

PATHS FROM
SCIENCE
TOWARDS
GOD

The End of All Our Exploring

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ONE WORLD
OXFORD

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Preface

In any enterprise that has been underway for some time, there comes a point at which it is wise to stand back a little and view where one is and how one got there. I have been thinking about the relation of the scientific worldview to Christian belief ever since my school days in the 1940s, when the lively forum of the sixth form of Watford Grammar School resounded in disputes about Darwinism and the book of Genesis. A subsequent, all-consuming scientific career, in which, as a physical biochemist, I was privileged to be involved with those discovering the structure of DNA and to follow up the physico-chemical ramifications of that fascinating structure, did not entirely suppress the search for wider meanings – the traditional concern of religion. I have recounted elsewhere¹ some of the ways and byways into which this parallel interest led me until, nearly thirty years ago, I found myself in a position, as Dean of Clare College, Cambridge, to study in depth² the relation of science to religion in general, and to Christianity in particular.

There had fortunately, in England, been a succession of outstanding people who had kept alive an intelligent, open, yet integrating approach to this relation. Major figures then were the Anglican Charles Raven,³ a former Regius Professor of Divinity in Cambridge and a keen naturalist, and the Methodist layman Charles Coulson,⁴ eventually Rouse Ball Professor of Mathematics in Oxford

and a superb exponent of quantum chemistry. Other figures, too, kept the flame alive – such as G.D. Yarnold,⁵ A.F. Smethurst,⁶ E. Mascall⁷ – so that a fruitful interaction between science and theology continued among thinking Christians. But it was certainly true by the early 1960s, at least in Britain, that, as John Habgood noted in *Soundings*,⁸ the public relation between science and theology had lapsed into a kind of ‘uneasy truce’. Across the Atlantic, Ralph Burhoe in Chicago had nurtured the debate since the 1950s, in the Institute for Religion in an Age of Science (IRAS), the Center for Advanced Study in Religion and Science (CASIRAS) and other associated activities, notably from 1966 onwards in the pages of *Zygon: Journal of Religion and Science*.

It was in the 1950s and early 1960s that my interest in this interaction quickened and I began, while still a full-time scientist, to develop my own approach, eventually published as *Science and the Christian Experiment*.⁹ While I was writing this work, Ian Barbour’s *Issues in Science and Religion*¹⁰ was published and began to open up theological thinking in the USA towards taking account of the impressive scientific worldview that had been developing. This process appears to have been inhibited in the USA after the Scopes Trial, concerning evolution, in 1925. By the 1960s the truce in the USA between science and theology was even more uneasy than in Britain, it would seem.

However, thirty years later the whole scene has been transformed. Meetings, papers, books and new journals concerned with the interaction of ‘science and theology’ and ‘science and religion’ proliferate. The pressure has mounted to find meaning in a universe opened up by cosmology and astrophysics, and in an evolutionary process that has highlighted the significance of genetics, and so of DNA in shaping human nature. Who could have imagined thirty years ago that the ‘hot big bang’ of cosmologists and astrophysicists and the ‘DNA’ of molecular biologists would become household words? Yet thus it is and scientists, philosophers and theologians (and many who are combinations of these) have been stimulated to make great efforts in this field, in many cases generously assisted by the John Templeton Foundation, which has made this interaction a particular concern.

For myself – nearly thirty years after taking the plunge from a full-time scientific career into the turbulent stream of science-and-religion

– this seems an appropriate point at which to survey where we are in our explorations from the world of science towards God.

There are particular issues¹¹ about which I have written in the past that I need to revisit, since the discussions about them have led to clarifications and I would like to fine-tune what I have written elsewhere, sparing the non-scientific and non-theological reader the more technical details of the academic debates. I also want to offer the general reader a broad perspective on where lines of investigation have proved to be dead ends and where I think other lines promise to be more fruitful. So I hope the book will prove to be a useful overview and judgement on the field of science-and-theology by one who has been much involved in its explosive and dynamic growth over the last thirty years.

