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Science In The World

Dualistic Difficulties

This may seem an odd title. What could it mean for science – or any other human concern -*not* to be in the world? My meaning is that this concern is cut off from the everyday world that we actually live in. In that sense, any institution, such as science, is cut off from our world if it is too idealized. For instance, if scientists are not seen realistically as fallible human beings but as ideal figures, superhumanly impartial and incapable of taking wrong directions, then our idea of science is not serious. It no longer fits the context of real life. (The same thing has sometimes happened about priests, and indeed poets.)

On the other hand, however, an institution is equally cut off from our world if it fails to deal with that world. If science is seen as not being *about* the real world – if it appears merely as a fanciful construction shaped by passing social pressures, not referring to the physical facts around us, then again it becomes irrelevant to the world that we live in.

As we all know, both these odd things have been happening to science in recent times. They have both damaged its status because they are both unrealistic. They are metaphysical distortions which have not flowed from the real nature of science itself but from confusions in the rest of our thought. Even the flattering distortion of excessive idealisation is damaging, because it distracts attention from the reality and sets up unreal expectations. Science does not need flattery. It needs to be honoured suitably for what it is – namely, a splendid and indispensable element in our thought.

These two distortions have developed for an interesting reason. Ever since the Enlightenment, our culture has been unwilling to admit that the world we live in is rich enough to contain both subjects and objects. People have constantly assumed that we have to choose between a world of subjects and a world of objects, between mind and body. At present, objections to this dualism can be heard on every side. But we have still done very little to break the bad habits it has generated. In fact at present those bad habits are becoming even more deeply entrenched by the computer analogy, which makes the sharp division between software and

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hardware coincide with the old split between mind and body. In the world of Artificial Intelligence Descartes still rules, OK? This is also true of the world of science-fiction.

Yet certainly efforts are now being made to bring mind and body together again after their long divorce. The interest in the status of science which brings us here today is one symptom of this rapprochement . Current excitement about the 'problem of consciousness' is another. So we now ask, how did these two aspects of life ever come to get separated?

Descartes, of course, originally divided them in order to allow appropriate ways of thinking to develop for these two sorts of question. And the division did succeed in doing this. The natural sciences worked out ways of talking about Objects while the Humanities dealt with people regarded as Subjects. Unfortunately, however, human combativeness dramatised this division of labour into a power-struggle. Contrary to Descartes' intentions, both sides made great efforts to take over the whole of thought.

After this history, it is not surprising that the long-delayed meeting now involves troublesome collisions and misunderstandings. During this academic warfare, humanists in the universities often failed to recognise the extent of scientific advance and did not expand their institutions properly to make space for the burgeoning natural sciences. The supporters of Science responded by raising their banners to make some extraordinary imperialistic claims.

Auguste Comte originally sketched out these claims and the Vienna Circle crystallised them early in this century under the title of the Omnicompetence of Science. Thus Rudolf Carnap ruled that 'When we say that scientific knowledge is unlimited, we mean that *there is no question whose answer is in principle unattainable by science*'. (Carnap, 1967: 290) This extraordinary claim to omnicompetence is still strongly supported by some present-day writers such as Peter Atkins, though of course many scientists today do not want to make it. (Atkins, 1995: 122–132) More importantly, the claim has been very influential in the outside world – so influential that it is not surprising if we now see a reaction against it. Very many lay people, including some in high places, have declared an enormous faith in science. Thus Jawaharlal Nehru, addressing the National Institute of Science of India in 1960, observed that

> 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.... At every turn we seek its aid... the future belongs to science and to those who make friends with science. (National Institute of Science of India, 1960: 564)

The interesting thing here is not just Nehru's confidence but what he meant by 'science'. Clearly, he did not just mean a store of empirical facts. He was calling for a whole new ideology, a moral approach which would justify using those facts to revolutionise social customs. And during the first half of the twentieth century, the word *scientific* was constantly used .in this value-laden sense. It often did not stand for any specific form of knowledge but for a new priority system. People who claimed that 'we live in a scientific age' did not just mean an age that *used* science. They meant one that is guided by science – an age which, in some way, chooses its ideals, as well as its medicines and its breakfast cereal, on grounds provided by scientific research. This notion of a scientific value-system which could not only remove religion but virtually take its place as a moral signpost was extraordinarily ambitious. It is certainly not compatible with the idea that science is objective and 'value-free'.

