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The Natural & the Human

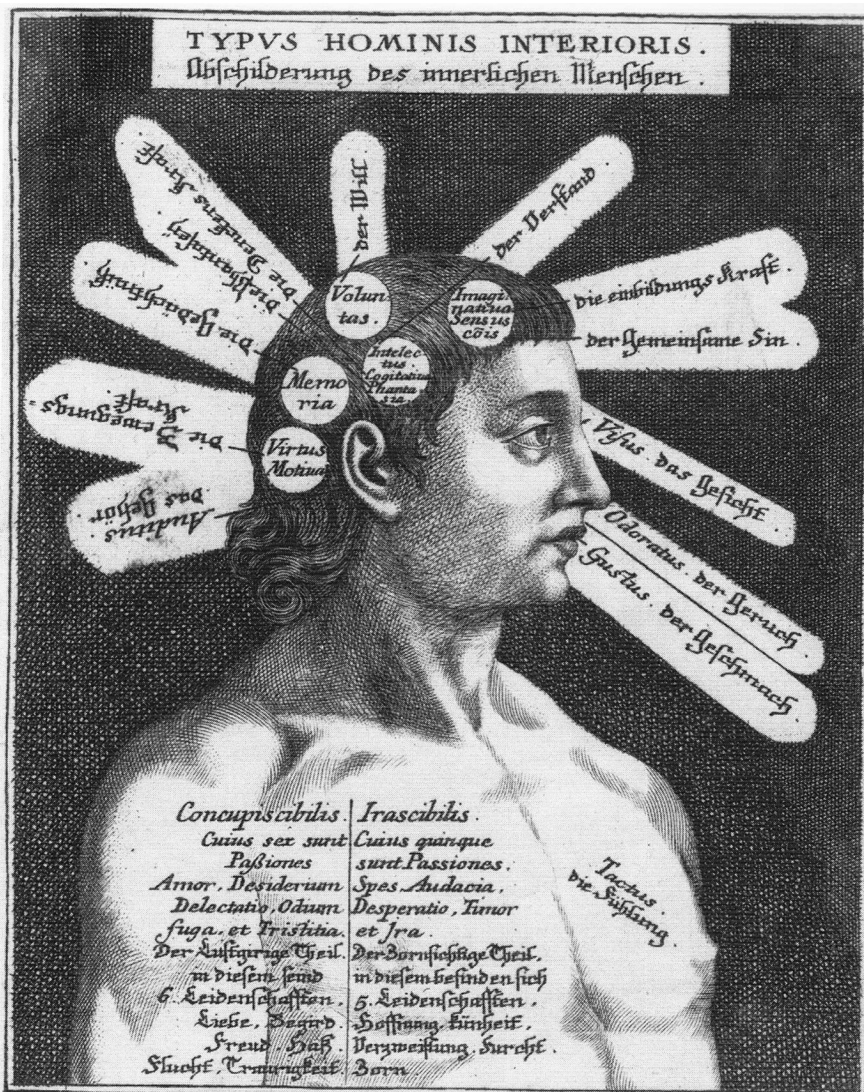
Science and the Shaping of Modernity

1739–1841



Stephen Gaukroger

THE NATURAL AND THE HUMAN



'The Inner Man', *Ichnographia Emblematica Triplicis Vitae* (Augsburg, 1779).

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*Science and the Shaping of
Modernity, 1739–1841*

STEPHEN GAUKROGER

OXFORD
UNIVERSITY PRESS

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Great Clarendon Street, Oxford, OX2 6DP,
United Kingdom

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First Edition published in 2016

Impression: 1

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Published in the United States of America by Oxford University Press
198 Madison Avenue, New York, NY 10016, United States of America

British Library Cataloguing in Publication Data

Data available

Library of Congress Control Number: 2015943256

ISBN 978-0-19-875763-4

Printed in Great Britain by
Clays Ltd, St Ives plc

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Preface

Over the last two decades, I have been preoccupied with the question of how the values of a scientific culture came to predominate in the West, something that was part of a transformation of Western culture that began in the thirteenth century. In two earlier volumes—*The Emergence of a Scientific Culture: Science and the Shaping of Modernity, 1210–1685* and *The Collapse of Mechanism and the Rise of Sensibility: Science and the Shaping of Modernity 1680–1760*—I set out to uncover the complex and unprecedented processes by which scientific values were established, vindicated, and reinforced from then up to the middle of the eighteenth century. In continuing this project into the late eighteenth and early nineteenth centuries, my attention has turned to the human sciences, and I have been taken back to the political and intellectual interests of my student days in the 1970s, interests that I was fortunate enough to share, in conversation and in regular reading groups, with Beverley Brown, Terry Counihan, Herman Feddema, Lynn Ferguson, John Forrester, Mike Gane, Barry Hindess, Paul Hirst, Colin McCabe, Jill McGreal, Jeff Minson, Mike O’Pray, Cesia Prytys, Grahame Thompson, Keith Tribe, Ken Umpleby, and Karel Williams. Although I haven’t exactly returned to these interests here—the nature of politics has changed so radically since then as to make that inconceivable—they have helped over the years to shape my sense of what the point and value of intellectual enquiry is.

The *termini* of the book are Hume’s *Treatise of Human Nature* (1739), and Feuerbach’s *Das Wesen des Christentums* (1841). I have allowed myself some flexibility with the timespan, but these two works mark crucial developments, the former firing the opening shots in the naturalization of the human, the latter bringing the project to a climax with the extension of the naturalization of the human to the naturalization of Christianity.

A long-term endeavour such as that of which this volume is part incurs many intellectual debts. In working on the present volume, I would particularly like to thank: Frédérique Ait-Touati, Francesco Borghesi, Stefanie Buchenau, Alan Chalmers, Conal Condren, Peter Cryle, Ofer Gal, Peter Harrison, Daniela Helbig, Ian Hunter, Mogens Laerke, Jennifer Milam, Dominic Murphy, Dalia Nassar, Joanna Picciotto, Annette Pierdziwol, Paul Redding, Jessica Riskin, Eric Schliesser, John Schuster, Katharina Schwarz, Anik Waldow, Catherine Wilson, Charles Wolfe, and John Zammito. As ever, my deepest thanks go to my wife, Helen Irving, and our children, Cressida and Hugh.

Material from the book has been presented at talks at the University of Aberdeen, Institute of Advanced Study University of Durham, École Normale Supérieure Lyon, École Normale Supérieure Paris, the Free University Berlin, University of Ghent, University of Graz, University of Helsinki, Humboldt

University Berlin, University of Lisbon, New York University, University of Oxford, University of Palermo, Princeton University, University of Queensland, the Rotman Institute at the University of Western Ontario, Shanghai Jiao Tong University, University of Sydney, and the University of Western Sydney.

Work on the project has been pursued primarily at the University of Sydney where, from the mid-1990s, I have received very generous support from the Australian Research Council, including two five-year Professorial Research Fellowships, without which it would probably not have been feasible to undertake something on this scale.

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Introduction

This is a book about the emergence of the human sciences between the mid-eighteenth and the mid-nineteenth centuries, but within a broad agenda. The development of science in the West has, until recently, been quite unlike that in those other societies in which there were successful scientific traditions.¹ Science in these latter cases effectively came to an end once a set of original aims had been achieved. In the West, by contrast, it underwent a unique form of cumulative development in the early-modern era, one in which it was consolidated through the integration into and shaping of a culture. But in the eighteenth century, science was cut loose from the legitimating culture in which it had found a public rationale as a fruitful and worthwhile form of enquiry. What kept it afloat between the middle of the eighteenth and the middle of the nineteenth centuries, when it began to form an intimate link with technology? Why didn't it follow the boom–bust pattern characteristic of those other cultures in which there were successful scientific traditions that simply came to an end when basic problems had been resolved? I have set out to show that the answer lies largely in an abrupt but fundamental shift in how the tasks of scientific enquiry were conceived, from the natural realm to the human realm.

Hume provides us with an appropriate starting point. The subtitle of his *Treatise of Human Nature* (1739), which describes the work as 'An Attempt to Introduce the Experimental Method of Reasoning into Moral Subjects', heralds the emergence of a novel programme of accounting for human understanding and behaviour, one based on what were seen as scientific principles.² A distinctive

¹ In the two earlier volumes in this series—*The Emergence of a Scientific Culture: Science and the Shaping of Modernity, 1210–1685* (Oxford, 2006), and *The Collapse of Mechanism and the Rise of Sensibility: Science and the Shaping of Modernity 1680–1760* (Oxford, 2010)—I used the term 'natural philosophy' rather than 'science'. But 'science' was gradually replacing 'natural philosophy' in the second half of the eighteenth century, and I shall talk about 'science' and 'scientific' here when discussing eighteenth-century developments, although without the connotations of an exclusively professionalized form of activity, associated with the term 'scientist', introduced in the 1830s (but not generally accepted until the end of the century). In every European language other than English, 'science' covers the natural sciences, social sciences, and the humanities. Pre-nineteenth-century uses of the word in English are closer to the broader sense common to other modern European languages, and indeed remained so in the definitions given in dictionaries, such as Johnson's dictionary, as late as the 1870s.

² The idea of modelling moral reasoning on natural philosophy was not without precedent: notably Francis Hutcheson, *An Essay on the Nature and Conduct of the Passions and Affections, with*

feature of this programme was its normative edge, for, from the middle decades of the eighteenth century onwards, large-scale projects were initiated to establish a connection between science and civilization: science became an essential part of the civilizing process. As Condorcet put it in a reception speech to the Académie Française in 1782: 'Experience also proves that in all countries where the physical sciences have been cultivated, barbarism in the moral sciences has been more or less dissipated and at least error and prejudice have disappeared.'³ This was certainly not a new thought, and by no means one confined to *philosophes*. In a speech given in September 1759 for example, Linnaeus, who was no *philosophe*, remarks that 'only the Sciences distinguish Wild people, Barbarians and Hottentots, from us', and 'the sciences are thus the light that will lead people who wander in the darkness'.⁴ These attempts to bind science and civilization shaped the broad understanding of both science and civilization, and the connection between the two, from that time onwards. In this book, we shall be concerned with how and why this came about by focusing on an unprecedented form of understanding the human condition, the naturalization of the human, and its correlate, the humanization of nature.

In broad terms, what we encounter from the middle of the eighteenth century is a new type of consolidation of European scientific culture, by which I understand a culture in which cognitive values generally become subordinated to scientific ones, and where, correspondingly, science is expected to provide an archetypal path to cognitive success not just for scientific disciplines but for any discipline with cognitive aspirations, such as theology, metaphysics, political theory, political economy, law, and history. Nothing like this had occurred in any other culture that we can identify as having successful long-term scientific programmes: classical Greece and the Hellenistic Greek diaspora; Arab-Islamic North Africa/Near East/Iberian peninsula in the ninth, tenth, and eleventh centuries; thirteenth- and fourteenth-century Paris and Oxford; or China from the twelfth to the fourteenth centuries. In none of these cases did science become integrated into a culture so that the values of that culture became identified with those of science. And in none of the cases did science escape a pattern of peaking and then decline, and undergo the kind of uninterrupted and cumulative growth that we witness in the West from the early-modern period onwards. Before the

Illustrations on the Moral Sense (London, 1728), and George Turnbull, *The Principles of Moral Philosophy: An Enquiry into the Wise and Good Government of the Moral World* (London, 1740). The difference is that Hutcheson and Turnbull use natural-philosophical reasoning to bolster pre-established accounts of human nature, and particularly morality, as evidenced in their providentialism, whereas Hume used it much more as a genuine exploratory device.

