

THE MYTHS WE LIVE BY

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HOW MYTHS WORK



SYMBOLISM AND SIGNIFICANCE

We are accustomed to think of myths as the opposite of science. But in fact they are a central part of it: the part that decides its significance in our lives. So we very much need to understand them.

Myths are not lies. Nor are they detached stories. They are imaginative patterns, networks of powerful symbols that suggest particular ways of interpreting the world. They shape its meaning. For instance, machine imagery, which began to pervade our thought in the seventeenth century, is still potent today. We still often tend to see ourselves, and the living things around us, as pieces of clockwork: items of a kind that we ourselves could make, and might decide to remake if it suits us better. Hence the confident language of ‘genetic engineering’ and ‘the building-blocks of life’.

Again, the reductive, atomistic picture of explanation, which suggests that the right way to understand complex wholes is always to break them down into their smallest parts, leads us to think that truth is always revealed at the end of that other seventeenth-century invention, the microscope. Where microscopes dominate our imagination, we feel that the large wholes we deal with in everyday experience are mere appearances. Only the particles revealed at the bottom of the microscope are real. Thus, to an extent unknown in earlier times, our dominant technology shapes our symbolism and thereby our metaphysics, our view about what is real. The heathen in his blindness bows down to wood and stone – steel and glass, plastic and rubber and silicon – of his own devising and sees them as the final truth.

Of course this mechanistic imagery does not rule alone. Older myths survive and are still potent, but they are often given a reductive and technological form. Thus, for instance, we are still using the familiar social-contract image of citizens as essentially separate and autonomous individuals. But we are less likely now to defend it on humanistic or religious grounds than by appealing to a neo-Darwinist vision of universal competition between

separate entities in an atomised world, which are easily seen as machinery – distinct cogs or bytes put together within a larger mechanism. Social atomism strikes us as scientific.

This same reductive and atomistic picture now leads many enquirers to propose biochemical solutions to today's social and psychological problems, offering each citizen more and better Prozac rather than asking what made them unhappy in the first place. Society appears as split into organisms and organisms into their constituent cogs. The only wider context easily seen as containing all these parts is evolution, understood (in a way that would have surprised Darwin) as a cosmic projection of nineteenth-century economics, a competitive arena pervading the development, not just of life but of our thought and of the whole physical universe.

At present, when people become aware of this imagery, they tend to think of it as merely a surface dressing of isolated metaphors – as a kind of optional decorative paint that is sometimes added to ideas after they are formed, so as to make them clear to outsiders. But really such symbolism is an integral part of our thought-structure. It does crucial work on all topics, not just in a few supposedly marginal areas such as religion and emotion, where symbols are known to be at home, but throughout our thinking. The way in which we imagine the world determines what we think important in it, what we select for our attention among the welter of facts that constantly flood in upon us. Only after we have made that selection can we start to form our official, literal, thoughts and descriptions. That is why we need to become aware of these symbols.

HOW NEUTRAL IS SCIENCE?

What, then, is the right place of such imaginative visions in our serious thinking? In particular, how do they relate to science? This question occurred to me forcibly some six years back when Amnesty International asked me to contribute to their lecture series entitled 'The Values of Science'. It struck me as remarkable that people answer questions about the values of science in two quite opposite ways today.

On the one hand, they often praise science for being value-free: objective, unbiased, neutral, a pure source of facts. Just as often, however, they speak of it as being itself a source of values, perhaps indeed the only true source of them. For example, the great evolutionist Conrad Waddington wrote in 1941 that 'Science *by itself* is able to provide mankind with a way of life which is . . . self-consistent and harmonious. . . . So far as I can see, the scientific attitude of mind is *the only one* which is, at the present day, adequate to do this'.¹ As we shall see, too, many serious theorists have claimed that science is 'omnicompetent', that is, able to answer every kind of question. And that must naturally include questions about value.

The eminent molecular biologist Jacques Monod noticed this difficulty and suggested heroically that science should take over this apparently alien realm of thought altogether:

Science attacks values. Not directly, since science is no judge of them and *must* ignore them; but it subverts every one of the mythical ontogenies upon which the animist tradition, from the Australian aborigines to the dialectical materialists, has based morality: values, duties, rights, prohibitions . . . True knowledge is ignorant of values, but it has to be grounded on a value judgment, or rather on an *axiomatic* value . . . In order to establish the *norm* for knowledge, the objectivity principle defines a *value*; that value is objective knowledge itself . . . The ethic of knowledge that created the modern world is the only ethic compatible with it, the only one capable, once understood and accepted, of guiding its evolution.²

Not surprisingly, Monod was for a time the favourite author of many scientists. Since what he meant by ‘knowledge’ was exclusively scientific knowledge, his ruling implied that the only value judgements that remained would be ones about whether a proposition in science was true or not.

