A Deluge of Doubt:

William Buckland and the establishment of geological science at Oxford

Peter Charles Lincoln
Registration No. 100179630

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Abstract

Oxford University's first 'professor' of geology, William Buckland (1784-1856), was a man of huge personality and divided loyalties. Deeply attached to the traditional tenets of the Church of England, he was also an influential advocate for a new science that was shaking the faith of many of his countrymen. In this thesis, I examine the life and career of this controversial figure, from his earliest days as a parson's son in Devon to the publication, in 1836, of his successful and widely admired Bridgewater Treatise.

Aiming at the non-specialist reader, I have taken care to elaborate the social and religious environments in which Buckland operated. Using much previously unexplored primary manuscript evidence – gathered from a wide range of archives – together with many primary printed sources, I have charted the labyrinthine networks of patronage that enabled Buckland to prosper within the very particular circumstance of early nineteenth century Oxford. I have also explored Buckland's own geological practice and the theoretical context within which he worked, with particular emphasis on how the constraints of Oxford's conservative traditions caused him to espouse a 'Diluvial Theory' that had long-since been abandoned in most quarters.

In the final chapters of the thesis, I focus on Buckland's crucial role in the nascent British Association for the Advancement of Science and the long genesis, and eventual reception, of his Bridgewater Treatise. I have, throughout, been at pains to weave into the narrative Buckland's idiosyncrasies as well as his personal and family life, not only because these provide human interest but because of their influence on the trajectory of his career.

I conclude with a brief epilogue sketching Buckland's pioneering adoption of Louis Agassiz's much-contested glacial theory, his promotion to be Dean of Westminster, and his melancholy death in a Clapham asylum.

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I am also grateful to all those gatekeepers of primary sources who have so graciously answered my queries and granted me access to, and permission to quote from, their treasures. Archivists Danielle Czerkaszyn at OUMNH; Dr Suzanne Foster at Winchester College; Caroline Lam at the Geological Society of London; Matthew Payne and his staff at Westminster Abbey; Julian Reid at Corpus Christi College, Oxford; Nicholas Rogers at Sidney Sussex College, Cambridge; Mike Sampson at Blundell's School, and Rafa Siodor at UCL Special Collections all deserve special thanks, as do the staff at the British Library, the Bodleian Library, the Devon Heritage Centre, the New York Public Library, the Philip Robinson Library in Newcastle-upon-Tyne, and the Royal Society Library. I am also especially grateful to Roderick Gordon for the privilege of seeing and handling the Buckland family collection and for his patience and understanding (and coffee) while I did so – and to him and Diana Harman, for permission to use images and words from this valuable source in my thesis. My thanks also to Dr Peter Riches for volunteering and allowing me to use a wonderful cache of Buckland letters in his private collection, and to Richard Bull at the Lyme Regis Museum, Dr Judith Hoyle at the Whitchurch Heritage Centre, the late Christopher Lowe at Islip, and the volunteer staff at the Axminster Heritage Centre who have all, in different ways, supported me with information and advice relating to their specific locations. I am particularly indebted to Professor Hugh Torrens, who, early in my project and with what I now know is characteristic kindness, made available to me the three large black box files of material concerning William Buckland. that he had collected over his long and illustrious career as an historian of science. I cannot thank him enough for his help and encouragement.

Before, during and after the strange times of Covid-19, a whole host of people have been kind enough to answer – often in considerable detail – my email queries, and I would like especially to thank Professors Patrick Boylan, Jim Kennedy, Ralph O'Connor and Mary Orr; Drs Patrick Anthony, Christopher Duffin, Jon Hodge, Charles Laporte, Douglas Palmer, Mike Taylor, and Jon Topham; as well as Duncan Hawley, John Henry, Paul Lewis, Christopher Powell, and Tom Sharpe. Thanks also to all those individuals and institutions acknowledged in the list of illustrations who have kindly allowed me to use their various images. I would also like to thank the members of the two East Suffolk U3A Geology Groups and, more recently, of the Westmorland Geological Society, who have done so much for my geological education while putting up with my constant references to the not-so-distant past. I have greatly appreciated their kindness and camaraderie at lectures and on field trips near and far.

Many of the individuals mentioned above are, or have been, connected to HOGG, the History of Geology Group affiliated to the Geological Society of London. Without the support of this friendly and welcoming gathering of enthusiasts this thesis would be much the poorer. The comradeship, discussion and encouragement I have received at their meetings has been immense. I am especially grateful for the helpful and constructive comments of two HOGG members, Anne Barrett and John Henry, who kindly read through this thesis before submission. I have also been most fortunate in having as a student colleague Sue Newell, an AHRC doctoral student at the University of Leeds, who is working on William Buckland's teaching materials at the OUMNH. Sue and I have enjoyed long discussions and several fruitful collaborations, and have been able to share in the discovery of source material to our mutual benefit. I am so grateful to have had a friend who cares about the Bucklands as much as I do! Thank you, Sue.

But, grateful as I am to all of the above, my biggest debt of gratitude, as ever, goes to Rosemary, who, for so long, has lived with this project without the slightest hint of irritation or complaint. This thesis is dedicated to you, my love, with my heartfelt thanks and appreciation.

William Buckland (1784-1856)

Samuel Howell (1807–1876)

Preface

> Most men cease to be interesting after they have gained success in life. Buckland was full of interest to the end.
>
> W. Boyd Dawkins, 1894[1]

> … a vulgar and almost coarse man … incited more by a craving for notoriety, which sometimes made him act like a buffoon, than by a love of science.
>
> Charles Darwin, 1876[2]

> Buckland's story is of a man who published a book which changed his countrymen's notions of pre-history; who forced himself to acknowledge in public that the main conclusions in that book were wrong; and who failed despite his own personal success to get Oxford to introduce science into its curriculum.
>
> Noel Annan, 1999[3]

This thesis, submitted for a PhD by Life-Writing, is a biography of William Buckland (1784-1856), Oxford's first 'professor' of geology. But why Buckland? The epigraphs above show that although a later admirer, the geologist and cave investigator William Boyd Dawkins, found him 'full of interest', Buckland's more famous younger contemporary, Charles Darwin, thought him 'a buffoon'. And then, a modern appraisal by the late Lord Annan – a notable biographer of influential men – suggests that his achievements were, at best, modest and ephemeral. What is it then about this man that makes him worthy of a modern biography?

The answer to this question lies hidden in plain sight in the epigraphs themselves. Buckland is interesting because he allowed himself to be a buffoon, and because he changed his countrymen's notions of pre-history, and, most especially, because he was prepared to acknowledge that he had been wrong. Through the prism of Buckland's life, played out across the many boundaries – social, intellectual and institutional – that his emollient personality enabled him to bridge, I examine in this thesis a particular and important period in the development of scientific thought and practice in England, especially that relating to the earth itself. Like most men of his time, Buckland was a creationist, in the sense that he believed that different species each resulted from the supernatural act of a divine Creator. He was also, in every sense, a true 'scientist' – a term that was only suggested, and barely ever used within his own lifetime.[4] Although he denied the possibility of the transmutation of one species into another, he helped to set the scene for Darwin by spreading the ideas that the earth was immeasurably old and that both it and the organisms that populated it had undergone development through time. His strictly empirical methodology stands in stark contrast to that of anti-rational devotees of 'intelligent design' who identify as 'Creationists' today.

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[1] W. Boyd Dawkins, preface to *The Life and Correspondence of William Buckland,* by Mrs Gordon (London: John Murray, 1894), vii.
[2] Nora Barlow, ed., *The Autobiography of Charles Darwin* (London: Collins, 1958), 102.
[3] Noel G. Annan, *The Dons* (London: HarperCollins, 1999), 28.
[4] Sydney Ross, 'Scientist: The Story of a Word,' *AS* 18, (1962): 71-8.

Variously characterised as an Age of 'Revolution', or 'Reform', or even simply 'Improvement', the early years of the nineteenth century were a time when essentially mediaeval traditions of authority were being displaced by a confident rationality that had its origins in the Enlightenment of the eighteenth century.[5] For geology it was also an 'Heroic Age'. Using consciously Homeric metaphor, William Whewell would later claim that Buckland and his contemporaries had 'slain [Geology's] monsters and cleared its wildernesses' as they set out on long expeditions, on foot or in the saddle, to prise from the earth an understanding of its structure – and also, in consequence, its early history.[6] This new knowledge was, however, never uncontested. In Britain especially, many people and institutions remained firmly wedded to the Biblical worldview that had for so long sustained the status quo. Nowhere was this truer than at the University of Oxford, an institution to which Buckland held a lifelong allegiance. Buckland's story, of a consummate man of science who also happened to be a devout Oxford clergyman, reveals much about the complex relationship between science and the Anglican church, and in particular about the systems of patronage that enabled such a man to exist at the intersection of these two worlds at that critical time. Having no substantial personal fortune, Buckland's work depended on support from both Church and State, and I have duly emphasised his efforts to secure this through the advocacy of his science within the university and the nation at large. Some, like Robert Peel, appreciated his efforts, but for many the gulf between faith and reason remained deep and, despite Buckland's naturally conciliatory nature and many significant personal triumphs, his occasional outbursts of a somewhat unrefined ebullience made it all too easy for detractors to dismiss him as 'a buffoon'.

Earlier Lives

Buckland's right to a 'serious and sustained' biography was made plain in 1996 when Michael Shortland and Richard Yeo specifically named him in an illustrative list of scientific figures for whom such a work is overdue.[7] This is not to say that Buckland's life has received no previous attention. A full account of the eulogistic appreciations of his life and achievements, together with subsequent shorter synopses from various early histories of geology, is given by Patrick Boylan in his highly esteemed but unpublished 1984 PhD thesis (see below, p.11).[8] To these should be added the lively paean written by William Jerdan for *The Leisure Hour,* later included in his 1866 volume, *Men I Have Known*; also Buckland's entry, by mineralogist Robert Hunt, in the original *Dictionary of National*

[5] See for example: Eric Hobsbawm, *The Age of Revolution: Europe 1789-1848* (London: Cardinal, 1973); Ernest Woodward, *The Age of Reform, 1815-1870* (Oxford: Clarendon Press, 1962); Asa Briggs, *The Age of Improvement. 1783-1867* (London: Longman, 1959). But see also Boyd Hilton, *The Age of Atonement: The Influence of Evangelicalism on Social and Economic Thought, 1785-1865* (Oxford: Clarendon Press, 1991) for an account of the continued influence of earlier patterns of thought.

[6] 'I consider the eminent men by whom I am surrounded as the Heroic Age of Geology. They have slain its monsters and cleared its wildernesses; and founded here and there a great metropolis…' William Whewell, Presidential Address, GSL, February 1839.

[7] Michael Shortland and Richard Yeo, *Telling Lives in Science : Essays on Scientific Biography* (Cambridge: Cambridge University Press, 1996), 2-3.

[8] Patrick Boylan, 'William Buckland, 1784-1856: Scientific Institutions, Vertebrate Palaeontology and Quaternary Geology' (PhD thesis, University of Leicester, 1984).

Biography (1886).[9] In 1970 W. F. Cannon wrote an entry for the *Dictionary of Scientific Biography* and Buckland's entry in the new (2004) *ODNB* was contributed by the late Neville Haile.[10] However, here it will be enough to consider just those authors (including Boylan) who have produced either a full treatment of Buckland's life or an extended work that depends significantly and specifically upon his activities.

The earliest comprehensive 'Memoir' of Buckland's life was written by his eldest son, Frank Buckland, as a preface to a new (third) edition of Buckland's Bridgewater Treatise, published in 1858, two years after Buckland's death.[11] Thirty six years later, well after Frank's death, this fifty-page biographical sketch was expanded by Buckland's daughter, Elizabeth (Mrs E.O. Gordon), into a full length *Life and Correspondence.*[12] Like the 'Memoir' on which it was based, Elizabeth's rather belated act of filial piety, although not without charm, is not always reliable as an historical source. She had, however, collected anecdotes and memorials from several of her father's surviving acquaintances, together with a substantial collection of Buckland's own letters. These passed eventually to her son, bacteriologist Dr Mervyn Gordon, F.R.S., who, shortly before his own death in 1953, began a series of notes concerning his illustrious grandfather.[13] Microfiched copies of this family collection are lodged at the Devon Heritage Centre in Exeter. Another, substantially more comprehensive project, also prematurely curtailed by the death of its author, was that undertaken by James Edmonds at the Oxford University Museum (now Oxford University Museum of Natural History, OUMNH). Edmunds was curator of the museum's geological collections and had access to the vast, but then still largely uncatalogued, mass of Buckland material at the museum – including letters and rough notes as well as many of the visual aids and specimens that so enlivened Buckland's teaching. Edmonds used these and other sources to create a meticulous chronological overview of Buckland's life – clearly preparation for an intended biography. Although by the time of his death in 1982, no extended work had been produced, Edmunds did write a short account of Buckland's life for *Nature* in 1956 (the centenary of Buckland's death), and later four well-researched papers dealing with specific episodes of Buckland's life.[14]

In 1977 Nicolaas Rupke, at the time a junior research fellow at Oxford's Wolfson College, began his own study of the Buckland papers at the university museum. His semi-biographical treatment, *The*

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[9] William Jerdan, *Men I Have Known* (London: Routledge, 1866), 54-66; Robert Hunt, 'Buckland, William,' in *Dictionary of National Biography,* Vol. 7, ed. Leslie Stephen (London: Smith Elder, 1886), 206-8.
[10] W.F. Cannon, 'Buckland, William,' in *Dictionary of Scientific Biography,* Vol. 1, ed. C.C. Gillespie (New York: Charles Scribner's Sons, 1970), 566-72; Neville Haile, 'Buckland, William (1784–1856),' in *ODNB*, 2004.
[11] Francis Buckland, 'Memoir' in *Geology and Mineralogy Considered with Reference to Natural Theology* by William Buckland, 3rd edition (London: Routledge, 1858).
[12] Mrs [Elizabeth Oke] Gordon, *The Life and Correspondence of William Buckland, DD, FRS: Sometime Dean of Westminster &c.* (London: John Murray, 1894).
[13] Lawrence Garrod, 'Mervyn Henry Gordon. 1872-1953,' Obituary Notices of Fellows of the Royal Society 9, no. 1 (1954): 153–63.
[14] James Edmonds, 'William Buckland (1784-1856),' *Nature* 178 (1956): 290–91. The four papers are: (jointly with James Douglas), 'William Buckland, FRS (1784-1856) and an Oxford Geological Lecture, 1823,' *NRRSL* 30, 2 (1976): 141–67; 'Patronage and Privilege in Education: A Devon Boy Goes to School, 1798,' *TDAAS* 110 (1978): 95–111; 'The Founding of the Oxford Readership in Geology, 1818,' *NRRSL* 34, 1 (1979): 33–51; and (posthumously) 'Vindiciae Geologicae, Published 1820; the Inaugural Lecture of William Buckland,' *ANH* 18, 2 (1991): 255–68.

Great Chain of History, was published in 1983.[15] This important work covers the same period of Buckland's life at Oxford as the present thesis and explores three major themes: Buckland's early diluvialism culminating in his later acceptance of the glacial theory; his stratigraphic and palaeontological work leading to a better appreciation of the history of the earth; and finally, the crucial role that natural theology played in the presentation of Buckland's science at Oxford. Rupke also suggests that Buckland was the leader of a distinctive, but hitherto largely unrecognised, 'English School' of geology during the 1820s and 30s.

Ten years before Rupke came to Oxford, Patrick Boylan had published a paper in a new specialist journal called *Studies in Speleology*.[16] Entitled 'Dean William Buckland, 1784-1856: a pioneer in cave science', this was the first of a series of Buckland-related publications from Boylan that culminated in his 1984 PhD thesis, *William Buckland, 1784-1856: Scientific Institutions, Vertebrate Palaeontology and Quaternary Geology* cited above. As the thesis' subtitle suggests, this substantial work focused on Buckland's institutional allegiances, specifically the University of Oxford, the Geological Society (of London), and the British Association for the Advancement of Science (British Association); his contribution to the early development of vertebrate palaeontology; and what Boylan called 'the quaternary dilemma' (diluvialism and the glacial theory). However, it was also prefaced by a long and extremely useful 'biographical framework' – the first chronological account of Buckland's life to be made public.

Since Boylan's thesis, some specific aspects of Buckland's work have been analysed and written about in a variety of contexts – see especially Marianne Sommer's work on the Paviland cave and various chapters in Martin Rudwick's two magisterial overviews of early nineteenth century geology.[17] However, until now, no further scholarly comprehensive biography has been attempted. A recent popular account, by Allan Chapman, depends heavily on Mrs Gordon, and while the author's familiarity with the science of the period enables him to provide some interesting context, the book adds little of biographical significance above that given in Gordon's 1894 *Life and Correspondence*.[18]

Three extremely useful studies bearing tangentially on Buckland's life have informed the present work. These are the PhD theses of Leroy Page and Jonathan Topham (my chapters 8 and 10) and Jack Morrell and Arnold Thackray's now classic *Gentlemen of Science* (my chapter 9).[19] Most recently, literary

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[15] Nicolaas Rupke, *The Great Chain of History: William Buckland and The English School of Geology (1814-1849)* (Oxford: Clarendon Press, 1983).
[16] Patrick Boylan, 'Dean William Buckland, 1784-1856: a pioneer in cave science,' *SS* 1, 5 (1967): 237–53.
[17] Marianne Sommer, "'An Amusing Account of a Cave in Wales": William Buckland (1784–1856) and the Red Lady of Paviland,' *BJHS* 37 (2004): 53–74; Marianne Sommer, *Bones and Ochre: The Curious Afterlife of the Red Lady of Paviland* (Cambridge, Mass.: Harvard University Press, 2007); Martin Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago: University of Chicago Press, 2005); Martin Rudwick, *Worlds before Adam: The Reconstruction of Geohistory in the Age of Reform* (Chicago: University of Chicago Press, 2008).
[18] Allan Chapman, *Caves, Coprolites and Catastrophes: The Story of Pioneering Geologist and Fossil-Hunter William Buckland* (London: SPCK, 2020).
[19] Leroy Earl Page, 'The Rise of the Diluvial Theory in British Geological Thought' (PhD thesis, University of Oklahoma, 1963); Jonathan Topham, "'An Infinite Variety of Arguments": The *Bridgewater Treatises* and British Natural Theology in the 1830s' (PhD thesis, University of Lancaster, 1993); Jack Morrell and Arnold Thackray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science* (Oxford: Clarendon Press, 1981).

scholars, including especially Adelene Buckland and Ralph O'Connor, have analysed the symbiotic relationship between the nascent science of geology and many forms of literary endeavour.[20] This is a field in which Buckland's eloquent and vivid brand of exposition continues to give him a special significance. Adelene Buckland's suggestion that early nineteenth century geology prospered by adopting Walter Scott's habits of detailed antiquarian-type storytelling with less attention – or even apparent disregard – to any overarching plot (in geological terms: any grand theory) is particularly applicable to Buckland, whose colourful expositions were always closely defined.[21] As Rupke has commented, '[William] Buckland loved the particular'.[22] This is not to say that Buckland did not envisage a time when a grand theory might be possible – he clearly held an axiomatic belief that the earth's history followed some, as yet darkly perceived, divine narrative. Rather it is to recognise that, in the meantime, he knew that his science would be best served by a careful, if imaginative, exposition of the empirical facts.

Every biographer has their own reason for writing. Obituarists and family members do so from a sense of duty or family pride. Edmonds must surely have been encouraged by his unique access to a wealth of previously unregarded material, as was Rupke, an historian of science with an interest in what he called the 'science-religion controversy' of Buckland's time.[23] For Boylan, setting out on a career in the world of museums, the impetus came from the collections of relics from Kirkdale Cave which continue to hold pride of place in several institutions in his native Yorkshire. My own motivation sprang from a long interest in the ways in which mankind has perceived the world. My introduction to Buckland came during dissertation research for a master's degree in the history and philosophy of science. Buckland's liminal position, poised between the worlds of the Anglican church (familiar to me since schooldays at a cathedral school) and a newly developing science, coupled with his inherently 'interesting' personality at once recommended him as a subject for further study. Knowing nothing of geology, I embarked upon an informal crash-course and I thank my friends from U3A East Suffolk for tolerating me in their lecture room and on expeditions to many field areas familiar to Buckland (Isle of Wight, Dorset, Charnwood Forest, Yorkshire Dales and the Black Country) and one (Southern Cyprus) that wasn't, also Professor Julian Andrews of UEA for allowing me to attend an undergraduate field trip to Snowdonia where I learned the workings of a clinometer and some of the tell-tale signs of former glaciation. I have also greatly benefited from the advice and support I have received from members of the History of Geology Group (affiliated to the Geological Society of London), whose magazine, *GeoHistories*, I have edited since the start of 2021.

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[20] Ralph O'Connor, *The Earth on Show: Fossils and the Poetics of Popular Science, 1802-1856* (Chicago: University of Chicago Press, 2007); Adelene Buckland, *Novel Science: Fiction and the Invention of Nineteenth-Century Geology* (Chicago: University of Chicago Press, 2013)

[21] Buckland, *Novel Science*, 46-55; see also Adelene Buckland, 'Losing the Plot: the Geological Anti-Narrative,' *Interdisciplinary Studies in the Long Nineteenth Century* 11 (2010).

[22] Rupke, *Great Chain*, 247; see also Stephen Jay Gould, 'The Freezing of Noah,' in *The Flamingo's Smile: Reflections in Natural History* (New York: W.W. Norton, 1985), 119.

[23] Rupke to Edmonds, 20 October 1977, OUMNH/Edmonds Papers G.34.

Sources

The main unpublished primary sources used by Buckland's earlier biographers have been the collections of papers assembled by Mrs Gordon and those at the OUMNH. Other important collections are the 285 items at the Royal Society (bought for £18:10s at Sotheby's in 1937) and the De la Beche collection at the National Museum of Wales, as well as the archives of the various institutions with which Buckland was associated. Boylan, Edmonds and Rupke each used some or all of these and Edmonds also noted significant items of correspondence from other collections across the country. Where possible I have interrogated all of the above for the present study, sometimes in more detail than has hitherto been the case. In particular Buckland's 35 letters to Lord Grenville (BL Add MS 58995) and 96 to George Bellas Greenough (UCL Greenough/B/4), both largely overlooked until now, have provided much information concerning Buckland's social relationships and movements during his early career at Oxford. Buckland's handwriting is notoriously difficult to decipher and I have, as part of this study, transcribed many letters in their entirety for the first time (including all of the Grenville and Greenough correspondence).

My work has also depended on many published sources, both primary (original nineteenth-century publications) and secondary. These are listed in full in the bibliography, but particular notice should be drawn to the important earlier works cited above.

Outcomes

Buckland was renowned for using whatever traces were left by the extraordinary creatures he studied to reconstruct the ecosystems of their antediluvian worlds. Here, the intention has been to use the extraordinary person of Buckland himself to unveil his own habitat in the world of pre-Victorian science. In so doing it is hoped to dispel any lingering suggestion of an inherent conflict between science and religion, [24] and perhaps to dilute the strength of other binary oppositions (e.g. Huttonian versus Wernerian or uniformitarian versus catastrophist) that are the staple of many popular accounts of the history of geology. By focusing on contexts, social as well as scientific, a far more nuanced scene emerges, with actors holding an eclectic and often provisional mix of views. In this complex world, Buckland – temperamentally poised between Regency exuberance and Victorian earnestness, and sitting at the boundaries between conservative, Anglican Oxford and fashionable London, and between gentlemanly enthusiast and salaried professional – is an ideal guide.

This thesis concentrates on Buckland's life up to and including the publication of his Bridgewater Treatise in 1836. It is divided into ten chapters, the first five of which move chronologically from before his birth in 1784 to the summer of 1821, by which time he was established in his new Readership in Geology at Oxford. The later chapters are more thematic, dealing in turn with the Kirkdale discoveries; promotion, marriage and family life; the diluvial theory and reconstructions of former worlds; the British Association; and the Bridgewater Treatise. Throughout,

[24] Widespread belief in an inevitable 'state of warfare' between science and religion, the so-called 'Conflict Thesis', was promoted by the polemicists Andrew Dixon White and John William Draper in the late nineteenth century. See Ronald L. Numbers, ed., *Galileo goes to jail* (Cambridge, MA: Harvard University Press, 2010), 1-7.

the intention has been to provide a granularity not present in earlier works, and in particular to display the social and institutional networks and connections that facilitated Buckland's scientific career.

In the opening chapter, having traced the ways in which the Buckland family's social ascent depended on the patronage of well-placed acquaintances, I have elaborated on Edmond's work to tell the convoluted story of Buckland's own admission as a Scholar at Winchester College. I have followed this with an account of a Scholar's experience at that establishment. Then, using College records and other archival and secondary sources, I have examined some hitherto unappreciated specificities of Buckland's time, again as a Scholar, at Corpus Christi College Oxford.

In Chapters 2 to 5, I make extensive use of Buckland's hitherto largely unexamined correspondence with George Greenough, employing this and other primary sources to provide a detailed account of Buckland's life as a Fellow of Corpus and his appointment, first as Oxford's Reader in Mineralogy, and later as the university's first Reader in Geology. These sources have revealed much new information about Buckland's early geological expeditions and have enabled me to give the fullest account to date of Oxford's informal Whitsuntide geological club and to provide some previously unpublished details about his relationships with colleagues and with the emergent geological community in London. The course of Buckland's career was often determined by the patronage he was able to attract and I have uncovered a long, previously unrecognised, association with the Shorts, a wealthy Exeter banking family.

The saga of Kirkdale cave has been set before the public on many occasions, but nevertheless, in Chapter 6, I have brought some new insights concerning chronology and the flow of information.[25] Similarly, in Chapter 7, I have, for the first time, set out the sequence of events surrounding Buckland's appointment to a Christ Church canonry and his protracted courtship of Mary Morland. Also revealed are some details of a previously unrecognised Hebridean sailing adventure with the Duke of Buckingham. In Chapter 8, I chart the changing emphasis of Buckland's work from stratigraphy and diluvialism towards what would eventually be called palaeontology, and then, in the penultimate chapter, I give an account of his involvement with earliest days of the British Association. The thesis concludes with the writing and publishing of Buckland's best-selling Bridgewater Treatise, which, despite the clamour of evangelical detractors, prepared the way for Darwin by making it credible and respectable for the British public to accept that the Earth and the organic life upon it were the products of an unfathomably long, and undeniably progressive, history.

Then and now – bridging the gap

This work contains many, sometimes fairly lengthy, quotations. I hope that by allowing Buckland and his contemporaries to speak for themselves in this way the 'otherness' of their very specific world might to some extent be revealed. In the absence of any record of direct speech, personal and official correspondence provide our best evidence concerning relationships and the day-to-day priorities of

[25] As an example, one popular account of the Kirkdale story is told in Roger Osborne, *The Floating Egg: Episodes in the Making of Geology* (London: Jonathan Cape, 1998), 212-254.

the actors. Like many men of his time, Buckland was an avid correspondent. However, often writing under pressure of time, he was, it has been suggested, not much given to 'polishing his periods'. For the sake of clarity, and only where obvious and unequivocal, I have added some punctuation. I have not, however, corrected Buckland's occasionally erratic spelling, nor have I generally inserted intrusive '[sic]'s within quotations, instead asking readers to trust that these have been faithfully transcribed. All occurrences of the long s have been converted to a short s, but – perhaps somewhat inconsistently – thorn (þ, written as y) has been retained where written for the definite article (y^{e}). Although pronounced as 'the', it is hoped that this simple written reminder will help emphasise the differences between Buckland's time and our own.

Another notorious difficulty is the changing value of money over time, a problem exacerbated by the current (2022) relatively high rate of inflation. Financial expert and Victorian scholar Paul Lewis suggests a factor of approximately 100x in converting values from the early 1800s to today.[26] This might work for the rumoured value of Buckland's Christ Church canonry (£1000 in 1825), giving him the equivalent of around £100,000 today – as I write, still a fairly aspirational income. However, for a bricklayer on a daily rate of between five and six shillings (i.e. £1:10s to £1:16s for a six-day week), this would equate to a weekly wage between £150 and £180, (or £7500 to £9000 for a 50 week year) – clearly too little.[27] Therefore, given the impossibility of achieving any form of precision, it is suggested that a range between 100x and 200x might be more appropriate to give at least a flavour of what a particular income might mean in today's terms. To evaluate the relative prices of publications, we might note that the purchase of Buckland's Bridgewater Treatise, retailing at £1:15s would require the whole of our bricklayer's weekly wage. O'Connor, mindful of a possibly more likely readership, equates the price of Buckland's Bridgewater to 3 weeks and 2 days wages for a notional 'lawyer's clerk'.[28]

Finally, every effort has been made to avoid anachronism in the use of technical terms – other than in this introduction, the temptation to refer to any actor as a 'scientist' has been resisted.

A telling episode

Buckland, after whom the fossil *Ammonites bucklandii* was named, was himself apparently once dubbed the 'Ammon Knight'. He earned this jocular honorific as a result of some allegedly comical equestrian exertions while retrieving a giant fossil. Such idiosyncrasies, much celebrated during his own lifetime, have left a rich legacy of anecdote. Another oft-repeated story has him lost in deep fog when riding with a companion between Oxford and London. It is said that Buckland dismounted, sniffed a handful of dirt from the roadside and announced: 'Uxbridge'. This second tale encapsulates much about the man – his enthusiasm for his science, his appreciation of the power of performance, and

[26] Paul Lewis, personal communication, 16 May 2022. The factor of 100x is broadly supported by reference to the online calculator at https://www.measuringworth.com.
[27] Arthur Bowley, *Wages in the United Kingdom in the Nineteenth Century* (Cambridge: Cambridge University Press, 1900), 82.
[28] O'Connor, *Earth on Show,* 222.

his sense of humour. It also reflects his eagerness to employ all of his faculties as he investigated the world around him. He was, in every sense, an earthy man.

In 1845, disenchanted with Oxford, Buckland was unexpectedly – and controversially – made Dean of Westminster. Five years later he was committed to a Clapham asylum, where, in 1856, he died. Back in Oxford, the extensive geological museum he had established was shunted away into storage and, according to Annan, 'it was as if he had never existed.'[29]

Annan's judgement is undoubtedly over severe. Buckland's contributions to the development of science, both at Oxford and in the wider world, were in fact substantial.[30] Nevertheless, it must be admitted that it was not Buckland's professional legacy that motivated the present work. Rather it was the man himself – and the times in which he lived.

It was an Heroic Age, and William Buckland really was the Ammon Knight.

[29] Annan, *The Dons,* 31.

[30] See Boylan, 'William Buckland,' [thesis], also Patrick Boylan, 'William Buckland (1784–1856) and the Foundations of Taphonomy and Palaeoecology,' *ANH* 24 (1997): 361–72.

Chapter One

1784-1805

Early Life and Education

By the time of William's birth in 1784, the Bucklands were an established clerical family. William's grandfather, the first Reverend William Buckland, was from the Devonshire town of Crediton where, as a boy, he was a 'quirester' at the Free Grammar School. In 1731 this earlier William was awarded an exhibition of '£6. 13s. 4d. a year to go to Oxford or Cambridge', and on 15 July that year 'Buckland Gulielmus, Filius Gulielmi Buckland Pellionis' was admitted to Sidney Sussex College, Cambridge.[1] While *Alumni Cantabrigienses* translates the occupation of the new student's father as 'furrier'[2], Burgess, writing in 1967, suggests that great-grandfather Buckland was possibly a 'wool-stapler': one who buys, grades and sells on wool.[3] However, by the early eighteenth century tanning and shoemaking had eclipsed wool as Crediton's principal trade, leading the compilers of Sidney Sussex's modern digital database to put him down as 'a tanner' – an altogether lowlier and smellier pursuit.[4] Whatever his occupation, the family was evidently of modest means since, despite benefiting from the Crediton exhibition, William entered the college as a 'sizar', receiving help with his fees in return for undertaking certain menial duties for the college Fellows or his more affluent undergraduate peers.

In due course, the boy from Crediton graduated and followed what was then the expected progression for a scholarship-boy by becoming a clergyman of the Church of England. In 1743 he married Elizabeth, the daughter of William Beare of Newton Abbot, 25 miles south of his childhood home. Three years later he became Rector of St Mary's Wolborough, one of the parishes that make up the modern, much expanded, town of Newton Abbot.[5]

William and Elizabeth had a total of six children, but for now it is the two eldest surviving sons, John (born 1746) and Charles (born 1750) who are important.

In 1760, the Reverend William Buckland, 'disgusted with his doctors, after unspeakable affliction and almost endless struggles, died a victim to pitiless gout'.[6] He was 48.

Thanks perhaps to Elizabeth's father, William Beare – evidently a man of substance[7] – all three of the Bucklands' surviving sons were able to complete their education as boarders at Blundell's School in Tiverton. In due course the two older boys went up to university: John to Corpus Christi College[8], Oxford as an Exeter Diocese Scholar, and Charles to his father's old college, Sidney Sussex in

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[1] *DCNQ*, (1931), 350. William's exhibition would probably have covered a major part of his expenses. John and J.A.Venn, *Alumni Cantabrigienses,* (Cambridge: University Press, 1924), 1, 3, 67.
[2] Venn and Venn, *Alumni Cantab.,* 1, 1, 247.
[3] G.H.O. Burgess, *The Curious World of Frank Buckland* (London: John Baker, 1967), xii.
[4] Nicholas Rogers, Archivist, Sidney Sussex College, notes that tanner fits better than furrier with Buckland's status as a sizar – personal communication, 22 December 2017. James Edmonds had also suggested that tanner was the more likely occupation. Edmonds, 'Patronage and privilege,' 95.
[5] *DCNQ* (1931), 349.
[6] 'Post ineffables Miserias Et pene infinitas Colluctationes Cum Opprobrio Medicorum Cecidit Victima Nil miserantis Podagrae' inscription in Wolborough Church: *DCNQ* (1931), 208 and 250.
[7] Beare was sufficiently well-off to be entered as a subscriber to: John Warren, *Sermons upon Several Subjects, Preached in the Cathedral Church of St. Peter in Exeter*, 1739.
[8] Edmonds, 'Patronage and Privilege,' 96.

Cambridge, but not, like his father, as a sizar, but as a fee-paying 'minor pensioner' – the family was going up in the world. However, it is possible that the family's funds did not stretch to allow a third son to enjoy a university education as the boys' younger brother William was instead respectably apprenticed to a local surgeon.

Charles Buckland took his BA in 1772, was quickly ordained and became curate at Highweek Chapel, a chapel of ease, or subsidiary church, connected to the parish of Kingsteignton. It was just three miles from his father's former church in Wolborough.

Among the Bucklands' acquaintances at that time was a young baronet, Sir John Pole. Orphaned by the age of three, Pole had inherited together with his title, the family seat at Shute, forty miles or so to the east of Wolborough. Seven years junior to Charles, Pole had also spent time at Blundell's School before leaving in December 1772 to prepare for university with help from private tutors, among whom were possibly John and Charles Buckland.[9] In 1776 he became a gentleman-commoner at Oxford's Corpus Christi College, where, by now John Buckland was a well-established Fellow.[10]

Pole's relationship with the Bucklands was evidently close. As John Buckland crowed to his brother from Oxford: 'You see we are inseparable; I am always at his Elbow; we have but one pen, one desk, & one sheet of paper. We think of you, talk of you & laugh at you together, & shortly we are coming to see you together.'[11]

Fig. 1.1 Sir John De la Pole (1757-1799)

Meanwhile, Charles had moved forty miles eastwards to become curate to the vicar of Colyton, where, once he had come of age, Pole would have the rights of ecclesiastical patronage. Clearly the young baronet already had the ear of 'his' vicar and had put in a good word for his friend. But a curate's stipend was modest, and Pole provided further help by persuading his trustees to appoint Charles to the rectory of Templeton, near Tiverton, another living of which he would one day be patron. Although Charles remained resident in Colyton, he now received tithe income from Templeton, from which he paid his own curate to do the work. Also, importantly, the mere fact of being a beneficed 'rector' rather than a humble curate probably enabled Charles to move with increased confidence amongst the landed gentry of the county.

[9] Blundell's School Admissions Register: 'no. 20 - Sir John William Pole, Bart., age 13, son of Sir John Pole, Bart., late of Shute, Devon, Jan. 31, 1771-Dec. 12, 1772.'
[10] Gentlemen-commoners paid higher fees and enjoyed more privileges than mere commoners. They were equivalent to fellow-commoners at Cambridge: of higher rank than pensioners, but below noblemen.
[11] John Buckland to Charles Buckland, n.d., DRO/138M/862.

In January 1783 Charles Buckland married Elizabeth Oke. She was 26, the daughter of the late John Oke, of the Manor House, Combpyne, a hamlet just to the east of Colyton.[12] The Okes were respected and long-established landowners and, like the Poles, provided officers for the local militia.[13] John Oke had died in 1776, leaving Elizabeth seven hundred guineas and some land in a neighbouring village.[14] With these endowments and Charles' income the couple were set for a comfortable, if hardly extravagant, life. Fourteen months after their marriage Elizabeth gave birth to a son.

We do not know when the couple moved the four miles to Axminster, but it must have been before 1784 as a footnote in local journalist George Pulman's *Book of the Axe* tells us that 'Axminster has the honor of being the birth-place of Dr. Buckland, the celebrated geologist and Dean of Westminster … [who] was born on March 12, 1784, in the house which stands on the eastern side of the entrance to Stony Lane on the Lyme Road'.[15]

Fig. 1.2 William Buckland's birthplace in Stony Lane, Axminster – at least according to George Pulman

This house is still clearly identifiable, now split into two and with a small modern housing estate covering its former garden. However, it seems that the Bucklands may not have lived there long after the birth of their son. Nearer to the centre of the town, in South Street, is a three storied, stuccoed town house, known as Buckland House.[16] Historic England dates this building as 'Early C19'. The evidence is circumstantial, but it is possible that William's parents had it built for them once they had decided to make Axminster their permanent home. With Elizabeth's seven hundred guineas, they could undoubtedly have afforded it. In 1789 Charles resigned from his curacy at Colyton and five years later he is recorded as an assistant to the vicar of Axminster, the Reverend Charles Steer, a man eight years his junior. Steer served as vicar from 1782 until his death in 1835, when William Conybeare took the living.[17] In 1828, long after both Charles and Elizabeth had died, Charles' second wife, Ann, added a codicil to her will bequeathing 'a dwelling house situate in and facing South Street in the Town of Axminster … to The Reverend William Buckland Doctor of Divinity and the Reverend John Buckland sons of my late

Fig. 1.3 Buckland House in South Street, Axminster

[12] Christopher Powell, *William Buckland (1784-1856): His Family and Axminster* (Sheffield: Christopher Powell, 2010), 14.
[13] DRO/138M/17 and 45-7.
[14] Powell, *William Buckland*, 14; (say £70,000 to £140,000 in 2021).
[15] G.P.R. Pulman, *Book of the Axe*, (London: Longman, 1854), 342.
[16] Powell, *William Buckland*, 14.
[17] Christopher Powell, *William Daniel Conybeare (1787-1857): His Family and Axminster* (Llandaff: Christopher Powell, 2008), 41.

husband'[18]. Was Ann perhaps acknowledging that property originally acquired through Elizabeth's money should properly end in the possession of Elizabeth's own sons?

In 1786, two years after William's birth, a brother – another John – was born, followed in 1787 by a sister, Lucy, who survived for only 17 months. Then came three more brothers: Charles, in 1788, Henry, in 1790, and Walter, in 1793. Perhaps mindful of the costs implied by his friend's increasing family, Sir John de la Pole – he added the 'de la' in 1789[19] – gave Charles the living of Trusham in 1793. Again, Charles was content to delegate day-to-day duties to a curate. However, he was clearly a well-regarded absentee rector; two years later, the patrons of West Chelborough, twenty miles away in Dorset, added that valuable living to his portfolio.[20] Meanwhile Charles remained in Axminster, enjoying the society of the de la Poles at Shute and his wife's family at Combpyne. Despite serving in the humble office of curate to Mr Steer, his status as a beneficed rector was never in question, and thanks to his son's biographer, his own granddaughter, Mrs Elizabeth Gordon, he is now remembered simply as the 'Rector of Templeton and Trusham'.[21]

By the time the Bucklands settled in Axminster the town had grown from the two hundred houses, 'made of mud and thatched with straw' recorded by a visitor in 1669, into a community with a population of 2500.[22] Roofs were still mainly thatched, but walls were now often brick or stone.[23] In the early eighteenth century, Axminster had been a centre for the finishing of woollen cloth. But, as in Crediton, by mid-century much of this trade had migrated to the mills of Yorkshire, and Axminster clothiers like Thomas Whitty needed new outlets for their energies. Whitty was a weaver and mercer whose business was struggling for survival. Visiting London in 1754, he was struck by the great width of the Turkish carpets that covered many of the grander floors of the metropolis. He began to think about how such a product might be made and, within a year, he had invented a vertical loom and produced the first 'Axminster' carpet. The piece was bought by Lady Shaftesbury, who was quick to recommend Whitty's work, and very soon Axminster carpets were covering the floors of great houses across the country. By 1793 *The Universal British directory of trade, commerce and manufacture* reported that 'the carpet manufactory is carried on here in great perfection, it is worked of any size in one piece, with needles, by women; in point of colours and strength, it is allowed be the first in the world.'[24]

As they grew up, William Buckland and his brothers must have been very aware of the industry for which their town was renowned. Although the Whittys were chapel folk, the completion of each

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[18] Powell, *William Buckland*, 10, 14-15. Will: PCC/PROB11/2137, proved August 1851.
[19] R.G. Thorne, ed., *The History of Parliament: The House of Commons 1790-1820*: https://www.historyofparliamentonline.org/research/members/members-1790-1820.
[20] Powell, *William Buckland*, 16, n.15 suggests that the patron was John Bragge of Sadborow House, a few miles from Axminster. Watkin and Pearse Chope in *DCNQ* Vol. XVI give the patrons as 'John Rolle and Judith Maris, his wife.' The annual value of the living was £237: R.J. Richardson in *Red Book; or a Peep at the Peers!!* (London: John Cleave, 1841), 72. At that time few curates received more than £100p.a.
[21] Gordon, *Life and Correspondence*, 1.
[22] Lorenzo Magalotti, *Travels of Cosmo the Third, Grand Duke of Tuscany, through England during the Reign of King Charles the Second (1669) (*London: J. Mawman, 1821), 140; Peter Barfoot and John Wilkes, *The Universal British directory of trade, commerce, and manufacture*… 2 (London: 1791-[8]), 77.
[23] Geoffrey Chapman, *A History of Axminster to 1910*, (Wilmington: Marwood Publications, 1998), 109.
[24] Barfoot and Wilkes, *Universal directory*, 77.

new carpet was celebrated by the pealing bells of the Anglican minster church as the carpet was processed through the streets to be laid, for all to admire, across the pews of the Independent chapel. William would have been just old enough to remember George III's visit in 1789, when the king himself looked around Whitty's 'manufactory'. Indeed, if the Bucklands were still living in the house described by Pulman, the royal party would have passed right by their door.

Charles Buckland was a notable figure in the small community. Educated and at least comfortably off, he had an entree to the homes of the local gentry and rising middling classes. He would also have regular contact with his less privileged neighbours and perhaps it was through watching his father as he moved about the parish, from grand house to humble cottage, that his eldest son, William, gained his own well-documented genius for mixing with all sorts and conditions of men. Charles took a particular interest in the improvement of roads in and around Axminster and, in 1792, he and his vicar, Charles Steer, were among the twenty founder commissioners of the Axminster Turnpike Trust.[25] In his 1858 'Memoir', Buckland's son Frank claims that it was while walking with his father to inspect roads and quarries around Axminster that the young William first 'collected Ammonites, and other shells, which thus became familiar to the lad from his infancy'.[26] Such prophetic early manifestations of aptitude – the stock-in-trade of the Victorian biographer – are usually best taken with a due sprinkling of salt, but in this case the claim is not altogether fanciful. Buckland himself would later relate how '[t]he love of observing natural objects which is common to most children was early exhibited by my aptitude in finding birds' nests and collecting their eggs. I also made observations on the habits of fishes in the Axe – particularly flounders, minnows, roaches, eels, and miller's thumbs.'[27]

The area around Axminster was a perfect place for a boy with an interest in any form of natural history. The River Axe with its minnows and miller's thumbs flowed past the western side of the town and meandered its way through a wide valley scoured over the centuries through the soft mudstones of the Red Marl. To the north and east of the town the topsoil was underlaid with the harder limestone of the Lias. The name is a corruption of the word 'layers', as these rocks are strongly banded, with sheets of hard limestone, often 8 to 10 inches thick, interspersed with thicknesses of more friable shales. Laid down in warm seas, around 200 million years ago at the start of what is now known as the Jurassic period, these rocks were not only good for the construction of roads, but were rich in intriguing fossilised remains. It is easy to imagine William whiling away the minutes fossicking through the debris on the quarry floor while his father discussed business with the quarrymen.

Occasionally father and son might have ventured further eastward towards the coast, where the town of Lyme Regis and its neighbouring village of Charmouth promised even more of interest for the young naturalist. Here the Lias was exposed in towering sea cliffs and the beaches were carved from wide slabs of limestone, whose slippery surface was often adorned with mysterious coils of 'serpent-stones'. After a stormy night the beach was littered with more portable treasures washed from the cliffs. Each species of strange-shaped rock had its own name: John Dories and Ladies Fingers and,

[25] Powell, *William Buckland*, 19.
[26] F. Buckland, 'Memoir,' xix.
[27] Ibid., xix-xx.

just occasionally, pieces that looked for all the world like the jaws of a crocodile.[28] Local people often collected these 'curiosities' to sell to passing travellers, and sometimes a gaggle of children might run after the clerical gentleman and his young son, hopeful that they might be tempted to part with a penny or two in exchange for some particularly spectacular specimen.

Neither Frank Buckland's *Memoir* nor Elizabeth Gordon's *Life and Correspondence* throw much light on their father's educational experience before he was sent, at thirteen, to be a boarder at Blundell's School in Tiverton. Following early tutoring at home, both William and John probably attended the town's charity school, which offered instruction in reading and writing to 20 Axminster boys.[29] The school, which was accommodated in a small chapel tucked away in a corner of the churchyard, had close links to the church, and both Mr Steer and the boys' father were inevitably involved in its management. Charles Buckland was certainly well acquainted with the schoolmaster, Richard Mallock, whose daughter, Ann, would eventually become his second wife.[30]

Blundell's Admissions Book shows that William and John Buckland both joined the school on 7 August 1797.[31] But while John remained there until he matriculated at Trinity College Oxford in the summer of 1802[32], William stayed less than a year, leaving in June 1798 with a scholarship to Winchester College.