³ Bibliothèque de l'Institut de France, MS 855, f. 7: quoted in Keith Michael Baker, *Condorcet: From Natural Philosophy to Social Mathematics* (Chicago, 1975), 75. The idea of a moral regeneration that naturally accompanies cultivation of the sciences was a theme in a number of writers: it is particularly stressed, for example, in Charles Louis Dumas, *Principes de physiologie, ou introduction à la science expérimentale, philosophique et médicale de l'homme vivant* (3 vols, Paris, 1800–3).

⁴ Quoted in Lisbet Koerner, *Linnaeus: Nature and Nation* (Harvard, MA, 1999), 94.

middle decades of the nineteenth century, when scientific and technological developments finally began to converge in an intensive way, it was this cultural consolidation of the scientific enterprise, rather than any particular scientific discoveries, that established the character of science in the West. It did more than simply allow a consolidation of science, however: it shaped its goals and aspirations, it shaped views of just what science could and could not achieve, and it largely determined what place science found for itself among other disciplines.

The emergence of a scientific culture is a modern phenomenon, but a number of pre-modern developments provided the conditions that made it possible, and enabled it to flourish. I explored these developments in the first volume in this series, *The Emergence of a Scientific Culture*. They date back as far as the thirteenth century, when theologians attempted to discover a more satisfactory philosophical basis for Christian theology. The solution to the theological problems was to replace what was effectively the Platonist theology of the Church Fathers with Aristotelianism. In stark contrast to Platonism, Aristotle had insisted that all knowledge derives from sense perception, so that, within Aristotelianism, natural philosophy—which comprised the study of the sensible world—was effectively the starting point for enquiry generally. Aristotelianism raised natural philosophy from the status of a marginal exercise wholly subordinate to theology and metaphysics, to that of the entry point for a philosophical understanding of the world. In theory, natural philosophy and Christian theology had an equal standing, and they dealt with different subject matters, but there were issues on which they nevertheless came into conflict—such as whether the universe had always existed, and the possibility of the personal immortality of the soul—and by the sixteenth century these had become problems that bore on the legitimacy and autonomy of both Christian theology and natural philosophy. The difficulties were compounded when Aristotelian natural philosophy came to be undermined in areas such as the theory of the heavens (astronomy), the theory of vision (optics), and—with the rise of atomism of various kinds—matter theory. By this time, the systematic structure of natural philosophy had been reinforced, partly because late sixteenth-century scholastic commentators had matched it up very closely with a systematic theology, and partly because, although the new natural-philosophical theories that were successfully coming to replace Aristotelianism were often piecemeal, there was an inevitable assumption that the best way to deal with Aristotelianism was to offer something that mirrored the breadth and generality of its claims.

As a result, a number of the new natural-philosophical programmes that emerged in the early and middle decades of the seventeenth century can be described as doctrinal. That is to say, they aspired to be both comprehensive and exhaustive; they envisaged a single source of truth, and tended to build on a set of general principles; they offered an exclusive ‘world view’; and what they aimed at above all was the establishment of a single and permanent body of truth, securing this in part by a regimenting of, and reconciling of, particular truths,

where appropriate by grounding them in the basic principles. Certainly not all work in natural philosophy was of this kind, but by the middle decades of the seventeenth century, Descartes' version of mechanism, particularly as set out in his *Principia philosophiae*, provided the general framework for natural-philosophical thinking. In broad terms, mechanism—not to be confused with mechanics—can be characterized in terms of its two main claims. First, macroscopic physical events are reducible to the interactions between micro-corpuscles making up bodies: there is nothing in the natural realm that cannot be accounted for in micro-corpuscularian terms, and this is the ultimate form of all natural explanations.⁵ Second, all interactions between these micro-corpuscles are deemed to be a result of exchange of motion resulting from physical contact, and are as a consequence characterizable wholly in terms of mechanics. At the same time that mechanism was providing a framework for natural-philosophical thinking generally, natural philosophy itself was entering into a symbiotic relationship with natural theology, particularly in Protestant England, where there was a concerted attempt to make natural theology commensurate with natural philosophy, so that the already doctrinal nature of Christianity was reinforced, as it became increasingly assimilated to a system of beliefs—beliefs which could, where necessary, be adjudicated by the same means as those in natural philosophy. Natural theology thereby took on some of the aspects of natural philosophy. It became more open-ended, and began to be construed very much as a form of enquiry, for example in the work of Boyle. At the same time, natural philosophy, in the form of mechanism, took on an unprecedented cultural role, for its association with natural theology meant that it was now a partner in a project that went far beyond simply understanding the natural world. The kind of understanding of our place in the world to which theology had traditionally laid claim was now no longer its exclusive preserve: natural theology sharing in the benefits of natural philosophy meant natural philosophy sharing in the benefits of natural theology.

But the mechanist model of explanation that provided the basis for understanding just what natural philosophy or science was had effectively collapsed by the early decades of the eighteenth century, a question to which the second volume in this series, *The Collapse of Mechanism and the Rise of Sensibility*, was devoted. One set of problems, in particular, went to the core of mechanism's claims to explanatory power. In the 1660s, questions arose about the price to be paid for the grand unified project that mechanism represented in natural philosophy. The possibility began to

⁵ Micro-corpuscularianism is a broader notion than atomism, for atoms were conceived as discrete pieces of matter separated by empty space, whereas micro-corpuscularism embraces both atoms in empty space and discrete pieces of matter in a material fluid medium, which may be distinguished from this surrounding fluid medium purely in terms of motions relative to one another (as in Descartes' account). These differences mattered in the seventeenth-century developments discussed in *The Emergence of a Scientific Culture*, but by the middle of the eighteenth century they are less important.

be raised that, as well as explanation in terms of micro-structure, there was also a legitimate form of explanation of phenomena in terms of how they were related to other phenomena. Indeed, the latter—non-reductionist and non-universalist—forms of explanation took on an increased significance as, from the 1680s onwards, it became increasingly difficult to see how the mechanist project might be realized, with mechanical explanation degenerating into promissory notes when it came to recalcitrant phenomena such as gravitation, electricity, magnetism, and chemical reactions.

Since it was mechanism that provided the model of general understanding both for those who wanted to effect a synthesis of natural philosophy and Christian theology, as well as for those who thought that mechanism could progressively usurp at least many of the claims of Christianity, its demise was momentous. Mechanism was the only comprehensive modern system of natural philosophy, and as a result its collapse had significant consequences for how one established a connection between an account of the natural world and an account of our place in it. While there had been some advocates of mechanism who tried to draw what they took to be the consequences of a mechanist model for religious, moral, and political questions, notably Hobbes and Spinoza, such an approach was marginal. The main thrust of mechanist thinking was to establish a mutually reinforcing relationship between natural philosophy and Christian theology, and Descartes and Boyle both proceeded in this way for example, despite profound differences in how they carried out the project. They took an understanding of our relation to the natural world from Christianity and mapped it on to the account of the world provided by mechanism, with a view to establishing an integrated picture of the world and our place in it (as it was conceived in Christian thinking) or, to put it in more modern terms, our relationship to it.⁶

This is precisely what was no longer possible. If, as Locke and his followers insisted, the unificatory project to which mechanism subscribed was based on a fundamental misunderstanding of the nature of physical enquiry, then our account of the world would come not in the form of a general theory, as Aristotelianism and Cartesianism had done, but rather in the form of relatively self-contained areas of inquiry—such as chemistry, electricity, measurement of the shape of the earth, and developmental biology—which had no intrinsic or obvious connections with one another. These provided successful and novel accounts of various physical phenomena, but they did not offer anything like the kind of general account that could be supplemented to provide an understanding of the world and our relation to it. In short, with the demise of

⁶ I use the word ‘picture’ advisedly, for picturability was crucial to understanding in seventeenth-century natural philosophy. See Frédérique Ait-Touati and Stephen Gaukroger, *Le monde en images: Voir, représenter, savoir, de Descartes à Leibniz* (Paris, 2015); and Dennis Sepper, *Understanding Imagination: The Reason of Images* (Dordrecht, 2013). Cf. Sachiko Kusukawa, *Picturing the Book of Nature: Image, Text, and Argument in Sixteenth-Century Human Anatomy and Medical Botany* (Chicago, 2012).

mechanism, scientific developments could no longer necessarily be seen as part of a coordinated enterprise. They were relatively piecemeal, for there was no general picture into which they fit, of the kind that had been provided by mechanism. Correspondingly, they lost the kind of purchase on legitimacy and relevance that the seventeenth-century natural philosophers were able to establish for them. There were, it is true, those who did try to generate an understanding of the human condition, as it were, from an account of physical science, more specifically from an account of the nature of matter. The French materialists, notably La Mettrie, offered something along these lines, but quite apart from the question of the intrinsic implausibility of their proposals, the project was really an outdated throwback to the Hobbesian and Spinozian ones of the seventeenth century. For those who took seriously the collapse of the seventeenth-century conception of natural philosophy, epitomized in mechanism, no revision of this conception was going to suffice.

The demise of mechanism forces us to confront a question that dominated *The Emergence of a Scientific Culture* and *The Collapse of Mechanism and the Rise of Sensibility*, and will continue to preoccupy us here: how was the scientific enterprise validated, such that it was able to occupy a central place in Western culture and gradually shape all cognitive values around its own? The decisive factor in the West was not the level of scientific innovation, because the other examples of long-term scientific activity that I have mentioned were successful in this respect. Rather, it was the consolidation of the scientific enterprise at a general level, one that placed a value not so much on particular scientific theories or results as on science as such. In the early-modern era, the picture of how this came about, at least up to the early decades of the eighteenth century, is reasonably clear. The connection, initially made by theologians, of narrowly conceived natural-philosophical values with broadly conceived theological ones, meant that scientific values generally took on a unique prominence, which early-modern natural philosophers built on and transformed. More specifically, the general vindication of scientific enquiry resulted in large part from a number of complex symbiotic exchanges between natural philosophy and Christian doctrine, from which both emerged transformed. Natural philosophy was transformed into something that contributed to a task which had previously been the sole responsibility of Christian doctrine, namely understanding our place in nature. For this, it was crucial that natural philosophy have some overall coherence; that it be a unified enterprise, somewhat as Christian theology was.

