

# British scriptural geologists in the first half of the 19<sup>th</sup> century: part 13. William Cockburn (1774–1858)

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## Biographical sketch<sup>1</sup>

Sometime in 1774 William Cockburn<sup>2</sup> became the third son born to Sir James Cockburn of Scotland. He achieved the distinction of twelfth wrangler<sup>3</sup> in mathematics at St. John's College, Cambridge, in 1795 and was a Fellow of the university from 1796 to 1806, obtaining an M.A. in 1798. In 1823 he earned the doctor of divinity degree. From 1803 to 1810 he served as Christian Advocate to Cambridge University, a task of defending the Christian faith among the students.<sup>4</sup>

He was ordained in the Church of England as a deacon in 1800 and as priest the following year. In 1822 he became the Dean of York, the primary pastoral leader and authority in the York Cathedral, which was a position he held until his death in 1858.<sup>5</sup> As such he received an annual stipend of £2000.<sup>6</sup> From 1832 onwards he was also rector of Kelston, Somerset, near Bristol, where he generally spent half the year.<sup>7</sup>

In 1829 a fanatical Methodist set fire to the Minster, causing considerable damage. As Dean, Cockburn was responsible to manage the repairs, which he did not do well, causing friction between him and William Vernon Harcourt and some others in the Minster chapter. A second, accidental fire in 1840 again caused massive damage. Conflicts over the restoration work and Cockburn's unwise financial management finally reached a boiling point in 1841, when a York prebendary<sup>8</sup> accused Cockburn of simony.<sup>9</sup> The charge was that Cockburn had accepted money in return for a promise to appoint to a parish in his patronage. According to Aylmer and Cant, Cockburn was foolishly frank, muddled his accounts, used repair funds for non-repair purposes, was intolerable to clear-thinking accountants and made too many independent decisions. But they concluded, 'The dean was culpably careless, but nothing else that we know about him suggests that he was criminal.'<sup>10</sup>

Eventually, litigation involving the Archbishop of York led to a judgment deposing Cockburn from the Deanery. Cockburn appealed to the court of the Queen's Bench, which ruled 'almost contemptuously' in favour of Cockburn, being particularly critical of the prosecuting attorney, Dr Phillimore, Regius Professor of Civil Law at Oxford, for his ignorance of the applicable laws. The reputation of the Minster suffered badly from this affair. However, the whole city of York was pleased that Cockburn was still Dean and

tried to raise money to give him a token of their respect. When Cockburn discovered the plan, he insisted that they not do it because it would foster unpleasant memories for everyone.<sup>11</sup>

In 1805 William married Elizabeth, the sister of Sir Robert Peel, who later twice served as Prime Minister.<sup>12</sup> She gave birth to three sons. But not long after becoming Dean, Cockburn was soon acquainted with grief; Robert, the second son, died in 1825 (a year before his mother). George, the third son, died in 1830 and James, the eldest, died in 1846 at the age of 38.<sup>13</sup> In 1830 Cockburn married Margaret Pearce, the daughter of a colonel in the British military, but they had no children. In 1853 Cockburn was made Baronet after the death of his brother, George, who was a FRS<sup>14</sup> and Admiral of the Fleet, Major-General of the Marines and Rear-Admiral of the United Kingdom.<sup>15</sup> At age 84, Cockburn died in Kelston on 30 April 30 1858, after over a year of growing infirmities.<sup>16</sup>

It would be difficult to place Cockburn precisely on the theological spectrum. He attempted, very early in his ministry in 1805, to call Methodists back to the Church of England and did reject extemporaneous prayer as 'absurd', which was a kind of prayer popular among evangelicals.<sup>17</sup> He sought to defend the establishment of the Anglican Church,<sup>18</sup> and was concerned for the poor and other economic issues.<sup>19–21</sup> Although he considered Catholics as 'Christian brethren', since they shared with Protestants many essential doctrines, still in 1843 he strongly opposed the Catholic view of the priesthood and the efforts of the Anglo-Catholic Tractarians to move the Church of England back towards Rome. He also appears to have had an evangelical view of infant baptism.<sup>22,23</sup> Like many in the church, he was a Freemason, believing it was a union 'to revive the spirit of Christianity', but his only public remarks on this do not suggest a very deep involvement in Masonry, which would explain his mistaken beliefs about its compatibility with Christianity.<sup>24</sup>

