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THE SELECTION OF THE AUTHORS OF THE BRIDGEWATER TREATISES

By W. H. Brock
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Plates 13 to 16]

THE argument for the existence of God from Design using the model of Newtonian scientific methodology formed the basis of the Natural Theology of the eighteenth and nineteenth centuries. Since the proof of God’s existence rested on what God was believed to have accomplished, and His continual benevolent activity was regarded as the explanation of everything which science could not explain, the power of the argument decreased proportionally as the horizons of science expanded. Nevertheless, a steady stream of learned and more popular literature on natural theology was published during the one hundred years after Newton’s death in 1727. The spate of publications continued despite Hume’s contention at the end of the eighteenth century that the use of analogical reasoning in theological discourse had no logical validity (1). In theology, unlike science, hypotheses cannot be tested either directly or by the fulfilment of certain predictions based on the original hypotheses. Although the use of analogical reasoning in scientific discourse is an invaluable aid to the formulation of hypotheses, these always have to be tested against experience. This is impossible in theology since the design analogy does not produce (in Hume’s requirement) a constant conjunction between the hypothetical first cause, God, and its effects, the materials of the observed world. We cannot confirm the existence of a World Designer by observing Him make one. Even so, as has been pointed out recently, the design argument continued to be used after Hume because ‘previously acquired and emotionally grounded prejudices in its favor’ were psychologically persuasive (2). In fact, this kind of natural theology remained a subject of considerable popularity, and it survived, in Great Britain at least, until the biological theory of evolution demolished the last vestiges of the design argument’s empirical foundations.

The epitome of this continuing tradition was Archdeacon William Paley’s very successful Natural Theology which appeared in 1802 and became a set-book at the Universities of Cambridge and Oxford during the remainder of the century. At Cambridge, Paley’s arguments became indelibly impressed upon the mind of the young Charles Darwin (3); while at Oxford, Paley’s chapters were used by the Duncan brothers as part of their scheme for the
FRANCIS HENRY EGERTON, F.R.S., 8th EARL OF BRIDGEWATER
(1756–1829)

From an engraving in the possession of the British Museum.

[Facing page 162]
DAVIES GILBERT, F.R.S. (1767–1839)

From a portrait by T. Phillips in the possession of the Royal Society.

[Facing page 163]
classification of the University Museum's Natural History collection in 1836 (4).

Paley (1743-1805), who was committed to the 'Sovereign Order of Nature' of the English Newtonian tradition, reacted strongly against the atheistic 'blind chance' of the French savants and of such English radicals as Erasmus Darwin. His design arguments were drawn principally from examples of organic contrivances; that is, he argued that the various species of plants and animals were all examples of beautifully designed artifacts. Paley paid little attention to the premises of the argument for design, and he completely ignored Hume's critique. This is not so surprising; for the Christian religion seemed to many people at that time to be the bulwark of an ordered, decent society, and Paley sincerely believed that the only alternative would be the blind chance, atheism and anarchy of the French materialists and revolutionaries.

There were some twenty editions of Paley's manual before 1820, and a further ten or more had appeared before the end of the century. The book became the Bible of Nature for many a scrupulously pious scientist, especially physicians who, despite their frequently barbaric education, usually became models of ethical and religious propriety (5). It is not a coincidence that four of the eight authors of the Bridgewater Treatises were practising physicians. For the clergyman, on the other hand, Paley's study was full of useful ammunition which could be fired against freethinkers and atheists.

The terms of the Bridgewater legacy have been interpreted by most historians as one sign of the worry and confusion over contemporary scientific developments, especially those which were taking place in geology (6). The dispute over 'Genesis and Geology' which took place between scientists of a uniformitarian or catastrophic persuasion, together with the clergy nourished on natural theology, was over both the interpretation of the geological record, and over whether this record did or did not reveal a providential deity who constantly intervened and actively participated in the development of nature by supernaturally adapting means to benevolent ends.

It was certainly in this environment that the Bridgewater Treatises came to be written, and it is interesting to notice that all the authors believed in a catastrophic geology, a providential deity, a God who had created the universe specifically for man, and a God who continually supervised its operations with this purpose in view.

The Bridgewater Treatises were sponsored by the will (7), dated 1825, of the eighth and final Earl of Bridgewater, the Reverend Francis Henry Egerton (1756-1829). The son of a bishop, Egerton was a clergyman who...
'assiduously neglected his parish' (8), a literary scholar rather than a scientist, and a family historian; but these were sufficient qualifications to gain him an 'F.R.S.' in the days when the Royal Society was to a large extent a Gentleman's Club, not a thriving scientific society. His rich store of 'Egerton Manuscripts', which deal with the history and literature of France and Italy, were left to the British Museum together with a sum of £12,000 for their provision. The Earl of Bridgewater, Viscount Brackley, Baron Ellesmore, Prince of the Holy Roman Empire, and Fellow of All Souls, Oxford, had both title and money. The Dictionary of National Biography notes politely that he also had his eccentricities. He filled his 'Hotel Egerton' in Paris with cats and dogs, many of which he dressed in men's and women's clothing, fed at his table, and took out with him in his carriage. An aristocrat to the end, 'in his last feeble days he stocked his garden with large numbers of rabbits, and with pigeons and partridges with clipped wings, in order to enjoy the sport of killing a few heads of game for his table' (9).