What seems to have happened is that, when Descartes divided the intellectual life into two distinct parts, both halves, like the sections of an amoeba, tried to develop their own compensatory organs. Neither succeeded very well. Hegel was unfortunate in his attempt to fix the number of the planets *a priori*. From the other side, the 'scientific

attitude' which prophets like Wells and Skinner recommended was undoubtedly meant to act as a scientific ethic. And it was sometimes a very strange one. Much of the 'anti-science' reaction which has set in in the second half of the century has surely been directed, not against scientific research itself, but against the bizarre ideologies that were preached in its name by some of its prophets.

For instance, there was what was called 'scientific management' in industry – (Taylorism) – that is, assembly-line systems designed to maximise the exploitation of factory-workers by treating them strictly as physical components in a process framed without reference to their lives and feelings. (Doray, 1988) Economists praised this approach, not just as a quick way of making money but as being scientifically 'objective' because it treated the people involved solely as physical objects. (It evidently was *not* objective in the ordinary sense of arbitrating impartially between workers and management.) This strange idea of scientific objectivity also appeared in the advice which behaviourist psychologists like Watson and Skinner gave parents not to hug or kiss their small children but to treat them always in a detached and distant manner, like adults, since (they said) this too would be more scientific and objective. (Ehrenreich & English 1979: 133–136)

You see how interesting this is? The sense in which this behaviourist approach seemed 'scientific' and 'objective' was certainly not that it rested on research showing that these child-rearing methods were specially successful. There was no such research. Instead it was a highly emotional attitude, expressing these psychologists' suspicion that affectionate behaviour was something dangerously human, something beneath the dignity of scientists. In fact, the source of both these doctrines was surely fear of the complications that attend ordinary human feeling. That feeling had become stereotyped as something 'soft', something belonging to the mind, not to the body – something appropriate to the Humanities, not to the sciences. The same kind of prejudice also operated in medicine, particularly in psychiatry, where a similar retreat from attending to the feelings of patients has also often been recommended as *objective* and *scientific*.

Modernism and Intellectual Monoliths

I hope it is obvious that, in mentioning these aberrations attending the attempt to expand science into a comprehensive ideology, I am not in any sense trying to 'attack science'. These doctrines are no part of science. They are irrelevant fungi that have grown on science and done it nothing but harm. What I am pointing out is something much more general, namely the hopelessness of ambitious ideologies that attempt to monopolise our intellectual life. The attempt to simplify thought by organising it into a single, comprehensive rational system is something that has fascinated European philosophy from Descartes' day until our own. Its most obvious recent form has of course been Marxism. This attempt to load science with the unrealistic title of being 'omnicompetent' – sometimes called Scientism – has surely been just another example of it. And still more widely, the general project of streamlining all our ideas in this manner is surely the one that we are now trying to renounce under the name of Modernism.

What does that name *modern* mean? As a name, it is confusing. We can't go on for ever using the word 'modern' in the exact opposite of its normal sense, to mean 'out of date; belonging to the early part of the twentieth century, or perhaps to the Enlightenment'. But a more serious difficulty about this word is that it is much too vague. We need to use terms which pin down more specifically the particular faults that have vitiated early twentieth-century thought.

The central mistake that we have in mind here has surely been a gross overconfidence in the idea that a fresh start had somehow produced a new and final comprehensive thought-system.. It is amazing how readily, at the start of this century, the most varied people used the

word 'modern' (along with 'scientific') as an all-purpose, all-justifying term of praise. – how readily they supposed that all the modern, scientific things they were praising were united by their modernness and would fit together into a harmonious whole. Thus a pantheon was built up containing a set of wholly incompatible prophets – Freud and Marx, Watson and Nietzsche, Skinner and Darwin and Gropius, each of whom could be referred to when convenient without any attention to their conflicts, because they all counted as modern.

