

10. Free will and determinism

‘Nothing would be uncertain and the future, as the past, would be present to [our] eyes.’

Pierre de Laplace

When Newton invented his laws of mechanics, many people took this to be the death of the free will concept. According to Newton's theory, the universe is like a giant clockwork, unwinding along a rigid, predetermined pathway towards an unalterable final state. The course of every atom is presumed to be legislated and decided in advance, laid down since the beginning of time. Human beings were seen as nothing but component machines caught up irresistably in this colossal cosmic mechanism. Then along came the new physics with its relativity of time and space and its quantum uncertainty. The whole issue of freedom of choice and determinism went back into the melting pot.

There seems to be a fundamental antagonism between the two theories that constitute the foundations of the new physics. On the one hand, the quantum theory endows the observer with a vital role in the nature of physical reality; as we have seen, many physicists claim that there is concrete experimental evidence against the notion of ‘objective reality’. This appears to offer human beings a unique ability to influence the structure of the physical universe in a way that was undreamt of in Newton's day. On the other hand, the theory of relativity, which demolishes the concept of a universal time, and an absolute past, present and future, conjures up a picture of a future that in some sense already exists, and so cuts from under our feet the victory won with the help of the quantum factor. If the future is *there*, does it not mean that we are powerless to alter it?

In the old Newtonian theory, every atom moves along a trajectory that is uniquely determined by the forces which act on it. The forces in turn are determined by other atoms, and so on. Newtonian mechanics permits, in principle, the accurate prediction of everything that will ever happen on the basis of what can be known at one instant. There is a rigid network of cause and effect, and every phenomenon, from the tiniest jiggle of a molecule to the explosion of a galaxy, is determined in detail long in advance. It was this conception of mechanics that led Pierre de Laplace (1749–1827) to declare that if a being knew at one instant the positions and motions of every particle in the universe he would have at his disposal all the information necessary to compute the entire past and future history of the universe.

The argument of the ‘Laplacian calculator’ is not as open and shut as it might seem,

however. First, there is the problem about whether a brain can, even in principle, compute its own future state. MacKay has argued that, for each individual, complete *self*-predictability is impossible, even in a mechanistic universe of the Newtonian variety. ¹ For suppose a super-scientist could peer into your brain and compute precisely what you will do on some future occasion, this does not logically preclude free will in a certain sense. The reason is that, though he may be correct in his prediction, he cannot tell you of that prediction (before the event) without messing up his calculation. When he tells you, for example, 'Yes, you will clap your hands' your brain state is inevitably altered from what it was before he told you the prediction; altered, that is, by this new piece of information. You would then have no reason to believe the prediction, since it was based on a now-altered brain state. Hence, no prediction can be made *that you would be correct in believing* about your future behaviour. MacKay thus argues that, however predictable and inevitable your behaviour may be to a hypothetical super-scientist who withholds that prediction, it remains logically unpredictable for you and so preserves at least an element of what is normally understood as free will.

Then there is the question of whether the universe is predictable after all in Newtonian mechanics. Recent advances in the mathematical description of mechanical systems have revealed that some types of forces are responsible for such acute instability in the evolution of certain systems that predictability is a meaningless concept. Whereas in a 'normal' mechanical system, slight variations of the initial conditions produce only slightly altered behaviour, these ultra-sensitive systems will evolve in totally different ways from two initial states that differ from each other by only an infinitesimal amount. Furthermore, the discoveries of modern cosmology reveal that our universe should have an expanding horizon in space, and that every day new disturbances and influences cross into the universe from the regions beyond the horizon. Because these regions have never been in causal communication with our part of the universe since the beginning of time, it is not possible, even in principle, for us to know what these incoming influences might be.

The most important argument, however, against complete predictability is the quantum factor. According to the basic principles of the quantum theory, nature is inherently unpredictable. Heisenberg's famous uncertainty principle assures us that there is always an irreducible indeterminism in the operation of subatomic systems. In the microworld, events occur that have no well-defined cause.

Does not the collapse of determinism conflict with the theory of relativity? In this theory there is no universal present, and the entire past and future of the universe are regarded as existing as an indivisible whole. The world is four-dimensional (three of space, one of time), and all events are simply *there*: the future does not 'happen' or 'unfold'.