From his position as Dean of York he launched his criticisms against the old-earth geological theories of his day, and against what were perceived to be the anti-Christian tendencies of the British Association for the Advancement of Science (BAAS) formed in 1831. He was one of the original vice-presidents of the Yorkshire Philosophical Society and remained a member until at least 1844.<sup>25</sup> He attended the



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Archway of St. John's College, Cambridge, where Cockburn achieved the distinction of twelfth wrangler<sup>3</sup> in mathematics.

first and fourteenth meetings of the BAAS held in York in 1831 and 1844.<sup>26</sup>

Cockburn wrote a number of short books and pamphlets addressing scientific and, particularly, geological issues. These included a response to the geological theory of Buckland's *Bridgewater Treatise*,<sup>27</sup> a reply to F.J. Francis' old-earth theory and his attack on Cockburn,<sup>28</sup> an appeal to the Duke of Northumberland to use his influence to bring an end to the BAAS meetings,<sup>29</sup> a criticism of Murchison's old-earth theory as expressed in his *Silurian System*,<sup>30</sup> a paper Cockburn read to the geological section of the BAAS in 1844 which again criticized the pre-adamite geological theory,<sup>31</sup> two letters to the editor of *The Times* criticizing old-earth geological theory and the recently published book on evolution, *Vestiges of the Natural History of the Creation*,<sup>32,33</sup> and finally a fuller statement of his view on the history of the earth in relation to geology and the Scriptures.<sup>34</sup> He also preached a sermon in which he asserted that pride was what caused many men of learning, particularly philosophers, to oppose Christianity.<sup>35</sup>

### Attitude to geology and geological competence

Cockburn made no pretension to being a geologist. But neither did he object to geological theories out of total ignorance. He claimed to have read carefully (and seems to have understood well)<sup>36</sup> Buckland's *Bridgewater Treatise* (1836), Murchison's *Silurian System* (1839) and *Geology of Russia* (1845), Phillips' *Geology of Yorkshire* (1829), Lyell's *Principles of Geology* (1830–1833), and Francis' *Physical and Fossil Geology* (1839), as well as some articles on geology in the *Edinburgh Review* and in the *Scarborough Guide*. He did not refer to any writings of other scriptural geologists, much less rely on their work to support his own similar views. This is particularly surprising in the case of Rev. George Young, who also lived in Yorkshire.

Cockburn did not just read about geology, however. In an 1844 letter to Rev. Adam Sedgwick (lead geologist at Cambridge University), he said that the argument between them was not over the 'facts of geology; which are admitted, and have been long studied by me, and confirmed in most cases by my own ocular observation'.<sup>37</sup> The fifth edition of his *Bible Defended* was more explicit: in response to Sedgwick's charge that Cockburn was geologically ignorant he claimed to have been 'constantly employed [meaning "actively engaged"] for many years in examining all the accessible strata in Devonshire and Yorkshire, and particularly in this advantageous locality (Somersetshire) where innumerable stone quarries are open on every side', and to have walked through 'all the tunnels of the railroad between Bath and Bristol'.<sup>38</sup> In 1849 he added that he had conducted 'a minute investigation and examination of all the quarries to which I have been able to gain access in the last twenty years'.<sup>39</sup>

Nevertheless, most of his writing was based on the observations and writings of the qualified geologists he was disputing. He respectfully and consistently acknowledged that the 'justly distinguished class'<sup>40</sup> of geologists, such as Buckland, Murchison, Sedgwick and many others, had gathered a mountain of geological facts.<sup>41–44</sup> But he was not convinced by the logic of their arguments that their interpretation of the facts was always correct. His opening statement to Murchison was typical:

'I have read with deserved attention the book which you have lately published on the 'Silurian System'. Too much praise cannot be given to the perseverance and assiduity with which you have investigated the facts connected with the subject. But while, with ready deference to superior experience, I presume not to doubt any of those facts, I feel myself entitled to affirm, that you have offered no rational or satisfactory account of the probable origin of the various formations which you have so well described.'<sup>45</sup>

Instead, he believed that 'by attending minutely to the historical account given by Moses' the facts could be reasonably explained by a single short period of creation and





Photo by Elizabeth Croft

York Minster, where Cockburn served as Dean, 1822–1858.