At that day, the impression evidently was that a final change was taking place, producing at last an ultimately satisfactory orthodoxy – a system of ideas which could last for ever because it was monolithically harmonious. No allowance was made for further development. People did not expect the usual dialectic,by which contradictions within any philosophical position lead to further unpredictable changes. Naturally, as time went on this attempt at finality produced paralysis by freezing intellectual fashions and blocking further development – most noticeably, perhaps, in architecture and in abstract painting. In the end people grew tired of this tyranny, which is why they are now trying to escape it by raising banners for 'post-modernism'. But this language reproduces exactly the same confusion.

Again, we are talking, with enormous confidence, as if we have invented a new comprehensive thought-system – namely, 'postmodernism'. And again we are giving that thought-system a name which is so vague that it means nothing *except* that this is the latest fashion. But this fashionableness is something that can't be guaranteed to last. Already there have been rumours that 'postmodern theology is dead'. Murmurs are heard in various quarters about the need to advance to the post-post-modern. There are also heated debates among people who still do want to be post-modern about what the correct, orthodox post-modern position really is. Sometimes it almost begins to look as if we were trying to reproduce the heresy-hunting which was one of the more distressing features of Marxism.

Now this is not a trivial issue. I am not just raising it be facetious. The actual movements that have been given this title *postmodern* are often very good. They often represent genuinely useful liberations from an earlier paralysis. But just because that paralysis was so general they differ among themselves and we should not insist on standardising them too closely. The prisoners who are now released from modernistic oppression want to go about their own various kinds of business, which will be different according to what their particular situation calls for. (For instance architects, who started the revolt, have quite different needs from political theorists or literary critics). But about the word itself, what I want to suggest (at least in the intellectual area) is this. – Instead of going on saying 'modern', we should usually try to say something more specific such as dogmatic, monistic, reductive, foundationalist, over-confident, over-simple. Instead of saying *postmodern*, we should usually use the opposite of one of these terms. Often, we might say something like *pluralistic*. Then we should explain just what sort of plurality we have in mind in that particular area and explain why it does *not* involve a lapse into unintelligible anarchy. We need to make clear how the grouping that we are now substituting for some earlier simplification can be made intelligible by relating it to some wider context, even though it can't be reduced tidily to a single set of ruling principles. (Later, I shall make some suggestions about how this can be done)

Rationality and Academic Imperialism

The reason why I am raising this point about 'modernism' is that it has important consequences for our attitude to science. It means that we really should stop treating 'science' as a single monolithic entity, a solid kingdom embattled against rival kingdoms. On the one hand, we should admit freely how much the various sciences differ. Ecology and anthropology are not at all like physics and

they don't have to be. And on the other hand, we should stop treating this solid entity called 'science' as an expanding empire that will eventually take over the rest of the intellectual world. These two mistakes have been closely connected, as is clear from the way in which the Unity of Science movement in the United States has devoted itself to asserting Omnicompetence. Both errors, in fact, spring from a single root in our over-narrow, over-monopolistic concept of rationality – a concept which we still draw, essentially, from seventeenth-century philosophers and particularly from Descartes.

Descartes, when he started on his famous epistemological quest for absolute certainty, did *not* – as his writings sometimes suggest – set out with an entirely open mind about where he might find it.[1] He already had his eye on Galileo. He had already decided that the kind of logical clarity found in the new mathematical physics could make it infallible and that this logical clarity was the only light which the human intellect could safely follow. This meant that the methods of this science must somehow be extended far beyond the borders of physics itself to cover all other subject-matters. It would eventually unite the whole realm of knowledge in a Theory Of Everything, a single rational system balanced securely on a single foundation.

Thus the Enlightenment notion of physical science was from the start imperialistic. From its birth, the idea of this science was associated with two hugely ambitious claims, infallibility and the power of imposing order on the rest of thought. We know now that these two enormous ambitions can't be achieved. This is not a tragedy. We don't need to be infallible, nor do we need to have all our knowledge tightly organised on the model of mathematics. Rationality does not demand these outgrowths. But it is taking us a long time to get clear of those projects.