This, however, would not have been a very convenient arrangement for the rest of life. The clash remained, and, as usual, the truth about it was more complicated than it looked. The word ‘science’ surely has a different meaning in these two claims. We do indeed sometimes think of science just as an immense store-cupboard of objective facts, unquestionable data about such things as measurements, temperatures and chemical composition. But a store-cupboard is not, in itself, very exciting.

What makes science into something much grander and more interesting than this is the huge, ever-changing imaginative structure of ideas by which scientists contrive to connect, understand and interpret these facts. The general concepts, metaphors and images that make up this structure cannot possibly be objective and antiseptic in this same way. They grow out of images drawn from everyday experience, because that is the only place to get them. They relate theory to everyday life and are meant to influence it. These concepts and images change constantly as the way of life around them changes. And after they have been used in science they are often reflected back into everyday life in altered forms, seemingly charged with a new scientific authority.

In this book we will consider several very potent ideas that have moved in this way from ordinary thought to affect the course of science and have then returned to outside usage reshaped by scientific use. Right away, one might name the concept of a *machine*, of a *self-interested individual*, and of *competition* between such individuals. Metaphorical concepts like these are quite properly used by scientists, but they are not just passive pieces

of apparatus like thermostats. They have their own influence. They are living parts of powerful myths – imaginative patterns that we all take for granted – ongoing dramas inside which we live our lives. These patterns shape the mental maps that we refer to when we want to place something. Such ideas are not just a distraction from real thought, as positivists have suggested. Nor are they a disease. They are the matrix of thought, the background that shapes our mental habits. They decide what we think important and what we ignore. They provide the tools with which we organise the mass of incoming data. When they are bad they can do a great deal of harm by distorting our selection and slanting our thinking. That is why we need to watch them so carefully.

HOW DO IDEAS CHANGE?

This question is specially urgent in times of rapid change, because patterns of thought that are really useful in one age can make serious trouble in the next one. They don't then necessarily have to be dropped. But they do often have to be reshaped or balanced by other thought-patterns in order to correct their faults.

In this process, myths do not alter in the rather brisk, wholesale way that much contemporary imagery suggests. The belief in instant ideological change is itself a favourite myth of the recent epoch that we are now beginning to abuse as 'modern'. Descartes may have started it when he launched his still-popular town-planning metaphor, comparing the whole of current thought to an unsatisfactory city which should be knocked down and replaced by a better one:

Those ancient cities which were originally mere boroughs, and have become large towns in process of time, are as a rule badly laid out, as compared with those towns of regular pattern that are laid out by a designer on an open plain to suit his fancy . . . one would say that it was chance that placed them so, not the will of men who had the use of reason.³

Today, too, another influential image, drawn from Nietzsche, works on the model of the *Deaths* column in a newspaper. Here you just report the death of something: Art, or Poetry, or History, or the Author, or God, or Nature, or Metaphysics or whatever, publish its obituary and then forget about it.

The trouble about this is that such large-scale items don't suddenly vanish. Prominent ideas cannot die until the problems that arise within them have been resolved. They are not just a kind of external parasite. They are not alien organisms, viruses: 'memes' that happen to have infested us and can be cleared away with the right insecticide (a suggestion that

we will discuss in Chapter 9). They are organic parts of our lives, cognitive and emotional habits, structures that shape our thinking. So they follow conservation laws within it. Instead of dying, they transform themselves gradually into something different, something that is often hard to recognise and to understand. The Marxist pattern of complete final revolution is not at all appropriate here. We do better to talk organically of our thought as an ecosystem trying painfully to adapt itself to changes in the world around it.

THE DOWNSIDE OF DRAMA

In this book, I shall start by concentrating on certain particular myths which have come down to us from the Enlightenment and are now giving trouble, though I shall move on from them to mention a number of others that we need to attend to. Enlightenment concepts need our attention because they tend to be particularly simple and sweeping. Dramatic simplicity has been one of their chief attractions and is also their chronic weakness, a serious one when they need to be applied in detail. For instance, the Enlightenment's overriding emphasis on freedom often conflicts with other equally important ideals such as justice or compassion. Complete commercial freedom, for example, or complete freedom to carry weapons, can lead to serious harm and injustice. We need, then, to supplement the original dazzling insight about freedom with a more discriminating priority system. And again, the insistence on individuality that has so enriched our lives degenerates, if we don't watch it critically, into the kind of mindless competitiveness that is so destructive today. It impoverishes lives by locking people up in meaningless solitude.

In the case of the physical sciences, we already know that Enlightenment ideas have been much too naive and dramatic. They suggested that physics could expect to reveal a far simpler kind of order in the world than has turned out to be available. Of course this simplification played a great part in making possible the astonishing success of the physical sciences. It gave western civilisation an understanding of natural 'mechanisms' (as we still call them) far beyond that of any other culture, and a wealth of technology that other cultures have never dreamed of. And it is right to celebrate this tremendous achievement. But we, the heirs of this great intellectual empire, don't actually need to come together simply to praise it.