a single global flood in a way that the reigning geological theory could not explain.<sup>46</sup>

Although Cockburn perceived that education without a religious basis would just produce intellectual pride, and he criticized the pompous meetings of the BAAS as unsuitable occasions for advancing scientific truth, he did not oppose science in general or the study of science in the universities in particular, as Orange asserts.<sup>35,47,48</sup> In his attacks on old-earth geological theories, he most definitely was not opposed to the study of geology, nor did he fail to show respect for the attainments of geologists. He described Murchison's *Silurian System* as a 'valuable work' in which geological phenomena were 'admirably and scientifically described'.<sup>49,50</sup> Buckland was commended for the 'diligent and scientific enquiries' reflected in his *Bridgewater Treatise*.<sup>41</sup> He also repeatedly asked the geologists, to whose theories he objected, to inform him, either privately or publicly, of what ways he had misunderstood them or to explain in a more explicit manner (that non-specialists, like Cockburn, could understand) how their theories actually did explain the geological facts.<sup>46,51–54</sup>

### The relation between Scripture and science

Cockburn did not discuss in what way the interpretations of the Word of God and of the geological phenomena were related. But he clearly believed that Genesis was a true historical account about the origin and history of the earth. In his only reference to the Galileo affair he attempted to show that it was quite different from the present geological debate:

'Why, it has been asked, did Galileo obtain credence for his philosophy which was at first so much opposed? Because he and his supporters began with the simplest axiom, and rose up, step by step, to the highest truths of science—proposition followed proposition—no link in the chain was wanting till the lowest and the highest intellect were equally convinced.'<sup>55</sup>

He obviously believed that in the 1830s and 1840s geological theory had not yet attained the same philosophical status as the Copernican theory.

### Creation and the Flood

Though Cockburn held firmly to a literal six-day creation about 6,000–7,000 years ago, he never discussed in detail the Creation Week and the Genesis genealogies.<sup>56</sup> Rather, his primary attention was focused on the account of the Noachian Flood, which he believed produced most of the geological record.

Cockburn believed that during the Creation Week God supernaturally created the *primary* rocks, the land and sea, and all the various kinds of plants and animals, as well as man. During the 2,000–3,000 years between creation and the Flood, man and the animals multiplied exceedingly as they spread out geographically in a world without convulsions, storms or great variation in climate. Rivers and tides steadily eroded and deposited sand and clay in various combinations in a tranquil sea to produce the successively layered slate and sandstone *transition* rocks (e.g. Cambrian and Silurian). Because this was a relatively peaceful ecological environment, he reasoned, the remains of very few creatures were imbedded in the ocean bottom, other than some of the bottom-dwellers.

Then came the great catastrophe, the Flood, which produced the *secondary* and *tertiary* strata. It began as the 'floodgates of heaven' poured down rain in vast superabundance and unprecedented volcanic activity (literally thousands of volcanoes) all over the world simultaneously ruptured the 'fountains of the deep'.<sup>57</sup> This volcanic activity was very prominent in Cockburn's view. He believed that it was not constant, but was spasmodic in its intensity, so that in different parts of the earth at the same time there existed places of great violence and others of relative tranquillity. Therefore, as the debris from the volcanoes mixed with the sediments, plants and animals (which were being transported into the seas from land, as a result of the torrential rains), the expected result would be

the complexity, general regularity and order of the stratified formations with their imbedded fossils.<sup>58,59</sup> In the process also, the single antediluvian continent was sunk to the ocean bottom and the sea-floor was lifted in the later stages of the Flood to produce new continents basically in their present arrangement with mountains, valleys and plains.<sup>60</sup>

The unimaginably great volcanic activity, suggested Cockburn, may have caused a tilting of the earth's axis so that before the Flood, the equator and ecliptic would have coincided, producing a worldwide climate conducive for larger and longer-living creatures and a more general distribution of them than at present.<sup>61,62</sup>