Descartes, in spite of his own interest in the human mind and the subtlety with which he defended it, managed to put physics in a position where it was almost forced to claim an intellectual monopoly over all knowledge. This called for a materialism which in the end would leave mind with no apparent standing-place in the universe. The philosophers who followed Descartes saw that clearly enough. But they were just as convinced as he was of the need for a single, comprehensive, unified rational system. So, instead of trying to bridge the gap that he had placed between mind and body, Idealists and Materialists responded by fighting prolonged wars to decide which of these two powers should control the whole system.

This conflict is still with us today. On the one hand Idealism, though it is not now much mentioned, is evidently still a shadowy background to many sceptical 'post-modern' doctrines such as extreme constructivism. On the other, dogmatic materialists still see this metaphysical feud explicitly as a living issue, a battle which can and must be won. But we ought surely to step back from the fight and ask what the disagreement is actually about. The really surprising thing about both contestants is surely what they have in common. They both still have a confident conviction that such a comprehensive thought-system is possible.

This ambitious project of uniting the world of ideas in an unanswerably orderly system has not always been a part of philosophy. It only arose in the seventeenth-century. Philosophers of that day saw no need to justify that ambition. They were convinced that this vast project was a simple, universal demand of reason. But when we look at it now, this assumption seems strange. It surely provides us with a crucial example of the way in which ideas grow out of the social context that generates them, – an example sharply relevant to our present enquiries about the status of physical science. It is worth while to pause on this example for a moment and ask 'what does and what does not follow from seeing how an idea connects with the age that produced it?'

The Historical Context

If we ask; then, why should seventeenth-century thinkers have been more determined

than any of their predecessors to unify the whole of thought? we won't find it hard to think of answers. That age was – like our own – a time of exceptionally painful political and moral confusion, an age which was desperately searching for some kind of unity. It was an age of violent religious wars, so that religion, which had supplied a unifying background in earlier conflicts, could no longer be called upon to do so. It was also an age of violent economic change as feudal arrangements broke up under the gradual influx of capitalism. Then, too, knowledge was being sharply expanded both by geographical discoveries and by the dramatic advances of physical science. In many ways the world seemed to be in chaos. And among the various possible ways of resisting this chaos that occurred to people, a seductive candidate was the idea of absolute monarchy – a political unity on earth echoing the celestial monarchy in Heaven.

It is surely not surprising, then, that thinkers anxious to stabilise their thought amongst all these confusions decided that they must settle things by building a strong, unifying rational system. Nor is it surprising, given the great achievements of physical science, that they looked to it for a unifying model. This process was undoubtedly helped, too, by potent analogies between the universe and clockwork mechanism, an image which obsessed the imagination of that age just as computer-imagery obsesses ours today.

Idealists and materialists both shared this tremendous ambition. But of course both parties could not succeed together. If they wanted to found a single intellectual empire they had to fight for it. That is why Hobbes and Leibniz, Hume, Berkeley, Hegel and Marx all found it so natural to carry on a knock-down debate on the subject – one which echoed the religious disputes that had begun to convulse Europe in the sixteenth century. Their debates also received impetus from a further social factor, namely, their attitudes to the political power of the Church itself. Both Hobbes's materialism and Hume's idealism were carefully designed to make religion appear meaningless, and were so designed because both philosophers had strong moral objections to Christian practice. Today, materialism is preferred for this purpose and is evidently often put forward primarily to support anti-clericalism. Hegel, on the other hand, saw his idealism as supporting the authority of the State, while Marx answered him with a form of materialism that was meant to justify revolution. Altogether it is clear that both idealist and materialist doctrines have usually been politically motivated, though both have always been presented as impartial, wholly objective responses to universal demands of reason.