However, this interaction between science and theology is not occurring in a vacuum. It has enormous implications for the way religious beliefs are established and for judging which of them are credible today. So in the first part of this book the current state of theology is examined – and found wanting – and a plea is made for the new directions that the theological enterprise must take if it is to meet the highest intellectual standards prevailing in Western culture. This also has repercussions for religion in general – not just for theology, which is but the rigorous intellectual assessment of the grounds and nature of the content of widespread religious belief.

The religious scene in Western Europe, and especially in Britain, cannot be regarded as encouraging. It seems that more and more people are believing but not belonging. That is, they have some kind of belief in God as creator but it is ill-formulated and plays little part in their public lives and they are not attached overtly to the institutions of organised religion. Moreover, a growing proportion of those who are members of, at least, the Christian churches in Britain increasingly adhere to very conservative forms of Christianity, both ‘evangelical’ and ‘catholic’. The prime casualty in this development within the churches is truth that is public, accessible to all, based on reason reflecting on experience – and not on the supposed infallible authority of book, church or any individual. In my view what is perennially ‘indefectible’ – to use the technical theological word for not being liable to failure, defect or decay – is not so much the Church, as so much ecclesiology has stated, but public truth.

There is little doubt in my mind that, whatever other sociological pressures may be at work in Western Europe (and among American intellectuals), it is the lack of credibility of what people perceive to be Christian belief that has undermined it. I say 'perceive to be' because there are many misconceptions prevailing about what constitutes Christian belief today. It has recently been argued,¹² for example, that there is a strong case for 'treating Contemporary Christianity as a new religion or at least treating historical Christianity and contemporary Christianity as two quite different religions'. In spite of the persistence of many elements in the liturgies, many modern educated Christians would be shocked by the general beliefs of 150 years ago – in eternal hell for unbelievers, in the literal interpretation of the Bible, in a historical Fall of Adam and Eve just after the creation of the world six thousand years ago, in the death of Christ interpreted as propitiating the 'wrath' of God, in the historical Jesus as omniscient, etc. This is because the content of belief is not static, once for all 'delivered to the Saints', but is a dynamic corpus of ideas, beliefs and symbols which has historical continuity with the past but can take quite new forms.

The broad aim of this book is to expound how science has opened up fresh vistas on God for human perception and life. All religious thinking, and notably Christian theology, is challenged by these new vistas, which afford a unique opportunity to weld together the human search for meaning through religion and the human quest for intelligibility through science. Contemporary Western culture is, for historical reasons, dominated by science, which has many able communicators who are mostly antipathetic to religion. However, scientists themselves are often involved in a spiritual quest, and Christian theology has historical grounds for welcoming this contemporary challenge, for challenges in the past have been the stimulus to theology's revivification.

The modes of inquiry that characterise the theological enterprise have an unfavourable academic reputation compared with those of science, which has successfully withstood the critique of postmodernism. The results of applying rational criteria can also, it is argued, be vindicated by an evolutionary perspective. It therefore behoves theology to attempt to satisfy the proper demand for reasonableness by inferring the best explanation of the variety of

data available. In this book I make a preliminary examination of the implications of this for theology.

With these considerations in mind, the paths from the world of science towards God are explored by examining the profound theological repercussions of scientific perspectives on:

- the world as it is;
- the world in process, that is, phases in the ‘epic of evolution’, and its cost;
- God’s interaction with the world and with humanity, especially when this constitutes special divine action.

This exploration leads to the advocacy of an open theology seeking integrating perceptions and thus to: a renewed stress on God’s immanence in the world and thence to a theistic naturalism and panentheism; the perception of the world as sacramental; revisiting the roots, ‘where we started’, of Judaeo-Christian concepts of the Wisdom, Word (*Logos*) and Uncreated Energies of God; and a reformulation of trinitarian understandings of our experience of God in a form open in principle to the insights of other religions. The book ends with a hopeful epilogue.

