Conclusions

In surveying, as we have, even if very cursorily, a great variety of systems of beliefs, cosmologies and suggestions as to how to understand specific phenomena or the world as a whole, we have come to recognise not just that the methods adopted by different groups differ but so too do their assumptions about the goals to be achieved. We have used the rubrics cosmology, ontology and science as place-holders for the fields whose history we have been investigating. But we have seen that we need to keep an open mind about what those terms may cover and how they should be cashed out in different contexts. That does not mean abandoning the task of interpretation on the grounds that the sheer opacity of the vocabulary in which it is conducted renders it impossible. Rather, the difficulties that that task encounters present an opportunity and not a threat, though the opportunity is not one for the faint-hearted. That confrontation with divergent systems is the occasion for us to expand our horizons, reviewing our assumptions about what needs explaining and the modes of explanation appropriate for that, recovering more of the past and viewing where we are today with due circumspection. The mode of comparative history of science that we advocate eschews the idea that the goal should always or even usually be a single definitive set of answers to problems where the implicit ideal is that both problems and solutions should be expressible as well-formed formulae to which straightforward judgements of truth or falsity apply.

It is time now, in conclusion, to take stock of where this inquiry of ours has taken us, concentrating on the two main issues of what I have called the multidimensionality of reality and the pervasiveness of values. First, however, there is a question to do with the very terms in which we conduct our investigation. We have, we suggest, good reason to reject certain common opinions about the semantics of any natural language. The still often used appeal to a contrast between the literal and the metaphorical senses of terms can be dangerously misleading, and attempts to circumvent this by

collapsing the literal into the metaphorical and saying that metaphor is all-pervasive are unsatisfactory. The radical proposal I pick up from earlier studies is to suspend the dichotomy. What replaces it is the suggestion that every term displays, across contexts, a degree of what I call semantic stretch. Though Aristotle was the first to make explicit the contrast between the literal and the metaphorical, to which he attached so much importance, it can be argued that semantic stretch offers the basis of a better account of a key feature of his own philosophical vocabulary as well as one of our own. Indeed he comes close to admitting as much when in his discussion of actualities and potentialities (*Metaphysics* 1048a35–b4) he allows that those terms cannot be given a univocal definition: rather we should learn to grasp the analogous relationships between the potential and the actual that we find in different contexts. Nevertheless when, as often, he demanded univocity, that served among other things to police the boundaries between science and philosophy on the one hand and rhetoric on the other. Substituting semantic stretch is an important step towards restoring the polyvalence of the fields thus bounded.

We have acknowledged, to be sure, that translation (within as well as between natural languages) is always difficult, always imperfect, and we have rehearsed the problems that surround claims to understand the radical Other, that is what initially appears to be quite alien to us. But against that we have insisted that a degree of comprehension is attainable as can be confirmed most simply where pragmatic tests can be applied. However, we have also pointed out how that understanding often involves the revision of the concepts we start out with. Our observers' categories need to be modified to get a better match with those of the actors whom we are investigating. We discover that for those concepts to be cross-culturally applicable we need, in fact, to pay more attention than we originally imagined to their semantic stretch, and that is true not just of such terms as 'person', 'agency' and 'causation' but also of the key terms for intellectual disciplines and endeavours that we customarily use, including 'philosophy' and 'science' themselves.

Then on the question of what is there to be explained, we have argued against accepting too straightforwardly that what we have to deal with is a single, simple, well-defined object, or even a set of such, in favour of allowing for the possibility that reality is, as we said, multidimensional. We have suggested some of the difficulties in our common presupposition that nature or natures are there for natural science (as we call it) to uncover, thereby providing unambiguous tests for the success or failure of our efforts. This does not mean, to be sure, that any account that we or anyone

else offers will do, or be as good as any other. But we cannot afford to assume that we necessarily know at the outset exactly what any one such account is supposed to be good for. Different aspects of the problems may require different approaches yielding different reflections or conclusions, all of them capturing (even though not definitively) some feature of the phenomena.

