

*The Question of Causal Factors*

The first goal of any historian is no doubt to give as accurate a description as possible of what actually occurred, while recognising that no account can be entirely theory-free, for all will presuppose some conceptual apparatus. But then the further task we face is to attempt some explanatory account of the factors at work that led to the outcome we describe. This will turn out to be of very varying degrees of difficulty depending on the focus of our attention. If we ask why after many decades when the so-called Warring States vied for hegemony in China, the state of Qin eventually achieved victory, we can explore the influence of such factors as the types of weaponry available, the effectiveness of military organisation and the extraction of resources, the centralisation of political power, even the ruthlessness of the leaders involved, while weighing up a series of always difficult counterfactuals – the question of whether things might not have turned out very differently, forcing us to endeavour to pinpoint the significant causal relations involved.

Where the history of scientific theories and programmes and of the underlying belief systems or cosmologies is concerned, an earlier positivist historiography was often satisfied by invoking the truth – that the principal factor at work when views change is how close they get to capturing what we with the benefit of hindsight can confidently proclaim to be the case. Scientific theories would come to be replaced because they were, or came to be seen to be, erroneous, even while those that replaced them would not be immune to being themselves superseded in turn, as more progress was made.

Yet the difficulty any such project of explanation suffers from is obvious. In practice what are later judged to be mistaken theories often survived even in the face of what positivism would have hailed as more advanced or truer theories. The heliocentric hypothesis proposed by Aristarchus of Samos in the third century BCE failed to supplant the ‘common-sense’ assumption that the earth is at rest in the centre of the universe, and that

was true not just for ordinary folk, but in the opinions of those who engaged most closely with the problems. As we shall see in the next chapter, in the second century CE Ptolemy mounted a battery of arguments to confirm what everyone normally believed, namely that the earth has no movement in space. Aristotle put it that having truth on your side is a powerful advantage in the battles of persuasion that get to be waged on every topic imaginable. The trouble was the difficulty in assuring yourself that your conception of where the truth lies on a particular issue was not itself mistaken.

As we have already remarked, there have been plenty of controversies surrounding narratives of major breakthroughs in the development of human understandings of the world. That has not deterred historians from proposing speculative accounts that seek to give causal explanations of the explananda howsoever they have construed them. We are faced in fact with a proliferation of Grand Narratives that purport to identify the principal factors that have influenced or even determined the varying fortunes, the rise and fall, of divergent ontologies or cosmologies. The task of this chapter is to comment critically on some of these.

Four main types of such suggestions may be identified, those that pinpoint ecology as the main consideration, those that focus on language (including literacy), those that do so on technology, and finally those that argue that the key to understanding world views lies in the social and political organisation of the groups that produced them. That ecology, language, technology and politics may all exercise a certain influence has a certain immediate plausibility. The questions we must tackle here are how far such influences extend and whether any of them, singly or in combination, amount to necessary and sufficient conditions for the characteristics of any of the belief systems with their attendant sets of practices for which we have evidence in ancient history and in the modern world.

The influence of ecology, even geography, is relatively easy to test in one way at least. There are plenty of examples of human groups that share broadly the same geographical conditions but that have very different understandings of the world. This applies first to large swathes across the Eurasian land mass that share approximately the same general climate, even though punctuated by pockets of distinct microclimates. Yet Eurasia has always been the locus of an even more considerable diversity of ontologies, cosmologies and explanations of the phenomena (cf. Diamond 2005). Again ecological conditions across much of Amazonia do not vary much and yet the types of shamanic beliefs and practices recorded differ appreciably, as between what has been dubbed vertical, that is hierarchical,

shamanism on the one hand and horizontal or egalitarian types on the other (Hugh-Jones 1994). Conversely Levinson's studies of spatial cognition, that we have mentioned before, have shown that an absolute frame of reference, using north, south, east and west coordinates, is found in peoples that are widely dispersed across the world, not just in the flat plains of central Australia and the tundra of Siberia but also in the broken terrain of Meso-America (Levinson 2003).

