Introduction

It has been an axiom for Christian anthropologists (that is, for Christians reasoning about human nature) that human beings are animals of a peculiar kind: 'spiritual amphibia' who are the meeting point of 'merely biological' and 'merely angelic or intellectual life'. It has also been axiomatic that human beings were particularly important to God, and that their appearance in the world was by special creation (even if that did not take place as literal-minded readers of the Book of Genesis might suppose[1]). Many Christian thinkers have also placed great stress on 'natural law', which is what 'nature has taught all creatures', as the basis for moral exploration. All these ideas have been called into question by recent biological theory and observation. It may be that some of them, and some related concepts (e.g. species essentialism), need to be abandoned; others need only to be reformulated, and a few need merely to be reasserted against the errors of our age.

Some writers have suggested that none of this is true: 'science' and 'religion', it is said, have entirely different provinces and operate by entirely different rules. Nothing about our biological history and nature, so they say, has any relevance to any 'religious' claim: science deals with 'facts' and religion only with 'values'. That claim is not unreasonable, though I believe it to be false; but if there is such a distinction, that itself

[1] 'The basic error of fundamentalism is something from which neither rabbinic midrashists nor church fathers suffered: it is a refusal to recognize the variety of styles and genres of statement in the Bible, and therefore to realize that the divine Truth, which both Jewish and Christian faith ascribes to the Bible, comes to us in many modes, some of them essentially symbolic', Robert Murray, *The Cosmic Covenant* (Sheed & Ward: London 1992), p. xviii.

demands a rigorous reformulation of traditional Christian discourse. Perhaps 'religion' is what Marx suggested: 'the opium of the people, *the heart of a heartless world*'.[2] It depicts a possible future, not an actual past. Those who make the distinction frequently confuse it with a quite different one: 'science' has no limit to its enquiries, accepts no explanation as complete, and takes nothing merely 'on authority', whereas 'religion' can only be a matter of unquestioning faith, dependent on the authority of sacred texts and persons.[3] My own experience is that scientists are as obdurate in their convictions as anyone, and that the institutions of peer review and academic rivalry have often made it difficult to question fundamentals.[4] 'Believers' and academic theologians, in my experience, are no *less* ready to subject their convictions and prior assumptions to critical enquiry – which is not to say that *anyone* is eager to do so.

The axioms of traditional Christianity, and the problems posed by modern biological science, are significant for more than Christendom. All the Abrahamic faiths[5] have very similar conceptions of our presence in the world. Indeed, it is difficult to find any tradition in which something like those axioms is not affirmed. In some archaic religions non-human animals are also denizens of the spirit world, and human beings, just as such, are nothing special, though a particular tribe may be. In Hindu

[2] Karl Marx, in his *Criticism of Hegel's Philosophy of Right*, tr. Annette Jolin and Joseph O'Malley (Cambridge University Press: Cambridge 1977); the point is not that religion is a delusion, but that it is a dream. Unfortunately human dreams have a way of coming true in ways that we might not wish.

[3] The claim is made, for example, by Steve Jones in *In the Blood: God, genes and destiny* (HarperCollins: London 1996), p. xvii.

[4] It is axiomatic, for example, that *all* knowledge is either good, or at least neutral, and only the uses of it (which are someone else's fault) can be bad; that all knowledge must be founded on repeatable experiments that demand no especial virtue to complete or understand; that the increase of human knowledge is enough to justify any amount of merely animal distress; that any sign of public disapproval merely shows that 'the public' needs to be better educated about scientific values. None of these claims strike me as obvious.

[5] These include Rabbinic Judaism, the various Christian churches, and Islam: all trace their beginnings to the historical example of Abraham, and are, in broad terms, ethical monotheisms. I do not mean to invoke that chimera, 'the Judaeo-Christian tradition'. See W. Cantwell Smith, *The Meaning and End of Religion* (SPCK: London 1978; first published 1962).

religions, distinctions of caste and cult may matter more, in a way, than any difference of species. In Buddhism the human world is only one of six distinct realms of being (the others being the worlds of animals, gods, demons, hungry ghosts and hell), and enlightenment lies in realizing our non-identity with any form we briefly wear: all forms are empty of significance. But all these notions, in usual practice, come round to the same three axioms: as human beings we do more than eat, drink, mate and sleep – we also dream, think, worship and aspire; our being thus human gives us a special relationship with cosmic reality; how we are to behave has something to do with how things generally do behave. Even those creeds that urge us to transcend or correct nature have some vision of the better way which demands that we take *some* judgements as merely given. Even those biologists who have most sought to contradict tradition often find it hard to change. Nature is something we both defy and follow, and 'human nature' demands that we inhabit other worlds of meaning than the merely biological. If we did not, however could we have formulated modern biological theory? As Chesterton observed, only human beings really notice that they resemble other creatures, and so differ from them even in their similarity. 'The fish does not trace the fish-bone pattern in the fowls of the air; or the elephant and the emu compare skeletons.'[6] Even those biologists who insist that human beings are only another variety of animal find it reasonable to use non-human creatures in ways that they would shrink from using other humans.[7] I do not say that they are right to do so.