Egerton had written a Paley-inspired Treatise on Natural Theology for private circulation (10), and in his 'very long and very extraordinary' will (7) he bequeathed £8,000 to the Royal Society as a payment to the person or persons chosen by its President who would:

... write, print and publish, one thousand copies of a work on the Power, Wisdom and Goodness of God, as manifested in the Creation: illustrating such work by all reasonable arguments, as for instance the variety and formation of God's creatures in the animal, vegetable and mineral kingdoms; the effect of digestion and thereby of conversion; the construction of the hand of man, and an infinite variety of other arguments; as also by discoveries ancient and modern, in arts, sciences, and the whole extent of literature (11).

Royalties were to be given to the author or authors.

The terms of this legacy placed a considerable burden of responsibility on Davies Gilbert, the personal friend of Sir Humphry Davy, who had succeeded to the Presidency of the Royal Society on Davy's resignation because of ill-health in 1827. Gilbert's responsibility was made difficult by the fact that throughout his Presidency he was the centre of the controversy over the power structure of the Royal Society between the Scientists and the Gentlemen Amateurs. Gilbert's position finally became intolerable and he resigned from the Presidency in November 1830 in favour of the non-scientific Duke of Sussex. Gilbert, therefore, had no direct hand in the final printing and publication of the Bridgewater Treatises which appeared between 1833 and 1836; this administrative responsibility was directed by the Society's
capable Secretary, Peter Mark Roget (1779-1869), who was himself one of the chosen writers. However, before his resignation, Gilbert co-ordinated the search for suitable authors, and commissioned the writing of eight treatises. His apparently personal decision that the legacy, which had been quickly invested in 3% Bank Annuities, should be broken down into eight divisions, did not go uncriticized (12), and it became used as yet another excuse for dissatisfaction with Gilbert’s Presidency. With some foresight, however, Gilbert had wisely aligned both the Archbishop of Canterbury, William Howley (1766-1848), and the Bishop of London, Charles Blomfield (1786-1857), on to his side, and invited them to suggest names and even to negotiate terms with writers of their own choice. The collection of correspondence connected with the Bridgewater authors that was published privately later in the century by Gilbert’s nephew, John Enys, reveals how these eight men were chosen (13).

Gilbert noted in 1831 that he had been ‘fully aware of the duty imposed on him to select persons amply qualified for discharging in an adequate manner the task they would have to perform; and he [had been] also impressed with the conviction, that however carefully a selection might be made, several gentlemen must be omitted possessing the requisite qualifications, equally, perhaps with those who received the appointment’ (14). As soon as the terms of the bequest were made known to him, Gilbert contacted the elderly politician Baron Farborough (Charles Long, 1761-1838), who had been related to Egerton by marriage, in order to make certain that neither Egerton’s large family or his three executors intended to challenge the endowment (15). Secure with Farborough’s reassurances, early in 1829 the Reverend G. D’Oyley, chaplain to the Archbishop of Canterbury, informed Gilbert that both Howley and Blomfield were willing therefore to assist him in the choice of authors (16).

Meanwhile, one may read between the lines of the Enys correspondence that Gilbert received a number of letters which either solicited a commission to write the Bridgewater Treatise, or recommended their friends as excellent candidates. One such claimant was John F. (sic) Graves, who was described by his supporter, the Bishop of Cloyne (John Brinkley), as ‘a young man of most excellent character and attainments’ (17). This must have been John Thomas Graves (1806-1870), the Irish mathematician and lawyer who became Professor of Jurisprudence at University College London, in 1831 and F.R.S. in 1839 (18). Since Charles Babbage later felt obliged to write an unofficial mathematical Bridgewater Treatise, the fact that Graves was primarily a mathematician might explain why no call was made on his
talents. However, Howley revealed in 1830 that 'Mr Grave's (sic) application does not tell in his favor . . . , and I conceive the intention of the Testator was not so much to give the prize to an ingenious young man, as to encourage the publication of a work or works which might be really useful to the public' (19).

Howley suggested, somewhat impractically, that a number of 'eminent persons' should be selected to plan a large work on natural theology whose parts 'might be filled up by them respectively, as they might agree amongst themselves' (19). For some time Gilbert held to this plan; for example, in June 1830, he still clearly envisaged eight separate essays in two octavo volumes (20). The eventual production of 8 large volumes in 12 seems to have been a purely practical decision taken by the authors themselves at a much later date when they found the essay form was too restrictive.