Nicholas Ferrar had been a Fellow of Clare College, Cambridge, and one of my great experiences at that college was, once a year, to go with students to Little Gidding, where he had founded a Christian lay community in the seventeenth century. There we conferred and then celebrated the Eucharist in an unforgettable, evocative and dignified small chapel with the light of the setting sun streaming through its west door. The words of T.S. Eliot’s poem *Little Gidding* thereby acquired a new power in ‘the intersection of the timeless moment’ in that place ‘where prayer had been valid’ which was ‘England and nowhere. Never and always.’ There and then we learnt that the vortex of our discussions had a still centre to which we, with our variegated presuppositions, were drawn from many directions. That experience grounds my hope for the track followed here. For science is one of the major spurs goading believers in God into new paths for expressing their beliefs and commitments. This work is an account of an exploration from the world of science towards God which recognises that although the ride may be bumpy, the goal is in

itself unchanged. That end is simply, as at Little Gidding, God's own self. If indeed God *is* at all, the honest pursuit of truth cannot but lead to God. In the last part of the book, I try to point to how the 'end of all our exploring' from the world of science is indeed the God of the Abrahamic and Judaeo-Christian tradition, the place 'where we started', and that we can know that God, that place, 'for the first time' in a new way.

That is my hope for the reader, too.

Arthur Peacocke

Note

Words (or their cognates) that appear in the glossary have been set in bold type when they are first mentioned in the text.

1

The contemporary challenge of science to religious beliefs

The 'two cultures' and the dominance of science

It is now over forty years since C.P. Snow, the novelist and theoretical physicist, delivered his broadside at contemporary English-speaking culture in his Rede Lecture on 'The Two Cultures and the Scientific Revolution'. It exploded on to the cultural scene and the reverberations continue, and the 'two cultures' became part of the stock-in-trade of intellectual discourse. The polarisation persists: a 1999 radio debate (BBC Radio 4, 13 March) among a select audience of academics resulted in a vote for the motion that 'This house believes that forty years after C.P. Snow's famous lecture, Britain is still a nation of two cultures'.

Nevertheless, some of the dividing walls between the scientific and literary cultures have been breached, or at least impaired. We have had plays, successful in both the UK and the USA, such as *Arcadia* by Tom Stoppard, invoking chaos theory, and *Copenhagen* by Michael Frayn, on the historical origins of the Heisenberg uncertainty principle, both taking seriously the implications of scientific ideas. But these are notable exceptions and recent years have witnessed a new phenomenon – the rise of the guru-scientists as popular, often polemical, communicators. They are calling the tunes in the intellectual world and so, more diffusely, among the general public.

In one sense, they have broken down the barriers between the two cultures, for they (among others, Peter Atkins, Richard Dawkins and Susan Greenfield in the UK and Steven Pinker and Stephen Gould in the USA) write with elegance and consummate skill and some of them with an informed knowledge of the English-language literary tradition. Yet it is a notable feature of most, though not all, of these authors that their basic stance is tinged with an all-consuming scientific imperialism that attributes to science the role of the only objective mentor and guide through the jungle of current problems concerning the nature and destiny of humanity.

This exaltation of science is thereby implicitly made at the expense of the humanities, which include theology and religious studies. This demoting of theology is often not so much implicit as vituperatively explicit, for some go further in their denunciation of Christian theology, denying even its legitimacy as a subject worthy of serious pursuit in a contemporary university.

Ironically though, even if 'science' is popularly regarded as having somehow undermined 'religion', people have come to be suspicious of science itself and of apparently authoritative scientists pronouncing, for example, on the safety of beef with respect to BSE, of genetically modified (GM) foods and of experiments to test GM organisms. Much of this suspicion is based on inadequate understanding of the nature of scientific inquiry, and of its results. Nevertheless, it has caused a certain unsettling of the pedestal of self-pronounced guru-scientists in the eyes of the general public – which adds to the cultural confusion of our times and catalyses, paradoxically, the resort to esoteric and exotic, not to say superstitious, notions in the midst of an increasingly high-tech society.