His view of the origin of limestone and coal was unique. The lime was either expelled by volcanoes (the view he maintained in most of his books) or it was produced by thermal springs (an idea suggested in his last book). This was his explanation for the lower Carboniferous (or Mountain) limestones as well as those above in the Lias and Oolite. He rejected the idea that the limestone (especially the Carboniferous) was the product of secretions from shell fish, because in the old-earth theory of the early history of the earth he could find no adequate source for the immense quantities of carbonate of lime from which they could produce their shells.<sup>63-65</sup> Also, although he had read the geologists' arguments, he was not yet convinced thereby that coal was of vegetable origin. Rather, he postulated, it, too, was one of the products of volcanoes during the early stages of the Flood, which acquired some of its vegetable impressions from the debris eroded from the continent and mixed with the volcanic material in the ocean.<sup>50,66-68</sup>

Regarding the plant and animal fossils, Cockburn attributed virtually all of them to the time of the Flood, during which their order of deposition was related to their respective living environments (i.e. various depths of the sea or elevations on the land), their ability to survive the gradual chemical pollution of the waters (due to volcanoes and land erosion), their ability to escape the Flood on land and their buoyancy (affecting the rate of deposition):

'The creeping things at the bottom of the sea were the first destroyed; then the fish; next, the animals inhabiting the marshes near the sea; afterwards, the heavy quadrupeds that could not run from the rapidly increasing waters; and, lastly, the more active animals, which had for a time escaped. We see, also, here how easily fresh water fish might be carried into the sea, and pressed down into the same strata with the natives of the ocean.'<sup>69,70</sup>

The reason we do not find human fossils, argued Cockburn, is that 1) the antediluvian continent is likely now part of the bottom of the sea and 2) humans were the most capable of escaping death and burial by the Flood for the longest time.<sup>71-73</sup>

The differences of shellfish, by which the various strata were distinguished as different creations separated by long ages, were interpreted by Cockburn to reflect instead the variety of environments in which the creatures lived, which

affected the kinds of shells they secreted (just as the same variety of sheep produced different kinds of wool depending on what climate they were raised in). He also argued that the actual differences between the varieties of trilobites, or the different species of crinoidea, or of corals, or of ammonites, etc., were triflingly small. Therefore, there was good reason to suppose that they all lived at the same time, though in different places and depths of the sea.<sup>70,74</sup>

Many of his speculations on the results of the Flood might be seen as plausible given his assumptions about its violent nature. But even his contemporary sympathizers might have found some of his ideas extremely dubious. For example, his explanation of the granite boulders found in Yorkshire was as follows.

'I conceive that at the time of the great flood, the waters were nearly level with the top of Shapfell, and that there were *floating* in these waters the ruins of the former earth. Many large trees, many vegetables, many carcases, which, accidentally uniting together, made a kind of raft on which some of the many stones ejected by the volcanoes might rest, and when the waters rushed towards the present ocean, these rafts would carry the stones, some a little way, some a great way, according as any trifling obstacle occasioned them to deposit their load. This explanation will suffice to account for the many similar facts recorded in several parts of the world, where so many large blocks have been found at a considerable distance from the parent rock.'<sup>75</sup>

Equally unbelievable to many might have appeared his notion of how quadruped footprints came to be preserved in the strata. In this case also he hurt his credibility by misrepresenting Buckland's view:

'Our author evidently supposes that these impressions were made under water, and at a considerable depth, since the sandstone was covered by so many deposits. But how could an earthly quadruped be walking on the sand in the deep water? To this obvious difficulty, Dr Buckland offers no solution. I conceive that the impression was made upon the sandstone when in the existing earth, and when moistened by the incipient flood; that the raging waters then tore up the sandstone, and carried it to the sea, partly in large pieces, partly in a pulverized state; and that where a large mass happened to sink, it retained the marks previously made upon it while on the earth.'<sup>76</sup>

### Objections to old-earth theories

In addition to presenting his own view of Earth history, he devoted the majority of his writing to questions and logical objections raised against various aspects of the old-earth theories. In each case, he accepted the facts of Murchison, Buckland and others but challenged the logic

of their deductions from those facts and attempted an alternative solution based on the Flood.<sup>77</sup> So, for example, he found most unconvincing Murchison's explanation for 'missing' rock formations, such as the entirely absent Trias, Lias and Lower Oolite between the plains of Prussia and the frontiers of Asia, as reported by Murchison.<sup>78</sup> He also found it difficult to conceive of the multiple cycles of submergence and elevation postulated to explain the carboniferous formations of alternating coal (from plants grown *in situ*), sandstone, limestone and clay, or to explain the death and burial of the Siberian mammoths.<sup>79</sup> Another unsolved problem in the old-earth theory, acknowledged by Murchison and Buckland, whom Cockburn quoted, was the origin of the lime to make vast limestone formations on the base of a granite crust of a cooling Earth.