By June 1830 names were being examined and rejected by the three selectors. Howley remarked to Gilbert that he had been pleased with a book of Peter Roget's which Gilbert had sent him (21), and also by Herbert Mayo's Outlines of Physiology (22). He also noted suggestively that the prospectus of John Macculloch's Proofs and Illustrations of the Attributes of God, which had been sent to him recently for approval, appeared 'to be very well done' (23). Of these three men only Roget was eventually chosen to be an author. Mayo (1796-1852), an excellent anatomist and physiologist, was Professor of Anatomy at King's College, London, but despite his membership of that 'Godly Institution' he was turned down by the three selectors in favour of John Kidd (1775-1851), who eventually wrote the anthropomorphic treatise on the physical constitution of man (24). As for the geologist Macculloch, nothing more is mentioned of him in the correspondence. Ironically, Macculloch deliberately withheld the publication of his own large book until the way had been prepared by the publication of all the Bridge-water Treatises. The book had to be published posthumously in 1837 because of his tragic honeymoon death in 1835. Macculloch would have been a good choice, but he was ignored perhaps because he was personally disliked by most scientists, and because William Buckland, who was in holy orders, was such an obviously dignified choice for the controversial subject of geology.

The successes of eighteenth-century mathematical astronomy had also made the astronomical design argument rather controversial and difficult. Gilbert spent some time anxiously searching for a suitable writer on astronomy, and with perhaps a diplomatic thrust at John Herschel, who was one of the principal spokesmen for the reform of the Royal Society, he first offered the commission to the great astronomer. Herschel’s dignified reply is
worth quoting, for it was critical of the manner in which Gilbert and his
advisers were directing this embarrassing legacy (25).

Slough, July 1st, 1830

My Dear Sir,

I am duly sensible of the honor you do me by proposing that I should
write the treatise on Astronomy in fulfilment of the conditions of Earl
Bridgewater's bequest for publishing a work 'on the Power, Goodness,
and Wisdom of God as manifested in the Creation'; though I must
dcline the undertaking.

No one, as you well know, is more deeply impressed with the great
truths intended to be inculcated in this work; but in precisely the same
proportion is the repugnance I feel to weaken the weight of my testi-
momy in their favour by promulgating them under the direct and
avowed influence of pecuniary reward. To any one who considers how
argument loses in persuasion, and praise in value (humanly speaking) by
the bare mention of such an origin, it will I fear appear questionable
whether much effective support is likely to accrue to Religion or Glory
to God from the adoption of the means in question. To yourself, as
President of a great scientific body, there is however another point of
view in which it may very reasonably be expected to occur, and has very
likely done so—viz: as an opportunity of calling forth to something like
lucrative exertion the talents of men, who with real science and irreproach-
able character, have their zeal chilled and their sphere of utility contracted
by the 'res augusta domi.' To such persons (men, for example, such as
Ritchie, who I mention as a specimen of the class I allude to) who live,
or rather starve on their science, but who prefer hunger in that good cause
to competency in a less dignified calling, a thousand pounds (the sum
you propose to devote to each of the eight sections of the work) would
indeed be a more material and noble assistance. Such men, who deserve
all encouragement, but who receive none, in the ordinary course of
events, in this country, are the people who every lover of science would
wish might receive at least the benefit of windfalls such as these.

William Ritchie (1790-1837), the physicist referred to by Herschel, had been
educated for the Scottish Church and had only taken up physics when he was
in his twenties (26). A born experimentalist, Herschel and others helped him
to become successively Professor of Natural Philosophy at the Royal Institu-
tion and at the University of London. Although he was a Fellow of the
Royal Society, Ritchie suffered from the same defect as Howley saw in
Edward Hawke Locker (1777-1849), a commissioner of Greenwich Hospital who was suggested by Baron Farnborough (27): both were ingenious men, and very useful as writers for the lower classes. ‘But I question whether [their] depth of knowledge is such as to qualify [them] for the production of a book which would stand the test of professional criticism’ (28). Herschel’s point was never taken by the selectors.

Another candidate, the Reverend Samuel Wix (1771-1861), was suggested by one of Egerton’s executors, the banker J. C. Clarmont. However, Blomfield dismissed Wix brusquely with the confidence that although he was ‘a highly respectable clergyman, his turn of mind and habits of thought are not precisely those which would qualify him for a share in this undertaking’ (29). Wix, a Fellow of the Royal Society, was of the High Church party, but his ecumenical ideas had involved him in much controversy. Complete theological orthodoxy was obviously a fundamental criterion of choice for the Bishop and Archbishop.