The spiritual life of scientists

Much more significant, however, for our present purposes is that new voices have been heard from within the community of science itself, voices that challenge dismissive attitudes towards religion and theology which are supposedly based on science. For in the last three decades the dialogue between science and Christian theology, and increasingly Islamic and Jewish theology, has intensified as the writings of scientist-theologians have become widely dispersed, and

numerous organisations and symposia devoted to this theme have proliferated and new journals have begun to appear.

Hence the voice of science itself is not accurately represented by the anti-theistic guru-scientists. Indeed it transpires from surveys that in the USA, at least, some forty per cent of practising scientists have theistic beliefs. In 1999, I attended a symposium in Berkeley, California, in which, before a public audience of more than three hundred, two dozen leading scientists related their professional activity as scientists to their own personal, spiritual quests. They included Muslims, Jews and Christians and some who would describe themselves as agnostics. What was striking was a shared sense of wonder about the natural world and their personal anecdotes of their joy in scientific discovery. Commitment to excellence in science was clearly not for them inconsistent with commitment to religion – even to highly specific traditions of belief and practice. They did not see their work as scientists as separate from their life as religious people, and they displayed an openness to new experience, acknowledged the diversity of religious traditions and emphasised the beliefs they shared in common. For them, the scientific and religious quests were explorations into realities – two vocations that are intertwined, indivisible and mutually sustaining.

There was, moreover, no sign at this significant occasion of the arrogant ‘scientism’ which claims that the only knowledge available to humanity is scientific or that scientific knowledge alone can satisfy the human quest for meaning. The speakers were very different in character, provenance, temperament, race and field of study, yet I think they would all have concurred with the humility of outlook expressed by that arch-hammer of ecclesiastics and Darwin’s ‘bulldog’, Thomas H. Huxley, in a letter to Charles Kingsley, the author and evangelical clergyman:

Science seems to me to teach in the highest and strongest manner the great truth which is embodied in the Christian conception of entire surrender to the will of God. Sit down before fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses Nature leads, or you shall learn nothing. I have only begun to learn content and peace of mind since I resolved at all risks to do this.¹

The scientists also echoed the wonder expressed by Fred Hoyle, then (perhaps still) a convinced agnostic, in the remarks with which he concluded his broadcast lectures in 1950 on the nature of the universe:

When by patient enquiry we learn the answer to any problem, we always find, both as a whole and in detail, that the answer thus revealed is finer in concept and design than anything we could ever have arrived at by a random guess.²

The widespread and sympathetic reporting of that Berkeley symposium in the national newspapers and weekly journals of the USA gives grounds for hope that the misconception of the supposed ‘warfare’ between science and religion is, at last, giving way to a recognition of their symbiotic role in the human quest for both intelligibility and meaning.

Yet for the last 150 years this has not been either the popular or academic perception and is light-years away from that synthesis of theology and natural philosophy which pervades that great epitome of the Middle Ages, Dante’s *Divine Comedy*. Dante could depict the figure of Virgil – the Latin poet he admired above all others and for him the embodiment of human wisdom – as leading him through Hell and Purgatory to the very threshold of Heaven. Only there did he have to be handed on to Beatrice, the embodiment of divine Wisdom, to lead him to the ultimate beatific vision of the divine Trinity, of ‘The Love that moves the heaven and the other stars’. Today, science appears to most thinking people to represent the surest and soundest form of human knowledge but is not widely perceived as leading into the divine presence – even when its practitioners evince attitudes of reverence and even awe towards nature, as evidenced at the Berkeley symposium.