We don't now need to tell each other that science is good any more than we need to say that freedom is good or democracy is good. As ideals, these things are established in our society. But when particular ideals are established and are supposed to be working, we have to deal with the institutions that are invented to express them. Today, some people plainly do *not* think that science is altogether good. At times there are similar doubts

about democracy and freedom. In such cases, those of us who care about the ideals need to ask what is going wrong with the way they are being incorporated in the world. We have to consider how best to understand the present condition of science, how best to live with its difficulties and responsibilities, and how to shape its further development so as to avoid these distortions.

In trying to do this, I shall start by discussing three current myths: the social-contract myth, the progress myth and the myth of omniscient science. These three myths are connected, not just because they are all overdramatic and need rethinking, but because the last of them impedes our efforts to deal with the first two, and with many other problems as well.

Exaggerated and distorted ideas about what physical science can do for us led, during the nineteenth and twentieth centuries, to the rise of powerful, supposedly scientific ideologies such as Marxism and behaviourism. These systems are obviously not actually part of physical science but, by claiming its authority, they have injured its image. People who want to defend science today need to take outgrowths of this kind seriously and go to some trouble to understand its relation to them. It is equally urgent to get rid of the absurd and embarrassing claim to 'omniscience'. Science, which has its own magnificent work to do, does not need to rush in and take over extraneous kinds of question (historical, logical, ethical, linguistic or the like) as well. Lovers of physical science can be happy to see it as it is, as one great department of human thought among others which all cooperate in our efforts at understanding the world. This is a far more honourable status than that of a nineteenth-century political power trying to enlarge its empire by universal conquest.

OUR PLACE IN THE WORLD



THE EXPANDING HORIZON

The three myths that I have mentioned still shape our intellectual and moral thinking, although the world has changed radically in the three or four centuries since they were coined. Most notably, our drama – the play in which we are all acting – has shifted to an enormously larger stage. We live now in a bigger world. It is bigger because the sheer number of humans has tripled in the last century and because we are now better informed about them, but also, even more crucially, because of the way in which our own power has increased. We urban humans have now become capable of doing serious harm all over the world, both to its human and its non-human inhabitants. This is something really new in human history. In fact it is possibly the biggest change our species has ever experienced, certainly the biggest since the invention of agriculture. No wonder if it throws us into culture-shock and makes us alter our concepts.

At present, the problems that arise here about our duty to distant humans are often discussed separately from those about our misuse of other animals and both are usually segregated from the environmental problems. Different academic departments and different political bodies commonly deal with these three matters. Feuds often arise between them. The division between the natural sciences and the humanities widens the split, but the link between them is crucial. (We will discuss it in Chapters 19 and 24.) The sudden enlargement of our power has transformed all these issues equally. In all these directions, technology has hugely multiplied both the range of matters that concern us and our ability to affect them. And though that ability often seems to be out of our hands as individuals, our civilisation as a whole clearly does bear some responsibility for producing this whole situation. Our trade, our investment and our expressions of public opinion do indeed affect all sorts of distant events.

We find it hard to believe in this whole expansion. Can it really be true that we bear responsibility for things that happen to people and countries so far away from us? Can we, still more oddly, have responsibilities towards the non-human realm? Our current moral tradition makes it hard for us to grasp these things. It doesn't leave room for them. Yet the changes are real. They do demand some kind of adaptation from us, adaptation of a morality that was formed for a quite different, more manageable kind of world. We can't go on acting as if we were still in that world. On that path, there is no way through.

HUMAN RIGHTS AND THE SOCIAL CONTRACT

This difficulty comes up strongly at present over the concept of universal human rights. That notion clashes with the Enlightenment idea that morality is essentially just a contract, freely made between fellow citizens for civic purposes and ultimately for individual self-interest. Some political theorists, who are rather oddly known as realists,¹ claim that we cannot have duties to people outside our own nation-state because they are not contractors in our society and *rights* (they say) arise only from contract. This is the idea that politicians are expressing when they reassure us that British interests must, of course, always come first.

The social-contract myth is a typical piece of Enlightenment simplification. It was developed (quite properly) as an answer to the doctrine of the divine right of kings, a defence against the religious wars and oppressions that monarchs set going in the sixteenth and seventeenth centuries. It rested political authority on the consent of the governed, which is fine. But its limitation is that it leaves no room for duties to outsiders. This brings it into conflict with another equally central Enlightenment idea, namely, the unity of all humanity. *That* idea says that, if oppression is wrong, it is wrong everywhere and that, therefore, anyone who can do something about it ought to do so. Quite early on, this wider concept was expressed by bold, non-contractual talk about the Rights of Man, which made possible widespread and effectual campaigns against things like slavery.