Any conflict is, in fact, illusory. Determinism concerns the question of whether every event is completely determined by a prior cause. It says nothing about whether that event is *there*. After all, the future will be what it will be regardless of whether it is determined by prior events or not. The four-dimensional perspective of relativity simply

forbids us to slice up spacetime, in any absolute way, into universal instants of time. The notion of two events in different places being 'simultaneous' is relative to one's state of motion. They may be judged to occur at the same moment by one observer, but one after the other by another observer. We must therefore regard the universe as extended in time as well as space. But the theory tells us nothing about whether the temporal extension includes rigid links of cause and effect between the events there displayed. So in spite of the fact that past, present and future seem to have no objective meaning, the theory of relativity does not forbid a human being from deciding later events by his earlier actions. (Recall that the earlier-later ordering relation is an objective property of time, even though *the* past and *the* future are not.)

However, it is not at all clear that an indeterministic universe is, in fact, what is wanted to establish free will. Indeed, the determinist would argue that free will is only possible in a *deterministic* universe. A free agent is, after all, one who is able to cause certain acts in the physical world. In an indeterministic universe, events occur that are uncaused. But can you be responsible for your acts unless they are caused — caused by you? Proponents of free will assert that the activities of a person are *determined*, for instance, by his character, inclinations, personality.

Suppose a docile and peaceful man were suddenly to commit an act of violence. The indeterminist could say, 'It was a spontaneous event, with no prior cause. You cannot blame the man.' The determinist, on the other hand, would declare the man to be responsible, but take comfort in the fact that he could be rehabilitated by education, persuasion, psychotherapy, drugs, and so on which would *cause* him to act differently in the future. Indeed, a central message of most religious thinking is that we are able to improve our characters. But that is only possible to the extent to which our future characters are determined by our earlier decisions and actions. It is important to realize that determinism does not imply events occur *in spite of* our actions. Some events occur because *we* determine them.

Determinism must not be confused with the doctrine of fatalism, which asserts that future events are entirely beyond our control. 'It is all written in the stars', declares the fatalist. 'What will be will be.' The soldier who behaves recklessly on the battlefield in the face of a hail of bullets while thinking 'if my number is on it, no precaution will avert death' is a fatalist. Some Oriental religions contain fatalist overtones, and many people are inclined to lapse into fatalism from time to time, especially as far as major world affairs are concerned. 'It is beyond my power to influence events, one way or the other.' That is doubtlessly true. Ordinary people cannot avert world war or prevent the devastation of a city by the impact of a huge meteor. Yet in daily life we continually influence the outcome of events in countless small ways. Nobody would seriously say, 'Why bother to look when I cross the road, for my fate is already decided.'

Still, we have strong misgivings about determinism, which is why so many people are relieved that the quantum factor apparently demolishes the idea. Certainly our desire for freedom includes the requirement that what we decide may actually be caused by us to happen. But in a completely deterministic universe the decision is *itself*

predetermined. In such a universe, though we may perhaps do as we please, *what* we please is beyond our control. The argument goes like this. When you choose to drink tea rather than coffee, the decision is due to environmental influences (such as, tea is cheaper), physiological factors (coffee is a stronger stimulant), cultural dispositions (tea is a traditional drink), and so on. Determinism asserts that every decision — every whim — is determined in advance. If that is so, however free you may feel to choose tea or coffee, in reality your choice was destined from the moment you were born — even before. In a fully deterministic universe *everything* is determined from the instant of the creation. Does this make us less than free?

The problem is that it is very hard to decide exactly what sort of freedom we want. One suggestion is that *real* freedom to choose tea or coffee means that if the circumstances leading up to the choice were repeated, with everything in the universe exactly the same (including your brain state, because your brain is part of the universe) then there is a probability that you would choose differently on the repeat performance. Such an outcome is clearly incompatible with determinism. But how could this ultimate version of freedom ever be tested? How could the universe ever be reconstituted in identical form? If that is what is meant by freedom its existence must be a matter of pure faith.

Perhaps freedom means something else: unpredictability in the MacKay sense? What you will do is determined by elements beyond your control, but you can never know, even in principle, *what* it is that you will do. Is this enough to satisfy the desire for free will?

Another view of freedom is that some (or all) events are caused, but that the events caused by us have no cause from within the natural universe. Specifically, this idea asserts that our *minds* are external to the physical world (the dualist philosophy), but they can somehow reach into it and influence what happens. Thus, as far as the physical world alone is concerned not all events can be determined, because mind is not part of the physical world. One can still ask, what causes the mind to decide in the way it does? If those causes originate in the physical world (and clearly some do) then we are back with determinism, and the introduction of a non-physical mind is an empty embellishment. But if some of those causes are non-physical, does that make us more free? If we have no control over the non-physical causes, then we are no better off than we are with uncontrollable physical causes. But if we can control the causes of our own decisions, what determines how we choose to exercise that control: more external influences (physical or non-physical), or *us*? ‘I do it because I make myself make myself make myself...’ Where does the chain end? Must we fall into an infinite regress? Can we say that the first link in the chain is *self*-caused: it requires no cause from outside itself? Does this concept of self-causation – causeless causes – have any meaning?