Given signs of some members of the scientific community becoming open to the spiritual dimensions of their work, has not the time come for the Christian community, and those of other religions, to reflect more profoundly on the experience of nature, of the world³ that the sciences have opened up?

In spite of the corrosion (corruption, in my view) of post-modernist relativities, scientists and religious believers share a common conviction that they are dealing with reality in their respective enterprises. Scientists would give up if they ceased to see

themselves as discovering the structures and processes of nature, even if only approximately – and worship and prayer would be vacuous if the God to whom they were directed were not regarded as real.

As we shall have cause to discuss later (p.23), the presuppositions of what I say here will be ‘critically realist’ with respect to both science and theology. I think that both science and theology aim to depict reality, that they both do so in metaphorical language with the use of models, and that their metaphors and models are revisable within the context of the continuous communities which have generated them. For it is also the aim of theology to tell as true a story as possible. Hence the religious quest must have intellectual integrity and take into account the realities unveiled by twentieth-century science. These are, needless to say, markedly different from those understood by Dante, let alone those understood two to three millennia ago when the Judaeo-Christian literature of the Bible which has so shaped our religious models and language was assembled. Given the inevitable influence of historical context on the perceived relations between knowledge of nature and knowledge of God, between science and religion, it clearly behoves us to examine the history of the rise of science to provide a better understanding of their relation.

The rise of science

One of the most significant periods in all human history was in the centuries around 500 BCE, when, in the three distinct and culturally disconnected areas of China, India and the West, there was a major expansion of human consciousness: in China, Confucius and Lao-tse and the rise of all the main schools of Chinese philosophy; in India, the Upanishads and Buddha; in Iran, Zarathrustra; in Palestine, the Hebrew prophets; and, in Greece, the literature of Homer, the pre-Socratic philosophers, followed by the whole great legacy of classical Greece to human culture.

In Ionia, the Greek colonists established a vigorous and hard-working culture, flexible and open to many influences – from Persia and further east. It was a time of travel, migration of populations, breakdown of the old and rising of the new. It was in this milieu of fluidity and change that science was born. The earliest scientific documents we possess that are in any degree complete are in the

Greek language and were composed about 500 BCE. I say ‘scientific’ because of the new quality of systematic, rational reflection which the Ionians brought to bear on their questions about the natural world, a quality that was distinctive and original and has remained the central characteristic of science ever since.

To appreciate what the Greeks did, imagine yourself as a Greek child growing up in the seventh century BCE, that is, without any of the scientific knowledge we have today. What would you think were the shape and size of the Earth? How would you map it? What would you think of the lights that shine, by day or by night, far out of reach in the sky above? And what would you make of eclipses? If you or others were ill, how should you treat them? We find Thales (born *c.* 625 BCE), asking the question ‘What is everything made of?’, – the first person, as far as we know, to look behind the infinite variety of nature for some single principle to which it could be reduced and so made intelligible. *His* answer was that all things were made out of water, which is by no means so silly if one thinks of its all-pervasive presence in the natural world. It is significant that in this search for unity behind the diversity of things the Ionians refrained from evoking any of the deities and mythologies of nature which are found in Homer and Hesiod.

Later, when science had moved westwards, the Pythagoreans discovered the significance of numbers but they were handicapped by the want of adequate instruments for experimental research and they thought it vulgar to employ science for practical purposes. Yet we see in their thinking brilliant anticipations of modern discoveries and, as Sir Richard Livingstone has said,

[Their] real achievement ... was in the fact they wanted to discover and that by some instinct they knew the way to set about it ... they started science on the right lines ... I am thinking of four qualities ... the desire to know ... the determination to find a rational explanation for phenomena ... open-mindedness and candour ... industry and observation.⁴

So science was born among the Greeks. But with the coming of Roman dominance, although science continued, like other efflorescences of the human spirit in history the flame began to flicker and grow dim. From here the torch was handed on to the Muslim

culture. Although having allegiance to a single monotheistic religion, followers of the Prophet incorporated many elements of Greek, Egyptian, Persian, Indian and other cultures to enrich their newly made empires. Their language of discourse was always Arabic, such was their intense regard for its special qualities, but they came to cultivate what they called the ‘foreign sciences’ of philosophy, medicine, astronomy and the other natural sciences.

