tried to show there that in Descartes' eyes the reality of nature is not a material mass which happens to be fully describable in mathematical terms, but rather the mathematical description is the only true account of nature, and the sensory terms in which we more often think of it are in fact a distortion of it, an appearance of that reality. We can now see that point more clearly. For a Cartesian, the challenge of science, to escape from the world of appearance to the world of reality, to discover the truth behind the outward show of things, can also be represented as a spiritual or religious challenge: to escape from the view which is natural to our physical embodiment, and to see the world as it really is, as God himself sees it, in purely non-sensory, mathematical terms.

I have tried here to sketch two readings of Descartes' account of God. On one, which I have called the clock-maker view, Descartes is a very modern thinker. If he is not himself an atheist, he certainly paves the way for atheism by producing an account of God and his relation to the world which means that the atheist scientist, though she may be damned for all eternity, is not mistaken in the way she sees the world around us. On the second account, the God-as-Substance view, Descartes' position would be much less familiar, because it would combine the fields of science and religion in a way that we find hard even to understand. On this account his invention of the appearance/reality distinction is at once not only a practical inquiry and a scientific research programme, but also a theological treatise and a programme of moral reform. If this second account is correct, for Descartes the notion of an atheist scientist is in fact an absurdity.

Reading

Descartes was extremely wary of writing on theological issues, and you need to read everything he says on the subject with that in mind. His official position is set out in *Principles* Part 1, but relevant comments can be found throughout his work, for example in *The World*, and also in his voluminous correspondence.

Questions to ask

(1) If we are not convinced by proofs of the existence of God, does it follow that we should be atheists? Compare: if we are not convinced we can *dis*prove the existence of God, does it follow that we should be theists? Where does the burden of proof lie, and why?
(2) If we understand God as the underlying reality of everything that is, does that mean he can't not exist? (How can reality be unreal?)
(3) God is usually taken to be outside of time. If that is so, then creation, because it is something that God does, cannot have happened at a time. Does that mean that any theist must regard creation as an ongoing process?