But what about broad distinctions between hunter-gatherers on the one hand, sedentary farmers on the other, which might be thought to be relevant in particular to notions of the relations between humans and other animals, the leitmotiv of Descola's fourfold classification of ontological regimes? Thus what he called animism, totemism, analogism and naturalism differ according to whether what he called physicality and interiority are or are not shared between humans and other living beings.<sup>1</sup> Yet hunter-gatherers do not all uniformly exemplify animist regimes, no more do they all adopt totemic ones. Even if we may accept that he has identified important differences between ontologies, there are no clear correlations between those regimes and the ecological circumstances in which different groups live. Obviously the imagery used in cosmogonical myths will reflect the physical experiences of the peoples concerned. Floods, tsunamis and earthquakes are more likely to figure more prominently in such stories in parts of the world where they are frequent. But while such trivial points can and should be conceded, attempts to see ontologies as determined by geography or ecology face prohibitive difficulties – not that Descola himself went down that route. Put quite simply, the varieties in the explananda show no distinct and uniform correlations with those in the explanatory factors that this argument would provide.

Where language and literacy are concerned, advocacy of their influence has been more sustained. We mentioned before (Chapter 1) Goody's thesis (1977) that the 'Domestication of the Savage Mind' (as he called it) owes much to the rise of literacy, especially that facilitated by the use of an alphabetic system of writing. First two concessions are in order. As

<sup>1</sup> The fourfold schema in Descola (2013) proceeds broadly as follows: (1) in animism other creatures besides humans have spirits, but what differentiates them is their bodies. So interiority is common, physicality is what differentiates things. (2) Totemism as now redefined assumes unity or continuity between humans and non-humans both on the physicality axis and on the interiority one. (3) Analogism, the reverse of totemism, assumes discontinuities on both axes but finds analogies and correspondences across the domains so differentiated. Finally (4) in naturalism, the default ontology of modernity, physicality is unified (everything is made of the same stuff) but interiority is discontinuous. Humans alone have true culture.

subsequent neurophysiological investigations, using fMRI scans, confirm, the ability to read does bring about certain changes in the brain (Changeux 1985). Yet how these correlate with modes and manifestations of intelligence remains problematic. As many studies since Goody have confirmed,<sup>2</sup> schooling and contact with literate outsiders such as missionaries can certainly have marked effects on behaviour. But as Vilaça (2010, 2019) for one has shown, those influences should not be exaggerated. Indigenous peoples can be as capable of making allowances for the differences between themselves and the foreigners who visit them as the anthropologists are when they conduct their fieldwork. Those indigenous peoples may, in other words, be far from convinced of the superiority of what those outsiders are trying to persuade them of. They are often keen to preserve their own ways and quite frequently succeed in this despite the pressures to which they are subjected.

But then the second and more particular concession to be made is that the presence of literate elites can undoubtedly produce important changes in the manners in which ideas are preserved, transmitted and challenged. However, we also noted two considerations that indicate that caution is needed in applying this second explanatory hypothesis too. First there is plenty of evidence that scepticism is present in basically non-literate societies and is certainly not the sole prerogative of literate ones, even though they had the advantage (when it was an advantage) of being able to cite written texts both for and against the positions they were dealing with. Conversely we have to take into account that when literacy is associated with the construction of a set of authoritative texts – a canon – that may inhibit the critical scrutiny to which Goody attached such importance.

But what about language itself, the factor that Sapir, Whorf and their followers have seen as key to the understanding of differences within cosmologies and to the development of scientific inquiry?<sup>3</sup> An obvious first difficulty here is that both in ancient and in modern times very different cosmic systems and different solutions to scientific problems have been proposed by individuals all of whom used the same natural language, whether that be ancient Greek or Chinese or modern French, German or English.

<sup>2</sup> Ong (1982), Havelock (1982), Olson and Torrance (1991) and Olson (1994) stand out among the many surveys of developments since Goody (1977).

<sup>3</sup> Leavitt (2011) has recently mounted a defence of a modified version of the original hypotheses of Sapir (1949) and Whorf (2012 [1956]) and Levinson (2003) has similarly cautioned against too swift a dismissal of their basic intuitions.