In mid-August 1830 Roget pointed out to Gilbert that all sorts of demarcation problems could arise later if a decision about the authors had not been reached before Gilbert officially resigned on the 30 November (30). Fortunately some measure of agreement between Gilbert, Howley and Blomfield had been reached already. They unanimously agreed that the anatomist Charles Bell, who had already published a work on natural theology, should tackle the subject of ‘Human Anatomy including . . . Lord Bridgewater’s favorite topic the Human Hand’ (31); that Roget should be given ‘Physiological or Comparative Anatomy’; that William Whewell (Blomfield’s choice) should write the work on astronomy; and that William Buckland (Howley’s choice) should be given geology. Four more authors were still to be found.

It is clear from the Enys correspondence that initially Gilbert did not think in terms of a separate chemical treatise, but of one which would include an incidental discussion of the imponderable elements of light and heat (32). The name of David Brewster (1781-1868), who was famous for his work on polarization, was proposed and seriously considered. Brewster, a member of the established Church of Scotland, had preached as a young man before nervousness had caused him to abandon the thought of a clerical profession. Prompted by the Bishop of London (33), by 2 September 1830 Gilbert instead suggested a treatise ‘Chemistry chiefly in reference to the Etherial or Imponderable Fluids or especially to Light, including Optics with the recent discoveries of Polarization’. This enlarged treatise was to be written by either William Prout (1785-1850), or by Brewster. Blomfield then
PETER MARK ROGET, F.R.S. (1779–1869)

From an engraving in the possession of the Royal Society.
advised Gilbert that Prout was 'a first-rate chemist', and 'I should think would do whatever he undertook with great ability'; but he spoiled the effect by admitting in a postscript that 'I don't know what sort of writer Dr Prout is; never having seen his publications' (34). He concluded his advice by emphasizing that the literary merits of Prout and Brewster were an important factor in deciding between them. In fact, although Brewster was the more productive of the two men, there was little to choose between their respective literary gifts and scientific experience. Why Prout rather than Brewster was eventually chosen is not revealed by the Enys correspondence; for with Gilbert's resignation, the task of organization seems to have fallen entirely on to the shoulders of Roget. It may be conjectured, however, that Prout was successful because he was well-known personally to both Roget and Gilbert through his Council membership of the Royal Society, and above all because he was known to be interested in the subject of digestion which had been mentioned specifically in Bridgewater's bequest. The result was the delectably titled *Chemistry, Meteorology, and the Function of Digestion considered with reference to Natural Theology*. A sarcastic *Athenaeum* reviewer noted wittily:

To dismember Meteorology from Geology—the one involving causes of which the other presents the effects—in order to make it the link between *Chemistry* and *Digestion*, was the work of no ordinary mind; and to separate *Digestion* from *Physiology*—a part from the whole—and again place *Physiology* deprived of the *Hand*, in opposition to the *Physical Nature of Man*, allowed to retain his hands, evinced most uncommon tact in classification. The ingenuity with which Dr. Prout has connected his subjects, does not render their combination a bit the less ridiculous (35).

There was also some difficulty over the choice of an author for natural history. Blomfield had immediately thought of John Leonard Knapp (1767-1845), 'the author of that very ingenious and pleasant work *The Journal of a Naturalist*'(36), and both Gilbert and Howley seem to have agreed. But in September of 1830 Blomfield began to make further enquiries and 'upon looking again into Mr Knapp's book' he doubted 'his competency to the task' (34). Whatever the reason, perhaps that Knapp had written a best-seller for the 'lower classes', he was rejected in favour of the orthodox Suffolk septuagenarian clergyman and entomologist, William Kirby (1759-1850).

The final two treatises were a curious example of demarcation. Howley noted from Gilbert's preliminary list of authors that none were Scotsmen. (He overlooked Bell who had lived in London for so long.) Both he and
Blomfield had immediately thought of the Scots reformer Thomas Chalmers (1780-1847) who had given scientific sermons from his Glasgow pulpit. Blomfield urged that:

... there should be an Essay on the adaptation of the *Physical Constitution* of man to his intellectual and moral faculties, his social propensities, and the provision made for his wants in the works of nature. This part of the subject might perhaps be advantageously divided into two, and the *intellectual* and *moral* discussion proposed to Dr Chalmers, the physical to Dr Kidd of Oxford, or Dr Mayo whose *Outlines of Physiology* is a very ingenious book (37).

Apart from the substitution suggested by Archbishop Howley of Kidd for Mayo which was noted earlier, the task of the selectors was finished.

Blomfield’s invitation to Chalmers was printed by the Reverend John Cumming in his posthumous edition of Chalmers’ treatise (38). It implied that the expenses of publication would be defrayed out of each £1,000. But it is difficult to believe that this was done; in any case its legality would almost certainly have been challenged. Such an arrangement would have been especially unfair on Buckland, half of whose treatise on geology was made up by costly illustrations on which three artists had to be employed (39).

