

**R. J. BERRY****John Ray, Father of Natural Historians<sup>1</sup>**

*John Ray (1627-1705) was a pivotal figure in both the history of biology and in our maturing of understanding the Bible in the light of secular knowledge. He was the son of an Essex blacksmith who became a Fellow of Trinity College, Cambridge, but resigned his fellowship to work with his pupil and patron Francis Willughby (1635-72) on a series of plant and animal classifications, which paved the way for Carl Linnaeus and inspired generations of naturalists. He is best known for his Wisdom of God Manifested in the Works of Creation (1691), which was plundered by Archdeacon Paley for his Natural Theology (1802). Although he lived when the rationalism of the Enlightenment was in the ascendant, Ray was not a deist; he was a man who rejoiced and worshipped God through studying God's 'book of works.' His influence persisted throughout the 18th and 19th centuries, underlying the tensions that developed in natural theology and natural history with the impact of Darwin and the growth of scientific professionalism. Three centuries after his death, he provides both a model and a stimulus for a Christian approach to the natural world.*

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*His greatness is that in a time of transition and universal turmoil he saw the need for precise and ordered knowledge, set himself to test the old and explore the new, and by dint of immense labour in the field and in the study laid the foundations of modern science in many branches of zoology and botany ... he did as much as any man of his time to develop a new understanding and interpretation of religion; more perhaps than any man he enabled the transition from the medieval to the modern outlook.<sup>2</sup>*

It is necessary to read between the lines when someone is praised for their contributions in a time of change. Sometimes the meaning is that the person concerned preserved stability during a period of potential chaos, enabling a peaceful succession. On other occasions, the interpretation should be that he (or occasionally, she) was a peculiarly sane revolutionary, enabling a new order while maintaining a link with the past. We need not equivocate about John Ray.

1 Based on a paper given at a Conference in Braintree, Essex on 18th March 1999 on 'John Ray and his Successors: the Clergyman as Biologist' organised by the John Ray Trust in conjunction with the Institute of Biology and the Society for the History of Natural History. (Ford, B.J. (1999). A Ray rekindled. *Endeavor*, 23 (2): 49-50; Cooper, N. (ed.) (2000) *John Ray and his Successors*. Braintree: John Ray Trust).

2 Raven, C.E. (1942). *John Ray*. Cambridge: Cambridge, p.12.

He was both: a man of his own generation, carrying on but improving the traditions he inherited;<sup>3</sup> but also an innovator, blazing the way for a truly modern view of the natural world yet setting forward a theological coherence which we are only just beginning to appreciate.

Nor do we need to question the reality of the social and intellectual turbulence of Ray's times: he lived during the flowering of the Age of Reason, from Galileo's debates in Rome through to John Locke and David Hume; during his life time, agricultural 'improvements' were gathering pace; when he was middle-aged, the rapidly growing London was rebuilt following the Great Fire of 1666. Ray was an early fellow of the Royal Society, being admitted in 1667, seven years after the Society's founding; and he shared in the adolescence of the reformed Church in England, resigning his fellowship of Trinity College, Cambridge because of his reservations about the 1660 Act of Uniformity.<sup>4</sup>

During the last quarter of the seventeenth century, Ray published under his own name or that of his pupil and patron Francis Willughby classifications of the major groups of animals and plants, taking a major step towards a natural system and preparing the way for Linnaeus (1707-78) both in terms of method

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3 Rupert Hall (*The Scientific Revolution 1500-1800*. London: Longmans Green 1954) wrote of Ray's descriptive works: 'Taken together they represented by far the most complete and best arranged survey of living nature that had ever been attempted. Ray had exercised his keen faculty for observation intensively over the whole of England [and Wales], and extensively over much of western Europe; he was deeply learned in the writings of ancient and modern naturalists; above all, he welcomed new ideas. From Grew he accepted as probable the sexual reproduction of plants; from Redi and Malpighi the experimental disproof of spontaneous generation; and he himself taught that fossils were the true remains of extinct species, not mere 'sports' of nature nor God-implanted tests of faith in the truth of the Genesis story. If the enumeration of species was his principal task – which still left him room for his *Collection of English Proverbs, Topographical Observations, and Wisdom of God* – Ray was very far from supposing that classification was the end of biology.' (p.284).