The inappropriateness of the Chinese language as a vehicle of scientific inquiry has been a recurrent theme, often associated with efforts to answer the so-called Needham question, of why the scientific revolution of the seventeenth century did not occur in China, which had been so far in advance of the West in so many respects up until then. As I noted in the Introduction that question is itself ill-formed, both oversimplifying Western breakthroughs and neglecting Chinese ones as well as attempting to explain a supposed non-existent occurrence (Sivin 1995a: VII). But that has not deterred both Western and some Chinese writers from claiming that Chinese suffered from crippling disadvantages, notably systematic ambiguity and the difficulty in expressing abstractions. Such accusations go back to Hegel, at least, and have been repeated with scant regard for the counter-evidence by scholars such as Granet (1920, 1934), Dubs (1929), Bodde (1936, 1991), Fung (1948, 1952–3) and Hansen (1983).<sup>4</sup>

One particular argument mounted by Bloom (1981) in the wake of Sapir's ideas is that classical Chinese suffered from a particular handicap, namely that it had difficulty in expressing counterfactuals, thought of as especially important for the review of competing scientific hypotheses. Yet as others besides myself have shown, that argument was well wide of the mark (Harbsmeier 1998: 116–18, Wardy 2000, Lloyd 2018: 59f.). Not only are there plenty of examples of classical Chinese thinkers considering what would be the case if certain conditions obtained (while recognising that they do not) but there is even an expression that marks out such hypotheticals. They are often introduced by a phrase that literally means 'falsely supposing' (*jia shi* 假使). The concession that should be made is that a highly inflected language such as ancient Greek or Latin does allow speakers to mark many different types of conditionals unambiguously. The reader or audience is thereby alerted to the difference between what according to the speaker *is* the case, what *will be* the case, what *may be* the case and what conceivably *might be* the case. But one would be hard put to it to identify where Chinese cosmological or scientific thought was hamstrung by the lack of syntactic forms suitable to make such distinctions salient.

In a more concrete and substantial instance relating to semantics rather than to syntax, namely the vocabulary to express colour perception, it is clear that the existence of a particular term for a particular hue enables a speaker to identify it without periphrasis. Yet although colour

<sup>4</sup> Harbsmeier (1998: 22ff.) surveys the history of this trope and rebuts most of the arguments concerning the characteristics of the Chinese language that were claimed to support it.

perceptions vary across human populations according to whether hue, or brightness, or saturation is the primary focus of interest, that does not mean that individuals find it impossible to discriminate between colours for which their natural language provides no particular name. Determining subjective impressions is always difficult, but differences between hues or between brightnesses can be registered without recourse to any language resources other than 'same' and 'different' (Mollon 1995). Here too, as in the case of spatial recognition, it cannot be claimed that a particular language that favours one particular mode of analysis has a monopoly of correctness.

Similarly systems of animal or plant taxonomy will vary in part according to the varieties with which any given human group will be familiar. Yet theories such as those of Atran and his associates (Atran 1990, Atran, Medin and Ross 2004) that would have it that across the world such taxonomies reveal more or less universal implicit apprehensions of similarities and differences between groups of animals run into difficulties when we ask how they relate to the actual differences that the attested classifications point to, for they may reflect quite different interests. In many cases the important explicit actors' *differentiae* do not concern zoology but such issues as whether the species of animal is edible or not, or whether its habitat is water, land or air (Lloyd 2007: ch. 3).

The third area we mentioned for consideration in our exploration of possible determinant factors in cosmological and scientific theories relates to technology, which has often been considered to be a key driver in the changes summarised under the labels of the scientific and the industrial revolutions. Once again obvious concessions must be made. The opportunity to reflect on what happens in the artificial conditions brought about by human technological intervention depends on the possibility of making such interventions in the first place. What the unaided human eye sees when it contemplates the heavens does not compare to what is revealed by an optical, let alone a radio, telescope. There is no way, currently, that the Higgs boson particle could have been verified without the Large Hadron Collider. As Macfarlane and Martin (2002) have argued, glass technology has repeatedly played a key role in one scientific advance after another.

Time and again the development of instrumentation stimulated fruitful modifications in scientific understanding. But to some extent that just pushes the problem one stage back, for the motivation to develop new tools and the realisation of that very possibility themselves require explanation. We understand, to be sure, that most humans will strive to seek a more comfortable mode of existence, one that demands less effort. But ideas on

how to achieve that, for example on whether it is a goal that should be pursued if it can only be attained at the cost of the exploitation of other humans, vary considerably. The well-known argument that the existence of slave labour was an obstacle to economic, and indeed technological and scientific, advance in the Greco-Roman world has sometimes been exaggerated (Finley 1965, Pleket 1973). The cost of slave upkeep and the threat of slave disorder were not lost on ancient authors, some of whom also challenged the underlying morality of the institution. Aristotle already reports the view (from which he himself dissents) that had it that the distinction between master and slave is not natural but arbitrary, a matter of custom or convention (*Politics* 1254a17–1255b15). If the ancient Greeks missed many opportunities – we might say – to explore technological solutions to the problems of production, straightforward monocausal explanations for this always fail in the face of the complexities of the situation.

