I

INTRODUCTORY: RELIGION AND NATURE

IT is customary, and perhaps even desirable, for anyone who has the honour to be invited to deliver lectures on Lord Gifford's foundation to say something of the conditions on which the lectureship was constituted. This is the more necessary at the present time when Natural Religion is temporarily under a cloud and when certain of the recent lecturers have not concealed their belief that for the Christian it is, if not a contradiction in terms, at least a heresy which he is bound to renounce and castigate. If nature is what Saint Augustine proclaimed it to be, a mere *massa perditionis*, then obviously no other course is possible.

It need not be argued that for such an attitude there is a reasonable defence. Natural religion is a phrase that came into existence in an atmosphere of conflict and as a challenge to the prevailing supernaturalism of traditional orthodoxy. At its best it was significant of the attempt to deliver Christendom from its thousand years' captivity to the belief in a rigid antithesis between the secular and the sacred, and of the conviction of the best seventeenth century thought that the order of nature not only proceeded from the same source but revealed the same quality as the order of grace. But dualism was too deeply ingrained in Catholic and Protestant theology for the phrase to be sympathetically considered: it threatened the Catholic separation of reason from faith not less than the Protestant doctrines of the universal effect of the Fall: it savoured of Spinozism and, curiously enough, of the rationalistic deism which was its opposite: it infringed the dearest prerogatives both of ecclesiastics and of Calvinists: if there were

any such thing as natural religion, then the uniqueness of Christ, the certainty of hell, the necessity for *sola fides*, indeed the whole structure of conventional apologetic were threatened. The denunciations called out by so conciliatory and orthodox a treatise as Sir Thomas Browne's *Religio Medici* show how inveterately hostile were the Churches of Western Europe to any attempt to formulate 'a religion for the scientist'.

The effect of such hostility was inevitable. The phrase became a slogan—to its opponents a synonym for laxity, almost for paganism, to its upholders not only a repudiation of the miraculous and supernatural as these were commonly understood, but a protest against any experience which could not be explained and even demonstrated by the scientific reason. So long as this reason was given the large scope and meaning which it held for Whichcote or Cudworth, for Bishop Butler or for William Law, natural religion could be welcomed and acclaimed. When reason was made equivalent to mathematics and the universe was given the character of a mere machine, the phrase became less acceptable. It may easily be argued that when Lord Gifford used it he did so with a desire to exclude the supernatural quite as much as to expound the natural.

If this was in fact his intention, it is manifest that it has been widely ignored by very many of those who have accepted appointment under his trust. For me as for them it would be impossible to conform to his will in such terms; indeed my whole contention is that nature and supernature belong together and that to divorce them, as is, alas, so freely done by our neo-orthodox theologians, is to come perilously near to the most notorious of all the early heresies. If nature is so corrupted as to be the antithesis of grace, then the Creator must be, as the Arians supposed, of a different substance from the Redeemer—unless of course He has, as some suggest, ceded His control of the world to the successful rebellion of the devil. If grace is radically contrasted with the beauty and truth and goodness of the natural order, then any belief in a real Incarnation is impossible—unless the Christ be, as the Gnostics maintained, and their modern followers admit, a divine intruder

totally other than mankind. If God is God, and God is manifested in Christ, then Creation, Redemption and Sanctification must be identical in origin and fundamentally also in character. It was the chief purpose of the Nicene Creed in its original form to maintain that this is the case.

If natural religion is a phrase open to objection as implying the exclusion of everything that cannot properly be assigned to the order of nature as normally understood, dislike of it has certainly been increased by the identification of nature with the realm of science, and science with the technique of weight and measurement. Many of us who insist upon the continuity of nature and supernature cannot approve, indeed strongly resent, the process which has first abstracted from the natural world certain elements in it susceptible to quantitative study and mechanistic interpretation, and then has proceeded to claim that these elements do in fact constitute the whole of the natural order. This matter is so important in itself and so germane to the subject of these lectures as to demand a fuller examination.