The clash between these two ideas is not one between different cultures. It arises between two closely related ideas within the same culture. It is still with us because both these ideas are still crucial to us. Both of them have been parts of the same bold attempt to make human society more just and less brutal. They were both originally somewhat crude and have needed repeated adjustment. The idea of contract was the formal, legalistic, reductive side of this humanitarian campaign. The notion of universal rights expressed the outgoing, generous, sympathetic feeling that powered the campaign in the first place. The difficulty of reconciling these two

elements has led to a lot of trouble. It has often been dramatised into a supposedly irresolvable conflict between reason and feeling.

This is always a confused idea because all reasoning is powered by feeling and all serious feeling has some reasoning as its skeleton. Thought and feeling are not opponents, any more than shape and size. They are complementary aspects which appear on both sides of any argument, a point that we will discuss further in Chapter 16. Polarising these two as opposites is, however, always tempting. On the issue of human rights it has been quite important that the reductive, contractual pattern was seen as the rational one and as being supported by physical science. The idea that people are solitary, self-contained, indeed selfish individuals, who wouldn't be connected to their neighbours at all if they didn't happen to have made a contract, looked rational because it reflected the atomic theory of the day, a theory that similarly reduced matter to hard, impenetrable, disconnected atoms like billiard balls. The two patterns, of political and scientific atomism, seemed to strengthen each other, and, for some time, each appeared as the only truly rational and scientific pattern of understanding in its own sphere. Social atomism, expressed as political and moral individualism, got quite undeserved support from the imagery used in science.

Today, of course, physics deals in particles of a very different kind, particles that are essentially fields, that is, patterns of connection. But on the human scene, and in biology, a quite unrealistic social atomism is still alive and kicking and still thinks of itself as scientific. The kind of individualism that treats people, and indeed other organisms, as essentially separate, competitive entities, ignoring the fact that competition can't get going at all without an enormous amount of cooperation to make it possible, has been the dominant ideology of the last few decades. Today it is under attack, which results in a lot of controversy.

This debate has not been just a futile zero-sum game. On its good days it has been a creative tension, a fertile dialectic in which each element has helped the other to become more adequate and workable. Talk of human rights is designed to express our current compromise between these two complementary insights. Most concerned people do now seem willing to use the words 'human rights'. In spite of the huge differences between various cultures, we do believe that there are indeed some things which ought not to be done to anybody, anywhere. Whatever the doubts about rights, we can all recognise human wrongs.² So, anyone who can protest effectively against these things is in a position to do so, whatever culture they belong to. This kind of belief is not, I think, confined to the West. Oppressed people in all kinds of countries now appeal to it. And in general they don't seem to be using it merely as a foreign language, but as a kind of intercultural dialect that everybody understands. It helps us to pick out the distant matters that really do call for our intervention, despite the gulfs that divide our societies.³

In this way we can try to bring the outgoing, generous element in Enlightenment thinking together with the narrowing, formal, legalistic side. In principle, and to some extent even in practice, we can combine the imperative force of the civic word ‘rights’ with the universal scope of species-wide sympathy. The work of reconciling these ideas still needs hard ethical thinking (which is different from scientific thinking though just as necessary) but for practical purposes the concept is usable. Bodies such as Amnesty International do make a difference to the world. Of course that difference is miserably small, but our official morality does have room for this extension. It does not force us to be fatalistic chauvinists, as it would if our ethics were really limited to contract thinking. We are not burdened, as we might have been, with the kind of moral ideas that would completely paralyse our efforts to help.

GOING BEYOND HUMANITY

So much, then, for distant humans. What about the claims of the rest of nature? It ought to be clear that, even if we don’t care personally about the wilderness itself, all humans share a common interest in preserving the biosphere they depend on. But our culture has found it surprisingly hard to grasp this.

The chief reason for this is, of course, that the environmental alarm is much more recent than the social one. The bad news, that the house is on fire, only arrived during the last half-century, and many people still hope that, if they don’t encourage it by attending to it, it will go away. More deeply, however, there is a difficulty because this matter is much harder to bring within the framework of contract.

The idea of universal *human* fellow citizens is slightly more familiar. Various images of a worldwide super-state or super-city already exist to relate it to civic thinking. The Stoics talked of the World City, Cosmopolis, and St Augustine talked of the City of God. But nobody has yet made coral reefs or the Siberian tundra our fellow citizens, and it is not easy to see how they could do so. These are not the kind of beings that live in cities or plead in law courts. They don’t make contracts. So, on the familiar model, it was hard to see how they can have *rights*. And this does, apparently, make it hard for some people to take our duties to them seriously.

This is surely a point where the perspective of the natural sciences can really help us. For many scientists, love and reverence for the natural world that they study has been a powerful motive, whereas this love and reverence has been less central to the humanistic parts of western culture. Indeed, some kinds of humanism have deliberately excluded it. Enlightenment thinking has often neglected non-human nature, especially since the Industrial Revolution, though Rousseau did not and poets, such as Blake

and Wordsworth, did what they could to protest against the bias. That concentration on our own species is what makes it so hard for us now to take in the facts of environmental destruction or react to them effectively. Traditionally, we have taken the natural support system for granted.