Here we come face to face with the core problem. By the middle of the eighteenth century, if scientific practice was to have any connection with broader issues, the path to securing this could no longer be to proceed in the way that mechanism had up to the early decades of the eighteenth century. Something very different would be needed. And if it were not provided, there was a strong chance that Western science would increasingly turn out to look like the earlier cultures

with strong scientific programmes which underwent a few decades of success before interest in science gradually began to decline, as the original aims of specific programmes came to be realized. Remember also that we are not dealing here with something that had any significant practical impact before the middle decades of the nineteenth century, so legitimacy and relevance could not be established in general, practical terms. Indeed, we can locate the problem period more precisely as being that between the collapse of mechanism in the early decades of the eighteenth century and the emergence of a new intimate relationship between science and technology in the mid-nineteenth century. Before this period, what secured the legitimacy of science was its integration with a Christian world view, as a result taking on roles that had previously been the preserve of Christianity. This source of legitimacy was not wholly abandoned between the mid-eighteenth and the mid-nineteenth centuries, and indeed in areas such as natural history attempts were made to foster it from time to time,⁷ but there was no well-defined 'science' in general which could continue to contribute to, and benefit from, this relationship. By contrast, after this period, the legitimacy of science, now becoming more integrated as a coherent whole, turned in large part on its usefulness, at least until the horrors of technologically driven warfare prompted attempts to dissociate it from technology in the wake of the First World War, and to establish a new identity for itself.

I have set out in this book to explore what happened in the period between these two developments. Was there a hiatus, during which the West began to mirror other cultures? There is no evidence of such a hiatus. We certainly do not witness a decline in interest in science, for example. Quite the contrary, there are a number of new attempts to define what science is and what it means to be scientific, above all in the burgeoning new fields of the 'moral' or 'human' sciences. What I have set out to show is that the legitimacy of science was established anew in a new arena, and that this brought about a reversal of legitimacy priorities. In the first place, it was not the natural sciences—which had been regarded as the core of scientific activity not just for mechanists but for all natural philosophers up to the middle decades of the eighteenth century, especially the areas of mechanics and astronomy—but the newly emerging human or moral sciences that now came to the fore, providing the ground on which new scientific conceptions were forged, in the process displacing traditional religious, humanist, and other approaches. It is in the moral sciences—defined by Condorcet as 'all those sciences that have as the subject of their researches either

⁷ The *Bridgewater Treatises* (8 vols, London, 1834–7) are often taken as a significant late work in this genre, but it was no longer possible by this stage to provide the kind of overarching physico-theological structure for knowledge at which earlier physico-theological works had aimed. The volumes acted instead merely as vehicles for instruction in science in a way that did not threaten religious orthodoxy. See Tony Topham, 'Science and Popular Education in the 1830s: The Role of the *Bridgewater Treatises*', *British Journal for the History of Science* 25 (1992), 397–430.

the human mind in itself, or the relations of men one to another'⁸—that questions of legitimacy are pressed. Second, the move to the moral sciences changes the way in which the understanding of the natural realm and the understanding of our relation to this realm are connected. Seventeenth-century natural philosophy took the first—understanding of the natural realm—as its own domain, and the second—understanding of our relation to this realm—as something provided by Christianity (or less commonly civic humanism of various kinds), or in extreme cases (Hobbes, for example, at least as he was commonly conceived) took understanding our relation to the natural realm to be nothing over and above understanding the natural realm. But what happens with the emergence of the human sciences is that considerations of our relation to the natural realm now shape conceptions of the natural realm itself.

In short, a new scientific culture did emerge, but it was one quite different from anything that had come before. One of its principal sources was Lockean sensationalism, which was itself an attempt to make sense of the experimental natural philosophy tradition, and consequently was intimately tied in with the development that did more than anything else to undermine the explanatory ambitions of mechanism. Locke had stressed the importance of sensation as a source of knowledge, and his followers, particularly those in France, extended this into a more general notion of sensibility—something that drew together questions in epistemology, physiology, medicine, and aesthetics. What resulted was a rethinking of the sources of our knowledge of the world, which developed into a new understanding of our relation to the natural world. In particular, French Lockeans such as Diderot argued that no cognitive relation to the world was possible without sensibility. Without sensibility, our cognitive faculties would just furnish us with experiences: it is sensibility that provided access to the world as something independent of us. Yet this dimension of experience was something alien to the mechanist model of natural philosophy, with its very limited biomechanical conception of perceptual cognition. Consequently, any account of our relation to the natural world now needed something more than just natural philosophy, at least as conceived up to this point. What I have set out to show is that, by the second half of the eighteenth century, considerations of our relation to the natural world started to shape conceptions of what kind of account of the natural world we should be seeking. This is the exact reverse of the mechanist programme, which starts with an account of the world and then supplements it with an account of our place in and our relation to this world. Instead, what now happens is that considerations of our relationship to the world shape what we want out of science, thereby providing it with a new cultural standing.

The new scientific culture of the second half of the eighteenth century was effected primarily by means of a process of naturalization of the human, that is,

⁸ 'Éloge de M. Bucquet': *Œuvres de Condorcet*, ed. A. Condorcet-O'Connor and F. Arago (12 vols, Paris, 1847–9), ii, 410.

the formulation in empirical terms of questions about the human realm that had up to that point taken a non-empirical form.⁹ This changed conceptions of what science was and what it should be doing. Above all, to the extent to which it immersed the human in the natural world, it also played a role in the humanization of the world, within which one needs to include both the natural and the supernatural realms.¹⁰ It not only made their investigation subject to human interests, but helped to transform nature from a cold inert realm into an active living one in which the human being found a natural place. By the last decades of the eighteenth century, the naturalization of the human and the humanization of nature existed in a complex interplay which had significant consequences for scientific, religious, and philosophical questions: as Kant put it in his lectures on anthropology, 'nature exists for the sake of the human, the human being is the purpose of nature'.¹¹ In short, the naturalization of the human, with its complementary humanization of nature, was a broad and consequential development, and it forms the core of our investigation into why a scientific culture in the West not only didn't collapse in the second half of the eighteenth century, but was renewed in a novel way.

In order to appreciate just what was involved in the naturalization of the human, significant orientation is necessary, and this is what I set out to provide in Part I. In Chapter 1, I begin by exploring a number of (often overlapping) issues that shaped the debates about the nature of the human between the middle of the eighteenth century and the beginning of the nineteenth. At the core of these is a complex and often acrimonious debate over whether the key to understanding human behaviour consists in the understanding of rationality. Philosophical, religious, and scientific questions were explicitly caught up in these debates. None of the issues was straightforward, and among the proponents of reason, for example, there was a sharp divide between those who considered that the rationality of individual behaviour was the proper object of study, and those who focused on the rationality of collective behaviour. By contrast, among those who rejected the idea that reason was sufficient, it was typically assumed that sensibility underlay our cognitive states as well as our affective ones, and indeed that the two

⁹ This characterization of naturalism is different from most of those offered in contemporary philosophy, which tie naturalism to continuity with the physical sciences (or, in areas such as ethics, to evolutionary biology). See for example the helpful account in Jack Ritchie, *Understanding Naturalism* (Stocksfield, 2008). I hope it will be clear in what follows why this is inadequate for my purposes, but also why my definition captures something crucial to naturalism as commonly conceived.

¹⁰ The separation between natural and supernatural is not a perennial one: two separate realms were distinguished only in the thirteenth century. Prior to that, while Christian theology remained Platonist, they were conceived in terms of continuous gradations. The strict separation, which comes with Aquinas, radically changed conceptions of 'our place in nature'.

¹¹ Immanuel Kant, *Gesammelte Schriften* (29 vols, Berlin, 1900 onwards), xxv. 470; *Lectures on Anthropology* (Cambridge, 2012), 48. (Note that I cite English translations where available, but do not always follow them to the letter: I have occasionally offered my own readings of particular sentences or phrases, without comment, where necessary for clarity or precision.)

were inseparable. This development put the autonomy of reason itself into question. But the problem had a number of dimensions, for reason and sensibility were aligned with two other issues: that of systematic versus non-systematic understanding, where the questions turned on the legitimacy of non-systematic forms of understanding; and propositional understanding (knowing that something is the case) and non-propositional forms of understanding (coming to terms with the world in terms of aspirations, anxieties, raw beliefs, desires, etc.), where the questions turned on whether the two could be reconciled. Finally, I examine the replacement of the search for certainty, which had played such an important part in the establishment of mechanics as a model for scientific enquiry, with the elaboration of procedures for the minimization and avoidance of error: rigour and precision now became separated from certainty.

Chapter 2 looks at conceptions of the nature of matter, traditionally one of the key ingredients in natural understanding. From the middle decades of the eighteenth century onwards, the understanding of science and its tasks was significantly altered. Above all, it was no longer thought of as something self-contained, but rather as an ingredient in a project of accounting for our relation to the natural realm. The naturalization of the human and the humanization of nature of necessity worked with basic assumptions about nature, but traditional assumptions had been abandoned in the seventeenth century with the advent of mechanism, only for mechanistic ones to be themselves abandoned by the middle of the eighteenth century. Consequently, it is important that we understand the new conceptions of nature that underlay developments in the second half of the eighteenth century. What I want to establish above all is the existence of a radical change in the understanding of basic natural processes. In the middle of the eighteenth century, mechanism had relinquished any role in those disciplines at the cutting edge of developments in the physical and life sciences.¹² In the case of chemistry, a complex experimental-phenomenological approach yielded significant progress in the understanding of chemical processes, but it remained remote from other areas, such as electricity, until late in the century. At the end of the eighteenth century this changed, with the assimilation of electricity to vital forces, the discovery of the ability of electrical currents to effect chemical processes and vice versa, and the construal of basic properties of matter exclusively in terms of forces. These suggested a new factor unifying the physical and the life sciences: the existence of some basic force underlying all natural phenomena. In short, we explore the move from a reductionist account, along mechanist lines, to the attempts to establish autonomous disciplines, notably in chemistry and the life sciences, to attempts to provide a new unifying synthesis.

Part II is devoted to our core concern, the naturalization of the human. I identify a number of different naturalizing projects, considered under four

¹² I argued this in detail in Part IV of *The Collapse of Mechanism and the Rise of Sensibility*.

general headings: anthropological medicine, philosophical anthropology, the 'natural history of man', and social arithmetic. A separate chapter is devoted to each of these.

Anthropological medicine, the subject of Chapter 3, was a highly naturalistic endeavour, but it was diametrically opposed to what was the dominant form of naturalization of the organic between the mid-seventeenth century and the early decades of the eighteenth, namely biomechanics. Biomechanics comprised a reduction of vital phenomena to mechanical interactions between inert micro-corpuscles. Anthropological medicine, by contrast, was not reductive. It originated in the 1730s with the physicians of the University of Montpellier, for whom the subject matter of medicine included every aspect of human experience. These *médecins philosophes* aimed to offer a general account of the interconnections between the realms of the physical, the mental/intellectual, and the emotions. Anything external to the body that affected the three realms was observed and recorded, for it had an effect on the well-being of the person. The resolutely naturalistic approach of anthropological medicine to these domains became a dominant way of thinking about the human in France, and it included everything from attempts to temper the effects of excessive sensibility caused by the unnatural environment of modern urban life, to the provision of a psychological basis for political programmes in the thinking of the *idéologues*, where a sensationalist psychology became the route to moral, economic, and social theory. Because advocates of anthropological medicine saw health in terms of harmonious balance, apparently extraneous political and social factors were considered part of the overall balance and needed to be adjusted to secure human happiness. The route to naturalization in this project was, in the first instance, via the naturalization of nervous sensitivity, but there were different forms of naturalization—such as those offered by laboratory medicine—that cut across and were at odds with this, and which consequently had to be excluded. It was not a matter of naturalization *tout court*, but rather one of choosing between competing strategies of naturalization. Anthropological medicine was committed to very strong claims about the physiological basis of human behaviour and it found itself in an increasingly hostile climate in the post-Revolutionary period, contributing to the difficulties that the *médecins philosophes* faced in holding together a programme which had extolled the virtues of naturalization against metaphysical and theological speculation, while at the same time resisting forms of naturalization in physiological research and experimental medicine due to the increasing use of microscopy and chemistry.