Nature in the sense in which it will be used in these lectures includes the whole of man's physical and terrestrial environment, earth and sky, land and sea, plants and animals, everything from the structure of the atom to the composition of the galaxy, and from the non-filterable viruses to the saints and sages of mankind. It is convenient to speak of the values discernible in this environment and of the quality of our spiritual and mystic insight into it as supernatural: but this does not imply that they contradict or are antithetical to the natural order—merely that they represent a higher level of our experience of it. It does not lie within the scope of these lectures to inquire into the special problem of man's dual relationship to nature: obviously he is not only, like the animals, himself a part of nature 'rolled round in earth's diurnal course with rocks and stones and trees', but, unlike them, he is also capable of a sense of detachment from it which at once involves a capacity to contemplate and criticize and also to feel solitary and self-conscious: in this regard it may be legitimate to call him 'the great Amphibium'—though the phrase has been gravely misused.

But it is clear that he has this double attitude, and highly probable that here is the distinction which gives him his special status. That the power of contemplation and of conscious selfhood alike spring out of a basic sense of awe, and that in consequence man may properly be distinguished as 'a worshipping animal' 'made in the image of God', is perhaps a legitimate inference from the evidence. If so, it would indicate how intimately connected are the dual aspects of religion, the awareness which has its culmination in ecstasy and the shame which involves penitence and self-abasement.

From the earliest days of our species man's relationship to nature shows this twofold quality. He derives from nature not only the sustenance of his physical being but the imagery and setting of his emotional and intellectual life. But he is from the first never able merely to accept and enjoy it: he must always be discovering from it affinities and animosities, mysteries which fascinate and terrify, objects that possess magic properties, haunts of ancient dread, presences that arouse imagination, problems that stimulate thought. It is at once a work of art—and we are artists before we are scientists or moralists—a school for curiosity and its satisfaction, and a home for growth in character and fellowship.[1] In it all is what Rudolf Otto has taught us to call the holy, the *mysterium tremendum et fascinans*. Totem and fetish, tabu and code, myth and folk-tale are gradually developed; and the apparatus of religion, cultus and ethic and doctrine, appears in embryo.

How a vague and undifferentiated animism, appropriate to the great god Pan, passed into a polytheism suited to man's growing ability to differentiate, analyse and estimate his surroundings; how this in turn gave him material for a varying valuation of the universe and so fixed the broad types of religious ethos—world-renouncing or world-accepting, dualist or pantheist; and how, thus, experience of the natural suggested and coloured the interpretation of the quality and meaning of man's life; these questions will always deserve the closest attention[2] even when, as at

[1] The subject is developed in my book, *The Creator Spirit*, pp. 105–31.

[2] I would acknowledge my debt to J. Oman, *The Natural and the Supernatural*, the most profound treatment of this subject known to me, and a book that has received less attention than it deserves.

present we can only see them in broad and often fragmentary outline.

At a very early stage the problem of number, unity and plurality, the significance of particular numbers and sequences, had begun to attract attention; and speculations about it are an important factor in the growth of human thought. The starry heavens, the phases of the moon, the appearances of the planets, and their possible influence upon earthly happenings and human destiny, these played a part (though, relatively to other mysterious phenomena which bore more directly upon human prosperity, an unimportant part) in shaping man's reaction to his world. But it is with rain and sun, seed-time and harvest, the ways of beast and bird, the fertility of cattle, the procuring of food and shelter and the management of domestic and tribal affairs that his days were principally occupied. The organic life around him, human, animal or vegetable, was always the primary stimulus alike to his activities and to his speculations.

Even when the age of intellectual inquiry was in its splendid springtime in Greece there is little evidence that abstract and numerical problems or even those of motion and its transmission took a prominent place or made a large contribution. The Pythagoreans like the priests of Egypt and the magians of Persia observed and counted, measured and speculated with real accuracy and insight: mathematics began to be a valuable part of man's equipment and to stimulate and guide his ingenuity and inventiveness: machinery of a simple sort was constructed and used: but it is with himself and human society, with plants and animals and with the significance and interpretation of nature that thought is chiefly concerned; and when Aristotle, the first of scientists, set out his teaching, though he raised and discussed the question of the mover and the moved, it was with the natural order in the full sense rather than with science in its modern quantitative aspect that he fills his books.[1] It is the total reaction to the order of nature, and

[1] Those like Professor B. Farrington who interpret Greek science in Marxist terms are reduced to denigration of its greatest minds and to a wholly unhistorical estimate of the scientific and social concern of the Ionic and Atomist schools. For a devastating exposure of their case, cf. F. M. Cornford, *The Unwritten Philosophy*, pp. 117-37.

not merely the mathematical or industrial manipulation of it, that is to him, as to most of us, the important consideration.