4 The problem for Ray seems not to have been the re-establishment of the Church of England including the obligation to use only the newly revised Book of Common Prayer, but the requirement to accept the illegality of the Solemn League and Covenant imposed by the Puritan Government in 1643 (which condemned *inter alia* episcopal government, superstition, profaneness and 'whatsoever shall be found to be contrary to sound doctrine and the power of godliness'). Many of Ray's students and friends were Royalists; the father of Ray's patron and travelling companion, Francis Willughby, had sent men, horses and arms to Charles I and was being punished with a heavy fine (Susan McMahon. In these times of giddiness and distraction: the shaping of John Ray and his contemporaries 1644-1662, in Cooper (2000): 80-95, see note 1). Raven believed that the last straw for Ray was the demand to denounce the Covenant. He had not taken it himself, but 'an oath was an oath, whatever kings and parliament might pronounce: to accept the Act [of Uniformity] was to subscribe to a lie; a man of honor ... concerned with truth, could not thus sacrifice truth to expediency' (Raven, note 2, p.60). However, McMahon (*loc.cit.* p.93) judges that Ray's reasons were more mundane 'that the attractions of travel and secular activities were irresistible to an individual who had already spent more than half his life at Cambridge.' Whatever the critical factors, Ray's faith remained strong. Many years later, he refused the Secretaryship of the Royal Society, giving as his reason that 'Divinity is my profession' (Raven, *loc.cit.*, p.59).

and data.<sup>5</sup> The French biologist Baron Cuvier described Ray as ‘the first true systematist of the animal kingdom ... his works are the basis of all modern zoology.’<sup>6</sup> Gilbert White of Selborne regarded Ray as his mentor, both scientifically and theologically.<sup>7</sup> He extolled Ray to his friend Daines Barrington as ‘Our countryman, the excellent Mr Ray [who] is the only describer that conveys some precise idea in every term or word, maintaining his superiority over his followers and imitators, in spite of the advantage of fresh discoveries’.<sup>8</sup> It was wholly justified for James Duncan (1835) to write of Ray, ‘Combined with learning of the first order and an integrity of life seldom equalled, justly entitle him to the grateful remembrance of his countrymen and the appellations of ‘Father of Natural History’, ‘Aristotle of England’ and ‘the Linnaeus of his time’ which some have bestowed on him.’<sup>9</sup> More recently, Peter Harrison goes further and places Ray’s biological impact in a theological context, seeing his success and importance as lying in separating the study of ‘the book of nature’ *sensu stricto* from speculations about its contemporarily assumed meaning; in other words denying the insidious power of allegory.<sup>10</sup> This in turn was the legacy of ‘the Protestant reformers who ... insisted that the book of scriptures be interpreted only in its literal, historical sense ... [T]he study of the natural world was liberated from the specifically religious concern of bible interpretation, and the sphere of nature was opened up to new ordering principles.’<sup>11</sup>

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5 Raven (1942: 87, 306 – see note 2) comments ‘Without Ray’s preliminary work, there could have been no Linnaeus ... the fame of Linnaeus and his jealousy and critical attitude towards Ray have obscured the value of Ray’s work.’ Eric Nordenskiöld in his *History of Biology* (English translation 1928; New York: A.A. Knopf) notes that ‘Ray’s work as a systematist ... constitutes an extraordinary advance, primarily in that he clearly realized the difference between species and genus, secondly on account of his possessing what was undeniably – in comparison with his predecessors – an extremely keen eye for the similarities on which the assumption of affinity in its widest sense may be based’ (p.202). Ernst Mayr (*The Growth of Biological Thought*. Cambridge, MA (1982)) writes: ‘As artificial as Ray’s method was, the resulting classifications were not only the best up to that time, but in certain details, superior even to the later ones of Linnaeus’ (p.169).

6 Cited by Boulger, G.S. (1896) in his essay on John Ray in the *Dictionary of National Biography*: 339-344.

7 See Mabey, R. (1986). *Gilbert White*. London: Century.

8 Letter, 1 August 1771, cited by Boulger, G.S. (1896), note 6.

9 Duncan, J. (1835). Memoir of Ray. *The Naturalist’s Library. Entomology, Vol.II. Beetles: 17-70*. Edinburgh: W.H. Lizars. This is the earliest reference I know to Ray as ‘Father of Natural History’ although it may well have been current by the beginning of the nineteenth century. Raven (1942: xiv, note 2) describes Duncan’s memoir as ‘pleasant but secondary.’

10 Harrison, P. (1998). *The Bible, Protestantism and the Rise of Natural Science*. Cambridge: Cambridge University Press, pp.1-4.

11 Harrison (p.7) argues that when the Protestant emphasis on the priesthood of all believers allowing direct access to God and the Bible without priestly mediators or officially sanctioned interpretations, was carried over into the sciences, it ‘granted to students of nature direct access to the book of God’s works, liberating them from both a slavish adherence to classical writing and the censorship of ecclesiastical authorities. Allied to this new freedom ... the Protestant demystification of the world also promoted the mechanical conception of nature ... A major catalyst in the emergence of science is the Protestant approach to the interpretation of texts.’

## Natural History Today

Ray's reputation was firmly established by the so-called Enlightenment typified by William Paley's *Natural Theology* (1802)<sup>12</sup>, a dull period occupied by dull people, in Raven's judgement.<sup>13</sup> The eighteenth century was, of course, the heyday of 'physico-theology', epitomised by the Boyle Lectures, which were established by a bequest from Robert Boyle (died 1691) to be delivered in London churches and directed against unbelievers. Unfortunately, their well meaning efforts involved speculation about God's benevolence in creation and undermined the perception of a God who is immanent as well as transcendent and who holds all things together. As a result, the stature and the relevance of natural history became debased by its use as a 'proof' of God's design of creation and Ray's glory and title as 'Father of Nature History' has been diminished.