Philosophical anthropology, the subject of Chapter 4, was largely an outcome of a reaction to metaphysics. Outside Germany, metaphysics had become marginalized from the beginning of the eighteenth century.¹³ Within Germany, by

¹³ The term 'Germany', in this period, covers the German-speaking parts of the Holy Roman Empire, although for all intents and purposes we shall be concerned exclusively with Prussia.

contrast, Wolff's version of Leibnizian metaphysics had some hold on university curricula, although by the middle of the century it was largely discredited, and Hume (in his essays and historical writings) and Rousseau began to provide models for the kind of enterprise that might replace metaphysics in the understanding of human behaviour. From the 1760s, Herder was advocating a novel philosophical anthropology which took its bearings from rearguard attempts by metaphysicians to come to terms with sense perception, and sensibility more generally. Sensibility had been thought by a number of philosophers since mid-century, when hostility to metaphysics was at its peak, to underlie our cognitive states, with the consequence that what, in metaphysical treatises for example, had been treated as epistemological questions were now given distinctive psychological and anthropological dimensions. Of particular importance in this context was the way in which a form of empirical psychology came to the fore as a means of explaining our cognitive and affective states. Herder uses this empirical psychology to replace abstract notions of reason. Treating reason in terms of thought, and thought in terms of empirical psychology, he accounts for the 'empirical' aspect of this psychology by exploring the way in which language reflects thought, so that the study of language now becomes an investigation of thought processes as they are mirrored in particular languages. Kant, by contrast, rejected all such attempts at naturalization, on the basis of an understanding of scientific enquiry that took rational mechanics as its model, arguing that philosophical anthropology could not aspire to the standing of 'knowledge'.

Anthropological medicine and philosophical anthropology both offer programmes for cultivation of the faculties, and shaping of the personality. By contrast, the second two forms of naturalization, which I look at in Chapters 5 and 6, are more descriptive than prescriptive, a feature that played a significant role in their subsequent domination of nineteenth-century thinking about human behaviour. Above all, they put in place profoundly challenging reassessments of the nature and sources of human behaviour.

The 'natural history of man', the subject of Chapter 5, was in many respects the forerunner of what came to be known as physical anthropology. Although philosophical anthropology and the natural history of man were not clearly distinguished in the eighteenth and early nineteenth centuries, they proceeded in entirely different ways from one another. I take the natural history of man to comprise comparative anatomy (what will in the course of the nineteenth century form the basis for evolutionary theories); what in the eighteenth century was termed 'physical geography' (in more modern terms a mix of human geography and physical geography), which attempts to identify the environmental factors that shape human behaviour; human variation, such as racial variation, and its significance; and the external marks of character, notably physiognomy, craniology, and phrenology. Crucial to this comparative exercise are the questions of whether there is any continuity between apes and humans, what the standing of seemingly half animal/half human feral children is, whether there is a continuity

between human races or whether they have separate origins, whether physical differences between men and women extend beyond their reproductive organs, and more generally whether significant differences are due to environmental or intrinsic factors. 'Environmental' factors are increasingly explored in the course of the eighteenth century in terms of comparative geography, which considers regional variations and their causes, and comparative history, which works primarily in terms of stages of historical development, from a primitive to modern civilization. Both of these played an important role in anthropological understanding, especially the second, which provided richer resources. But whereas physical geography offered a set of possible determinants of behaviour which one could either accept or reject, the programmes behind the identification of historical stages varied radically, some identifying socio-economic factors as driving the historical sequences, others cultural and aesthetic factors, yet others religious ones, and so on. In consequence, claims about the influence of such factors depended on larger, intractable issues.

Chapter 6 deals with a fourth form of naturalization, social arithmetic, which treats questions of human behaviour not in individual terms or in terms of universal attributes—as Christian teaching and the metaphysical and humanist traditions had done for example—but in terms of collective or aggregate properties. These are distinctive features of collective activity that are not mirrored at the individual level, and cannot be arrived at by abstraction from individual behaviour. I trace the investigation of collective properties back to the beginning of the eighteenth century, to Mandeville's notorious tract *The Fable of the Bees*, which provoked many of the questions concerning the relationship between individual behaviour and collective outcomes that were subsequently to dominate social and political thought. Above all, Mandeville stressed the existence of a discrepancy between the reliance of economic and political well-being on the collective consequences of self-interest, and the moral condemnation of self-interest at an individual level. The use of social arithmetic as a means of naturalization of the human required a redefinition of morality, provoking one of the most profound transformations of human self-understanding of the modern era. In particular, Bentham offered a system of morality in which individual behaviour is modelled on quantitative procedures for assessing the morality of collective outcomes. At the same time, attempts to account for a range of aspects of everyday life—from health and population to law and politics—are subjected to measurement as a means of accounting for various kinds of human behaviour. The development that most sums up the magnitude of the shift is the way in which the rational man comes to be replaced, as an object of study in the nineteenth century, by Quetelet's idea of the average man.

Finally, in Chapter 7, we turn to the naturalization of non-propositional forms of understanding: coming to terms with the world by means of such things as aspirations, desires, fears, raw beliefs, anxieties, responsibilities, and goals. Some coherence can be introduced into these otherwise disparate ways of engaging with

the world by treating them under the rubric of myth. This category includes both religious and aesthetic forms of understanding our relation to the world, and one large-scale theme that will occupy us is the move from a religious to an aesthetic-humanist understanding. There are four developments that we shall be concerned with. The first was an influential argument, in Kant and the Kantians, about the limits of a philosophical account of theological questions, which leaves open the need for empirical—primarily historical—exploration. The second development was the independent emergence of a form of historical enquiry, one that made no concessions to ‘sacred history’, into the development of Christianity, especially into the circumstances under which its doctrines were formulated, substituting secular history, its critics complained, for faith in the sacred. At the same time there emerged a critical assessment of the role of Jesus, transforming him into a moral teacher. Third, there was a comparative account of the evolution of religions, ranking them from primitive to the most developed. The basic assumption behind such accounts was that at the apex of this development came Christianity. This led to the fourth development: the questioning of whether Christianity did in fact represent the final stage in spirituality. Feuerbach, for example, argued that the evolution did not in fact cease with Christianity but went one step further, culminating in a form of humanism. These developments highlight the way in which the naturalization of the human and the humanization of nature come to be part of the same programme by the nineteenth century, as Feuerbach’s naturalization of the spiritual takes the form of a humanization of the spiritual. This became in many respects a defining feature of modern thought in the West. But these developments did not mean that the understanding of the spiritual effectively became reduced to knowledge of the world. In the final section of the chapter, we see how this understanding could remain in the mythical realm, but needed to be given some new coherence, perhaps in the form of a reworking of Christianity, or alternatively in terms of an aesthetic-humanist conception of our aims and aspirations.

PART I

I

The Dichotomies of Understanding

On 26 July 1772, Mlle Julie de Lespinasse, *salonnière* of one of the greatest Parisian *salons* from the mid-1760s to her death in 1776, wrote a letter of advice to Condorcet, whose career she and d'Alembert were nurturing, on how he might reinforce his credentials as a candidate for the position of next permanent secretary of the Académie des Sciences. Condorcet was well-respected in scientific and mathematical circles, and this was now, at d'Alembert's urging, a necessary credential. He lacked one crucial qualification, however. Previous secretaries had been known for their literary skills. Fontenelle, the most powerful and prestigious of them, whose forty-four-year tenure of the secretariat had raised the position to one of exceptional prestige, made his name initially in literature rather than natural philosophy. His contributions ranged from poetry, journalism, histories of mythology, and an opera libretto, to what can be considered the first piece of 'popular science', the highly successful *Entretiens sur la pluralité des mondes* of 1686. Working in a *salon* culture as much as in the Académies, it was Fontenelle who introduced the work of the Académie des Sciences, and natural philosophy more generally, to a broad reading public, by incorporating it into the Republic of Letters. Such skills were considered crucial to the secretary, and in particular, it was his duty to compose the *éloges* of academicians, which treated them in terms previously reserved for monarchs and generals. In her letter, Mlle de Lespinasse asks Condorcet whether he knows that his 'fellow academicians' are asking whether he 'has enough talent' to replace Jean-Paul Grandjean de Fouchy, whose ineffectual tenure of the position had seen the Académie fall behind in a number of respects. The talent she particularly has in mind is a literary one. She advises him to 'write a few pieces to be published before St. Martin's Day. I hear that you have something on printing. You would do well to look over it and publish it.'¹

The topic of Condorcet's essay on printing was the effect of the birth of printing on the development of the sciences, but it was quickly refocused as a history of the Académie des Sciences. The history was to begin with an account of the sciences before the advent of printing, then proceed to their development before the foundation of the Académie, concluding with an account of their

¹ Julie de Lespinasse, *Lettres inédites de Mlle de Lespinasse*, ed. Charles Henry (Paris, 1887), 79–80.

progress from the founding of the Académie up to the present, with biographies of members of the Académie. It was this project, in itself hardly novel or adventurous, that was to grow, over a period of twenty-one years, into the most important statement of the idea that the history of civilization was the history of the progress of science. The association between science and civilization set out in the *Esquisse d'un tableau historique des progrès de l'esprit humain*, which was published posthumously in 1795, was to prove a pervasive and resilient idea.² Although the work certainly had precedents, most notably d'Alembert's genealogy of reason in the preliminary Discours of the *Encyclopédie*,³ and Turgot's December 1750 lecture to the Sorbonne, 'Sur les progrès successifs de l'esprit humain',⁴ it was Condorcet's defence of the inevitability of progress that would quickly become the default notion of civilization in the early decades of the nineteenth century, and it has remained so for many thinkers since that time, at least up to the second half of the twentieth century, displacing religion, the humanities, politics, and the arts in any claims they might have made to this role. The key argument is that progress in the physical sciences brings with it progress in the moral sciences and in practical applications: mastery of one's physical environment through the physical sciences leads to mastery of one's social and political environment by means of the moral sciences. The association of science and civilization consolidates a social role and standing for science that establishes it at the core of modern culture.

It has traditionally been assumed that the centrepiece of this association, which is distinctive of the Enlightenment, is the primacy of reason. In fact, the situation is more complex. What comes to the fore in the course of the eighteenth century is what I have termed naturalization: a concerted attempt to argue that questions that had been treated as conceptual or a priori were in fact more fruitfully pursued in empirical terms. As we shall see, this empirical investigation took a range of forms—medical, historical, physiological, anatomical, environmental, economic, and so on—and there was some disagreement on what the appropriate form was in many cases. The point is that what was at issue here was not reason versus religion, a common trope in studies of the Enlightenment, but reason versus empirical enquiry, in the form of a concern over what resources should be deployed in treating particular questions, and what we are going to be particularly concerned with are questions about the sources and nature of human behaviour. Metaphysics, theology, and to some extent civic humanism, had construed such

² As Baker notes, Condorcet 'was a central figure in that widespread attempt to apply scientific thinking to all aspects of social affairs that was so marked a feature of late eighteenth and early nineteenth centuries, particularly in France. Saint Simon and Comte claimed him as the principal precursor of their positive sociology; Quetelet fulfilled his program for a social mathematics; Laplace, Poisson, and Cournot took seriously his dream of a rational science of decision-making.' (*Condorcet*, viii.)