It is with man's attitude to nature as a whole—an attitude out of which has developed at particular periods, and notably since the seventeenth century, the scientific movement strictly so called —that the student of religion is primarily concerned. The study of nature is indeed a perennial obligation for all mankind: we live with it and by it; and our general valuation of it, a valuation so deep-seated as to be largely unconscious, has a profound influence upon our whole life and thought. Hence the relation of religion towards nature, as Dr John Oman has proved, supplies a fundamental source of study for those who would appreciate the true character of a religious system; it is a matter far larger and more significant than the familiar business of religion and science. For science itself, as at present limited in scope and competence, only includes particular elements of the natural order; and these have been selected less for their intellectual and philosophic than for their practical and utilitarian interest. Indeed it is largely out of the misunderstanding between the order of nature and the field of science that our controversies have arisen. Instructed scientists are fully aware that they are only concerned with certain special aspects of nature, aspects appropriate to the scope of a particular research and patient of a special and technical manipulation. But the ordinary person, and indeed often the less thoughtful scientist, assumes that science has taken the whole of nature into its purview, that what it does not include is either unimportant or illusory, and that hypotheses valid for particular data are laws of universal application. Students of the subject who are familiar with the detailed history of any scientific development will easily recall examples of the ignoring and indeed the suppression of evidence which did not happen to be compatible with current scientific convictions.

This is not, of course, a defect peculiar to scientific research. In some degree every specialist must limit the field of his studies and select from it the evidence immediately relevant to his inquiry. That he should afterwards check his results, by testing their

appropriateness to related problems and where possible by considering their bearing upon knowledge as a whole, is plainly desirable. But in these days of increasing departmentalism, and when no generally approved philosophy supplies a criterion, he cannot be expected to do so with any completeness. In fact even in the closely related fields of botany and zoology it is not difficult to find signs of a lack of co-ordination.

Such a defect only becomes important when, as has happened in this case, hypotheses based upon admittedly selected evidence are put forward as if they not only covered the whole order of nature but could be used to exclude any other data from consideration. To the historian, for example, nothing is more evident than that the era of modern science was initiated by a new enthusiasm for investigation and classification and speculation and by a new method of observation and experiment; and that in its early stages the movement owed far more to the biologists than to the mathematicians, far more to the anatomists and herbalists, the gardeners and explorers than to the astronomers. To represent the history of science, as is done in almost all the text-books, as a papal succession, Copernicus, Kepler, Galileo, Newton, with Boyle and Hooke and a few others wedged into the series, is only possible on the assumption that the important contributions are those which led up to the dominant mechanism and determinism of the late nineteenth century, and that the astonishing achievements of zoologists and botanists in the sixteenth and seventeenth centuries can be ignored. Historians of science have, until recently, committed the same error as historians of the early Church in the fourth and fifth centuries: they have written as if the only events of importance in the previous period were those which directly anticipated and promoted the current orthodoxy of their own day.

This is a matter of such importance, and the claim just made is so far new, that it requires illustration. In the histories of science —almost all written by scientists who have had no training in historical research and little acquaintance with general history—it is almost invariably assumed that the work of Copernicus was at

once the starting-point and the epoch-making event of the scientific movement. Vesalius's work in anatomy, Gilbert's contribution on magnetism, Harvey's discovery of the circulation of the blood are the only universally recognized achievements outside the field of astronomy. Of biologists before Linnaeus there is usually no mention: Gesner scarcely appears in their indexes; Ray receives a page or two of commendation; Stensen and Redi, and even Malpighi and Swammerdam are hardly better recognized. Yet, from the point of view of the knowledge of nature, no single work is of more importance as initiating a new era than Gesner's *Historia Animalium*, which not only was the first book to summarize, criticize, and dismiss the age-old fables and legends of Aesop, Philologus, and the Bestiaries, but by its provision of accurate descriptions, notes of habits and distribution, and quite admirable illustrations founded the scientific study of zoology and exerted an unequalled influence upon its development. So too in the realm of particular discoveries it may well be argued that the overthrow of spontaneous generation, the universal belief, authorized alike by Scripture[1] and the Classics,[2] that bees were generated from putrefying flesh, lice from human sweat, caterpillars from cabbages and the London Rocket from wood-ash,[3] was an achievement as necessary, as difficult, and in its effects at least as influential as that of Copernicus; and hardly less notable is the rejection of the equally widespread belief in the transmutation of species.[4] Yet Francesco Redi's experiments, Swammerdam's demonstrations and Ray's lifelong advocacy have never been recognized as accomplishing anything of fundamental and revolutionary value. No one will wish to diminish the honour due to astronomers and mathematicians; but historically the origin of modern science is traceable to a much wider movement, to a wholly new approach to the order of nature, and to the simultaneous development of new knowledge in a very wide field of exploration, study and research. It was as part of this wider move-