Charles' decision to send his boys away to school had been heavily influenced by his elder brother. The Reverend John Buckland, who had no children of his own, took a great interest in his nephews. He himself had entered Oxford's Corpus Christi College in 1762, being made a Fellow in 1771. Although he left Oxford in 1797 when he became perpetual curate of Warborough, an hour's ride south of the city, he continued to maintain contact with the university, occasionally preaching at the university church of St Mary's.[33]

In 1796, Charles had asked his brother how best to secure university places for his two eldest boys. John emphasised that they must be prepared to the highest academic standards and suggested that for William, who he considered 'to excel your other boys by many degrees in talents and industry, and I will add in many other respects', the best route would be via Winchester College.[34] Winchester, as well as offering 'closed' scholarships to Oxford's New College, would, he believed, also provide the most appropriate teaching. Realising that it was beyond Charles's means to have William enter Winchester as a fee-paying 'Commoner', John set about securing his election to one of the College's seventy foundation scholarships.

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[28] Anon., 'The fossil-finder of Lyme Regis,' *Chambers's journal of popular literature, science and arts* 8 (1857), 382-4.
[29] Barfoot and Wilkes, *Universal directory*, 77.
[30] In 1786 Charles Buckland and Richard Mallock were appointed joint trustees of Richard's young relative Roger Mallock, whose father had died leaving him a considerable fortune. Powell, *William Buckland*, 5.
[31] Mike Sampson, Archivist, Blundell's School, personal communication, 22 May 2017.
[32] Joseph Foster, *Alumni Oxonienses 1715-1886* A-D (Oxford: Parker and Co., 1888), 184.
[33] Acts & Proceedings, CCC/B/4/1/1. In 1807 John Buckland was one of the Public (or Select) Preachers at the University. Anon., *Literary Panorama* 1 (1807): 905.
[34] John Buckland to Charles Buckland, 20 March 1797, DRO/138M/19.

John Buckland knew that Winchester scholarships were decided by the college's Warden, George Huntingford, and a 'chamber' of electors who drew up a ranked list from which the new Scholars were selected.[35] To be included on the list, the advocacy of some influential person with Wykehamist connections was required.[36] John and Charles turned to their friend, Sir John de la Pole.

Although de la Pole was not himself a Wykehamist, other members of his extended family were. He put Charles in touch with his second-cousin, Reginald Pole Carew, who had been a 'commoner' at Winchester in the late 1760s. He could hardly have suggested a better man.

Pole Carew was a Cornish MP and an active supporter of fellow MP and old school friend, Henry Addington, who had risen to become Speaker of the House of Commons.[37] At Winchester, both Pole Carew and Addington had been taught by the young George Huntingford with whom Addington in particular had formed a close and lasting friendship.[38] It is even possible that, in 1789, it was Addington's influence that secured his friend's election as Winchester's Warden.[39] Addington was therefore the ideal man to lobby Huntingford. Now, through Pole Carew, the Bucklands had access to Addington.

The convoluted details of exactly who approached whom, and to what effect, have been teased out by the late James Edmonds and recorded in his 1978 paper.[40] It is sufficient here to state that by March 1797 it was settled that William Buckland would be the Warden's first choice for election to a scholarship the following year.

Blundell's was not Winchester - but it would do in the interim. Knowing that it would be eighteen months before Huntingford could nominate William, John Buckland was eager that his nephew should use the intervening time productively. He told Charles: 'I think you do wrong to neglect sending him to Tiverton, unless there is more diligent exertion in the school at Axminster *now* than when I remember it.'[41] By John's reckoning the boy 'should have Virgil and Horace, Homer and Xenophon at his finger ends', and Blundell's School was the local institution best suited to ensure that he did.[42] Although, as John warned his brother, even for a Scholar the expenses at Winchester would be 'very great, I suppose at the least not less than fifty pounds pr. an.', the costs at Blundell's were more manageable.[43]

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[35] Edmonds, 'Patronage and privilege,' 97.
[36] Wykehamists are past and present pupils at Winchester – after William of Wykeham, the school's fourteenth century founder.
[37] Information about the Parliamentary careers of Addington and Pole Carew is taken from Thorne, *House of Commons*. Henry Addington became Prime Minister in 1801. In 1805 he became the first Viscount Sidmouth. It was rumoured that Pole Carew's promotion to the Privy Council was due to his having suggested a suitable title for his newly ennobled friend.
[38] Andrew Robinson, 'Huntingford, George Isaac (1748–1832),' *ODNB* (2004).
[39] Ibid.
[40] Edmonds, 'Patronage and privilege,' 103.
[41] John Buckland to Charles Buckland, 20 March 1797, DRO/138M/19.
[42] Ibid.
[43] Even allowing for inflation on the £14 accommodation charge (plus 4 shillings for 'blacking and cleaning Shoes') quoted by Headmaster Atherton in 1759, (DRO/138M/3), that together with the maximum figure of £6 for tuition given in Mike Sampson, *A History of Blundell's School* (Tiverton: Blundell's School, 2011), 86-7, would come to considerably less than £50.

Founded in 1604 by the bequest of Peter Blundell, a cloth merchant who traded Devonshire woollen goods to London, Blundell's mission was to prepare boys for entry to Oxford and Cambridge. Its curriculum, as William outlined in a letter to his father, was highly traditional. On Tuesdays 'we learn … Virgill before brecfast, Epistles of Horace after and Homer after dinner,' on Thursdays it was 'Virgill before brecfast, Grammar after.'[44] Dry fare indeed, but it matched well with his Uncle's expectations.

In 1797 the school was run by the 25-year-old Master, the Reverend William Page Richards, assisted by an 'usher', or assistant master, who took charge of the younger boys.[45] Outside the classroom, supervision of the hundred or so pupils was delegated to prefects: senior boys whose unmoderated power was frequently abused, making life all but intolerable for many. There was, however, one kindly face. Samuel Chilcott, recently graduated from Sidney Sussex, had returned to his old school to work as an extra usher.[46] He, at least, met with William's approval, being 'very ready to assist us, if our verses are not right he will alter them for us.'[47] During 1798 the school also appointed a 'writing master to attend during school hours'. [48] William, however, derived little lasting benefit from this, his handwriting eventually becoming a notoriously illegible scrawl.

But Blundell's had only ever been a stopgap until Huntingford made good on his promise, and in June 1898 William left Tiverton for the last time.

On 25 August, 'Gulielmus Buckland de Axminster' was admitted as a Scholar of Winchester College.[49] A year earlier John Buckland had told his brother that if William 'comes in under the patronage of the Warden, he will be the immediate object of his attention, and if he desires it, of his protection' – an acknowledgement of the daunting prospect awaiting a new boy at a public school.

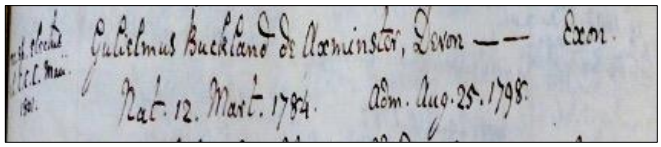
Gulielmus Buckland de Axminster, Devon — Exon.
Nat. 12. Mart. 1784. Adm. Aug. 25. 1798.

Fig. 1.4 William Buckland's entry in the Winchester Admissions Book

The Winchester College that the fourteen-year-old William entered in 1798 was barely different to the institution established by William of Wykeham in the fourteenth century. The buildings had been erected in 1397: a gateway leading to an outer courtyard which in turn gave way to an inner 'Chamber Court' around which ranged the seven 'Chambers' that accommodated the seventy foundation Scholars. William was allocated to the Seventh Chamber, where his 'marble' still adorns the wall.[50]

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[44] WB to Charles Buckland, 3 March [1798], DRO/138M/20.
[45] Sampson, *Blundell's School*, 84.
[46] Venn and Venn, *Alumni Cantab.* 2, 2, 27.
[47] WB to Charles Buckland, 3 March [1798], DRO/138M/20.
[48] Sampson, *Blundell's School*, 84.
[49] As well as the seventy Scholars provided for at the school's foundation, there were a variable number of 'Commoners' living outside the College and paying a tuition fee directly to the Headmaster, a man subordinate to the Warden, employed to undertake the classroom teaching.
[50] The tradition of erecting 'marbles' began the seventeenth century. Many still adorn the walls of the seven original 'Chambers'. Charles Stevens and Christopher Stray, *Winchester Notions : The English Dialect of Winchester College* (London: Athlone, 1998), 180.

Fig. 1.5 Winchester's Chamber Court

Fig. 1.6 William Buckland's 'marble' in Seventh Chamber

There is no account of William Buckland's time at Winchester. However, his son Frank has left us with a detailed memoir of his own schooldays, and since for most of the intervening period Warden Huntingford – whose byword was famously 'No innovation' – remained in charge, we can reasonably depend on this for a flavour of the institution as it was in William's time.[51] And if Frank's account might seem a little remote from William's period, we have as corroboration the diary of Charles Minet: a meticulous record of his life at the school during the 'Long Half' term of 1818.[52]

It was a strange, almost barbarous existence – although the first impression is that the boys enjoyed an almost idyllic freedom. Day after day Minet writes of hours spent at cricket, swimming, fishing, or even duck shooting. He brews beer, plays chess, chases badgers, and in the evening there is often some cheerful 'bolstering' or the making of apple-pie beds. Frank Buckland reveals himself to be an accomplished poacher of trout, and, more macabrely, seems to spend long hours snaring and then dissecting hapless college cats. There is little mention of the schoolroom or time spent studying – 'up to books' in the curious argot of the Wykehamist.

But in fact, the hours of study were even longer than William would have known at Blundell's. Chapel from 6.00 to 6.30 am was followed by a total of seven and a half hours 'up to books' on a normal school day – a day which didn't end until a further visit to chapel between 9.00 to 9.15pm. Tuesdays, however, were 'remedies' or holidays, and Thursdays 'half-remedies': time for chasing badgers – or dissecting cats.

It is only as we read further that it becomes clear that discipline was maintained with a shocking brutality. Floggings, or 'tundings' – anything from twelve to fifty strokes with an ash sapling cut for the purpose by junior boys – were administered by prefects and are described with matter-of-fact acceptance. Perhaps not all prefects abused their position, but Minet's diary shows that this did happen. On Easter Sunday (22 March 1818) he wrote: 'one of the Praefects licked Wade jnr. … he hurt him so much that he was taken up quite senless, and the Surgeon said if he had been an hour later he wd. have

[51] Frank Buckland's 'Reminiscences of Winchester College' first appeared in *Temple Bar Magazine* 37 (1873). It is quoted in full in George Bompas, *Life of Frank Buckland* (London: Smith, Elder, 1885), 19-33. Huntingford was Warden from 1789 to 1832.

[52] Manuscript 'Journal' of Charles William Minet, Long Half (February to July) 1818. WCA.

been a corps'.[53] It was probably of little comfort to Wade junior that his tormentor was instantly expelled.

Like much of English society, by the end of the eighteenth century the great schools had become corrupt and inefficient.[54] Over the years the revenue from endowments and rents had increased, but trustees – in Winchester's case the Warden and Fellows – often channelled the extra income into their own pockets, to the detriment of their charges.[55] School food was notoriously bad and the boys' accommodation primitive and poorly maintained. But just as oppressed workers took to the streets to demand fairer treatment, so did the boys at England's public schools.[56] Although William witnessed no major rebellion while he was at the school, between 1770 and 1818 Winchester boys rebelled no fewer than five times.[57] One such insurrection, in which Minet himself took part, was only subdued when a contingent of soldiers was summoned, and who, in Minet's words, 'charged at us with their bayonets pointed'.[58]

Such was the background to William's relatively short career at Winchester, starting in the Middle Fifth form in October 1798 and ending – as we shall see, somewhat prematurely – in March 1801. But in those two and a half years the school made a lasting impression. Already aged 14 when he joined, he probably missed the extreme misery of the most junior years, but he must, nevertheless, have endured some hardship. Many looked back on their schooldays with nothing but abject horror. Even in old age, Sydney Smith, despite having risen to be captain of the school, 'shuddered at the recollection of Winchester … the system was one of abuse, neglect and vice.'[59] But William's view seems to have been rather more sanguine. For him, to be a Wykehamist was to be part of an exclusive club, the membership of which was valued all the more *because* it had been hard won. He attended reunion dinners, and in later life, he often displayed a sense of fellow-feeling for other Wykehamists amongst his scientific or clerical colleagues. And, of course, when the time came, he ensured that his sons would have the same 'opportunity'.

Perhaps it was the use that a boy made of his free time that determined his view of his schooldays. About twice a week, on those days declared 'remedies', Winchester boys would go, *en masse*, 'to Hills', to play on the site of the Iron Age hillfort that had once held sway over the area. Much later, William recalled that his first knowledge of the chalk came 'from the fact of the pathway to the play-ground on St. Catherine's Hill, passing close to large chalk pits, which abounded with sponges and other fossils; and from the practice of digging field-mice from their holes in the surface of the chalk, within the vallum of the ancient camp at the top of this hill.'[60] It was a skill inherited by Frank, who

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[53] Ibid. 22 March 1818.
[54] An analysis of the extent of corruption in early nineteenth-century Britain is given in W.D. Rubinstein, 'The End of "Old Corruption" in Britain 1780-1860,' *Past & Present* 101 (1983).
[55] J.P. Sabben-Clare, *Winchester College : After 600 Years, 1382-1982* (Southampton: Paul Cave, 1981), 5-7.
[56] Jonathan Gathorne-Hardy, *The Public School Phenomenon,* (London: Penguin Books, 1979), 65.
[57] John Lawson and Harold Silver, *A Social History of Education in England* (London: Methuen, 1973), 254.
[58] Minet, 'Journal,' 18 May 1818.
[59] John D'E. Firth, *Winchester College*, (London: Winchester Publications, 1949), 83.
[60] F. Buckland, 'Memoir,' xxii.

boasted that he himself 'was looked up to by the other boys as the most experienced mouse-digger in the college'.[61]

Fig. 1.7 St. Catherine's Hill, Winchester

But William had not been sent to Winchester to improve his knowledge of natural history. He was there with the express object of securing a scholarship at an Oxford college. The Winchester curriculum was probably not very different from that at Blundell's: Latin and more Latin, leavened with a smattering of ancient Greek. Sydney Smith claimed that he had composed ten thousand Latin verses at Winchester – 'no man in his senses would dream in after life of ever making another.'[62] But since this was what was required for entry to the two English universities, this was what was taught. The nearest we have to a formal statement of the curriculum is a copied manuscript bearing the initials 'G.H.' and headed 'Business at Winton College 1756 1757'.[63] Given George Huntingford's lack of enthusiasm for 'innovation', it was very probably the schedule that William would have followed. Virgil, Horace and Homer predominated in 'Short Half' (the term between October and Christmas), with the addition of Ovid, Juvenal, Terence, Sallust and Demosthenes in the 'Long Half' (February to July). Pupils would be required to learn by heart and to 'construe', or translate aloud, passages from the Latin authors, with great attention being given to elegant and careful expression. William was, it appears, very good at this, 'always having ready the nearest corresponding English expressions for difficult phrases'.[64] John Buckland considered his nephew to be a very good Latin scholar though not so good at Greek and, rather alarmingly, 'very bad' at English.[65]

Great store was set by a boy's 'position in class', which at Winchester was indicated not just by the ranking on a written list, but by the position occupied along the schoolroom bench. Demotion involved both a loss of dignity and, probably more painful, the loss of some privilege or the imposition of some irksome duty. And it was not just a sanction for poor work; Minet describes being 'turned junior of my row up to books, for hitting Elliott on the head'.[66] However, it was an academic failing that once caused William to lose 'several places in the class'. When he had regained these places 'and several more besides', Dr Goddard, the Headmaster, was said to have remarked: 'Well, Buckland, it is as difficult to keep a good boy at the bottom of the class, as it is to keep a cork under water.'[67]

William returned to Axminster just twice a year while he was at Winchester: at Christmas and for the summer holiday. He was therefore probably at school when his father suffered the accident

[61] Bompas, *Frank Buckland*, 30.
[62] Firth, *Winchester College*, 82.
[63] WCA/23490.
[64] F. Buckland, 'Memoir,' xxii.
[65] Ibid.
[66] Minet, 'Journal,' 26 February 1818.
[67] F. Buckland, 'Memoir,' xxii.

that left him blind for the last 22 years of his life.[68] Neither the date nor the circumstances of this calamity are recorded, and William never alludes to his father's disability in later correspondence. It was however, while he was at home during the summer of 1800 that the following extraordinary event occurred. The report comes from an anonymous article entitled 'The Fossil-finder of Lyme Regis' published in *Chambers's Journal* in 1857, a year after William's death. Recent careful research by historians Michael Taylor and Hugh Torrens has shown that Frank Buckland was a co-author of the piece which was the first ever published on the subject.[69] It begins with a first-hand report, almost certainly copied from an account that Frank found amongst his recently deceased father's papers:

> 'The weather was very sultry, and the harvest was nearly in, it being 19th August…about five o'clock there was an awful peal of thunder which re-echoed round the fine cliffs of Lyme Bay. Our attention was called, soon after, to a group of noisy talkers, who had an infant, for whom they wanted some hot water. A bath was procured and the apparently dead child was bathed with ultimate success…Three dead bodies were carried home at the same time, one of whom was the nurse of the infant…[T]he three were together with the infant in arms when the shower began, and the whole ran under the dangerous shelter of an elm-tree, when a flash of lightning dealt instant destruction to all but the babe. This baby…had been a dull infant, but was dear to her parents: her name was Mary Anning.'[70]

If William was indeed the original author of this piece, it brings Mary Anning, the celebrated collector of fossils, into his life several years earlier than is usually supposed. It also makes him responsible for one of the most enduringly popular narratives concerning her: how a lightning strike transformed a 'dull infant' into the 'greatest fossilist the world ever knew'.[71]

In October 1800 William learned that he was eighteenth on a list of twenty Winchester scholars to be nominated for vacant scholarships at New College. It was a grave disappointment. There was little hope that he would rise sufficiently up the list in the time that he had left at Winchester. Fortunately, an alternative course soon became apparent. Two of the twenty scholarships at John Buckland's own college, Corpus Christi, were reserved for candidates from the Exeter diocese. Most unusually, in early 1801, both happened to become vacant. With two places on offer, father and uncle considered the possibility of entering both of Charles' older sons at the same time.

Drawing on his familiarity with the election process, John Buckland undertook to check that the boys were well prepared, asking each to send him samples of their work. His findings were not encouraging. In March he wrote to Charles:

> With respect to John, I feel myself at a loss what to say to you, but upon the whole I think it best for me not to dissemble with you, tho' he does, and to speak the whole truth…he has been guilty of a gross imposition upon me both in the prose and verse exercise and further aggravates the offence, by supporting it with a wilful lie…It is evident that he wants

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[68] Ibid., xix.
[69] Michael A. Taylor and Hugh Torrens, 'An Anonymous Account of Mary Anning (1799–1847), Fossil Collector of Lyme Regis…,' *ANH* 41 (2014).
[70] Ibid., 310.
[71] Hugh Torrens, 'Mary Anning (1799-1847) of Lyme; "The Greatest Fossilist the World Ever Knew",' *BJHS* 28 (1995), 258.

> to be released from school and it is equally evident to me that he ought to be kept there still.[72]

John had, it seems, tried to pass off, as his own, passages copied from standard works that were all too familiar to his uncle. The uncle's letter reveals him to be a sensitive and enlightened mentor. He goes on to urge Charles to treat his errant son with care.

> I recommend it to you…not to upbraid him…for fear that it should carry him to some act of desperation, bur entirely forebear until he comes home to you, when you would gently correct him and remonstrate with him at your discretion upon the guilt of lying…Boys at school are very apt to practise such impositions in this manner.[73]

In the event, the devious young John, who, we should remember, was only fourteen years old, remained at Blundell's. He must have mended his ways, as the following year, at the age of sixteen, he was awarded an Exhibition scholarship to Oxford. Not, however, to his uncle's college, but to Trinity.[74]

But young John was not the only cause for concern. Winchester had evidently not lived up to the expectations that the Bucklands had placed upon it. On 22 February 1801 John wrote to his brother: 'It is but lately that I have been made acquainted with the plan of studies William has been pursuing at Winchester, which I do most highly disapprove of … it is very un-improving and ill-adapted to prepare him for the ensuing examination.'[75] He went on to outline a plan for William to leave Winchester and come to him at his home at Warborough where he would coach him for the Corpus election examination which was due to begin on 6 May. Mindful that such a scheme might backfire, he cautioned:

> if you adopt my proposal at all, it would be prudent to keep it secret. It would be best it should not be known to the competitors, for many obvious reasons, that I am pursuing such a design. William might leave Winchester on the pretence of going to enter at Oxford – even Goddard [the Headmaster] should not be informed of the true reason.[76]

Two letters from William to his father complete the story. On 22 March he wrote from Warborough:

> Dear Father, It gives me great pleasure to inform you that I arrived safe at Warborough yesterday morning. As you desired me I have taken an Inventory of my Books & left one with the Bedmaker Jones, who also has the Care of my College Furniture, which He values at £6-0-0 which is about a Shilling more than I gave for it. The Warden has promised to give me a Testimonial if my Uncle thinks it necessary. I have brought with me all my Linen and other Clothes excepting one old College Waistcoat which is safely secur'd with my Gown. I met with very stormy weather on my Journey, so that I was obliged to get into the inside of the coach where I met with good company and was not at all sick as generally

[72] Edmonds, 'Patronage and privilege,' 107.
[73] Ibid., 107.
[74] Ibid., 111, n48.
[75] Ibid., 106.
[76] Ibid., 106.

> happens. I have brought in my trunk without inconvenience all the books which are necessary for my studies with my Uncle.[77]

And then on 13th May, after six weeks of intense study, he was able to tell his father:

> I am happy to inform you that I have just been elected Senior Scholar for Devonshire, after a course of many days' rigorous examination against eight competitors … the testimonial Dr. Huntingford sent of my behaviour was highly approved of by the President and electors.[78]

On 14 May 1801 William Buckland matriculated at the University of Oxford. It would be his home for almost 45 years.

In 1801 Corpus Christi College was a small community, very much as it had been in 1517 when it was founded to educate young men for the priesthood.[79] Its statutes allowed for a President, twenty Fellows, twenty Scholars, and four Exhibitioners.[80] The Fellows, apart from one medical Fellow, were all in Holy Orders and there remained a strong presumption that its Scholars and Exhibitioners would also eventually seek ordination. However, in the seventeenth century, like other Oxford colleges, Corpus developed a subsidiary role in the education of the sons of the gentry, taking a very few so-called 'gentlemen commoners' whose families paid for their place.[81] Nevertheless, true to its founder's intention, and especially for its Scholars, the college remained devoted to the education of those intending to be ordained.

The Bucklands knew that William's election as a Scholar would effectively guarantee his future. Corpus was unusual among Oxford colleges in that only its own Scholars were eligible for its Fellowships, and since a man might remain a Scholar for up to ten years, no Scholar who aspired to a Fellowship was likely to be disappointed. Most new Scholars became Fellows after about eight years. Fellowships could be held for life. They provided board, lodging, and a comfortable, if modest, income in return for some less-than-onerous teaching or other duties. However, since Fellows were prohibited from marrying, for most, a Fellowship was just a congenial way of spending time before a suitable church living became available. Here, yet again, the college provided, having, over the years, acquired the 'advowsons',

Fig. 1.8 Corpus Christi College, Oxford

[77] Ibid., 106-7.
[78] Ibid., 107.
[79] G.V. Bennett, 'Against the Tide: Oxford under William III,' in *The History of the University of Oxford, Volume 5: The Eighteenth Century*, edited by L.S. Sutherland and L.G. Mitchell (Oxford: Clarendon Press, 1986), 43.
[80] An Exhibitioner had no automatic right to a fellowship.
[81] During the early 1800s the number of gentlemen commoners never exceeded nine.

or patronages, of twenty parishes across the country. As these became vacant, through death or promotion, they were offered to each Fellow in turn, in order of seniority. This ensured a steady turnover among the younger Fellows. It had been just such a college living that had enabled the 51-year-old John Buckland to leave Oxford, marry, and settle into the comfortable life of a country parson.

In March 1797, having previously turned down no fewer than seven of the parishes in the college's gift, John Buckland had accepted Warborough, one of its more lucrative livings. He had been a Fellow for 26 years, taking his turn at various duties from junior dean to lecturer in Latin.[82] In 1786 he was appointed a chaplain at the Chapel Royal in Whitehall, an honour that paid him £30 in return for a month's duty each year.[83] But enjoying, as he did, a wide and influential set of friends he continued to hope for greater things. In 1801, William Scott, a friend from undergraduate days, became MP for the University and, in the same year, Scott's younger brother, John, rose even further: ennobled as Lord Eldon, he became Lord Chancellor of England. John Buckland was not slow to see the potential in so powerful an acquaintance. In early 1805 William told his father that 'My Uncle is still in expectation from the Chancellor, tho I fear they will not be gratified.'[84] It was in fact four years before Lord Eldon gave him the rectory of St George the Martyr, Southwark[85], a living that he held in plurality with Warborough, adding to both his income and his influence. He travelled frequently between his homes in London and Oxfordshire, as well as making occasional visits to relatives in Devon. As late as 1833, when well into his eighties, his new will specified three separate burial plots; he could never guarantee where he might be when the need arose.

The request that John Buckland's body should 'be buried … as near as possible to that of my late deceased wife Ann Buckland' comes as something of a surprise. We know little about Ann, not even when and where the couple married. She is mentioned in no surviving correspondence. All we know is that Ann Buckland died, 'deeply lamented' by the poor of Warborough, on 30 March 1826, aged 48.[86] After Ann's death, her friend, Mrs Jane Davies cared for the ageing parson until he died, aged 91, in April 1837.[87] He left Jane Davies a Wedgwood tea set – given him by 'his old friend the Dowager Lady Pole' – and a generous annuity of £150. William received his books and papers. His estate, including a large holding of consolidated government stock, would have been equivalent to almost £1.5 million today.[88] Thanks to his education and a circle of influential friends, John Buckland enjoyed a comfortable and successful clerical life. It was probably just such a life that he and his brother Charles envisaged for the young William.

There was just one course open to undergraduates when William arrived at Oxford. The syllabus had evolved from the scholastic studies of the early university when it had been designed to give

[82] Thomas Fowler, *History of Corpus Christi College* (Oxford: Oxford Historical Society, 1893), 290.
[83] *BHO*: http://www.british-history.ac.uk/office-holders/vol11/pp304-315#fnn5.
[84] WB to Charles Buckland, 10 February 1805, DRO/138M/38.
[85] *GM* 161 (1837): 665.
[86] *JOJ*, 8 April 1826.
[87] *GM* 161 (1837): 665.
[88] John's investments included 13,000 3% consolidated annuities.

students a sound grasp of the tools of learning: grammar, logic and rhetoric – the ancient trivium. Over the centuries, grammar schools had taken on much of this preparatory work and, following humanist ideals of recovering the lost wisdom of ancient civilisations, the undergraduate curriculum had been expanded to include a wider reading of classical authors, poets, statesmen and philosophers. Finally, borrowing from ancient quadrivium – itself now the foundation for MA degree – some arithmetic and geometry were added as optional extras. It may seem strange that an institution set up for the express purpose of educating clergymen should include no theology in its primary course of study, but as J.H. Newman commented in 1852: 'Liberal Education makes not the Christian, not the Catholic, but the gentleman.'[89] 'The grand design of a liberal education' was, in the words of the theologian Edward Bentham, 'to form and confirm the habits of piety, wisdom, justice, temperance, and fortitude.'[90] Only after this thorough preparation in the liberal arts was a man considered ready for more specialised training in the higher faculties of the university: theology, medicine and law – although, in practice, the London hospitals or the Inns of Court would be the more likely postgraduate destination for aspirant physicians or lawyers.

A surviving fragment of William's own undergraduate work shows what such a liberal education might mean in practice. Written in his first year, it is a short, unsophisticated, and rather worthy essay, headed by a Greek epigraph that translates roughly as 'Hard work and bravery will earn you praise'.[91] With many classical references and a good dose of patriotic sentiment, it ends with the words: 'Ought not then every Briton following example of his glorious Forefathers, who conquered in the fields of Cressy and Agincourt to be stimulated to exert himself to imitate their Valour, and prove himself worthy of equal Fame and Immortality.'

Undergraduate teaching at Corpus was in the hands of two college tutors: a senior, or classical, tutor and a junior tutor, who looked after the mathematical parts of the course.[92] These were often newly-elected, 'probationary' Fellows – hardly older than the students they taught.

Of the twenty scholars at Corpus when William arrived, eleven had already graduated, leaving a class of nine undergraduate Scholars and four Exhibitioners, plus, perhaps, a gentleman-commoner or two. The Scholars – whose average age on election was a little over 16 – and the slightly older Exhibitioners spent much time together. John Taylor Coleridge, a near contemporary, later recalled that:

> we were somewhat boyish in manner, and in the liberties we took with each other; but our interest in literature, ancient and modern, and in all the stirring matters of that stirring time, was not boyish; we debated the classic and romantic question; we discussed poetry and history, logic and philosophy … Our habits were inexpensive and temperate: one break-up party was held in the junior common room at the end of each term, in which we

[89] John Henry Newman, *The Idea of a University: Defined and Illustrated* (London: Longmans, Green, 1886),120, quoted in E.G.W. Bill, *Education at Christ Church Oxford 1660-1800* (Oxford: Clarendon Press, 1988), 3.
[90] E. Bentham, *Advices to a Young Man…upon his Coming to the University* (c.1760), 7, quoted in Bill, *Education*, 5.
[91] A collection of students' work, possibly submitted as 'Collections' – internal college examinations, CCC/B/10/1/1.
[92] Thomas Charles-Edwards and Julian Reid, *Corpus Christi College, Oxford: A History* (Oxford: Oxford University Press, 2017), 275ff.

> indulged our genius more freely, and our merriment, to say the truth, was somewhat exuberant and noisy; but the authorities wisely forbore too strict an inquiry into this.[93]

The day began with chapel at 8am, after which a simple breakfast might be taken. At 10am there would be a lecture in the college Hall – sometimes Greek, sometimes Latin. At 11am the class would split, half to one tutor and half to the other, and at one o'clock the position was reversed. At a time of general laxity in the university, Corpus stood out for its high standards. As William Phelps, another near contemporary, told his father: 'Corpus men pride themselves on their behaving as gentlemen. This college is very social: they have not much intercourse with other colleges. The generality of men read very much, even the rakes devote great part of the day to study.'[94]

William's own letters home tended to concentrate on the practicalities of college life, frequently including requests for more money.

> Yesterday our Battles for last Term came out I have to pay 8 Pounds on or before the 4th of March. … I shall therefore [be grateful] to you if you will send me by that time the above mentioned Sum, and likewise 6 or 7 Pounds to go on with, as after paying my Journey, Coalman's Bill, Xmas Fees, & Scouts Bill & Common Room Expences, the sum I had of you when I left home is very nearly exhausted.[95]

The presence of his Uncle John, ten miles away at Warborough, was both a blessing – he did, for example, offer to pay 'y^{e} Expenses of my Degree' – and a source of irritation.[96] He could clearly be rather overbearing as William's letter to his father just before his first Christmas at Oxford clearly hints:

> Sir William Pole has kindly offered to take me down with him free of all Expence,[97] … Under these Circumstances I should think my Uncle cannot have the least Objection to my going down to Axminster, as my expenses at College during the Vacation, would be much more than my Journey up again will cost me.[98]

A few years later, William was more forthright. Having returned from a short holiday on the Isle of Wight, he told his brother that their Uncle John had left him 'a querulous note, saying that I most strangely delude myself if I suppose my eccentric project could meet his approbation', going on to say that 'I am too old not to have discovered that whatever is done is wrong in the eyes of some folks'.[99] The resentment is clear, but even then, William remained under some obligation to his uncle who, he said, 'wishes me to come there [to Warborough], which I must at all events do, as I must get from him some Money.'

He often discussed his prospects in letters to his father. In 1801 the issue was his placing on the schedule of Scholars: 'Mr Putt is not yet come to Oxford … you will probably see him … and

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[93] Fowler, *Corpus Christi*, 307.
[94] Fowler, *Corpus Christi*, 308-311. Phelps was an undergraduate between 1815 and 1819.
[95] WB to Charles Buckland, 10 February 1805, DRO/138M/38.
[96] Ibid.
[97] Sir William de la Pole had inherited the baronetcy on his father's death in 1799. He matriculated, at Christ Church, a month before William Buckland.
[98] WB to Charles Buckland, 6 December 1801, DRO/138M/43.
[99] WB to John Buckland, 16 July 1809, DRO/138M/35.

have an Opportunity of talking to Him yourself, on the Subject of my Right of preceding Mr Mount.'[100] The Reverend Thomas Putt was vice-president of Corpus and also rector of Farway, ten miles from Axminster. Charles Mount had matriculated as a gentleman-commoner at Trinity College but had then been elected, a little later, to a scholarship at Corpus where his name appeared just above William's on the roll.[101] Although Mount's matriculation in 1800, was a year before William's, his election at Corpus was later, and the Bucklands felt that William should therefore have precedence.[102] Since vacant fellowships were offered only to those who had reached the top of the list of Scholars, the gaining of even a single place was highly desirable. However, Mr Putt and his colleagues clearly did not share the Bucklands' opinion, and in due course Mount gained his fellowship a full year ahead of William, remaining the senior man throughout their time together at the college.[103]

After three and a half years' study, just before Christmas in 1804, William sat before 'six sour Master of Arts', who according to one commentator: 'sit at a large table in the middle of the chamber, and ask questions concerning religion, mathematics, logic, algebra, languages, and heaven knows what, to which the trembling undergraduate answers from the other side of the table.'[104] Afterwards, with some sense of elation, he told his uncle:

> Before I came out of the schools they told me … they were extremely sorry they had not publicly thanked me in the schools but that I had passed a most creditable examination. I hope you will now find good reason to change the opinion which you gave me to understand you had formed; viz., that I did not take up enough for my degree, and that I appeared to have no ambition, but barely wished to save my groats.[105]

His pride was justified. A public expression of thanks from the examiners was a recognised acknowledgement that a candidate had performed particularly well. However, he still had a hurdle to jump. Corpus tradition demanded that degree candidates should stand in hall and give a formal Latin oration before receiving the College's 'grace' to take their degree.[106] William's speech, preserved with others in the college archive, is an unremarkable and 'safe' piece extolling Cicero's works on the art of oratory itself.[107] It was, however, enough. On 21 February 1805 'Grace was granted to Buckland – Scholar of the House to proceed to the Degree of BA'.[108] The following day he took his degree.

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[100] WB to Charles Buckland, 6 December 1801, DRO/138M/43.
[101] Fowler, *Corpus Christi*, 410.
[102] Foster, *Alumni Oxoniensis*, 993.
[103] *University of Oxford Calendar* 1815 and subsequent years.
[104] M.C. Curthoys, 'The Examination System,' in *The History of the University of Oxford. Volume 6, Nineteenth-Century Oxford*, Part 1, edited by M.G. Brock and M.C Curthoys (Oxford: Clarendon Press, 1997), 346.
[105] F. Buckland, '*Memoir*,' xxv.
[106] Fowler, *Corpus Christi*, 235, 298 and 302.
[107] CCC/MS521.
[108] Acts & Proceedings, CCC/B/4/1/2.

Chapter Two

1805 – 1813

Geological beginnings

Corpus was particularly strict in enforcing the ancient statute requiring graduates to undertake a further three years of residence before being awarded an MA. During this time therefore Buckland (as we will now refer to him) remained in college, subsisting on his small Scholar's pension.[1] Now largely responsible for directing his own studies, he made the most of the limited opportunities available for instruction in topics connected to the natural world.

In 1805 the University employed just seven professors of scientific subjects. Three taught some branch of medicine and a further two, the professors of botany and chemistry, were also medical men. This left two doctors of divinity, Abraham Robertson (geometry) and Thomas Hornsby (natural philosophy, astronomy and 'experimental philosophy'), to fulfil the requirement that MA candidates should have some familiarity with all branches of natural philosophy. Such slender provision reflected the subsidiary status in the university of what we now call 'the sciences'.[2] But although 'only classical and historical knowledge could make able statesmen … mathematics and other things were very necessary for a gentleman' and Thomas Hornsby's lectures in particular were very well attended.[3] However, in January 1805, a thoughtful Buckland told his father that:

> I shall not attend Dr Hornsby this Term, but by the advice of Mr Pinckney [his former junior tutor] I am attending Mr Robertson in Plane & Spherical Trigonometry first and shall not attend Hornsby till next Year, because he will be attended with so much more advantage after knowing Trigonometry &c.[4]

Hornsby and Robertson gave their lectures in the Ashmolean Museum, an elegant building, modest only in relation to Christopher Wren's majestic Sheldonian Theatre next door. Commonly described as a museum, the Ashmolean was conceived as a kind of prototype 'university science park'.[5] Opened in 1683, it was named in honour of Elias Ashmole, who had donated the large collection of 'curiosities' housed on the upper floor. The middle floor was a lecture space known as the 'School of Natural History' and the basement contained a chemical laboratory: 'the first purpose-built teaching

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[1] L.S. Sutherland, 'The Curriculum,' in *The History of the University of Oxford, Volume 5: The Eighteenth Century*, edited by L.S. Sutherland and L.G. Mitchell (Oxford: Clarendon Press, 1986), 485.

[2] During the first half of the nineteenth century the term 'science' was still a more general term applied to any form of systematically acquired knowledge, or even skill. E.g. Jane Austen in *Pride and Prejudice*: '"Every savage can dance", [said Mr Darcy.] Sir William only smiled... "I doubt not that you are an adept in the science yourself, Mr Darcy."' See also Sydney Ross, 'Scientist: the Story of a Word', *AS* 18, 1962, 65-85.

[3] From *The Life and Letters of Sir Gilbert Elliot* as quoted in G.L'E. Turner, 'The Physical Sciences,' in *The History of the University of Oxford, Volume 5: The Eighteenth Century*, edited by L.S. Sutherland and L.G. Mitchell (Oxford: Clarendon Press, 1986), 660.

[4] WB to Charles Buckland, 10 February 1805, DRO/138M/38.

[5] A.V. Simcock,*The Ashmolean Museum and Oxford Science, 1683-1983* (Oxford: Museum of the History of Science, 1984), 8. See also Arthur MacGregor, 'The Ashmolean as a museum of natural history, 1683-1860,' *Journal of the History of Collections* 13 (2001): 125-44.

laboratory in the country.'[6] The Ashmolean was the centre for Oxford's scientific endeavour throughout the eighteenth century and although little or no original research was carried out, the professors endeavoured to ensure that what they were teaching was up-to-date. Hornsby was an accomplished lecturer who understood the importance of spectacle and the value of a few loud bangs in keeping his audience's attention – employing, for example, an electrostatic generator to ignite a sample of hydrogen in a so-called 'electric pistol'.[7] Although, by Buckland's time, the septuagenarian lecturer may have become a little less demonstrative than he was in his prime, his enthusiastic student would have appreciated and learnt from so seasoned a practitioner. He certainly gained much from two of the medical men among Hornsby's colleagues.

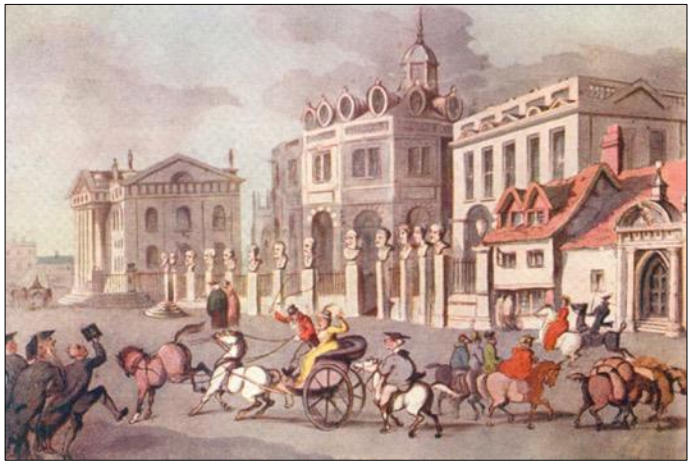

Fig. 2.1 Oxford's Broad Street, c.1800. From l to r the buildings are: the Clarendon Printing House, The Sheldonian Theatre, the Ashmolean Museum. The smaller, pitched-roof buildings on the right were part of Exeter College and were replaced by the current building in 1833-4.

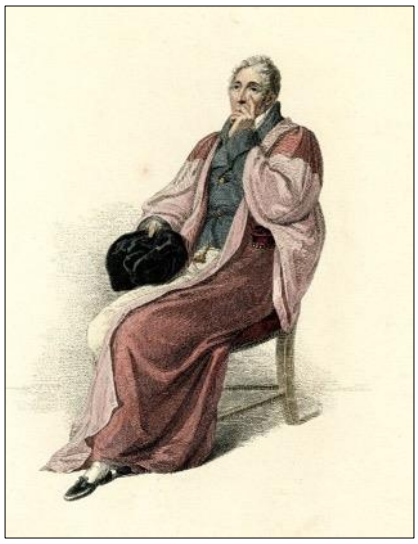

Fig. 2.2 Sir Christopher Pegge (1765-1822) Regius Professor of Medicine

'The interval between my Bachelor's and Master's degree afforded me leisure to attend the Lectures of Dr. Kidd on Mineralogy and Chemistry, and of Sir Christopher Pegge on Anatomy'.[8] These lectures, although ostensibly intended for aspiring physicians, were often attended by men with no intention of achieving medical qualification. Medical teaching in Oxford had hardly moved forward at all during the eighteenth century. Insulated by its classical traditions, and hampered by its collegiate organisation, Oxford lagged behind centres such as Padua and Leiden where real innovations in teaching and clinical practice were taking place.[9] In Britain, most aspiring physicians chose Edinburgh, where the professors were free to model their teaching on the best continental practice, and where they could save time and money by beginning their medical education as undergraduates. In consequence Oxford produced fewer than 400 medical graduates during the whole eighteenth century.[10]

[6] Simcock, *Ashmolean Museum*, 1.
[7] Turner, 'Physical Sciences,' 674.
[8] F. Buckland, 'Memoir,' xxv.
[9] C. Webster, 'The Medical Faculty and the Physic Garden,' in T*he History of the University of Oxford, Volume 5: The Eighteenth Century,* edited by L.S. Sutherland and L.G. Mitchell (Oxford: Clarendon Press, 1986), 701-2.
[10] Ibid., 699.

Nevertheless, there was worthwhile knowledge to be gained. John Kidd, having graduated from Christ Church in 1797, had undertaken four years of medical training at Guys Hospital in London. Returning to Oxford, he was awarded his MD degree and became the first Aldrichian Professor of Chemistry. While in London Kidd had studied *materia medica* with Guy's apothecary, William Babington, who passed on to him his own great enthusiasm for the study of mineralogy.[11] Kidd was now capitalising on his new interest by offering a course in mineralogy alongside the chemistry lectures he was appointed to give. In doing this he was following the lead of his colleague Christopher Pegge, also an enthusiastic mineralogist, who had once given private lectures based on his own collection of minerals and fossils.

Fig. 2.3 Dr John Kidd (1775-1851), Aldrichian Professor of Chemistry

The ownership and study of such curiosities was a great fashion amongst the gentry, and Pegge had attracted around him a small band of men who would meet for discussion and forays into the countryside in search of interesting specimens.[12] Kidd maintained the tradition, and it was this group that would, in due course, become a key determinant of Buckland's future career.

However, as a graduate, and now sitting in hall, not with the poor undergraduate Scholars, but with the affluent gentlemen-commoners, Buckland probably felt more keenly the limitations of his meagre Scholar's pension. Both uncle and father urged the possibility of some private tutoring, and in March 1805 Corpus' president, Dr Cooke, recommended him as a private coach for a newly elected Exhibitioner, John Calley. Then, towards the end of the year, Buckland's brother, John, and his brother's friend George Standert, both at Trinity, also sought his help in preparing for their BA examinations. By November Buckland was complaining to his father that: 'my time is so completely taken up with Standart [sic], Calley and my Brother that I have given up the idea of reading a syllable for myself this Term', adding what had become a characteristic rider… 'Of course I shall not see any of Standarts money … perhaps not till next Term, so that I shall be obliged to you if … you will let me have a 5 Pounds …, otherwise I shall be awkwardly situated'.[13] He was clearly a successful tutor; both John and George Standert acquitted themselves well in their examinations and he continued to work with Calley until 1808.[14]

In the summer of 1807 Buckland told his father of his hopes for speedy election to a fellowship.

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[11] Cherry L.E. Lewis, 'Doctoring geology: The medical origins of the Geological Society,' in *The Making of the Geological Society of London*, edited by C.L.E. Lewis and S.J. Knell (London: GSL, 2009), 52ff. In 1807, Babington was one of the 13 founder members of the Geological Society.
[12] Edmonds, 'Oxford Readership in Geology,' 48, n.16.
[13] WB to Charles Buckland, n.d. [November 1805], DRO/138M/41.
[14] WB to John Buckland, 15 December 1805, DRO/138M/40.

> My Uncle who rode into Oxford last week brought report that Purlevaint [Revd. Harry Purlewent, rector of Brampton St. Botolph, Northamptonshire] is dead. Mr Lockton, it is supposed will take the living. Now I consider this as highly fortunate for me to have a vacancy so unexpectedly made 6 months before I take my Masters degree. But I am not altogether without hopes of getting a fellowship more expeditiously than by the long process of waiting for Mr Locktons vacancy.[15]

He went on to explain how Dr Barton, a fellow for fourteen years, had recently been presented to a prosperous living that, by historical circumstance, could be legally held alongside his fellowship. Barton, hopeful that he might eventually become president, was intent on remaining in college. John Buckland had told his nephew that 'all the senior fellows [were] very much displeased at Barton's selfish conduct … in keeping a fellowship with a living of 700 a year' and both he and Buckland hoped that Barton might be shamed into giving it up. But righteous sentiment was not enough to displace the ambitious Barton, who held onto both parish and fellowship for another ten years – although he never became president. Meanwhile Lockton did take up the late Mr Purlewent's college living and, in the fulness of time, his fellowship became available for Buckland.