Most problematic for Cockburn was the idea of multiple destructions and creations, as a result of divine intervention in the course of nature. He complained that often the old-earth geologists never offered any explanation for the origin of plant and animal life—they just asserted that it had happened.<sup>40,80</sup> But still worse, in Cockburn's mind, was that such a view of Earth history impugned the nature of God as revealed in Scripture. Writing to one opponent, he objected:

'You leave us indeed to suppose, that the Deity, constantly and repeatedly, interfered to cause all these effects—But how humble an idea of Deity does this supposition present. He first made a world utterly useless, which continued through 'hundreds of thousands of years'—He then, by means of volcanoes, broke through its crust, and raised up rocks above the surface of the water—But still the earth was 'a mere barren desert'—The Deity afterwards formed the mould, and by his power created the seeds of vegetables, and planted the trees in the mould, and there they grew for thousands of thousands of years. Then new volcanoes destroyed them all. Then all was begun again, and new vegetables sprung up on new formed mould. At last the Immortal God was employed in creating a few crawling trilobites—because the world, formed by such successive efforts, was fit for nothing better. How unwarrantable—how incredible a description of infinite power do you thus present to us. ... The world, notwithstanding all these efforts of divine energy, was still useless and unenjoyed. Such frequent and little successful efforts on the part of Deity, to produce a particular effect, are derogatory to the idea we have formed of Him who created all things.'<sup>81</sup>

### Conclusion

Though Cockburn was not a geologist, neither was he completely ignorant of geological literature and actual geological phenomena. He did not oppose the study of

geology or dispute the facts of geology. And while he based his own view on the Bible, he did not primarily use the Bible to attempt to refute his opponents. Rather, he challenged the logic of deductions from those facts cited by his opponents. He was not convinced by their arguments and sought for further private or public clarification of the facts and theories propounded. His general approach was to raise objections and questions. He did, however, offer some alternative geological interpretations, though even his fellow scriptural geologists would probably have found some of them quite unpalatable. Because he saw no convincing way to harmonize the old-earth theory with the biblical account of creation and the Flood, he believed that the geological theory was undermining Christian faith in the Scriptures, which would have negative repercussions for the church and for society. As a wealthy clergyman in a secure life-long position, he did not need to write. Opposing the old-earth geologists would not have improved, but rather aggravated his already difficult ecclesiastical situation. And though he was closely related to a politician, there is no evidence that politics played any role in his opposition to old-earth geological theory. There seems no compelling reason to doubt that his stated Christian convictions were what motivated him in his 'cause'.

### References

1. Unless otherwise noted, this is based on his obituary in *Gentlemen's Magazine*, N.S. IV:670–671, 1858.
2. Pronounced as 'Coburn'.
3. The Late Dean of York, *Yorkshire Gazette*, p. 7, 8 May 1858. Those who gained a first-class Cambridge honours degree in mathematics were wranglers. Cockburn had the 12<sup>th</sup> highest scores in math at the university that year.
4. Cockburn, W., *Strictures on Clerical Education in the University of Cambridge*, 1809. In this article he defined his job (as Christian advocate) 'to offer replies, according to the best of his abilities, to such new arrangements as may be published against the divine mission of Jesus Christ' (p. 3). Here he complained of the inadequate undergraduate training of men for the ministry and offered suggestions for improving ecclesiastical knowledge.
5. The Late Dean of York, *Yorkshire Gazette*, p. 4, 15 May 1858. Shortly thereafter William Vernon Harcourt (an opponent of the scriptural geologists and founder of the BAAS) became (in 1823) residentiary canon and his brother, Leveson Vernon Harcourt (a scriptural geologist) became (in 1827) chancellor of the York diocese. Gilbert, R., *The Clerical Guide*, 1836. Diocesan meetings must have been interesting when these men were all attending!
6. Aylmer, G.E. and Cant, R. (Eds.), *A History of York Minster*, Oxford: Clarendon Press, pp. 287–288, 1977.
7. Aylmer and Cant, ref. 6, p. 284.
8. An honorary 'canon' in the Church of England, in this case associated with the York Cathedral.
9. The buying or selling of sacred or spiritual things, as sacraments or benefices (an endowed church office that provides financial income)—in simple terms the use of money to gain spiritual or religious advantage, as Simon Magus did in Acts 8.
10. Aylmer and Cant, ref. 6, pp. 274–286. Quote on page 286.
11. Aylmer and Cant, ref. 6, pp. 274–287. Aylmer and Cant say that Cockburn never cleared himself of the charges of simony, but he was likely innocent.