During the winter of 1831 scandalous rumours began to appear in the press concerning the ‘competitors for the legacy’ (40). Buckland was appalled (41) and appealed to Gilbert for a public statement from him which would give the names of the authors and explain that there had been no lobbying. Gilbert obliged with a suitable statement of the true facts in the *Philosophical Magazine* for March 1831 (42).

The Reverend and Right Honorable Francis Henry Egerton Earl of Bridgewater died in the month of February 1829, at Paris, leaving his last will and testament bearing date on the 25 February 1825, in which he desired and directed his trustees to lay out and invest in their own names in some or one of the public stocks or Funds of Great Britain, the sum of eight thousand pounds sterling; the said sum with all accruing dividends thereon to be held at the disposal of the President for the time being, of the Royal Society of London, to be transferred, paid and applied, according to the order and direction of the said President of the Royal Society, in full, and without any diminution or abatement whatsoever, in such proportions and at such times, according to his direction and judgement, and without being subject to any control or responsibility whatsoever, to such person or persons the said President, for the time being, should or might nominate or appoint and employ. . . . And
he [Bridgewater] desired that the profits arising from and out of the
circulation and sale of the aforesaid work should be paid to the said
President of the Royal Society, as of right, as a further remuneration to
such person or persons as the said President of the Royal Society
should so nominate, appoint and employ, with a further power to
advance the sums of £300 and of £500 during the writing and printing
of the said work.

... Each [author had] been pledged to take a part, as designated by the
testator, most adapted to his acquirements and to his pursuits; and thus
it is confidently hoped and expected, that a work intrusted to such
individuals will appear, as a whole, worthy of the age and of the country
about to give it birth.

The names of the authors and the titles of their books were then listed.

Meanwhile Roget had great difficulty finding a publisher (43). Murray
accepted the series, then backed down because of a decline of trade; Long-
mans refused to publish only the initial limited edition of a thousand copies
which the will seemed to legally demand. (If interpreted to the letter, only
250 copies of each book could have been printed—a most uneconomic
proposition.) At last, at a meeting of the nominees in London on 11 October
1832 (44), the final allocations were decided and contracts signed with the
publisher William Pickering (45). Lord Bridgewater’s desire for a professional
a posteriori demonstration of the existence of a benevolent deity was finally
satisfied by the publication of the eight ‘strange and deadly’ volumes inter-
mittently between 1833 and 1836 (8).

There were still two further episodes before the Royal Society was able
to finally close its file on the Bridgewater legacy. In February 1837 Buckland
sent the following legal bombshell to Gilbert (46).

Ch.[rist] Ch.[urch]
Oxford
Feb. 28, 1837

My Dear Sir

You will no doubt recollect that in the appointment you were pleased
to make of myself and others to write the Bridgewater Treatises, it was
expressly stipulated as directed by the will of the Earl of Bridgewater
that the sum of £8,000 should be vested in the Funds until the whole of
the Treatises were finished to the satisfaction of the President of the
Royal Society and that then the said sum with interest and accumulation
of interest should be divided among the eight Authors as Tenants in
Common.
On the completion of the work by the publication of my Treatise in September last the Authors conjointly applied for their respective shares of interest on the £8,000, and were informed that the whole of the money was sold out in 1833, and has not been kept at interest as the will directed until all the Treatises were finished. This communication from Mr Parkinson, the Solicitor to Lord Bridgewater's Trustees, was accompanied by an opinion of Mr Knight of the Chancery Bar that the Trustees were under the circumstances of the case, justified in the course they had taken. I have subsequently submitted this opinion of Mr Knight to the Solicitor General [Sir Robert Rolfe] and have obtained from him a decided opinion that interest is due to each of the Authors up to the time when he received his £1,000 on the completion of his Treatise.

Having these two conflicting opinions it has been agreed by the Authors to refer them both to the Attorney General [Sir John Campbell] as an Umpire, if Mr Parkinson on behalf of the Trustees will agree to such an Arbitration, and that all the parties concerned should abide by the Attorney General's decision. It is the wish of the Authors to settle the matter in question amicably and quietly, and we consider the course proposed of referring it for final decision to the Attorney General to be the most delicate that can be pursued, and to be that which we should be gratified to find approved of by yourself.

I was in hopes of seeing you in London in the course of two or three recent visits to the Geological Society when I might have explained to you in person the details of this matter as I hope soon to have an opportunity of doing.