Now I have been mentioning some motives which might well have made these thinkers specially anxious to unify the whole of thought, and to do it in their own particular way. This kind of suggestion does not, of course, in itself do anything to undermine their proposals. Opinions can't be proved wrong merely by psycho-analysing the people who hold them. The reason for now thinking that the unifying project was in fact mistaken is much stronger. It is just that, after endless careful trials, we have seen by now that it does not work. Many of the systems put forward have been very useful in their own way and on their own favoured ground, where they were originally conceived. Perhaps all of them embody partial truths... But they all become counter-productive when they are extended to other areas that do not suit them. When we notice this, it surely does become worth while to get suspicious about the universalizing project itself, about the whole attempt to build all thought into a single system and reduce all its forms to a single basic pattern.

We may well decide that rationality does not demand this severe dragooning of the various thought-forms. We may also suspect that science itself is not well served by these attempts to load it with the responsibilities of universal empire. As I've mentioned, the ideologies that were considered scientific early in this century often had no real connection with science and were sometimes

sinister ones which tended to discredit it strongly. Perhaps both science and reason are compatible with a less draconian, more realistic arrangement. Perhaps they may even do better there.

Underlying Unity

So how can we make that new arrangement without lapsing into anarchy? To do this, we shall surely need to get rid of the great gap which Descartes placed between mind and body, between subjects and objects. The ways in which we think about these two vast topics ought not to be kept incommunicado in separate watertight compartments. They need to speak to each other. And this speaking ought not to be hard, since our everyday life is a seamless web which weaves the subjective and objective points of view together as a matter of course. We could not have the kind of experience that we have everyday without constantly relating our momentary, inner perceptions to the facts that we know about the outer world. We also know, in a general way, how to relate the facts that we know through common-sense and history to the ones supplied by the natural sciences. But when we take up the scientistic viewpoint all this co-operation begins to look not just difficult but impossible. For physicalist prophets such as the Churchlands, (Churchland & Churchland, 1995: 64–78) all the ways of thinking by which we usually deal with ourselves and other people as subjects – as conscious, sentient agents – are dismissed as amateur vapourings, mere folk-psychology because they fall outside the strict definition of science. These prophets still dream of finding a a single truly scientific language which will one day replace this stuff by terms which will say everything that we need to say about people, as well as about objects, but will say it in ways that are scientific and objective. In their view, any trace of subjectivity is simply a weakness which must in the end be eliminated from serious thought.

Thus the inner and outer aspects of life, which are inseparable sides of the whole person, are violently abstracted, reified and treated as if they were alternative realities fighting for supremacy. That is the set-up which we have to get rid of. Mind and Body are not two separate, rival kinds of stuff or force. They are two points of view – inside and outside, subjective and objective, the patient's point of view on his toothache and that of the dentist who studies it. *Consciousness is not a suspect supernatural entity – a dubious extra to be sliced off with Occam's Razor. Consciousness is a normal function of our species, an emergent capacity acquired by all social creatures during the regular course of evolution. And it could not have been so acquired if it did not play a central part in shaping their behaviour.*

Of course these two angles do often have to be distinguished for thought. But they are inseparable aspects of our normal experience, just as shape and size are inseparable aspects of objects. The dentist is aware of the patient's pain as an important objective fact about the current situation, and the patient, too, has some objective thoughts about what is wrong with him. Indeed, dentists themselves can have toothache. Ontologically, only one kind of item has to exist in the world in order to accommodate these two standpoints – namely the whole person, the person who has those two aspects. Of course this whole person is not a *simple* entity. He or she may be full of inner conflicts and confusions. But this does not alter the genuine unity of the whole, because in this world (never mind about science-fiction) each of has only one life to live and must live that life through a single continuing body.

It is remarkable how badly the Cartesian picture has managed to block our perception of the ways in which the subjective and objective angles are conceptually inter-dependent. On the physical side, Cartesian matter is abstract and idealized. It is the subject-matter of physics, not the tangible stuff of everyday experience. And equally on the subjective side, the Cartesian pure ego is bizarre because it is quite unrealistically

solitary. Descartes wrote in the singular – 'I think, therefore I am'. He established a thinker who was a solipsist, a hermit whom no subsequent efforts have ever managed to connect to his neighbours. But a human being could not be such a hermit. Anyone who speaks a language – as this creature appears to do – belongs to a particular human society and has absorbed its customs and attitudes in learning to speak. Still more deeply, this speaker is a social mammal, a born bond-former. Like other social creatures, human beings start life innately equipped with a wide repertory of expressive gestures and with the power to read those gestures in others. The power of speech is only a part of this repertory. We are aware of other people long before we are aware of ourselves, and we eventually understand ourselves in the light of the ideas we have already formed about other people. There is not, and could not be, any I without a We.