³ See my discussion in *The Collapse of Mechanism and the Rise of Sensibility*, 427–37.

⁴ Anne Robert Jacques Turgot, *Oeuvres de Turgot*, ed. Eugène Daire (2 vols, Paris, 1844), ii. 597–611.

questions as falling exclusively under rational, as opposed to empirical, enquiry. This was now a point of contention. But the primacy of reason was also contested in a number of other ways. Some of these, such as the debates over reason versus sensibility, were connected directly with the question of empirical resources, for sensibility was easily naturalized in a way that reason could not be.⁵ In other cases, such as disputes over the relative standing of reason and religious faith, there is no direct connection, but there is a probing of the nature and limits of reason that bears on the general issue of the role and limits of reason in enquiry. The primacy of reason was fiercely contested on a number of grounds in the period between the middle of the eighteenth century and the early decades of the nineteenth, and it was in the context of an unprecedented questioning of the nature and limits of reason that a new and intimate connection between ‘science and civilization’ was established. The human sciences formed a point of contact between science and civilization of a wholly new kind, and reshaped the understanding of both.

THE PLACE OF REASON

In Book I of his *Treatise Concerning Human Nature*, Hume offered an empirical exploration of the basic principles of human understanding, that is, one he envisaged as being based on observation, by contrast with general speculative principles. The core of observation, he tells us, lies in sensory or emotional experiences, either in the direct lively form, or in the fainter form of memories. The ideas that result from these are combined in three different ways. First, there are those cases where we experience two things as being routinely contiguous, and by association we acquire a disposition to think of the one when we think of the other. Second, there are resemblances between objects and, by association, when we think of an object we come to think of others that resemble it. Third, the way in which our minds are organized reflects our experience of a causal order that we perceive in the world, so that our thoughts run along tracks shaped by our (associative) experience.

Taken as claims describing various aspects of cognitive powers in animals, these would have been widely accepted. Although they might have been contested at the level of fine detail, there is nothing especially novel or radical in them. Similarly with the extension of such considerations to rudimentary human cognition, of the kind characteristic of the ‘lower’ faculties, and manifest perhaps in learning processes in infants, before reason locks in. We can find such an approach in Descartes, for example. In his account of cognition in the *Traité de*

⁵ It is even possible to see sensibility in materialist terms, though I shall not be arguing that here. For an account of sensiblist materialism, see Charles Wolfe, ‘Sensibility as Vital Force or Property of Matter in Mid-Eighteenth Century Debates’, in Henry Martin Lloyd, ed., *The Discourse of Sensibility: The Knowing Body in the Enlightenment* (Dordrecht, 2013), 147–70.

l'Homme, he had explored animal cognition, partly as something of interest in its own right, but also partly as a way of clarifying what features of cognitive operations were purely corporeal and hence mechanistically characterizable, so that one could then ask what the introduction of a rational mind added to our abilities, and in what way it transformed them.⁶ The aim of such an enterprise is to understand how animal cognition is effected and how far we share in this, with a view to establishing the boundary between what might be characterized as animal cognition, and properly human cognition.

Hume's project is far more radical than this, however. This is not because he sets out to establish that there is in fact no boundary between the animal/lower faculties and the distinctively human ones. Both the insistence on boundaries and the rejection of boundaries can be considered as equally speculative from a Humean point of view. Rather, what is at issue for Hume is a methodological question, which he couches in terms of a contrast between a speculative approach in which one comes to one's subject matter with already formed principles, dictated by metaphysical or other considerations, and a Newtonian 'natural history' that is free of such attempts at guidance on the basis of (assumed) prior understanding. Newton's account of gravitation is explicitly the model in the latter case. Rather than attempting to probe underlying causes, in the form of a theory of the behaviour of the micro-corpuscles that are deemed to constitute bodies, one instead tries to provide a comprehensive description of the phenomenon, showing how it underlies a range of events which had hitherto been considered entirely separate and unconnected (such as bodies falling to the ground and planets occupying stable orbits around the sun), and capturing their lawlike behaviour. Newton's achievement, construed in terms of its prevalent eighteenth-century Lockean interpretation, was presented as the triumph of factual investigation over speculative metaphysics: the latter being associated, in this case, with Cartesianism.

Hume's attempt to change the direction of philosophical enquiry had a particular resonance in Germany where, by contrast with France, there had still been a residual commitment to metaphysics in the middle of the century.⁷ In his lectures on logic dating from the early 1770s, Kant distinguishes 'dogmatic' from 'critical' philosophy. The dogmatic philosophers identified are Descartes, Malebranche, Leibniz, and Wolff, 'the last of whom, through his industry,

⁶ See Stephen Gaukroger, 'Descartes' Theory of Perceptual Cognition and the Question of Moral Sensibility', in John Cottingham and Peter Hacker, eds, *Mind, Method and Morality: Essays in Honour of Anthony Kenny* (Oxford, 2010), 230–51.

⁷ On the background to this question, see Peter Petersen, *Geschichte der aristotelianischen Philosophie im protestantischen Deutschland* (Leipzig, 1921); Hans Maier, 'Die Lehre der Politik an den deutschen Univeritäten vornehmlich vom 16. bis 18. Jahrhundert', in Dieter Oberndorfer, ed., *Wissenschaftliche Politik: Eine Einführung in Grundfragen ihrer Tradition und Theorie* (Freiburg, 1967), 59–116; and Ian Hunter, *Rival Enlightenments: Civil and Metaphysical Philosophy in Early Modern Germany* (Cambridge, 2011).

produced a *systema* of philosophy'.⁸ Among the critical philosophers, Hume figures prominently in Kant's account, although only Locke is identified here. Summing up the influence of the two approaches, Kant tells us that 'the critical philosophy thrives most, and in this the English have the greatest merit. For the most part the dogmatic method has fallen into disuse in all sciences; even morals is not expounded dogmatically any more, but more often critically.'⁹ In aligning himself with 'critical' philosophy in these lectures, Kant is not using the term as he will after his 'critical' turn in the 1780s. The distinction drawn here between critical philosophy and dogmatic philosophy is different, and it is both fundamental and complex. It reflects a number of deep divisions in European intellectual culture in the second half of the eighteenth century. In its starkest terms, the choice can be seen as that between modelling oneself on Wolff—the systematic metaphysician cloistered in the university and writing in a dry style exclusively for a university audience—and Rousseau—the 'free agent' who sees little if any value in the education provided by universities, and who writes in a personal and engaging style for men and women of letters.

In the German case, *Bildung*—the notion of cultivating a particular kind of educated, cultured, and enlightened *persona* for oneself—is crucial.¹⁰ The division is not merely between different styles of pursuing philosophy and science, but above all between different *personae* for the practitioner of these forms of enquiry. The contrast between the systematic metaphysics or *Schulphilosophie* of the Wolffians—typified for its critics in the *Stubengelehrte*, the antisocial and argumentative learned man who spent his all his time alone in his study—and the advocates of *Popularphilosophie* is not a simple one between content and presentation, but something that explicitly went to the heart of what it meant to be a philosopher.¹¹ A number of images were used by the *Popularphilosophen*. The problem with the professional philosopher, writes Feder, is that he is 'locked in his

⁸ The 'Blomberg Logic': Kant, *Gesammelte Schriften*, xxiv. 37; translated in Immanuel Kant, *Lectures on Logic* (Cambridge, 1992), 24. Cf. Wolff: 'I finally brought everything together into an order such that one thing could be made understandable and known through another, and such that a *systema* could be made out of the foundational science, because all theories stand together like parts in a human body.' *Ausführliche Nachricht von seinen eigenen Schriften, die er in deutscher Sprache von den verschiedenen Teilen der Weltweisheit ans Licht gestellt* (Frankfurt am Maine, 1733), 229 (¶78).

⁹ *Gesammelte Schriften*, xxiv. 37; *Lectures on Logic*, 24–5.

¹⁰ See, for example, Hans Weil, *Die Entstehung des deutschen Bildungsprinzips* (Bonn, 1930). The literature is vast: for a guide to it, see Rudolph Vierhaus, 'Bildung', in O. Brunner, W. Conze, and R. Koselleck, eds, *Geschichtliche Grundbegriffe* (5 vols, Stuttgart, 1972–89), i. 508–51. For a recent account of the history of the notion, see Julian Hamann, 'Bildung in German Human Sciences: The Discursive Transformation of a Concept', *History of the Human Sciences* 24 (2011), 48–72. Cf. Eckhardt Fuchs, 'Nature and Bildung: Pedagogical Naturalism in Nineteenth-Century Germany', in Lorraine Daston and Fernando Vidal, eds, *The Moral Authority of Nature* (Chicago, 2004), 155–81.

¹¹ See Doris Bachmann-Medick, *Die ästhetische Ordnung des Handelns: Moralphilosophie und Ästhetik in der Popularphilosophie des 18. Jahrhunderts* (Stuttgart, 1989); Gert Ueding, 'Populärphilosophie', in R. Grimminger, ed., *Deutsche Aufklärung bis zur Französischen Revolution 1680–1789* (Munich, 1984), 605–34. More generally on what it meant to be a philosopher in this period in Germany, see Werner Schneiders, 'Der Philosophiebegriff des philosophischen Zeitalters:

closet, buried under his books, withdrawn from the world' and preoccupied solely with 'people in his head'.¹² Garve compares the academic philosopher to the traveller who, concerned only with reaching his destination, takes the shortest route there, without any interest in the fields and farmlands that he traverses, whereas the *Popularphilosoph* is like someone who enjoys and enlightens himself on his stroll, taking in everything around him with no particular destination in mind.¹³

Popularphilosophie was in some respects a continuation of a Wolffian programme, one aimed at a cultivation of knowledge and virtue, even though the audience at which it was directed was different, as were the means by which it was achieved. Its aims were the cultural and ethical cultivation of members of the educated classes, as opposed to a university audience, and the means of cultivation lay not in metaphysics, as it did for Wolff and *Schulphilosophie*, but in areas such as history, aesthetics, and pedagogy, with a strong commitment to a literary culture, broad learning, and the art of conversation.¹⁴ Although a few of the *Popularphilosophen* were professors of philosophy, most were not, and many earned a living outside the university system: Tetens was briefly a professor of physics and philosophy, then mathematics and philosophy, before becoming a financial official in the Danish civil service; Wieland left the university system after a short spell and earned his living as a novelist; Mendelssohn was a bookkeeper in, and then co-owner of, a silk factory; Nicolai was a bookseller and publisher;¹⁵ and so on. Given this lack of adherence to any philosophical school, of the kind one finds in the university system at the time, it is not surprising that there was no consensus on substantial philosophical issues among the *Popularphilosophen*. As van der Zande points out, 'all the great debates of their times found them on both sides of the issues, whether it was about Lavater's theories of physiognomy, about the philosophy of Spinoza, about the question of deism in view of Lessing's publication of the Wolfenbüttel fragments, or about the supposed threat from obscurantist forces after the Edict of Wöllner

Wandlungen im Selbstverständnis der Philosophie von Leibniz bis Kant', in Rudolph Vierhaus, ed., *Wissenschaften im Zeitalter der Aufklärung* (Göttingen, 1985), 58–92.