Ray's most enduring publication was his *The Wisdom of God Manifested in the Works of Creation* first published in 1691 and reprinted many times in the next century and a half.<sup>14</sup> William Derham based his Boyle Lectures of 1711-12 on the *Wisdom*, fully acknowledging in the published version 'my Friend the late great Mr Ray.'<sup>15</sup> Derham encapsulated and stimulated the eighteenth century enthusiasm for natural theology, precipitating the concentration on deism at the expense of theism, which culminated in Paley's works and the Bridgewater Treatises. In contrast, Ray's own insistence on study rather than superficial observation was specifically practical. It built explicitly on the urging of Francis Bacon: 'The Psalms and other scriptures do often invite us to consider and magnify the great and wonderful works of God, so if we should rest only in the contemplation of the exterior of them as they first offer themselves to our sense, we should do a like injury unto the majesty of God.'<sup>16</sup> Detailed study tended to be submerged, even though Derham reminded his readers that scripture not only commends God's words but also those 'curious and ingen-

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12 Raven (1942: 452, note 2) points out that 'Paley seldom quotes it [the *Wisdom*] by name, but repeatedly borrows from it without acknowledgment: indeed almost its whole contents are found rewritten but easily recognisable in his pages.'

13 Raven, C.E. (1954). *Organic Design*. London: Oxford University Press.

14 Keynes, G. (1951). *John Ray. A Bibliography*. London: Faber & Faber. Mayr (Ref.5) describes the *Wisdom* as 'not only a powerful argument [for the work of God] from design but also very sound natural history, indeed, one might say one of the earliest works of ecology' (p.104). James Edward Smith, founding President of the Linnean Society wrote in 1819 that the *Wisdom* is 'known all over the world by its numerous editions and translations, and universally admired for its rational piety, sound philosophy, and solid instruction. The book is the basis of all the labours of following divines, who have made the book of nature a commentary on the book of revelation; a confirmation of truths which nature has not authority of herself to establish. In it the author inculcates the doctrines of a constantly superintending Providence, as well as the advantage, and even the duty of contemplating the works of God' (The Life of John Ray in *Rees' Cyclopaedia*, reprinted in Lankester, E. (ed) (1846). *Memorials of John Ray*. London: Ray Society, p.66-7). John Hedley Brooke and Geoffrey Cantor (*Reconstructing Nature*. Edinburgh: T & T Clark, 1998) regard the *Wisdom* as 'the paradigmatic British treatise on natural history' (p.177).

15 Derham, W. (1713). *Physico-Theology: or a Demonstration of the Being and Attributes of God from His Works of Creation*. London.

16 Bacon, F. (1605). *On the Advancement of Learning*. Cited by Harrison (1998: 167) note 10.

ious Enquirers that seek them out or pry into them.’<sup>17</sup>

This era ended when Darwin comprehensively scuttled the restricted deist notion of God as being nothing more than a clever designer,<sup>18</sup> and thus torpedoed the notion of natural theology as practised up to his time.<sup>19</sup> This was one of the major consequences of the Darwinian ‘revolution.’ John Hedley Brooke records about the preceding century, ‘natural theology flourished in England due to the social and political circumstances that gave the English Enlightenment a distinctive character. From 1688, the constitution had incorporated demands – such as representative government, the sanctity of property, and a degree of religious toleration – that in other European countries remained on the agenda of reformers. England, early in the eighteenth century, was almost alone in that Enlightenment hopes were accommodated, rather than thwarted, by the existing order of state and society.’<sup>20</sup>

One effect of this perception was that the condition of the natural world was assumed to mirror God’s will for society, and hence was a profitable exercise for Christian study. The way in which nature was ordered and disposed came to be seen as a premise from which God’s wisdom and providence could be inferred. ‘Interpreting the book of the creation became a matter of discerning the intentions of its author.’<sup>21</sup> This produced an understandable revulsion against anything legitimising change, which explains, in part at least, the resistance to Darwin’s ideas expressed by Samuel Wilberforce in his infamous British Association debate with Thomas Henry Huxley. Merrill comments that natural theology provided an agreeable moral skeleton for natural history in the nineteenth century: ‘In the footsteps of Paley, naturalists like Gosse found that natural theology made the study of natural history not only respectable, but almost a pious duty’,<sup>22</sup> and as Lynn Barber points out in her fascinating history of ‘the heyday’ of natural history, ‘there was nothing the Victorians liked so

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17 Derham, *loc.cit.* p.466.

18 ‘The one impossible conception of God, in the present day, is that which represents him as an occasional visitor. Science had pushed the deist’s God further and further away, and at the moment when it seems as if He would be thrust out all together, Darwinism appeared, and under the guise of a foe, did the work of a friend ... Either God is everywhere present in nature, or he is nowhere’ (Aubrey Moore. *The Christian doctrine of God.* In *Lux Mundi*, 12th edition, 1891:73. Gore, C. (ed.) London: John Murray).