In January 1808, having completed the necessary exercises for his MA, Buckland fulfilled his college's final requirement. Once again standing in hall and speaking in Latin, he addressed the president and senior fellows 'On the Tragedies of Sophocles'.[16] It was perhaps a measure of his increasing confidence that this time he chose as his example the violent and shocking tale of *Antigone*, a far cry from the 'safe' topic of his Bachelor's oration. On 26 January 'Grace was granted to two bachelor Scholars, viz. Mount & Buckland to proceed to the Degree of M.A.'[17] Two days later Charles Mount, still above Buckland on the list, was elected a probationer Fellow.

On 20 March both Mount and Buckland were ordained deacon by the Bishop of Winchester at the Chapel Royal in St James Palace.[18] Then, on 12th June, they were back in Oxford to be priested by the Bishop of Oxford in Christ Church Cathedral.[19]

Finally, on 10 February 1809, just before his 25th birthday, Buckland was elected probationer fellow 'in the place of Mr Lockton'.[20] He was, at last, the Reverend William Buckland, MA, Fellow of Corpus Christi College, Oxford.

Many of the men that Buckland met at Dr Kidd's mineralogy lectures became his lifelong friends. He probably already knew the Conybeare brothers, at least by name. In 1803, John Josias Conybeare had succeeded his father as Prebendary of Warthill, a valuable sinecure connected to York Minster that, quite coincidentally, entailed an interest in over thirteen thousand acres of land around

[15] WB to Charles Buckland, 19 July 1807, DRO/138M/37.
[16] CCC/MS523.
[17] Acts & Proceedings, CCC/B/4/1/2.
[18] Certificate of Ordination, DRO/138M/54; CCEd Record ID: 132753 (Buckland) & 132752 (Mount) [both CCEd records erroneously give date as 21 March]
[19] Certificate of Ordination, DRO/138M/61; CCEd Record ID: 34369 (Buckland) & 34370 (Mount).
[20] Acts & Proceedings, CCC/B/4/1/2.

Fig. 2.4 John Josias Conybeare (1779-1824)

Axminster as well as the patronage of Charles Steer's living. Both John and his brother William Daniel were Christ Church men, and both were blessed with prodigious intellects. In 1808 John became professor of Anglo-Saxon, exchanging that post four years later for the chair in Poetry. His younger brother came up to Christ Church in 1805 and, in 1808, took one of the earliest first-class degrees to be awarded in classics (his contemporary, Robert Peel, being the first to gain 'firsts' in both classics and mathematics). As boys, the Conybeares had lived on the edge of London in their father's Bishopsgate parish, 'buried for nine months in the year in the old rectorial house…in a most ghoulish atmosphere in the middle of a churchyard'.[21] However, their summers were spent at Bexley in Kent, where William had been able to roam the 'free fields of the country' and explore the deep shafts of ancient chalk workings known as deneholes.[22] In contrast to Buckland, the Conybeares had no financial concerns. On coming up to Oxford they had each received a gift of ten thousand pounds.[23] In William's own words:

Fig. 2.5 William Daniel Conybeare (1787-1857)

> The generosity of a worthy grandmother having at the time bequeathed me an annual income of £500, as my collegiate expenses did not exceed £300, I usually employed £100 in promotion of my library … also another £100 I usually devoted to travelling, and as the second revolutionary war shut me out of the continent, English topography was my resource. At the time Stukeley's *Itinerarium Curiosum* was my great text-book.[24]

But if William Stukeley was Conybeare's earliest guide in the field, it was another William that Buckland would remember as his own mentor: 'I took my first lesson in field geology in a walk to Shotover Hill with Mr. William John Broderip … whose early knowledge of Conchology enabled him to speak scientifically on the fossil shells in the Oxford oolite formation'.[25] Buckland's junior by almost five years, Broderip matriculated as a gentleman-commoner from Oriel College in 1807. His father was an apothecary who used the fortune he made through the supply of dubiously efficacious medicaments to indulge his passion for collecting 'shells…corals and other specimens of natural history'.[26] He was well-acquainted with Joseph Townsend, a noted collector of shells and fossils who had once been a

[21] F.J.North, 'Dean Conybeare, Geologist,' *TCNS* 66 (1933), 17.
[22] Ibid., 18.
[23] Approximately £1M in 2021.
[24] W.D. Conybeare, 'Fragment of Autobiography,' in *Letters and Exercises of the Elizabethan Schoolmaster John Conybeare,* ed. F.C. Conybeare (London: H. Frowde, 1905), 134-5.
[25] F. Buckland, 'Memoir,' xxiv.
[26] Handbill for the sale of William Broderip's collection by Mr King of Covent Garden, 15 June 1819. Private collection.

collaborator with the surveyor William Smith, and it was Townsend who guided and encouraged the younger Broderip as he arranged and catalogued his father's collection. Having thus acquired a precocious knowledge of fossil organisms, it was natural that Broderip should find his way into the mineralogical lectures given by Dr Kidd. Despite their difference in age, he and Buckland became firm friends. Much later, after Buckland's death, Broderip wrote this illuminating account of an early meeting between them:

Fig. 2.6 William John Broderip (1789-1859)

> after a breakfast at Corpus, during which the undergraduate [Broderip himself] had held forth rather enthusiastically to his host upon geology in general, and organic fossils in particular, both set out to walk over to Oriel … As they were passing across Corpus quad toward the neighbouring college, Buckland, kicking over two loose flints lying on the gravel, said –
>
> 'I suppose you will say next that these are organic, and once had life.'
>
> 'They contain what once had life; and, if you will crack one, you will find the remains of a sponge, or of an alcyonium.'
>
> 'We'll soon see that. Mr Manciple, be so good as to bring a hammer.'
>
> The hammer was brought, and a blow struck on one of the flints, which happened to be a very good specimen, and exhibited just what the undergraduate had foretold.[27]

Broderip eventually became a respected London magistrate and Buckland would often seek his advice – but always on matters of science rather than law.

The content of Kidd's early mineralogical lectures was set out in his 1809 publication, *Outlines of Mineralogy*.[28] The greater part of this work was devoted to a straightforward taxonomic account of the mineral part of Creation. But Kidd's lectures went beyond the purely descriptive as, each year, he incorporated the latest ideas gleaned from the 'excursion' he had made during the previous long vacation.[29] He summarised these discoveries in the Introduction to the *Outlines*, putting them into a wider picture. In this he was going beyond mere mineralogy and effectively taking tentative first steps in 'geology'.

Geology – the very word was new. Writing in 1778, the Windsor-based Genevan Jean-Andre de Luc had used it as a more appropriate term than 'cosmology' to denote his attempts to describe the evolution of earth.[30] Ever since Newton formulated his theoretical description of the celestial world, men had sought a similar overarching theory for terrestrial phenomena. Thomas Burnet, William Whiston and the naturalist Buffon were among many who had produced heroic, but wildly speculative, 'Theories of the Earth', each highly dependent upon the writer's personal theological inclinations.[31]

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[27] [W.J. Broderip], 'Buckland's Bridgewater Treatise,' *Fraser's Magazine* 59 (1859), 230.
[28] John Kidd, *Outlines of Mineralogy*, (London: Longman, 1809).
[29] Kidd to Greenough, 7 November 1814, UCL/Greenough/B/4/K/6/1070.
[30] Rudwick, *Bursting the Limits*, 133-5. The first use of the word geology (giologia) is credited to the sixteenth-century Italian naturalist Ulisse Aldrovandi, but it was rarely used until de Luc in 1778. G.B. Vai and William Cavazza, *Four centuries of the word geology: Ulisse Aldrovandi 1603 in Bologna* (Bologna: Minerva, 2003).
[31] Thomas Burnet, *The Theory of the Earth*… (London: R. N[orton], 1697); William Whiston, *A New Theory of the*

De Luc's work was cast in the same mould, and his neologism came to represent the whole undertaking. But popular as such theories were amongst the reading public, they lacked sound empirical foundations and, to serious investigators, 'geology' became a pejorative term. However, it was too useful a word to be wasted and by the early 1800s it was increasingly used to describe just that type of empirical study that John Kidd had summarised in the Introduction to his *Outlines*. In a few short pages Kidd set out an agenda that was essentially the foundation of the study of geology at the University of Oxford.

Although Kidd was quick to dismiss the ideas of clerical theorists like Burnet and Whiston, he was at pains to point out that his own observations would always be fully consistent with the Scriptures, whose 'credibility rests on higher grounds than our explanation of natural phenomena'.[32] He did find some agreement with theories elaborated by James Hutton, the Edinburgh physician turned farmer and philosopher. Hutton's ideas, originally couched in his own impenetrable prose, had been made accessible through the writings of his friend, John Playfair. After many years of study and investigation, Hutton had concluded that the earth was subject to a cycle in which the river-borne products of erosion gradually accumulated on the ocean floor where they were consolidated and raised again to the surface by the action of subterranean heat. Becoming once again land, the new rocks were themselves eroded – and the whole cycle repeated. The process was continuous and immensely slow, and there was, as Hutton so famously wrote, 'no vestige of a beginning, – no prospect of an end.'

As a product of the Scottish Enlightenment, Hutton espoused a deistic theology in which the Creator, having done his work, stood back. For Kidd, securely and devoutly Anglican, this would not do. His argument was not with the vast timescale that Hutton invoked – he was happy to accept that 'the Mosaic chaos' might be 'the ruin of a former world', effectively re-setting the clock at the moment of Creation. What concerned Kidd was that Hutton had purposely failed to recognise the evidence of 'a general deluge', the Noachian Flood, a sign of God's continuing involvement with His Creation. The Flood, he believed, was locally illustrated by the widespread occurrence in surface soils of well-rounded pebbles of minerals not found in the region's bedrock. It was a topic that would be of lasting interest to Buckland.

In the summer of 1808 Buckland spent several solitary weeks riding in a south-western arc from Oxford across the chalk of the Berkshire Downs, through Wiltshire, and into Dorset. It was his first true geological exploration. Since three of his Oxford acquaintances – Pegge, Kidd, and John Conybeare – had already been recruited as honorary members by the newly Geological Society that had been established in London, he may just have been aware of that Society's *Geological Inquiries*, a printed schedule of queries designed to encourage provincial observers to report details of their local geology.[33] But, for now, he was simply a young man, with time to spare, indulging in a new passion.

Earth… (London: J. Whiston and B. White, 1755). Georges-Louis Leclerc, Comte de Buffon's theory of a cooling earth was set out in his 44-volume encyclopedia: *Histoire naturelle* (1749-1804).

[32] Kidd, *Outlines,* xiii.

[33] 'Geological Inquiries,' appendix to *The Making of the Geological Society, London,* ed. C.L.E. Lewis and S.J. Knell (London: GSL, 2009), 449-56.

Like Kidd and his friends, the Conybeares, Buckland was engaged upon what was, in essence, a Romantic pursuit. Set against a background of sometimes dramatic scenery these men's intellectual endeavours were complemented by a manly physicality.[34] Fieldwork was fundamental to their interest in the subject. In this they were very much men of their time, emulating, in their way, men like Alexander von Humboldt, the Prussian naturalist who had recently returned to Europe after a gruelling expedition in South America.[35] Cut off from the world by the war with France, these energetic young Englishmen had to make do with the exploration of the wilder parts of their own island. Their ethos was summed up by William Conybeare, who claimed to 'partake more largely of the spirit of the Knight of La Mancha than of his craven squire and prefer the enterprise and adventure of geological errantry to rich castles and luxurious entertainments'.[36]

But Buckland did not allow geology to consume all his time. The following summer he joined Corpus friend Thomas Bridges and a 'Mr Pitt' on that brief holiday to the Isle of Wight that had so upset his uncle.[37] After enjoying 'some famous French Claret' with Bridge's brother aboard HMS L'Aigle at Portsmouth, they toured the Dockyard before crossing to Cowes where they hoped to meet another Corpus man, Matthew Arnold.[38] But Arnold was not at home – 'however', Buckland told his brother John, 'we went to Ch. & spent the morning and evening with his mother and sisters, whom Bridges has often seen before (& uncommonly pleasant Girls they are).'[39]

Buckland was, nevertheless, sufficiently smitten by his new enthusiasm, to fit in a second geological excursion that summer. He began with a visit to Axminster where he was able to deputise for his father's vicar, Mr Steer. As he told his brother, by now also an ordained clergyman:

> [I shall] be at Axm. the 6th of August ye Sunday after you leave it, & I might succeed you in your Duty shd my services be wished for – As we may be treading on ye same ground, I wish you to tell me what Texts you have been preaching on at K & M or elsewhere, you have not I suppose used any of those sermons which I gave you a Copy of with ye Intention that you shd use them in ye neighbourhood of Marlow, & not where I might be likely to preach.[40]

Having seen his family and fulfilled these clerical duties, Buckland journeyed into Dartmoor, where he might well have pondered the origin of the conspicuously crystalline granite tors. Were these crystals precipitated from some vast primordial ocean as the celebrated 'geognost', Abraham Werner, taught

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[34] Roy Porter, *The Making of Geology: Earth Science in Britain, 1660-1815* (Cambridge: Cambridge University Press, 1977), 140-1.
[35] Andrea Wulf, *The Invention of Nature: The Adventures of Alexander von Humboldt* (London: Hodder & Stoughton, 2015), 111.
[36] W.D. Conybeare to G.B. Greenough, 28 June 1811, UCL/Greenough/B/4/C/30/434.
[37] Thomas Bridges was elected President of CCC in 1823. The third party was probably Cornelius Pitt, a student of Oriel College.
[38] Uncle of the poet and brother of Thomas Arnold.
[39] WB to John Buckland, 16 July 1809, DRO/138M/35.
[40] Ibid.; K & M would refer to Kilmington and Membury, two 'chapels of ease' that came under the care of the vicar of Axminster.

at the Mining Academy in Freiburg?[41] It was the most commonly held view. Or were they evidence of earlier melting, caused by the subterranean heat so central to James Hutton's theories? Whichever was true, the rock was obviously very different from the chalks and limestones he was used to. Having collected some fine specimens, Buckland headed north to explore the Mendip Hills. Forty years later, he would tell a large audience in Taunton how these had been…

> three of the most interesting weeks of his life[;] to travel in solitude – his only companion being an ordnance map, which he had geologically coloured on the spot – over the whole of Mendip, from one end to the other, for the first time that it was ever traversed by any individual of the human species, employed, and successfully employed, in ascertaining by personal inspection, the structure of that important range of hills.[42]

Buckland would work, off and on, on this Mendip survey for the next ten years. But despite his map being safely preserved at the Geological Society's London headquarters, it carries so many revisions that this original 1809 colouring can now hardly be discerned.

The colouring technique he used was broadly similar to that pioneered by the surveyor William Smith who, in 1799, had first coloured over a commercially printed map to show the distribution of the different rock types around the city of Bath. Since that time Smith had been painstakingly working towards the great map of 'England and Wales with part of Scotland' for which he is rightly celebrated today. Smith's huge experience, gained through surveying mines and canals and latterly through working as a freelance adviser on land drainage schemes, gave him a uniquely wide knowledge of the country's geology. His modest background disbarred him from the gentlemanly circles of either university or Geological Society, nevertheless, it is probable that – even at that early stage of his own career – Buckland was aware of his work. If he was, his source would have been Joseph Townsend, the physician-turned-cleric who had helped his friend Broderip with his father's shells. Back in 1799 Townsend, together with the Reverend Benjamin Richardson, had encouraged Smith to set down onto paper his insights concerning the sequence of the different strata. We don't know exactly when Buckland and Townsend first met, only that at Christmas 1812 Buckland looked to travel home 'by way of Bath where I want to see old Townsend'; by then at least, it appears they were well acquainted.[43]

Just before Christmas in 1809 Buckland found himself helping organise the election of a new University Chancellor. He was keen to support his Uncle John's friend and mentor, Lord Chancellor Eldon, who was standing against the Whig-leaning politician, Lord Grenville. Grenville had led the short-lived 'Ministry of All the Talents', the coalition that had been formed after the death of William Pitt in 1806, with an agenda of ending the war with France and lifting Roman Catholic disabilities.[44]

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[41] Geognosie (literally, earth knowledge) was the word used by Werner and others to describe the study of the three-dimensional structure of the earth's crust, (Rudwick, *Bursting the Limits*, 84).
[42] *PSANHS* 1 (1851), 10.
[43] WB to Charles Buckland, 22 December 1812, DRO/138M/26.
[44] Briggs, *The Age of Improvement*, 149-150.

Many in Oxford, including John Buckland and his nephew, feared that Grenville's enthusiasm for the Catholic cause would lead to a diminution in the constitutional supremacy of the Anglican Church. The election was closely contested. As Buckland reported: 'Heaven and Earth will be moved to bring up every Creature from Scotland, Ireland & even Lord Collingwood's fleet to Vote for the Grenvilles.'[45] In the event, Grenville secured a narrow victory, and Buckland, despite his initial reluctance, secured a valuable friend and ally.[46]

Early the following year, Buckland began to think about the future. Despite some tutoring work and the income from his Fellowship, finances remained tight.[47] Young and ambitious, he was also impatient. Knowing that it might be years before a suitable college living came his way, he let it be known – perhaps through his uncle, whose new Southwark living often took him to 'Town' – that he was available as a private tutor. Hearing that Lord Sefton was keen to consider him for the post of tutor to his sons, Buckland took an overnight coach to London to seek an interview. His hopes and expectations are best expressed in his own report of the encounter:

> I gave him [Lord Sefton] to understand that my object in making an engagement with a Pupil was not present emolument only, but a Prospect of future benefit – His Lordship observed that He considered that any Person who sd. give up Part of the prime of his life to the education of his sons wh'd be entitled to something more than present compensation, & tho He did not chose … to enter into any express contract on the subject, He shd. feel himself bound to continue the stipend He shd allow to his Tutor until He could procure him adequate Preferment, but this of course infers the supposition of his not leaving him till his sons education shd be completed – If an opportunity shd offer he shd wish his son to travel – at present there is no prospect of his doing any thing but coming to Oxford but whether the Tutor shd come to Oxford with the Eldest or continue at Eton with the younger sons is at present a Matter of uncertainty – & I think of no very great Importance – I hear from my Friend Cheese at Eton that the House &c which Davidson has there is one of the most gentlemanly comfortable establishments in the Place – The Salary Lord S tells me is £900 a year – which as it is to be continued till Preferment can be procured & as it is better than a living of 400 is an object wch I think if I decline I may wait some time before I get a better offer.[48]

Although clearly excited by the prospect of almost undreamt-of wealth, Buckland was not surprised to be disappointed. For almost three months he heard nothing, then in early June he received a note informing him that an earlier applicant had been appointed. He then heard that yet another contender for the job had 'declined it not liking the family'. Lord Sefton, a one-time master of the Quorn hunt and a personal friend of the Prince Regent, had once been caricatured as 'Lord Dashalong', due to his predilection for fast driving in his four-in-hand.[49] He was, according to a biographer, a man whose father had 'stamped upon him his hideous form, but, with it, his sharp and caustic wit' He was a man who 'plunged with ardour into politics… though he had no opinions or principles but such as resulted

[45] WB to Charles Buckland, 10 December 1809, DRO/138M/34.
[46] Grenville took 406 votes to Eldon's 390. Edmund Burke, *The Annual Register of World Events* (London: Longmans, &c., 1811), 404.
[47] WB to Charles Buckland, 22 March 1810, DRO/138M/33, refers to 'my Pupils'.
[48] Ibid.
[49] Caricature by Robert Dighton, NPG 13410.

from personal predilections'.[50] Buckland was probably right when he told his father, 'from what I hear I think I have experienced no loss but rather have found a lucky escape'.[51]

Fig. 2.7 William Molyneux (1772-1838), 2nd Earl of Sefton caricatured as 'Lord Dashalong BENT on driving'

Lord Sefton's rejection left Buckland free to pursue an alternative proposition. It came from William Short, a Hampshire clergyman. The Shorts were a well-known Devonshire family. Initially involved in the woollen trade, they had taken to banking and, in 1786, the marriage of William Short's brother John to Charlotte Baring, daughter of banker John Baring, created a formidable alliance.[52] When John Short died in 1801 Charlotte took his place as a partner in the bank in addition to overseeing the care of her four young children. Her first-born, John Baring Short, who appears to have suffered some unspecified cognitive impairment, was now 20, and Charlotte had enlisted her brother-in-law, William, to find a suitable tutor to take the young man on some sort of tour. William Short had probably learned of Buckland's availability through his own son, Christ Church undergraduate Thomas Vowler Short. In contrast to Lord Sefton, the Shorts offered only a brief engagement – but it promised to pay well. According to Thomas Vowler, his father had 'mentioned the sum of a Hundred Pounds, & all expenses paid'. Reporting this attractive proposal to his own father, Buckland admitted that '[i]f I had been desired to name for myself, I should have said 30 or 40'.[53]

Whatever the eventual fee, it was agreed that Buckland would accompany John Short on a tour. The route seems to have been left to Buckland's discretion and even as late as 10 June he was suggesting that '[n]othing is yet settled respecting our line of March or mode of conveyance'.[54]

During the first week of July Oxford would be awash with visitors come to witness the ceremonial installation of Lord Grenville as Chancellor. Buckland had booked lodgings for his friend Sir William Pole, and his own brother John was due to come across from Marlow, where he was teaching at the Royal Military College.[55] Their uncle John also paid for the younger brothers, Charles and Harry, to come up from London. 'It will', Buckland declared, 'be impossible for them to see Oxford in greater splendour or more advantage.'[56] He also arranged for his new young charge to be there, telling his father that 'Mr Short my pupil is to come to the Installation and set off hence as soon as it is over, I shall get him a Bed in one of my Rooms'.[57]

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[50] *The Greville Memoirs*, ed. Strachey and Fulford, iv. p.10, quoted in Thorne, *House of Commons*.
[51] WB to Charles Buckland, 10 June 1810, DRO/138M/29.
[52] Margaret Dawes and Nesta Selwyn, *Women Who Made Money: Women Partners in British Private Banks 1752-1906* (Trafford Publishing, 2010), 129.
[53] WB to Charles Buckland [15 April 1810], DRO/138M/30.
[54] WB to Charles Buckland, 10 June 1810, DRO/138M/29.
[55] *JOJ*, 25 July 1807.
[56] WB to Charles Buckland, 8 April 1810, DRO/138M/32.
[57] WB to Charles Buckland, 10 June 1810, DRO/138M/29.

According to Frank Buckland it was at this time that his father 'made his first tour of the centre and north of England, exploring the then unknown history and extent of every stratum he came near, and colouring the results on Carey's large map of England'.[58] It's not clear how far John Short accompanied him on this tour, but Buckland himself was certainly still on the road in late September, when he is known to have been in Bakewell in Derbyshire with the ingenious stonemason-turned-geologist, White Watson. It may have been during this visit that he subscribed to Watson's 1811 *Delineation of the Strata of Derbyshire*, a slim volume promoted as 'an explanatory account' of a print based on one of Watson's unique stones tablets 'composed of the specimens of each stratum' to be found on a line between Bolsover and Buxton.[59]

Encouraged by the success of this first expedition with Short, in 1811 Buckland planned a more ambitious tour for the man that his friends referred to as his 'Cub'. They would go first into Scotland, possibly as far north as Inverness, then double back to cross the Irish Sea and make a grand loop from Belfast to Dublin by way of the Antrim coast.[60] It may even have been during this trip that Buckland first visited the Hebridean island of Staffa.[61] It was a mutually satisfactory arrangement; as William Conybeare rather rudely observed before they left: 'Buckland will again be paired with his Cub for the Vacation, the Cub indeed is I believe the Ass that carries the prophet in his journeying'.[62] Buckland, like a caring elder brother, provided his 'Cub' with suitable experiences and in return the Cub's family financed Buckland's geological wanderings.

The arrangement lasted for some years. In 1815 Buckland told Greenough that he was under obligation to 'name the time when I can commence operations with my ancient Cub, whom I am to take where I please, & am not yet decided between Scotland & Wales probably I shall take y^{e} latter…'[63] In the event, he settled for a ten-day 'ramble with Mr Short in Gig or on Horseback in Pembroke Cardigan Caermarthen and Brecknock'.[64] But what started as a convenient and profitable employment eventually became an obligation undertaken more from a sense of duty than from the necessity to earn the fee – welcome though that undoubtedly remained. In July 1817 Buckland wrote to Greenough,

> My Plans for y^{e} Beginning of y^{e} Vacation are a little changed. The Cub was brought up by his Mamma last Saturday … his Mother begs me to take him a short Tour for a few days no Matter where. I have again to do it But know not where to go … I am rather inclined to y^{e} Forest of Dean as y^{e} Shortest & least likely to interfere …[65]

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[58] F. Buckland, 'Memoir,' xxvii.
[59] White Watson, *A Delineation of the Strata of Derbyshire* (Sheffield: W. Todd, 1811). For evidence of Buckland's visit see White Watson papers at Alnwick, teste Hugh Torrens.
[60] W.D. Conybeare to Greenough, 21 & 28 June 1811, UCL/Greenough/B/4/C/30/433 & 434.
[61] Leonard Wilson, *Charles Lyell, The Years to 1841: The Revolution in Geology* [Vol.1] (New Haven and London: Yale University Press, 1972), 54.
[62] W.D. Conybeare to Greenough, 21 June 1811, UCL/Greenough/B/4/C/30/433.
[63] WB to Charles Buckland, 22 December 1812, DRO/138M/26; Buckland to Greenough, 1 June 1815, UCL/Greenough/B/4/B/44/278.
[64] WB to Greenough, 10 September 1815, UCL/Greenough/B/4/B/44/283.
[65] WB to Greenough, 8 July 1817, UCL/Greenough/B/4/B/44/293.

The following year, on 8th February, John Baring Short died. He was 27. A recent family biography suggests that he died in a hunting accident but, if so, death was clearly not instantaneous.[66] Writing to Greenough on 2 March 1818 Buckland would ask:

> Have you heard of the Death of poor Mr Short at his own House 3 Weeks ago of Apoplexy. He went to Bed quite well & next Morning was found dead. It is a most happy Release for himself & all his family – few Persons of his limited Powers of mind have been so instrumental in serving y^e^ Cause of Geology[67]

In the meantime, the Oxford geologists had found a new friend. George Bellas Greenough had developed a passion for geology while studying at the University of Gottingen. Having inherited great wealth, Greenough was free to follow his interests at will. Though between 1807 and 1812 he was MP for the particularly rotten borough of Gatton, he devoted much of his attention to the newly formed Geological Society of which he was founding president. In particular he orchestrated the collection of data called forth by the Society's *Geological Inquiries* with the intention of creating a mineralogical map of the whole of England.

In 1810 Greenough had been in Oxford to witness Lord Grenville's installation as Chancellor.[68] While there, he met many of Kidd's geological students. The Oxford men clearly relished contact with this representative of the new metropolitan society and the following spring William Conybeare was quick to seek his advice:

> Buckland and myself propose to make an excursion to the Isle of Shepey in the approaching vacation, but both of us are nearly in absolute ignorance what points of the Island are most interesting in their fossil contents, as also where it will be most advisable to take up our head quarters with regard to Bed and Board considerations which we are not philosophers enough entirely to despise.[69]

On 4 April, three weeks before this proposed expedition, Conybeare accompanied his brother to a meeting of the Geological Society. Buckland, meanwhile, wrote to Greenough from Axminster, detailing a consignment of local rocks that he was sending to him in London: not just random samples, but specimens intended to illustrate the sequence of strata to be found in the district.[70] Just the sort of data that Greenough was seeking. On 26 April, Buckland wrote again, this time from Canterbury, telling Greenough that he and Conybeare had now been to Sheppey and would be in Dover the following evening, 'where we shall be most

Fig. 2.8 George Bellas Greenough (1778-1855)

[66] Charles Scott-Fox. *Bickham House and the Short Family*…(Scott-Fox, 2006), 22; *TEFP*, 12 February 1818.
[67] WB to Greenough, 2 March 1818, UCL/Greenough/B/4/B/44/301.
[68] Edmonds, 'Vindiciae Geologicae,' 257.
[69] W.D. Conybeare to Greenough, 27 March 1811, UCL/Greenough/B/4/C/30/430.
[70] WB to Greenough, 15 April 1811, UCL/Greenough/B/4/B/44/246.

happy if you can with Convenience join our Party.'[71] There is no evidence that the invitation was accepted, but a week later, both Conybeare and Buckland were listed as 'visitors' at the Geological Society; Buckland attending as a guest of George Greenough.[72] Then, on 17 May, William Conybeare became the Society's 200th member.[73]

Greenough was doubtless delighted to recruit such intelligent and active collaborators to his cause, and the Oxford men, intoxicated with their own enthusiasm, clearly relished the additional warrant that this metropolitan connection gave to their own endeavours. Conybeare begged him to come to Oxford at the time of the annual Commemoration.[74] His letter was accompanied by a round-robin invitation.

> Oxford June 13. 1811
>
> The interests of the Geological Society imperiously demanding the personal attendance of its President in this place; & no individual presuming singly to request such an act of condescension; We, the circumscribed members of the Independent Rag Formation of Oxford do with great earnestness express our hope that he will hold a visitation in this University on Monday the 23 inst. & though the form of this address affects no particular angle with the Horizon, yet as its prototype is to be found in the Concretions of the Oldest Granite as of the newest Trap it is sincerely hoped that he will consider it as a specimen not unworthy his attention.[75]

The invitation, with its somewhat opaque Wernerian allusions to granite and trap, was in William Conybeare's hand but was circumscribed with ten signatures, including those of Conybeare himself, his brother John, William Buckland, John Kidd and Philip Serle, a young Fellow of Trinity.[76] But Greenough, busy with the Geological Society's anniversary dinner, was unable to accept. His refusal prompted a prompt and mischievous rejoinder from Conybeare.[77] 'I regret extremely that the Gnome of the mines was of so stubborn a nature as placed him beyond the influence of our magic circle to which every sprite of more gentle frame and occupation must necessarily have been obedient.'[78]

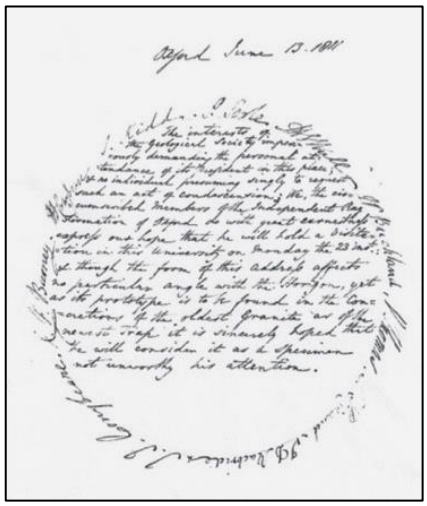

Fig. 2.9 Round-robin letter to Greenough from Oxford's 'Rag Formation'

Perhaps as compensation, Greenough invited Conybeare to join him on a summer expedition to Scotland and Ireland, but now Conybeare had to decline, feeling duty-bound to be in London with his ageing father. In the event, however, he and John Kidd made a heroic expedition to South Wales – 'a

[71] WB to Greenough, 26 April 1811, UCL/Greenough/B/4/B/44/247.
[72] GSL, GSL/OM/1/1
[73] Ibid.
[74] W.D. Conybeare to Greenough, 12 June 1811, UCL/Greenough/B/4/C/30/431.
[75] Ibid. Conybeare was mistaken about the date. 23 June was a Sunday.
[76] The other signatories were: Martin Sandys Wall of Christ Church, Vaughn Thomas of Corpus Christi, Stephen Rigaud of Exeter (Professor of Geometry), John Mcbride of Exeter and Charles Burney of Merton.
[77] Horace Woodward, *The History of the Geological Society of London* (London: Geological Society, 1907), 43.
[78] W.D. Conybeare to Greenough, 21 June 1811, UCL/Greenough/B/4/C/30/433.

tour of 700 miles 500 of which I boast to have performed on foot'.[79] Conybeare later sent Greenough eleven closely-written pages describing the discoveries that he and Kidd had made in the Principality as well as news that Philip Serle had been in Cornwall where he had 'spent the whole long Vacation at Marazion & conducted his researches with a degree of industry & ability that deserve (if we puisne Philosophers may be allowed to say so much of one another) the highest praise'.[80] The following year, Conybeare introduced Serle at a meeting of the Geological Society and, shortly after, his friend became the society's 206th member.

Buckland, meanwhile, had spent the summer touring Scotland and Ireland with young Mr Short. Circumstantial evidence suggests that John Conybeare may have joined them for some of the time, and Buckland clearly also hoped that they might meet up with Greenough.[81] On 21 September he wrote to Greenough in Dublin announcing his own imminent arrival in that city and ending with an open invitation:

> Should I not have the Pleasure of seeing you before you leave Ireland, give me leave to petition in the name of the rising Geology of Oxford, that … you will deign by your august Presence to countenance our infant Colony wh may almost date its Existence from your inspiring visit to Oxford last Summer.… If you will send me a Line the Day before you arrive, I can without y^{e} smallest Inconvenience provide for you the … Luxury of a vacant Fellows Room in Corpus where you shall have Bed Fire Pen & Ink, Hammer Chisel Hay & packing Paper, with a Servant to wait upon you for as many Days as you can possibly steal for Us from the more important Occupations of Parliament & the Geological Society.[82]

Greenough's enthusiasm for the collection of data clearly inspired the Oxford men, who were keen to channel their own predilection for vigorous outdoor exploration into so useful a project. On 8 May 1812 it was John Kidd's turn to write to Greenough. He reported on the discussions of 'a Geological Committee' that had met in Buckland's Corpus rooms.

> … having talked during dinner time of your promise to come to Oxford for a few days before the Long Vacation, we agreed that the time most likely to be convenient to all parties would be Whitsuntide: & I engaged to act as secretary on the occasion; & to request in my own as well as Buckland's, Serle's & the Conybeares' names that you would come down on the day before Whitsunday, & remain with us as long as you can with convenience to yourself.[83]

Once again Greenough probably did not attend, but the Whitsuntide meeting went ahead without him, becoming the first of a series of geological jamborees to be held by the Oxford group at that time of year.

When, in early summer 1812 Buckland learned that his mother was unwell, he abandoned plans for a trip to Wales with his friend Thomas Bridges. Instead, having visited his brother Charles in London – where he was able to attend the Geological Society's anniversary dinner – he travelled to

[79] W.D. Conybeare to Greenough, 15 November 1811, UCL/Greenough/B/4/C/30/435.
[80] W.D. Conybeare to Greenough, 15 November 1811, UCL/Greenough/B/4/C/30/435.
[81] Boylan, 'William Buckland,' [thesis] 57.
[82] WB to Greenough, 21 September 1811, UCL/Greenough/B/4/B/44/248,
[83] Kidd to Greenough, 8 May 1812, UCL/Greenough/B/4/K/6/1067.

Axminster to see his mother and take care of some unspecified family legal business.[84] He then set out to tour Devon and Cornwall with John Conybeare, whose short paper describing the 'Porphyritic Veins, &c, of St. Agnes' was read at the Geological Society in December 1813. It was, as the author explained, written 'almost wholly from the notes of my friend and fellow traveller Mr Buckland'.[85] Although not under his own name, this was in effect Buckland's first published geological work.

On 24 October 1812 Elizabeth Buckland died.[86] Buckland supported his father at the funeral. His melancholy note of the event, left for posterity amongst his papers, provides an intimate demonstration of his now finely developed powers of objective observation:

> No Change took place in ye Corpse before burial except a lessening of its Bulk, & a sinking & Decay of ye Eyes - ye Countenance was placid and serene with ye expression of a smile on ye lips – ye colour was but slightly altered towards black without ye least unpleasant smell from incipient Putrefaction. Ye Coffin was not closed till 5 minutes before ye Funeral when we bade her a long farewell & proceeded to attend her dear Body to ye Grave …
>
> My Father was very much affected by ye Funeral & wept bitterly.[87]

Buckland makes no mention of his own feelings.

In early 1813, John Kidd decided it was time to give up teaching mineralogy.[88] He asked both Buckland and William Conybeare whether either might care to take it on. Conybeare, whose sights were already firmly fixed on marriage and a country parsonage, declined at once, but Buckland, 'in a half consenting & half refusing manner', asked for time to think it over.[89] Despite a later explanation that 'it would not have been fitting for him to offer himself to fill the office of lecturer on that subject had Mr Conybeare been desirous to occupy it'[90], the real reason for Buckland's hesitation was probably money. The lectures currently carried no regular stipend. But, as Buckland undoubtedly knew, this was a situation that it might be possible to change.

Only a few months earlier Kidd himself had, through the Chancellor, Lord Grenville, successfully petitioned the Prince Regent for a government stipend of £100 to be attached to his chair of chemistry – it was, perhaps, this additional income that allowed him to consider giving up his mineralogy lectures.[91] Inspired by Kidd's success, one of his colleagues at the Ashmolean, Stephen Rigaud, was already busy writing his own 'memorial', urging that the meagre thirty pounds he received as Reader in Experimental Philosophy should be similarly supplemented from the Exchequer.[92] Like

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[84] WB to Charles Buckland, 19 June 1812, RS/MS251/1.
[85] J.J. Conybeare, 'XXII. Memoranda Relative to the Porphyritic Veins, &c. of St. Agnes in Cornwall,' *TGSL* s1, 4 (1817): 401–3.
[86] Note of newspaper notice, DRO/138M/861; *SM*, 2 November 1812; *TEFP,* 29 October 1812.
[87] DRO/138M/863.
[88] Kidd to Greenough, 7 November 1814, UCL/Greenough/B/4/K/6/1070.
[89] Powell, *William Daniel Conybeare*, 28.
[90] Woodward, *History*, 42.
[91] This annual grant brought Oxford into line with Cambridge, where the professor of chemistry had enjoyed a similar benefit for many years.
[92] From 1749, by a bequest of Lord Crewe, the Reader in Experimental Philosophy received £30 p.a. in addition to the usual fees charged to pupils; Stephen Peter Rigaud, ed., *Miscellaneous Works and Correspondence of The Rev. James Bradley, DD, FRS* (Oxford: University Press, 1832), xxxviii.

Kidd, Rigaud was acting on his own initiative. He sent his petition – addressed, as Kidd's had been, to the Prince Regent – directly to the Prime Minister. Unlike Kidd, however, he had not previously consulted the university authorities about the matter. When, eventually, the university's governing body, the Hebdomadal Board, was alerted and asked to comment, it resolved:

> That altho' the Board could not have presumed to have approached His Royal Highness with such a Memorial having so recently experienced H.R.H.'s Bounty in the case of the Professor of Chemistry – yet they consider a compliance with the Prayer of this Memorial as likely to be beneficial to the Interests of the University and the Advancement of Science[93]

Rigaud's memorial duly went forward to the Prince, championed by the Prime Minister, Lord Liverpool.

However, although the Hebdomadal minutes make no note of it, it is clear that the petition, as laid before the Prince, had been significantly amended. On 16 August Lord Grenville reported 'the gracious determination of His Royal Highness the Prince Regent to grant to the Lecturers in Experimental Philosophy *and Mineralogy* in the University, an annual Salary of £100 each'.[94] We do not know how, or by whom, the supplication on behalf of the mineralogical readership had been added, only that ten days earlier Buckland had received a personal letter directly from a Treasury official informing him that such a grant would be made.[95] All doubts now resolved, Buckland duly became John Kidd's successor.

Officially now the University's Reader in Mineralogy, Buckland quickly assumed the style of 'Professor'. Oxford was still relatively careless of titles in the first half of the century before Royal Commissions and reforming zeal introduced the concept of a progressive academic career.[96] William Tuckwell, a well-known, if not always reliable, chronicler of the Oxford scene, suggests that 'Professor as a titular prefix' was not generally used in Oxford until later in the century, adding that it 'came, I am told, through the Scottish Universities, which had borrowed it from Germany'.[97]

Unlike universities in Scotland and continental Europe, the two English Universities were, in effect, federations of autonomous colleges, each responsible for the tuition of its own students. Most teaching was done by college tutors and private 'coaches' – often young, recently graduated Fellows filling time as they waited for suitable ecclesiastical preferment. The only university-wide, permanent appointments were the six Regius chairs sponsored by the Crown, fifteen professorial chairs established by private endowment and the two new 'readerships', in Experimental Philosophy and Mineralogy. The holders of all these posts were expected to deliver annual courses of lectures, in return for which they received a stipend as well as the fees that they took from their pupils. A few also benefited from some *ex officio* appointment: perhaps a well-endowed living or a Christ Church canonry.

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[93] Minutes of Hebdomadal Board, August 1813. OUA/WPg/24/3
[94] Ibid.
[95] Edmonds, 'Vindiciae Geologicae,' 257.
[96] Arthur Engel, *From Clergyman to Don: The Rise of the Academic Profession in Nineteenth-Century Oxford*, (Oxford: Clarendon Press, 1984).
[97] W. Tuckwell, *Reminiscences of Oxford* (London: Cassell, 1901), 31-2.

Although almost all these posts officially carried the appellation 'Professor', there was no sense of professional hierarchy and titles were often loosely ascribed. In both manuscript documents and printed calendars the terms 'Professor', 'Reader' and 'Lecturer' may be found describing the same post. Buckland's presumption in assuming the title 'Professor', which today might be interpreted a sign of vanity – if not downright fraud – would have caused little comment amongst his Oxford contemporaries. However, outside the University, and especially abroad, where 'Reader' would have meant nothing at all, the word 'Professor' carried a more calculated significance. For a young clergyman intent on establishing himself in a secular intellectual field, the taking of such a liberty was an astute move, placing him on equal terms with the most illustrious of his colleagues – at home and abroad. This was clearly something that Buckland understood. Three years later, as he prepared to make his first continental tour, he suggested that his passport should bear the description: 'Wm Buckland A.M. Fellow of Corpus Xti Coll & Professor of Mineralogy in y^{e} University of Oxford & M.G.S. of London', adding that 'for Safetys Sake both y^{e} Scientific Titles at least shd be adopted'. Then, as an afterthought: 'perhaps y^{e} rest wd do no harm."[98] There was no mention of his clerical status.

[98] WB to Greenough, 13 May 1816, UCL/Greenough/B/4/B/44/287.

Chapter Three

1813-1816

Further afield

A few months before accepting the mineralogical readership, Buckland had become the 241st Member of the Geological Society. His sponsors were George Greenough, who had recently stepped down as president, and James Laird and Leonard Horner, the Society's past and present secretaries. With a six-guinea admission fee and a three-guinea annual subscription, this was a significant commitment for a man living in Oxford, for whom regular attendance at the Society's London headquarters was unlikely. Buckland was not present at the time of his election and it would not be until December that he was able to sign 'the obligation' which formally admitted him to the Society.[1]

Shortly after his election, on Easter Monday, Buckland set off on his faithful black mare for the four-day ride from Oxford to Axminster. Frank Buckland makes much of the virtues of this horse, which he tells us was no mere beast of burden, but an active participant in her master's endeavours, automatically stopping at wayside quarries and refusing to move until her rider had dismounted and examined the rock.[2] Buckland would need the horse later as after he had dealt with some family business relating to the prudent transfer of various parcels of land – in characteristic style he had urged his father to 'let no Tenant have y^e^ Grounds without binding him to Manure'[3] – he planned to meet up with Greenough to survey the coast between Bridport and the Isle of Wight.

On 26 April he wrote to Greenough suggesting that they meet in Lyme Regis the following Monday.

> … If you will take a Place in the Exeter Mail Saturday Evening for Charmouth you will arrive there about 5 in the afternoon at which Time it will be low water and you may get an admirable Walk along y^e^ Shore to Lyme about 2 Miles on the Great Crocodile Bed … If you get to Lyme by 9 OClock or Dark you will get a good Bed at the 3 Cups Inn. If you rise early Monday morning go to Mrs Annings Curiosity Shop till Breakfast & by 9 O'Clock or 1/2 past I will join you – do not wait Breakfast for me …[4]

Greenough duly arrived and he and Buckland did indeed pay the almost obligatory visit to Mrs Anning's shop before setting off on their four-day coastal expedition.

The previous year Molly Anning's daughter, Mary – the girl whose 'miraculous' survival of a lightning strike Buckland had witnessed back in 1800 – had achieved some celebrity by uncovering the fossilized remains of a 'crocodile' whose head her brother, Joseph, had discovered in the cliffs above the town. Their father had died two years earlier, leaving substantial debts, and the £23 they received for their find had come as a great relief. The 'crocodile' had found its way to London, alerting the scientific community to the presence of such fantastic beasts in the Dorset cliffs.[5] Later discoveries commanded even higher prices, making it very much worth Mary's while to spend long hours searching

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[1] WB to Greenough, 28 March 1813, UCL/Greenough/B/4/B/44/250.
[2] F. Buckland, 'Memoir,' xxix.
[3] WB to Charles Buckland, 2 March 1813, DRO/138M/25.
[4] WB to Greenough, 26 April 1813, UCL/Greenough/B/4/B/44/252.
[5] Torrens, 'Mary Anning,' 259.

the beaches below the cliffs. Although no further complete remains had turned up by the time of their visit, Buckland and Greenough were sufficiently impressed by Mary's wares to buy at least one specimen apiece.[6]

Back in Oxford, Kidd was halfway through his final course of mineralogical lectures when he and Buckland sat up late into the night discussing some notes, sent over by Greenough, concerning the ordering of the different layers, or strata, of rock as they are found in the field.[7] Both recognised that this was a topic of immense importance. A clear understanding of the disposition of the various layers relative to one another would be essential to any eventual explanation of their early formation. Kidd, having spent time amongst the complex rocks in Wales and the West Country, doubted whether any universal classification and arrangement would ever be possible, however, Buckland was more sanguine.[8] Kidd's next lecture was to be on the Paris Basin. Five years earlier, Alexandre Brongniart and Georges Cuvier had reported on their investigation of the rocks lying above the chalk in this region surrounding the French capital.[9] In addition to the usual mineralogical descriptions, these French savants had given a detailed account of the fossils found at every level. Buckland, who knew from talking to Joseph Townsend – and possibly also Benjamin Richardson – that their friend William Smith was also using fossil markers to identify specific strata, appreciated the potential of such evidence. Even as he sat with Kidd, poring over Greenough's notes, he must surely have pondered on how he would present this complicated evidence to his students when his time came the following year.