12. Chadwick, O., in: *The Victorian Church* I:562, 1971. It is suggested that this fact may have contributed to the wide circulation of Cockburn's writings on geology. But it is questionable whether this was well known. Cockburn made no mention of this relationship to Peel in his writings on geology.
13. Venn, J.A., *Alumni Cantabrigienses* II:81, 1940–1954. Note that the stated year of James' death (1824) is incorrect. James' obituary appeared in the *Yorkshire Gazette*, 3 January 1846.
14. Fellow of the Royal Society.
15. *Yorkshire Gazette*, 27 August 1853.
16. The Late Dean of York, *Yorkshire Gazette*, pp. 7–8, May 1858.
17. Cockburn, W., *An Address to Methodists and to all other honest Christians who conscientiously secede from the Church of England*, p. 17, 1805.
18. That is, the Church of England continuing to be the official state church of the British Empire.
19. Cockburn, W., *Church and State: a Sermon preached at York Minster*, 1834.
20. Cockburn, W., *Commercial Oeconomy; or The Evils of a Metallic Currency*, second edition, 1819.
21. Cockburn, W., *A Letter Addressed to Lord Viscount Althorp, on the State of the Nation, and particularly of the Poor*, 1831.
22. Cockburn, W., *An Address to Roman Catholics of Great Britain and Ireland*, 1807.
23. Cockburn, W., *On the Proposed Revival of Romish Customs and Ceremonies in the Church of England*, 1843.
24. Cockburn, W., *A Sermon preached in the Parish Church of Tor ... on the consecrating [sic] the Lodge of St. John, at Torquay*, p. 7, 1810.
25. Orange, A.D., *Philosophers and Provincials*, p. 66, 1973.
26. Orange, A.D., The Idols of the Theatre: The British Association and its early critics, *Annals of Science* XXXII:284, 1975.
27. Cockburn, W., *Letter to Prof. Buckland, concerning the Origin of the World*, 1838. Hereafter, this 16-page work is cited as *Letter to Buckland*.
28. Cockburn, W., *Remarks on the Geological Lectures of F.J. Francis*, 1839. This was a quick 16-page reply to F.J. Francis's *A Brief Survey of Physical and Fossil Geology*, which had appeared earlier in 1839. Francis' book was the publication of two lectures he gave in November 1838 and February 1839 to the Marylebone, Western and Richmond Literary and Scientific Institutions. Francis believed there had been at least four revolutions over the course of millions of years, the Noachian Flood being the last, which produced the valleys, boulders and other diluvial deposits on the earth. This view he believed was perfectly harmonious with Scripture by means of the gap theory. His arguments show that he was heavily relying on the pre-1830 writings of Buckland, Cuvier and Sedgwick, a fact which revealed how out of touch he, as an old-earth creationist, was with the current thinking of Buckland and Sedgwick on the Flood and its geological consequences. Nevertheless, he charged Cockburn and other scriptural geologists with having 'a zeal which is not according to knowledge—a zeal which is ardent in the mind just in proportion as the truths of natural science are unknown [p. 92–93]'. Hereafter, references to Cockburn's response to Francis will be cited as *Remarks on Francis*.
29. Cockburn, W., *Remonstrance, addressed to His Grace the Duke of Northumberland, upon the Dangers of Peripatetic Philosophy*, 1838. Hereafter, this 26-page work is cited as *Remonstrance*. In addition to criticising the BAAS and Buckland's geological theory, half of this work was devoted to arguments against the undulation theory of light.  
  