So questions about our history and nature are of more than parochial interest. How can we preserve, or can we preserve, the notions which have so far sustained us all? How can we accommodate ourselves, as we have conceived ourselves, within the theories that our best scientific endeavour has endorsed? And what follows if we cannot? What follows, in particular, for our conduct towards other creatures, whether human or

[6] G. K. Chesterton, *The Everlasting Man* (Hodder & Stoughton: London 1925), p. 307.
[7] Chesterton himself, it is only fair to add, entirely disapproved of vivisection (see 'Christmas' in *All Things Considered* (Methuen: London 1908).

non-human, and for our plans for the future? What difference, especially, must evolutionary theory make?

Adam Sedgwick, Professor of Geology at Cambridge from 1818 to 1873, regarded Charles Darwin's theory of 'evolution through natural selection' as an ill-grounded, and dangerous, speculation. In his *Spectator* review in 1860, he expressed his

> 'deep aversion to the theory; because of its unflinching materialism; because it has deserted the inductive track, the only track that leads to physical truth; because it utterly repudiates final causes, and thereby indicates a demoralized understanding on the part of its advocates. By the word, demoralized, I mean a want of capacity for comprehending the force of moral evidence, which is dependent on the highest faculties of our nature. What is it that gives us the sense of right and wrong, of law, of duty, of cause and effect? What is it that enables us to construct true theories on good inductive evidence? Theories which enable us, whether in the material or the moral world, to link together the past and the present. What is it that enables us to anticipate the future, to act wisely with reference to future good, to believe in a future state, to acknowledge the being of a God? . . . By gazing only on material nature, a man may easily have his very senses bewildered; . . . he may become so frozen up, by a too long continued and exclusively material study, as to lose his relish for moral truth, and his vivacity in apprehending it.'[8]

Sedgwick saw a genuine difficulty, a genuine threat, and therefore resisted the theory. Others have believed that we could accept the theory and still accommodate all that we need of old humanity (however much that is). A few, as I have indicated, have thought that we should simply hold 'the realm of science' and 'the realm of religion' apart – a doctrine which Aquinas denounced (in the shape of Siger of Brabant's Two Truths Theory) some centuries ago.[9] According to that account, it is as unreasonable to expect 'religious' or 'moral' truth to agree with

[8] Adam Sedgwick, 'Objections to Mr Darwin's Theory of the Origin of Species' (7 April 1860); reprinted in David L. Hull, ed., *Darwin and his Critics* (University of Chicago Press: Chicago and London 1983), pp. 159–66, esp. pp. 164–5.

[9] It was this, by Chesterton's account, that roused Aquinas to a last great burst of fury (*St Thomas Aquinas* (Methuen: London 1933), pp. 106ff.). Since Chesterton is now too often supposed to have been 'a mere journalist', and therefore unreliable, it is worth adding that Etienne Gilson found it reasonable to say that this was the best book ever written on Aquinas (M. Ward, *Gilbert Keith Chesterton* (Sheed & Ward: London 1944), p. 526); this seems fair comment.

'scientific' truth as to criticize '*Xena: Warrior Princess*' for obvious anachronism and physical implausibility (whether it is science or religion that is to be compared to *Xena*).[10] My own suspicion is that the doctrine of 'Many Truths' amounts to exactly the sort of polytheism that Abrahamists have always resisted: there can in the end be only *one* claim on our devotion and belief. But whatever the intellectual or psychological solution may eventually be, at least the question must be asked: how human, how religious, how Christian can a biologically informed intelligence now be? Conversely, how much of biological theory, observation and practice can we justly entertain?