For sure, as we said, much of modern science depends heavily on the technologies available, many of them way beyond the reach of much of the world's population in the past and even today. But where the impact of technological factors on cosmological understandings is concerned, the bottom line is the same as we noticed with language. Those understandings can hardly be said to be determined by the technology, since they are found to differ even when the technological circumstances were, in antiquity, or still may be today, to all intents and purposes, identical.

These remarks already take us to the final field we identified for examination, that relates to the social and political factors in play. At first sight there is again an obvious difficulty, in that here too no clear correlation seems to exist between ontologies or cosmologies on the one hand and political regimes on the other. Descola's four ontological schemata, for instance, to return to them, are not clearly associated with different particular solutions to the problems of social and political organisation. That does not mean that political considerations are irrelevant to our inquiry, but to follow up the influence they may have had we have to look not to substantial theories or explanations, so much as to such issues as the range of alternatives available to those proposing such explanations. The degree of dissent and dispute that particular regimes may tolerate on what we call cosmological as well as political or ethical issues does vary:<sup>5</sup> how significant is that?

<sup>5</sup> Thus far we may agree with Goody, while not invoking literacy as the key to the solution of the question.

One obvious point to start from is that in small-scale societies, limited to populations in their hundreds or thousands, as opposed to hundreds of thousands upwards, the range of possible views that are likely to be entertained on such questions as the stuff of which things are made or the origins of the world will in all probability be severely limited. Comparisons with the theories adopted by individuals or particular groups in societies as large and as complex as ancient Babylonia, or Egypt, or China or even Greece are then liable to mislead. If in those four ancient societies we find considerable scope for disagreement even on fundamental cosmological or religious questions, we must bear that point in mind. That is not to say that in small-scale polities there will be total uniformity of opinion. On the contrary we have already observed that doubt and scepticism about some common ideas, and concerning some claimants to knowledge, can be and are expressed frequently enough in small largely oral communities. Yet obviously full-scale debates such as we find in ancient Greece between atomism and continuum theory or in China between different conceptions on the transformations of yin and yang and of the five phases (see below, Chapter 8) depend on there being sufficient room for intellectual manoeuvre for different individuals and groups to develop and express their own solutions to the problems.<sup>6</sup>

The place that such would-be intellectual leaders hold in the societies to which they belong does offer one example where we may appreciate the relevance of political organisations. Evidently, as we said, both ancient and modern societies vary in the degree to which divergence in opinion is tolerated. Autocratic regimes do not take kindly to dissent on fundamental issues such as who is in control, who has the authority to govern. Yet that does not prevent some such regimes allowing disagreement on technical matters to exist and even to flourish. Thus in ancient China there were debates on the nature of the observations to be conducted, and even the instrumentation to be used, in relation to the determination of the lengths of the solar year and lunar month (Cullen 2007). Indeed, that was not just a 'scientific' issue, but one with important repercussions for the state. Nevertheless, the regulation of the calendar was the responsibility of the emperor himself and directly or through his representatives he ultimately adjudicated the outcome of the discussion. So here expertise was allowed to express itself, but only within well-defined limits. Challenge to the

<sup>6</sup> Neither of those ancient civilisations originally had institutions of religious censorship that matched those that were eventually developed by the Christian Church or other monotheistic regimes, though as I go on to note other modes of controlling deviant views certainly existed.

emperor himself was generally punishable by death, while denying the very idea that the rule of one person is the sole legitimate political regime was never within the horizon of possibility.

The contrast but also the comparison with the situation in classical Greece are alike instructive. Before the unification of China under Qin Shi Huang Di in 221 BCE, the so-called Warring States offered different bases for those who wanted to make their mark as advisers or experts including on the investigations of things, but even more importantly on matters of good governance. If a leading thinker fell out of favour in one court or one polity, he (it was usually a man) could move to another and try to build a reputation for expertise or as an adviser there.<sup>7</sup> Similarly in ancient Greece many would-be Masters of Truth moved from one city state to another, in search of patrons or pupils, more often the latter since they generally depended on teaching for a livelihood.<sup>8</sup> Those city states varied among one another in their political constitutions, the standard classification of such ranging from the rule of one person, through more or less restricted oligarchies, to democracies where power lay with the citizen body as a whole, though that never included females, foreigners or slaves. To that variety between different Greek city states we can add a further dimension, in that in many of them there were usually more or less violent alternations between more oligarchic and more democratic regimes. The instability of Greek political regimes – the constant threat of *stasis* – was the subject of considerable comment among the Greeks themselves, particularly among those such as Thucydides and Plato who saw democracies as especially unstable.