About the broad classification of rocks there was no argument. In both Oxford and London, geologists recognised the divisions set out by Abraham Werner. Led by Greenough, the gentlemen of the Geological Society – their sights resolutely set on the gathering of facts rather than any premature grand theorising – might well have demurred from speculating on the whys and wherefores of the ever-receding universal ocean upon which Werner's cosmogonical narrative depended. Nevertheless, his five categories of rock appeared to fit well enough with what they saw in the field and were widely accepted. Kidd's own 1815 *Geological Essay* shows us exactly how this framework was understood at the time:

> Werner divides rocks into five classes, called *Primitive, Transition, Floetz, Alluvial,* and *Volcanic*. The first class contains those rocks which are supposed to have been deposited from the chaotic fluid which originally enveloped the earth antecedently to the creation of living beings. They are of a character almost exclusively chemical and do not contain organic remains of any kind. The second class contain those rocks which are supposed to have been formed during the transition of the earth from its chaotic to its habitable state. These are partly chemical and partly mechanical formations; and contain not only

[6] WB to Greenough, 16 June 1813, UCL/Greenough/B/4/B/44/255.
[7] Kidd to Greenough, 25 May 1813 UCL/Greenough/B/4/K/6/1068; WB to Greenough, 26 May 1813, UCL/Greenough/B/4/B/44/253.
[8] John Kidd, *A Geological Essay on the Imperfect Evidence in Support of a Theory of the Earth* (Oxford: University Press, 1815), 130.
[9] Rudwick, *Bursting the Limits*, 476.

> fragments of the preexisting rocks but occasionally organic remains of some of the low orders of animals. The third class contains those rocks supposed to have been formed while animals and vegetables existed in great numbers. These, which are also partly chemical and partly mechanical, and often abound in organic remains, are denominated Floetz rocks; because they are generally disposed in horizontal or flat strata. The fourth class, called Alluvial, comprehends not only depositions of silth &c from rivers, and accumulations of peat and various other substances which are actually now in the progress of formation; but also beds of gravel. The fifth class contains true volcanic rocks, as varieties of lava; and pseudo volcanic rocks, as burnt clay &c. resulting from the effect of the combustion of coal strata.[10]

But the questions that he and Buckland discussed so late that night concerned a much finer level of detail. Within each of Werner's broad categories, especially the Floetz, there was a bewildering profusion of identifiable strata and groups of clearly related strata which Werner himself had called formations.[11] Even as Kidd read Greenough's notes to him, Buckland knew that a major part of his work in the coming years would be to find, and set out, the order amongst these different bodies of rock.

With the prospect of taking over the mineralogical lectures, Buckland's enthusiasm was clearly running high as he sent out invitations for that year's Whitsuntide meeting. As well as Greenough, he hoped to attract James Parkinson, another founder member of the Geological Society and author of a comprehensive treatise on fossils. But despite his entreaties, it seems that neither Parkinson nor Greenough made it to the meeting on 7 June.

Later that summer Buckland, Greenough and Serle each planned separate visits to Ireland. Buckland had arranged to accompany two friends from Corpus on a tour from Dublin to Sligo, where he hoped that he might possibly meet up with either Serle or Greenough.[12] But, as ever with Buckland, the arrangements were fluid. When he reached Killarney, he was joined by William Conybeare and a friend, named only as Boissier. They reached Sligo on 18 August, from where Buckland wrote to Greenough, c/o the Post Office at Edgeworthstown.

> Had not Chance thrown us into the Arms of the illustrious Dick Martin I shd infallibly have overtaken you at Westport Castlebar or Sligo where your Cabbage nets have left an impression on y^{e} Natives as decided as your Hammers have done on every Rock we have passed in the last 150 miles from Oughterard hither[13]

As well as suggesting remedies for the problems of insect predation, Greenough was clearly doing some geological investigation. Dick Martin was the larger-than-life Colonel Richard Martin, renowned duellist, Westminster MP, and campaigner for the abolition of cruelty to animals. 'Humanity Dick', as he was known, was 'a virtual law unto himself on his vast, desolate and encumbered estates, he was one of Ireland's great and perhaps underestimated eccentrics.'[14] He was reputedly often '[u]nable to

[10] Kidd, *Geological Essay*, 60-1.
[11] Rachel Laudan, *From Mineralogy to Geology. The Foundations of a Science* (Chicago: University Press, 1987), 6.
[12] WB to Greenough, 16 June 1813, UCL/Greenough/B/4/B/44/255.
[13] WB to Greenough, 18 August 1813, UCL/Greenough/B/4/B/44/256.
[14] R.D. Ryder, 'Martin, Richard (1754–1834),' *ODNB*, 2004.

contain his penchant for humour and … was often misunderstood as an inconsequential joker.' Much the same would later be said of Buckland and the two evidently got on well.

During the last stage of their journey across the north of the island, Buckland and Conybeare saw two different and distinctive rocks that provided each of them with material for a paper for the Geological Society.

The hexagonal basalt columns of Antrim's Giant's Causeway, long celebrated as the work of the giant, Finn McCool, were already an established tourist attraction.[15] The site also provided a perfect battleground for adherents of rival schools of geological thought. The two Englishmen hired a boat to make sketches of the cliffs and they carefully mapped the relative disposition of the layers of chalk and basalt, producing innovative 'coastal sections' that were to be the focus of Conybeare's paper. When it was finally published, Buckland's contribution was handsomely acknowledged in the title:

> 'Descriptive Notes… of the coasts of Antrim and Derry Collected by the Rev. W. Conybeare, M.G.S. From the joint Observations of The Rev. W. Buckland, M.G.S. Reader in Mineralogy to the University of Oxford, and himself during a Tour in the Summer of 1813'.

Aware of the unseemly hostility between the so-called Huttonians and Wernerians in Edinburgh, the Geological Society expected its members to concentrate on the gathering of facts rather than the espousal of theories. In this context Conybeare was careful to provide a neutral account of their observations. It was only in a long footnote that he admitted that he, and by implication Buckland, had been convinced of the igneous origin of the basaltic rock: a conclusion that definitely veered towards Hutton's ideas of internal heat and was at odds with the Wernerian views held by Kidd, Greenough and most other members of the Society.

Unlike Conybeare, Buckland challenged no orthodoxy in his paper, but it nevertheless set the scene for an important methodological development.[16] As the friends turned south, somewhere between Belfast and the village of Moira, they saw some 'large siliceous bodies of a very peculiar character'. Locally known as paramoudra, a word which Buckland 'could trace to no authentic source', these huge, roughly cylindrical flints – some as large as two feet in length – were distinguished by the hole that ran through their middle creating something resembling the pastry portion of a sausage roll. Ever since that walk across the Corpus quad with Broderip, Buckland had been aware that nodules of flint were probably formed around

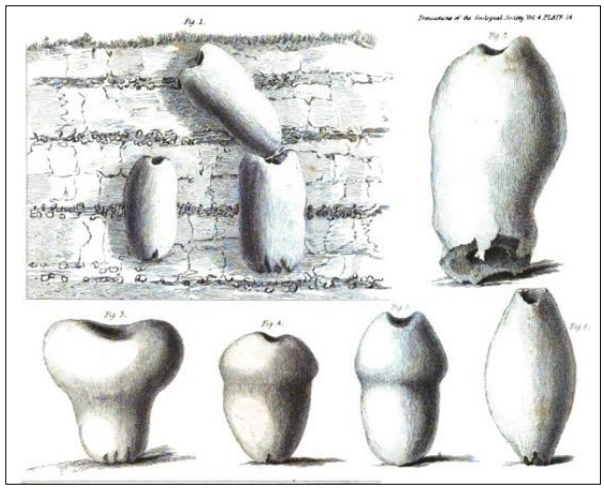

Fig. 3.1 Illustrations of Paramoudra in Buckland's 1816 paper to the Geological Society

[15] G.L. Herries Davies, *The Earth in Decay: A History of British Geomorphology, 1578-1878* (London: Macdonald Technical and Scientific, 1969), 21.
[16] W. Buckland, 'XXV. Description of the Paramoudra, a Singular Fossil Body That Is Found in the Chalk of the North of Ireland...,' *TGSL* s1, 4 (1817).

some type of organism. He concluded that these monstrous shapes had originated from huge sponges living on the ocean floor at the time that the chalk was being deposited. Although no longer widely held within the geological community, it is an idea that continues to have enthusiastic advocates.[17]

After their return from Ireland Buckland and Conybeare made another careful study of some flinty phenomena – at a very different scale. In a paper 'On the Origin of … Organic Impressions … in Nodules of Flint' Conybeare suggested that the tiny impressions of the paper's title were casts of the boreholes that some organism had 'excavated in the substance of certain marine shells'.[18] The paper concluded with a delightfully graphic description of the putative parasite's *modus operandi,* written, as Conybeare told his readers, from his own independent observations, by 'my friend Mr Buckland'. At a time when the Geological Society's Transactions largely comprised dry mineralogical surveys of different parts of the country, Buckland and Conybeare were clearly engaged in a very different enterprise. They were speculating about 'former worlds' and the life-forms that may have inhabited them. It was a type of study both men would eventually make very much their own.

In the meantime, however, Buckland found himself increasingly involved in George Greenough's great mapping project. Having finally met up in Belfast and crossed back to England together, he and Greenough had enjoyed a brief excursion to Drigg on the Cumberland coast where they were shown some intriguing 'vitreous tubes' that had been found in the sand dunes. They correctly surmised that these strange features, known today as *fulgurites,* were caused by lightning strikes on the surface of the sand.[19] Then, separating from Greenough, Buckland made his way back to Oxford on a route that took him through the Welsh Marches.

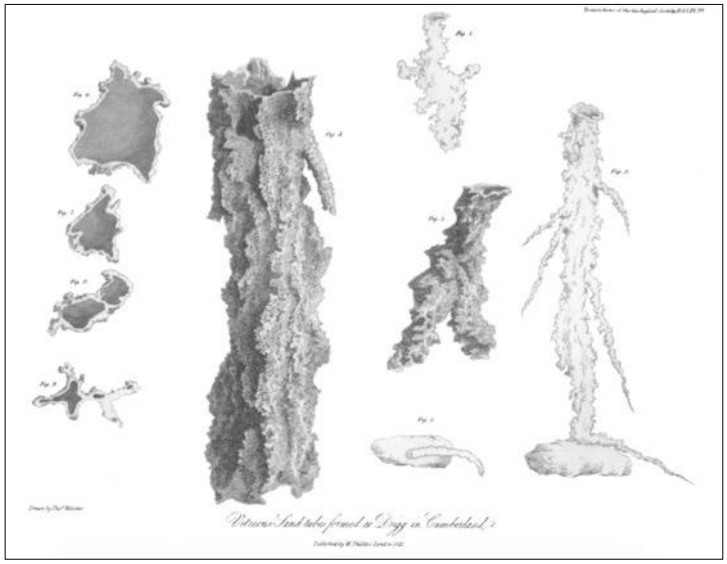

Fig. 3.2 Vitreous Tubes found at Drigg

As usual, that Christmas, he made the journey to Axminster, stopping on the way to spend an hour in Bath with Joseph Townsend – whom he found to be 'very much alterd & reduced' – and two days discussing local geology with Townsend's friend, Benjamin Richardson at Farleigh Hungerford.[20] He used his time in the South West productively, telling Greenough that 'In Defiance of opposing fogs & Snows, I have made great Progress since I saw you with the Maps of Devon Somerset Wilts &

[17] Russell Yeomans, 'Paramoudra: observations on large flint structures from the Chalk (Upper Cretaceous) and flint formation,' *PYGS*, 2018.
[18] W.D. Conybeare, 'XV. On the Origin of a Remarkable Class of Organic Impressions Occurring in Nodules of Flint,' *TGSL* s1, 2 (1814).
[19] Anon., 'On the Vitreous Tubes Found near to Drigg, in Cumberland,' *TGSL,* s1, 2, (1814).
[20] WB to Greenough, 8 December and 9 February 1814, UCL/Greenough/B/4/B/44/259 & 261.

20 Miles round Bath'.[21] Clearly the highest possible degree of accuracy was required and he was insistent that no item should be recorded on Greenough's master map unless it could be vouched for by a recognised authority – preferably his own:

> I this Day return… your Map of Devon, brought as near to Perfection as my present knowledge will admit… as I have no other Copy I will thank not to fill it up any farther without good Evidence till I have seen it again & transferred y^e^ Contents to a map of my own[22]

These working maps, many of which are preserved in the Geological Society's archive, are in themselves minor works of art. Neatly folded into small packages, sometimes protected by a sturdy but well-worn cardboard slipcase, their many annotations and revisions bear witness to the labours behind their execution: names and addresses of useful local contacts roughly scribbled on blank areas and pencilled notes concerning rock exposures entered more precisely at their true locations. Once the fieldwork was complete, the putative extent of each formation would be neatly marked with colour-wash. Buckland was particularly concerned that a standard scheme should be established, asking Greenough to send him a 'list of Colours with a small dash of each on y^e^ Paper wh contains their names [and] a notion where they are to be procured'.[23] Not satisfied with Greenough's response, he told him: 'I am sorry to say my Eyes are much too dim to see clearly y^e^ distinction of y^e^ 24 Colours you have been so kind as to send – pray invent some more as in my opinion these will hardly supply 12 sufficiently distinct for practical Purposes.'[24]

In January Buckland had been elected Junior Dean at Corpus. Having enjoyed five years as a Fellow without obligation, he could hardly refuse. College deans, being responsible for undergraduate discipline, needed to be resident; so the positions were considered 'offices of burden', to be taken, often reluctantly, by each Fellow in turn. Trapped in Oxford until summer, Buckland's thoughts turned to the long vacation.

Reports from Europe suggested that the long war with Napoleon might soon be at an end. In February Buckland asked Greenough, 'Pray what are y^e^ Speculations of our Fraternity touching y^e^ Continent if matters succeed as we hope they will.'[25] With no personal experience of foreign travel, Buckland valued his friend's experience and leadership. In March he wrote again: '[i]f you do not go to y^e^ Continent I shall remain in England this Summer as I shd find no Companion who wd enter so fully as yourself into my Pursuits on such an Expedition & shall at first feel myself much in want of an Interpreter.'[26] Although he envisaged, at most, a modest 'Tour in France only' that summer, his excitement at the prospect was tinged with caution. He added a PS:

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[21] WB to Greenough, 9 February 1814, UCL/Greenough/B/4/B/44/261.
[22] WB to Greenough, 15 February 1814, UCL/Greenough/B/4/B/44/262.
[23] Ibid.
[24] WB to Greenough, 17 March 1814, UCL/Greenough/B/4/B/44/263.
[25] WB to Greenough, 15 February 1814, UCL/Greenough/B/4/B/44/262.
[26] WB to Greenough, 17 March 1814, UCL/Greenough/B/4/B/44/263.

> Do you think it probable that those countries wh have been ye seat of war will have recoverd themselves sufficiently… to allow geology to be pursued without Risk of Interruption … will it be possible to find conveyances to get on or accommodations at Inns – or to evade ye Cossack Banditti wh for many months to come will be endeavouring to establish themselves in warmer latitudes.[27]

He needn't have worried; although Greenough did make a short visit to Paris in the early summer, his priorities lay at home, with his great map, which he considered almost ready for publication. For Buckland the disappointment of remaining in Britain was offset by the hope that Greenough would soon have 'a map of ye Stratification of our nice little Island as shall exalt ye Glory of our School of Geology above ye level of that of Freiburg & of Paris'.[28] Instead of France he suggested that together they make a 'Tour of verification to all those Points of England wh have hitherto eluded or defied our observation'.[29] But before that he had a course of lectures to give.

The popularity of Kidd's mineralogy lectures probably owed as much to his explanations concerning the structure and history of the earth's surface as it did to his descriptions of crystal forms. The new science of geology was evolving fast. It was an amalgam of four hitherto fairly separate disciplines: the systematic skills of the museum-based mineralogist; the wisdom of practical mining men concerning the disposition of rock masses, (known by the German term 'geognosie'); the study of landforms, the province of the physical geographer; and lastly, what the French called 'physique de la terre', the search for causal explanations of the phenomena described by the other three sciences.[30] Being caught up in these developments himself, John Kidd used his lectures to introduce this new, wider discipline within the university.

What Kidd had begun, Buckland embraced with enthusiasm. From early February onwards he busied himself in preparations with support from both Serle and William Conybeare. Serle helped arrange the Ashmolean's geological museum, unpacking specimens and setting them out to illustrate, as best they could, the sequence of rocks to be found in the Earth's surface.[31]. Conybeare contributed coloured maps and diagrams, as well as occasional bursts of intellectual inspiration.

From the beginning Buckland's students were to be treated to an experience utterly different from the dry exposition of the classic Oxford lecture. He understood the need for students to see and handle real specimens. When he thought that Conybeare might accompany Greenough to Paris, he begged him 'to return with a grand suite of specimens for the museum'.[32] Maps and other visual aids, like Conybeare's sketches of the Antrim coastline, were to be an integral part of the new Reader's teaching.

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[27] Ibid.
[28] WB to Greenough, 5 April 1814, UCL/Greenough/B/4/B/44/260.
[29] Ibid.
[30] Geology's four precursor sciences are described in detail in Rudwick, *Bursting the Limits*, 59-115.
[31] Gordon, *Life and Correspondence*, 14-15.
[32] Ibid.

He asked Greenough to lend him the notes on the various strata that he and Kidd had read together so late into the night, claiming that he had 'quite forgotten many important facts contained in them wh as I intend to make my lectures as geological as possible I shd be sorry to pass over in Silence.'[33] And to Conybeare he wrote: 'Pray send me the notes you had begun touching Moses and Huttonianism'.[34] The allusion to scripture is significant. The two clergymen, sincere as they were in their personal belief, were also well attuned to the sensitivities of the time and, more especially, the place in which they were operating. Buckland evidently valued his younger friend's opinion, not only as a geologist, but as a theologian.

On 29 April statutory notices went up in college common rooms:[35]

> THE READER IN MINERALOGY will begin his Course of Lectures on the Structure of the Earth, on Monday May the 9th, at the Museum, at Two o'Clock. The Lectures will be delivered three times a Week.

Fifty-six men paid their two guineas to attend. Their fees, together with the £100 from the treasury, gave Buckland an aggregate of £217 12s. This, in addition to his Fellow's 'dividend' from Corpus, probably made up an annual income of around £500: comfortable if not lavish. However, despite this healthy attendance, not all of his audience stayed the course.

A great compiler of facts, George Greenough never threw anything away. Amongst his vast archive, now preserved at London's UCL, is a letter from John Kidd dated November 1814.[36] At the end of eight closely-written pages Kidd squeezed in a post-script: 'I have now to ask you to burn this letter…' His request went unheeded, leaving us with a valuable insight into the petty jealousies of academic life.

In the letter Kidd relates in rueful terms how, having handed his mineralogical responsibilities to Buckland, he found himself excluded. He explained that, before leaving the scene entirely, he was planning to set down his accumulated knowledge in a book, the writing of which would entail reference to specimens in the Ashmolean collection. Buckland, claiming that he too had designs for a book, was reluctant to allow this, asserting that the museum now contained 'many specimens which he had himself collected and put in; & that it was hardly fair that another person, about to publish… should have the advantage of them.' The situation was compounded when Kidd mentioned that he would not complete his book until he had benefited from his young protege's lectures, leading Buckland to further respond that 'it was not fair to make public use of what a Lecturer advanced in his Lectures'. Buckland can hardly have been surprised when Kidd then begged him 'not to be offended if I ceased to attend his present Lectures after the opinion he had just expressed.'

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[33] WB to Greenough, 15 February 1814, UCL/Greenough/B/4/B/44/262.
[34] Gordon, *Life and Correspondence*, 14.
[35] Edmonds and Douglas, 'Geological Lecture,' 143.
[36] Kidd to Greenough, 7 November 1814, UCL/Greenough/B/4/K/6/1070.

Buckland's obstructiveness was indicative of a subtly changed attitude amongst English geologists. The early sense of collaboration that characterised the Geological Society was giving way to a more competitive atmosphere, where issues of priority and plagiarism became important. There was an increasing demand for popular introductory texts, and several established practitioners saw an opportunity to enter a potentially lucrative market.[37] Buckland, newly installed in a publicly recognised post, might well have had his eye on such a prize; and John Kidd clearly hoped that his own publication might bring him a useful return – some compensation for renouncing the mineralogy lectures.

Buckland's first lectures 'on the Structure of the Earth' did indeed break new ground. For Kidd, as for Greenough, sequences of rock were purely local affairs, applicable only to the district in which they were found. Although both men accepted the broad nomenclature suggested by Werner, they denied the reality of the fixed succession that the Saxon mineralogist's scheme implied. Such ideas had too much the whiff of an overarching theory. As Kidd would write in his geological swansong: 'scarcely any point of general uniformity is observable; each group, and almost every distinct part of each group, having its own peculiarities'.[38] But Buckland had no qualms that such theorising was premature. He was already convinced that a fixed succession not only existed but would one day be shown to extend across even such significant barriers as the English Channel. Never one to be coy, the very title of this lecture series made his ambitions plain. He was proposing to expound nothing less than *the Structure of the Earth*.

That it was the ebullient Buckland, a man who had yet to set foot on the Continent, rather than the genial Kidd or the well-travelled, but inherently cautious Greenough, that espoused such universalist ambitions might be explained by their respective temperaments. But it might also owe something to Buckland's close acquaintance with the Reverends Townsend and Richardson and, through them, with the work and methods of William Smith. It was after all Townsend and Richardson who, back in 1799, had written out, at Smith's dictation, the pioneering *Order of the STRATA*.[39]

Not that Smith's work was Buckland's only model. In February, well before he began his first lectures, he told Greenough that he had recognised that a collection of fossils he had found three years earlier in Hampshire were identical to some of those described in Brongniart and Cuvier's description of the Paris Basin.[40] Convinced that the order of strata found in England would be replicated across the Channel he had urged Greenough to use his forthcoming journey to 'identify y^{e} Granite of Normandy with that of Cornwall & ascertain y^{e} Relation of y^{e} Stone of Caen & Maestricht with our own formations'.[41]

In his ambitious plan to explain 'the Structure of the Earth', Buckland was clearly encouraged by William Conybeare, himself immersed in continental geology at the time. Conybeare was using the

[37] Simon Knell, 'The Road to Smith: How the Geological Society Came to Possess English Geology,' in *The Making of the Geological Society, London*, edited by C.L.E. Lewis and S.J. Knell (London: GSL, 2009), 35.
[38] Rupke, *Great Chain*, 118.
[39] Simon Winchester, *The Map That Changed the World* (London: Penguin, 2002), 140.
[40] WB to Greenough, 15 February 1814, UCL/Greenough/B/4/B/44/262.
[41] WB to Greenough, 16 April 1814, UCL/Greenough/B/4/B/44/265.

work of the Swiss geologist Horace Saussure and others to draw up a 'large Section of Europe' as well as a map showing all the main rock formations, both of which he made available for Buckland's lectures.[42] With the support of his friends, the new Reader in Mineralogy was setting up much more than just a series of lectures: he was specifying what might now be called a research project.

Perhaps this accounted for Buckland's strangely secretive behaviour. Knowing that Kidd had previously dismissed the notion of widespread regularity in the strata, Buckland may have been hesitant to introduce such radical ideas so soon after taking office. Maybe he needed time to explore and express these new insights free from risk of being criticised – or perhaps he was simply concerned that his predecessor might steal his ideas.

In his letter to Greenough Kidd emphasised that, despite everything, he and Buckland were still 'on the best terms – as I sincerely hope we may always remain'. His *Geological Essay,* dedicated to Greenough, was published the following year. In the Preface Kidd acknowledged his 'obligations' to Buckland, the two Conybeares and Philip Serle, 'to all of whom I am united by the firmest ties of friendship', and concluded by expressing satisfaction that he had now passed on the mineralogical lectures 'to one, from whom I should have thought it an injustice to the University longer to withhold them.'

Five years later, in the preface to his *Vindiciae Geologicae*, Buckland returned Kidd's compliment, referring to

> my friend and predecessor in the office of Reader in Mineralogy, Dr. Kidd, a gentleman whose scientific and classical labours in these subjects have long been known … and to whom we owe the foundation of that valuable collection of specimens in Geology which the University now possesses.[43]

By that time Kidd, shortly to succeed Sir Christopher Pegge as Regius Professor of Medicine, had little time for geology.

Apart from the awkwardness with Kidd, Buckland's first course of lectures had gone well. That summer, he began by traveling south, visiting the Isle of Wight with Geological Society president Henry Grey Bennet, before calling in on his father who, blind and in his sixty-fifth year, had recently won the hand of Ann, the thirty-eight-year-old daughter of his friend, Axminster schoolmaster Richard Mallock.[44]

Leaving Devon on 30 July Buckland journeyed to London, where he met with Greenough, recently returned from Paris, to begin their 'Tour of verification' in the north of England. Their route took them up through the North Yorkshire Moors and into Durham where they enjoyed 'a grand hunt' in the area of Cockfield Dyke on the edge of the Durham coalfield. There they saw how the rocks adjacent to the intrusive basalt had been altered, apparently by heat. It was, Buckland wrote, enough to make even the sceptical Greenough 'admit as long as he is within sight of it that possibly it [the

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[42] W.D. Conybeare to Greenough, 24 January 1823, UCL/Greenough/B/4/C/30/459.
[43] William Buckland, preface to *Vindiciae Geologicae; or, the Connexion of geology with religion explained* (Oxford: University Press, 1820).
[44] *JOJ*, 13 August 1814; Powell, *William Buckland*, 18.

basalt] may be of igneous origin'.[45] Buckland himself claimed to be 'a confirmed Huttonian upon Whin Dykes & begin to think them less absurd in giving an igneous origin to granite, but am by no means converted on this point and shall suspend my judgement till I have visited ye Alps.[46]' The matter was clearly still not completely resolved in his mind.

In Northumberland they 'found ye Picts Wall standing on ye Escarpment of a Whin Sill with its precipitous front towards ye Scots'.[47] Then, as now, the central part of Hadrian's Wall was an impressive sight, causing Buckland to comment that the Roman engineers were obviously 'able Geologists'. Moving on to the Eden Valley, they made a close examination of an interesting and complex outcrop of greenstone and slate now known as the Cross Fell Inlier, which provided the content for the first paper to appear exclusively under Buckland's name in the Geological Society's Transactions.[48] The paper, read on 28 March 1815, challenged the received views concerning the identity of the underlying sandstone strata. Although he was concerned that he might be running 'too much into Theory' for Greenough's liking, Buckland was clearly claiming for himself a stratigraphical expertise above that of earlier investigators of the area.[49]

The following year Buckland found his geological enthusiasm running away with him. His audience was 'as overflowing as it was last year', and he had so much to say that by early June, although he had already given 22 lectures, he still had five or six more to give.[50] What is more he had totally neglected the basic mineralogy that he was actually appointed to teach, causing him to consider giving a second course the following October.[51]

However, he still found time to orchestrate a Whit Monday gathering, sharing the burden of entertainment with his friends, as he told Greenough:

> Our arrangements have been made thus – to dine with Hony on Monday, Serle Tuesday & myself Wednesday. For family Reasons for wh all who know them must honor him it will be inconvenient to Kidd to give dinner in his Souterrain & if you … get a Beefsteak on your road – & eat a lobster at my Rooms on Sunday Evening it wd conform better with our Engagements on Whitsunday which will keep some of us out of Oxford on that day till the Evening. I shall be home myself from my Uncles Church about 8 & depend on seeing you to sup with me.[52]

The domestic details are revealing. Kidd and his family were clearly still living in the dank basement of the Ashmolean, where a 'permanent habitation' for the reader in chemistry had been established

[45] WB to W.D. Conybeare, 13 February 1815, CALS/D5154.
[46] Ibid.
[47] Ibid.
[48] W. Buckland, 'III. Description of an Insulated Group of Rocks of Slate and Greenstone in Cumberland and Westmoreland, on the East Side of Appleby, between Melmerby and Murton,' *TGSL* s1, 4 (1817).
[49] WB to Greenough, 11 March 1815, UCL/Greenough/B/4/B/44/274.
[50] WB to Greenough, 21 April 1815, UCL/Greenough/B/4/B/44/276.
[51] WB to Greenough, 1 June 1815, UCL/Greenough/B/4/B/44/278.
[52] WB to Greenough, 9 May1815, UCL/Greenough/B/4/B/44/277.

four years earlier; and Buckland, despite his 'promotion', was also still riding out to deputise in his uncle's pulpit at Warborough.[53]

After brief visits to London and Axminster, the summer was occupied with yet another tour of Scotland and Ireland. This time his travelling companion was Philip Serle. On the way back, Buckland spent ten days exploring Snowdonia with John Macbride, Principal of Magdalen Hall, before he met with his 'ancient cub', John Short, for a ten-day gig and horseback tour of the south western counties of Wales.

Throughout his summer journeying, Buckland maintained a lengthy correspondence with Greenough – much of it concerning Greenough's map. Buckland was concerned that this should carry as much information as possible, including not just the heights of hills and depths of lakes, but historical features such as the sites of ancient camps and forts as well. Also, thinking of the wider correspondences that he was proposing in his lectures, he entreated Greenough to colour 'as much as you can include of y^{e} French Coast, as y^{e} Connexion of our Strata with those across y^{e} Water will to all Learners be highly catching & instructive & in other views is of y^{e} highest Importance.'[54]

In March 1814 Greenough had reported that the map was 'ready for the engraver', but both Buckland and William Conybeare appear to have had misgivings about its appearance so soon.[55] Buckland's enthusiasm, however, far outweighed his concerns, which were merely implied. The previous year he had written: 'Your news of your Map delights me. I suspect Smith of Bath has a similar Production in contemplation but know not in what Progress – or Degree of Perfection'.[56] Conybeare, who had several points of scruple, was more forthright:

> 1000£ appears to be an immense sum to lavish on the first edition of the map wh must necessarily be very imperfect – & sent out as much to obtain additional information & correction as for any other purpose – were it executed in the style of those engraved for the agricultural surveys & by the same artists, I should think the expense would be much less probably not (100£) & /it would yet/ be quite adequate to convey all the information at present possessed – I am for reserving splendor & delicacy of execution for a 2d edition with corrections & additions as the phrase is – I question whether it would not be desirable to take Smith into partnership for the great Oolite or waiting till he publishes wh I understand he really means to do & then stealing from him honestly.[57]

On 1 August 1815 William Smith's pioneering map had at last been published; but not before John Farey, another working surveyor, had published a forthright attack on 'the unhandsome conduct' of the gentlemen of the Geological Society, and in particular, Greenough, towards its author.[58] The degree to which Greenough's map depended on Smith's work is, even today, a matter of heated discussion amongst historians. But for Buckland, issues of priority took second place to matters of accuracy and

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[53] R.F. Ovenell, *The Ashmolean Museum 1683-1894* (Oxford: Clarendon Press, 1986), 185-6.
[54] Ibid.
[55] Woodward, *History,* 58.
[56] WB to Greenough, 21 March 1814, UCL/Greenough/B/4/B/44/264.
[57] W.D. Conybeare to Greenough, n.d. [ca.1814], UCL/Greenough/B/4/C/30/448; see also Woodward, *History,* 58-9.
[58] John Farey, 'Observations on the priority of Mr Smith's investigations of the strata of England,' *PM* 45 (1815): 333.

utility. As he wrote to Greenough from Ireland, 'Fareys Assault has excited Attention on this Side of ye Water. it remains for ye Comparison of your Map with Smiths to silence Him.'[59] It would be another five years before that comparison could be properly made, but the question of Greenough's alleged duplicity would rumble on much longer.

In 1816, with Napoleon safely installed on St Helena, it was at last safe to venture abroad. William Conybeare, despite now enjoying all 'ye comforts of domestic life' and having a sixth-month old son, seems to have felt the pull most strongly. In February Buckland told Greenough:

> I have recd from W Conybeare a most important Communication of wh ye Object is to establish between you Him & Myself a Geological Triumvirate wh in ye course of ye next Summer shall spread Conquests, more extensive over the subterraneous World than were ever accomplished by our less penetrating Predecessors, ye superficial Triumvirs of Rome.[60]

He went on to add that 'I have all but absolutely engaged to be one of ye Party on Condition that you can manage to make the third'.

Greenough's prompt agreement confirmed Buckland's own commitment and enthusiasm. A week later he wrote again: 'As far as I can learn a Carriage will be indispensible to ye Tour. When we are ascending ye Mountains it may be taken round to meet us at ye Point of our descent.'[61] He had very clear ideas about what was needed. In May he told Greenough that 'Your Arrangements as to ye Carridge are excellent bating [except for] the Portmanteaus.'[62] Buckland was adamant that each traveller must have his own baggage space. '2 Trunks & ye Common Receptable for ye luggage of 3… I deem to be wholly impracticable without a thousand inconveniences.'[63] Eventually they agreed to hire, at £10 per month, a 'travelling carriage' built by the fashionable coach maker Lionel Lukin.[64] It was:

> strong, roomy & convenient: … with two large wells useful for the stowage of our specimens: a front boot on springs, just large enough to admit two portmanteaus; a hind boot which exactly held two portmanteaus of smaller size and above this a dickey for two persons with a chaise seat, all upon springs likewise. Straps beneath the front windows secured our umbrellas, and two oblong black knapsacks fixed by buttons to the back of the carriage supplied to those who rode upon the dickey two useful pockets & desks. The window behind opened that the passengers inside might converse with those on the dickey, and leathern loops placed by the side of the knapsacks held a speaking trumpet by the aid of which we could confer with our postillions;[65]

The outside 'dickey' seats, once occupied by the original owner's servants, would allow the gentleman geologists unfettered views of the country they passed through. Although something of a tradition

[59] WB to Greenough, 10 September 1815, UCL/Greenough/B/4/B/44/283.
[60] WB to Greenough, 21 February 1816, UCL/Greenough/B/4/B/44/286.
[61] WB to Greenough, 29 February 1816, UCL/Greenough/B/4/B/44/290.
[62] WB to Greenough, 13 May 1816, UCL/Greenough/B/4/B/44/287.
[63] Ibid.
[64] Hugh Torrens, 'Geology in peace time: An English visit to study German mineralogy and geology … in 1816,' *Algorismus* 23 (1998): 153-5.
[65] Ibid. 154. Greenough's note in UCL/Greenough/B/2.

among English geologists, this practice of riding on the outside caused great amusement among onlookers who couldn't understand why 'gentlemen' would forgo the comfort of their well-appointed carriage.[66]

Among the other facilities the carriage afforded were:

> distinct pockets for our passports, postbook – for small money – an opera glass – a compass – our knives & forks – an inkstand, a bottle of acid & a handbell; we carried also a brace of pistols, wax candles for our lamps, some spare leather straps, ropes, 2lbs of tea and some canisters of the anti-attrition compound [axle grease].[67]

For Buckland an 'important Desideratum to my personal Comforts in travelling is a Something that will prevent those horrid monsters of y^e^ Night called Bugs from touching me.'[68] He asked Greenough to inquire 'amongst your most experienced & intelligent Friends' whether any knew of something to deter these pests, adding that 'I care not how offensive to myself, y^e^ Smell may be provided it offends y^e^ Insects.' Having as far as possible established his personal comfort, Buckland turned his attention to the paperwork. Passports were obtained, as were letters of introduction to scientific colleagues and, with help from the mother of his 'Cub', Buckland arranged for banking services along the way.

On 5 June the three geologists set off, beginning with a three-and-a-half-hour voyage from Dover to Calais.[69] Buckland later noted that '[t]he Journey occupied 5 months of intense labour employed in seeing every Collection & Professor that could be heard of & purchasing every Map, Book & print that has been published relating to our favourite science'.[70]

They began by travelling eastwards across the German states. On 3 July they were at Gailenreuth, near Bayreuth where they visited a local tourist attraction. The Romantic fashion for the 'sublime', that mixture of beauty and dread that served as a counter to the dry rationalism of the Enlightenment, had greatly increased interest in caves. Like high mountains, they were spaces where visitors might experience wonder and horror in equal measure. For Greenough, at least, the Gailenreuth cave was perhaps more horrific than wonderful:

> The chasm continuing to an unknown depth – you descend by fixing your hands & feet on the rough projections of y^e^ chasm striding alternately from side to side – while I was doing this a piece of flaming pitch fell from Buckland's torch on my cap & I did not dare extinguish it till I had reached the bottom.… I lay on my back at full length there & when Buckland had descended took a flambeau from him in order to exhibit the bones with which this spot is filled … in a short time the smoke became so oppressive that Buckland returned, the delay of a minute also almost rendered the light of the flambeau invisible & stopped respiration – it was with great difficulty that the woman who was our guide & myself could command sufficient strength to return up the chasm to a freer atmosphere.[71]

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[66] Davies, *Earth in Decay,* 134; Torrens, 'Geology in peace time,' 154.
[67] Torrens, ibid., 154.
[68] WB to Greenough, 23 May 1816, UCL/Greenough/B/4/B/44/289.
[69] WB to Greenough, 21 & 23 May 1816, UCL/Greenough/B/4/B/44/288 & 289.
[70] WB to Lady Mary Cole, 3 April, 1817, NMW84.20G.D/146.
[71] Torrens, 'Geology in Peace Time,' 157-8.

This particular awe-inspiring cavern was famed for the profusion of ancient animal bones that littered its floor, some of which the custodian, Inspector Wunder, gathered up for sale as curiosities. Having safely escaped the abyss, the Englishmen paid £2 for 'a fine Bears Head' and a further £5 for other relicts. For Buckland, such 'bone caves' would soon come to have a much deeper significance and six years later a second visit to the Gailenreuth cave would see him investigating, in much finer detail, the debris that littered its floor.

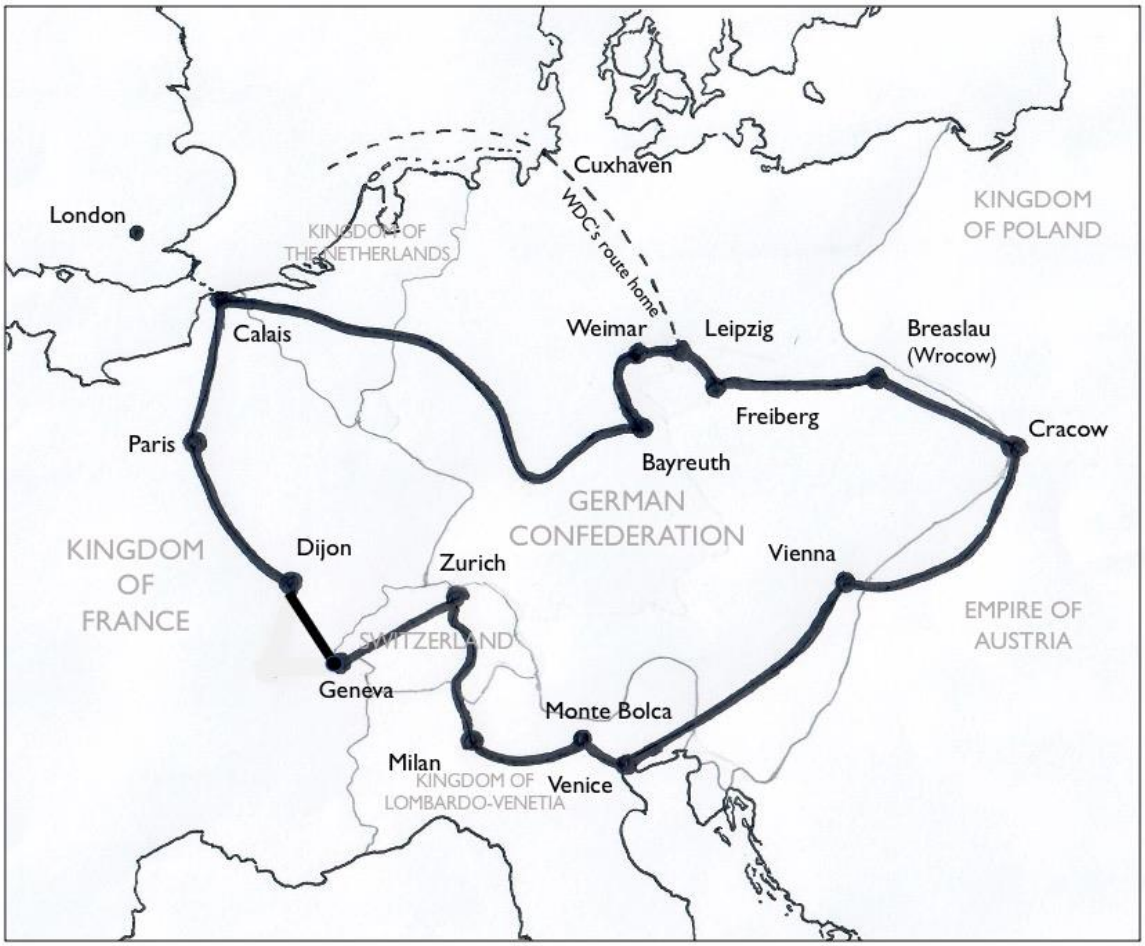

Fig. 3.3 Map showing approximate route of 1816 Continental tour

A week later they reached Weimar, where they met the ageing Goethe, who, despite his eminence, failed to impress Greenough. 'He seems not to take much interest in geology tho he has worked at it – asked no questions, posted no hypothesis.'[72] At Leipzig Conybeare left for home, taking the 'tedious & disagreeable' sea route across the German Ocean from Cuxhaven, while Buckland and Greenough continued towards Freiberg where they were entertained by the great Abraham Gottlob Werner.[73]

Whereas Buckland merely recalled that Werner 'gave us a grand supper, and talked learnedly of his books and music, and of anything but geology'[74], Greenough was more forthcoming: 'fair complexion, light eyes … in manner, earnest … was drest in a coat of dark Prussian lin'd and faced

[72] Ibid., 159.
[73] WD Conybeare to Greenough, 4 December 1816, UCL/Greenough/B/4/C/30/451.
[74] F. Buckland, 'Memoir,' xxix.

with green breeches, red waistcoat & a white ribbon at his buttonhole – his hair nicely powdered'.[75] For Buckland's sake they spoke in French, Greenough noting that Werner 'talks intolerable French & abuses y^{e} poverty of that language in conveying geological ideas', also, perhaps unsurprisingly, that he 'is no admirer of Cuvier [or] Brongniart'. After a litany of further deficiencies Greenough concluded that 'Werner, with all his merits, had not a genius at all suited to geological investigations', adding that the minds of his students 'were rather narrowed & weakened than enlarged & invigorated by the lessons they had learned in the school of Freyberg.'

Nevertheless, Buckland, at least, gained something from the visit. Following the example set by William Smith back in 1799, he had created and continued to refine a stratigraphic chart for use in his lectures. A future published version of this chart would have, on its reverse, a list of the Floetz formations, 'as Sketched in a Hasty Manuscript List, Given by the Late Herr Bergrath Werner to Professor Buckland at Freyberg, in July 1816'.[76]

From Freiberg they continued east to Cracow before turning south-west through Hungary, where they visited the gold mines at Kremnitz and Schemnitz before heading south into Italy.

Wherever they went their carriage would be repeatedly halted to allow an examination of the rocks or a search for specimens as at Monte Bolca, a place renowned for its well-preserved fossil fish. Their seemingly eccentric behaviour did not go unnoticed by the authorities. On one occasion Buckland even found himself in the prison at Parma until, somehow, he was able to demonstrate his innocence, though of what he was suspected we are not told.[77] More disturbing was an episode that occurred a few days later as they ascended towards the Simplon Pass on their way back over the Alps. Their carriage was in collision with a wagon driven by a drunken Swiss. As Greenough related to his aunt:

> the man watched the moment when I was off my guard, seized me by the throat, drew his knife and was on the point of making use of it when Buckland sprung upon him in return & snatched the knife out of his hand… but the fellow had got so firm a hold of me that it was not easy even then to disengage myself - nor could I do so till he had torn my shirt all the way from the collar to the waist.[78]

The man was eventually taken off to the préfet and spent a week in jail, but it cost the travellers half a guinea for repairs to his cart.

Despite the hazards, the pair arrived home, via Paris and Calais, in early November. The tour had been a great success. For Buckland and Conybeare at least, it encouraged ideas concerning the relationship between the rock formations on either side of the Channel. Greenough, less certain about international correlations, was happy to concentrate on his British map.

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[75] Torrens, 'Geology in Peace Time,' 161.
[76] Page, 'Diluvial Theory,' 62-3.
[77] WB to Lady Mary Cole, 3 April 1817, NMW84.20G.D/146.
[78] Greenough to Mrs Smedley, 22 October 1816, private collection. I am grateful to Duncan Hawley for alerting me to this letter and providing a transcription.