Is this policy still open to the objection that it tends to undermine the single-minded ambition of science to provide unequivocal, robust, repeatable results that can further serve as the basis of attempts to exploit and manipulate the phenomena? Yes, if by that we mean to suggest that those are not the only valid ambitions of inquiry. But no, if that is to ignore that each reflection or conclusion needs to withstand the appropriate scrutiny. Multidimensionality underscores the point that different types of account may be rewarding and legitimate. One example we have used is that not all comments and explanations aim to give causal accounts of actions or the phenomena, for we have seen that many target rather the criterion we have labelled felicity. But multidimensionality applies also within investigations that all share the ambition to give causal explanations, for, as we have seen, varying views can legitimately be entertained on the types of cause to be sought and on the key effects that the phenomena present for explanation. We use the term 'data' for what we believe to be given: but what we hold to be given is always already subject to, indeed the product of, interpretation.

This takes me to the final and maybe most important point, concerning values. We are used to cordoning off ethics from cosmology and natural science. We are right to guard against moving from descriptions of what occurs to conclusions relevant to human interests, to how we should conduct ourselves, from statements about what 'is' the case to those that concern how we 'ought' to behave. Certainly such inferences have often been dangerously misleading. Yet we have found reason to question the impermeability of those boundaries. Success is sometimes to be judged by the greater clarity in understanding that it can deliver, by the correctness of prediction and a proven ability to control and exploit the phenomena. But some investigations into aspects of the world around us – those we undertake and others that our fellow human beings do or have done – can and do serve as food for thought about our place as members of the societies we live in, as well as that of humans in general in a world we all in some sense share even though our experiences may differ widely.

There are, to be sure, nowadays plenty of signs that suggest that the scientific and industrial juggernauts are more or less unstoppable. Many individuals and institutions devote huge efforts to promote what they

claim or assume to be unequivocal progress. Yet the concerns that are coming to be increasingly expressed on the negative effects that may have, on the dangers of the impact of human intervention on the environment on which we all depend, as well as on such matters as the disenfranchisement of many peoples who have so small a share in modernity, those concerns may serve as a reminder that we need all the resources we can muster as antidotes to the hegemonic assumptions that have so often punctuated the history of human endeavours to impose a certain understanding of our predicament.

Whatever may have been assumed or claimed in the past and even in certain quarters maybe still is today, we were not sent into the world to conquer, control and use it in any way that suits us, whether that 'us' means all humans or – as more often in the history of human exploitation – some section of them, the members of some chosen race or just some group within it, or even just some of the adult males. The grosser versions of such elitism may be relatively easy to diagnose and hopefully avoid. However, we still need to exercise self-criticism where residual manifestations of such tendencies continue to lurk, in the notions, for example, that some of us have a privileged vantage point from which everyone else can be assessed, or even the still common view that what counts as science is uniquely the product of Western modernity.

We should take on board the full consequences of the principle that no account can be theory-neutral, none is value-free. We have to leave behind the idea of being content just with the security of customary modes of scientific verification and with the thought that the only criterion that counts is such verifiability. The fact that values are always implicated demands a different mode of judgement, not one that dictates agreement, *per impossibile*, with every view and mode of behaviour we encounter, but one that does start from the assumption that they are to be taken seriously. Whereas the traditional history of science often turned into one of the successive correction of errors in the onward and upward march towards today's confident knowledge, my aim has been to recapture more of the problem situations of those who did not have the benefit of such hindsight, and that includes more of how those actors themselves diagnosed and reacted to the mistakes they recognised in themselves and others. That does not negate or deny progress, but it makes it more complicated to trace and to contextualise.