Scientists who concern themselves with ecological matters can help us greatly here. They do so even though, at present, they themselves actually have a difficulty about acknowledging this outgoing, reverent attitude to nature because it became for a time rather unfashionable within science itself. It was associated with ‘natural historians’ – that is, with patient, wide-ranging observers like Darwin – rather than with the laboratory-based experts in microbiology who were for a time viewed as the only possible model of ‘the scientific’. But this narrow, reductive perspective does seem to be shifting. The sociobiologist Edward Wilson has celebrated *Biophilia* – the love of all living things – as something absolutely central for science.⁴ And again, James Lovelock’s concept of ‘Gaia’, which expresses our proper reverence for our planet at the same time as suggesting scientific tools for diagnosing its troubles, is no longer viewed as something wild.⁵ It is beginning to get the kind of serious attention that it deserves within science. In fact, the two aspects of science are beginning to come together again, a process that very much needs to be encouraged.

Should we say, then, that this love and reverence for nature is one of the ‘values of science’? If we are to talk about such values at all it surely is. Perhaps indeed it is the only value that is in some sense special to the natural sciences. The other values that we think of as scientific are intellectual virtues such as honesty, disinterestedness, thoroughness, imaginative enterprise, a devotion to truth. Those virtues are indeed scientific, but they are so in the older and wider sense of that word which is not restricted to physical science. They belong to every kind of disciplined and methodical thought, to history and logic, to ethics and mathematics and linguistics and law, just as much as they do to the natural sciences. But those enquiries don’t deal so directly with the non-human world around us, with the plants and animals and stars that we should surely honour and revere, as the natural sciences do. The love of these things, and in particular the love of living things – ‘biophilia’ as Wilson calls it – has played a special part in the thought of most great scientists, and it is a vital element which their successors can bring to stir us up against our present dangers.

If we do manage to take up this wider perspective, it will, of course, make our moral position more complicated, not simpler. But that is bound to happen anyway. Already we have to arbitrate many conflicts between the interests of humans and non-humans such as elephants or trees. People who do this on a contractual basis rule out the non-human party in advance. But that simple principle no longer convinces us and we can’t seriously go on using it. These clashes demand some sort of a compromise. Even in the short term the interests of the two parties do not always conflict and

in the long term they often converge strongly. If the local people are forced to destroy the habitat, then they too will soon be destroyed, along with the trees and the elephants. This convergence is of course particularly plain over indigenous peoples, who accordingly have often campaigned heroically to defend it.

PROGRESS, SCIENCE AND MODERNITY



THE PLEASURES OF OMNICOMPETENCE

So far I have been discussing the first myth that I mentioned, that of the social contract. I have been suggesting that this sweeping, monolithic thought-pattern, used for quite good reasons by earlier thinkers in the Enlightenment, now hampers our thought. The narrow civic stereotype makes it hard for us to adapt to a changed world in which our increased power makes traditional social-contract thinking disastrously parochial.

This is just one case, however, among many where Enlightenment thinking, after its initial successes, becomes oversimple and Procrustean. Often it seizes on a particular pattern of thought as the only one that can properly be called rational and extends it to quite unsuitable topics. This intellectual imperialism constantly favours the form over the substance of what is being said, the method over the aim of an activity, and precision of detail over completeness of cover. That formal bias is not in fact at all particularly rational, though it is often thought of as being so.

I have suggested that this simplistic habit is what people are usually complaining of today when they stigmatise recent thinking as ‘modern’. The actual word ‘modern’ is quite unsuitable here. It can certainly not go on much longer being used forever in this way to describe what is manifestly out of date. Besides, it is too vague. We need clearer, more specific words for this range of faults. For present purposes I suggest that the terms needed are often ones such as ‘dogmatic’, ‘one-sided’, ‘simplistic’ and ‘monolithic’.

The same kind of trouble arises about our next two examples, the linked ideas of inevitable progress and the omnicompetence of science. Here certain ways of thinking that proved immensely successful in the early development of the physical sciences have been idealised, stereotyped and treated as the only possible forms for rational thought across the whole range of our knowledge. As with the social contract, the trouble is not in the

methods themselves, which are excellent in their own sphere. It lies in the sweepiness, the dramatic zing, the naive academic imperialism that insists on exporting them to all sorts of other topics.

The myth of inevitable progress is one that has been around in a general form since the late eighteenth century. It arose then to express a new kind of confidence in Man and the works of Man, replacing the earlier Christian reliance on God and the afterlife in Heaven. Today it is often linked with the idea of evolution, though this link belongs to Lamarck rather than to Darwin and is rooted in wish-fulfilment or in religion, not in biology. That association has, however, probably helped to give the idea of progress a quite undeserved aura of scientific respectability. And it has also probably strengthened the idea that belief in progress required faith in the omnicompetence of science.