We in the West often forget that Muslim science lasted for nearly six centuries – longer than modern science itself has existed. Only in about 1100 CE did Europeans become seriously interested in the science and philosophy of their Saracen enemies and they had to learn all they could from them before they themselves were able to make further advances. Hence Islam was midwife to the Greek mother of the modern, Western scientific outlook.

The reception in the West of Arab and Greek science laid the foundation both of medieval natural philosophy and of the remarkable awakening in the sixteenth and seventeenth centuries to the power of human reason to interpret natural phenomena, especially in the form of mathematics when combined with experiment. It is well established historically that those involved in this development saw their activities as an outward expression of their Christian belief. That belief led them to expect to observe orderliness in a world given existence by a Creator God who transcends it and is supra-rational. Moreover, because that world was believed to be created by the free act of God, the way that rationality was imprinted in it had to be discovered by experiment. The enterprise was regarded, as Kepler famously said, as ‘thinking God’s thoughts after him’. Thus monotheistic Christian culture, like the Islam centuries before, was an intellectually welcoming environment within which the natural sciences, as we now know them, could flourish.

From that origin in the West some four centuries ago has arisen the modern world in which science dominates intellectual culture – and, I believe, will continue to do so in spite of postmodernist misgivings, for the claim of the natural sciences to depict reality is continuously and pragmatically vindicated by their successful technological applications. That is enough, for most people, to maintain its position in any hierarchy of reliable knowledge (we shall return to this theme later, pp.22ff). As an intellectual enterprise, science is characterised by

rigour, openness, flexibility, innovation, the welcoming of new insights, and a genuinely international, global community. In all of these respects, its public image stands in marked, and usually unfavourable, contrast to that of religious communities, including Christian ones. These latter tend to be seen, if not as lethargic and supine, as closed, inflexible, unenterprising and immune to new insights, continually appealing to the past, to the ‘faith once delivered to the saints’, and socially divisive. So the Christian Churches have an uphill job to commend themselves globally to a world aware of the vastness of new vistas and opportunities.

More particularly, there has been, in the West, at least,⁵ a collapse in the credibility of all religious beliefs, notably Christian ones, as they are perceived as failing to meet the normal criteria of reasonableness, so strongly present in the practice of science, namely: fit with the data, internal coherence, comprehensiveness, fruitfulness and general cogency. Yet spiritual hunger is endemic in our times – and attempts to satisfy it lead to many aberrations in the ‘new religions’, the resurgence of ‘paganism’ and ‘Earth cults’, and so on. Intellectual society seems to be full of wistful agnostics who would like to be convinced that there is indeed an Ultimate Reality to which they can relate but who are not convinced by the claims of the monotheistic religions to be speaking of reality. Thus all religions, and especially Christianity in the West, face new challenges posed by the successful methodology of the sciences and by the worldview it has generated. Such an intellectual challenge is not new in the history of Christianity. It is worthwhile to recall in brief some of the past perceived threats to its basic beliefs.

The forging of Christian belief through past challenges

Religion in general has been defined by Gerd Theissen as ‘a cultural sign language which promises a gain in life by corresponding to an ultimate reality’.⁶ Through its language, symbols, rituals, scriptures, art, music and architectural sign language, the Christian faith has promised the fruition of human existence in profound and eternal relation to the Ultimate Reality of God as manifested and made effectual in and by the teaching, life, death and resurrection of a particular person, Jesus of Nazareth.

More than almost any other religion, Christianity has elaborated a complex conceptual system of beliefs to give intellectual coherence

to its intuitions and practices. What is affirmed, how it is affirmed and what sort of metaphors are utilised to elaborate its system of beliefs have, much more than most Christians would admit, continually changed – and sometimes with an abruptness comparable to that of the paradigm shifts said to characterise the history of science.