That question clearly strikes some people as offensive. Surely, they say, we have a duty to the Truth, which transcends any other ethical or religious demand. Surely, we must have learnt by now that 'science' cannot be halted or suppressed, and that it should accept no premises upon the authority of any sacred text. We must 'cut loose the natural history of mankind from the Bible, and place each upon its own foundation, where it may remain without collision or molestation'.[11] But it is worth recalling what Josiah Nott was demanding, in his 'lectures on niggerology': the right to preach that there were many different human species, with no necessary similarity or shared compassion. Is it *obvious* that people have a right to spread whatever tales they wish, and that there are no other duties than one 'to the Truth'? Is it *obvious* that there is only one route to the Truth, and that we must abandon everything else to reach it? Is it *obvious* that those who abandon an older authority then owe their thoughts to nothing but the Truth? Is it even *obvious* that all truths should be taught, as a matter of course, to children, against their parents' wishes, and irrespective of the effect such

[10] 'For the three hundred years prior to Tycho [Brahe], science and religion had coexisted on terms under which science was to be regarded as merely a collection of "likely stories" – stories that could be interesting in their way, but from which it was completely inappropriate to expect any real picture of the physical world', Victor E. Thoren, *The Lord of Uraniberg: a biography of Tycho Brahe* (Cambridge University Press: New York 1990), p. 275, after Edward Grant, 'Late Medieval Thought, Copernicus and the Scientific Revolution', *Journal of the History of Ideas* 23.1962, pp. 197–220.

[11] Josiah Nott, cited by Stephen Jay Gould, *The Mismeasure of Man* (W. W. Norton & Co.: New York 1981), p. 70, from W. Stanton, *The Leopard's Spots* (University of Chicago Press: Chicago 1960), p. 119.

teaching has? Is it not, on the contrary, obvious that even 'great scientists', let alone the common kind, are frequently moved by prejudice, and would often have done much better to pay attention to an older and more liberal tradition? Devotion to the Truth makes sense if we suppose that it is *God* who is that Truth. But why should we devote ourselves to a Truth that is, expressly, not divine?

Much of what follows will, I hope, be relevant to any humane intelligence. But it may also be true that Christian tradition allows one further question. The majority of Christian thinkers have probably followed Greek, and Hebrew, precedent in supposing that Christ revealed what all of us, in our heart of hearts, already know. He is called the *Logos* because He is the one through whom we are *logikoi*.[12] At the least, the new commands of God are consistent with the ones revealed through human reflection upon nature and society. If biological theory now casts doubt on common sense, it also casts doubt on Christendom. But some theologians have entertained the difficult suggestion that all merely human thought is sin: 'natural religion' amounts to devil worship, secular virtues are but splendid vices, and the Christian revelation is that we were always wrong. On these terms (however difficult they are to formulate, let alone to face), a sound biological understanding which contradicted common sense might, paradoxically, confirm the Christian view – except, of course, that 'sound biology' is as impossible for sinners as 'sound religion'. God and Nature are sometimes, in many traditions, almost the same thing. In others, and notably in some Christian sects, they are almost opposite things. A dim reflection of that opposition appears to haunt even some atheistical biologists, who speak of fighting back against 'the selfish gene' in the name of higher, or at least more amiable, values (without explaining where these values come from, nor how we might hope to succeed).[13]

There may be a truth to learn even from such Manichaean

[12] The aphorism is owed to Origen, cited by M. F. Wiles, *The Spiritual Gospel* (Cambridge University Press: Cambridge 1960), p. 93.

[13] See S. A. Barnett, *Biology and Freedom* (Cambridge University Press: Cambridge 1988), pp. 136ff. for an appropriately acerbic response.

stories[14] – but one simple answer was given by Augustine long ago, to those who believed themselves uniquely inspired by a God with nothing to say to anyone else. They must concede that at least they owed their knowledge of the alphabet to human beings, and so their knowledge of the revelatory scriptures. If Fact and Value really were inscrutably distinct, we could never find out Value: 'if God is not in Nature, He is not in you', as Plotinus warned those who thought themselves exalted above all natural things.[15] Conversely, we can value nothing that the facts of our nature make impossible for us. If we cannot sensibly trust ourselves, we cannot even trust our own best image of the trustworthy. If we can identify something as deserving greater trust than any ordinarily human voice, we cannot simultaneously suppose that we are thoroughly perverse. And finally (for the moment), any supposed Fact which really had no Value would not be worth believing.

In brief, we cannot sensibly adopt a theory which entails that we could never have the intellectual or moral virtue to discover or to recognize its truth. Any doctrine of 'total depravity' (however plausible it sometimes seems) implies that we could not recognize its truth. It follows that God cannot have left Himself without witnesses, even if the witness is often disturbed or cloudy. It also follows, so I shall suggest, that a *strictly* Darwinian biology cannot sensibly be considered true. If it were, we could neither have the wit to find it out, nor any duty to admit it if we did.

The issue before us is to discover or determine what we are, and what we are for. Traditional believers – amongst whom I count myself – suppose that there are answers to those questions, and that they can be found by prayerful examination of

[14] Manichaeanism is one of a select group of consciously devised religions: its founder, Mani, supposed that the world of our present experience was created by one of a pair of deities, and that it was the *other* god who was responsible for our grasp of real virtue, and our only hope of escape from misery. David Lindsay's *Voyage to Arcturus* (Gollancz: London 1965; first published 1920) is a fine literary exposition of the system, and one informed by contemporary biological theory.