That does not mean we have to or even can sign up to others' beliefs ourselves. But conversely we should allow that revisability goes all the way down, including challenging both our own provisional assumptions and

the conclusions they seem to suggest, indeed especially those we identify as ours, as well as those that we ascribe to others. The perspective of the jaguar who quaffs beer and socialises with other jaguars is not one we can identify with. But we can certainly learn from pondering the consequences of the belief that the Achuar or the Araweté or the Wari' entertain that that is how jaguars live their lives.

Our own thinking about animals, plants, the environment, evolution can thus draw on resources that stretch all the way from the work of cognitive scientists, ethologists, psychologists, biologists, geologists, cosmologists, to the insights that have come from the members of societies who lay no claim to belong to the mainstream of science as defined in the West, but that are important insights nevertheless that we would be wildly irresponsible to ignore. The truly ecumenical comparative history of science expands its remit far beyond its traditional frontiers, certainly to include the knowledge of both ancient peoples and indigenous contemporary ones. Meanwhile we need to recognise that the boundaries that currently exist between our modern academic disciplines can be a serious obstacle to a more comprehensive understanding of the problems. This is perhaps especially true of those between social anthropology and cognitive science, at least when the former takes its task to be the uncovering of divergence while the latter tends to discount human diversities and sets its sights on universals.

The principle that has driven my investigation is the need to examine critically whatever understandings are attempted, on the basis of whatever assumptions, with whatever successes and failures. We cannot and should not expect the efforts of those whom we study to be value-free: nor are our own. But embracing that fact, we can turn that to our advantage to expand our appreciation of the values and understandings that we find worthwhile. It is in that spirit that I have undertaken these inquiries and made these suggestions concerning how a more ecumenical construal of the comparative history of science may be able to offer insights that might otherwise be missed.

They include not just particular knowledge of this or that item in the physical world, but also the potential for plural understandings that we have insisted upon. Of course we do not need to travel to Amazonia to appreciate the merits of considering problems from several points of view (as we say). But the differences that anthropological perspectivism challenges us to explore (Chapter 2) offer dramatic examples of how far-reaching they may be, for there we are not talking of different opinions about a single stable reality, but of different, that is multidimensional,

realities. Once again a balance has to be struck. Even while we recognise that the quest for total objectivity is an unattainable ideal, we should evidently not totally abandon the principle that drove that quest, the need to guard against the purely arbitrary elements that may warp subjective judgement. On the other hand, the search for some 'view from nowhere' is bound to prove just as mistaken. There can be no such Archimedean point. But conscious that we are always speaking from some location, we can learn to uncover its specificity by comparing and investigating other voices from other times and places.

So how should we sum up the expansion of the horizons of the history of science that this book has set as its aim? The first key move is to allow for comparability across different traditions. The ways in which investigations of the physical world proceeded differed and continue to differ at different times and places, as too did ideas about what 'the physical world' comprised, and that includes not just notions of 'stuff' but also of the very cognitive faculties that we as humans use to make sense of our experience. Yet the commonalities we can detect in the aims and use of certain methods and procedures still allow us to recognise a family resemblance between them. The rubric 'history of science' is still legitimate even when the histories and the sciences diverge.

One recommendation that deserves underlining is the need to enlarge the scope of the 'science' whose history we are studying beyond what is pursued in university departments of 'natural science' to include other endeavours where observation, classification, measurement, prediction, verification are brought to bear to describe, explain and control aspects of the physical world including the very means we possess to understand it. As we have acknowledged, we immediately encounter our own problems of translating and understanding, where we find that our initial concepts and assumptions often require revision to be fit for purpose, most notably perhaps on the key issue of the viability of the notion of 'nature' itself. We are faced indeed with a multiplicity of ideas and practices both on the question of what there is to be understood and on how that is to be achieved. But in assessing those – as indeed assessment is inevitable – we are not limited to the values and preconceptions we start out with and that continue to dominate Western modernity. Ecumenical comparative history of science provides, on the interpretation here proposed, the best way to challenge those assumptions and to move towards a more even-handed appreciation of human endeavours to understand and make sense of lived experience.