A pluralism of independent polities might permit a certain degree of pluralism in the belief systems of independent-minded thinkers. The skills those thinkers had to display to survive and flourish varied accordingly. It is

<sup>7</sup> The most notable case of this is what was reported about the life of Confucius, who in his travels nevertheless failed to find a ruler worthy to receive his instruction.

<sup>8</sup> One of the charges levelled against those called sophists was that moving from state to state in search of pupils, they bore no stable allegiance to any particular polity and so could not be trusted to have stable political or even moral views. In the context of disputes in the law courts they were criticised for supposedly teaching how to argue both sides of a case, and how to win suits irrespective of whether they were sound or not. They made the 'weaker' or the 'worse' cause the 'better', as Aristophanes, for instance, put it (*Clouds* 112ff.) and as Aristotle implies was associated with the teaching of Protagoras in particular (*Rhetoric* 1402a23–7). There was no doubt a good deal of exaggeration in such criticisms. But the basic fact remains: whatever their own city of origin, there were sophists who could and did move between city states offering instruction, including public lectures or *epideixeis*, on a wide variety of subjects to whoever was prepared to pay. Chinese itinerant advisers were very different in this respect, that their ultimate target audience was not the general public, nor even their own peer group (though that was sometimes the case), but rather rulers and their ministers.

obvious that a democratic assembly could be as closed in its opinions and as arbitrary in its judgements as any autocrat – as Socrates, as we said, certainly discovered. Yet whether faced with monarchs or groups of fellow-citizens, the problem of persuading the relevant audience to take your ideas seriously was always present. As we noted in the last chapter, some Greek thinkers sought to block the objection that all that they produced were just plausible arguments by developing and invoking a very different model of reasoning, one that purported to deliver incontrovertible conclusions.

Yet for all the generic similarities that the task of persuasion presents, a gap opens up when we consider the consequences of different situations for livelihoods. Patrons might be rulers or private individuals, more or less generous in fostering the ambitions of those they supported in their entourages. They might even be prepared to allow some extravagantly heterodox opinions, for their courtiers were in business to entertain as well as to instruct (Netz 2009). However, there was always a more or less determinate line that could not be crossed.

But when your livelihood depended on the pupils you attracted, the risks were rather different, at least when what you taught was what you wanted to teach and what your pupils sought instruction in, rather than what a state-controlled curriculum dictated. To be sure overstepping the norm of what convention allowed could mean you lost your pupils and so your livelihood, though only in exceptional circumstances such as that of Socrates a risk to your freedom or your life, which would more often be at stake in autocratic regimes.<sup>9</sup> The recurrent problem with reliance on a patron was that he was liable to set or at least heavily to influence the agenda. The professional teacher could, in principle and sometimes in practice, engage in whatever investigations and instruction he or she chose: yet that was sometimes at the cost of a lack of the more or less stable support that an influential patron could afford. We thus encounter, already in the ancient world, a version of the issue that still besets us today, that of striking a balance between institutional sponsorship and individual innovation. It is certainly not the case that we have entirely resolved the problem of ensuring reasonable state or institutional support without considerable negative interference in how that support is used.

<sup>9</sup> When Aristarchus proposed the heliocentric theory the Stoic philosopher Cleanthes is reported to have said that he ought to be tried for impiety for moving the Earth, the Hearth of the World, from its central position (Plutarch *On the Face of the Moon* ch. 6, 923a). But there is no evidence of anyone following up such a suggestion. The contrast with the fates of Giordano Bruno and of Galileo is obvious.

So where ancient Greece is concerned, the possible influences of their distinctive political institutions are both multiple and complex. On the one hand, as Vernant (1962) and Vidal-Naquet (1967) were among the first to emphasise, the insistence on accountability in public life (especially but not exclusively in the democracies) is mirrored by demands for justification of theories and explanations in philosophy and elsewhere. In those circumstances it was not enough to defend a point of view merely on the grounds of the authority of tradition. On the other, as we have seen, Greek politics also supplied negative models, when dissatisfaction came to be expressed with 'mere' persuasiveness (even and perhaps especially when that was judged by what the majority voted for) – a view that led to a demand for an altogether more rigorous (if often unattainable) ideal, namely for strict demonstration securing indisputable conclusions.