Chapter Four

1816-1820

Reader in Geology

By the time Buckland had fulfilled the fairly minimal requirements to obtain his Bachelor of Divinity degree in December 1816, his name had risen half way up the list of twenty Fellows at Corpus.[1] In addition to his university readership, he had now served terms as both Junior and Senior Dean and was so well respected and popular amongst his Corpus colleagues that, in June 1817, they presented him with a 'magnificent silver Inkstand', inscribed in Latin, in recognition of his lectures at the museum.[2]

That spring, meanwhile, he had recruited another promising student to his lecture room. Even before he came up to Exeter College in 1815, Charles Lyell had been a keen naturalist. Although his father hoped that he might earn a living at the bar, a tendency to eyestrain and Lyell's own enthusiasms would eventually cut short his legal career and set him on a very different path. At Oxford, Buckland's lectures had engaged him 'heart and soul' and despite his father's evident reservations, he quickly became his teacher's active accomplice, reporting home from a vacation in Norfolk that 'I flatter myself I shall compile some interesting information for Buckland'.[3]

Lyell was not the first of Buckland's students to be pressed into service as a geological correspondent. The Hon. William Fox Strangways matriculated from Christ Church in 1813. Described by Buckland as 'a very promising Geologist', Strangways was, according to his niece, 'one who likes flowers better than men and stones better than flowers'.[4] He was elected to the Geological Society in 1815 and the following year he was ostensibly the first man at Oxford to be examined in geology, although in reality geology merely provided the subject for Strangways' traditional oral assessment in logic – hardly a real test of geological expertise.[5]

In 1816 Strangways was sent as an attaché to the British embassy in St Petersburg, from where he undertook some significant geological investigations. His detailed reports back to Buckland and the Geological Society were complemented by shipments of specimens, either collected by himself, or the gifts of Russian *savants* he had cultivated. In return, 'suites' of local rock were sent from England to the Russians. It was a hazardous business and at least one consignment ended up at the bottom of the Baltic rather than on the intended museum shelf.[6] The collaboration was not limited to the exchange of physical specimens. Early in 1819 Buckland and several other English geologists received diplomas proclaiming them members of the recently-formed Russian Mineralogical Society in St Petersburg, an honour that Buckland later acknowledged with 'a latin Letter to the President of the Society'.[7] Then,

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[1] Acts & Proceedings, CCC/B/4/1/3.
[2] WB to Greenough, 2 June 1817, UCL/Greenough/B/4/B/44/292. S.T.B. (Sacrae Theologiae Baccalaureus) is an archaic form of Bachelor of Divinity.
[3] Wilson, *Lyell*, 44; K. Lyell, ed., *Life, Letters and Journals of Sir Charles Lyell, Bart*., Vol.1 (London; John Murray, 1881), 44.
[4] Susan Rands, 'William Buckland at Stinsford House,' *SDNQ,* 36 (2010): 394.
[5] WB to Lady Mary Cole, 3 June 1816, NMW84.20G.D/145; Rupke, *Great Chain*, 120.
[6] WB to Greenough, 26 March 1818, UCL/Greenough/B/4/B/44/303.
[7] WB to Greenough, 8 January 1819, UCL/Greenough/B/4/B/44/313; W.R. Ward, *Victorian Oxford* (London:

in August of the same year, packed into a box that had 'been detained all Winter by the Ice', Buckland found a 'Diploma electing me Member of the Imperial Society of Naturalists at Moscow'.[8] The exchange of such honours provided valuable lubrication to the machinery of cooperation, and for Buckland, these were but the first of many.[9]

Over time Buckland recruited an extensive corps of foreign correspondents, many of whom, like Strangways, had been sent to exotic locations on government business. One who didn't fit that description however was Strangways' own half-sister, Lady Mary Cole. Nineteen years her brother's senior, Mary was now the wife of naval hero Sir Christopher Cole, though she continued to live at Penrice Castle, the Welsh ancestral home of her late first husband, Thomas Talbot.[10] Like Strangways, Mary and her five daughters, the Misses Talbot, took a more than merely fashionable interest in natural history and, as early as 1815, Buckland was enlisting their help to provide 'information on the geology of Glamorganshire … for insertion in the Geological Society's Map of England'.[11] Alongside his home-grown army of correspondents, Buckland was keen to expand his connections by welcoming foreign visitors to Oxford, such as the German geologist Leopold von Buch, who was a guest at the Whitsuntide meeting in May 1817.

Fig. 4.1 Lady Mary Cole (1776-1855) (seated), with her daughter Mary Theresa Talbot (1795-1861)

Buckland's main fieldwork that summer was delayed by what would turn out to be his final expedition with the 'Cub'. It was not until early September that he began an exploration of the 'left Bank of y^e^ Severn from Gloster downwards as far as Time & Circumstances will carry me'.[12] His main concern was to establish the geological connections between 'y^e^ 2 Parts of y^e^ Severn' and in doing so to find 'in y^e^ red Sand Stones of this District y^e^ key to the Division that will be found pervading these formations in Devonshire'. It was a thorny problem that would continue to puzzle geologists for another 20 years.

As he explored the quarries of Somerset, Buckland kept his eye open for a source of stone suitable for the large public monument that the architect William Wilkins was designing to commemorate Wellington's victory at Waterloo. Having found something that he thought might do,

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Cass, 1965), 337.
[8] WB to Greenough, 13 August 1819, UCL/Greenough/B/4/B/44/322.
[9] Gordon, *Life and Correspondence*, 277.
[10] Lady Mary Cole's son, Christopher Rice-Mansel Talbot, later developed Port Talbot and became immensely rich.
[11] Gordon, *Life and Correspondence,* 16.
[12] WB to Greenough, 7 September 1817, UCL/Greenough/B/4/B/44/295.

he noted that it was protected *in situ* by a covering of 'short grey lichen' and that 'it is Question perhaps whether the Smoke wd allow the growth of this Vegetable in the vicinity of London'.[13] He went on to suggest that 'this may be seen by y^e^ State of y^e^ old Buildings on or near the Spot where y^e^ proposed Monument is to be erected.' Wilkins' monument was never built, and the question of lichen was forgotten. However, several years later there were red faces in the geological community when the stone selected for the rebuilding of the Palace of Westminster proved deficient for this very reason. Sadly, Buckland's advice had not been sought on that occasion.

In February 1818 Buckland became a vice-president of the Geological Society and three weeks later he was also elected a Fellow of the Royal Society. Founded in 1660, the Royal Society was the world's first national scientific society. Then as now, the Fellowship conferred considerable kudos. But in 1818, although hardly any serious scientific gentleman was not a Fellow, by no means all Fellows were scientific. Under the presidency of Sir Joseph Banks the society's membership was quite consciously divided into two classes: 'the working men of science, and those who, from their positions in society or fortune, it might be desirable to retain as patrons of science.'[14] The concentration of serious 'philosophers' had thus been diluted by large numbers of wealthy dilettantes. It was a situation which Buckland would eventually help to rectify. However, there was one aristocrat whose election, two months after his own, he would surely have supported. Oxford's Chancellor, Lord Grenville had developed quite an interest in geology, possibly even attending Buckland's lectures, and was, Buckland thought, a man who 'takes hold of y^e^ thing at y^e^ right end', putting together 'as good a geological Letter as W. Conybeare wd write'[15]. For Buckland to have found so influential a patron with so genuine a sympathy for his own interests was indeed a stroke of good fortune.

Having, the previous September, spent some time exploring the banks of the River Severn, Buckland decided that Clifton near Bristol would 'make a pleasing & instructive Variety' for the 1818 Whitsuntide meeting.[16] But despite his encouragement, few Oxford colleagues could afford the time to make the journey and London men outnumbered Oxonians by five to three.[17] However the location did facilitate the attendance of a 'Mr De la Beach from Lyme', whom Buckland judged to be 'a very active & intelligent Geologist & likely to be of great Service to the Society'.[18]

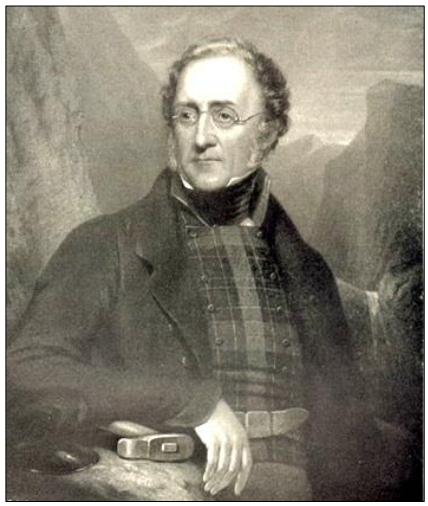


Fig. 4.2 Henry De la Beche (1796-1855)

[13] WB to Greenough, 5 November 1817, UCL/Greenough/B/4/B/44/297.
[14] Marie Boas Hall, *All Scientists Now* (Cambridge: Cambridge University Press, 1984), 4.
[15] WB to Greenough,12 January 1818, UCL/Greenough/B/4/B/44/300.
[16] WB to Greenough, 11 March 1818, UCL/Greenough/B/4/B/44/302.
[17] WB to Greenough, 1 May 1818, UCL/Greenough/B/4/B/44/304.
[18] WB to Charles Buckland, 25 May 1818, DRO/138M/24.

Living with his widowed mother in a rented house in Lyme Regis, young Henry de la Beche enjoyed the leisure and the means – thanks to the income from Jamaican plantations inherited from his father – to pursue his geological interests. He was a frequent patron of the Anning family's curiosity shop and used his drawing skills – a talent he had perhaps honed during a brief career at the Royal Military College at Marlow – to sketch the fossil remains they were uncovering. The most exciting of these were the 'crocodiles' or, as they were now generally known, ichthyosaurs.

The beast that the Annings had sold so fortuitously for £23 had been passed on to the showman, William Bullock, who put it in his Piccadilly museum where it had attracted attention from several learned gentlemen, some of whom were already studying other, less complete, 'croc' specimens. Among these were two museum curators: Sir Everard Home, who had charge of the museum of the Royal College of Surgeons, and Charles König of the British Museum. Between 1814 and 1819, Home presented no fewer than five short papers about these fossils at the Royal Society, but it was König who gave the strange beasts the name *Ichthyosaurus* – or fish lizard.[19]

By 1818, interest in these exciting monsters from a former world was running high. Living on the spot in Lyme, and friendly with Mary Anning, De la Beche was often amongst the first to hear of any interesting specimen she might turn up. He was an intelligent and perceptive observer and was becoming quite an authority on the subject.

Now that Greenough's great map project was nearing completion both Buckland and William Conybeare had become increasingly intrigued by the anatomy of these strange fossilised creatures. But while Buckland merely kept a watching brief – telling Greenough before the Clifton meeting that 'I long to see Mr De la Beches fin of Ichthyosaurus', Conybeare soon found himself collaborating with De la Beche in making a detailed anatomical study of them.[20] In this work Conybeare drew extensively on the system of labelling used by the French anatomist Georges Cuvier.

Cuvier had developed unique skills in comparative anatomy. His career, like Buckland's, had prospered through a combination of talent, good fortune, and wily political manoeuvring. Born in Montbéliard, in the borderlands of eastern France, in 1769, he had been appointed to a junior post at the Muséum d'Histoire Naturelle in Paris in 1795. Rising quickly to a professorial position, he became the youngest member of the scientific 'First Class' of the Institut de France, an honour equivalent to fellowship of the Royal Society. He had achieved international renown through his meticulous study of the stream of specimens that flowed into the Muséum, itself a cherished and well-supported part of the French state, whose collections were constantly augmented by specimens contributed by a network of correspondents around the globe.

No new bone, fossilised or fresh, escaped Cuvier's examination and it had become apparent to him that many of the fossil specimens he studied had no counterpart in any present-day species. He surmised that whole populations of earlier species had been wiped out by a sequence of 'catastrophes', allowing new, more perfect creations to take their place. It was not, however, an explanation that was

[19] Torrens, 'Mary Anning,' 260.
[20] WB to Greenough, 1 May 1818, UCL/Greenough/B/4/B/44/304.

immediately accepted by all, with some choosing to cling to the belief that modern descendants of the fossilised creatures might yet be found in some far corner of the globe – a possibility made plausible by recent discoveries such as that of the platypus, a creature previously undreamt of by Europeans.[21] Others, more daringly, suggested that perhaps environmental changes had caused the fossil species to transmute into the forms that populated the earth today. – an idea that smacked of a dangerous, god-denying, materialism. Nevertheless, for Buckland and Conybeare, well acquainted with some of the strange fossil evidence, the fact of extinction was an entirely rational explanation. Furthermore, if the last of Cuvier's several 'catastrophes' could ever be positively identified as the Biblical Flood, it would add considerable weight to their own as yet unspoken project to reconcile the worlds of geology and theology.

Fig. 4.3 Georges Cuvier (1769-1832) – a portrait presented to Mary Buckland in 1826

Although London boasted no collection to rival that of the French Muséum, it was nevertheless home to almost 14,000 zoological and botanical specimens assembled by the surgeon John Hunter. These was now held at the College of Surgeons, and it was there, on 19 June 1818, that Cuvier, freshly arrived in England, arranged to meet Buckland. Buckland's excitement must have been intense as he prepared to meet the man whom he would later describe as 'one of the most enlightened Philosophers, and the greatest Anatomist of this or any other age'.[22]

But Buckland was also keen that Cuvier should come to Oxford, where he wanted to show him some large unidentified fossil bones. These had come from deep, mine-like quarries in the area around Stonesfield, a village a few miles north-west of the city. Stonesfield 'slate', a type of sandy limestone that split into thin sheets after exposure to frost, was much in demand as a roofing material and occasionally, while extracting it, the quarrymen came across fragments of fossilised bone which they would offer, at a price, to interested gentlemen collectors. Buckland had, himself, bought a few modest examples, but the two specimens he wanted to show Cuvier did not belong to him. In 1797 Sir Christopher Pegge had paid half a guinea for a large jawbone with a fearsome, scimitar-like tooth still attached, which he had lodged in the anatomical museum that he maintained at Christ Church.[23] The second specimen, acquired more recently by Philip Barker Webb, an undergraduate who had attended

[21] The first brief scientific description of the platypus was written by George Shaw in his 1799 tenth volume of *The Naturalist's Miscellany,* a fuller account appeared in his *General Zoology*, Vol. 1 (London: G. Kearsley, 1800), 228-232. For a summary of the three explanations for unfamiliar fossil remains, none of which 'was obviously more plausible than the others', see Rudwick, *Bursting the Limits*, 242-5.
[22] Buckland, *Vindiciae*, 5.
[23] E.A. Howlett et al., 'New Light on the History of Megalosaurus, the Great Lizard of Stonesfield,' *ANH* 44, 1 (2017): 89.

some of Buckland's earliest lectures, comprised five enormous vertebrae fused together to form a sacrum.

On 30 July, after Cuvier had accepted Buckland's invitation and examined the Oxford specimens, Buckland wrote to Greenough: 'Have you seen Cuvier since He was here… He has no Doubt the Great Stonesfield Beast was a Monitor 40 feet long & big as an Elephant 7 feet high & that the flat triangular tooth with serrated Edges must have belonged to it'.[24] Cuvier's view that the Stonesfield bones were those of a giant lizard was consistent with his belief that the time when the stratified 'secondary' rocks were being deposited was an 'age of reptiles'. Both Smith's map and Greenough's soon-to-be-published version placed the 'oolitic' limestone of Stonesfield squarely amongst these 'secondaries'. It had formed earlier than the chalk and just a little after the 'lias' rocks from which Mary Anning was excavating so many interesting specimens in Lyme Regis. But while Miss Anning's reptilian-looking creatures were clearly adapted to a marine environment, modern monitors were land lizards. Could it be that the Stonesfield beast too had been a terrestrial animal? It was an exciting thought – but not yet one that Buckland would find the time to explore. His immediate attention had been diverted to matters of a more utilitarian kind. He had become involved in a time-consuming undertaking to bring the benefits of gas lighting to the city of Oxford.

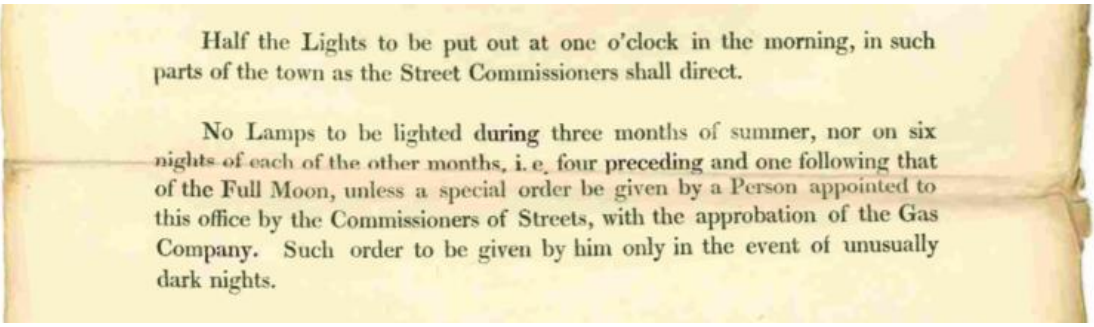
When it was suggested that Oxford might join the growing number of towns whose streets were lit by gas, Buckland had been enthusiastic and keen to invest in the new venture.[25] It was an enterprise designed to appeal to him, mingling scientific and humanitarian causes in equal measure. But, as with all such innovations, there were those who were opposed, and it was probably as much Buckland's emollient personality as his technical acumen that led to him becoming the first chairman of the newly incorporated Oxford Gas Light and Coke Company. The requisite Act of parliament was passed in on 23 May 1818 and it was hoped – somewhat optimistically – to have street lighting in place by that Christmas.[26]

In August Buckland travelled with John Kidd, another investor, to Exeter, where a similar project had been in hand since 1815. Admitting but a small slippage in the schedule, Buckland later told Greenough:

> My Expedition with Kidd to Exeter succeeded very well[.] [T]he Exeter gas is certainly superior to any other & we shall probably adopt it in Oxford wh we hope to illuminate by New years Day. I am in hopes great Part of my Work in Presiding in the Deliberative Department is at an End. We are now working in the Executive wh is a mere matter of Brick & Mortar & Iron & easy sailing.[27]

[24] WB to Greenough, 30 July 1818, UCL/Greenough/B/4/B/44/307.
[25] Anon., *The Oxford and district gas company, 1818-1948* (Stroud: Walter King, 1949), 4.
[26] Lionel Shadwell, *Enactments in Parliament : Specially Concerning the Universities of Oxford and Cambridge*…, Vol. II (Oxford: Clarendon Press, 1912), 364.
[27] WB to Greenough, 18 September 1818, UCL/Greenough/B/4/B/44/310.

But although one or two specimen lamps may have been installed by the new year, it was well into 1819 before the new gas works, situated amongst the impoverished dwellings of the parish of St Ebbes, was supplying gas to all 150 of the new streetlamps in the city centre. Under Buckland's



Half the Lights to be put out at one o'clock in the morning, in such parts of the town as the Street Commissioners shall direct.

No Lamps to be lighted during three months of summer, nor on six nights of each of the other months, i. e. four preceding and one following that of the Full Moon, unless a special order be given by a Person appointed to this office by the Commissioners of Streets, with the approbation of the Gas Company. Such order to be given by him only in the event of unusually dark nights.

Fig. 4.4 Proposed rules concerning the lighting of Oxford's gas streetlights

leadership the company took its profit solely from its private customers and supplied the public street-lighting at cost, although it did place some sensible restrictions on exactly when the lamps should be lit.

Fittingly, Corpus Christi College was among the company's earliest commercial customers. In August 1819 Buckland told Greenough that 'we have been introducing Gas Light in every Part our College from the Hall downwards to Kitchen Buttery Stairways & Passages usque ad Cloacum'.[28]

Once established, the scheme was a great success and on 31 December the Oxford Journal celebrated the city's good fortune in having so fine a luminary as Buckland among its residents:

> Gas-lamps, that mean to rival soon
> The parish lantern, called – the Moon,
> And far and wide their lustre flashing,
> Throw the old stars quite out of fashion :-
> While BUCKLAND'S* scientific name
> Attendant on his *favourite flame,*
> In radiant honour, too shall bloom,
> The Pharos-light of times to come!
>
> * The Rev. Wm. Buckland, Fellow of C.C.C. &c. &c. the indefatigable, energetic, conciliating, and enlightened Chairman of the Oxford Gas and Coke Company.[29]

Buckland undeniably set the Oxford Gas Company upon secure foundations. More than a century later, on the eve of Nationalisation, its last chairman proudly recorded that 'the price of gas in Oxford was as low as anywhere in the Kingdom and the price of the Company's stock was among the highest for similar securities.'[30]

Conscious that he had been neglecting the mineralogical aspects of his subject, Buckland advertised his 1818 lectures as 'the Elements of Mineralogy and Geology'. Gratified that, despite this

[28] WB to Greenough, 24 August 1819, UCL/Greenough/B/4/B/44/323.
[29] *JOJ,* 31 December 1819.
[30] Anon. *Oxford gas company,* 3.

less exciting focus, audience numbers remained buoyant, he told Greenough: 'My Lectures on Simp Mins [simple minerals: the basic building blocks of more complex rock species[31]] go off a thousand times better than I had expected. My class tho today was the 7th Lecture still keeps increasing'.[32] It was, however, becoming clear to Buckland that the subject now required more than the single course of lectures he was paid to give. At Cambridge, where Adam Sedgwick had just been appointed to lecture on the Natural History of the Earth as Woodwardian Professor, there was already a separate mineralogical chair.

As well as the ever-increasing scope of the subject, there was also the matter of resources. Most of Buckland's gentlemanly geological colleagues enjoyed the means to pursue their enthusiasms without further thought. With his own relatively meagre income, it had always been difficult for him to meet, without some personal sacrifice, the costs of travel and the procurement of books, maps and specimens. Cuvier's visit that summer had reminded him that, in France, the government not only provided men like himself with a comfortable home and a very adequate salary but also access to the best scientific facilities and the ability to command the resources of the state in the collection of specimens. He discussed his predicament with his Uncle John, who was quick to offer his support – but not before he had confirmed for himself his nephew's competence.

On 25 May 1818 Buckland told his father:

> at one of my first lectures I had my Uncle for a Pupil & exalted myself many Degrees in his Estimation by talking an Hour & half at full Speed on Subjects above his Comprehension, or rather out of his line & therefore of course Considered by him more sublime & difficult. He is going to present a Syllabus of my Lectures to Lord Eldon & Sir W. Scott, with comments on the Author.[33]

John Buckland's old friends and patrons, John and William Scott, the first a former Lord Chancellor, the other one of the university's MPs, would be useful allies, if and when his nephew did make a bid for further funds.

It is a sign of Buckland's dissatisfaction that, shortly after Cuvier's visit, he was briefly tempted by the possibility of a tutoring engagement 'with a young man who wanted a Companion to travel for the next 12 months'.[34] However, tied up as he was with Gas Company business, he chose to remain in Oxford, using the time to work on cataloguing the Ashmolean collection. But by mid-October he had formulated a plan. First, he would persuade the Vice-Chancellor, Dr Frodsham Hodson, to create for him a new post of Reader in Geology. This proved easily done, after all it cost the university nothing, merely the sanctioning of a further course of lectures for which the new 'Reader' might charge a separate fee. Then, as before, Buckland would petition the government for a stipend to be attached to this new post. He outlined his plan to his uncle:

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[31] Rudwick, *Bursting the Limits,* 62.
[32] Edmonds, 'Oxford Readership in Geology,' 35; Buckland to Greenough, 1 May 1818, UCL/Greenough/B/4/B/44/304.
[33] WB to Charles Buckland, 25 May 1818, DRO/138M/24.
[34] WB to Greenough, 12 August 1818, UCL/Greenough/B/4/B/44/308.

> I state my case thus prospectively. I am Lecturer in Mineralogy – for that I receive £100 per annum and am content. I crave to be Lecturer in Geology – for that I ask £100 for my lectures; and £100 for being Curator of the Collection and shewman of it, or private lecturer to every stranger, foreign or domestic, that comes to Oxford[35]

Having secured the new Readership, Buckland duly submitted a 'memorial' to the Hebdomadal Board for forwarding to the Prince Regent. In it he stressed geology's utilitarian importance to the nation while also warning that it 'is a branch of Knowledge … liable to be perverted to purposes of a tendency dangerous to the Interests of Revealed Religion'. The fear of atheism and insurrection was ever-present, and Buckland implied that only a cadre of clergy, properly instructed in the new science, would be able to convince their congregations that there need be no contradiction between geology and scripture. The Board accepted his proposal and, after Vice-Chancellor Hodson had added some judicious and diplomatic amendments to Buckland's text, a fair copy was sent to Lord Grenville for forwarding to the Prime Minister and thence to the Prince Regent.

On 20 November, the Prime Minister informed Grenville that the Prince Regent had 'approved the appointment of Mr Buckland to be Professor of Geology' with an additional salary of £100 'in addition to what he already enjoys as Reader in Mineralogy'. Ostensibly Buckland had what he had asked for. Despite hinting at the extra expenses incurred in carrying out his duties, his memorial had not specifically requested the additional hundred pounds he had mentioned to his uncle. His strategy had, in fact, been to pursue this through personal application. Shortly after submitting his petition to the Hebdomadal Board, Buckland had travelled to London to speak directly to Charles Arbuthnot, a Secretary at the Treasury. But things had moved fast, and he was already too late. Although Arbuthnot tactfully suggested that he submit a written appeal for a larger-than-usual grant, by the time of their meeting the matter had actually already been settled.

When, three days later, Buckland learned that he had been granted just £100, he immediately spent a further week in London vainly seeking a second interview with Arbuthnot. Eventually Robert Peel, a Christ Church contemporary of William Conybeare, whose election as a University MP Buckland had championed the previous year, interceded on his behalf. Peel was told that although the matter was still under discussion, the Treasury was wary of establishing a precedent by granting any further money. In less diplomatic words: the matter was closed.

However, back in Oxford, it seemed that all might not be quite lost. The Vice-Chancellor thought that funds might be still found, telling Grenville that he hoped 'we shall be able in some shape or other to assist Mr Buckland, and I have when soothing him under the disappointment of hopes unduly raised by Mr Arbuthnot expressed myself to that effect.' But although the kindly Dr Hodson did identify some unallocated funds in the university accounts, no payment was ever made to the newly appointed Reader in Geology.

Buckland allowed nothing of his disappointment to show amongst his friends. On Christmas Eve he wrote to Lady Mary Cole: 'you will be glad to hear I have obtained from the Crown … the

[35] WB to John Buckland, 26 October 1818, DRO/138M/23.

establishment of a Professorship in Geology which I am to hold with my former office of Reader in Mineralogy.'[36] His failure to secure all the money he hoped for was compensated by the…

> 'flattering civilities' he received on his appointment from such eminent men as Sir Joseph Banks and Lord Grenville, to whom it gave 'great satisfaction to reflect that the attainments of the Person by whom [the new Readership] will in the first instance be filled are such as will reflect credit both on the establishment itself and on the University.'[37]

Among the friends that Buckland rushed to tell of his appointment, none was so important as William Conybeare. Since he had first sought his friend's advice concerning Moses, Huttonianism and Creation, while preparing his first lectures, Buckland had often referred to Conybeare where matters of theory or theology were concerned. He now approached him again.

Newly appointed professors customarily introduced themselves with an 'inaugural' lecture. For Buckland this presented a very particular challenge. He knew that many in Oxford remained deeply sceptical about his enterprise. Only a few years later – after he had set off on a journey to the Alps – 'an authoritative elder is said to have exclaimed "Well, Buckland is gone to Italy; so, thank God, we shall hear no more of *this geology*."'[38] It was therefore important that he reassure his audience that 'this geology' was not about to blow apart the foundations of their faith, or entail a descent into the kind of bloody anarchy so recently suffered in France. Like him, his auditors would be men steeped in the classics and he therefore planned to legitimise his new science by emphasising its foundations in ancient learning. After telling Conybeare about his new appointment, he outlined his ideas for the lecture and asked his friend which classical authors he thought it most appropriate to cite.

The generosity of Conybeare's response, which arrived on 4 January 1819, must have been particularly gratifying.[39] The letter began: 'I am most delighted with y^{r} letter – it gives me sincere pleasure to see your career of science becoming daily more brilliant. I highly approve the sketch you have given me'. Then, encouraging Buckland to make his lecture 'a classical composition and publish it', Conybeare became so caught up with the project that he scribbled a further eight pages on the subject, ending: 'These hints swell into an alarming bulk – but still perhaps they may contain something which may be selected with advantage – at any rate they have afforded me much pleasure in throwing them together, whether their perusal will give you any I know not.' He then suggested a long list of possible references, from Herodotus to Plutarch before ending, somewhat ironically in the circumstances: 'P.S. You can afford to pay postage with your fat salary.'

The postage would, in fact, be a sum well spent. Buckland ignored the list of ancient authors and concentrated on the earlier notes that had been 'set down at hazard as they present themselves.' He pencilled his own editorial markings across Conybeare's manuscript: substituting words, striking

[36] WB to Lady Mary Cole, 24 December 1818, NMW/84.20G.D148.
[37] Edmonds, 'Oxford Readership in Geology,' 41.
[38] Gordon, *Life and Correspondence*, 10; Annan identifies the speaker as Thomas Gaisford, who became Dean of Christ Church in 1831, Annan, *The Dons*, 32.
[39] WD Conybeare to WB, December 1818, DRO/138M/548.

out paragraphs, and adding phrases of his own. But, when he had finished, the content and form of Buckland's inaugural lecture remained much as Conybeare had suggested.

Vindiciae Geologicae, or the Connexion of Geology with Religion Explained, as the published version of the lecture would be titled, was a manifesto declaring geology's rightful claim to a place in the University's curriculum.[40] Its object was to demonstrate that geology, rather than being inimical to the teachings of the church, actually supported them: most obviously by providing physical evidence of a devastating flood that might be equated with that reported in the Book of Genesis, but also by contributing to the arguments of that branch of teaching known as 'natural theology'.

Natural theology assumes that a rational study of nature will show that the world must be the work of a 'benevolent, intelligent and superintending Deity'.[41] Ever since 1687 when Newton explained the ordered, and therefore seemingly designed, working of the universe in his *Principia*, these ideas – which originated far back in classical antiquity – had become a primary theological underpinning of the Anglican Church. In 1802, William Paley, a respected and popular theological author, had published a comprehensive account of this 'argument from design'. Like his earlier books, *Natural Theology, or Evidence of the Existence and Attributes of the Deity, collected from the appearances of nature*, went through many editions, becoming essential reading for students at both Oxford and Cambridge.[42] It was Paley's view that a rational man, having seen, in nature, evidence for the existence of an immanent deity, would progress to belief in the paternal Christian God revealed in the Holy Scriptures. For the clergy of the Established Church such belief was as vital to the social stability of the nation as it was to the eternal souls of their future flocks; as events in France had shown, infidelity led to insurrection.

Buckland's lecture would demonstrate that geology, alongside the more familiar sciences of anatomy and botany, could play its part in supporting Paley's simple and palatable form of theology. It was delivered on 15 May 1819 before a large and august audience that included Lord Grenville, the University's Chancellor, whom Buckland now recognised as an influential ally.[43] Following the usual obligatory acknowledgements, Buckland expressed gratitude to both the Prince Regent and to the 'highest authorities in this place' that geology had become a subject 'exalted to the rank of sciences, the teaching of which forms part of our established system of education'. He nodded to Oxford's centuries of tradition by adding that not 'a single particle of our own peculiar, and, as we think, better system of Classical Education' should be surrendered as a consequence. Then, using words taken more or less verbatim from Conybeare's letter, he described geology's utility both in terms of 'pecuniary profit and tangible advantage' and, more nobly, the gratification of the human mind's appetite for truth. He suggested that not only would geological investigation lead students into contemplation of sublime aspects of nature, but that the study of this 'third part of nature' would both complement

[40] Buckland, V*indiciæ*.
[41] John Herschel, quoted in C.C. Gillispie, *Genesis and Geology* (New York: Harper & Row, 1959), 32.
[42] Paley, *Natural Theology*.
[43] Boylan, 'William Buckland,' [thesis], 81.

and supplement mankind's knowledge of the animal and vegetable kingdoms. Geology would enjoy a symbiotic relationship with subjects like chemistry and mathematics; '[s]o that while she receives assistance from many sciences, she on the other hand imparts her light to others'. He concluded by emphasising the need for this wider curriculum: 'the philosopher of our days can no longer be allowed to remain satisfied with those inquiries which belong to any single branch [of science]'.

Having settled the matter of geology's usefulness, Buckland went on to enumerate his 'proofs in support of Natural Theology', supported by well-chosen quotations from Newton, Paley and others. These 'proofs' ranged from the convenient disposition of mineral resources to the unfailing constancy of water supply, and, as Buckland explained, they had all clearly been arranged by a benevolent Creator for the benefit of the earth's 'various millions of inhabitants'.

But Buckland knew that these proofs alone would not satisfy his more serious detractors. With a slight note of defensiveness, he began the third and final part of the lecture where he examined 'in what degree the results of Geological investigations appear to have affected the evidences of Revelation'. Such matters had been only lightly touched upon in Conybeare's letter and Buckland had scored through this section, scribbling beside it 'MS. W.B.' If he was to make the most of this opportunity, it was crucial that he did not flinch from addressing the apprehensions of his fiercest critics, the ardent scripturalists.

The principal difficulty to be overcome concerned the apparent age of the earth. Since the seventeenth century histories of the earth had largely assumed the universe to be coeval with mankind. Bookish 'armchair philosophers' had produced any number of so-called 'sacred histories of the earth'. These scholarly men did no fieldwork and took no account of the evidence of the rocks, basing their work entirely on the study of ancient texts including, most prominently, the Bible. But it was now apparent to those who did trouble to examine the earth itself that the six thousand or so years allowed by these writers, abetted by sincere and learned chronologers like Archbishop Ussher, was nowhere near long enough for the globe to have achieved its present state. It was clear to Buckland, and to any serious geologist, that the earth was much more ancient. But how could this evidence, so clearly written in the book of nature, be reconciled with the divinely inspired words in the Book of Genesis?

Five years earlier, Thomas Chalmers, an up-and-coming Scottish divine, had brought this problem to public attention by including a chapter entitled 'The Scepticism of Geologists' in his popular book *The evidence and authority of the Christian revelation*.[44] The solution to the problem, according to Chalmers, was to interpret the opening verse of the Holy Scripture 'In the beginning God created the heaven and the earth' not as a mere summary of what was to follow, but as a description of the divine activity that preceded the six days of creation. In such an interpretation 'the beginning' became an undefined period during which God oversaw the formational processes that were now becoming so evident to geologists. This explanation appealed to Buckland, who concluded that if such ideas were acceptable to 'some of the ablest divines and writers of the English Church, men uninterested

[44] Thomas Chalmers, *The Evidence and Authority of the Christian Revelation* (Philadelphia: Anthony Finley, 1817), 166-75.

in geology, but interested in Religion; no danger can surely be apprehended from their admission'.[45] Furthermore, he reassured his audience, nothing discovered by geologists had at all undermined 'the Records of Sacred History and Profane Tradition' concerning the short span of time allotted to the '*existence of mankind*'.

But while this argument neatly disposed of the most obvious stumbling block dropped by geology in the path of faith, Buckland wanted to go further. If geology could only prove the reality of an event like the great Flood described in chapters 6 to 8 of the Book of Genesis, then surely his position would be secure. It was not, he thought, beyond the bounds of possibility:

> Again, the grand fact of *an universal deluge* at no very remote period is proved on grounds so decisive and incontrovertible, that, had we never heard of such an event from Scripture, or any other authority, Geology of itself must have called in the assistance of some such catastrophe.[46]

This bold assertion was based not just on his own observations, or even those of his former teacher Dr Kidd, but on the testimony of his new friend, Georges Cuvier.

In 1812 Cuvier had quite literally 'made history' when he published his monumental study of fossil remains, *Recherches sur Les Ossemens Fossiles de Quadrupeds.*[47] In the prefatory 'Discours Preliminaire' to this work Cuvier suggested that, long before man appeared on earth, the globe had undergone several 'revolutions' – by which he meant floods or inundations – that had caused the extinction of many species. However, while Cuvier admitted to evidence for 'a revolution' that had 'buried all the countries *which were before inhabited by men and by the other animals that are now best known*', and even suggested that this occurrence had happened not 'much farther back than five or six thousand years ago', he had nowhere specifically equated this 'revolution' to the biblical Flood.[48] He had no need to do so. In France, science and religion were now entirely separate spheres of study and no one attempted to integrate the two. But for Buckland, in the traditional atmosphere of Anglican Oxford, the situation was different, and he was happy to press Cuvier's 'Preliminary Discourse' – translated into English under the misleading title *Essay on the Theory of the Earth* – into service for a purpose quite different from that intended by its author.[49]

However, the Bible called for just one flood, and Cuvier had provided a whole sequence. Undeterred, Buckland asserted that if geology 'shews that the present system of this planet is built on the wreck and ruins of one more ancient, there is nothing in this inconsistent with the Mosaic declaration, that the whole material universe was created in the beginning by the Almighty'.[50] This time he found theological warrant for his words in the work of the young theologian and Eton schoolmaster John Bird Sumner, from whose 1816 work, *A Treatise of the Records of Creation,* he quoted long passages, including the telling statement that 'we are not called upon to deny the possible existence of previous

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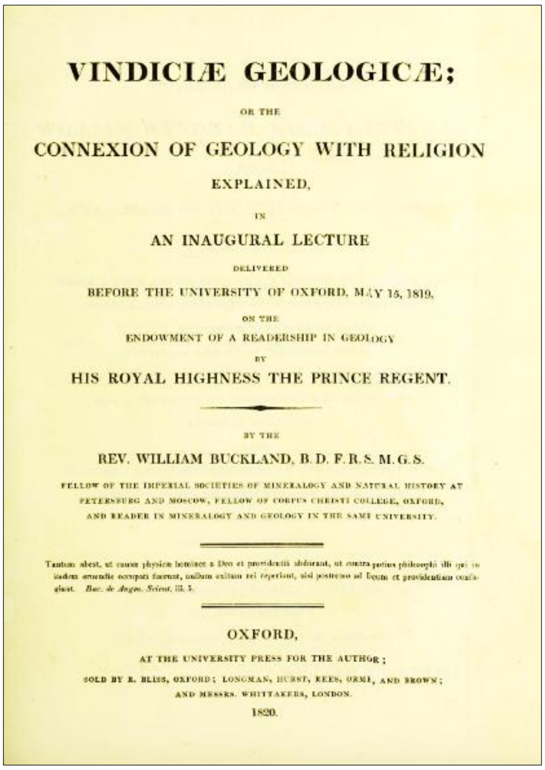
[45] Buckland, *Vindiciae,* 33.
[46] Ibid., 23.
[47] Georges Cuvier, *Recherches Sur Les Ossemens Fossiles de Quadrupèdes* (Paris: Deterville, 1812).
[48] Buckland, V*indiciæ*, 24.
[49] Georges Cuvier, *Essay on the Theory of the Earth*, trans. Robert Kerr (Edinburgh: William Blackwood, 1817).
[50] Buckland, V*indiciæ,* 24.

worlds, from the wreck of which our globe was organized, and the ruins of which are now furnishing matter to our curiosity.'[51]



VINDICIÆ GEOLOGICÆ;

OR THE

CONNEXION OF GEOLOGY WITH RELIGION

EXPLAINED,

IN

AN INAUGURAL LECTURE

DELIVERED

BEFORE THE UNIVERSITY OF OXFORD, MAY 15, 1819,

ON THE

ENDOWMENT OF A READERSHIP IN GEOLOGY

BY

HIS ROYAL HIGHNESS THE PRINCE REGENT.

BY THE

REV. WILLIAM BUCKLAND, B. D. F. R. S. M. G. S.

FELLOW OF THE IMPERIAL SOCIETIES OF MINERALOGY AND NATURAL HISTORY AT PETERSBURG AND MOSCOW, FELLOW OF CORPUS CHRISTI COLLEGE, OXFORD, AND READER IN MINERALOGY AND GEOLOGY IN THE SAME UNIVERSITY.

Tantum abest, ut causæ physicæ homines a Deo et providentiâ abducant, ut contra potius philosophi illi qui in iisdem eruendis occupati fuerunt, nullum exitum rei reperiant, nisi postremo ad Deum et providentiam confugiant. *Bac. de Augm. Scient.* iii. 5.

OXFORD,

AT THE UNIVERSITY PRESS FOR THE AUTHOR;

SOLD BY R. BLISS, OXFORD; LONGMAN, HURST, REES, ORME, AND BROWN; AND MESSRS. WHITTAKERS, LONDON.

1820.

Fig. 4.5 Vindiciae Geologicae, title page

In the end Buckland did not mention Herodotus, Plutarch or any other ancient author, preferring instead to base his case on the work of well-respected thinkers of the modern world. He quoted, at various lengths, from Francis Bacon, Newton, Paley, Cuvier and Sumner – but none so much as he did from the letter of his friend William Conybeare.

The lecture did as it was designed to do. It allowed, without too much dissent, what Buckland referred to as 'the ingrafting … of the study of the new and curious sciences of Geology and Mineralogy, on that ancient and venerable stock of classical literature from which the English system of education has imparted to its followers a refinement of taste peculiarly their own'.[52] Once again following Conybeare's advice, Buckland arranged and paid for the University Press to print the text. It was published the following year, by which time Buckland had added a four-page appendix elaborating what he alleged were nine 'Proofs afforded by Geology of the Mosaic Deluge'. He sent bound copies to more than 100 friends and colleagues in Oxford and beyond but, as it appears, few others made it past the shelves of booksellers.[53] Four years later, in 1824, he sent a batch of 250 unbound copies to John Murray in the hope that the publisher would bind them and present them for sale at three shillings each. There is no record that this was ever done. Although, today, the few copies that have survived change hands for many hundreds of pounds, it seems that, at the time of publication, Buckland's first attempt at authorship was effectively 'remaindered'.

Vindicae was, however, not Buckland's only foray into what he hoped would be the 'popular print' at this time. Something about *King Coal's Levee* had appealed to Buckland straight away. It was a rollicking verse narrative in which species of rock were caricatured as courtiers at a royal reception and was, he felt, just what was needed to bring geology to a wider audience.[54] Its author, John Scafe, had printed just twenty-five copies, but as soon as he saw it, Buckland suggested a second edition, with

[51] J.B. Sumner, *A treatise on the records of the creation, and on the moral attributes of the Creator* (London: Hatchard, 1816), 357-8. Sumner would later become Bishop of Chester and then Archbishop of Canterbury.
[52] Buckland, V*indiciæ,* 2-3.
[53] Edmonds, 'Vindiciae Geologicae,' 255.
[54] WB to Lady Mary Cole, 13 July 1819, NMW84.20G.D/150.

extra notes to be contributed by himself. An equally enthusiastic William Conybeare offered to make 'some additions to the Machinery of the Poem' itself.[55]

Several editions of the augmented work appeared during the latter part of 1819. They were widely distributed, even reaching Goethe, who began (but never finished) a German translation.[56] But, successful as it was, *King Coal's Levee* gave Buckland an early lesson in the dangers of upsetting his public. It was not the geological story that gave offence but the nonsensical dramatic vehicle used by Scafe to tell it: in particular a scene where a rabble of plebeian Pebbles is held at bay by brave King Coal. For Buckland and Conybeare, the poem itself was of no consequence, 'emancipate[d]', as it was, 'from its cumbrous connexion with sense'.[57] This was the summer of the 'Peterloo Massacre' and nerves were raw. Some were only too keen to interpret the innocuous allusion to a gravelly mob as a wilful incitement to revolt.[58] The Privy Council received a report that the poem was being used to inspire insurrection in the manufacturing areas of the north. The same informant suggested an 'Oxford conspiracy ... for bringing the Government into contempt, and for blowing up our excellent Constitution in Church and State.'[59] Could it be doubted, the informant went on, 'that by King Coal is meant any other personage than his royal highness the Prince Regent?' Fortunately the Privy Counsellors did doubt it and the fuss soon died down. But the lesson was clear: what passed as a pleasing allegory in the rarified atmosphere of an Oxford common room might be easily misconstrued in the streets outside.

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[55] Ibid.
[56] Hugh S. Torrens, 'Scafe, John (1776–1843),' in *ODNB*, 2004.
[57] [W. Buckland, and W.D. Conybeare] 'A Critical Dissertation on "King Coal's Levee",' appended to [John Scafe], *A Geological Primer in Verse*, (London: Longman, 1820), 50. See also Adelene Buckland, 'The World Beneath Our Feet,' in *Time Travellers*, ed. A. Buckland and S. Qureshi (Chicago: University of Chicago press, 2020), 56-59.
[58] Rupke, *Great Chain*, 224; O'Connor, *World on Show*, 83.
[59] [Buckland and Conybeare] 'Critical Dissertation,' 61-4.

Chapter Five

1820-1821

Making friends – at home and abroad

Not long after Buckland's Oxford colleagues had listened to his inaugural lecture, his friends at the Geological Society were treated to his *Description of the Quartz Rock of the Lickey Hill … with considerations on the evidences of a Recent Deluge…*'. This was an analysis of the distribution of the small quartz pebbles that littered parts of the Oxfordshire countryside. A decade earlier John Kidd had drawn attention to these well-rounded stones, swept from their source in Worcestershire, as he believed, by the Biblical Flood.[1] Buckland's researches added more precision to Kidd's observations, mapping the direction and scale of the presumed deluge. He was now testing this evidence before the nation's highest geological court. If these avowedly scientific London gentlemen assented to 'the grand fact of *an universal deluge',* his Oxford colleagues must surely be reassured that his science did indeed support the scriptural account.[2]

The paper acknowledged the assistance of two important field collaborators. The first was August Breunner, a Viennese nobleman whom Greenough had invited to the 1819 Whitsuntide gathering – held that year in the West Midlands. After the meeting Breunner had accompanied Buckland in an exploration of the area around Lickey Hill in Worcestershire, where they examined the outcrop of quartzite that Kidd had earlier identified as the source for the rounded pebbles.[3]

Fig. 5.1 Count August Breunner

Both Greenough and Buckland were clearly impressed by the young Count. Back in London, Breunner was elected an honorary Foreign Member of the Geological Society, and a week later, thanks to Buckland's intercession, he was in Oxford to receive the degree of Doctor in Civil Laws.[4] Once again, patronage had oiled the cogs of international collaboration. But while the cultivation of a rich Austrian aristocrat was entirely consistent with Buckland's strategy of self-promotion, his motives in enlisting help from the young daughter of an Abingdon solicitor were of a different complexion entirely.

As told by Cornish Quaker diarist Caroline Fox, Buckland met Mary Morland in a Dorset coach.

> Dr Buckland was once travelling somewhere in Dorsetshire, and reading a new and weighty book of Cuvier's which he had just received from the publisher; a lady was also in the coach, and amongst her books was this identical one, which Cuvier had sent her. They got

[1] Kidd, *Outlines*, iii-vi.
[2] Buckland, *Vindiciae*, 23 (italics as original).
[3] WB to Greenough, 7 June 1819, UCL/Greenough/B/4/B/44/319; William Buckland, 'XXVIII. Description of the Quartz Rock of the Lickey Hill in Worcestershire…,' *TGSL* s1, 5 (1821): 506.
[4] *Oxford Calendar,* 1820, 138.

> into conversation, the drift of which was so peculiar that Dr Buckland at last exclaimed, "You must be Miss ——— to whom I am about to deliver a letter of introduction."[5]

Sadly, this intriguing and romantic story is almost certainly untrue. It seems that Miss Fox may have misconstrued a story told her by Cornish engineer and MP, Davies Gilbert, about his own meeting with Miss Morland, which did occur in a coach, in Dorset, in 1823. By that time Mary might well have been carrying a copy of Cuvier's book – possibly given to her by the author in acknowledgement of her own contributions to it.[6] Her acquaintance with Buckland, however, began long before that book was published.