So far we have been ignoring indeterminism. Most physicists would claim that the conflict between determinism and free will is irrelevant because we know that the quantum factor disproves determinism anyway. But we must be careful here. Quantum effects are probably too small to have much influence on the operation of the brain at

the neuron level, but if they did we would surely have not free will, but breakdown. A quantum fluctuation that forced a neuron to fire when it would normally not (or vice versa) is surely to be regarded as an interference to the otherwise normal operation of the brain. If electrodes were planted in your brain and triggered at random by an external source, you would regard that form of interference as a *reduction* of your freedom: someone ‘taking over’, or at least impeding, the operation of your brain. How can random quantum quirks inside your head represent anything other than ‘noise’? You decide to raise your arm, the neurons fire in the correct sequence, but a quantum fluctuation disturbs the signal. Your leg moves instead. Is that freedom? That is the fundamental problem of indeterminism: your actions may not be under your control because they are not *determined*, by you or anything else.

Still, it is hard to resist the impression that the quantum factor does hold out some hope for freedom. Certainly we do not wish the sequence of neuron firings to be interrupted once it has been initiated, but it might be argued that quantum effects are only important at the first stage — the initiation. Imagine a neuron that is primed to fire, and needs only the slightest disturbance at the atomic level to trigger it. The quantum theory says there is a definite probability that the neuron will or will not fire. The actual outcome is undetermined. This is where the mind (or soul) comes in. It says (subconsciously) ‘Electron move to the right!’, or some such command, and the neuron fires. No violation of a physical law is involved in this version of mind-over-matter, because there was a distinct chance that the neuron would have fired anyway. The mind simply tipped the balance of odds to make sure it did.

Unfortunately, however, quite apart from the lack of any evidence that the brain really is so delicately balanced (and if it were, extraneous electric and magnetic disturbances might then swamp the effect of the mind) this scenario runs into the problem already discussed above — the question of what causes the mind to command the electron to move to the right in the first place. It also runs into strong objection from those who reject the dualist solution of the mind-body problem, for they would maintain that the mind is not a substance capable of *acting on* the brain anyway. If the mind is regarded as the software representative of the brain's electrochemical structure, to talk of the mind acting on the brain is to fall for a confusion of levels once again. It is as meaningless as attributing the publication of a novel to one of its characters, or saying that a switching circuit in a computer fires because the program forces it to.

None of the foregoing really gets to grips with the central paradox of the quantum theory, which is the unique role played by the mind in determining reality. As we have seen, the act of observation causes the ghostlike superposition of potential realities to cohere into a single, concrete reality. Left to its own devices, an atom cannot make a choice. We have to observe it before a particular outcome is realized. The fact that you can decide to create either an atom-at-a-place or an atom-with-a-speed confirms that, whatever its nature, your mind does, in a sense, reach into the physical world. But now we can once again ask *why* you decided to measure, say, the position rather than the motion of the atom. Is this freedom to construct reality any more powerful than the

already existing freedom to influence the external world by moving objects around, say, by touch?

Many physicists these days are inclining towards the so-called Everett many-universes interpretation of the quantum theory. This view (briefly discussed in Chapter 8) has bizarre implications for the subject of free will. According to Everett, every possible world is actually realized, with all the alternative worlds coexisting in parallel. This duplication of worlds extends to human choices. Suppose you are faced with a choice — tea or coffee? The Everett interpretation says that the universe immediately divides into two branches. In one of the branches you have tea, in the other coffee. This way you have everything!

The many-universes theory would seem to satisfy the ultimate criterion for freedom of choice discussed above. When the split occurs, the circumstances leading to each outcome are truly identical in all respects — they are in fact the *same* universe — yet two different choices are made. (As noted before, no one can directly verify this theory, for *anyone* must be restricted to one branch of the dividing universe.) Yet the victory seems a pyrrhic one. If you can't avoid making *all* possible choices, are you really free? The freedom seems overdone, destroyed by its own success. You want to choose tea *or* coffee, not tea *and* coffee.