¹² Johann Georg Heinrich Feder, *Untersuchungen über den menschlichen Willen* (4 vols, Göttingen, 1779–93), i. 350.

¹³ See for example his disquisition on 'the art of thinking': Christian Garve, 'Einige Beobachtungen über die Kunst zu denken', in *Versuche über verschiedene aus der Moral, der Litteratur und dem gesellschaftlichen Leben* (5 vols, Breslau, 1792–1802), ii. 245–430.

¹⁴ This is evident for example in the journal *Der Philosoph für die Welt*, the first volume of which was published in 1775 in Leipzig by Johann Jakob Engel, to be followed by a second in 1777. It was the epitome of *Popularphilosophie*, containing, for example, literary pieces by Engel himself, a cautionary discussion of Helvétius' materialism, debates on Lessing's *Emilia Galotti* and on Goethe's *Werther*, more philosophical pieces by Mendelssohn and Benjamin Franklin, and an essay by Kant on racial differences.

¹⁵ On the cultural importance of publishing at this time, and Nicolai's role in it, see Pamela Eve Selwyn, *Everyday Life in the German Book Trade: Friedrich Nicolai as Bookseller and Publisher in the Age of Enlightenment, 1750–1810* (University Park, Penn., 2000).

became effective'.¹⁶ But there was one theme that did unite the *Popularphilosophen*: a commitment to an anthropology, a science or philosophy of man. As the *Popularphilosoph* Karl von Irwing put it, 'presently one can incorporate almost our whole philosophy, and not without profit, into the science of man'.¹⁷

What is at issue here is not a question of Enlightenment versus Counter-Enlightenment, for Wolff and his followers were very much the standard bearers of the German *Aufklärung*, especially in its early phase. Neither is it just a question of the standing of metaphysics. Science too is subjected to severe criticism in *Popularphilosophie*, basically along lines dictated by Rousseau. In his pre-critical days, for example, Kant had few doubts about the dangers of pursuing metaphysics and science, and his characterization of them is in terms of something unhealthy. In an essay of 1764 he includes metaphysical speculation in an account of mental illness and its cure.¹⁸ And elsewhere he tells us that science 'cannot make up for its own discontents', and its practitioners 'become increasingly harmful to themselves and useless to the public'; science itself 'tears us away from pleasures'.¹⁹ Newton, in other contexts Kant's great hero (along with Rousseau), is described as becoming 'an ape or an angel instead of a human being', never satisfying himself, becoming childish, and ending his days as someone who was laughed at.²⁰

The concerns that emerge here are not specific to Germany, and Hume and Diderot were raising related worries. To take these concerns seriously, as British, French, and German thinkers in the second half of the eighteenth century certainly did, was not only to question the ability of science to provide a general model of enquiry, but also, potentially, to call into doubt the very legitimacy of the scientific enterprise, at least as it had been construed up to this point. To understand what can only be described as a crisis of confidence in the ability of science to articulate, embody, or share broader cultural values, we need to separate out some core issues and to try to understand how they came to be connected in the way that they were.

There are three levels on which this dilemma works: that of propositional versus non-propositional forms of understanding; that of systematic versus non-systematic conceptions of understanding; and that of reason versus sensibility. The respective terms of the three dichotomies tended to go together. Advocacy of the primacy of reason was associated with the advocacy of comprehensive systematic understanding, and in turn with the idea that understanding had to take

¹⁶ Johan van der Zande, 'In the Image of Cicero: German Philosophy between Wolff and Kant', *Journal of the History of Ideas* 56 (1995), 419–42: 424.

¹⁷ Karl Franz von Irwing, *Erfahrungen und Untersuchungen über den Menschen* (2 vols, Berlin, 1777–9), preface.

¹⁸ 'Versuch über die Krankheiten des Kopfes': *Gesammelte Schriften*, ii, 271.

¹⁹ 'Metaphysik Herder' (i.e. Herder's notes on Kant's metaphysics courses from the 1760s): *Gesammelte Schriften*, xxviii, 892.

²⁰ *Ibid.*, 894.

the form of propositional understanding. Correlatively, advocacy of the primacy of sensibility tended to be associated with the advocacy of non-systematic understanding. But such forms of non-propositional understanding as coming to terms with the world and our place in it through our desires, anxieties, or aspirations, did not seem in any way to be a replacement for propositional understanding. In short, there appeared to be a fundamental dichotomy in our understanding of the world.

We can distinguish three broadly different kinds of response to the dichotomy: those that privilege propositional understanding; those that privilege non-propositional understanding; and those that see the solution in balancing the two. It will be helpful to get a sense of what motivates these three kinds of response, before we examine the larger issues of reason versus sensibility, and systematic versus non-systematic understanding.

On the first view, the claim is that non-propositional forms of understanding have to be 'propositionalized' in some way if they are to count as genuine forms of understanding. Failure to achieve this means that they lose their status as forms of understanding. This is because, on such an approach, propositional understanding is the only possible genuine or legitimate form of understanding. There are different versions of this kind of approach, and we shall be considering the Wolffian defence of reason, which is a defence of exclusively propositional understanding, later. A different kind of approach which ends up with largely the same conclusions, albeit couched in a more radical form, is that associated with some of the ideas inspiring the French Revolution, and the key figure here is Condorcet, permanent secretary of the Académie des Sciences, and the only one of the *philosophes* to play a significant role in the events following 1789.

Condorcet's ambition, as Baker has put it, was 'to guide the French Revolution by transforming societal choice into the rational decision-making of the idealized republic of science'.²¹ He set out to provide 'stronger combinations, more precise means of calculation' because 'all of the truths recognized by the enlightened have been confused in a mass of uncertain changing opinions', so that it is necessary to 'fetter men to reason by the precision of ideas, by the rigour of proofs, so as to put the truths presented to them beyond the sophistry of interest'.²² Whereas in the Wolffian tradition—and that of the German Enlightenment, the *Aufklärung*—reason is embodied in metaphysics, in the French *philosophe* tradition reason or rationality is embodied in science. The connection between the social and political domain and that of science had been established and set out in detail mid-century in terms of the association of science and civilization in d'Alembert's

²¹ Baker, *Condorcet*, ix. Cf. two earlier works: Gilles-Gaston Granger, *La mathématique sociale du Marquis de Condorcet* (Paris, 1956); and Roshdi Rashed, *Condorcet: Mathématique et société* (Paris, 1974).

²² Marie Jean Antoine Nicolas de Caritat, Marquis de Condorcet. *Esquisse d'un tableau historique des progrès de l'esprit humain* (Paris, 1795), 542.

preliminary 'Discours' to the *Encyclopédie*.²³ D'Alembert reworked the theme of the transition from superstition to rational belief that had been pursued in writers such as Fontenelle from the late seventeenth century onwards, providing a progressive genealogy in which various stages in the triumph of reason can be discerned. We are offered a vindication of the project of the *Encyclopédie* in the distinctively Baconian genre of a legitimating genealogy. What is at issue is primarily a question of establishing a historical sequence in which one can follow a progression that starts with the origins of knowledge and traces a process of growth—while uncovering and analysing various false starts—which can be shown to culminate in the present, so that the present, as represented by the *Encyclopédie*, provides both a secure vantage point for scrutinizing the past and a secure starting point for further enquiry. In his 1753 *Essai sur la société des gens de lettres et des grands*, d'Alembert adds a political dimension to this account, telling us that Louis XIV gradually conquered the traditional predilection of the nobility for ignorance, and natural philosophers and others engaged in intellectual pursuits were taken out of the solitude to which they had been accustomed and raised to the standing of 'greats'.²⁴

What d'Alembert sets out to describe in his account is the progress of civilization from superstition to a scientific understanding of the world, and the *Essai* shows how this transition can be reinforced by a raising of the standing of those to whom we owe the greatest debt in this respect. What is at issue here is not a reworking of Plato's advocacy of 'philosopher-kings', for the contribution of philosophers and scientists is less direct than that. But we do have a notion of a rational ordering of society, and with d'Alembert's protégé Condorcet, the model for the reordering is that of a rationally organized science.

This model is set out in his *Esquisse d'un tableau historique des progrès de l'esprit humain*, published in 1795, a year after Condorcet's death in prison. Like d'Alembert's 'Discours', the *Esquisse* was originally intended as an introduction to a larger (unfinished) work. The Tenth Epoch, on the 'Future Progress of Mankind', begins:

If man can predict, almost with certainty, those appearances of which he understands the laws; if, even when the laws are unknown to him, experience of the past enables him to foresee, with considerable probability, future appearances; why should we suppose it a chimerical undertaking to delineate, with some degree of truth, the picture of the future destiny of mankind from the results of its history? The only foundations of faith in the natural sciences is the principle, that the general laws, known or unknown, which regulate the phenomena of the universe, are regular and constant; and why should this principle,

²³ Denis Diderot and Jean le Rond d'Alembert, *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers par une société des gens de Lettres, mis en ordre et publié par Diderot et quant à la Partie mathématique par d'Alembert* (2nd edn, 40 vols, Geneva, 1777–9), i. xxxii–lix.

²⁴ Jean Baptiste d'Alembert, *Œuvres* (5 vols, Paris, 1821–2), iv. 338–43.

applicable to the other operations of nature, be less true when applied to the development of the intellectual and moral faculties of man?²⁵

The crucial thing to note about the claims regarding predictability here is that they apply not to individuals as such but to collective properties of larger-scale human organizations and societies. That is to say, questions of human behaviour are treated neither in individual terms nor in terms of universal attributes—as Christian teaching and the humanist tradition had done for example—but in terms of collective properties, that is, distinctive features of collective activity which are not mirrored at the individual level, and cannot be arrived at by abstraction from individual behaviour. The eighteenth-century shift to the study of collective properties will occupy us in Chapter 6. For the moment, it is sufficient to note that Condorcet's focus is on collective properties.

The 'Introduction' to the *Esquisse* takes its bearings from a Condillac-inspired sensationalist psychology—virtually a *sine qua non* of French intellectual life in the second half of the eighteenth century, as we shall see—and he makes the standard move of associating sensations with feelings of pleasure and pain, and transforming these into 'durable sentiments'. These latter enable us to form ties of interest and duty with our fellow creatures. But to leave things at this individual level, Condorcet tells us, is to pursue metaphysics, whereas he has something different in mind:

But if we consider this development in its results, relative to the mass of individuals co-existing at the same time on a given space, and follow it from generation to generation, it then exhibits a picture of the progress of human intellect. This progress is subject to the same general laws, observable in individual development of our faculties; being the result of that very development considered at once in a great number of individuals united in society.²⁶

Here we can begin to appreciate the immense distance between what Condorcet is doing and a metaphysical project such as that of Wolff. Despite the fact that they are both committed to the idea that 'reason' is the sole key to understanding human behaviour, their objects of study are completely different. Wolffian metaphysics is concerned to establish the grounding of human behaviour—whether cognitive, affective, or moral—in reason, whereas Condorcet's concern is with what account we can give of the rationality of collective behaviour.²⁷ This leads him to deal with various voting paradoxes, such as that where the ratification

²⁵ Condorcet, *Esquisse*, 327. I have used the English translation which appeared in the same year as the French edition: *Outlines of an Historical View of the Progress of the Mind* (London, 1795), 316.