Mary Morland's mother had died in 1799, shortly after her daughter's first birthday. In 1802 Mary's father, Benjamin, had remarried, and by the time of her meeting with Buckland Mary was living, along with ten younger step-brothers and sisters, at Sheepstead House, Marcham, the substantial home that her father had bought in 1812.[7] Benjamin Morland clearly encouraged his eldest daughter's interests in natural history. A successful solicitor and businessman, Morland was involved in several projects that caused him to take an interest in scientific matters: he even subscribed to William Smith's 1815 geological map. The Morlands were also friends of Sir Christopher and Lady Pegge in Oxford and it may have been something of a relief for Mary to occasionally escape the hurly-burly of Sheepstead House to spend time at their Oxford home. In Oxford, Mary enjoyed the run of Sir Christopher's library as well as his collection of mineralogical specimens. As her interests developed, Mary undertook a programme of self-education by copying passages from scientific books. One of her notebooks has been preserved: half bound in red leather, its plain grey boards are inscribed in neat black manuscript:

Fig. 5.2 Mary Morland (1797-1857) – probably drawn by her eldest daughter, Mary Ann Scott Buckland

Mary Morland
Natural History

The flyleaf is dated June 1817 and on the first verso page, under the heading 'Argonaut, or Paper Nautilus in different views', Mary has conscientiously copied out a translation of Pliny's description of the animal. Her source is given as the second volume of *Zoological lectures* of George Shaw.[8] However, it is not the neatly written note that captures the eye but the exquisitely executed illustration opposite. Here, Mary has reproduced the relevant woodcut from Shaw's book, transfiguring the dull black

[5] Caroline Fox, *Memories of Old Friends…,* ed. Horace N. Pym (London: Smith, Elder, 1882), 44.
[6] Martina Kölbl-Ebert, 'Mary Buckland (née Morland) 1797-1857,' *ESH* 16, 1 (1997): 37 n.5; Pentland to WB, 2 July 1821 in W.A.S. Sarjeant and Justin B. Delair, 'An Irish Naturalist in Cuvier's Laboratory. The Letters of Joseph Pentland 1820-1832,' *BBM(NH)* (hist. ser.) 6 (1980): 274.
[7] The Morlands were a prominent brewing family. The name is still familiar to beer drinkers today.
[8] Shaw was keeper of natural history at the British Museum; he delivered these lectures at the Royal Institution.

Fig. 5.3 Mary Morland's copy of the Argonaut or Paper Nautilus (with original on left)

outlines of the original by the addition of her own meticulous colour-wash. Leafing through the little book, we find it filled with similarly illustrated notes transcribed from several sources: an entry on fossil lilies copied from James Parkinson's *Organic Remains,* or an account of the northern polar region taken from the *Quarterly Review*. There are also long extracts from the Geological Society's *Transactions*: one, headed 'Irish Chalk', being notes taken from William Conybeare's paper reporting on the visit that he and Buckland made to Ireland in 1813. The notebook contains no original work, but the range of topics and the careful selection of concise and salient extracts testify to the breadth of Mary's interests and the depth of her reading. Sir Christopher, lacking a son to whom to pass on his enthusiasms, must have been delighted that his friend's daughter should show such aptitude. When he died, in 1822, he left Mary his mineral collection together with 'all my books of natural history and comparative anatomy as a mark of my esteem and regard'.[9]

Failing the Dorsetshire coach story, we cannot be sure when or where Mary Morland first met Buckland. Were they introduced by their mutual friends, the Pegges, or through some other connection within the Oxfordshire gentry? It is even possible that she met him as a result of her father's own geological interests. What we can be certain of is that, despite the thirteen-year difference in their ages, a warm mutual attraction quickly developed. Mary clearly admired Buckland's ability, telling him as early as May 1820: 'I wish you had time and inclination to write an elementary work on Geology – you write so clearly and intelligibly'.[10] By then they had known each other for at least a year and Mary had, in turn, already proved herself in Buckland's eyes. Their daughter, Mrs Elizabeth Gordon, tells us that Mary drove a little chaise pulled by a 'beautiful white Spanish Donkey' to go in search of 'freshwater and land shells of which she made a very fine collection'. This was clearly a serious pursuit. Perhaps encouraged by Buckland, or maybe her father, she even corresponded and exchanged specimens with the zoologist William Leach at the British Museum. Leach sent her papers to read and encouraged her own writing, commenting on the excellence of her notes. But it must surely have been Buckland who urged her to expand her snail-hunting forays in the valleys of the Cherwell and Evenlode to include a search for the small quartz pebbles that his *Lickey Hill* paper depended upon. No longer just a copyist

[9] Kölbl-Ebert, 'Mary Buckland,' 33–38; Hugh S. Torrens, 'Buckland [née Morland], Mary (1797–1857),' in *ODNB*, 2004.
[10] Mary Morland to WB, 11 May 1820, NZSL/BUC/5.

of others' work, Mary was now an active fieldworker making her own original observations. By Buckland's own admission he was 'under extensive obligations' to her for her 'exertions in the cause of geology'.[11]

Meanwhile Buckland had his own family in Devon to consider. Charles Buckland's late alliance to Ann Mallock had proved more than a mere marriage of convenience and in 1817 a son, Samuel, had been born. This can hardly have been welcome news to Buckland but, with his father now in his seventieth year and increasingly frail, he felt bound to offer what help he could. In fact, he would take an active interest in the careers of all his brothers.

The Buckland family, poised between the world of the minor gentry and that of the mercantile class, could not afford to despise 'trade'. Whereas for the nobility the church offered a gentlemanly occupation for younger sons lacking the spirit for a military career, for families like the Bucklands a university education and a subsequent curacy remained an aspiration for a favoured few. For the rest the harsher world of commerce beckoned. Despite his personal predisposition to associate in circles of wealth and power, Buckland was no snob. He recognised the need for talent in every part of the economy. It was a theme he often returned to, considering it short-sighted that conventional English propriety rendered any occupation remotely connected to manual labour unbecoming of a gentleman. He compared the situation with that on the Continent, where

> the younger sons & brothers of noblemen, in fact all such people as with us block up the entrances or the inside of the church [who] superintend the miners and that office wh. in England is filled by private individuals of humble station narrow minds & uncultivated understandings is there held by gentlemen in a public capacity, the most learned & scientific of the day.[12]

Nevertheless, the eldest of his brothers, John, whose lax attitude had so vexed their uncle, had managed to follow Buckland to Oxford, and, having taken Holy Orders, had been appointed a 'professor' at the Royal Military College at Marlow.[13] In 1816 John married Frances, one of the 'uncommonly pleasant' Arnold girls that had so impressed Buckland on his visit to the Isle of Wight seven years before.[14] John and Frances set up home in the Thames-side village of Laleham, where in 1819 John opened a school in partnership with Thomas Arnold, the youngest of Frances' three brothers.[15] Although Arnold remained at Laleham – offering private tuition to a few older boys – until he left in 1828 to make his name at Rugby School, his partnership with John was amicably dissolved in 1825, leaving John in sole charge of the remaining preparatory school.

Meanwhile, brother Charles had married and was living in London, where, thanks in part to a helpful contact made through his Uncle John, he was making his way in the linen drapery business.

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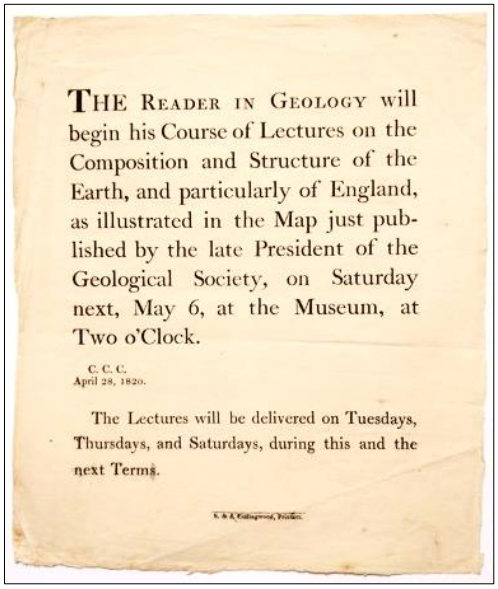
[11] Buckland, 'Quartz Rock of Lickey Hill,' 525.
[12] J.H. Newman, MS notes of Buckland's lectures, quoted in Boylan, 'William Buckland,' [thesis], 533.
[13] *JOJ,* 25 July 1807.
[14] *JOJ*, 27 July 1816
[15] A. Reeve, 'Arnold, Thomas (1795–1842),' in *ODNB*, 2004.

Although, at this time, nothing is known of Henry's whereabouts, Buckland had earlier expressed the strong opinion that 'Harry seems so well qualified for a merchant … that even if it were practicable, it would be a strange misapplication and waste … to breed him up to any other Profession.'[16] By 1830 Henry Buckland was living in New York where, according to Buckland's geological friend George Featherstone, he was suffering a 'daily diminution of his resources'.[17] In collaboration with his Uncle John, Buckland was able to set up a £100 annuity, which together with some other family money, helped to ease his brother's distress.

Only Walter, the youngest of Buckland's full brothers – born in 1793 – remained in Axminster, content, according to Buckland, to live 'the remainder of his idle life' there, paying £12 a year for two rented rooms and having his dinner provided for him from the George Inn.[18] Although Walter was said to have 'no pretensions to literary or scientific attainments', he was active amongst Axminster's Freemasons and apparently well-loved within the town.[19]

Buckland spent most of September 1819 with his father and was just thinking of leaving when an accident detained him in Devon for another month. While hammering rock a spark had flown into his eye. When the iron fragment 'began to oxydate' it took 'half a Dozen Journeys to Exeter' for a series of operations to 'cut it out piecemeal'. Knowing that his own father had been blind for almost 20 years, the injury clearly shook him and prevented any reading or writing during most of October.[20] On 29th he wrote to Lady Mary Cole, 'I have been taught to appreciate still more than I did before the value of the Organs of Vision as the fairest Inlets of Knowledge & Pleasure to the Soul.'

According to the date printed on its first edition, *A Geological Map of England and Wales by G.B. Greenough Esq.* was published in November 1819. However, it was May 1820 before subscribers received their copies, with many final adjustments being made in the intervening period. On 22 December Buckland ensured that Lord Grenville knew that he had been 'detained … by the final Correction of Mr Greenough's Map of England which required a Multitude of Alternations no Person but myself could make.'[21] As soon as the map was available, Buckland put it to use by advertising his geological lectures as being 'on the Composition and Structure of


THE READER IN GEOLOGY will begin his Course of Lectures on the Composition and Structure of the Earth, and particularly of England, as illustrated in the Map just published by the late President of the Geological Society, on Saturday next, May 6, at the Museum, at Two o'Clock.

C. C. C.
April 28, 1820.

The Lectures will be delivered on Tuesdays, Thursdays, and Saturdays, during this and the next Terms.

Fig. 5.4 Handbill advertising Buckland's Geological Lectures in 1820

[16] WB to Charles Buckland, 1 May 1808, DRO/138M/36.
[17] Featherstonhaugh to WB, 12 July 1830, DRO/138M/264
[18] WB to Henry Buckland, 22 November 1830, RS/MS/251/38.
[19] *TEFP*, 3 November 1859.
[20] WB to Lady Mary Cole, 29 October 1819, NMW84.20G.D151; WB to Greenough, 3 November 1819, UCL/Greenough/B/4/B/44/324.
[21] WB to Grenville, 22 December 1819, BL Add MS 58995 ff.79 & 80.

the Earth, and particularly of England, as illustrated in the Map just published by the late President of the Geological Society'.[22]

His lectures delivered, Buckland agreed to join Greenough and Breunner in the Alps, followed by a visit to Breunner's home city of Vienna. He arranged to meet his friends in Milan in mid-July, giving himself time to make a couple of stops along the way. A month earlier he had asked Mary Morland to make drawings of some unspecified fossil specimens for Georges Cuvier – the first of several commissions that she would undertake for the Frenchman.[23] Buckland would now deliver these gifts, before moving on to examine for himself the volcanic district of the Auvergne.

Cuvier greeted Buckland: 'with the greatest cordiality, and saluting my cheeks with more than English familiarity … [he] immediately made a dinner for me, inviting Humboldt … and several others of the savants of Paris'.[24] For the next few days the Englishman wandered about the Jardin du Roi, attending lectures and discussing his favourite science with the foremost Continental savants including the German, Alexander Humboldt, who plainly impressed him. 'He talks more rapidly and more sensibly than any man I ever saw, and with a brilliancy that is indicative of the highest level of genius.'[25]

However, determined to 'attend to nothing there but my undergroundology', after a stay of six days Buckland left Paris, albeit with 'pressing invitations to visit it again on my return' ringing in his ears.[26] Reaching Clermont, he ascended the Puy-de-Dome and examined the chain of smaller volcanic remains of which it forms part. Having assured himself that the region's volcanic activity was 'post diluvian' he noted that the lava flows 'stand on, and have burst up through, an enormous mass and elevated plain of granite'.[27] The modest grandeur of the scenery also did not escape his notice. As he told his friend, the Welsh judge, Sir John Nicholl: 'the mountains…are yet beautiful, presenting that second-rate style of mountain scenery which we have in the best parts of Monmouthshire.'[28] But time was short and he pressed on to Milan, to join his friends and turn his attention to the Alps: unarguably mountain scenery of a first-rate style.

The rendezvous accomplished, the three geologists spent several weeks exploring the Tyrol and Grisons regions before making their way east towards Cracow and then retracing their steps towards Vienna. There Buckland left his friends to continue to unravel the geology of the area around the city. In a rare display of informality Breunner would later write 'believe me, dear Bucks, the Vienna bason is not so easily made out as I thought it at first'.[29] Meanwhile, 'Bucks' himself headed west, first along the Danube and then across to Munich where he fell in with an American professor of Greek, who let him share his coach as far as Geneva. As Buckland later told Greenough: 'I am fortunate thus to

[22] Handbill, 28 April 1820, private collection.
[23] Mary Morland to WB, 11 May 1820, NZSL/BUC/5.
[24] Gordon, *Life and Correspondence*, 37.
[25] Ibid., 38.
[26] Pentland to Thomas Webster, 29 June 1820, in J. Challinor, 'Some Correspondence of Thomas Webster, Geologist (1773–1844) I,' *AS* 17 (1961): 186. WB to Sir John Nicholl, 1820, quoted in Gordon, *Life and Correspondence*, 40.
[27] Gordon, *Life and Correspondence*, 40.
[28] Ibid.
[29] Breunner to WB, 6 April 1821, OUMNH/WB/A/1/073.

get a Companion for the time I wanted … The only fault I find is a little impatience at the time I take for stone Picking'.[30] In Zurich he was able to question the naturalist Hans Conrad Escher about the way that huge boulders had been moved during a recent landslide in the Val de Bagnes – more potential evidence for his diluvial theory.[31]

On his way north, Buckland took his Parisian hosts at their word and stopped once again in the French capital, where he assisted 'at a kind of Geological Congress… with Humboldt & several French Travellers in Italy France Germany & Hungary'.[32] He was pleased to find that his newly acquired knowledge 'harmonise[d] most delightfully' with that of the Parisian savants and that, between them, they were able to establish 'a nomenclature & come to an understanding with respect to the identity of English & Continental formations': all very much in accordance with what he had set out to do.[33]

Among those that Buckland met in Paris was Joseph Pentland, a talented, if somewhat opinionated, Irish student who had managed to inveigle himself into position as an assistant to Cuvier. The English-speaking Pentland's presence in the Jardin du Roi undoubtedly contributed to Buckland's fruitful alliance with Cuvier and his colleagues at the Museum. This collaboration was based on assistance with the procurement of publications and, even more importantly, the exchange of specimens – or sometimes casts or drawings of these that acted as efficient proxies.[34] In one of several letters sent after Buckland's return to Oxford, Pentland wrote:

> Mr Cuvier desires me for the moment to thank you for the superb present you intend to make him, he will write to you very soon himself more fully on the subject. I am sure that nothing can be more liberal on your part as such an offer, which at the same time that it will render Mr Cuvier under an obligation to you personally, will advance in his hands considerably the history of this interesting and extinct species.[35]

The promised gift was the skull of a rhinoceros: according to Buckland '[t]he largest and finest head I have ever seen of this species'. The fossil had come from a correspondent at St. Petersburg and although Buckland did already have access to a similar skull – one of two found near Rugby in 1815 – the donation of this superior specimen to Cuvier was plainly a deliberate signal of his respect for the French anatomist, demonstrating his intention that the materials trafficked between them should be of the highest quality and scientific value.[36]

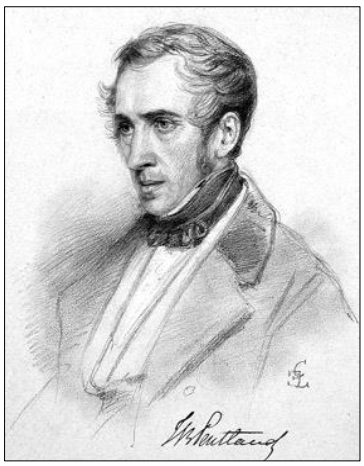


Fig. 5.5 Joseph Pentland (1797-1873)

[30] WB to Greenough, 17 September 1820, UCL/Greenough/B/4/B/44/325.
[31] Ibid. See also Rudwick, *Bursting the Limits*, 617-8.
[32] WB to Grenville, 13 November 1820, BL Add MS 58995 ff.81-2
[33] WB to Grenville, 13 November 1820, BL Add MS 58995 ff.81-2
[34] Pentland to WB, 24 April 1821, in Sarjeant and Delair, 'Irish Naturalist,' 269.
[35] Pentland to WB, 20 November 1820, in Sarjeant and Delair, 'Irish Naturalist,' 261: (where it is incorrectly dated as "20 Sbr. 1821")
[36] The second of the two skulls found at Newnham, just outside Rugby, was presented by Henry Warburton to the Geological Society, in whose Burlington House library it remains.

In addition to this physical exchange Pentland also facilitated a profitable exchange of information. During the winter, as Buckland set down his thoughts on the structure of the Alpine mountains – the fossils he had seen had convinced him that, contrary to Werner's supposition, many of the rocks were not 'primitive' – he was in regular correspondence with Pentland and, through him, others at the Museum.[37] To ensure timely publication of his work – perhaps with an eye to establishing priority – Buckland sent a long contribution to the June edition of the *Annals of Philosophy,* one of several commercial ventures that had sprung up to cater for the growing interest in scientific matters.[38] The nineteen page article was billed as a 'prospective notice… of a future and more extensive communication to the Geological Society' although, in the event, no such 'communication' ever appeared under Buckland's name.[39] Copies of this 'notice' were rushed to Paris to be distributed by Pentland, who was 'sure both Humboldt & Brongniart will be highly pleased with it, especially with the comparative tabular view placed at the end.'[40] This table, which correlated specific strata on the continent with counterparts in England, was a logical geographical extension to the stratigraphic tables that Buckland had been steadily refining over much of the previous decade.

It was perhaps Buckland's blossoming relationship with the anatomists at the Paris Museum that led him to add a short catalogue of vertebrate remains to the published version of his Lickey Hill paper in early 1821. He suggested that the soft and unmineralised bones found amongst the gravel deposits in different parts of the world 'oblige us to refer their origin to a common cause, viz. the latest diluvian catastrophe that has affected the surface of our globe.[41]' He had clearly discussed these ideas with Pentland who was 'almost entirely converted' as far as the gravel was concerned, but 'very far from supposing with you that the remains of Animals contained therein belong to individuals which formerly lived in the latitudes where they are actually found.'[42] The Irishman could not accept that the antediluvian world could have been so different that any animal – apart from 'man and man alone' – would be endowed 'with a constitution and Structure' that enabled it to inhabit every region of the earth. He told Buckland that '[i]n my humble opinion it is much easier to suppose a general dispersion of the remains of certain genera and species all over the globe's surface by the effects of the last and very recent diluvian action'.[43] Cuvier, however, appears to have been less sceptical,

[37] Laudan, *Mineralogy to Geology,* 194. Pentland to WB, various dates between November 1820 and June 1821, in Sarjeant and Delair, 'Irish Naturalist,' 261-273.
[38] For an analysis of the burgeoning scientific periodical press in the early nineteenth century see G. Dawson and J.R. Topham, 'Scientific, Medical, and Technical Periodicals in Nineteenth-Century Britain: New Formats for New Readers,' in *Science periodicals in nineteenth-century Britain: constructing scientific communities*, ed. Gowan Dawson et al. (Chicago: University of Chicago Press, 2020), 39-45.
[39] William Buckland, 'Notice of a paper laid before the Geological Society on the Structure of the Alps and adjoining Parts of the Continent, and their Relation to the Secondary and Transition Rocks of England,' *AP* n.s., 1 (1821): 450-68.
[40] Pentland to WB, 21 June 1821, in Sarjeant and Delair, 'Irish Naturalist,' 272. Buckland's article was also translated into French and published in the July edition of the *Journal de Physique*.
[41] Buckland, 'Quartz Rock of Lickey Hill.'
[42] Pentland to WB, 6 November 1820, in Sarjeant and Delair, 'Irish Naturalist,' 263-4.
[43] Ibid.

approving of Buckland's analysis of 'diluvian action' and only sorry that it had come too late to be included in his revised 'Discours Préliminaire'.[44]

For Cuvier too was working hard that winter, putting the finishing touches to the first volume of the new edition of his *Ossemens Fossiles*, of which the 'Discours' was again to be the introduction. He had intended that the volume would include articles on the ancient species of elephant, mastodont, hippopotamus and rhinoceros, but following Buckland's gift of the St Petersburg skull and the promise of access to further English specimens, Cuvier decided to delay the rhinoceros' article until a later volume. In the meantime, Buckland arranged for Mary Morland to produce, according to Cuvier's instructions regarding scale and aspect, drawings of the more interesting rhinoceros bones found with the two skulls at Rugby. Through Pentland, Cuvier expressed his 'best Thanks for the interest you take in forwarding so many new materials for his work, which he says will owe more of its utility to you and Miss Morland's talent than to any other of his friends.'[45] A little later, Pentland told Buckland, 'between ourselves I believe he intends to send her [Miss Morland] a copy of his work' – possibly another snippet contributing to Miss Fox's fable of the Dorsetshire coach?[46]

Buckland had now achieved considerable authority in geological circles on both sides of the English Channel. During 1821, doubtless in recognition of his openhanded collaboration with Cuvier, he was made a Corresponding Member of the Museum in Paris and also a member of the Société Géologique de France. In London he was re-elected a vice-president of the Geological Society – an honour he had first received two years earlier.[47] In Oxford, tributes were of a more homely nature. On his return from the Continent in 1820, he was presented with *An Elegy Intended for Professor Buckland,* it began:

> Mourn, Ammonites, mourn o'er his funeral urn
> Whose neck y^{e} must grace no more;
> Gneiss, granite, and slate, he settled your date,
> And his y^{e} must now deplore…[48]

The author, Richard Whately, later Archbishop of Dublin, was a somewhat eccentric Fellow of Oriel. Known as the 'White Bear' due to his rough manners and idiosyncratic attire, he was a man much in Buckland's mould.[49] Flattered by the light-hearted accolade, Buckland had Whately's verse printed for distribution amongst his friends, including of course Lord Grenville, to whom he was also careful to forward the 'Papers' announcing his election at the Paris Museum.[50] Pentland reported from that city that 'The verses on your death has made every one laugh' and that a fellow émigré, the watercolourist

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[44] Pentland to WB, 21 June 1821, in Sarjeant and Delair, 'Irish Naturalist,' 272.
[45] Ibid.
[46] Pentland to WB, 2 July 1821, in Sarjeant and Delair, 'Irish Naturalist,' 274.
[47] His place had been taken in the intervening year by Strangways. WB to Greenough, 31 January 1820, UCL/Greenough/B/4/B/44/326.
[48] Gordon, *Life and Correspondence*, 41.
[49] Richard Brent, 'Whately, Richard (1787–1863),' in *ODNB*, 2004. See also J. Cornwell, *Newman's Unquiet Grave* (London: Bloomsbury, 2011), 31-2.
[50] WB to Grenville (draft?) 27 December 1820, RS/MS/251/8; WB to Grenville, 18 June 1821, BL Add MS 58995 ff.83 & 84.

Thomas Underwood, had 'found them so good that he has requested a copy'.[51] Underwood's own assessment of Buckland was made clear in a letter to Thomas Webster in 1822: 'notwithstanding his eccentricities and roughness, [Buckland] is good natured, devoid of meanness and can behave like a gentleman, in which he differs from some others we know.'[52] The 'others' probably included Joseph Pentland, whose self-serving behaviour was by then beginning to upset his colleagues.

The arcane reference in the second line of Whately's poem related to a story printed in James Sowerby's *Mineral Conchology of Great Britain* concerning the naming of the species *Ammonites Bucklandi*. According to Sowerby, once, having discovered a magnificent specimen of this fossil that lacked its central whorls, Buckland had 'placed it as a French horn is sometimes carried, above one shoulder and under the other, and thus rode with his friendly companions, who amused him by dubbing him an Ammon Knight'.[53] Sowerby gave no date for this episode and he later told Charles Lyell that 'I hear Buckland was perfectly astonished when he read it.'[54] Nevertheless, the story must have gained wide circulation amongst Buckland's Oxford circle, since Philip Duncan alluded to it again in an unpublished poetical description of his friend:

> His neck no gorgeous Baldric graced
> But round in horrid folds embraced
> What was, or seemed to look upon
> A loathley serpents form in Stone.[55]

However, since Buckland had himself used the ammonite pun back in May 1813 when he told Greenough that 'All ye Ammon Knights in Oxon unite in kind Remembrance', the joke was clearly an old one. Whatever truth might lie behind Sowerby's story – a simple experiment with a child's inflatable swimming ring will demonstrate some of the practical difficulties – it was, like the poem itself, seized upon by Buckland as a constituent of the persona he was keen to project. These were self-consciously heroic times and if his friend Conybeare was happy to compare himself to Don Quixote, Buckland was proud to be considered the 'Ammon Knight'.[56] Ten years later, when the portraitist Thomas Phillips painted him holding a – by then iconic – hyaena skull, the ammonite (or perhaps a diminutive cousin?) was clearly depicted in the background.

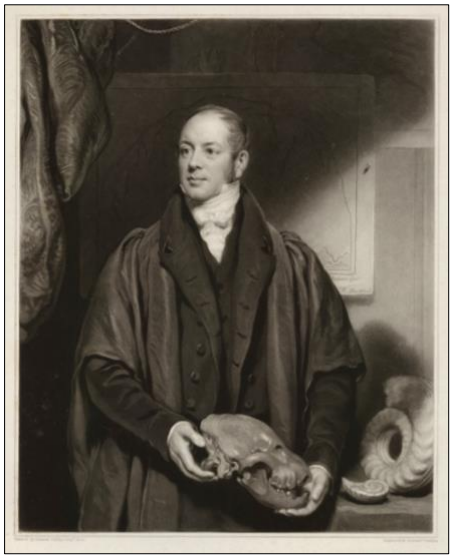

Fig. 5.6 Thomas Phillips' portrait of William Buckland, mezzotint engraved by Samuel Cousins, 1833 – note ammonite bottom right

[51] Pentland to WB, 23 December 1820, in Sarjeant and Delair, 'Irish Naturalist,' 265.
[52] Underwood to Webster, 21 December 1822, in J. Challinor, 'Some Correspondence of Thomas Webster, Geologist (1773–1844) – II.' *AS* 18, 3 (1962): 174.
[53] James Sowerby, *The Mineral Conchology of Great Britain*, Vol. 2 (London: J. Sowerby, 1818), 69.
[54] Lyell to Charles Lyell Snr. 20 July, 1817, in K. Lyell, *Life, Letters and Journals,* Vol. 1, 40.
[55] WB to Lady Mary Cole, 25 July 1821, NMW84.20G.D/158.
[56] Rupke, *Great Chain*,10.

Having posted off copies of Whately's elegy, Buckland set off for Axminster where, on 5 January 1821, his father, Charles Buckland, had died, just a few days short of his 71st birthday. Buckland makes no reference to his bereavement in any surviving correspondence and with the Mallock family on hand to support his step-mother and three-year-old half-brother, Samuel, it is possible that his role in settling his father's affairs was limited. However, he continued to take an interest in young Samuel's progress and probably helped to secure the boy's eventual place as an undergraduate at Christ Church. For her part, as we have seen, Ann Buckland would eventually bequeath the house in South Street to Buckland and his brother John. Within days of his father's death, his brother John 'inherited' one of his father's parishes when Sir William Pole presented him to the rectory at Trusham.[57] Like his father before him, John would hold this living *in absentia*, concentrating his attention on the Laleham school.

Whately's *Elegy* was by no means the first attempt to caricature Buckland in verse. A year earlier another Oxford friend, Philip Shuttleworth, a tutor at New College, had composed a poetical *Specimen of a Geological Lecture.*[58] Shuttleworth had been a senior contemporary of Buckland's at Winchester and now regularly attended his lectures. Despite its tone of gentle mockery, the *Specimen Lecture* shows why Buckland's style of lecturing was so appealing. It also reveals the diverse and distinguished nature of his audience. The scene was set in the opening stanzas:

> In Ashmole's ample dome with look sedate,
> Midst heads of mammoths, Heads of Houses sate,
> And Tutors, close with undergraduates jammed,
> Released from cramming, waited to be crammed.
> …
> Before the rest, in contemplative mood,
> With sidelong glance, the inventive Master stood,
> And numbering o'er his class with still delight,
> Longed to possess them, cased in stalactite.
> Then thus with smile supprest. …

The author then adopted the voice of the lecturer, describing the formation of the earth and outlining some of the earlier organic forms that populated its surface.

> … Then granite rose from out the trackless sea,
> And slate, for boys to scrawl, when boys should be,
> But earth, as yet, lay desolate and bare,
> Man was not then,– But Paramoudras were…

The verses echoed the form of the 1803 *Temple of Nature*, a popular poetical exploration of progressive development published by Charles Darwin's polymathic grandfather, Erasmus.[59] In using such a form

[57] *JOJ*, 3 February 1821.
[58] WB to Lady Mary Cole, 29 October 1819, NMW84.20G.D/151; C.G.B. Daubeny, *Fugitive Poems Connected with Natural History and Physical Science* (Oxford: J Parker, 1869), 84-7.
[59] O'Connor, *Earth on Show*, 82.

Shuttleworth was clearly keen to illustrate Buckland's own powerful narrative style, including his inventive use of metaphor:

> The earth, what is it? mark its scanty bound,
> 'Tis but a larger football's narrow round;
> Its mightiest tracts of ocean – what are these,
> At best but breakfast tea-cups, full of seas.

Throughout the piece, he emphasised the materiality of the lecture. The room had been set out with care:

> Above, around, in order due displayed,
> The garniture of former worlds was laid,
> Sponges and shells in lias moulds immersed,
> From Deluge fiftieth, back to Deluge first.

As the lecture progressed, more material was produced that the students were clearly expected to handle and examine for themselves:

> The specimen I hand about is rare,
> And very brittle; bless me, sir, take care.

or later

> These bones I brought from Germany myself;
> You'll find fresh specimens on yonder shelf.

What he was describing was plainly very different from the usual dust-dry declamation of an Oxford lecture.

In addition to these insights into the lecture, Shuttleworth's poem tells us much about the intellectual atmosphere at the university. The literary allusions and borrowings were all part of that 'refined taste' into which Buckland had claimed that his science might be 'ingrafted'. When Shuttleworth's lecturer says 'I'll tell of something, very like a whale', most readers would at once recall Polonius' words in Act 3 of *Hamlet*.[60] Despite having chosen to delve deep into the book of nature rather than study the texts of scripture or the classics, Buckland remained completely at home within that literary world, quick to appreciate the witty epigram or classical reference. Shuttleworth tells us as much by ending his poem with words that he claimed to be straight from Buckland's own mouth. He prefaced them with the following explanation:

> The concluding couplet which is given without any addition from the mouth of the learned lecturer, is here subjoined solely because it serves as an additional proof, if such were wanted, of the close connection between geological speculation and (not the ideas only, but) the language of complete poetry.

[60] 'Very like a whale.' Polonius to Hamlet, in *Hamlet*, Act 3, Scene 2. Although English Literature formed no part of the formal curriculum of school or university, Jane Austen wrote in 1814 that: 'Shakespeare one gets acquainted with without knowing how. It is a part of an Englishman's constitution. His thoughts and beauties are so spread abroad that one touches them everywhere…'. Jane Austen, *Mansfield Park* (London: Pan Books, 1972), 259. I am indebted to Dr Charles LaPorte for this reference.

> It will be observed that, though intended as a common sentence of Adjournment, it has all the fluency and grace of the most perfect rhythm, and of its own accord slides into verse, and hitches in a rhyme:–
>
> Of this enough. On Secondary Rock,
> Tomorrow, Gentlemen, at two o'clock.

Buckland had also had this poem printed. He sent a copy to Lady Mary Cole, regretting that he would 'not be present to partake in the Amusement it will afford you'.[61]

His appointment as Reader in Geology had, in fact, provoked similar responses from several other friends. Both William Conybeare's *Ode to a Professor's Hammer* and Philip Duncan's *Picture of the Comforts of a Professor's Rooms in C.C.C., Oxford*, resonate with excitement as they lay out the intellectual adventures promised to followers of the newly appointed Reader. Meanwhile, Conybeare's elder brother John, until 1821 the university's Professor of Poetry, chose to pen his own brief *Epitaph on Professor Buckland* in Latin. As Buckland immodestly suggested to Lady Mary Cole, 'few ladies have given origin to more Poetry than my Bag & Hammer'. The new Reader could hardly have hoped for a warmer reception from his colleagues.

An instructive, but less poetic, view of Buckland's lectures was provided by John Henry Newman, who attended in 1821 – probably as a little light relief as he swotted up for his Oriel College fellowship examination.[62] Newman's notes show that Buckland's mineralogical lectures followed quite closely the scheme that his predecessor, John Kidd had set out in his 1809 *Outlines of Mineralogy.*[63] However, the dry exposition was frequently enlivened by anecdotal diversions: accounts of toads secreted within stones or fantastically efficient oriental beheadings. Tales of Buckland's own adventures in the field were combined with appeals to common experience, as when he asked the several 'Wickhamites' in his audience to recollect a particular method used by boys to warm their beer at Winchester. The lecturer was also clearly abreast of the current thinking on chemistry and crystallography and keen to introduce his audience to the latest discoveries such as Hans Christian Oersted's recent demonstration of the connection between magnetism and electricity.[64] And, as Shuttleworth's poem had suggested, the lectures were more than just words. The tools of chemical analysis such as blow-pipe and goniometer were demonstrated, and, of course, Buckland missed no opportunity to exhibit his specimens – a fact not altogether appreciated by Newman, who commented that: 'very frequently in the course of these lectures minerals have just been mentioned for the sake of showing specimens'. Nevertheless, the serious-minded Newman still preferred the orderly explanations and beautiful specimens of mineralogy to the speculative postulations of the geology lectures, where he failed to take any notes at all, telling his mother that 'the science is so in its infancy,

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[61] WB to Lady Mary Cole, 5 January 1820, NMW84.20G.D/152.
[62] Cornwell, *Newman's Unquiet Grave*, 31-2.
[63] A very similar content is seen in the lecture notes taken by the antiquary John Edward Jackson in 1832. Boylan, 'William Buckland,' [thesis], Vol. 2, 582-614.
[64] In 1832 he was able to mention Michael Faraday's crucial discovery of electromagnetic induction, publicly announced only the previous week.

that no regular system is formed'.[65] He did, however, admit that the subject was 'most entertaining, and open[ed] an amazing field to imagination and to poetry.' It also opened the field to adventure and, sometimes, even to great peril.

Newman may or may not have been among the little cavalry, bedecked in cap and gown, that rode out of Oxford on 21 June 1821. Buckland's class that year – once again, 'Enormous…bigger than ever' – numbered about sixty, so it must have been a grand sight as they made their way to Shotover Hill, a favourite location for fieldwork, about four miles east of the city.[66] As they ascended the hill they searched for fossils in the sticky Kimmeridge clay. At the summit their teacher gathered the class around him to point out features of the landscape: the gentle slope of the Cotswolds to the north and west and the steeper escarpment of the Chilterns to the south east. At what stage in these proceedings disaster struck, or even quite what went wrong, we are not told, merely that before the day's end the party had 'lost 1 Horse killd' and that '1 man wounded, broke his thigh', then – adding injury to injury – that another man 'went to see the place next day & broke his Arm'.[67] Much later Elizabeth Gordon recalled that her father 'delighted in giving a new class of equestrian listeners a practical lesson in geology, by sticking them all in the mud to make them remember the Kimmeridge clay'.[68] In those days before statutory 'risk assessments', the Ammon Knight clearly sometimes managed to lead his troops into considerable danger.

Fig. 5.7 Buckland in the field – a fanciful depiction by J.P. Hughes

[65] Kerr, Ian, and Thomas Gornall, *The Letters and Diaries of John Henry Newman*, Vol. 1. (Oxford: Clarendon Press, 1978), 109, cited in Boylan, 'William Buckland,' [thesis], 105.
[66] WB to Greenough, 27 June 1821, UCL/Greenough/B/4/B/44/333.
[67] Ibid.
[68] Gordon, *Life and Correspondence*, 30.

Chapter Six

1821-1823

'A den of hyaenas'

When that winter one of his more distinguished 'pupils', Edward Legge, Bishop of Oxford, told him about a cache of ancient bones recently discovered in a cave in Yorkshire, Buckland's interest was aroused. A little later, on a visit to London, he learned that a significant quantity of the bones, teeth and horn fragments from this Yorkshire discovery had been acquired by a Mr Gibson who had them at his house in Stratford, a few miles east of the City of London. Buckland hurried to Stratford and persuaded Gibson to lend him a few specimens for further examination[1]. He also reported the discovery to Joseph Pentland in Paris, claiming excitedly:

> it is not easy to conceive that anything short of the common calamity of a simultaneous destruction could have brought together in so small a compass so heterogeneous an assemblage of animals as we find here intombed in a common charnel house, animals which no habit or instinct we are acquainted with could ever have associated with a den of hyaenas.[2]

But whereas he was never in any doubt that the 'common calamity' of the Biblical Flood was part of the story, once he had properly examined the bones, Buckland quickly came to a very different explanation for the fact that they were found in 'so heterogeneous an assemblage'.

A few months earlier John Gibson had left the chemical works that he and his partners ran in Stratford to visit his family home at Kirby Moorside, a small market town on the edge of the area now known as the North York Moors.[3] He had left his business in good hands as both his partners were capable and dependable Quakers. Indeed one, amateur meteorologist Luke Howard, was already renowned for applying the terms cumulus, stratus and cirrus to the classification of clouds and had just that year been elected a Fellow of the Royal Society. But now it was Gibson himself who would be playing a role, albeit a minor one, in scientific history.

It was apparently local surgeon John Harrison who first noticed that there was something strange about the fragments of bone and teeth that he was finding along roadways around Kirby Moorside. His experience told him that some, at least, were not the remains of any animal currently found in the neighbourhood. He shared this insight with friends, including the visiting Gibson, to whom he was distantly related.[4] The source of the bones was traced to a small quarry in the quiet valley of Kirkdale a mile or two outside the town. They came from a narrow cave, the mouth of which had been revealed by the activities of the quarrymen. These workers had paid little heed to the bones, merely scooping them up together with the broken limestone destined for the local roads. Only when Harrison and Gibson arrived on the scene did the true significance of the discovery become apparent.

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[1] Gibson to WB, 7 December 1821, OUMNH/WB/A/1/205.
[2] WB to Pentland, 18 November 1821, MNHN/MS/627/22, quoted in Rupke, Great Chain, 32.
[3] Now Kirkbymoorside. The nineteenth century spelling has been retained here.
[4] For information on Harrison and Gibson see www.natstand.org.uk/kirkdale.

James Smyth, the vicar of Kirby Moorside, and the Congregational minister, William Eastmead, both came along to see the cave for themselves, and they were soon joined by William Salmond, a retired colonel of militia from York, and George Young, a Presbyterian minister from Whitby. As a student at Edinburgh, Young had been exposed to the conflicting theories concerning the earth's history that were being hotly debated in the city at the turn of the century. He had studied with John Playfair, the leading advocate of James Hutton's cyclical 'Plutonist' theories, but he had later joined Robert Jameson's Wernerian Natural History Society, no doubt finding Werner's more traditional 'Neptunist' ideas more in keeping with his own scripturally-based understanding of the world. Now settled at Whitby on the Yorkshire coast, Young had developed an interest in fossils and, together with fellow fossilist John Bird, had written a *Survey of the Geology of the Yorkshire Coast* which was almost ready for publication. The news from Kirkdale arrived just in time for it to be included in the book, so Young had rushed across the moors to see the site for himself – and of course to gather specimens for his own collection.

It was soon apparent that far from being common cattle, as assumed by the quarry workers, many of the Kirkdale remains belonged to more exotic beasts: elephant perhaps, or rhinoceros or hippopotamus. Identification cannot have been easy. Harrison's training in anatomy had been enough to arouse his interest, and from their own experience he and others may well have recognised the remains of horse, deer and fox. But for the rarer species they depended on educated guesswork backed up by the one work of reference they had to hand: the third and final volume of James Parkinson's ground-breaking study of fossils, *Organic Remains*.[5] However, even this contained barely a handful of relevant illustrations, and would have been scant help. It was only when Gibson returned to Stratford, from where he made the short journey to the Hoxton home of Parkinson himself, that their suspicions were confirmed.[6] Not only were there exotic species amongst the collection, but by far the greatest number of specimens could be identified as the bones and teeth of hyenas.

Encouraged, no doubt, by Parkinson's reaction, Gibson took his collection a little further west to the museum of the Royal College of Surgeons in Lincoln's Inn Fields so that William Clift, the curator, might give a still more definitive identification by reference to specimens in his care. Clift at once recognised the importance of the find and, on 11 November, a week before Buckland would do so, he also wrote to Pentland in Paris.[7]

Pentland, assuming Buckland to be already on site in Yorkshire, at once addressed a letter to him at Kirby Moorside, relaying Cuvier's urgent request to procure 'by exchange or by buying them' some of the bones, 'especially those of the Rhinoceros, Hippopotamus & Hyena'.[8] However, it was almost a month before Buckland was free to make the journey north. On 12th December he wrote to Greenough, 'I think of going to Yorkshire next Monday [17 December]… Pray write me if you have

[5] George Young and John Bird, *A Geological Survey of the Yorkshire Coast* (Whitby: G. Clark, 1822), 275.
[6] Yorkshire Gazette, 23 February 1822, (see www.natstand.org.uk/kirkdale.htm).
[7] See also Gibson to WB, 7 December 1821, OUMNH/WB/A/1/205.
[8] Pentland to WB, 24 November 1821, in Sarjeant and Delair, 'Irish Naturalist,' 283-4.

anything you wish to be particularly examined in the Helmsley District'.[9] He may have hoped that Greenough would join him, but Greenough had evidently suffered an inconvenient injury. Three days before setting off Buckland wrote again, 'I wish you could have gone with me into Yorkshire to visit the Hyaenas Den instead of snapping your tendons in company whose dancing Powers at least wd associate them more nearly to the inhabitants of Gaylenreuth than of Kirkdale'.[10] The reference to an 'Hyaenas Den' is telling.

Buckland had clearly already formed his theory. Suspecting – as yet probably without evidence – that hyenas would have dragged dismembered parts of their prey to their dens for later consumption, he had, three weeks earlier, suggested to Mary Talbot in Wales that, although the bones might have been 'drifted into a fissure by the Diluvian Waters', he thought it much more likely that they were in fact 'the wreck of the Hyenas Larder'.[11] He possibly also remembered the bones in the Gailenreuth cave, polished by years of rubbing by the hides of resident bears, and noted that many of the Kirkdale bones were 'polish'd & worn by the trampling of [the hyenas'] successive generations'[12]. Though severely fragmented, the bones he had seen showed no evidence of having been 'rolled' as would be the case had they been transported long distances by the waters of a flood. The animals to which these bones belonged had lived and died not far from the site of their discovery. Added together, these observations suggest that Buckland's ideas about the contents of Kirkdale cave were well advanced long before ever he squeezed into its narrow entrance.

At the quarry Buckland became, in the words of William Eastmead, one of the 'men of science exchanging the splendid apartments of mansions for a den of Hyaenas'.[13] Writing a year or two after the initial discovery, Eastmead recalled how at that time a bystander at the cave's mouth might have 'beheld a rustic's frock investing a man of letters…equiped with knee-caps and trowsers, his head bound about with an handkerchief, his hands and face patched with mud'.[14] But any sartorial indignity felt by the philosophic gentlemen was as nothing compared to the discomfort they suffered as they wormed their way inside the cave:

> the appearance of its interior is particularly grotesque, it fills the mind with peculiar sensations; … and after having been shut out from daylight three or four hours, with a candle in your hand, … sometimes crawling on your hands and knees, sometimes going on your breast, and at other times on your side, assuming nearly the vermicular motion,

[9] WB to Greenough, 12 December 1821, UCL/Greenough/B/4/B/44/329.
[10] WB to Greenough, 14 December 1821, UCL/Greenough/B/4/B/44/332.
[11] WB to Miss Talbot, 26 November 1821, NMW84.20G.D/162. Some earlier commentators have incorrectly identified the recipient of this letter as Miss Jane Talbot, Mary's younger sister, however, it is clear that Buckland observed the usual proprieties of the time in addressing Lady Mary Cole's eldest daughter as 'Miss Talbot' and Jane as 'Miss Jane'. The correspondence shows that Jane's interests were more botanical than geological.
[12] Ibid.
[13] William Eastmead, *Historia Rievallensis: Containing the History of Kirkby Moorside* (London: Baldwin, Chadock and Joy, 1824), 13.
[14] Ibid., 13-14.