19 John Polkinghorne (*Science and Creation.* London: SPCK, 1988) believes that ‘natural theology today is currently undergoing a revival, not so much at the hands of the theologians (whose nerve, with some honourable exceptions, has not yet returned) but at the hands of the scientists. There has grown up a widespread feeling, especially among those who study particle physics, that there is more to the world than meets the eye’ (p.15).

20 Brooke, J.H. (1991) *Science and Religion:* 200. Cambridge: Cambridge University Press. Keith Thomas (*Man and the Natural World*, 1983: 261. London: Allen Lane) comments, ‘The semi-religious devotion to wild landscape was, of course, a European phenomenon, whose prophets included Rousseau and Alexander von Humboldt.’

21 Harrison, p.168. See note 10.

22 Merrill, L.L.(1989). *The Romance of Victorian Natural History:* 42. New York: Oxford University Press.

much as a duty.<sup>23</sup> Furthermore, as Keith Thomas makes clear, 'it was the English who went furthest towards what has been called 'the divinisation of nature', whereby a walk in the woods or a climb up a mountainside became a pilgrimage (which may account for the British promotion of Alpine mountaineering).<sup>24</sup>

Nature came to be seen as 'morally healing,' and so could be approached with a truly religious zeal. It could even be pastorally important. J.C. Loudon, founder of the *Magazine of Natural History*, believed that 'compared even with a taste for classical studies, for drawing, for painting, or any other branch of the Fine Arts; or for amateur turning [lathe-work], or any other kind of mechanical employment; a taste for Natural History in a clergyman has great advantages. For in contrast to indoor hobbies, nature study finds the naturalist abroad in the fields, investigating the habits and searching out the habitats of birds, insects, or plants, not only invigorating his health, but affording ample opportunity for frequent intercourse with his parishioners.'<sup>25</sup>

David Allen has identified a number of influences that contributed to the extraordinary flourishing of natural history during the nineteenth century: evangelical religion, middle-class earnestness, the absence of the dampening leaven of professional science, increasing mobility, easier publication through the introduction of steam-driven printing-presses, lithography, and a reduction of paper tax.<sup>26</sup> A survey carried out in 1873 revealed 169 local scientific societies in Britain, of which 104 claimed to be field clubs. Most of these had come into being since 1850, a rate of formation of 10 per year.<sup>27</sup>

A passion for nature did not vanish with the *Origin of Species* nor with the end of the Victorian era, but it became far less common and often a private obsession (such as that of the Reverend William Keble Martin in dedicating himself to illustrating the entire British flora).<sup>28</sup> But by the end of the nineteenth century, much of the energy had gone out of the traditional natural history movement. In contrast, professional biology developed, largely in the universities, changing the allegiance of some of the more able natural history practitioners; but more significantly, local knowledge became incorporated into national surveys, and local societies either grouped together into regional unions or their members became absorbed into new, national societies. The more successful federations maintained contact with national and metropolitan scientific organizations, especially the research committees of the British Association and, from 1884, the British Association Conference of Delegates of Corresponding Societies (in part modelled on the Yorkshire Naturalist's Union).

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23 Barber, L. (1980). *The Heyday of Natural History*: 23. London: Jonathan Cape.

24 Thomas, p.261. See note 20.

25 Cited by Allen, D.E. (1976). *The Naturalist in Britain*: 22. London: Allen Lane.

26 Allen, D.E. (1976). *The Naturalist in Britain*: London: Allen Lane (especially chapters 4,5).

27 Britten, J. (1873). Local scientific societies. *Nature*, 9: 38-40, 97-99.

28 Martin, W.K. (1968). *Over the Hills ...* London: Michael Joseph.

However, the most progressive developments were in recording schemes leading on to national organization. The best example of this is in Botany. The stimulus for botanical recording seems to have been a letter from H. C. Watson (1831) in the *Magazine of Natural History* advocating the exchange of specimens on a national scale.<sup>29</sup> This led to a regional network of recorders, producing distribution maps for different species. Then in the 1890s the Smith brothers of University College Dundee proposed a more systematic survey, linking it specifically to local societies.<sup>30</sup> A Central Committee for the Study of British Vegetation was established in 1904 to co-ordinate the work. All its members were college lecturers except one who was employed in the National Library, Dublin, but all had strong links with local societies.<sup>31</sup> The Central Committee changed itself into the first Council of the British Ecological Society in 1913.<sup>32</sup>

The study of the environment is now divided between amateurs and professionals.<sup>33</sup> I believe this is to their mutual detriment: the professional does not have easy access to the local knowledge and acquaintance with many taxonomic groups which characterize the amateur, while the amateur lacks guidance and stimulus in the recording which is the sphere in which s/he excels. Fortunately, this division is not complete. Its breakdown is perhaps best seen in the ornithological world, where the British Trust for Ornithology (which developed from the Oxford Bird Census, itself an offspring of the University Ornithological Society) collates details of bird habitats, breeding, movements, mortality, etc., collected by a large army of amateurs; a small band of professionals encourages, uses and liaises with the amateur bird-watchers to the benefit of both. A similar symbiosis in the plant world led to the publication of an *Atlas of the British Flora*, and the establishment of a national Biological Records Centre at Monk's Wood, near Huntingdon, which collects data from a number of national recording schemes, and publishes atlases of species distribution. For most groups, the bulk of the data is collected by amateurs.