²⁶ Condorcet, *Esquisse*, 2–3; *Outlines*, 3.

²⁷ The gradual separation of 'reason' (considered as the highest human faculty, and something with general application) and 'rationality' (considered as formal reasoning independent of personality and context, and usually taking the form of algorithms) came to a peak in the middle of the twentieth century: see Paul Erikson et al., *How Reason Almost Lost its Mind: The Strange Career of Cold War Rationality* (Chicago, 2013).

of a constitution can produce different results if each clause must be ratified by a majority of assemblies and the whole constitution must be ratified by a majority of assemblies;²⁸ with the conditions under which it is legitimate to subject citizens to a law which has not received unanimous approval; and with calculating the maximum acceptable error in collective judicial proceedings.²⁹ Such questions are quite different from any of the considerations raised in the Wolffian metaphysical tradition, but they are critical to the kind of rationality at stake in Condorcet.

By contrast, the second kind of response denies that rationality is what is at stake either in the individual case or the collective one. Rousseau, who privileges non-propositional forms of understanding, is concerned with both kinds of case, above all in his treatment of how one moves from individual wills to the general will. But for Rousseau, primitive 'natural' forms of understanding are taken to have been perverted by civilization and the educational precepts by which it is perpetuated. Reason is associated with a rigid dogmatism, something evident in his account of education, where the idea of an authority figure who imparts knowledge according to a pre-established scheme is replaced with a process whereby the child's natural capacities are activated in a process of autonomous discovery.³⁰ This focus on natural capacities shifts the centre of gravity of the discussion from reason to sensibility. Sensibility in this context can be thought of as a very specific form of non-propositional understanding, so to this extent Rousseau is rejecting propositional understanding in favour of a form of non-propositional understanding. By contrast, a different kind of strategy to elevate sensibility is that pursued by Diderot, who argues that sensibility underlies our cognitive abilities. Since these cognitive abilities were traditionally included under 'reason', what is being claimed in this case is that a form of non-propositional understanding does not replace, but underlies, propositional understanding.³¹ Nevertheless, the autonomy of propositional understanding is clearly threatened by such a strategy.

²⁸ Condorcet, 'Sur la nécessité de faire ratifier la constitution par les citoyens' (1789): *Œuvres*, ix, 411–13. What he shows is that majority preferences are intransitive.

²⁹ Condorcet, *Essai sur l'application de l'analyse à la probabilité des décisions rendues à la pluralité des voix* (Paris, 1785).

³⁰ See, in particular, Jean-Jacques Rousseau, *Émile, ou de l'éducation* (The Hague, 1762).

³¹ I will be restricting my attention here to the French Lockean tradition, but it is worth noting that a conclusion mirroring this was reached on wholly different grounds in the German natural law tradition. Johann Jacob Schmauß, for example, in his *Vorstellung des wahren Begriffs von einem Recht der Nature* (Göttingen, 1748), argued that no one corresponding to the idea of man as presented in natural law theory can be found in history. History shows reason to be a rare occurrence, and the discrepancy between philosophy and history in this respect indicates that there is something wrong with philosophy. The emotions and the will are the natural features of human beings, Schmauß argues. Reason is a product of development: it comes after, and rests on, the emotions. See the discussion in Peter Hanns Reill, *The German Enlightenment and the Rise of Historicism* (Berkeley, 1975), 57–8.

A third option is that offered by Hume. Rather than attempting to come to a satisfactory conception of understanding by choosing between the alternatives, he opens up the possibility of conceiving of understanding in terms of a balance between propositional and non-propositional forms of understanding. At the beginning of *An Enquiry Concerning Human Understanding*, he proposes a dilemma with respect to the nature of understanding. He writes:

But the mind requires some relaxation, and cannot always support its bent to care and industry. It seems, then, that nature has pointed out a mixed kind of life as most suitable to the human race, and secretly admonished them to allow none of these biases to *draw* too much, so as to incapacitate them for other occupations and entertainments. Indulge your passion for science, says she, but let your science be human, and such as may have a direct reference to action and society. Abstruse thought and profound researches I prohibit, and will severely punish, by the pensive melancholy which they introduce, by the needless uncertainty in which they involve you, and by the cold reception which your pretended discoveries shall meet with, when communicated. Be a philosopher, but amidst all your philosophy, be still a man.³²

Simplifying somewhat, Hume came to the view that the most developed form of systematic general understanding, metaphysics, led to paradoxical conclusions which were so contrary to 'common life' that we could not accept them as true. Yet to the extent to which we desire to develop a critical understanding of the world and our moral and other practices, we cannot renounce such forms of philosophical enquiry. We are faced with a mode of life and thought that leads to dangerous or ridiculous phantasies, but which is part of the thoughtful existence distinctive of civilization, by contrast with an unreflective mode which he associated with barbarism. Neither 'reason' alone nor 'sensibility' alone can reliably guide our choice here: it is a matter of judging between the competing demands of the two.³³ Correlatively, Hume would also have rejected the notion advocated by d'Alembert and Condorcet that history was the history of reason. In his detailed account of the development of constitutionalism in Britain in his *History of England*, for example, he is at pains to stress that the British constitution was not the work of conscious design: rather its provisions were largely unintended results of painful and unwilling adjustments forced by over a century of political chaos.³⁴

The range of positions is, then, considerable. To probe more deeply we need to consider two basic dichotomies that make up the fault lines of thought about science and philosophy in the second half of the eighteenth century: systematic versus non-systematic knowledge, and reason versus sensibility.

³² David Hume, *Enquiries concerning the Human Understanding and Concerning the Principles of Morals*, ed. L. A. Selby-Bigge, 2nd edn (Oxford, 1962), 9.

³³ See Gaukroger, *The Collapse of Mechanism and the Rise of Sensibility*, 438–52.

³⁴ See, for example, the discussion in Donald W. Livingston, *Philosophical Melancholy and Delirium: Hume's Pathology of Philosophy* (Chicago, 1998), ch. 2.

SYSTEMATIC KNOWLEDGE

'Nothing makes me sicker than that arch-error of the Germans, namely the building of systems', writes Herder in 1767.³⁵ The dichotomy between systematic and non-systematic forms of understanding was absolutely basic after the early decades of the eighteenth century, but the issues go back to classical antiquity. The origins of philosophy (including natural philosophy) as a discipline lie in Plato, whose characterization of philosophy was set out in explicit contrast to the activity of the sophists. Plato drew on the systematic nature of philosophical enquiry, characterizing the failing of the sophists to lie in their seeking simply to win arguments or show off their ingenuity, whereas the truth that the philosopher sought requires systematic connections. The implication of this view is that it is the systematic nature of philosophy that prevents the decontextualized form of argument for its own sake that characterized the sophists' practice.³⁶ This systematic nature of the project was later reinforced with attempts, beginning in the thirteenth century, to reconcile Christian theology with Aristotelian natural philosophy.³⁷

To understand the long-term significance of this, it is important to grasp a very distinctive feature of Christianity. Before the modern era, Christian theologians treated all religious differences in terms of differences in doctrine, and they construed Islam and Judaism, for example, as forms of heresy, rather than as different religions, for there was no concept of 'religions' in the plural. In the course of the seventeenth and eighteenth centuries, this changed. There now developed the view that there were different religions, although these were distinguished on a doctrinal basis. It is in the seventeenth century that we witness the first attempts to distinguish other religions from Christianity,³⁸ an exercise

³⁵ Herder to Scheffner, 31 October 1767: Johann Gottfried Herder, *Briefe: Gesamtausgabe 1763–1803*, ed. Wilhelm Dobbek and Günter Arnold (10 vols, Weimar, 1977), i. 92. Cf. his remark in his *Journal meiner Reise im Jahr 1769*: 'Above all I want to resist the temptation of the Germans to try to develop everything out of nominal explanations of what follows or what cannot follow.' Herder, *Werke in zehn Bänden*, ed. Günther Arnold et al. (9 vols in 10 parts, Frankfurt am Maine, 1985–2000), ix–2. 110. What Herder is opposed to is system-building, not systematic thinking: see Marion Heinz, *Sensualistischer Idealismus: Untersuchungen zur Erkenntnistheorie des jungen Herder* (Hamburg, 1994).

³⁶ See the discussion in Gaukroger, *The Emergence of a Scientific Culture*, 229–39. We are not concerned here with how accurate Plato's characterization of the sophists' practices were.

³⁷ By the seventeenth century, the notion of 'right reason' was being used extensively by Anglican divines to indicate an alignment of reason with Christian teaching: there was (mere) reason and there was sound or proper reason. See Lotte Mulligan, "Reason", "Right Reason", and "Revelation" in Mid-Seventeenth-Century England', in Brian Vickers, ed., *Occult and Scientific Mentalities in the Renaissance* (Cambridge, 1984), 375–402; and idem, 'Robert Boyle, Right Reason, and the Meaning of Metaphor', *Journal of the History of Ideas* 55 (1994), 235–57.

³⁸ See Peter Harrison, *'Religion' and Religions in the English Enlightenment* (Cambridge, 1990), and Ernst Feil, *Religio: Die Geschichte eines neuzeitlichen Grundbegriffs vom Frühchristentum bis zum Reformation* (Göttingen, 1986). Note that as well as different religions there was a concern with

renewed in the nineteenth century, when there was a concerted move to offer comprehensive classifications of world religions.³⁹ The point I want to stress is that different religions were distinguished exclusively on a doctrinal basis, on the model of identifying heresies: irrespective of what these other religions might have considered their own religious identity to consist in, they were assimilated to sets of core doctrinal beliefs. There are distinctive core beliefs in other religions of course, but Christianity is quite unique in its construal of the identity of a religion as lying in its beliefs on theological questions. For Christianity, it is necessary and sufficient to be a Christian that one hold particular theological beliefs. No moral qualities are required, for example: one can be excommunicated for propounding heretical doctrines, but not for behaving immorally. Moreover, it was assumed—despite worries from the seventeenth century onwards about whether Confucianism was a religion in any recognizable sense or whether China was, *per impossibile*, a nation of atheists—that this criterion was shared with the other world religions. But it was not shared. In Islam, Buddhism, Confucianism, Hinduism, and Judaism, all kinds of things other than beliefs play crucial roles—dietary restrictions and fasting, for example, or daily rituals governing hygiene, or such practices as meditation and chanting. Note that whereas post-Reformation Christianity takes doctrines about the nature of God as its core (his existence, his tripartite nature, the Incarnation, etc.),⁴⁰ such a concern may be completely absent in what are identified as other religions. Confucianism, for example, does not posit the existence of a God, and what is distinctive of it for its practitioners is rather the transition from chaos to order. Even when a God is posited, belief in the existence of that God may not be a necessary condition for belonging to that religion, as in Judaism.⁴¹ In short, the doctrinal focus of Christianity, which had become established by the fourth century,⁴² is something peculiar to Christianity. This is not to deny that some of these other ‘religions’ have significant doctrinal

different sources of heresy. John Robertson has compared the 1692 atheism trial of Basilio Giannelli and Giacinto Cristofato in Naples with the 1696 Scottish trial of Thomas Aikenhead for atheism, noting that whereas in the Naples case ‘the prosecutors were much concerned by non-Christian accounts of the origin and development of the world, and particularly by ideas associated with Epicureanism’, in Scotland ‘heterodox ideas about nature and the eternity of the world were secondary in importance to disrespect for Scripture and the denial of the Trinity’: *The Case for Enlightenment: Scotland and Naples 1680–1760* (Cambridge, 2005), 95.