[1] Judges xiv. 8, 9.
[2] Vergil, *Georgics* IV, 281–314.
[3] One of the last arguments for spontaneous generation was the sudden abundance of this plant, *Sisymbrium irio*, on the ruins of London after the Great Fire of 1666.
[4] For its persistence cf. Note 1 below, pp. 204–5.

ment that the specialized work of astronomers and mathematicians grew into prominence and gradually established an almost exclusive claim. Newton's great achievement,[1] coming at a time when the original impulse of the New Philosophy had almost spent itself, ushered in a new era, but must not be allowed to occlude the brilliance of the previous period or to distort its significance.

That the biological sciences which had in fact made such remarkable progress in the seventeenth century should have had to mark time, in spite of the physiological studies of Malpighi and Grew and later of Stephen Hales, was plainly inevitable.[2] So long as physics was committed to the doctrine of the four elements and chemistry still entangled with alchemy and white magic there could be no full exploration of the processes and functioning of the living organism. It was unfortunate that the vast but inflated reputation of Linnaeus (whose claim to high distinction depends solely upon his work in identification and nomenclature)[3] and the speed and utility of the developments in applied mathematics, physics and engineering should have fostered a distorted interpretation of the origin of modern science and given an exaggerated importance to mechanistic analogies. By the close of the eighteenth century the machine had become the symbol and instrument of the whole scientific movement; the attempt to see nature as a whole was abandoned; and the study of the living organism was being forced on to physical and chemical lines. In consequence we may note that the sort of questions which Harvey suggested in his *De Generatione*[4] and Ray propounded for investigation in *The Wisdom of God in the Works of Creation*[5] were ignored for nearly two centuries by professional biologists. Science had produced industrialism and transformed civilization—and the countryside. It was natural that utility should become its objective, and that it

[1] The attempt by B. Hessen in *Science at the Cross Roads* to interpret Newton in terms of economic determinism is fully answered by Dr G. N. Clark, *Science and Social Welfare in the Age of Newton*.

[2] A good illustration is Ray's failure to carry through satisfactorily his book on respiration.

[3] As a systematist his classification of plants was inferior to that of Ray or even Cesalpino, as a scientist he contributed chiefly collections and binomial names; cf. below Chap. VIII.

[4] E.g. with regard to the courtship and egg-laying of birds.

[5] Cf. my *John Ray*, pp. 464-76.

should concern itself with the means of livelihood rather than with life.

It is hardly surprising that religion which in Britain had given a warm welcome and valuable help to science in the seventeenth century should have found the partnership much more difficult in the nineteenth. For in fact materialism, 'the categories of weight and measurement', having sufficed to accomplish immense results in physics and chemistry, extended its claims to cover the domination of the animate realm and even of man. When Descartes in the seventeenth century had argued that all the rest of the animal kingdom were mere automata, he was met by sharp and in fact unanswerable criticism from Henry More, John Ray and many others, who were quick to point out in the language of their own day that a creature self-impelled, self-fuelling, self-repairing, self-reproducing, self-controlling, self-surrendering and, at the human level, self-conscious could not, except by gross misuse of language, be described as a machine; and in any case Descartes had specially exempted man from the robot class. But the biologists of two hundred years later, even if they did not explicitly assert that man was a mere animal, yet made it plain that science could only deal with the living organism as with a piece of complicated machinery. And when the camp-followers of the sciences went on to assert that science was the only source of verifiable knowledge, the outlook for artist and poet, moralist and saint was not very inviting. By the first decade of the present century the frontier between science and religion had become almost an iron curtain: it was hard for an honest and intelligent youngster to keep a footing in both worlds.

For this estrangement the scientists can hardly be held to blame. The concentration upon physics and chemistry at the close of the seventeenth century was an essential phase in the development of the whole movement; and its technological and industrial consequences were a proper and valuable outcome. That 'pure' and 'applied' science go together, and that the basic motive in scientific progress is far more often curiosity and the passion for truth than economic or commercial advantage, are convictions which the