What are the motives behind such amateur dedication and enthusiasm? I believe they have the same roots as inspired John Ray. In his flora of Cambridgeshire he wrote:

First I was fascinated and then absorbed by the rich spectacle of the meadows in spring-time; then I was filled with wonder and delight by the marvellous shape, colour and structure of the individual plants. While my eyes feasted on these sights, my mind too was stimulated. I became inspired with a passion for Botany, and I conceived a burning desire to become proficient

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29 Watson, H.C. (1831). Botanical exchange. *Magazine of Natural History*, 4: 166.

30 Smith, W.G. (1903). Botanical survey for local naturalists' societies. *Naturalist, Hull*: 5-13.

31 Lowe, P.D. (1976). Amateurs and professionals: the institutional emergence of British plant ecology. *Journal of the Society for the Bibliography of Natural History*, 7: 517-535.

32 Sheail, J. (1987). *Seventy-Five Years in Ecology*. Oxford: Blackwell Scientific.

33 Berry, R.J. (1983). The evolution of British biology. *Biological Journal of the Linnean Society*, 20: 327-352.

in that study, from which I promised myself much innocent pleasure to soothe my solitude.<sup>34</sup>

Such a passion still exists and is multiply documented. For example, John Barrett has written of the excitement of setting up a Field Centre (Dale Fort in Pembrokeshire) after the Second World War:

The trickle of interest in the living world was beginning to run around us. More and more, not only in universities and then in schools, but also amongst increasing numbers of citizens from every corner came the understanding that the world was full of marvels which they could not see and would not recognise if they were before their eyes. Somebody had to show the way. We hoped we might be able to help in doing so ... All of us already knew that the whole was greater than the sum of its parts. What we would show was how different parts of the natural world hung together – plants, animals, rocks, geography, the climate ... We understood exactly why G. M. Trevelyan had said that a historian needed a pair of stout boots as much as a library ...<sup>35</sup>

Love for nature is the result of exposure to the real world; it is caught not taught. I look back with gratitude to four men who infected me: John Barrett of Dale Fort; George Bramwell Evans, a Methodist minister who pioneered ‘nature trails’ on BBC Radio (and who ‘caught’ me young; he died when I was barely nine years of age); Bernard Kettlewell, a country GP who achieved international fame through his work on the evolution of melanism in moths; and John Ray’s biographer, Charles Raven.<sup>36</sup> When Raven retired from the Regius Chair of Divinity in Cambridge, he lectured to scientists on the History of Biology. He pointed out how observation of nature (beautifully exemplified by some of the carvings in mediaeval churches) overcame the formal and arid scholasticism of the Middle Ages, and how this led naturally and ineluctably in his view to the Renaissance, then the Reformation, and on to the Scientific Revolution. Raven taught me to challenge authority and to think for myself. He made me realize that Biology comes from hedgerows and seashores, even though their messages have to be supplemented by textbooks and learned papers.<sup>37</sup>

This is where the circle becomes complete for Ray as ‘Father of Natural History’, because in Britain ecology is ‘scientific natural history’ and differs

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34 Cited by Baldwin, S.A. (1986). *John Ray (1627-1705)*. Essex Naturalist. Witham: Stewart Baldwin.

35 Barrett, J.H. (1986). The Field Studies Council: how it all began. *Biological Journal of the Linnean Society*, 32: 32-41, p.36.

36 Berry, R.J. (1988). ‘Natural history in the twenty-first century.’ *Archives of Natural History*, 15: 1-14.

37 Raven’s views have been corroborated by Peter Harrison in his magnificent *The Bible, Protestantism and Natural Science* (see note 10). See also Livingstone, D.N., Hart, D.G. & Noll, M.A. (eds.) (1999). *Evangelicals and Science in Historical Perspective*. New York: Oxford University Press, where contributors repeatedly emphasize the importance that study of God’s ‘book of works’ has been as a motive for scientific study.

from its roots in North America and parts of continental Europe where it tends to be regarded as a branch of physiology.<sup>38</sup> The disciplines of observation and recording developed by Ray for himself have properly and fairly been handed on to all of us who work in the field, whether as amateurs or professionals. It is well demonstrated by Charles Darwin, natural historian *extraordinaire* who, in the words of his *Autobiography*:

... had no great quickness of apprehension or wit which is so remarkable in some clever men, for instance, Huxley. I am therefore a poor critic; a paper or a book, when first read, generally excites my admiration, and it is only after considerable reflection that I perceive the weak points ... On the positive side of the balance, I think that I am superior to the common run of men in noticing things which easily escape attention, and in observing them carefully. My industry has been as great as it could have been in the observation and collection of facts. What is far more important, my love of natural science has been steady and devout.<sup>39</sup>

Ray did not merely preserve a tradition; he reworked it and handed it on to us in as rigorous a way as the mathematics of his contemporary Isaac Newton.