Wm. Buckland

Presumably the authors had been contracted to produce their manuscripts by a certain date, otherwise, on the brief of Buckland and the Solicitor General, an author could have gained more interest merely by dallying with his manuscript. As it was, Buckland stood to gain most from the success of his argument; for his book took him six years to write and was the last of the Bridgewater Treatises to be published. However, no record of any legal action has been discovered and it must be assumed that an amicable quiet settlement was reached. The possibility of a civil action by the Bridgewater authors against the Bridgewater estate, or against the ex-President of the Royal Society would have led to an appalling scandal. The commonest criticism of the Bridgewater Treatises was that they had been written for money (47). Although the authors publicly and privately denied the credibility of this, Buckland's letter, and an earlier one from Whewell to Gilbert
WILLIAM BUCKLAND, F.R.S. (1784–1856)

From an engraving in the possession of the British Museum.
(48), reveal that whatever their individual piety, the motives of the eight writers may not have been entirely altruistic when offered a thousand pounds.

Finally, as if to underline altruism, Charles Babbage, who had been unpleasantly critical of Gilbert’s Presidency, published his extraordinary and unofficial Ninth Bridgewater Treatise in 1837 (49). Ostensibly Babbage’s book was written in opposition to Whewell’s denial in his Bridgewater Treatise that pure and applied mathematicians could marshal natural theological arguments from mathematics. Babbage proceeded to demonstrate that they could, noting caustically that his demonstration was voluntary and that no money was involved. This Tristram Shandy of a book—Chapter 6 is largely blank space, and Chapter 14 consists of a single sentence—was very much the ‘Fragment’ indicated by Babbage’s sub-title. However, it is a most interesting document which contains dissertations on free will and miracles supported from arguments drawn from his calculating engine.

It is clear that the eight Bridgewater authors had to fulfil three conditions:

(i) They had to be good, and if possible, well-known scientists. (One suspects that they were expected to be Fellows of the Royal Society.)
(ii) They had to have literary ability and be able to write for an educated, if not, academic public.
(iii) They had to be pious individuals who were theologically orthodox, and who would not write solely through financial inspiration.

How successfully were these criteria achieved?

With the exception of Chalmers all the authors were Fellows of the Royal Society and very distinguished scientists. As Canon Raven remarked in his famous Gifford Lectures of 1951:

A team which included Thomas Chalmers of Edinburgh, William Whewell, afterwards the great Master of Trinity, William Buckland the geologist, and William Kirby, the doyen of entomologists, could not easily be improved (50).

To this we need only stress that the team also included John Kidd, who with Buckland and Daubeney pioneered the teaching of science in nineteenth-century Oxford, Charles Bell the skilled artist and investigator of the nervous system, and William Prout, who is famous for his hypothesis about the nature of matter and for his analysis of gastric juice. All eight men wrote fluently, and, as may be judged from the number of editions recorded in the Bibliography to this paper, their Treatises sold exceptionally well. In general, too, the authors were well-treated by reviewers. To the modern reader, of course, all the treatises seem to suffer from the basic fault that evolutionary change appears to be perversely unrecognized. Each species of plant, animal
and mineral is assumed to have been created specially, and the authors seem to us to labour under the impossible task of demonstrating the final intention of God for every structure which they describe. Frequently the authors are led into logical incongruities, for when final causes are assigned they have an unfortunate tendency to cancel one another out. On the other hand, in their own time, the Bridgewater Treatises were of high merit as scientific textbooks. For example, they stressed the advantages of Cuvier’s classification of animals, and the neologism, *convection*, first came into scientific use through one of the Treatises (51a).

Theologically, they were less successful. Four of the authors were in holy orders, and in their Christian orthodoxy the eight men ranged from the quaint fundamentalism of Kirby to the High Anglicanism of Whewell. Although the Treatises were sincerely written—only Whewell and Buckland appear to have inquired the exact size of their emoluments—their logic was only as good as the Design Argument can ever be. None of them really tried to get to grips with the difficulties of their reasoning; the problems of pain, disease, disaster and death were either ignored, or disposed of in a hurried and faintly embarrassed fashion as the mysterious ways of the beneficent deity.

Despite the careful vetting of Howley and Blomfield, two of the Treatises were heterodox in tendency. Oddly, these two treatises, those of Buckland and Prout, were to my mind the best and most creative scientifically. As was to be expected, Buckland’s *Geology and Mineralogy* was the most controversial book simply because he had to say something about Genesis and Geology. Dictated at night to his devoted wife (52), the book was awaited with eager anticipation by Buckland’s followers. Would he attack Charles Lyell’s uniformitarian *Principles of Geology*? How would he reconcile the biblical chronology with geological time? Although he said nothing about Lyell’s thesis, his first chapter was devoted to the problem of reconciling Genesis with Geology. The Bible, said Buckland, was not a scientific textbook, even though it frequently harmonized with the scientific record; the Bible had been written to reveal God and instruct men of the Divine purpose, and not to teach men science. For these opinions, which echo those of Galileo, Buckland was attacked in the daily press which had evidently expected a defence of Mosaic geology from him. Instead, what Buckland gave his contemporaries was an extremely good geology textbook which even made favourable reference to Lyell.