Cockburn asked for the cessation of the BAAS. However he was not opposed to scientific investigation. [See Marston, P., *Science and Metascience in the Work of Adam Sedgwick*, Ph.D. thesis, The Open University, p. 290, 1984. Marston comes to the same conclusion.] Rather, it was because, first, he was convinced that the BAAS 'peripatetic' philosophers were hurting science, by presenting their ideas orally in their 'annual assemblies of Thespian Orators', instead of in written form to the universities and other permanently resident scientific institutions for their studious examination. Secondly, because the BAAS strictly ignored the religious views of its members, he believed it was 'likely to be injurious to religion', i.e. the Christian faith (p. 5). Thirdly, he perceived that the BAAS fostered intellectual pride (pp. 21–26). Lastly, like many others, he also condemned the BAAS meetings, where the majority appeared to attend 'only with the hope of sharing the compliments and custards which will be lavishly distributed' (Cockburn, ref. 28, p. 16).
30. Cockburn, W., *The Creation of the World, addressed to R.J. Murchison*, 1840. Hereafter, this 40-page booklet is cited as *Creation*.
31. Cockburn, W., *The Bible Defended against the British Association*, fourth edition, 1844. Hereafter, this 23-page work is cited as *Bible Defended*. Sedgwick's hour and a half long stinging response [summarized in *Athenaeum* 884:903–904, 1844] after Cockburn sat down, would have silenced most men. But not Cockburn. He sought private or public interaction with Sedgwick on the issue and his pamphlet went through five editions in just a few months after the September 1844 BAAS meeting. It included correspondence that Cockburn had, or tried to have, with Sedgwick and other BAAS leaders about the objections he was raising.  
  
The 1844 BAAS Report of the meeting gave a two-line notice of the paper remarking that it was critical of Buckland's *Bridgewater Treatise*. The Report contained no mention of Sedgwick's criticism of it. The events of the day were reported in *Chambers' Edinburgh Journal* I(47):322–323, 23 November 1844. The report was likely written by Robert Chambers, one of the two brothers who owned the journal, and who, the same year, published anonymously his work advocating evolution, *Vestiges of the Natural History of the Creation*. After hearing Sedgwick dress down Cockburn, Chambers was likely not too surprised by Sedgwick's harsh criticism of his own book. See Sedgwick, A., *Vestiges of the Natural History of Creation*, *Edinburgh Review* LXXXII(165):1–85, 1845.
32. Cockburn, W., Letter to the Editor, *The Times* p. 6, 10 June 1845.
33. Cockburn, W., Letter to the Editor, *The Times* p. 4, 20 June 1845.
34. Cockburn, W., *New System of Geology*, 1849. Hereafter, this 61-page book is cited as *Geology*.
35. Cockburn, W., *A Sermon on the Evils of Education without a Religious Basis*, 1844.
36. He did occasionally misunderstand his opponents, e.g. when he wrongly thought that in 1836 Buckland believed the Flood was the cause of the diluvial deposits. See Cockburn, ref. 27, p. 6. Nevertheless, it appears that generally Cockburn did understand the arguments he opposed and that he did quote his opponents accurately and in context.
37. The letter was included in: Cockburn, ref. 31, p. 20.
38. Cockburn, ref. 31, pp. 16–17.
39. Cockburn, ref. 34, p. 58.
40. Cockburn, ref. 30, p. 4.
41. Cockburn, ref. 27, p. 5.
42. Cockburn, ref. 28, p. 6.
43. Cockburn, ref. 31, p. 5.
44. Cockburn, ref. 34, pp. 1–2.
45. Cockburn, ref. 30, p. 3.
46. Cockburn, ref. 27, p. 7.
47. Orange, A.D., *The Beginnings of the British Association*, 1831–1851.
48. Macleod, R. and Collins, P. (Eds.), *The Parliament of Science*, p. 58, 1981.
49. Cockburn, ref. 34, p. 13.
50. Cockburn, ref. 30, p. 36.
51. Cockburn, ref. 30, pp. 37–40.