> through narrow passes, you are pleased with the return of day, as in your retreat from the interior region you draw near the mouth of the damp and gloomy cavern.[15]

Fortunately, despite the difficult conditions and the depredations of the earlier investigators, Buckland found enough evidence to piece together the scene as it had been before it was disturbed. There had, he later wrote, been a 'sediment of soft mud or loam, covering the whole bottom [of the cave] to the average depth of about a foot'.[16] Indulging in his passion for simile, he went on to describe how a deposit of stalactite had run down the cave's walls and out onto the surface of this sediment, 'shooting across like ice on the surface of water, or cream on a pan of milk'.[17] Below the soft muddy layer – between it and the limestone of the cave floor proper – he found there to be a second 'partial deposit' which he described as 'stalagmite'. The animal remains had been lodged 'chiefly in the lower part of the earthy sediment, and in the stalagmitic matter beneath it', but in a few places 'where the mud was shallow, and the heaps of teeth and bones considerable,' some bones actually projected through the upper encrustation and into the air, 'like the legs of pigeons through a pie-crust'.[18] These bony protuberances, he noticed, were themselves coated with a thin layer of stalagmitic material.

Buckland examined the bones in the possession of local people. He met William Salmond, who would later pay for spoil to be removed so that the deeper recesses of the cave could be mapped, and was sufficiently impressed by George Young's geological knowledge to put his name down for no fewer than six copies of the forthcoming *Survey of the Yorkshire Coast*.[19]

Despite their common ground in matters of present-day geological fact, there was a world of difference in the way he and Young interpreted these facts. Both needed to reconcile their observations with their belief that God had created the world as a dwelling place for mankind and had revealed his intentions through the inspired author of the Book of Genesis. Where they differed was in the weight they assigned to that ancient text compared with the evidence of their own eyes. They each accepted Cuvier's assessment that 'the crust of our globe has been subjected to a great and sudden revolution, the epoch of which cannot be dated much farther back than five or six thousand years ago', and, going further than Cuvier, both Buckland and Young were happy to equate this 'sudden revolution' to the Biblical Flood. Their only difference lay in their individual conceptions of that great event.

When the Presbyterian Young read in Chapter 7 of the Book of Genesis that the 'fountains of the deep [were] broken up and the windows of heaven were opened' so that 'the waters prevailed exceedingly upon the earth … and the mountains were covered', he imagined a truly cataclysmic event: something like that depicted in John Martin's popular mezzotint *The Evening of the Deluge*. He visualised a devastation so total that the entire surface of the globe had been shattered and its material suspended or dissolved in the engulfing waters. This awe-inspiring and Romantic idea captured the imagination

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[15] Ibid., 9-10.
[16] William Buckland, *Reliquiae Diluvianae or Observations on the Organic Remains contained in caves, fissures, …* (London: John Murray, 1823), 10.
[17] Ibid., 11.
[18] Ibid., 11-12.
[19] Young and Bird, *Geological Survey*, 333.

of a wide public. Some, having, like Young, scientific pretensions, took the idea yet further, conflating the Flood with Werner's primordial sea, suggesting that all the stratified rock of the modern world – including the limestone in which the Kirkdale cave had been formed – had been deposited from the debris when the waters retreated. By this account, organic remains, the least dense of this debris, would have drifted long about the globe, settling only as the last of the flood subsided. That some had found their way into crevices in the rapidly consolidating rocks should surprise no-one.

Fig. 6.1 The Evening of the Deluge, John Martin (engraved William Miller)

From a modern perspective such an explanation appears simply preposterous. Even by the 1820s it found little support amongst most serious students of the strata. Nevertheless, it shows the intellectual difficulties faced by many honest British men of letters as they struggled to reconcile the authority of the scriptures that so defined their worldview with the evidence from their increasingly detailed observations. But if Young and others resolved the dilemma by moulding their observations to fit a rigidly interpreted text, Buckland took an opposite course. He interpreted the text so as to make sense of the evidence that he saw so clearly.

For Buckland the Flood had been less cataclysmic. Though still capable of moving huge boulders and carving valleys through the strata, it had left the deeper substrate undisturbed. He had long accepted the view of less theologically-constrained geologists at home and abroad, that the earth had come to its present state over an unimaginably long period. He believed – following such authorities as de Luc, and more recently Cuvier – that the Flood was merely the last in a series of 'revolutions' that had, by increments, rendered the globe fit for the habitation of man. Its particular effect had been limited to shaping the surface of the land, and extirpating some of the species whose remains were found in the gravelly deposits it left behind, as well as in protected environments such as the Kirkdale cave. Furthermore, as he had tried to convince Joseph Pentland, Buckland believed that even the more exotic of these extinct species had lived and died in the very area where they were now discovered. George Young, however, had other ideas, writing that 'it would appear, that the animals whose bones have been discovered in the cavern, never lived there; and that their bones have been floated into it, in a shattered state'.[20]

Now, as he examined the cave, Buckland knew he had incontrovertible proof that Young was mistaken. Lying amid the fractured bones, unnoticed by earlier investigators, he found 'many small

[20] Ibid., 278.

balls of the solid calcareous excrement of an animal that had fed on bones'.[21] Hyenas' poo. This surely proved that the animals must have used the cave while they were alive, confirming his Hyenas' Den hypothesis.

Buckland had seen things that others, content with their own preconceived notions, had missed; but even he could not avoid the temptation of seeing more in those layers of stalagmite and mud than the facts could reasonably support. Assuming that the muddy layer itself was a product of the Flood, he inferred that the relatively thin layer of stalagmite below it must have built up during the interval between the formation of the cave and the onset of the Flood, and that the considerably thicker stalagmitic layer above the mud represented the period between the Flood and the present day. It was, he told Greenough, 'the finest Chronometer I have ever seen.'[22] Writing to Lord Grenville he was even more explicit:

> comparing the quantity of [the] Postdiluvian Stalactite deposited above the Mud with that deposited before its introduction and lying below the Mud[,] the former bears nearly the same Proportion to the latter that the Postdiluvian Period does to that which our Chronologies give to the antediluvian State of the Earth. It appears moreover that no Stalactite at all had been formed before this last named Period began, for had the Cave existed above Water & been subjected to the infiltration of Stalactite during a long Succession of Ages, it would long ago have been entirely filled up by it & obliterated – The Harmony of all its Circumstances & their Confirmations of each-other & of the important facts of the Mosaic Deluge & Chronology render this by far the most interesting Geological Phenomenon I have ever met with[.]

Here was an entirely positive 'connexion of geology with religion'. It was a vindication of his own *Vindiciae Geologicae* in which his favoured hypothesis had 'supposed the word "beginning" as applied by Moses in the first verse of the Book of Genesis, to express an undefined period of time which was antecedent to the last great change that affected the surface of the earth'.[23] In this scenario, the rocks that included the Kirkdale cave, created long before, had become dry land only during that last 'great change' which heralded the start of man's tenure of the Earth, approximately 6000 years ago. Accepting this timescale, the relative thickness of the layers of stalagmite below and above the diluvial mud would date the Flood (a somewhat lesser 'change' that did not involve the long-term exchange of land and ocean) to about 4000 years before present – very much in accord with the sacred chronologers' estimate.

Buckland's eagerness to announce the full range of his findings to the University's chancellor was understandable. However, when it came to the wider scientific world, he was more circumspect, putting aside his theological spectacles and exchanging his speculative chronological analysis for the sober assessment that the phenomena could only have been caused by 'a transient deluge, affecting

[21] Buckland, *Reliquiae*, 20.
[22] WB to Greenough, 13 January 1822, UCL/Greenough/B/4/B/44/335.
[23] Buckland, *Vindiciae*, 31.

universally, simultaneously, and at no very distant period, the entire surface of our planet'.[24] It was a case of 'deluge' rather than 'Deluge'.

However, even if its theological ramifications were ignored, Buckland knew he had made an important discovery and wasted no time before making it public. Beginning on 7 February, the Royal Society of London devoted three evenings to the reading of his long and detailed paper on the Kirkdale bones.

It was now three years since Buckland's election as a Fellow of the 'Royal' and in choosing to present his findings there rather than at the Geological Society he plainly had an eye to making his mark in this most exclusive gathering of scientific men. He was also aware of two earlier brief and, as he believed, mistaken reports on the subject of bone-bearing caves in the Society's *Philosophical Transactions*. The author of these flawed accounts was Sir Everard Home, Master of the Royal College of Surgeons and one of the Royal Society's vice-presidents. Although truly a distinguished surgeon, Home was a vain man who craved recognition and was prone to flood the pages of the *Philosophical Transactions* with articles and papers – more than a hundred appeared under his name – on topics ranging from gout to the genitalia of wombats. Some of these, such as his early descriptions of the ichthyosaur, were simply slight or ill-considered, but others were tainted with the suspicion of plagiarism. This serious charge arose from his cavalier treatment of the papers of his late brother-in-law, the famous surgeon John Hunter, whose extensive collection of anatomical specimens had been bequeathed to the Royal College of Surgeons and was now under Home's control. The true extent to which Home used Hunter's work in composing his own articles and lectures will never be known because in 1823, purportedly in obedience to Hunter's instructions, Home burnt most of Hunter's original papers.

It was not, however, plagiarism that concerned Buckland as he prepared his paper for the Society. He simply wanted 'to set right all the Errors that have appeared in their Vols from Plymouth and Elsewhere about Elephants Rhinoceros & Animals of that kind'.[25] In 1817 Home had reported in the *Phil. Trans.* on some ancient bones and teeth found in a cave near Plymouth by workmen quarrying limestone for the mile-long breakwater being built across the famous Sound. Although he correctly identified these as the remains of a species of rhinoceros, Home did not visit the cave himself and merely passed on, without comment, the claim of his informant that there was 'no possibility of the cavern having had any external communication, through the rock in which it was enclosed'.[26] The far-reaching implications of such a fact, if true, he left completely unexplored. To the practically-minded Buckland however, the possibility that the caves had in effect been formed around the deceased animals at about the time of their death – in much the way that George Young was

[24] William Buckland, 'XVI. Account of an Assemblage of Fossil Teeth and Bones of Elephant, Rhinoceros, Hippopotamus, Bear, Tiger, and Hyaena, and Sixteen Other Animals; Discovered in a Cave at Kirkdale, Yorkshire, in the Year 1821,' *PTRSL* 112 (1822): 224.
[25] WB to Greenough, 13 January 1822, UCL/Greenough/B/4/B/44/335.
[26] Everard Home, 'XII. An Account of some fossil remains of the Rhinoceros, discovered by Mr. Whitby, in a cavern inclosed in the lime-stone rock, from which he is forming the Break water at Plymouth,' *PTRSL* 107 (1817): 177.

postulating for the Kirkdale remains – was inconceivable. This was the 'Error' that needed to be 'set right'. It was therefore logical, as well as personally expedient, that he should choose the Royal Society for his own, more comprehensive, analysis of cave bones.

Completed in a little over a month, when printed, Buckland's paper occupied 66 pages of text together with twelve engraved plates. It was a prodigious effort. As well as reporting what he had found in Yorkshire, Buckland compared the Kirkdale bones with those found in other caves in both Britain and Germany. He included the corroborating evidence of the strange white balls which he referred to by the old apothecaries' term *Album Graecum*. His friend, chemist William Hyde Wollaston, had analysed samples in his private laboratory and had also found time to consult the keeper of the popular menagerie at the Exeter 'Change, who had confirmed that the peculiar white matter did look very like modern hyena droppings.[27]

Fig. 6.2 Album graecum from Kirkdale Cave

To illustrate his paper, Buckland not only enlisted two expert scientific illustrators, William Clift and Thomas Webster, but also two ladies. One was Frances Duncombe, the eighteen-year-old daughter of Edward Legge's sister, Charlotte Duncombe, at whose home, a few miles from Kirkdale, he had stayed. The other was his friend Mary Morland. He secured a copy of Salmond's map of the cave and, with Webster's help, converted his own sketches into a helpful *mise en scene*.

Fig. 6.3 Sketch of Kirkdale Cave from Plate 2 of Reliquiae Diluvianae

Meanwhile, in mid-February, even as his paper was being read in London, Buckland gave two 'public lectures' on the subject to 'overflowing Audiences' in Oxford.[28] A little earlier, on 1 February, he had clearly enjoyed exhibiting a 'large bagful' of Kirkdale relics at the dinner following the Geological Society's annual meeting. Reporting on that occasion Charles Lyell told his friend Gideon Mantell that 'Buckland, in his usual style, enlarged on the marvel with such a strange mixture of the humorous and the serious, that we could none of us discern how far he believed himself what he said.'[29]

[27] The menagerie occupied the upper floors of the Exeter Exchange building in the Strand between 1773 and 1829.
[28] WB to Grenville, 19 February 1822, BL Add MS 58995 ff.90-91. C.J. Howes, 'The Dillwyn Diaries 1817-1852, Buckland, and the Caves of Gower (South Wales),' *PUBSS* 18, 2 (1988): 300.
[29] Lyell to Mantell, 8 February 1822, in K. Lyell, *Life, Letters and Journals,* Vol. 1, 12.

More sober perhaps, his presentation to the Royal Society produced a different reaction. The Society's president, Sir Humphry Davy, told him: 'I do not recollect a paper read to the Royal Society which has excited so much interest as yours.'[30] The paper was quickly taken up by the periodical press: a long abstract appeared in *Annals of Philosophy* in March and before long other journals carried items of various lengths.[31] Within little more than a year the paper had been translated into both French and German.[32]

In a world where scenes from the past are routinely brought to life through the use of colourful computer-generated imagery, it is hard to appreciate quite how startling and novel Buckland's description of ancient Kirkdale appeared in 1822. Not content with a simple record of the species found in the cave, Buckland had reconstructed the scene as it was when these animals were alive, creating a narrative of their daily activity. It was the first truly scientific attempt to describe a scene from the deep past: the first conjuring of an authentic antediluvian world. He had, in his own words, 'procured an insight into the private life & Habits of the Antediluvian inhabitants of this Country as complete & circumstantial as … the Pen of Scott, of the Manners of the Highlanders of the last Centuries'.[33] But exciting as this was, for an Anglican clergyman it was fraught with peril. Buckland knew that the harsh struggle for survival that his scene implied ran counter to the notion of a peaceful Garden of Eden. It was hardly surprising that his Geological Society colleagues found it hard to 'discern how far he believed himself what he said'.

Both Buckland's reconstruction of the scene and his chronological analysis were swiftly taken up by William Conybeare who produced a light-hearted verse summary. Stanzas 9 and 13 give a flavour of the detail he included as he made Buckland proclaim:

Fig. 6.4 William Conybeare's depiction of Buckland in the Kirkdale cave

> I know how they fared every day,
> Can tell Sunday's from Saturday's dinner;
> What rats they devoured can say,
> When the game of the forest grew thinner.
> …
> By the crust of the Stalactite floor,
> The Post-Adamite ages I've reckoned,

[30] Davy to WB, 18 March 1822, RS/MS/251/10.
[31] As a measure of how widely Buckland's work was disseminated it is noted that *The Bury and Norwich Post*, a provincial newspaper in East Anglia, carried long excerpts from the *Quarterly Review* spread over two editions on 6 and 13 November 1822.
[32] Boylan, 'William Buckland,' [thesis], 118-119.
[33] WB to Grenville, 21 February 1822, BL Add MS 58995 ff.92-94

Summed their years, days & hours & more,
And find it comes right to a second.

Conybeare had the poem, together with a cartoon depicting the moment of discovery, lithographed as a broadsheet which he and Buckland distributed amongst geological friends in Oxford and London. Lord Grenville was, of course, one of the first to receive a copy, and at least one print made its way across the channel to Cuvier in Paris.[34] The illustration showed Buckland, on hands and knees, candle in hand, happening upon a den of ravening hyenas as he emerged into a low, underground gallery; it was hard to discern whether he or the hyenas were the more startled. Flattering as it was to Buckland's vanity, the print also helped to make his work acceptable; like his own performances in the lecture hall the 'strange mixture of the humorous and the serious' provided cover for the introduction of his seemingly fantastic ideas.

Until the discoveries at Kirkdale captured his attention, Buckland had planned to spend the summer of 1822 in the Pyrenees.[35] But, as he admitted in a letter to Greenough, 'my Attention has been entirely taken from Continental Geology by the hyaena Story.'[36]

Nevertheless, he was tempted by an invitation to sail to the Orkney Islands with Lord Grenville's nephew, the legendarily corpulent and heroically named Richard Temple-Nugent-Brydges-Chandos-Grenville, recently created first Duke of Buckingham and Chandos by his friend King George IV. The new duke was not universally well-regarded. Dubbed 'Lord Grenville's fat nephew', or sometimes the 'gros Marquis', he was widely seen as a man of few talents save that for self-advancement. However, profligate and adulterous as he may have been, the Duke was also a keen collector of works of both art and nature – and an enthusiastic sailor. Later, when his ruinous financial mismanagement forced a temporary exile from Britain, he commissioned a grand yacht, the *Anna Eliza,* complete with especially wide gangways to accommodate his vast girth.[37] He and his substantial retinue (which included a personal chaplain) toured the Mediterranean in this early 'super-yacht', collecting both works of art and geological specimens. Through Grenville, Buckland had provisionally accepted the Duke's offer, 'provided his Grace will be pleased to tolerate the total prostration of all my Powers to which on first going to Sea I am always

Fig. 6.5 The 1st Duke of Buckingham and Chandos (1776-1839)

[34] Ibid.
[35] WB to Grenville, 19 February 1822, BL Add MS 58995 ff.90-91.
[36] WB to Greenough, 30 May 1822, UCL/Greenough/B/4/B/44/336.
[37] F.M.L. Thompson, 'Grenville, Richard Temple-Nugent-Brydges-Chandos-, First Duke of Buckingham and Chandos (1776–1839),' in *ODNB*, 2004.

subject'.[38] However, within weeks, the voyage was postponed and, with no other engagements on the horizon, Buckland was free to devote the summer to cave research and comparative anatomy.

Reports of fresh discoveries were flowing in. From Yorkshire, Charlotte's husband, Charles Duncombe, told of a further previously unopened cave at Kirby Moorside, and a colleague at the Royal Society, Admiralty Secretary John Barrow, alerted Buckland to yet another unexplored cavern at Oreston near Plymouth. Buckland quickly requested that both caves should be sealed until he could examine them in person. He planned to do this in July, after which he would head off to Germany to take a more critical look at the caves he had visited in 1816.

In both Yorkshire and Devonshire he was accompanied by Henry Warburton, a friend from the Geological Society, and in Yorkshire they were joined by Sir Humphry Davy, who had been invited to witness for himself – in accordance with the Royal Society's famous motto 'Nullius in verba' – the uncovering of pristine new evidence of the 'Antediluvian world'.

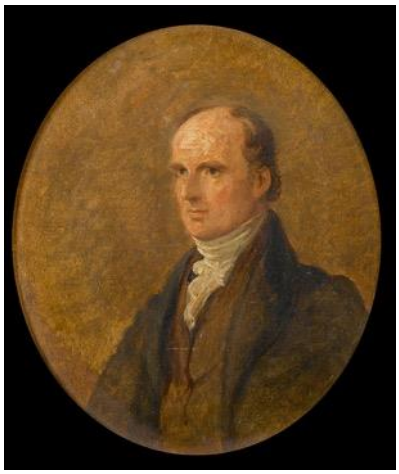

Fig. 6.6 Henry Warburton (1784-1858)

How excited the three men must have been as Duncombe's temporary wall sealing the mouth of the cave was removed – and how correspondingly great their disappointment to find no bones at all: in fact, nothing more than a thick layer of mud covered with a crust of stalagmite.

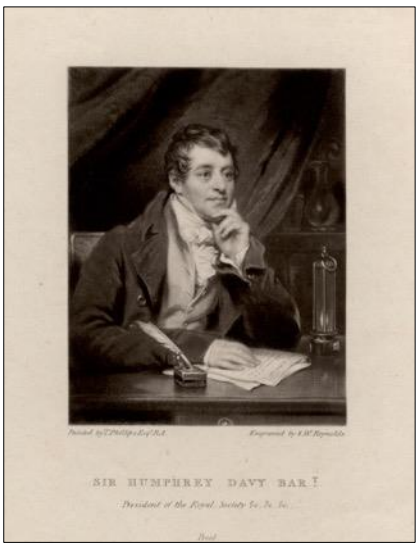

Fig. 6.7 Sir Humphry Davy (1778-1829)

However, concealing any dismay he might have felt, Buckland deftly turned this negative result into further evidence for his hyena den theory. He noted that what they had just uncovered was, in fact, the more usual situation: 'the absence of bones in this cave (the mud being present) adds to the probability that it was by the instrumentality of the hyaena, and not of the diluvial waters, that the animal remains were collected in such quantities in the adjacent den at Kirkdale'.

They also examined a deep fissure in Duncombe Park, where they found the bones of 'dogs, sheep, deer, goats , and hogs'. Buckland analysed these with his tongue; unlike the Kirkdale bones, they tended not to stick to it. This showed that the bones 'retain[ed] much more animal matter, and are in all respects more fresh and recent' than those from Kirkdale. They were, he decided, merely the remains of animals which had accidentally fallen into the concealed chasm.

From Yorkshire, Buckland and Warburton travelled south to Oreston where the caves had already yielded many bones of species similar to those found at Kirkdale. By a further judicious application of his tongue, Buckland quickly established that these bones retained even less of their

[38] WB to Grenville, 19 February 1822, BL Add MS 58995 ff.90-91.

'animal gelatin' than those from the Kirkdale cave and so were at least as old. However, as there were proportionately fewer hyena remains, and few of the bones had the characteristic signs of having been gnawed, he ruled out the possibility that this cavern had also been a hyena den. A close inspection of the surrounding rock soon revealed – as he had suspected it would – hitherto unrecognised fissures that had once connected the cave to the surface. Like the bones in the Duncombe Park chasm, those at Oreston must surely also be the result of accidental falls; the difference being that they had fallen from a world as it existed before the Flood.

Having gleaned all he could from these English caves, Buckland set off across the Channel, possibly in the company of his old travelling companion, Count Breunner.[39] The two principal centres of interest were the forested Hartz mountains to the east of Gottingen and the area around Muggendorf in Franconia – the scene of his hair-rising adventures with Conybeare and Greenough six years earlier. He also visited the limestone caverns near the Belgian town of Spa and in October he was back at the Muséum in Paris, where he examined specimens and exchanged information with his friend Cuvier.[40]

Although he saw no cave directly comparable to the hyenas' den at Kirkdale, Buckland returned to Oxford convinced that the exotic species found in Yorkshire had also once thrived over the greater part of the Continent, and that the muddy sediment on the floors of the European caves had also been deposited 'by the waters of a transient deluge.'

In November Buckland learned that he was to be given the Royal Society's Copley Medal. This award 'for the most important scientific discovery or the greatest contribution made by experiment' had been presented each year since 1731, making it probably the world's oldest scientific prize. It was a huge honour. Almost as gratifying was the praise he received from the eighty-eight-year-old bishop, Shute Barrington, who urged him to publish his research more widely. The aged Bishop of Durham, who now spent most of his days at Mongewell Park, a few miles from John Buckland's rectory at Warborough, had once been an important patron to William Paley, whose *Natural Theology* Buckland had quoted in his inaugural lecture. On Barrington's recommendation, and armed with the wealth of new data he had collected on the Continent, Buckland began to expand his already comprehensive Royal Society paper into a substantial volume, attractive, as he hoped, to an even wider audience. This book, which he dedicated to Barrington, was to be much more than a mere scientific treatise. It would bridge the two worlds he inhabited, bringing together the most modern of metropolitan science with the theological traditions of Anglican Oxford.

Some years later, a student, J.E. Jackson recorded some of Buckland's words in the back of his notebook: 'advice - never to try & persuade y^{e} world of a new theory - persuade 2 or 3 of y^{e} tip top men - & y^{e} rest will go with y^{e} stream, as Dr B. did with Sir H. Davy & Dr. Wollaston in case of

[39] Although he had told both Greenough and Grenville of his hopes of Breunner's company, he does not mention any companion in his accounts of this expedition.
[40] Buckland, *Reliquiae*, 149.

Kirkdale Cave.' Buckland had indeed persuaded 'ye tip top men'; now it remained for the rest to 'go with ye stream'.[41]

During December Wombwell's celebrated travelling menagerie visited Oxford, giving Buckland the opportunity to see a living 'hyaena' for himself. With the keeper's consent, he fed the beast the shin bone of an ox and was delighted to find that after the modern hyena had enjoyed the treat 'the state and form of [the remnant were] precisely like those of similar bones at Kirkdale'. Pairing the newly gnawed bone with a similar relic from Yorkshire, Buckland commissioned the artist George Scharf to create a comparative illustration to add to the earlier drawings of the Kirkdale relics.

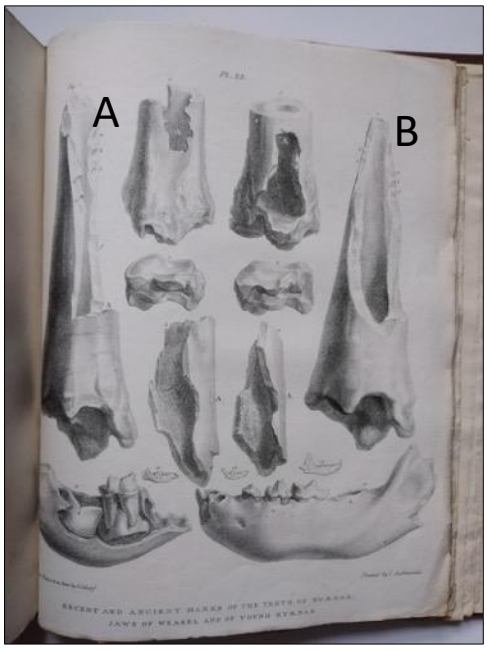

Fig. 6.8 Plate 23 from Reliquiae Diluvianae. *The modern shin bone [A] on the left is compared to the cave bone [B] on the right.*

His new book, to be called *Reliquiae Diluvianae*, or 'Relics of the Flood', was a compilation of all his Flood-related work to date. In the first part he built upon his Royal Society paper, adding an account of his recent summer expedition. In Part II he enumerated other 'evidence of diluvial action', collected from authorities around the world, and in a short Appendix he summarised his work on the pebbles from Lickey Hill and a more recent paper on the formation of valleys in Dorset and Devon. All the plates from previously published work were reused and several new ones, including some created from his sketches of the German caves, were added.

But, even as Buckland assembled this mass of information, news of yet further discoveries continued to reach him. An Oxford friend told him that a large number of well-preserved bones had been found in a cavern at Wirksworth, in Derbyshire, and Lewis Dillwyn, a neighbour of Lady Mary Cole in Glamorgan, mentioned a similar discovery on the Gower peninsular.[42] Dillwyn, an enthusiastic naturalist and friend of William Wollaston, had been in Oxford the previous February when he had heard Buckland's public lectures on the Kirkdale discovery. However, his initial information about the new cave was sketchy and on 24 December Buckland wrote directly to Lady Mary Cole:

> Pray oblige me with a line to say whether there really has or has not been a Discovery of a New Cave full of Bones in your neighbourhood … I should gladly have come into Glamorganshire at this time with Sir H. Davy and Dr. Wollaston, had I not been under the necessity of preparing immediately my account of the German Caves I have visited in the past summer for my Book which is forthcoming at Murrays in a Month or 2.[43]

Davy, at least, was Dillwyn's guest that Christmas, and on 26 December the pair went to stay with the Coles at Penrice. The following day, Lady Mary Cole's eldest daughter, Mary Talbot, together with the

[41] Boylan, 'William Buckland,' [thesis], 648.
[42] The cave was discovered at a lead mine called the Dream, about one mile west of Wirksworth.
[43] WB to Lady Mary Cole, 24 December 1822, NMW84.20G.D165.

Reverend John Traherne from Cardiff, took Dillwyn to investigate the newly discovered cave. They were pleased to find 'the Bones of Elephants & etc.' and returned the following day and 'brought away a great quantity of Bones'. Mary Talbot must have immediately written to Buckland, perhaps enclosing her note, together with a sample tooth, with her mother's response to Buckland's letter of 24th. On 31 December Buckland wrote directly to Miss Talbot:

> I am indeed sorry and extremely vexed that my present engagements shd. have been so pressing as not to allow me to have assisted at the opening of your very interesting new Cave at Paviland the Circumstances of which must form another feature in my Work[44]

Having provisionally identified the tooth as that of a bear rather than a hyena, Buckland went on to address no fewer than eight specific questions to his young correspondent, before ending:

> I am impatient for further Accounts & the moment I can stir will if possible run down to get a peek at what remains in the Cave, for as yet I do not understand its history, or how the Animals got there. Meantime pray have the Mouth closed up again to prevent total destruction[45]

However, before Buckland 'ran down' to South Wales, he went to Wirksworth, where he found the almost complete skeleton of a rhinoceros surrounded by loose soil and stones in the centre of a large cavern. He concluded that this animal really had been washed into the cave by floodwater: evidence both of the Flood and also that antediluvian Britain had been home to exotic creatures.

Going directly from Wirksworth to Wales Buckland met John Traherne at Cardiff from where they travelled on to Penrice Castle. Buckland spent a good part of the next two days at the Cave, sometimes in the company of Traherne, Mary Talbot and eventually Dillwyn – who joined the party later – and sometimes alone.

It was Buckland himself who discovered the human skeleton. Unlike the cave at Kirkdale, the Paviland cave, or Goat Hole as it was locally known, was not a recent discovery and Buckland must have known that it would show signs of human interference. It was a sea cave, accessible only at low tide, and although it was common knowledge that its floor was littered with a variety of old bones, no-one had taken much interest in them until two local men, motivated perhaps by news of the Kirkdale discoveries, had decided to take a closer look. It was their report that had alerted Dillwyn and that now brought Buckland to the spot. But human interference was one thing, human remains quite another.

Buried only six inches below the surface of the soil, it was immediately clear to Buckland that the human bones must be a relatively recent addition to the muddle of remains on the cave floor. 'The entire mass through which the bones are dispersed appears to have been disturbed by ancient diggings, and its antediluvian remains thereby have become mixt with recent bones and shells'.[46] Not for one

[44] WB to Mary Talbot, 31 December 1822, NMW84.20G.D166.
[45] Ibid.
[46] Buckland, *Reliquiae*, 85.

moment did he doubt that the skeleton belonged with the 'recent bones and shells' rather than the 'antediluvian remains'.

Despite the scriptural assertion that God had destroyed both beast and man in his great Flood, Buckland knew that no appropriately ancient human remains had ever been discovered. Notwithstanding the fact that the presence of human relics amongst the diluvian gravels would tend to confirm his identification of the last geological inundation as that described in Genesis, he had persuaded himself that such remains were unlikely to be found – at least not in northern latitudes. In 1662 the theologian Edward Stillingfleet had analysed the Genesis account of the Flood in his *Origines Sacrae*, subtitled, *A Rational Account of Natural and Revealed Religion*. So highly considered was this work that Oxford's Clarendon Press had printed a new edition as recently as 1817[47]. Buckland himself possessed three copies. According to Stillingfleet, at the time of the Flood, the small human population was still concentrated around the original Garden of Eden; only later did Noah's descendants spread out across the world. This analysis, similar in effect to an appealing but rather less Biblical narrative posited by Buckland's hero, Cuvier, nicely explained an otherwise embarrassing deficiency of human remains in the fossil record.[48]

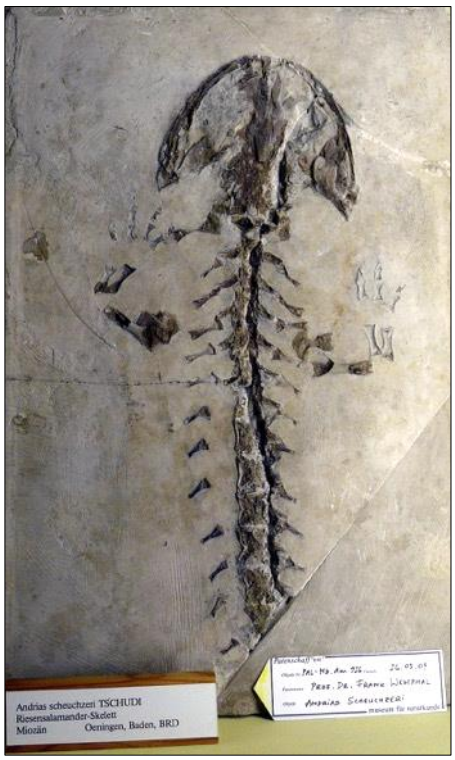

Fig. 6.9 'Homo diluvii testis'?

Others, of course, thought differently, and great excitement attended any report suggesting the presence of man in earlier times; but, so far, these had all proved to be false alarms. In 1726 Johann Scheuchzer, a Swiss physician, announced that he had found a fossilized human which he called *Homo diluvii testis*, or 'man, witness of the flood'. Many were sceptical, but it took until 1811 for Cuvier himself to debunk the claim, identifying the creature as a species of salamander. In 1805, an incomplete, but unquestionably human, skeleton was found embedded in limestone on the Caribbean island of Guadeloupe. This intriguing specimen was eventually captured by the British forces and taken to London where, in 1814, following a chemical analysis by Humphry Davy – presumably a more sophisticated procedure than Buckland's 'tongue test' – the British Museum's Charles König explained that, despite appearances, the bones were actually relatively recent.[49]

Given Buckland's enthusiasm for Cuvier's views and his own reliance on Stillingfleet's work and the history of these earlier 'discoveries', it was quite reasonable that he should adopt a precautionary

[47] Edward Stillingfleet, *Origines Sacræ: Or, A Rational Account of the Grounds of Natural and Revealed Religion* (Oxford: Clarendon Press, 1817). Yet another edition would be issued in 1836.
[48] For Cuvier's ideas see Sommer, *Bones and Ochre*, 93. For an indication of Buckland's continued scepticism concerning human fossils see Sadiah Qureshi, 'Looking to our Ancestors,' in *Time Travelers: Victorian Encounters with Time and History,* ed. A. Buckland and S. Qureshi (Chicago: University of Chicago Press, 2020), 4-9.
[49] Rudwick, *Bursting the Limits*, 592.

approach. If *Homo diluvii testis* was to be found, it would not be in Pembrokeshire but somewhere closer to Eden's presumed location in Mesopotamia.

The rocky coastline around Paviland was well known as a landing place for smugglers and the first theory to occur to Buckland and his fellow investigators was that the bones had belonged to some poor customs man, done to death in the line of duty and hastily hidden away in the cave. This was probably no more than a light-hearted suggestion; fascinating as they were, the human remains were not the real object of interest at the time. Only after Buckland had returned to Oxford and subjected what he had seen to a more antiquarian analysis did he write to Lady Mary: 'The man whom we voted an Exciseman turns out to have been a Woman'.[50] The cause for this radical reassignment was the presence of various pieces of carved ivory and small shells in the vicinity of the bones: items that, to Buckland and his Oxford friends, could only be explained as feminine adornments. He went further, surmising that the woman might have been 'a Dealer in Witchcraft', and as the bones – the entire left side of a human skeleton minus its skull and vertebrae – were also stained red with ochre, Buckland thought that her story might well create 'a Romance to be entitled the Red Woman or the Witch of Paviland'.[51] It was interesting antiquarian speculation, great fun, but hardly to be taken seriously.

However, by the time Buckland came to write the account of Paviland in *Reliquiae Diluvian*i, a third, more plausible and academically respectable identity for the 'Red Lady' had presented itself. This latest incarnation was inspired by a letter from John Traherne, his collaborator at the cave. Like Buckland, Traherne had attended lectures in chemistry and anatomy while at Oxford. He had joined the Geological Society in 1817 and, within six months of his recent Christmas meeting with Wollaston and Davy, he would also be elected to the Royal Society. A self-effacing man, he probably dissuaded Buckland – usually scrupulous in this regard – from crediting his contribution. Nevertheless, he was clearly the source. On 3 March he told Buckland:

> The subject of the caves having been reviewed in my mind … I might remind you, (if indeed you were aware of the fact) that there is a small British encampment immediately above the cave – so that it is not unreasonable to suppose that your enchantress may have stimulated the former inhabitants of Gower to warlike deeds[52]

To which Buckland replied:

> I was not aware of the Camp at Paviland till your letter of this morning – it is to my mind quite decisive as to the Chronology & Character of the red woman – Tho not the identical scarlet Lady of Babylon she was clearly of the same profession. What's not so convenient for her calling as a cave the very counterpart of that in which Aeneas began his peccadillos with Dido & in such as which, military heroes from that time & onwards have no doubt found frequent occasions to follow his example. This explains the Beef & Mutton & Pork bones mixed with those of the Antediluvial animals – The soldiers brought her marrow bones & she supplied them with shell fish & other commodities.[53]

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[50] WB to Lady Mary Cole, 15 February 1823, NMW84.20G.D/167.
[51] Ibid.; Samuel Rush Meyrick, introduction to *The History and Antiquities of the County of Cardigan* (London: Longman, 1808), clxxxviii.
[52] Traherne to WB, 3 March 1823, quoted in Sommer, *Bones and Ochre*, 64-5.
[53] WB to Traherne, 6 March 1823, quoted in Russell Weston, 'John Traherne, FSA and William Buckland's

Within a few short weeks the remains had not only changed sex, but had also aged: going from eighteenth-century exciseman to medieval witch, and ending as a camp-following sex-worker living 'anterior to or coeval with, the Roman invasion of this country'. It appears, however, that at no stage did Buckland even consider that the Red Lady might be a true fossil, or that he himself might actually have stumbled upon a real *Homo diluvii testis*. For him, the possibility of human remains mingled with those of now-extinct species could only further muddy the waters of the Flood; like human artefacts, he considered such relics to be the province of the antiquarian, not the geologist.[54]

Much later, DNA analysis reversed Buckland's (re-)assignment of the Red Lady's gender, establishing once and for all that the remains were those of 'a healthy, young adult male'.[55] As early as 1863, Edouard Lartet and Henry Christy, two pioneers of what would later become known as palaeoanthropology, suggested that the bones might indeed be far, far older than Buckland had believed, and in the 1960s, radiocarbon dating was used to confirm this early suspicion, giving a age of about 20,000 years.[56] But even this figure has subsequently been revised upwards, the latest estimate being that the Red Lady died about 33,000 years before the present.[57]

Back in Oxford, Buckland devoted the fourth of his geological lectures to describing the Paviland cave. As he told Lady Mary Cole, he had spoken to 'an overflowing Class, amongst whom I reckon the Bishop of Oxford & 4 other Heads of colleges & 3 Canons of Ch. Ch. [Christ Church]'.[58] It was around this time that two interesting lithographic portrayals of Buckland in his Ashmolean lecture room were created.

In 'The Geological Lecture Room, Oxford', by Oxford artist Nathaniel Whittock, Buckland is shown lecturing to twenty-nine senior university men – many of whom are clearly recognisable. This is very much the group described in his letter to Lady Mary and provides a valuable insight into both the setting and Buckland's teaching methods – as well as his capacity for self-promotion.[59]

'Red Lady': an archaeological perspective,' *The Antiquaries Journal* 88 (2008): 359.

[54] A fuller analysis of Buckland's reluctance to assign a high antiquity to the Red Lady is give in Sommer, *Bones and Ochre*, 59-120.

[55] R.M. Jacobi and T. F. G. Higham, 'The "Red Lady" Ages Gracefully: New Ultrafiltration AMS Determinations from Paviland,' *JHE* 55, 5 (2008): 900.

[56] Édouard Lartet, Henry Christy, and T.R. Jones, *Reliquiae Aquitanicae* pt.2 (London: Williams and Norgate, 1875), 93-94.

[57] Ewen Callaway, 'Date with History: By Revamping Radiocarbon Dating, Tom Higham Is Painting a New Picture of Humans' Arrival in Europe,' *Nature* 485, 7396 (2012): 27–29.

[58] Buckland to Lady Mary Cole, 15 February 1823, NMW84.20G.D/167; During this lecture Philip Duncan wrote the doggerel:

> Have ye heard of the Woman so long underground? / Have ye heard of the Woman that Buckland has found,
> With her bones of empyreal hue? / O fair ones of modern days, hang down your heads,
> The Antediluvians rouged when dead, / Only granted in life-time to you.

[59] Although, in Edmonds and Douglas, 'Geological Lecture', Whittock's lithograph has been specifically associated with Buckland's Paviland Cave lecture, Susan Newell (personal communication) has suggested that it was more likely to have been created later to celebrate the university's acceptance of Buckland's gift of his large collection of geological specimens (see Chapter 7).

Fig. 6.10 Nathaniel Whittock's print of Buckland lecturing (note that the map of England behind the figure of Buckland shows that print is reversed)

The other, slightly smaller, portrait was engraved by George Rowe, a young artist from Exeter.[60] Like the Whittock picture, this was printed in London by Charles Hullmandel, and may well have been intended for inclusion, perhaps as a frontispiece, in Buckland's new book. In April Buckland told Lady Mary Cole that publication was now imminent and that it would include '25 Plates of caves and Animals including a Picture of Scrub in his Hole at Paviland & of the Author in his Den (viz. Lecture Room) at Oxford.'[61] In fact when *Reliquiae Diluvianae* was finally published, priced at one and a half guineas, on 21 June, it contained a total of 27 plates. The one illustrating the Paviland cave did indeed include the charming detail of a dog – presumably 'Scrub' – sniffing its way into the furthest recesses of the cavern.

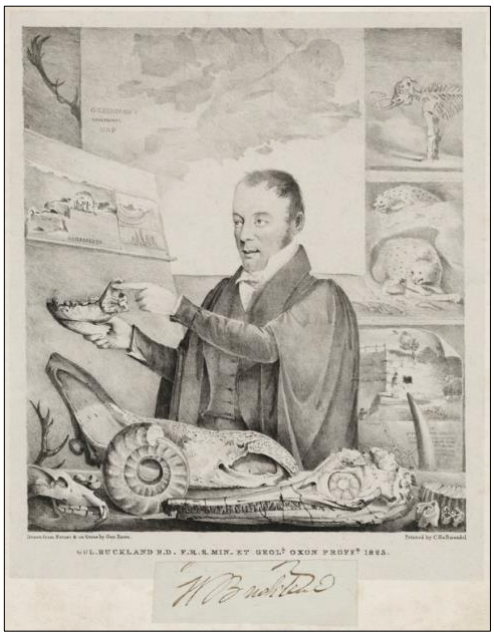

Fig. 6.11 George Rowe's portrait of 'the Author in his Den'

[60] Rowe's portrait of Buckland has been described by Patrick Boylan in 'An Unpublished Portrait of Dean William Buckland, 1784-1856,' *JSBNH* 5, 5 (1970): 350–54.
[61] WB to Lady Mary Cole, 3 April 1823, NMW84.20G.D/168.

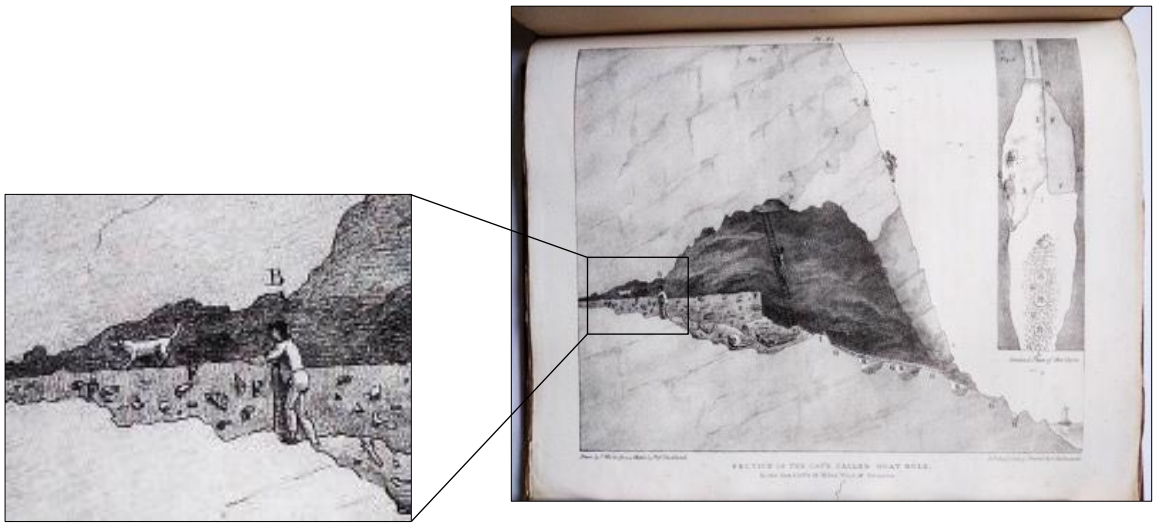

Fig. 6.12 Plate 21 from Reliquiae Diluvianae 'Goat Hole' with detail showing 'Scrub in his Hole'.

There was, however, no frontispiece. Did Buckland have second thoughts about it? Or was his hand stayed by John Murray, his publisher, who recognised the authorial portrait for the self-aggrandising exercise that it undoubtedly was? In mitigation, it was an understandable gambit. This book was Buckland's sign to the world that he had fulfilled his promise to integrate geology within the theological traditions of his university. He would present copies to several of his Oxford colleagues, and a few days before it was made available to the paying public he sent a copy to Lord Grenville. In his covering letter he emphasised that even the great Cuvier had recently made 'an admission of the Change that has taken place in his Opinions & of their present Conformity with my own as to those points on which I had ventured to differ from him in my first Accounts of Kirkdale.'[62] Naturally, Buckland did not bother to explain that the points of difference on which Cuvier had relented related to the dating of the cave bones as contemporaneous with those found in diluvial gravel; they did not extend to the identification of the Biblical Flood as the cause of their demise – a point on which Cuvier remained determinedly and purposefully silent.[63] Nevertheless, Buckland felt able to claim Cuvier's endorsement, placing him – and through him, Oxford – amongst the leaders of European science, a point that would not be lost on his noble patron.

[62] WB to Grenville, 12 June 1823, BL Add MS 58995 ff.105-106.
[63] Philippe Taquet, 'Cuvier's Attitude toward Creation and the Biblical Flood,' in *Geology and Religion: A History of Harmony and Hostility*, edited by M. Kölbl-Ebert (London, GSL, 2009), 130-1.

Chapter Seven

1823-1826

Preferment, marriage and family life

Whether or not there was an official betrothal, it was now clear to everyone that there was something of an understanding between Buckland and Mary Morland. As early as September 1821 there was sufficient connection between them for Martha Hare, a mutual acquaintance from Shrivenham, fifteen or so miles west of Abingdon, to interrupt an otherwise business-like letter to tell Buckland about her chance meeting with Miss Morland during a recent visit to the Isle of Wight. And the following year, in Paris, the English painter Thomas Underwood admitted that he had 'joked' Buckland about some drawings made by 'his friend Miss Moreland'.[1] Mary was clearly more than just an artist whose services Buckland occasionally relied upon. However, until Buckland's circumstances changed, there was little prospect of their relationship developing further.