But now the many-universes proponent says: 'Ah! But what do you mean by *you* here?' The 'you' that actually has the tea is not the same as the 'you' that has the coffee. They inhabit different universes. If nothing else, these two individuals we lightly referred to as 'you' will differ in their perceptual experience (for instance, in the taste of the drink). They cannot be the *same* person. So, offered the choice, you don't actually have tea and coffee after all. Whichever of the two product 'yous' one is discussing, *that* you has made its choice. According to this view, then, saying that you have chosen tea in preference to coffee amounts to no more than a definition of 'you'. To say 'I chose tea' means, simply, 'I am the tea-drinker'. Thus, although a single 'you' was faced with the choice, the outcome involved two individuals, not one. In the Everett theory the self is continually multiplied into countless near copies. (The implications of this for the traditional concept of a distinct soul would be interesting to explore.)

Much has been written about the relationships between free will and the question of blame and responsibility for crime. If free will is illusory, why should anyone be blamed for their acts? And if all is predetermined, every one of us is locked into a course of action that is decided in advance of our existence. In an Everett multi-universe, could not the felon plea that at least one component of his multi-self is obliged by the laws of the quantum theory to commit the crime? We must, however, turn aside from this minefield and ask about the position of God in a deterministic universe. As soon as God is injected into the picture we bring down upon ourselves a deluge of puzzles.

Can God exercise free will and make decisions?

If man possesses free will, surely God does too? In which case many of the foregoing problems concerning the freedom concept extend to God. In addition we have all the usual perplexities associated with an infinite and omnipotent Deity. If God has a *plan* for

the universe, which is implemented as part of his will, why does he not simply create a deterministic universe in which the goal of the plan is inevitable? Or better still create it with the plan achieved? If the universe is indeterministic, however, does that not mean that God's power is limited because of his inability to predict or decide what the outcome will be?

It could perhaps be argued that God is free to relinquish some of his power if he wishes. He can give *us* free will to act against his plan if we so desire, and he can give atoms the quantum factor to turn his creation into a cosmic game of chance. But there is a logical problem of whether a truly omnipotent agent can relinquish some power.

The notion of freedom implied by omnipotence is quite different from the sort of freedom that humans enjoy. You may be free to choose tea or coffee, but only so long as supplies exist. You are not free to do *anything* you please — to swim the Atlantic or turn the moon to blood, for example. Human power is limited, and only a small range of desires are capable of being fulfilled. By contrast, the power of an omnipotent God is without limit, and such a being is free to have whatever he chooses.

Omnipotence raises some awkward theological questions. Is God free to prevent evil? If he is omnipotent, yes. Why then does he fail to do so? This devastating argument was deployed by David Hume: if the evil in the world is from the intention of the Deity, then he is not benevolent. If the evil is contrary to his intention, he is not omnipotent. He cannot be both omnipotent and benevolent (as most religions claim).

One response to this argument is that evil is due entirely to human activities; because God has given us freedom, we are free to do evil and thus frustrate God's plan. Still, if God is also free to prevent us from doing evil must he not share some of the responsibility if he fails to do so? When a parent allows an unruly child to run amok, attacking neighbours and causing damage, we would normally lay a portion of the blame at the parent's feet. Must we therefore conclude that evil (in perhaps a limited amount) is all part of God's plan? Or is God not free after all to prevent us from acting against him?

Fresh puzzles crop up if the Christian doctrine is followed in which God is believed to transcend time, for the concept of freedom to choose is intrinsically a temporal one. What meaning would it have to make a choice, not at a particular moment, but timelessly? And if God already knows the future, what meaning can we attach to a cosmic plan and our own participation in it? An infinite God will know what is happening everywhere. But as we have seen, there is no universal present moment, so God's knowledge *must* extend in time if it extends in space. So we conclude that it is meaningless for a Christian eternal God to have freedom of choice. But can we believe that man possesses a faculty not available to his creator? We seem forced to the paradoxical conclusion that freedom of choice is actually a *restriction* that we suffer — namely, our inability to know the future. God, released from the prison of the present, has no need of free will.

The problems seem insurmountable. The new physics undoubtedly gives a new slant to the longstanding enigma of free will and determinism, but it does not solve it. The

quantum theory undermines determinism, but brings its own crop of difficulties concerning freedom, not least of which is the possibility of multiple realities. The theory of relativity offers us a universe extended in time as well as space, but still leaves the door open for some sort of freedom of action. No doubt future developments in our understanding of time will cast new light on these fundamental problems of our existence.