In the two millennia of Christian history one can identify many transitions induced by facing up to threatening challenges, that generated a new vitality and relevance. In the very earliest days, recorded in the pages of the New Testament, St Paul faced the challenge of taking the insights of the first Jewish followers of Jesus – claimed to be the hoped-for Messiah, the ‘Anointed One’ – into the wider Jewish diaspora (hence Paul’s struggles with and analyses of ‘Law’ and ‘grace’). Then, as in the speech attributed to him at Athens, he entered the wider Hellenistic culture, an extension exemplified also by the books attributed to ‘John’ in the New Testament. Paul’s journeys from Jerusalem to Athens and then to Rome symbolised a profound challenge to the faith and experience of the early Jewish witnesses, which was magnificently surmounted, enabling Christianity to become the conduit, more than two centuries later, of the religious impulses of the whole Roman Empire.

Christians then had to come to terms with the intellectual life of that Empire, expressed as it was in the sophisticated and philosophical terms of a modulated Hellenism. The Cappadocian Fathers (Gregory of Nyssa, Gregory of Nazianzus and Basil of Caesarea) achieved this when they were able to articulate a system of Christian beliefs consistent with and in terms of the most convincing, largely Neoplatonic, philosophy of their day. They out-thought their opponents both inside and outside the Christian church.

I have already mentioned another potentially traumatic challenge, in the thirteenth century, to the received Christian faith – namely, the arrival in the West through the mediation of the Arabs of great swaths of Greek literature. The works of Aristotle posed a particular challenge with their comprehensive worldview arrived at by critical thinking. To this Albert the Great and his pupil Thomas Aquinas responded so effectively that the latter’s intellectually powerful synthesis of faith and reason dominated the church for more than six centuries. It remains today an intellectual construct that Christian philosophers ignore at their peril.

Apart from certain famous contretemps, the emergence of modern natural science in the seventeenth century was nurtured by its advocates and practitioners in a way that, as we have seen, they regarded as consistent with and a natural consequence of their general understanding of nature as creation – that is, as being given existence by a **transcendent** Ultimate Reality, named ‘God’ in English.

However, the subsequent eighteenth century too readily interpreted Newtonian science to imply a natural order that was so mechanistic and clocklike that God was often relegated to the role of the original Clockwinder. This concept of the absentee God of **deism** undermined the belief of Christians (and indeed of any adherents to the Hebrew scriptures) in God as living and **immanent** in the processes of the world. In the nineteenth century, Darwin’s discovery of the evolving nature of the biological world and of the role of natural selection entailed for some the final demise of a God no longer needed to account for biological design, yet it also reinstated the idea of God as creating all the time through natural evolution. As one Anglican theologian said in 1889, ‘Darwinism appeared, and, under the disguise of a foe, did the work of a friend.’²⁷ Nevertheless, the supposed warfare between science and religion imprinted itself on the popular mind in the English-speaking world, not least after the 1880s because purely legendary and unhistorical accounts of the 1860 Oxford encounter between the Bishop of Oxford, Samuel Wilberforce, and Thomas Henry Huxley were propagated.

An uneasy truce between science and the Christian religion prevailed thereafter, each preserving a demarcated field for itself. It took over a hundred years, until the middle of the twentieth century, for it to become apparent to a number of thoughtful scientists who were also Christian thinkers that the situation was not that simple. For them the whole relation of science to religious belief, in particular to Christian belief, was ripe for reappraisal. In practice this renewed dialogue between theology and science has taken place mainly in the academic world and has not had much impact on the general public or even upon those in the pews. Current academic activities include: the development of an increasingly sophisticated literature; the establishing of societies and academic centres devoted to these issues; the publication of international journals in the field; the organising of public lectures and a swarm of conferences and

symposia; the funding of academic courses; and, at long last, the funding of permanent academic posts in this field. Of all this, most people, including many religious people, are largely unaware.