### **Natural Theology Today**

To the outsider, science is often perceived as a desiccated exercise in quantitative experimentation. The fact that this is incorrect is unimportant for the present, except for the fact that it disguises and often distorts the motives of scientists.<sup>40</sup> John Ray was a man of science, albeit not in the restricted modern sense of the word.<sup>41</sup> It is clear from all his writings (and especially the *Wisdom*) that the driving influence in his life was a Christian imperative, not a simple inquisitiveness. He would have known the words of the Psalmist, that 'Great are the works of the Lord, studied by all who delight in them' (Ps 111:2). In the *Wisdom* he wrote 'It is a generally received opinion that all this visible world was created for Man ... yet nowadays wise men think otherwise'. Is it speculating too much to expect that he would have rejected the anthropocentrism of classical economics, based as it is on the assumption that the only value of 'nature' is

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38 Elton, C.S. (1927). *Animal Ecology*. London: Sidgwick & Jackson; McIntosh, R.P. (1985). *The Background of Ecology*. Cambridge: Cambridge University Press.

39 Barlow, N. (ed.) (1958). *Autobiography of Charles Darwin 1809-1882*. London: Collins, p.140-1.

40 Edge, D.O. (ed.) (1964). *Experiment*. London: BBC; Berry, R.J. (1996). *God and the Biologist*. Leicester: Apollos.

41 The full title of Raven's biography is 'John Ray, Naturalist.' This is a historically correct description of Ray. After all, the term 'scientist' was not invented until 1840 (by William Whewell). Notwithstanding, Ray was a true scientist in the Popperian sense of rigorous faithfulness to observation and analysis (q.v. Ruse, M. *Mystery of Mysteries*. Cambridge, MA: Harvard University Press, 1999).

instrumental?<sup>42</sup> Or that he would have been horrified at the pantheism of the New Age or even the fashionable panentheism of process thinkers, on the grounds that they make nonsense of the transcendence and freedom of the Creator, never mind the Incarnation?<sup>43</sup> On the positive side, it seems likely that Ray would have welcomed Bryan Norton's 'weakly anthropocentric' recognition of the *transforming* effect of creation.<sup>44</sup> We are increasingly conscious that the natural world has a dynamic relationship with us in addition to and qualifying its use as a resource.

Clarence Glacken complements the description of John Ray as the Father of Natural Historians by describing the *Wisdom* as 'probably the best natural theology ever written.'<sup>45</sup> Although Ray believed creation remained in much the same form as at its beginning, he was clear about the three key points of biblical environmentalism:

1. The Earth belongs to God;
2. He has entrusted it to us to care for on his behalf; and
3. He will hold us responsible for our discharge of this trust.

A Church of England General Synod paper expanded these ideas:

We all share and depend on the same world with its finite and often non-renewable resources. Christians believe that this world belongs to God by creation, redemption and sustenance, and that he has entrusted it to humankind, made in his image and responsible to him; we are in the position of stewards, tenants, curators, trustees or guardians, whether or not we acknowledge this responsibility. Stewardship implies caring management, not selfish exploitation; it involves a concern for both present and future as well as self, and a recognition that the world we manage has an interest in its own survival and well-being independent of its value to us.<sup>46</sup>

This statement was based on Christian assumptions and hence it imposes a greater onus on Christians than any from secular analyses. But there is considerable convergence between Christians and non-religious thinking. For example, the UK White Paper on the Environment which formed the formal British

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42 The full quotation from the *Wisdom* is: 'It is a generally received opinion that all this visible world was created for Man [and] that Man is the end of the Creation, as if there were no other end of any creature but some way or other to be serviceable to man. But though this be vulgarly received, yet wise men nowadays think otherwise.' (Brooke, J.H. & Cantor, G. *Reconstructing Nature*: 221. Edinburgh: T & T Clark, 1998 caution against interpreting this statement too radically. They point out that 'when Ray clarifies his position ... objects that appear to be of no human use now, may well be to future generations').