Since H. G. Wells's day, the future has been seen as a special kind of imaginary country, the country that we see on television programmes such as *Tomorrow's World*, a country dripping with all the latest science and technology. At first, this future land was approached with euphoric confidence, which was shown by odious talk about the need to 'drag people kicking and screaming into the twentieth century'. (Fortunately, we do not seem now to be talking in this way about the new millennium.) Later, of course, there was disillusion, which we will consider presently. But before disillusion set in, scientific prophets proclaimed their total confidence in the omnicompetence of science.

That phrase is not just a satirical parody of their faith. It has been used, quite literally, by a number of influential theorists to claim that something called 'science' could indeed encompass the whole range of human thought on all subjects. Auguste Comte, the founder of positivism, originally sketched out this claim and the philosophers of the Vienna Circle crystallised it soon after the First World War. Thus Rudolf Carnap ruled, 'When we say that scientific knowledge is unlimited, we mean that *there is no question whose answer is in principle unattainable by science*'.¹ This extraordinary claim is still supported by some contemporary writers such as Peter Atkins,² though of course many scientists today have no wish to make it.

More importantly, the claim has been very influential in the outside world – so much so that it is not surprising if people now react against it. Many lay people, including some in high places, have declared a comprehensive, all-purpose faith in science. Thus Pandit Nehru, addressing the National Institute of Science of India in 1960, observed

It is science *alone* that can solve the problems of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people . . . The future belongs to science and to those who make friends with science.³

The interesting thing here is not just Nehru's confidence but what he meant by science, a point that I mentioned at the outset and that now becomes central. He clearly did *not* mean just a memory-bank, a store-cupboard of neutral information. He meant a whole new ideology, a moral approach that would justify using those facts to change society in a quite particular way. And during much of the twentieth century the word 'scientific' has constantly been used in this value-laden sense. It often has not stood for any particular form of scientific knowledge but for a new scale of values, a new priority system, leading to particular political projects. People such as B. F. Skinner, who claimed that 'we live in a scientific age', did not just mean an age that used science. They meant an age that is *guided* by science, an age that, in some way, chooses its ideals as well as its medicines and its breakfast foods on grounds provided by scientific research. This new system was certainly not seen as value-free but as a moral signpost that could take the place of religion.

SCIENCE ALONE?

Nehru and Waddington and Carnap spoke here for a whole mass of their contemporaries for whom science meant a great deal more than simply correct information. No doubt information in itself can be said to be 'value-free' but this is because information on its own has no value. It only begins to have a value when it supplies a need, when it is brought into contact with some existing system of aims and purposes and fills a gap in that system, when it becomes relevant to people's beliefs and attitudes. 'Pure curiosity' is a wish for understanding, not a wish for mere information. When we think of knowledge as valuable in itself we are always assuming something about the kind of understanding that underlies and connects the various pieces of information to form a coherent world view. That view cannot come from science alone because it involves a wider context in the life around the knower.

Thus the great scientists who have done so much to shape our present way of thinking have done it by expressing such a comprehensive vision, one that they did not draw only from the sciences. They knew that they vitally needed to consider other ideas in their culture and they often discussed those sources eagerly. Galileo and Huxley, Einstein and Bohr, Schrödinger and Heisenberg and J. B. S. Haldane all consciously and deliberately philosophised, skilfully using profound ideas drawn from those who had thought about their large problems before them. None of these people would have accepted for a moment the idea of science as an isolated imperial power, at war with other intellectual disciplines and anxious only to subdue them.

How, then, do the imperialistic writers we have been considering fit into this tradition? They are certainly within it in so far as they, too, aim to

promote a particular world view rather than merely furnishing neutral facts. All these writers have explicitly meant by 'science' a particular kind of spirit or attitude that includes far more than a mere set of facts or a curiosity about facts. Nehru saw this wider attitude, not as neutral but as the bearer of new values, as a moral force which *alone* could solve all his problems. He personified it, speaking of 'those who make friends with science' rather than just of those who use it. He saw it, not as a mere tool but as a powerful ally of secularism in the battle against 'superstition and deadening custom and tradition'.

Supposing we were to ask Nehru: can you really rely on science *alone*? Aren't you also going to need good laws, effective administrators, honest and intelligent politicians, good new customs to replace the old ones, perhaps even a sensitive understanding of the traditions that you mean to sweep away? Might you not even need to know a good deal of history and anthropology before you start on your destructive cleansing of tradition? Now Nehru knows, of course, that he is going to need all these things. But he is assuming that they are all included in what he means by science. He includes in 'science' the whole world-view which he takes to lie behind it, namely, the decent, humane, liberal attitude out of which it has actually grown. In fact he expects to buy the whole Enlightenment as part of the package. He has faith in the Enlightenment's humanistic ethics as well as in its chemical discoveries. He expects that the scientific spirit will include within it wise and benevolent use of those discoveries. He is certainly not thinking of science as something likely to produce industrial pollution, or the invention of refined methods of torture, or opportunities for profiteering, or a concentration on weaponry, or overuse of chemicals on farms, or computer-viruses, or irresponsible currency speculation made possible by the latest computers, or the wholesale waste of resources on gadgetry.