³⁹ See Tomoko Masuzawa, *The Invention of World Religions* (Chicago, 2005). Cf. Talal Asad, *Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam* (Baltimore, 1993).

⁴⁰ I say ‘post-Reformation’ because medieval Christianity was not quite so straightforward, with rituals playing a more significant role in shaping its identity: see Eamon Duffy, *The Stripping of Altars: Traditional Religion in England, 1400–1580* (New Haven, 1992).

⁴¹ On the complex issues surrounding the meaning of ‘religion’, see Wilfred Cantwell Smith, *The Meaning and End of Religion* (London, 1978). There is a case to be made that the term is misleading, to the extent that it encourages the view that the different world ‘religions’ have something in common. See Stephen Prothero, *God is Not One* (New York, 2010).

⁴² See Diarmaid MacCulloch, *A History of Christianity* (London, 2009), ch. 6. Cf. Guy Stroumsa, *Barbarian Philosophy: The Religious Revolution of Early Christianity* (Tübingen, 1999).

aspects.⁴³ It is just that everything does not hinge on doctrine, as it comes to do in Christianity. Their identities go beyond whatever doctrines they may subscribe to. From the point of view of our present concerns, what is distinctive about Christianity is not so much the content of the doctrines it espouses, but the fact that it defines itself in terms of doctrines.

The upshot of this was that building up and protecting a body of doctrine was a fundamental feature of Christianity, at least from the fourth century onwards. It was an indispensable ingredient in defining its identity. Doctrinal consistency was at a premium, and this was achieved by means of systematic theology, for many purposes the core of Christianity from the Patristic thinkers onwards, and something that shaped its sense of authority, manifested in a striking way in its concern with heresy, for example, and its naturally proliferating sectarianism. What was at issue in the thirteenth-century scholastic reconciliation of Christianity and Aristotelian natural philosophy, as well as in the subsequent seventeenth-century attempts (e.g. among mechanists) to align Christian theology and natural philosophy, was not a question of the relation between 'science and religion', but rather a question of bringing a Christian doctrine together with natural-philosophical tenets formulated in terms of a natural-philosophical doctrine. There were many forms of natural philosophy that were not doctrinal—such as natural history, as well the various forms of mechanics and positional astronomy placed under the rubric of the 'subordinate sciences' in the Aristotelian account—but these were not, and (at least as they stood before the modern era) could not have been, part of the package.

In the light of this, it is hardly surprising that the scholastic reconciliation of Christianity and Aristotelian natural philosophy proceeded along a trajectory that was both doctrinal—in that it set out to establish and build up a permanent body of truth—and systematic. Not only was metaphysics, which was considered the most fundamental philosophical doctrine, intrinsically systematic from the thirteenth century onwards, but the scholastic development of Aristotelian natural philosophy was predominantly a matter of its reformulation in more systematic terms, something that came to a head in the scholastic textbooks of the late sixteenth and early seventeenth centuries.⁴⁴ Nor was this exclusively a feature of

⁴³ In some cases, they may even have taken doctrinal questions seriously as a reaction to Christianity. There is a case to be made, for example, that in the wake of the attempts of Justin Martyr to distinguish Christianity from Judaism in doctrinal terms—one of the formative early attempts to establish what Christian orthodoxy consisted in—the rabbinical movement responded by moving in a doctrinal direction. See Daniel Boyarin, *Border Lines: The Partition of Judeo-Christianity* (Philadelphia, 2004), chs 2 and 3.

⁴⁴ See Charles H. Lohr, 'Metaphysics', in Charles B. Schmitt, Quentin Skinner, and Eckhard Kessler, eds, *The Cambridge History of Renaissance Philosophy* (Cambridge, 1988), 537–638. The legal model of enquiry also played an important role here: see Gaukroger, *The Emergence of a Scientific Culture*, 141–6. For details, see Harold J. Berman, *Law and Revolution: The Formation of the Western Legal Tradition* (Cambridge, Mass., 1983), and idem, *Law and Revolution ii.: The Impact of the Protestant Reformations on the Western Legal Tradition* (Cambridge, Mass., 2003).

scholasticism. On the contrary, the dominant natural philosophy of the mid-seventeenth century, namely mechanism as set out in Descartes' *Principia philosophiae*, aspired to much the same degree of doctrinal integrity and systematicity as scholastic philosophy, and it was the claim of mechanism to encompass the whole of the natural realm in terms of a systematic fundamental reduction that was taken to indicate its explanatory power and its suitability as *the* natural philosophy.

By the early decades of the eighteenth century, the situation had changed radically, and there was a strong reaction to systematic explanation, coming to a head in the third quarter of the century. There did, however, persist two programmes, one in mechanics and one in metaphysics, that promoted the ideals of systematicity. 'Rational mechanics'—a project that Huygens, Newton, and Leibniz helped to initiate, and which, using the advanced mathematical techniques devised above all by the Bernoullis, was brought to fruition mid-century in the work of d'Alembert and Euler—adhered to strict standards of mathematical rigour and axiomatic organization. Its practitioners conceived it as a model of physical enquiry, and their hope was that once the mechanical core had been developed and firmly established, one could work outwards to areas such as gravity, chemistry, electricity, and optics, reducing them to an axiomatically structured mechanics and reworking them into a systematic form. But the mathematical sophistication of rational mechanics was not mirrored in its physical relevance, and it became effectively insulated from the main body of physical sciences, which were the successors to the seventeenth-century 'experimental natural philosophy' tradition, and, in areas like chemistry and electricity, were concerned largely with making sense of a mass of complicated experimental results. Rational mechanics could provide no guidance at all here, any more than could micro-corpuscularianism. In consequence, it became distanced from what were the cutting-edge developments in the sciences. Indeed, what can be regarded as the epitome of rational mechanics, Lagrange's *Mécanique analytique* (1788), is really just a work of systematization through a rewriting of mechanics as developed by Euler and others in more elegant algebraic form.⁴⁵

As regards metaphysics, in the first half of the eighteenth century, after Leibniz, Wolff was the only significant advocate of a comprehensive systematic

⁴⁵ Joseph Fourier, in his 1829 *éloge* of Lagrange, notes that 'all his mathematical compositions are remarkable for a singular elegance, by the symmetry of forms and generality of methods, and if one may speak thus, by the perfection of analytical style', and Jean Delambre in his introduction to the 1867 edition of his works notes that, in his work in astronomy, Lagrange 'made of these problems, simple, common and already resolved, the same use that is made by other analysts of questions of pure curiosity, that they furnish examples of calculus and occasions to develop new analytical artifices'. Both quoted in Craig G. Fraser, 'Lagrange's Analytical Mathematics, its Cartesian Origins and Reception in Comte's Positive Philosophy', *Studies in History and Philosophy of Science* 21 (1990), 243–56: 243. In this respect, Lagrange's work was surpassed only in Hilbert's axiomatization of classical mechanics: see Leo Corry, *David Hilbert and the Axiomatization of Physics (1898–1918): From Grunlagen der Geometrie to Grundlagen der Physik* (Dordrecht, 2010).

metaphysics.⁴⁶ What he offered was a basically scholastic metaphysics reformulated along Leibnizian lines. It was the contemporary archetype of *Schulphilosophie*, and was directly opposed to Thomasian and pietist thought, which were considered to have abandoned the claims of reason.⁴⁷ Wolff's influence was largely confined to a few German states however,⁴⁸ and even there it was often under attack, not just from within the university establishment, which was its natural home, but also from the powerful Frederick I of Prussia, who expelled Wolff from his kingdom in 1723. It is true that his successor, Frederick II, subsequently reinstalled him at Halle and appointed him vice-chancellor of the university in 1740, but his influence had waned considerably by that time, and his classes, once the highlight of the academic term, were now poorly attended. Many German scholars were contemptuous of him by this stage, the historian Johann Köhler in 1736 characterizing him as someone who had nothing better to do than sit around playing with monads and speculating about pre-established harmony.⁴⁹

Wolff's system was a simplified and revised version of a scholastic/Leibnizian metaphysics. Scholastic metaphysics had always been highly systematic, and Leibnizian metaphysics had systematic aspirations, although it had never received a comprehensive formulation. Wolff began by rewriting logic (syllogistic) along Leibnizian lines, and he conceived the aim of logic to be the provision of a means whereby confused concepts were analysed and made clear and distinct. This procedure was then applied to the whole of philosophy, including natural theology. Philosophy was conceived as a discipline that investigated why things are as they are, including the distinctively Leibnizian project of accounting for why things are possible if they are possible, and why they are actual if they are actual.⁵⁰ The model was explicitly that of mathematics (although rational mechanics could equally have acted as a model along the same lines), where necessary truths were

⁴⁶ With the exception of his *Théodicée*, Leibniz's works were known only in fragmentary form before the posthumous publication of the *Nouveaux essais sur l'entendement humain* in 1765, and the appearance of some of his more systematic works in the edition of Louis Dutens in 1768. So Wolff (who died in 1754) and his followers effectively had the field to themselves before the mid-1760s. On the relation between Wolff's philosophy and that of Leibniz, see Walther Arnspurger, *Christian Wolffs Verhältnis zu Leibniz* (Weimar, 1897); Charles Corr, 'Christian Wolff and Leibniz', *Journal of the History of Ideas* 36 (1975), 241–62.

⁴⁷ See Max Wundt, *Die deutsche Schulphilosophie im Zeitalter der Aufklärung* (Tübingen, 1945).

⁴⁸ Wolff did have a French disciple, Jean Deschamps—author of the *Cours abrégé de la philosophie wolffienne* (2 vols, Leipzig and Amsterdam, 1743–7)—although his attempt to promote Wolffian philosophy in France was largely unsuccessful. More generally, Wolff's work was also known through the Marquise de Châtelet's *Institutions de physique* (Paris, 1740). The short anonymous entry on 'Psychologie' in the *Encyclopédie* offered a positive account of Wolff: on the impact of Wolffian psychology in the encyclopedia tradition see Fernando Vidal, 'Psychology in the 18th Century: A View from Encyclopedias', *History of the Human Sciences* 6 (1993), 89–119: 101–5.

⁴⁹ Johann David Köhler, *Erneuerter Entwurf eines Collegii über den gegenwärtigen Zustand von Europa und die jetzigen Welt-Händel* (Göttingen, 1736), 2–3.

⁵⁰ Wolff set out his system at length on a number of occasions. The first complete exposition was *Vernünftige Gedanken von den Kräften des menschlichen Verstandes* (Halle, 1713).