The argument would not be that science – any science – could not flourish under any but open democratic or pluralistic regimes: the tremendous achievements of scientific investigators under autocracies in the ancient world and in more modern times from the Renaissance to the twenty-first century are enough to refute any such view. Rather the most that can be claimed are more modest points. While political pluralism is no guarantee that alternative world views will get to be developed and explored, it may serve as a more favourable political background to the development of cosmological and epistemological pluralism. The possibility of alternatives in one domain may inspire the contemplation of such possibilities in others: once again the question of scale is relevant. At least we have had plenty of experience of the contrary situation, where all-encompassing state ideologies close down dissent across the board. Yet the pluralism that counts where cosmology and science are concerned is as much a matter of the career structure and livelihoods of individuals as one of their participation in the political processes of the states in which they lived.

Given that we all inhabit one or other habitat on this one planet Earth, and given (more controversially) that we all share the same basic cognitive capacities, it may be thought surprising first that our understandings and our ontologies vary so widely and that pinpointing the reasons for this is so difficult. Yet maybe that surprise can to some extent be alleviated if we bear in mind the very different jobs of work that what we have been calling 'belief systems' and the corresponding practices perform. While some are directed at concrete problems of survival, others are geared to offering imaginative commentaries on whatever we may find interesting or puzzling, where elements of the ludic or playful may qualify such serious

concerns. Some have major repercussions for moral and ethical issues: others appear to be more abstract and technical, while never (so we have argued) being entirely value-free.

We are all perplexed by apparently fundamental questions to which we have no reliable answer. Of course modern science tells us a lot about the nature of life, the structure of matter, the origins of galaxies and even the Big Bang itself. Yet many problems still elude solution, in reconciling quantum mechanics and relativity, in the search for the Grand Unifying Theory, in the exploration of black holes and antimatter, as well as a host of issues in genetics since the discovery of DNA. It would be foolhardy to suggest that anyone can now predict where fundamental physics, where biology, or even where AI will be by the end of this century, even by the end of the next decade.

But although the way in which we now formulate the questions and attempt to devise methods to answer them are peculiarly modern, there is no reason to think that the capacity to pose at least some of the fundamental questions to do with life, the universe and our place in it, is not as old as the human race itself. It is not just modern science that puzzles about the origins of things and our future and the future of the world we live in. The assessment of what have been offered as answers is an ongoing concern where too hasty a dismissal is, as I have been maintaining, out of place.

To be sure, philosophy can claim that some such questions are simply not well formed. Given that an explanation must always be in terms of some factor that lies outside what has to be explained (if we are to avoid simple circularity) it follows that to ask for an explanation of 'everything' is one such ill-formed question, although attempts to answer it have repeatedly been made. Yet that leaves the vast majority of philosophical and scientific issues, not least those to do with how we should conduct ourselves, still to be resolved. On many technical issues, progress will no doubt eventually be made. But wherever values are implicated, we have to recognise that what we need is not just cleverer science, but greater wisdom. And what would that consist in? Greater self-awareness, no doubt, in the first instance, but also greater prudence in evaluating consequences and greater empathy in adjudicating between different conceptions of those values. Here the very proliferation of belief systems is not so much a cause for regret and dismay, as one of hope, if, that is, we can make the most of the opportunities those views offer us to learn. The baffling nature of cosmological heterogeneity can be turned into an incentive to deeper exploration, provided, of course, that we do not imagine that we have the correct answers already. We come to the investigation with

methodological and substantive presuppositions, but the first thing to keep in mind is that all are subject to scrutiny, none is immune to revision.

Meanwhile our explorations in this chapter serve to underline the difficulties we face in identifying just why and how different scientific theories, cosmological systems or ontological regimes get to be adopted, promulgated, defended, modified and on occasion abandoned. That is to say we cannot be confident that any of the factors we have reviewed provides the basis for fully adequate explanations on its own nor even in combination even though we can identify certain effects that literacy, technology, and political and social institutions have had at particular historical junctures. We are left then with the task of applying them differentially to the heterogeneous data thrown up by our cross-cultural comparisons, and we shall accordingly endeavour to take some steps towards such clarifications in the studies that follow.