Prout’s heterodoxy was rather different and potentially more serious theologically. Because of his research interests in animal chemistry Prout believed that an animal or organic agent was necessary to organize the
organic substances which went to make up living things. This agent was of a different order from the inorganic forces that held together the molecules of organic substances. In later editions of his Bridgewater Treatise Prout postulated a large number of organic agents which he described as 'intelligent' conscious beings 'possessing knowledge, will and power' (51b). 'We must confess', wrote one hostile critic apropos this 'ugly excrescence' to an otherwise brilliant book, 'our inability to discern the essential difference between this figment, and the mythical notions of the ancients respecting their deities or semi-deities, which we presume that Dr Prout would condemn as absurd' (53). Prout’s metaphysical ideas sounded dangerously like polytheism, a doctrine with which Archbishop Howley and Bishop Blomfield must have taken care to avoid when they vetted potential authors for the Bridgewater commissions. But to be fair, these tendencies of Prout’s were not at all obvious in 1830, and they were only explicitly voiced by him in 1845.

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Treatise III: The Rev. William Whewell, Astronomy and General Physics Considered with Reference to Natural Theology (dedicated to Blomfield), 1833 (1833, 1834, 1836, 1837, 1838, 1842, 1847, 1852, 1864).

Treatise V: Dr Peter Mark Roget, *On Animal and Vegetable Physiology Considered with Reference to Natural Theology* (dedicated to the Duke of Sussex), 2 vols., 1834 (1839, 1840, 1862, 1867, 1870).


Treatise VIII: Dr William Prout, *Chemistry, Meteorology, and the Function of Digestion Considered with Reference to Natural Theology* (dedicated to Gilbert), 1834 (1834, 1845, 1855).


Rev. (now Canon) D. W. Gundry, ‘The Bridgewater Treatises and their Authors,’ *History*, 31, 140 (1946); 32, 122 (1947); 33, 125 (1948).


Notes


(4) H. M. and K. D. Vernon, *A History of the Oxford Museum*, Oxford, 1909, p. 36: ‘Happily at this time a taste for the study of Natural History . . . has been executed in the university by Dr Paley’s very interesting work on Natural Theology, and the very popular lectures of Dr Kidd on Comparative Anatomy and Dr Buckland on Geology.’ The Museum’s contents were arranged so that: ‘The first division proposes to familiarize the eye to those relations of all natural objects which form the basis of the argument in Dr Paley’s Natural Theology; to induce a mental habit of associating natural phenomena with the conviction that they are the media of Divine manifestation; and by such association to give proper dignity to every branch of natural science.’


(7) For a full description of the will see *Gents Mag.*, 99, i, 559 (1829).


(9) C. W. Sutton, ‘Francis Henry Egerton’, *Dictionary of National Biography* (cited as *D.N.B.*), 17, 154. This account was based largely on the material of note (7) supra.

(10) Cited in refs. (7) and (9) supra; there is no copy in the British Museum.

(11) Quoted in the front papers of all eight Bridgewater Treatises. The Bridgewater legacy became the model for many other zealous benefactions. For instance, in 1838, a certain Mrs Hannah Acton, widow of Samuel Acton, ‘from motives of respect and regard for the memory of her deceased husband, and in order to carry into effect his desire and intention, caused an investment to be made of the sum of £1,000 in 3%
Consol Bank Annuities, in the names of the Trustees of the Royal Institution of Great Britain, the interest of which was to be devoted to the formation of a fund out of which the sum of one hundred guineas was to be paid septennially, as a reward or prize to the person, who in the judgement of the committee or managers for the time being of the Institution, should have been the author of the best essay illustrative of the wisdom and beneficence of the Almighty, in such department of science, as the committee of managers should, in their discretion, have selected. The first winner of this Actonian Prize was the Professor of Practical Chemistry at University College London, George Fownes. His Chemistry As Exemplifying the Wisdom and Beneficence of God, London, 1844, from which the quotation is taken, was inferior to the Chemical Bridgewater Treatise of William Prout. (See G. Wilson, Religio Chemici, London, 1862, pp. 1-50, for a joint criticism of Fownes and Prout.) The Royal Institution's Actonian Prize is now given to an invited lecturer, and is not competitive. Note also The University of North Carolina's 'John Calvin McNair' lecture bequest of 1857 to prove the existence and attributes . . . of God from Nature', and the terms of the Scottish Universities' Gifford Lectures of 1887.