[15] Plotinus, *Enneads* II.9.16, 26–8; the chapter in question is entitled, by Plotinus' follower, Porphyry, 'Against the Gnostics'. I have used A. H. Armstrong's translation throughout: *Plotinus*, vols. I–VII (Loeb Classical Library, Heinemann: London 1966–88).

the Word of God in Scripture – and the world. Less traditional believers, reacting against the follies that have often been taught as gospel, believe instead that the answers are not for us to discover, but rather to decide. The question is not (for them) about our present world, but about the world to come, and its coming rests on human enterprise. Humanity is a bridge between the unmeaning world of brute biology and the future, happy world of humane artifice. I am myself less optimistic about the sort of world that human beings, unaided, will create, but also less enthralled by any *present* order than conservative believers are. It is precisely because I think our nature is imperfect that I distrust the plans of those who would remake it. Conversely, it is because I catch occasional glimpses of a redeemed humanity that I can believe we are not bound for ever within the circles of this world.

CHAPTER I

The development of Darwinian theory

SAMENESS AND DIFFERENCE

Civilized people, almost everywhere, believe that people are unlike dogs, cattle, sparrows and ants. People decorate and clothe themselves; they build houses, fences, roads and monuments; they tell elaborate stories about their personal and communal history, and sign their names to contracts. Most civilized people also assume that people matter more than 'animals', although they do not agree what treatment that importance warrants. Tales about tribes who treat human beings as property, or as meat, simply support our own conviction that we ourselves are civilized. Tribes who seem to regard monkeys, crocodiles or cows as their superiors, or at least as 'sacred', almost make us suspect that 'savages' like that are not *really* human (and so may be treated with the same contempt that they, we think, display).

Such humanism is itself a strand in all the Abrahamic faiths, as also in the sort of atheism which thrives in a post-Abrahamic culture. The first point to be made about the humanism of civilized humanity is simply that it was always compatible with the equally obvious truth that people are very *like* dogs, cattle, sparrows and ants. Obviously, we are born, eat, drink and die. We also jockey for position, make up to potential mates and allies, mark out our territories, defend our young, and (ants apart) play games. It has always been obvious that people are mammals (like dogs and cattle), vertebrates (like dogs, sparrows, crocodiles and trout), and animals (like dogs, ants, worms and jellyfish). Our very shapes are so alike that we can imagine easy

transformations, of human to wolf or dolphin. These similarities pick out real classes. There is no real class of (for example) yellow things (although a great many things are yellow), since there is no true generalization about all yellow things beyond the merely tautological (that they are yellow). Being mammalian, or vertebrate, or animal, entails many other properties, which allow real, useful classifications. It does not follow that such classes have real essences, as though all and only mammals, for example, had a particular set of properties. Perhaps there is no property that all and only mammals have – but there is still good reason to distinguish mammals and birds.

Common sense identifies real species and real kinds of creature. Their existence suggests that there are a limited number of ways to be, variously realized in the world of nature. Similarly, there are many crystalline forms, having discoverable similarities and differences. Individual crystals may have different sorts of symmetry. Briefly: a crystal has a *centre* of symmetry if every face of the crystal has a similar face parallel to it; it has as many *planes* of symmetry as there are ways of dividing the crystal into portions which are mirror images of each other; if it is rotated around an *axis*, it may reach a position where all its parts are congruent with the original position only after a complete (360-degree) rotation, or at earlier points. This last phenomenon identifies the axes of rotation: it turns out that crystals can return to congruence after movement through 360, 180, 120, 90 or 60 degrees, and there may, correspondingly, be four sorts of axis of rotation (dyad, triad, tetrad and hexad; there is no pentad axis,[1] and a full 360-degree rotation is possible for anything). Summing up these different symmetries identifies seven crystal systems (a cube, for example, belongs to the same system as octahedrons and rhombic dodecahedrons).[2]

[1] There are, however, aperiodic 'quasi-crystals', returning to congruence after a 72-degree rotation, which have been identified as possible analogues of DNA; see Paul Davies, *The Fifth Miracle: the search for the origin of life* (Penguin: Harmondsworth 1999), pp. 244–5.

[2] For the record: triclinic crystals have only one axis of rotation (that is, they return to a congruent state only after rotating through 360 degrees); monoclinic have one diad axis only; orthorhombic have three diad axes; tetragonal have one tetrad axis only; cubic have four triad axes; trigonal have one triad axis; and hexagonal have one hexad axis. Other symmetries are mathematically related to those limitations. This