The prophets of this scientific movement expected from the thing they called 'science' nothing less than a new and better ethic, a direct basis for morals, a distinctive set of secular values which would replace the earlier ones supplied by religion. They hoped that it would supersede and replace the corruption and confusion of traditional moral thinking. They did not – and their successors still do not – notice that the ethical component of this package is something much wider and actually quite independent of the science. At first they identified their new scientific values very simply (as Nehru did) with those that the Enlightenment had brought in as a reaction against Christianity, values which were already an accepted part of western culture. But as time went on they became bolder and really did try to produce something new. In these more confident moods they thought – and their successors still think – of the new scientific values, not as a contribution to an existing ethical culture, not as an outgrowth of it, not even as something harmonious with it, but as a conquering invader that must replace it.

That faith powered the huge exaltation of science that has gripped so many would-be reformers from the mid-nineteenth to the late twentieth century. It promised a new wisdom, a decisive spiritual and moral advance. Our disillusionment with this approach surely centres even more on the failure of this spiritual and moral project than on the mixed results of actual scientific practice. Certainly new technologies have often done harm as well as good. But the harm has been largely due to the lack of the promised new wisdom.

We must surely wonder now why so many people expected this wisdom to appear. That expectation set up a kind of cargo-cult which is only now giving way to blank disappointment. From Hobbes and Bacon to Auguste Comte and Marvin Minsky, scientific prophets have regularly made Nehru's mistake of expecting the wrong kind of thing from science. They have been unconscious flatterers who got it the wrong kind of reputation. What they promoted as scientific thinking was actually a series of uncriticised ideologies, which gradually diverged from mainstream Enlightenment thinking in various alarming directions.

The first ideology that claimed to be specially scientific in this way was Marxism. But Marxism did at least appear explicitly as a thought-system. Being defended by arguments, it was clearly open to philosophical attack. Its successors, however, tended to bypass this dangerous stage, claiming rather to be parts of science itself and to share its absolute authority. That is why, when disappointment followed, it was science itself that became discredited. And this disappointment was bound to follow, partly because the good things that these prophets offered could not be supplied, partly because some of the things they offered were not good anyway.

OBJECTIVITY AS TURNING PEOPLE INTO THINGS

So what was this new ideology? The most obvious point about it – its hostility to religion – is actually a superficial one. It is true that, from the eighteenth century on, scientific prophets have tended to be anti-Christian, holding that Christianity had failed to purify society and ought somehow to be replaced by science. The Russian Revolution eagerly pursued this project, but the results were disappointing. State atheism turned out to be every bit as convenient an excuse for crime and folly as state religion had been, and it is not at all clear that atheism itself – which is a metaphysical position – has anything to do with physical science. In any case, whatever the faults of religion, science cannot sensibly be put in its place. Attempts to expand it into a religion reverse the excellent move that Galileo and his colleagues made when they narrowed the province of physics, excluding from it all questions about purpose and meaning.

The functions of science and religion within a society are too different for this idea of a competition between them to make much sense once one begins to consider it seriously. Rivalry here only looks plausible when both elements are stated in crude forms (as of course they often are), or when the power-groups that run them conflict at the political level. Political entanglement with power-groups has had a bad effect on religion and does so equally for science, which today is increasingly sucked into the power-struggles of the market.

However, throughout the twentieth century, scientific prophets repeatedly told a bewildered public that policies that in fact had little to do with science must be accepted because experts had shown that they were scientific and objective. A central case of this is the behaviourist doctrine that psychology, in order to be scientific, must deal only with people's outward behaviour, ignoring motives and emotions and regarding them, not just as unknowable but as trivial and causally ineffective. This led to many bizarre practical policies, such as the advice that J. B. Watson and B. F. Skinner gave to parents that they should not hug or kiss their children but should treat them in a detached and distant manner 'like young adults'. This treatment (they said) was necessary because it was scientific and objective.⁴

It is interesting to notice that what made this approach seem scientific was certainly not that it rested on research showing the success of these child-rearing methods. (If there had been any such research, it would have produced the opposite result.) Instead, the behaviourists' attitude seems surely to have been itself an emotional one, a fear of affectionate behaviour as something dangerously human, something beneath the dignity of scientists. It flowed from a more general fear of the conflicts and complications that attend ordinary human feeling. In order to escape these problems, psychologists stereotyped feeling in general as something 'soft', something that was the business of the humanities, not the sciences. The same kind of prejudice has also operated in medicine, especially in psychiatry, where a similar retreat from attending to the feelings of patients has also often been recommended as 'objective' and 'scientific'. In such cases, the mere fact of reversing a tradition and attacking ordinary feeling has often been enough to suggest that the claim was scientific, as Nehru's language shows.