The challenge of the scientific culture to religion today

Our brief incursion into the history of Christian thought suggests that the meeting of intellectual challenges, painful though it may be at the time, in the long run reinvigorates Christian theology and thereby the Christian community at large. Today it is the scientific worldview that constitutes the challenge to received understandings of nature, humanity and God – in a way that can be initially devastating yet is potentially creative. The credibility of all religions is at stake under the impact of: new understandings of the natural world, of the place of humanity in it and of the very nature of personhood; and – even more corrosively – the loss of respect for the intellectual integrity of religious thinking in general and of Christian theology in particular. The impact of science is a challenge primarily to theology, which is concerned with the articulation and justification of religious assertions about God and about God's relation to nature and humanity. This will be the centre of our concerns here. Not that the applications of science, especially at present the biological sciences, does not raise profound ethical issues and have implications for the practice, norms and injunctions of religious communities – but that will not be the focus of this work.

Theology, like science, is a search for intelligibility but, unlike science, it also seeks to meet the human need to discern meaning which has generated religion as a social phenomenon in all human societies. However, any meaning attributed to the existence and processes of nature and human society must rest for its justification on the hard thinking required to render those phenomena intelligible. So I make no apology for concentrating here on theology. The nature of the challenge of scientific perspectives to theology is well illustrated by the vista of the cosmic process represented in that *Genesis for the third millennium* which forms my Prologue. The background assumptions of religious beliefs, notably those of the Judaeo-Christian tradition, concerning the creation of human life on the Earth has been entirely replaced in the last 150 years by this new epic of evolution – and even more fundamental changes are

imminent in our perceptions of human nature as the brain sciences delve into the physical basis of human mental capacities.

The Prologue expresses a theistic perspective on cosmic and biological evolution but it has to be recognised that there is no easy route from reflection on the natural world unveiled by the sciences to any account of the nature and attributes of God. This was indeed the aim of the ‘physico-theology’ of eighteenth-century English theologians and of much ‘natural theology’ everywhere up to the end of the nineteenth century. It was thought possible to integrate science with what was claimed to be ‘revealed’ theology, a procedure going back at least to Aquinas. This aim has been frustrated in the last 150 years by the ambiguity of nature itself as a source of inference about God and by questioning of the validity of claimed sources of divine revelation as a result of critical studies of the *actual* histories of religious communities and their sacred literature.

Nevertheless, any exploration towards God can be based only on what we understand to be good grounds for reflection on nature and humanity – and the investigations of science provide the most widely accepted and justified basis in this regard. This is, of course, not the only exploratory route towards God – for the paths, among others, of aesthetic and mystical experience have been, and still are, those followed by many. But the inevitably subjective character of such experiences makes them less accessible, and so more contentious, as the basis of public knowledge, of which scientific knowledge is the outstanding exemplar. What characterises science is a method that is manifestly capable of producing reliable public knowledge about the natural world, sufficient for prediction and control and for producing coherent, comprehensive, conceptual interpretations of that world. The mere existence of such a method and of such a corpus of reliable knowledge resulting from it is a challenge to traditional religious attitudes. Moreover, such authority as the scientific community has – and this too is in marked contrast to most religious communities – can always be called in question. Yet no individual scientist can ever repeat all past experiments, which have to be taken on trust. The scientific community has therefore a limited but never absolute authority. Can religion learn to outgrow its reliance on claimed authorities and the popular image of a God who acts and reveals by supernatural means – the

'laser beam' God rightly caricatured by David Jenkins, former Bishop of Durham?

What can theology learn from the way in which science explores the natural world about how its own explorations towards God might be conducted? Would, should, this influence the way in which theology goes about its investigations in the future, not least in its engagement with the content of the scientific worldview, so totally different from its traditional presuppositions?