(13) John D. Enys (ed.), Correspondence Regarding the Appointment of the Writers of the Bridge- water Treatises Between Davies Gilbert and Others, priv. printed, Penryn, Cornwall, J. Gill & Son, 1877, 32 pp. Hereafter cited as 'Enys'.
(14) Phil. Mag. (2), 9, 200 (March 1831); Enys, p. 23.
(15) 14 February 1829, Enys, p. 3. Farnborough inherited property worth £4,000 p.a. from the Bridgewater estate because Egerton was his wife's uncle. See 'Charles Long', D.N.B. 34, 99.
(16) 14 May 1829, Enys, p. 4.
(17) 12 May 1829, Enys, p. 3.
(18) See 'John Thomas Graves', D.N.B. 22, 430.
(19) 8 June 1830, Enys, p. 4.
(20) Letter to John Herschel, 29 June 1830, Enys, p. 5. (For original letter, see the Royal Society Herschel correspondence, HS. 8. 127.) Farnborough, on the other hand, was under the impression that the work was to be divided into only three parts, 7 August 1830, Enys, p. 7.
(21) 8 June 1830, Enys, p. 4. Roget's 'treatise' must have been either his An Introductory Lecture on Human and Comparative Physiology, London, 1826, or one of his essays for the Society for the Diffusion of Useful Knowledge: Natural Philosophy, vol. 2, Electricity, Galvanism, Magnetism, Electromagnetism, London, 1829, etc.
(22) H. Mayo, Outlines of Physiology, London, 1827, with several later editions. For Mayo, see D.N.B. 37, 172.
(24) Note that John Kidd, Regius Professor of Medicine at Oxford, had previously published An Introductory Lecture to a Course in Comparative Anatomy, illustrative of Paley's Natural Theology, Oxford, 1824.
(25) Enys, pp. 6-7. See supra, note (20) for Gilbert's letter. Enys did not print the second halves of Gilbert's letter and Herschel's reply; these were concerned with comments on a paper on optics by John Herapath. For Herschel's original draft, see Roy. Soc. Herschel correspondence, HS. 25. 1. 5.
(26) See D.N.B. 48, 326; Phil. Mag. (3), 12, 275-276 (1838).

(27) 7 August 1830, Enys, p. 7. Locker had edited The Plain Englishman with Charles Knight from 1820-1823. A Fellow of the Royal Society, he is now principally remembered for his creation of the gallery of naval portraits at Greenwich. See D.N.B. 34, 41.

(28) 11 September 1830, Enys, p. 15.

(29) 28 August 1830, Enys, p. 12; note also ibid. pp. 8, 10. For Wix, see D.N.B. 62, 275, and Gents Mag. 12, i, 94 (1862).

(30) 17 August 1830, Enys, p. 8.

(31) 23 August 1830, Enys, p. 9. Bell's earlier volume was Animal Mechanics, or Proofs of Design in the Animal Frame, London, 1827 (Society for Diffusion of Useful Knowledge). Later he produced an annotated edition of Paley with Lord Brougham, Paley's Natural Theology, with . . . notes by Henry Lord Brougham . . . and Sir Charles Bell; to which are added supplementary dissertations by Sir C. Bell, London, 1836, 1842 and 1843.

(32) Enys, pp. 9, 10, 11.

(33) 'I agree with you in thinking that Light might be the subject of a distinct treatise, provided that it embraces Optics. Is chemistry to form a branch? If not Heat should be coupled with Light', 28 August 1830, Enys, p. 11.

(34) 1 October 1830, Enys, p. 16.

(35) Athenaeum, 58, 349, col. 1 (1834); note also Edinb. Rev. 58, 424 (1833-1834).

(36) 28 August 1830, Enys, pp. 11-12. Knapp, a botanist, was never made a Fellow of the Royal Society. His Journal of a Naturalist was issued anonymously in 1829, with further eds. in the same year and in 1831. See D.N.B. 31, 235.

(37) 28 August 1830, Enys, p. 11.


(39) Buckland noted there were 87 plates and 705 figures, Sixth Bridgewater Treatise, London, 1836, vol. 2, p. vii. According to Alliborne's Dictionary of English Literature, London, 1885, 1, 277, Buckland spent much of his £1,000 on the illustrations.

(40) E.g. The Literary Gazette and Journal of Belles Lettres, Arts and Sciences, no. 733, p. 88, 5 February 1831.

(41) 8 February 1831, Enys, pp. 20-21.

(42) Phil. Mag. (2), 9, 200 (1831); Enys, pp. 21-24.

(43) 13 October 1832, Enys, p. 17.

(44) Chalmers and the infirm Kirby were unable to attend.


(46) Enys, pp. 31-32.

(47) Cf. Herschel's feelings supra; also note the later reaction of John Tyndall when asked to edit a posthumous edition of Prout's treatise in 1854, A. S. Eve and C. H. Creasey, Life and Work of John Tyndall, London, 1945, p. 36. (The date of Tyndall's remark is incorrectly given as 10 June 1854; it should be 19 November 1854.)

(48) 17 October 1830, Enys, p. 19.

(49) C. Babbage, The Ninth Bridgewater Treatise: A Fragment, London, 1837, 2nd ed., 1838. It was published by Murray who was perhaps somewhat vexed by the success of Pickering's eight treatises.