Descartes' predicament, then, was an unreal one. His image of a solitary isolated spirit, struggling to contact the outside material world through an inverted pyramid of logic, doesn't reflect our real situation at all. We are social beings, animals in the world who are connected to their surroundings from the start. Epistemologically then, we don't need that logical pyramid to resolve Descartes' systematic doubt, because that doubt never arose in the first place. So we don't need to call on Science to build us that pyramid.. Science does not have to perform inappropriate metaphysical functions or make undertakings that it cannot fulfil. It does not have to pretend to be infallible,nor to act as a system which can cover the whole area of our knowledge.

Objectivity Has Degrees

So how does science – or rather, how do the many sciences – relate to the rest of our thought? Here again we need to get rid of the absurdly simple pattern in which a single objective science on the one hand confronts, across an enormous gap, a mass of indescribable subjective experience on the other. Virtually all our thought integrates material taken from these two angles and we have by now formed very useful concepts for doing this. Thus, when the dentist thinks about his own toothache, he uses a whole series of conceptual schemes which work in between these two extreme positions. Objectivity is not a single, simple standpoint. It is one of two directions in which thought can move. As Thomas Nagel puts it, when we want to acquire a more objective understanding of some aspect of life or the world,

> we step back from our initial view of it and form a new conception which has that view and its relation to the world as its object... The process can be repeated, yielding a still more objective conception... The distinction between more subjective and more objective views is really a matter of degree... The standpoint of morality is more objective than that of private life, but less objective than the standpoint of physics. (Nagel, 1986: 5)

Thus we combine elements derived from the two angles in various ways that suit the different matters that we are discussing, ways that differ widely according to the purpose of our thought at the time – perhaps much as we combine sight and touch in our sense-perception. As Nagel points out, increased objectivity isn't always a virtue, nor is it always useful for explanation. A dentist who decides to become more objective by ignoring his patient's pain will not thereby become a better dentist.

How, then, do we manage to relate these various ways of thinking, and their various degrees of objectivity, when we use them together in our lives? The fashionable reductive pattern tells us that, when we want to connect different concepts, we should order them in a linear sequence running from the superficial to the fundamental, a hierarchy which will fill the whole logical space available for explanation. The more fundamental thought-patterns are then called 'hard' and the upper layers 'soft' . This rather mysterious tactile metaphor means that the

upper or 'softer' layers are more superficial, amateurish, non-serious, because they fall short of the ultimate explanation. Classed as 'folk-psychology', these layers must only be tolerated as makeshifts to be used until the real scientific account is available, or when it is too cumbersome for convenience. They are just stages on the way to the only fully mature science, which is physics.

The metaphor of 'levels', which is often used to describe the relation between these various ways of thinking, seems to endorse this one-dimensional pattern. But it really is not clear what sense this idea of a linear hierarchy could ever make. It can only work if the relation between physics and chemistry – which is its original model – can be usefully extended beyond biology to colonise all other branches of thought, for instance history, logic, law, linguistics, musicology and indeed mathematics – which is certainly not an empirical science – and translate them into physical terms. This project remains so desperately vague that I suggest we should, for the moment, put this whole linear pattern aside and consider a quite different conceptual map, one which is drawn from the homeland of all maps, geography.

The Many-Maps Model

In our atlases, we find a great many maps of the world. My atlas offers World Physiography, World Climatology, World Vegetation, World Political, World Food, World Airlines and a great many more. They all represent the world differently. But there are not many worlds. How do we relate these varying pictures?