43 Fergusson, D.A.S. (1998). *The Cosmos and the Creator*. London: SPCK, pp.83f.

44 Norton, B.G. (1987). *Why Preserve Natural Variety?* Princeton, NJ: Princeton University Press.

45 Glacken, C.J. (1976). *Traces on the Rhodian Shore*. Berkeley, CA: University of California Press, p.379.

46 *Christians and the Environment* (1991). A Report by the Board for Social Responsibility. London: General Synod Miscellaneous Paper, No.367.

submission to the United Nations Conference on Environment and Development in Rio (the Earth Summit) (*This Common Inheritance*) began with an explicit moral commitment, 'The starting point for this Government is the ethical imperative of stewardship which must underlie all environmental policies. Mankind has always been capable of great good and evil. This is certainly true of our role as custodians of our planet. The Government's approach begins with the recognition that it is mankind's duty to look after our world prudently and conscientiously....We have a moral duty to look after our planet and to hand it on in good order to future generations.'<sup>47</sup>

This British statement is only one of a large number of national and international pronouncements on environmental ethics. Intriguingly and encouragingly, all their variety of content and background can be reduced to ten or so propositions, which implies that they may be widely acceptable.<sup>48</sup> It seems possible that a worldwide environmental ethic may be within reach. It supports the exploration of the World Council of Churches when it extended its longstanding programme on Peace with Justice to one on Justice, Peace and the Integrity of Creation that there may be an endpoint to the search, albeit not one expected by Geneva.<sup>49</sup>

John Ray lived almost three centuries before our actions and technology have made international agreements an important control and discipline on humankind. For him, observation of the natural world served to 'stir up and increase in us the Affections and Habits of Humanity, Admiration and Gratitude.' He believed God had provided in excessive abundance and our role was to manage nature harmoniously under divine guidance. He followed George Hakewill (1635) in arguing against any decay of nature consequent upon Adam's 'Fall' or for any other reason. Although he wrote about the 'dissolution' of the world, he argued that this would be in the distant future and would have to be sudden because he saw no evidence of decay in his time.<sup>50</sup> It is intriguing to wonder what he would have made of apocalyptic warnings of a nuclear winter, ozone holes, climate change, massive extinctions, and so on. It is our growing scientific sophistication that has made us uncomfortably aware of the reality of these effects and focussed attention in an acute way on Paul's words about creation 'groaning' (Rom. 8:19f) or the plagues of Rev. 6:8.

This is not the place for detailed Bible exegesis but it is worth quoting Charles Cranfield's magnificent *reductio ad absurdum* argument on Rom. 8:19-22 because it is a passage which apparently troubled Ray. In his *Dissolution* published two years after the *Wisdom* and based on 2 Pet. 3:11, he refers to a

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47 *This Common Inheritance* (1990). London: HMSO, Cm.1200.

48 Berry, R.J. (1999). A worldwide ethic for sustainable living. *Ethics, Place & Environment*, 2: 97-107.

49 Gosling, D. (1992). *A New Earth*. London: CCBI; Atfield, R. (1999). *The Ethics of the Global Environment*. Edinburgh: Edinburgh University Press.

50 Ray, J. (1692). *Miscellaneous Discourses Concerning the Dissolution and Changes of the World*. London: Samuel Smith.

number of Bible passages which support his contention that the world will be 'refined, purified or renewed' (Ray quotes Ps. 102:26; Is 65:17, 66:22; Matt. 19:28,29; 1 Cor. 7:31; 2 Pet. 3:13; Rev. 12:1; and others), but he hesitated over Rom. 8:21, noting 'I omit that ... because of the obscurity and ambiguity thereof' (1693 edition, p.355). Cranfield expounds these verses in a way which mesh well with Ray's general approach:

What sense can there be in saying that 'the sub-human creation – the Jungfrau, for example, or the Matterhorn, or the planet Venus – suffers frustration by being prevented from properly fulfilling the purpose of its existence?' The answer must surely be that the whole magnificent theatre of the universe, together with all its splendid properties and all the various chorus of sub-human life, created for God's glory, is cheated of its true fulfilment so long as man, the chief actor in the great drama of God's praise, fails to contribute his rational part. The Jungfrau and the planet Venus and all living things too, man alone excepted, do indeed glorify God in their own way; but, since their praise is destined to be not a collection of individual offerings but part of a magnificent whole, the united praise of the whole creation, they are prevented from being fully that which they were created to be, so long as man's part is missing, just as all the other players in a concerto would be frustrated of their purpose if the soloist were to fail to play his part.<sup>51</sup>

Derek Kidner used the same analogy of disorder in a musical performance a decade earlier than Cranfield in commenting on the Fall story in Gen. 3: 'Leaderless, the choir of creation can only grind on in discord. It seems from Rom. 8:19-23 and from what is known of the pre-human world that there was a state of travail in nature from the first, which man was empowered to 'subdue' until he relapsed into disorder himself.'<sup>52</sup>

Ray would probably have been able to accept the Cranfield and Kidner exposition of Rom. 8, although he would have stumbled over Kidner's reference to 'the state of travail in nature from the first.' Sure proof of extinctions in fossil faunas came almost a century after his death,<sup>53</sup> but their implications were not highlighted until William Buckland (1837) devoted a chapter to animal suffering in his *Bridgewater Treatise*, and argued that animal death must be regarded as qualitatively different from human death.<sup>54</sup> This distinction certainly makes sense of Pauline teaching (as Buckland pointed out with specific reference to Rom. 5:12),<sup>55</sup> and emphasizes that creation disorder is not the result of a divine

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51 Cranfield, C.E.B. (1974). Some observations on Rom. 8:19-21. In *Reconciliation and Hope*: 224-230. Banks, R. (ed.). Grand Rapids, MI: Eerdmans.