52. Cockburn, ref. 31, pp. 16–22.
53. Cockburn, ref. 34, pp. 1–2, 59.
54. In this regard Aylmer and Cant have overgeneralized from the experience with the fires at York Minster, when they say of Cockburn that ‘he had no inquiring mind, was inclined to shrink from asking for information which he needed to form a judgment and was too apt to trust the last speaker who gave information’. See Aylmer and Cant, ref. 6, p. 284.
55. Cockburn, ref. 31, p. 18.
56. Cockburn, ref. 29, pp. 7–9. Cockburn used Ex. 20:8–11 to argue for literal days and against the gap theory. In nearly every work, he explained the Flood as having occurred 2,000–3,000 years after creation. So he was not a strict ‘Ussherite’. The chronology of Bishop James Ussher has been republished by Pierce, L. and Pierce, M. (Eds.), *Annals of the World*, Master Books, Green Forest, AR, 2003.
57. Though Cockburn did not give a detailed discussion of the subject, he believed these events were triggered by a combination of natural or supernatural means, the latter being dominant. See Cockburn, ref. 31, pp. 12–13 and Cockburn, ref. 34, p. 3.
58. Cockburn, ref. 31, p. 15.
59. Cockburn, ref. 30, pp. 13–14, 35.
60. He never discussed the effects of post-diluvial processes of erosion and sedimentation.
61. Cockburn, ref. 30, pp. 23–24.
62. Cockburn, ref. 34, p. 3.
63. Cockburn, ref. 27, pp. 17–18.
64. Cockburn, ref. 31, pp. 8–9.
65. Cockburn, ref. 34, pp. 32–34. He cited Buckland’s comments in his *Bridgewater Treatise* I:89, 1836, where in a long footnote Buckland remarks: ‘It is a difficult problem to account for the source of the enormous masses of carbonate of lime that compose nearly one eighth part of the superficial crust of the globe. Some have referred it entirely to the secretions of marine animals; an origin to which we must obviously assign those portions of calcareous strata which are composed of comminuted shells and corallines: but, until it can be shown that these animals have the power of forming lime from other elements, we must suppose that they derived it from the sea, either directly, or through the medium of its plants. In either case, it remains to find the source whence the sea obtained, not only these supplies of carbonate, or lime, for its animal inhabitants, but also the still larger quantities of the same substance, that have been precipitated in the form of calcareous strata.  
  
‘We cannot suppose it to have resulted, like sands and clays, from the mechanical detritus of rocks of the granitic series, because the quantity of lime these rocks contain, bears no proportion to its large amount among the derivative rocks. The only remaining hypothesis seems to be, that lime was continually introduced to lakes and seas, by water that had percolated rocks through which calcareous earth was disseminated.’
66. Cockburn, ref. 27, pp. 18–20.
67. Cockburn, ref. 28, pp. 10–12, 14.
68. Cockburn, ref. 34, p. 4.
69. Cockburn, ref. 34, pp. 7–8.
70. Cockburn, ref. 30, pp. 21–22.
71. Cockburn, ref. 27, pp. 22–23.
72. Cockburn, ref. 30, p. 16.
73. Cockburn, ref. 34, pp. 8–10. The second reason also explained, he said, why such creatures as the hare, elk and other active animals were generally found in the upper deposits.
74. Cockburn, ref. 34, pp. 12–19. While he never addressed the question of the naturalist origin of species, or evolution, it is clear that he believed that there could be variation within the originally created kinds of creatures (eg. trilobites, ammonites, sheep or people).
75. Cockburn, ref. 34, pp. 52–53. It needs to be added that his notion of floating mats of vegetation and earth was, as has been noted before, completely in accord with the known facts. Lyell discussed the matter in his *Principles of Geology* II:96–98, 1830–1833.
76. Cockburn, ref. 34, p. 38. In his *Bridgewater Treatise*, Buckland nowhere suggested that land quadrupeds walked on the sand in deep water.
77. Based on my study of the arguments of his fellow scriptural geologists, I would surmise that while they would have approved of most of Cockburn’s objections to the old-earth theory, they would not have found all his alternative solutions to the problems any more convincing than the ones he refuted.
78. Cockburn, ref. 34, pp. 31–32.
79. Cockburn, ref. 34, pp. 29–31, 45–47. Also, since he was not convinced of the vegetable origin of coal, he found the transport theory equally hard to believe. Although he believed that the Flood would have washed down much land vegetation into the sea, he questioned how the plant material could accumulate in such vast quantities in one spot and sink together to form the great coal beds. See Cockburn, ref. 30, p. 6.
80. Cockburn, ref. 27, pp. 9–12.
81. Cockburn, ref. 28, pp. 9–10, 13–14. A similar argument was presented to Murchison in Cockburn, ref. 30, p. 19 and to Sedgwick in Cockburn, W., ref. 34, pp. 12, 35.

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