Perhaps the most striking case of this distorted approach, however, is industrial Taylorism, which was commonly known quite simply as scientific management. This is the philosophy of the conveyor-belt, the view that workers ought to be treated like any other physical component on the production-line. Any reference to their own point of view was seen as subjective and thus an illicit, unscientific distraction. The economists who devised this approach, and Henry Ford who accepted it, did not think of it merely as a quick way of making money. They saw it as something much grander, as scientific progress, a laudable extension of physical science into

realms formerly ruled by sentiment and superstition. It seemed obvious to them that it is 'subjective' to pay any attention to subjectivity.⁵

Another favoured way of appearing scientific is, of course, simply to mention quantities rather than qualities. Thus policies can be called scientific if they involve counting or measuring something, never mind whether that particular thing needs to be counted or not, and never mind what use is being made of the resulting data. Anybody who is using some statistics can make this claim. Reliance on the citation index, on exams, and on the league-tables that compare exam results, are examples of this habit. Similarly, the American spin-doctor Dick Morris claimed scientific status, saying that all he does is to 'reduce the mysterious ways of politics to scientific testing and evaluation'.

It is also often seen as scientific to talk as if people were actually and literally machines. This machine imagery has been so useful in many scientific contexts that many people no longer think of it as a metaphor but as a scientific fact. Thus, much as they might say 'soot is just carbon' or 'penguins are just birds', they remark in passing that the human brain is just a computer made of meat. They don't think of this as a metaphor at all.

This machine imagery became entrenched at the dawn of modern science because in the seventeenth century scientists were fascinated, as well they might be, by the ingenious clockwork automata of the day. They naturally hoped to extend this clockwork model, which – for a time – worked well for the solar system, to cover the whole of knowledge, and, as the Industrial Revolution went on, that hope seemed more and more natural. But physics, the original source of this dream, has now largely abandoned it. The clockwork model proved unsuitable for many central purposes, along with the simple atomic theory that fitted it. Indeed, physics has dropped the whole idea that the basic structure of matter is bound to prove perfectly simple, an idea that seemed obvious to seventeenth-century thinkers and one that made the abstractions of the machine model look plausible. Today, with talk of eleven-dimensional space-time, non-locality and multiple universes, that hope of simplicity has vanished. For inorganic matter as well as for organisms, complexity is now the name of the game. The idea that physicists will some day find a single all-embracing 'theory of everything' is just a speculation. Some distinguished cosmologists embrace it, others reject it entirely. But even if such a theory were found, it could not possibly be simple. It would clearly be hugely complex. And it would not be a theory of everything – only of certain abstractions that are discussed in theoretical physics.

UNIVERSAL?

In a very interesting survey of current views on this problem, Paul Davies states the difficulties. As he says, the current demand for a 'theory of everything' is in fact largely just an effort to bring together two distinct and

apparently warring thought systems within physics itself, systems that now rule in different areas of the study. Their disconnectedness still blocks contemporary efforts to resolve the central question that he poses, namely; What makes the universe tick?

Physics in the twentieth century was built on the twin revolutions of quantum mechanics (a theory of matter) and Einstein's theory of space. But it's extremely unsatisfying to find two ultimate descriptions of reality when you're looking for just one.⁶

After discussing various current suggestions for unifying them and ending up with a raft of unanswered questions, he rather suddenly introduces a quite different angle:

Where does consciousness come from? Why do some swirling electrical patterns, such as those in a brain, have thoughts and sensations attached, whereas others, such as those in the national grid, presumably do not? . . . Are these even questions for physicists to answer?

Some think they are for physicists to answer – myself among them. Relating the mental and physical world is something most physicists avoid, but *if physics claims to be a universal discipline* then it must eventually incorporate a description of consciousness.⁷

In what sense does physics claim to be a universal discipline? As he says, most of his colleagues answer this question with their feet by simply not visiting topics outside what is now recognised as the physical or material aspect of things. They do not share Carnap's ambition to wield a science that can answer every kind of question. Though they deal with large questions about issues such as time and the nature of matter, they are happy if they can end their discussions about these things with a coherent set of equations and if somebody managed to reconcile the two jarring physical languages in those terms, they would be content. They would not ask for a connection between them and other aspects of the world.

Davies, however, has always taken an interest in the spiritual aspect of things. He wants to relate the mental and physical world. He minds about mind. This is surely admirable. And obviously he, as a physicist, is quite entitled to follow out this interest. It is an interest that he shares with most of the great physicists of the past, from Archimedes to Einstein. But in doing so he, like them, will not be trying to discover further physical facts. He will be trying to fit together different thought-systems that deal with different aspects of the world. The connection of physics with other studies is not itself a part of physics. It is a piece of philosophical plumbing. Since most physicists now are narrowly educated, it is badly needed and we should wish Davies all success in his efforts.