52 Kidner, D. (1967). *Genesis*. London: Tyndale, p.73.

53 Lovejoy, A.O. (1936). *The Great Chain of Being*. Cambridge, MA: Harvard University Press; Mayr, E. (1982). *The Growth of Biological Thought*. Cambridge, MA: Harvard University Press.

54 Buckland, W. (1837). *Geology and Mineralogy considered with reference to Natural Theology*. London: William Pickering.

55 Buckland, W. (1839). *An Inquiry Whether the Sentence of Death Pronounced at the Fall of Man Included the Whole Animal Creation or was Restricted to the Human Race*. London: John Murray.

curse, but is our responsibility (or rather, lack of it).<sup>56</sup> Creation is not simply a stage for God's saving work for mankind, but provides the focus of his cosmic reconciling work (Col. 1:15-20); environmental conservation is a divine mandate<sup>57</sup> and gospel opportunity<sup>58</sup> as well as a survival necessity. John Ray would have appreciated that, even though the language used by scientists would have been strange to him. For Ray, 'loyalty to truth was loyalty to God ... he found in the physical world the awe and reverence, the release and inspiration which psalmists, poets, thinkers and explorers have always found ... When Bishop Butler expounded the implications of Ray's work in his *Analogy*, when John Wesley made its message a part of his philosophy, when Gilbert White gave it worldwide fame, they demonstrated that the Church was ready to abandon its mediaeval *Weltanschauung* and reassert its faith in the works of the Lord ... *The Wisdom of God* [provided] a type of theology capable of giving appropriate expression to the Christian faith in a scientific age.'<sup>59</sup> There is now a healthy attention to environmental theology<sup>60</sup> and encouragingly this is developing into

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56 Berry, R.J. (1999). This Cursed Earth: is 'The Fall' credible? *Science & Christian Belief*, 11: 29-49; 12: 53-63.

57 This is the converse of the widespread assumption that a (or perhaps, the) main cause of environmental damage is the Church's (mis)interpretation of the command to 'subdue and have dominion' (Gen. 1:28). Although Christians are far from innocent in their treatment of the environment, they seem to be no more guilty than those of other faiths, including allegedly environmental-friendly Eastern religions: Sheldon, J.K. (1992). *Rediscovery of Creation: a bibliographic study of the Church's response to the environmental crisis*. Matuchen, NJ: Scarecrow Press; Oeschlaeger, M. (1994). *Caring for Creation*. New Haven, CN: Yale University Press; Berry, R.J. (1995). Creation and the environment. *Science & Christian Belief*, 7: 21-43.

58 Over the past few years, a number of organizations have been formed to bring together Christians with environmental concerns. They include:

1. The Church and Conservation Project within the Arthur Rank Centre at the Royal Agricultural Society of England HQ, Stoneleigh Park, Coventry CV8 2LZ.
2. Christian Ecology Link, a membership organization dedicated to offering insights into ecology and the environment to Christian people and churches (20, Carlton Road, Harrogate HG2 8DD).
3. A Rocha Trust, founded in 1983 to put into practice the biblical call to care for creation. It runs Christian field studies centres/communities in a number of countries (Connans Knowe, Kirkton, Dumfries DG1 1SX).
4. The John Ray Initiative, established in 1997 'to bring together scientific and Christian understanding of the environment in a way that can be widely communicated and lead to effective action', taking its inspiration from John Ray but with no formal connection to either John Ray Trust or the Ray Society (c/o Cheltenham & Gloucester College of Higher Education, Francis Close Hall, Swindon Road, Cheltenham, GL50 4AZ).
5. Eco-Congregation is a project of Going for Green, 'to encourage, enable and excite local congregations to rejoice in God's gift of creation; and to encourage and enable the church at regional, national and international levels to make positive responses to environmental issues' (Elizabeth House, The Pier, Wigan WN3 4EX).

59 Raven. See note 2, pp.455,478.

60 Granberg-Michaelson, W. (ed.) (1987). *Tending the Garden*. Grand Rapids, MI: Eerdmans; Elsdon, R. (1992). *Greenhouse Theology*. Tunbridge Wells: Monarch; Northcott, M.S. (1997). *The Environment and Christian Ethics*. Cambridge: Cambridge University Press; Fergusson, D.A.S. (1998). *The Cosmos and the Creator*. London: SPCK.

a substantive theology of creation rather than a specialist interest.<sup>61</sup> John Ray would approve; his spirit lives on.

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61 For example, A Christian approach to the environment. *Transformation*, 16: 73-112, 1999; the proceedings of a consultation organized by the John Ray Initiative; Berry, R.J. (ed.)(2000). *The Care of Creation*. Leicester: IVP.

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