We do not need to pick on one of them as 'fundamental'. We don't need to find a single atomic structure belonging to that map and justify the other patterns by reducing them to it. Nor do we need to bring in physics, which has already done that atomizing job for us. What we need is something different. We have to relate all these patterns in a way that shows the relation between them, shows why there is room for them all and why they are not contradicting each other – not rival pictures representing separate alternative worlds. As John Ziman has pointed out, each of us is called on to perform this same feat in a still more striking way whenever we have to relate the Underground map of a city such as London to the much more complicated Street Map.[2] We also have to do it whenever we relate what one way of thinking – say, poetry or anthropology or history – tells us about the human heart to our everyday experience.

In order to make these connexions, we always draw back to look at the larger context of thought within which the questions arise which lead to these various ways of thinking. Explanation, in fact, works by widening the context, not by atomising the structure. There is nothing irrational about this outward move. We know that the different maps are meant to answer different sorts of questions, questions which arise from different angles. All these questions concern the same enormous world, which can rightly be described in all these ways because it is much bigger than all of them. Rationality, in fact, demands this pluralistic approach because it is the only way to do any kind of justice to the complexity of the facts which we encounter in our experience. This complexity is no threat to rationality. Nor is the fact that our set of maps is never exhaustive. Rationality does not call on us to pretend that we know everything about the world, nor that we could ever do so. Indeed, it would be highly irrational to make this claim. We can readily admit, today, that there is logical space left around and between our maps because we do not need to claim – as the seventeenth-century theorists did, and as Marxists still do – to have a Theory of Everything, a supermap uniting all the maps in a single vast, comprehensive system.

If, then, we ask how we actually do relate our various maps,. the simple answer is that we do it by following the coastlines which appear on all of them, showing common patterns which remind of the larger context and referring us back to what we know of it For instance, political maps, especially maps

of Africa and Australia, often show mysterious straight lines of a kind not found in most other maps. (There are no straight lines in nature...) The only way in which we can understand these straight lines is to relate them to the history of particular treaties and, beyond that, to the colonial system which produced them. But treaties are not things which can be explained in terms of physiography or vegetation or electrons. Nor can they be explained in terms of the neurones of the people who make them, any more than vice versa. The only way to explain treaties is by thinking about human history and human purposes. And this is talk which cuts into the cosmic cake – so to speak – at quite a different angle.

Understanding the relation of history to physiography is not (then) like relating two places on the same map. It involves relating two maps – two different ways of thinking – to one another. And when we consider problems about how consciousness relates to the physical sciences, and more generally to the rest of life, that is what we have to do.

This work is philosophical. But that does not mean that it has to be left to the philosophers. It is a co-operative venture, to which all citizens of the intellectual republic can contribute. And it is a much more interesting and useful occupation for them than the wars recommended by competitive imperialism.

NOTES

[1] His impressive account of this search in the opening chapters of the *Discourse on Method* is no doubt true enough in itself but it is by no means the whole truth.

[2] Ziman, 1995: 65–82. The map metaphor is discussed at length by Stephen Toulmin (Toulmin, 1953) and by John Ziman (Ziman, 1978). Indeed, this metaphor has been put forward independently without special comment by a number of philosophers, starting perhaps with Wittgenstein. See, for instance, his image of a representational grid which might just as well be triangular or hexagonal as square *Tractatus Logico-philosophicus* (Wittgenstein, 1961: §6.341), his discussion of alternative descriptions in *Philosophical Investigations* (Wittgenstein, 1963: §24), his remark that 'A philosophical problem has the form "I don't know my way about"' (Wittgenstein, 1963: §123) and above all his image of language as an ancient city whose shape cannot be explained as conforming to any single pattern (Wittgenstein, 1963: §18). Images such as these resemble map-talk in having the advantage that they do not require us to talk of truth and falsity. We do not describe grids or maps as true or false. Since, however, maps undoubtedly are more or less accurate, more or less correct or misleading, this talk still keeps to the standards of everyday realism. On the wider question of what guarantees we can reasonably expect here, see *On Certainty* (Wittgenstein, 1969).

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