When in February 1823 John Cooke, the venerable president of his college, died, Buckland saw just the opportunity he was looking for. Unlike the fellows, the college president was permitted to marry and the substantial president's lodging was more than adequate to accommodate a family. Buckland was now sixth most senior fellow in college. He was a popular figure at high table and, despite his geological commitments, had continued to take a full part in college life, currently serving a second period as senior dean as well as being college librarian.[2] He duly put his name forward as a candidate for the post.

Although he didn't win – Thomas Bridges, his one-time holiday companion, became Corpus' new president – Buckland's candidacy clearly brought his position to the notice of influential people. Shortly after the election he confided to Lady Mary Cole:

> tho' failing in my prime object I think I am likely to derive Advantages very speedily superior to those I have fail'd to obtain at the present Moment. I am not at liberty to state what has passed on this Occasion among persons of the highest Weight in the Country, but it is more flattering to my Vanity & to my future Prospects than any thing that has ever occurred in the whole Course of my life.[3]

The canons of Christ Church Cathedral were appointed by the prime minister of the day. Endowed at the time of Henry VIII, the eight canonries entitled their holders to a spacious house and a substantial income for the remainder of their lives in return for some trifling duties connected to the cathedral. The Regius Professors of Divinity and Hebrew occupied two of these positions ex officio, leaving six, so to speak, 'without portfolio'. To become a canon of Christ Church would indeed confer 'superior advantage' to one in Buckland's position. It would secure his presence in Oxford, provide time and money to continue with his geological work – and he would be free to marry. But although, taken together, his letter to Lady Mary Cole and subsequent events imply that just such a thing was

[1] Underwood to Webster, 21 December 1822, in Challinor, 'Some Correspondence, I,' 174.
[2] *Oxford Calendar,* 1823, 227.
[3] WB to Lady Mary Cole, 15 February 1823, NMW84.20G.D/167.

being considered, even with the support of 'persons of the highest Weight', it would take time and not be straightforward.

In the meantime, Buckland used his own limited means of patronage to consolidate his standing within the university. He had, over the years, accumulated his own large collection of fossils and geological specimens in addition to those he placed in the Ashmolean. This collection had served him well in his teaching and research and would now be mobilised in the interests of his future. On 24 February a handbill was posted announcing that 'The Professor of Geology' – note the title – had 'presented to the University a large and valuable Collection of Specimens illustrative of that Science'.[4] The notice further advertised a Convocation – a meeting of members of the university – to express 'the thanks of the University for this liberal donation, and to grant the sum of £300 for the purpose of providing Cabinets, and making such alterations in the Museum as may be requisite for the due arrangement and preservation of the same.' By August the promised cabinets had been installed.[5]

Buckland's position was also enhanced by the success of *Reliquiae Diluvianae*, a first edition of 1000 copies of which was published in June. By December he could report that 'not a Copy has been left for some time & Mr Murray is very busy bringing out a 2d. edition of 1000 copies more'.[6] He later claimed that the book had earned him £500.[7]

Meanwhile, in Paris, Cuvier was working on the later volumes of his revised *Ossemens Fossiles,* and was pressing Buckland for information about the Stonesfield animal. Since Cuvier had identified the remains as those of a large lizard in 1818, Buckland had been preoccupied with diluvial matters. He had hoped that Conybeare – who had developed considerable expertise in saurian anatomy – would help him to describe the beast.[8] But that collaboration had not happened and now Buckland was left to undertake the work alone. In July he told Cuvier that he was actively working on it and that Miss Morland had already made some drawings. He added that he had – after consultation with Conybeare – even given the animal a name: 'Herewith I send you Proof Plates of the great Animal of Stonesfield, to which I mean to give the name Megalosaurus'.[9]

That winter Buckland became president of the Geological Society. Few men had better credentials for the position: author of a sell-out volume, Copley medallist and trusted collaborator with the great Cuvier. At the age of almost forty, he was a leading figure among the scientific men of his country. He was moving amongst the rich and powerful and, despite his still relatively modest personal circumstances, he was beginning to enjoy some small luxuries. His 'geological steed' had given way to a faster, sleeker beast. At a time when the average price of a horse was between ten and fifteen

[4] Handbill, DRO/138M/124.
[5] WB to Grenville, 11 August 1823, BL Add MS 58995 ff.107-108.
[6] WB to Lady Mary Cole, 3 December 1823, NMW84.20G.D/171.
[7] Boylan, 'William Buckland,' [thesis], 197.
[8] WB to Pentland, 11 July 1822, in Howlett et al., 'Great Lizard of Stonesfield,' 96.
[9] WB to Cuvier, 9 July 1823, ibid.

pounds – he has been told 'by every Body who has seen it, that my Colt is so valuable, being worth a hundred pounds'.[10] He was clearly cutting a dash.

In February 1824, having heard nothing more concerning his future in Oxford, he lobbied Lord Liverpool. The prime minister was, it seems, gracious in his response, as Buckland explained to Lord Grenville:

> His Lordship has been pleased to honor Me with a most flattering Reply in which He expresses the Strongest Desire that I should be enabled to continue my Pursuits in Oxford & concludes with saying that He was anxious I should learn from Himself not only his sense of My Services but his anxious Desire to mark the Sense He entertains of them by some suitable Provision and Reward[11]

Encouraging words, but no concrete proposal of preferment.

Undeterred – or perhaps even encouraged – by Liverpool's response, Buckland threw himself into his role at the head of the Geological Society. It was doubtless his showman's instincts that led him to choose his first meeting as president to announce the long-awaited results of his study of the Stonesfield Monitor, but he could not possibly have known that his *Notice on the Megalosaurus or great Fossil Lizard of Stonesfield* would become one of the defining moments of his career.

Almost twenty years later, in 1842, the anatomist Richard Owen coupled the Greek word *deinos* – meaning 'terrible' or in Homeric terms, 'inconceivable' – to *sauros*, the word for lizard, to form the compound word, dinosaur. By that time, news of several other species of 'terrible lizard' had reached a public eager for sensation and the word dinosaur became firmly lodged in the collective imagination.[12] In fairness, the Sussex surgeon Gideon Mantell might claim priority in the matter. In his 1822 *Fossils of the South Downs*, he had announced to the world the former existence of 'one or more gigantic animals of the Lizard Tribe'.[13] But Mantell was then still on the periphery of the scientific world, and he neither named nor described his 'gigantic animals'. It is therefore Buckland who will be forever remembered as the man who first brought one of these fantastic beasts to public attention.

The audience for this historic 'first' was, according to Buckland, the largest he had ever seen at a meeting of the Society.[14] However, the reason for the high turnout was probably neither Buckland himself, nor his small collection of disarticulated *Megalosaurus* bones, but the chance to see a spectacular, almost perfect specimen of a plesiosaurus that had just arrived in London from Lyme Regis. It was a momentous meeting and Buckland was well satisfied, telling a friend that 'my first evening of taking the chair as President was one of great *eclat*'.[15]

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[10] WB to John Buckland, 18 May 1823, RS/MS/251/33.
[11] WB to Grenville, 25 February 1824, BL Add MS 58995 ff.109-110.
[12] Ichthyosaurus and plesiosaurus were of course both identified and named earlier, but being aquatic animals, are not properly 'dinosaurs'.
[13] Gideon Mantell, *The Fossils of the South Downs* (London: Lupton Relfe, 1822), 299.
[14] WB to William Vernon, February 1824, in Gordon, *Life and Correspondence*, 98.
[15] Ibid., 84.

When printed in the Society's Transactions, Buckland's *Notice on the Megalosaurus* included no fewer than five plates depicting just the Stonesfield specimens. All had been drawn by Mary Morland. Her work for Buckland was undoubtedly a 'labour of love', but others could not take her talents for granted. A few weeks later William Conybeare wrote to Buckland about a newly discovered fossil skull. 'Will M.M. draw it for me,' he asked, 'If she will I will write either an essay or a poem (the length of a Newdigate prize) in her praise'.[16] Sadly, amongst the many literary compliments that survive among Buckland's papers we find no such essay or poem; perhaps Mary was just too busy. She did however find time to produce her own 'superb' drawing of the plesiosaurus, for Buckland to send to Cuvier in Paris.[17]

Fig. 7.1 Jaw of Megalosaurus – bought by Sir Christopher Pegge in 1797, now in Oxford University Museum of Natural History

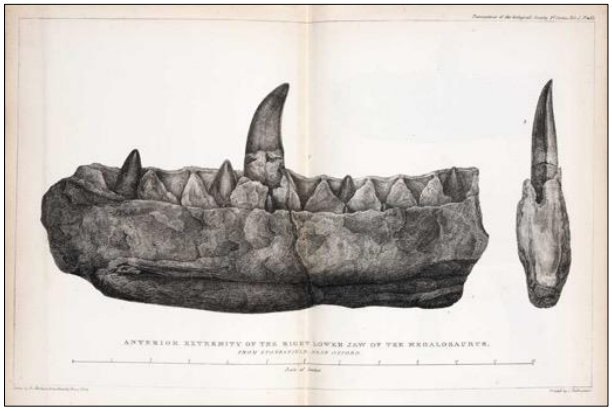

Fig. 7.2 Mary Morland's drawing of Pegge's Megalosaurus' jaw

There appears to have been an understanding within the Geological Society that once he became president, Buckland would be the right man to negotiate the grant of a Royal Charter. Two years earlier the Society's secretary William Fitton had told him to bear the issue in mind, and within a month of his election Henry Warburton, a long-standing Council Member, wrote that he was 'desired to remind you of the subject of the charter.'[18] Perhaps it was his earlier success in securing stipends for his readerships that recommended him for the task? If so, it was an astute move. Under Buckland's guidance a petition was drawn up and submitted and the new charter was approved, signed and sealed by the King on 23 April 1825. By its terms Buckland became the first president of the newly named 'Geological Society of London' and its members now became 'Fellows', the post-nominal MGS becoming FGS. In June that year, having formally received the impressive charter document, Buckland hosted a celebratory dinner at the Freemason's Tavern, the Society's 1807 birthplace.

Having set the business of the charter in train, Buckland travelled to Scotland where he joined the Duke of Buckingham for the long-postponed sailing excursion – not as originally proposed to the Orkney Islands, but in and out of the sea lochs along the west coast. For Mary Morland the three-

[16] Conybeare to WB, n.d. [March-June 1824], private collection. The Newdigate Prize, founded in 1806, is an undergraduate prize for a verse, the length of which is 'not to exceed 300 lines'.
[17] Rudwick, *Worlds before Adam*, 33 n.10.
[18] Fitton to WB, 16 February 1822, private collection; Warburton to WB, 12 March 1824, DRO/138M/71.

month separation was clearly a trial, as shown by her letter of 11 July, addressed to Buckland in Glasgow, but forwarded to Inveraray.[19] The letter is so revealing that it deserves to be quoted in full:

> Sheepstead July 11th
> My dear Sir,
> It gave me sincere pleasure to hear that your Party promised so well, and I trust that the Sea may now cease to be Ipecacuanha[20] to you and that you may have every enjoyment possible in your Scottish Excursion – to be sure three months is a long time to look forward to your absence, and I miss you very much already, but it would be the extreme of selfishness to wish you any where than on the spot where you now are – there seems to be an ample field laid open to you in Scotland, and I anticipate you doing great things there – while you are traversing the Sea and the Land and contemplating nature in her wildest and most imposing attire, pursuing enquiries so highly interesting to yourself and to science, I am employed in tying up flowers and killing snails – the Comparison make me appear somewhat contemptible in my own eyes, and , I could almost wish myself a man – but, were I one of the Lords instead of the Ladies of Creation, I might probably have been envious and jealous of your fame and success whereas they now afford me the highest Gratification, so that I believe matters are better as they are.
>
> I only wish that among those nearest and dearest to me I could find some Companion in my noble pursuits of gardening and snail-destroying, but Alas! I fear they were not born to it, as old Isaac Walton says of a man who does not love fishing – I have tried to make all my sisters from the biggest to the last take some sort of interest in these things, but in vain. and, in the midst of a large family I live in solitude as far as kin in community of pursuits and occupations – I often fear I shall grow absolutely stupid – if it were not that your society occurs to rub up my Intellects I think I should, nevertheless, it is a mortifying fact that I always feel conscious of being particularly dull and flat in your presence – this dullness appears to be extending itself into my letter – but it is unavoidable, for I have not the least interesting matter to communicate to you –
>
> Mr Tuckwell[21] dined here last week to see Lady Pegge but he told no Oxford news worth relating. I have not yet heard when I am to go into Sussex. I wish you had seen the Aylings on your road. I hope you will see[?] more of Dr Chalmers. Did you ever read his Sermon on the Impiety of modern Philosophy? I believe he attended particularly to Geology, I mean to the fanciful theories put forth concerning that Science – Mr Irving's Orations[22] lie before me, speaking of the neglect of spiritual things among the higher classes of Society he says – "The rocks from these residences among the clouds to their deep seats in the dark bowels of the Earth, have a most bold and venturous priesthood, who see in these rough and flinty places faces a more delectable image to adore than in the revealed countenance of God" – happily your geology has been turned to a better account than to deserve such a censure –
>
> I hope you mean to give me a series of Scottish rock specimens of your own collecting. I would suggest the place of your keeping the corner of a box for my exclusive use, or I shall get none for you have left me with a single stump of a Hyaena's tooth by way of "specimens from /of/ Kirkdale". pray don't use me so shabbily again, for I want to keep up my small geological collection – I think, as soon as you have filled a little box you had better send it off to me at once – I find the books you were so kind as to send me on Shells very useful – Did I tell you that Mrs Duffield's governess who is perfectly acquainted with Italian, has taken me in hand & I am making rapid

[19] Mary Morland to WB, 11 July 1824, NZSL/BUC/5.
[20] Ipecacuanha: a plant from which Syrup of ipecac, a common emetic, was made.
[21] William Tuckwell was a surgeon at the Radcliffe and father of Revd William Tuckwell, author of *Reminiscences of Oxford*.
[22] Edward Irving, a popular if uncompromising preacher, had been Chalmers' assistant at Glasgow, but by 1824 had moved to London. He would later be expelled from the Church of Scotland for his views on the human nature of Christ.

> progress in the language so that the next time you give me an Italian letter to translate, I shall be au fait in the matter. I am very sorry the bone was broken – I acknowledge my unskillful packing however remember this is the first accident that ever befell the numerous bones which have for years journeyed to and fro in Mr Cheer's[?] Cart – Being come to the end of my paper I have only to say God bless you – the oftener you can write, the oftener will you give pleasure to Yrs most truly & sincerely
> M.M.

Not only does Mary's letter tell us a great deal about her relationship with Buckland and her own enthusiasm for geology and the collection of specimens, but it is an early indication of the concern she had for the theological propriety of Buckland's geological researches. Criticism of her husband by evangelical literalists would be painful to Mary throughout her married life. However, although clearly aware of Thomas Chalmers' work, she appears unaware of how far Buckland had depended on it in his own inaugural lecture four years before.

By 27 July Buckland was in Fort William complaining to Walter Trevelyan that the only geology he had done so far was when they stopped at Arran.[23] At Tobermory, on the Isle of Mull, he found another letter from Mary, this time bearing a seal depicting a bird with the words 'COME BACK' across the top. Once again, the letter shows Mary's keen interest in geological matters – as well as a clear recall of the contents of Phillip Shuttleworth's *Specimen of a Geological Lecture*:

Fig. 7.3 Mary Morland's seal, with the words 'COME BACK'

> I am very glad to hear your voyage proceeds so prosperously and that you have such pleasant companions – it was very provoking to miss of the Giants' Causeway, but I hope a fair voyage to Staffa may compensate in some measure for your disappointment. I congratulate you on your satisfactory visit to Arran; I have no doubt your researches will throw much light on those perplexing trap rocks; though Dr Shuttleworth may say what he please of "Trap being understood by most Professors" it's history appears to me very little known by any of them. Dr McCulloch's account of Arran is not at all intelligible – I should think the S.E. of Sky will prove very interesting – is it not there that a Trap Dyke converts some of the Lias into Marble, as on the C of Iceland? I wish I had any entertaining matter to communicate to you but I have only everyday occurrences to detail…[24]

Whatever others may have said about the Duke – and Mrs Arbuthnot, wife of Buckland's disappointing acquaintance at the Treasury, thought him 'odious and unpopular to the last degree … utterly without talent or the respect of one human being' – Buckland clearly relished his company.[25] Or, at the very least, his patronage. Earlier that year he had secured for the Duke the spectacular plesiosaur skeleton that Conybeare had described to the Geological Society and now, on the Isle of Mull, he was able to advise on the selection of ornamental granite for the embellishment of the Duke's house at Stowe in Buckinghamshire.[26] A few months later he would report to his Uncle John, 'I am just returned from a

[23] WB to W.C. Trevelyan, 27 July 1824, NCL GB/186/WCT/5/2/26.
[24] Mary Morland to WB, 26 July 1824, NZSL/BUC/5.
[25] Thompson, 'Duke of Buckingham.'
[26] WB to Grenville, 10 December 1824, BL Add MS 58995 ff.111-112.

Visit to Stowe in to which Place I have recd a most cordial invitation to come without asking whenever it is convenient to me.'[27]

The sailing excursion over, Buckland spent several weeks exploring mainland Scotland, including some time in the company of Charles Lyell. Starting from Lyell's family home at Kinnordy, north of Dundee, the pair travelled up round the coast all the way to John O'Groats. They then tracked back down the Great Glen as far as Fort Augustus from where they returned to Edinburgh, travelling via Glen Roy, where they saw the famously enigmatic 'parallel roads'.[28] Amongst the scientific luminaries they met in the Scottish capital was the Wernerian, Robert Jameson, upon whose edition of Cuvier's *Essay on the Theory of the Earth* Buckland had so much relied in his inaugural lecture. After a week at Edinburgh, they made a short tour to visit one of Jameson's antagonists in the great 'Werner versus Hutton' debate that had so convulsed the city in the 1790s. Sir James Hall had become convinced of the truth of his friend James Hutton's theories, after he himself had carried out many experiments into the melting and chemical composition of rock. According to Lyell, Sir James was now an 'old gentleman…far past his prime', but as compensation the young geologist was pleased to note that 'the two unmarried daughters are very pleasant, one of them very pretty.' Leaving Scotland on 18 October, Buckland stopped a day at Alnwick Castle – where he found the Duke and Duchess of Northumberland 'both keen after geology and mineralogy' – before calling on his friend William Vernon in York.[29] Throughout this long summer of exploration, Buckland missed no opportunity to search for evidence in support of his diluvial theory and was gratified to find several examples of deeply scratched rock surfaces that must, he thought, have been caused by rocks carried along by the violence of the flood.

Sometimes it must have seemed to Buckland that he himself was being carried along by a great flood. On his return to Oxford he was met not only by Mary, but by a slew of correspondence bringing news of more caves that clamoured for his attention. Within days he was back on the road to investigate some caverns in Somerset.

As president, he also felt duty-bound to attend the Geological Society's fortnightly meetings. In 'Town', he usually put up at the Salopian Coffee House in Charing Cross. This long-established lodging, described as 'rather snug than elegant', was favoured by practical men.[30] Indeed, for many years the engineer Thomas Telford had been pleased to call it home. But however congenial these temporary London quarters, Buckland must have been delighted when a Geological Society Club was set up for members 'to dine together on the days of the Society's meetings'.[31] Limited to forty members, and meeting at the Thatched House Tavern – the St James's Street birthplace of many of London's gentlemen's clubs – this new club provided a welcome contrast to the formality of the Society itself.

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[27] WB to John Buckland, 20 January 1825, RS/MS/251/21.
[28] In 1838, fourteen years after Buckland's visit, Charles Darwin would suggest that the so-called 'parallel roads' were ancient marine shorelines. They are now recognised as the former beaches of an ice-dammed glacial lake.
[29] WB to W.C.Trevelyan, n.d. BL Add 31026, ff.46-7.
[30] John Roach, *Roach's London Pocket Pilot, or Stranger's Guide through the Metropolis* (London: J. Roach, 1796), 49.
[31] Woodward, *History,* 65.

Here the gentlemen would relax, drink claret and champagne and place wagers on the outcome of outlandish experiments. Within a year Buckland had won a bottle of champagne from Warburton for predicting the result of an experiment that involved incarcerating toads in stone sarcophagi.[32]

It was by now becoming clear to both Buckland and Mary that, despite Lord Liverpool's hints of preferment, a Christ Church canon's stall would not be gained easily or quickly. The next to become available – most likely to be that occupied by the octogenarian James Burton – had, it transpired, already been promised to Peter Elmsley, a genial classical scholar who had recently become professor of ancient history. As Elmsley was apparently reluctant to relinquish his claim, and since the other canons were all younger men, Buckland might well wait some time.

He had not, however, been forgotten. On 13 December he learned from Grenville that Lord Liverpool had negotiated, on his behalf, a Civil List 'pension' of £300 per annum.[33] By the standards of the day, this was a generous amount, far in excess of the meagre £100 that Buckland and Rigaud received for their readerships. No doubt Grenville and the Prime Minister both hoped that this token of good faith might be enough to hold Buckland in Oxford until a more satisfactory arrangement could be made. However, such a sum would do little to facilitate his marriage. It would hardly cover the financial loss entailed in giving up his fellowship, let alone the loss of accommodation. Buckland replied to Grenville straight away:

> I confess I am quite at a loss & wholly unable from my own Judgement to come to any determination with respect to Lord Liverpools Proposal of a pension of L300 per an from the Civil list. My own feelings are at the present Moment against accepting it –
> first because it wd be inadequate to the Object proposed of enabling me to establish myself in Oxford
> Secondly because Lord Liverpool says He could not do it without considerable difficulty, & thirdly because in these Days of Outcry against every thing in the Shape of Pension & Place I shd be very sorry to have my Name brought before Parliament in a form which any Body might assail.
> If therefore I were at this Moment obliged to determine in the Case before me I should prefer waiting for the Chance of something that would really answer the purpose I have in view of enabling me to keep a house in Oxford, & at the same time discharge the expensive duties of My Professorship, to the Acceptance of that which under the Semblance of Recompense would only place me in a Situation of greater Embarrassment than that in which I should stand if I continued as I now do to discharge my Public Duties with nothing but Reputation for my reward.[34]

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[32] The question of 'toads in stones' was an old one, prompted by tales of miners and quarrymen apparently finding live toads within the rocks they were breaking. For earlier investigations see: Benjamin Franklin, *The Works of Benjamin Franklin* (London: Benjamin Franklin Stevens, 1882), 381,441-2; and White Watson, *A Delineation of the Strata of Derbyshire* (Sheffield: W. Todd, 1811) 10. Following the wager, Buckland carried out further investigations resulting in a paper: William Buckland, 'On the Vitality of Toads Enclosed in Stone and Wood,' *ENPJ* 13 (1832), 26-32. Buckland's findings were also reported later in the popular magazine, *The Leisure Hour: TLH* 115 (1854), 158-9.

[33] This figure compares to a bricklayer's income of ca. £85 p.a. (see preface) and that of a 'middle-class' clerk with 15 years' service with the East India Company who might receive as much as £400. H.M. Boot, 'Real Incomes of the British Middle Class, 1760-1850,' *EHR* 52 (1999): 638–68.

[34] WB to Grenville, 13 December 1824, BL Add MS 58995 ff.113-114.

Buckland's letter ended with a plea that he might take a few days 'to consult my friends upon this Subject before I return a decisive Answer to the proposition' but, in reality, his mind was already made up. On 20 January he wrote to his uncle at Warborough:

> since I saw you I have written a letter to Ld Grenville declining the pension which letter Ld G has forwarded to the premier. He says of it to me "nothing can be more proper than the Letter you have written and I most fully acquiesce in the Wisdom of your decision["] – Since this I have heard nothing from either of the noble Lords.[35]

Having the scent of a Christ Church canon's stall in his nostrils, Buckland was prepared to play the long game. But both he and Mary were impatient for progress.

On 21 December, a few days after Liverpool's offer, the Revd. Robert Gatehouse died. Gatehouse had been the absentee rector of Stoke Charity, a small village a few miles to the north of Winchester. The now-vacant rectory was one of the twenty or so livings in the gift of Corpus Christi College. It would be offered, in order of seniority, to each of the current fellows. When the offer reached Buckland, he felt inclined to accept. As he explained to his Uncle John, it would be worth 'more than 400 per An[num] & [is] within a few Hours drive from Oxford & London, & near Winton [Winchester] & the Duke of Buckingham'. The Duke's estates included – as well as Stowe – a grand house at Avington to the east of Winchester, and he had clearly been one of the first to be consulted on the matter. Buckland reported to his uncle, that the Duke 'now fully concurs with every Body that I ought to take it tho at first He wrote to warn me of the Badness of the House & the Smallness of the income, & advising me to see it before I took it'.[36]

Having visited Stoke Charity in mid-January Buckland was sufficiently reassured. He politely declined Lord Liverpool's offer of a government pension and on 26 February he accepted the rectory of Stoke Charity.[37]

Buckland himself described the parish as '1000 acres of poor chalk land' and William Cobbett reported that the population was 'half-starved'.[38] It was a community sorely in need of the spiritual and practical leadership of a resident rector. But that was not Buckland's plan. Once installed in his new church he set about finding a suitable curate. On 25 April he conducted the funeral of parishioner Ann Baily; but thereafter his name does not appear in the church register until 1841, when he baptised Ellen Sharp, a labourer's child. He clearly made occasional visits over the next twenty years, and in the 1840s he probably took some part in organising the emigration of 200 impoverished villagers (a quarter of the parish) to Canada. But the only other record of his presence in Stoke Charity was a visit of three days when he reportedly fished in a nearby lake.[39] Like his brother John, and their father before them, he was quite comfortable with his role as an absentee rector.

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[35] WB to John Buckland, 20 January 1825, RS/MS/251/21.
[36] Ibid.
[37] Acts & Proceedings, CCC/B/4/1/2.
[38] WB to Peel, 12 January 1844, BL Add 40538 f.246; Canon T.G. King to James Edmonds, 9 May 1976, OUMNH Edmonds Papers; William Cobbett, *Rural Rides in the Counties of Surrey, Kent &c.* (London: Cobbett, 1830), 304.
[39] King to Edmonds, 9 May 1976, OUMNH Edmonds Papers.

Meanwhile, on 8 March, three days after Buckland's official institution at Stoke Charity, Peter Elmsley, the man that stood between him and the promise of a Christ Church canonry, died. As soon as he heard the news Buckland wrote to Lord Grenville:[40]

> Oxford March 9 1825
> My Lord
> Your Lordship will doubtless have heard of the much lamented death of our poor Friend Dr Elmsley, an Event by which the principle difficulty that lay in the way of Lord Liverpools wishes with respect to my future residence in Oxford will apparently have been removed … from Lord Liverpools Strong Expressions of kind feeling towards Myself I confidently trust his Lordship need not be reminded of my present Situation, & feel there wd be the highest indelicacy in any kind of Representation being made to Him by Myself, yet after the kind Communication your Lordship was pleased to make to me of what had been your intention in Case the fatal Event which has now occurred had taken place last Summer, I venture to hope that under existing circumstances you will be pleased to take such Steps as to your Lordships better Judgement may appear most expedient in order to give effect to those good Wishes which it is the most gratifying Result of all my labours to know that your Lordship entertains with respect to my not being removed from the active discharge of the Duties of my Professorship in Oxford…
> Your Ever Grateful & Most Obedt Servant
> W Buckland

Grenville's response prompted yet more effusion:[41]

> Oxford March 17 1825
> My Lord
> It is with feelings of the deepest Gratitude that I now sit down to acknowledge & return to your Lordship my most heartfelt Thanks for the gratifying Communication transmitted to me this morning of Lord Liverpools Reply to your Lordships Application on my Behalf for the Situation which is of all others the best calculated to enable me to continue my Public Services in Oxford.
> By this Prospect I am relieved from a position of much Anxiety & enabled to look with confident Expectation to the passing the Remainder of my life in the Place in which of all others I feel I shall be most usefully employed, & in an Occupation which in addition to the Pleasure I have derived from its Pursuit now appears likely through your Lordships Intercession to be followed by more substantial Rewards
> Believe me my Lord I shall to the last Moment of my Life cherish the most Grateful Recollections of your Lordships Kindness and ever remain more sincerely than I can express
> Your Most Obliged & Most Devoted Servant
> Wm Buckland

Despite Buckland's effusion, two men still stood between him and the coveted canon's stall. One was the present incumbent, the ailing, eighty-year-old Dr Burton; the other was Thomas Gaisford, Regius Professor of Greek. Gaisford's claim to succeed Burton was championed by the influential professor of divinity, Charles Lloyd, who insinuated that Buckland's 'loose and desultory habits' unsuited him

[40] WB to Grenville, 9 March 1825, BL Add MS 58995 ff.117-118.
[41] WB to Grenville, 17 March 1825, BL Add MS 58995 f.119.

for such a dignified position.[42] But despite Lloyd's misgivings, when Burton died at the end of June, it was Buckland who took his place as Canon of the First Prebend at Christ Church Cathedral.[43]

The news spread fast; within a week an envious Lyell was telling his friend Mantell, 'Buckland, you know, is made by Lord Liverpool a canon of Christ's Church, a good house, 1,000l per annum, and no residence or duty required. Surely such places ought to be made also for lay geologists.'[44]

It would actually be many years before any lay geologist was so richly rewarded. But Buckland was now financially secure – in addition to his generous allowance from Christ Church and the income from Stoke Charity he still had the fees and the £200 stipend from his readerships – and what is more, he now had a large house and, once he had resigned his fellowship at Corpus, there was nothing to prevent him from marrying. He spent the autumn involved in renovations to his new home where 'the hunting of bricklayers and carpenters for the present entirely supersedes that of crocodiles and hyenas'.[45] On 3 November, as was customary, convocation awarded the new canon the honorary degree of doctor of divinity.

Fig. 7.4 The front door of Buckland's new home in Christ Church

On the last day of 1825 Buckland married Mary Morland at All Saints' Church in Marcham just outside Abingdon. It had been a long courtship. As may be expected of one so well-versed in the arts of blandishment, Buckland had been an attentive and diplomatic suitor. When he sent flowers, he took care not to forget his future father-in-law, as a letter from Mary just a few months

Fig. 7.5 All Saints' Church Marcham, as it was at the time of the Bucklands' marriage

[42] Ward, *Victorian Oxford*, 51. Lloyd's remarks are more likely to be the result of partisanship and a difference in personality than any suggestion of real impropriety.
[43] *JOJ*, 9 July 1825.
[44] K. Lyell, *Life, Letters and Journals,* Vol. 1, 161.
[45] Gordon, *Life and Correspondence,* 87.

before their marriage testifies. Addressed to the Salopian Coffee House, it begins:

> My Dear Friend
> I was quite delighted with the flowers – if they do not flourish it will not be for want of care – I fear the Grafts, which I shall present to Papa in your name, will not have justice done them for we have not proper stocks on which to place them but the Gardener has done his best with them. Papa is a great Apple Fancier…[46]

The marriage, according to genteel custom, was 'by License with consent of Parents'[47] rather than by banns, and the witnesses were two of Mary's step-sisters and her step-brother Thomas. Thomas and the other Morland men were keen horsemen, even owning the occasional winner at the annual Abingdon Races, and Buckland, renowned for his own stamina in the saddle, would have felt comfortable in the company of such men.

The honeymoon was to be a long tour to Italy and Sicily. They left on 19 February, two days after Buckland's last meeting as President of the Geological Society. By 25 February the couple were in Paris. Mary had already met the Cuviers during a visit to France the previous summer, when she had been invited 'to dine with them to meet Lady Davy and many English people' – an invitation she was apparently too shy to accept.[48] Now, however, she found them disappointing, recording that 'The Cuvier's parties are by no means brilliant; he is very taciturn, and so cautious that he never utters an opinion in company'.[49] On the other hand, she thought the astronomer Francois Arago was 'the most Englishlike Frenchman I ever saw … and the most intelligent in his conversation'.[50]

The detailed journal that Mary kept on the tour is now lost, but the fragments recorded by Mrs Gordon show that she was both knowledgeable and enthusiastic about the geology they saw. 'The quarries near the Pont du Gard and the aqueduct itself, she wrote, 'are a very coarse *calcaire grossier*, as like as possible to our Norfolk crag, but the mountains which support the Pont on either side are compact Jura limestone'.

There is no record of the couple's reaction to the sight of Etna, Sicily's famously active volcano, but we are told of Buckland's own reaction to another local tourist attraction. At the shrine of St Rosalia in Palermo he embarrassed the authorities by pronouncing that the bones contained in the saintly reliquary were in fact those of a goat. A similar story demonstrating Buckland's robust debunking of what he considered to be Catholic superstition related to a later visit to 'a foreign cathedral, where was exhibited a martyr's blood – dark spots on the pavement ever fresh and eradicable'.[51] Here it seems that the sceptical professor 'dropped on the pavement and touched the stain with his tongue', exclaiming '"I can tell you what it is; it is bat's urine!"'. Buckland's predilection for using his tongue as an analytic tool being so well documented, there is no reason to doubt the tale's veracity; nevertheless, Elizabeth Gordon primly fails to mention the episode.

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[46] Mary Morland to WB, 20 April 1825, DRO/138M/87.
[47] Boylan, 'William Buckland,' [thesis], 154.
[48] Mary Morland to WB, 9 July 1825, NZSL/BUC/5.
[49] Gordon, *Life and Correspondence,* 93.
[50] Ibid.
[51] Tuckwell, *Reminiscences,* 40.

Leaving Sicily, Buckland and Mary returned north and took a westward route along the Mediterranean coast. They visited the caves at Lunel where a Professor Marcel de Serres of Montpellier, had recently found a collection of hyena bones together with abundant quantities of *album graecum*.[52] But, despite this earthy evidence, Buckland was unable to convince Serres that the remains had not simply been washed there by the waters of a flood.[53] After Lunel, the couple travelled north towards Besançon to examine the remains of cave bears in the Grotte d'Osselles where, once again, the perceptive Buckland tongue found analytical employment.[54] It is, however, unlikely that Mary accompanied her husband into the further recesses of these caverns as she was, by this time, already quite heavily pregnant.

By early November the Bucklands were back in London, where Lyell pronounced that Buckland himself 'looks 5 years younger & is so full of health, spirits & information that to be with him is quite exhilarating'.[55] Modesty would have prevented any comment on the condition of Mrs B. The couple then returned to Oxford and their newly refurbished home in Tom Quad, where, on 17 December, Francis Trevelyan Buckland, usually known as Frank, was born.

'I am told', wrote Frank many years later, 'that soon after my birth, my father and my godfather, the late Sir Francis Chantrey, weighed me in the kitchen scales against a leg of mutton, and that I was heavier than the joint provided for the family dinner that day.'[56] This heart-warming picture of a proud and playful father, at ease with the world, stands in contrast to Frank's equally graphic follow-up: 'In honour of my arrival my father and Sir Francis then went into the garden and planted a birch tree. I know the taste of the twigs of that birch tree well.'[57]

From the beginning the Buckland home was a model of the rumbustious bohemianism that typified the more colourful section of the English upper-middle class. The door it seemed was ever open and, over the years, their visitors' book – should such a thing have existed – might have formed a veritable 'Who's Who' of the arts and sciences. Sir Francis Chantrey, the society sculptor, had been one of Buckland's closest friends for several years, recruited on more than one occasion to make casts of fossil bones. Chantrey's fellow godparents were the boy's aunt Francis, wife of Buckland's brother John and sister of Thomas Arnold, and Sir John Trevelyan, father of Buckland's former student, Walter Calverley Trevelyan.

Mary quickly learned to tolerate Buckland's long-established disregard for the conventional standards of housekeeping, accepting that her family would live amid a jumble of specimens, books and papers – augmented later by a menagerie of more-or-less unusual pets. Caroline Fox was shocked when Mary, whom she found 'a most amusing and animated woman, full of strong sense and keen

[52] Tanya Szrajber, 'Marcel De Serres: Documents on Early Lithography,' *PQ* 17 (2000): 123.
[53] Marcel de Serres, 'Note on the Bone-Caves of Lunel-Viel, Herault,' *QJGS* 18 (1862): 3.
[54] Buckland, William. 'The Discovery of a Number of Fossil Bones of Bears in the Grotto d'Osselles,' *PGS* 1 (1827): 21–22.
[55] Lyell to Caroline Lyell, 9 November 1826, in Wilson, *Lyell,* Vol.1, 159.
[56] Bompas, *Frank Buckland*, 11.
[57] Ibid.

perception' , explained that her attempts to clear 'the dust and rubbish held sacred to geology … so disturbed the Doctor, that she determined never again to risk her matrimonial felicity in such a cause.'[58] Miss Fox's words are corroborated by the author William Tuckwell, who remembered sideboards laden with dusty fossils, surmounted by a card bearing the words 'Paws Off', and Thomas Sopwith, a later friend of Buckland's, recalled being told that the breakfast room 'had not been invaded by the dust-cloth for the last five years'. Frank's own biographer, his brother-in-law George Bompas, painted a similar, if somewhat alarming picture of the domestic scene:

> besides the stuffed creatures which shared the hall with the rocking-horse, there were cages full of snakes, and of green frogs, in the dining room, where the sideboard groaned under successive layers of fossils, and the candles stood on ichthyosauri's vertebrae. Guinea pigs were often running over the table; and occasionally the pony, having trotted down the steps from the garden, would push open the dining room door, and career round the table, with three laughing children on his back[59]

The three laughing children were Frank, his brother Edward and Bompas's wife Mary, known within the family as Mit.

Edward Copleston Buckland was born seventeen months after Frank, in May 1828. Then came Mary in October the following year. Again, great care was taken over the choice of godparents. Edward's godfathers were two of Buckland's oldest friends: the provost of Oriel, Edward Copleston, recently appointed Bishop of Llandaff and Philip Serle, a former member of Oxford's 'Rag Formation' geological club, now well established as Rector of Oddington, just outside Oxford. Edward's godmother was Mrs Mary Barrington Price, the sister of Mary Buckland's step-mother, who, as chance would have it, had also married into the family of another of Buckland's mentors, the recently deceased Shute Barrington, Bishop of Durham.

Mit, Mary Anne Scott, the Bucklands' eldest daughter enjoyed the support of the Viscountess Sidmouth, the second wife of ex-prime-minister Henry Addington, who had, so long before, helped secure Buckland's place at Winchester. Lady Sidmouth, formerly Marianne Scott, also happened to be the daughter of William Scott, Uncle John Buckland's old college friend and brother of his patron, the Earl of Eldon.

Mary Buckland would have two more pregnancies in quick succession. William Oke Buckland was born in December 1830 and Charlotte Jane Eva in February 1832.

Five pregnancies in a little over six years took their toll. In December 1832, Buckland told his friend Roderick Murchison that 'My wife has been very poorly during the last week & in the way of a miscarriage but is better again.'[60] However, five months later, the poor woman was 'during two hours … in a State of imminent Peril arising from a miscarriage attended by a succession of faintings from loss of Blood which at length happily subsided but left her in a state of extreme debility'.[61] After many

[58] Fox, *Memories of Old Friends*, 54-5.
[59] Bompas, *Frank Buckland*, 17.
[60] WB to Murchison, 31 December 1832, DRO/188M/233.
[61] WB to Murchison, 26 May 1833, DRO/188M/234.

days of bed-rest Mary recovered, but it was not until September 1836 that her sixth child, Buckland's eventual biographer Elizabeth Oke, was born.

The children were almost certainly all vaccinated against the smallpox, but it was another disease entirely that proved to be the family's enemy. In February 1835 the house in Tom Quad house resonated with the characteristic cough and the gasping for breath that signified the whooping cough. In a short time, the disease had spread to all five children. Although the older ones fought it off, the barely-three-year-old Eva and her brother, 'little Willie' both succumbed. A stone stab marks their burial place in Christ Church Cathedral.

Elizabeth Oke and her younger brother Adam both inherited several of their god-parents from their dead siblings. Adam Sedgwick Conybeare Buckland, born in January 1838, as his names suggest, was sponsored by Adam Sedgwick and William Conybeare as well as Conybeare's wife Sarah as godmother. A little over a year after Adam's birth came Caroline Mary and the final Buckland child, poor little Emily – she appears to have had no second Christian-name – was born on 13 May 1841. No god-parents are recorded for Emily. She was baptised 'privately' in June and died just before Christmas, at the age of seven months.

Fig. 7.6 Memorial to Eva and William Oke Buckland in Christ Church Cathedral, Oxford

Three years later the family would once again suffer grievous loss. News of the sudden death of his third son, Adam, reached Buckland as he was *en route* to a meeting of a scientific convention at York, where he had hoped to meet many geological friends, including the boy's godfather, Adam Sedgwick.[62] The story is told in Buckland's own words from the draft of a black-edged letter, probably intended for Sedgwick:

> When 10 days ago I transmitted to De la Beche an invitation to meet me at Wentworth on the way to York, & added I expect this week to be one of the happiest of my whole life, little did I foresee the blow that was impending over the parents of my dear & most promising boy of whom it has pleased God to bereave us by almost sudden death last Saturday.
>
> The poor child has been a little out of health for 3 months past & somewhat more so during the last 3 weeks. He was better Saturday morning & had been playing with his Cart & talking Cheerfully & Dictating a list of Persons to be invited to his Nurses approaching Wedding.
>
> He suddenly vomited a little bile & said to his Mother I am so hot, sprang up suddenly on the bed, uttered a loud scream but not indicative of pain - and fell back dead.
>
> My Wife thought He had fainted …
>
> I had fondly hoped that the Names he bore would have been memorials to another generation of the happy Triple Alliance it has pleased God to permit to subsist for so many years between his Father & 2 of his most dear friends founded with y^{e} most

[62] It was at this meeting that Sedgwick mounted a famous and spirited defence of Buckland, whose ideas concerning the age of the earth were being violently attacked by William Cockburn, the Dean of York.

> delightful of all ties congeniality of feeling, & kindred Pursuits but Heaven has decreed that instead of sharing your joyous and most useful Meeting now in progress, it will be my sad duty to consign the names of Adam Sedgwick Conybeare Buckland inscribed on my Dear Childs Coffin to the Grave.[63]

Adam was buried, alongside his three younger siblings, 'in a deep brick grave… in the North Transept of Christ Church Cathedral'.[64] Elizabeth, who was just eight at the time, remembers simply that afterwards 'the family went by coach for a change of air to Lyme.'[65]

But the sorrows of infant death, shared, as they were, by so many at that period, simply throw into relief the gaiety and warmth of the home in the corner of that famous quadrangle. With her almost continual state of pregnancy and a husband who was often absent in London or elsewhere, even with the help of several servants Mary had her hands very full.[66] As Elizabeth makes clear, it was the Bucklands' policy to keep their children busy.

> On one point only Dr Buckland was a strict father. He never allowed his children to be unemployed. … There was always something to do, – their animals to feed, or their gardens to tend, or if a wet day came, they all adjourned to the dining room and sat round the big table helping Mrs. Buckland to cut and paste cardboard into strong neat little trays for specimens, while one of the party read aloud, generally from a book of travel or Arctic voyage.[67]

Mary Buckland's aptitude for collecting and curation were as valuable to her husband as her artistic skill and many of the specimens in the Oxford University Museum still bear her neatly written labels. In addition to geology, the couple shared a great enthusiasm for botany and the collection of plants. It had long been Buckland's habit to acquire seeds or cuttings of plants encountered on his travels and he often encouraged his foreign correspondents to send him specimens. He would nurture these himself or sometimes pass them on to friends. Lady Mary Cole and her botanist daughter, Jane Talbot, were frequent recipients, as was Lord Grenville, with whom he also swapped notes about the management of hothouses. The high-walled garden of his Christ Church home became Buckland's particular delight. From it his children would cut for him scented buttonholes: of the hothouse-raised lemon verbena or the hardier yellow Banksia rose bush that he planted in memory of his friend Sir Joseph Banks. It was here that he sealed toads into stone sarcophagi and, less gruesomely, it was the home for what can only be described as the family's menagerie, including a tortoise, a fox, rabbits, guinea-pigs and ferrets, hawks and owls, a magpie and a jackdaw, as well as the more usual dogs, cats, and poultry.

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[63] WB to ? [Sedgwick?] (draft), NZSL /BUC/1.
[64] MS note, DRO/138M/886.
[65] Gordon, *Life and Correspondence,* 113.
[66] The 1841 Census records four female servants, aged between twenty and thirty years and one nineteen-year-old male. In addition, Buckland's half-brother, Samuel, his nephew Charles Thomas (son of Buckland's brother, John) and William Conybeare's twenty-year-old daughter were staying with the family. The census was enumerated on 6 June and the visitors may have been in Oxford to witness the visit of HRH Prince Albert for the Commemoration celebration on 15 June.
[67] Gordon, *Life and Correspondence*, 101.

Both Elizabeth and Frank emphasised their father's exuberance when it came to introducing his children to the natural world. It was not just ponies ridden round the dining room, there was also the tale of the live turtle. This poor animal – ultimately destined for a significant role at a college banquet – was made to swim around the 'Mercury' fountain in the centre of Tom Quad while the young Frank enjoyed a brief ride on its back.[68] As a further treat Frank helped the cook to cut off the reptile's head, which he kept for his private 'museum' – perhaps one of the earliest 'Curiosities of Natural History' for which he later became renowned.[69]

Fig. 7.7 Frank, Mary and Edward Buckland play with crocodiles. Sketch by P.B. Duncan

Crocodiles also make several appearances in Buckland family folklore. They too might be ridden or, like the poor turtle, be made to swim in the Mercury pond before being served at the dinner-table – though as a delicacy they were 'an utter failure' according to one gastronomically unimpressed guest.[70] On one occasion the children were intrigued when their father brought home the carcass of bear, wrapped in a travelling rug. Once the beast had been carefully examined and its meat cooked and tasted, the fat was 'given to the nurse to make into a pomatum for family use'.[71]

There were also frequent family excursions:

> In summer afternoons, after the early three o'clock dinner, Dr. Buckland would drive out Mrs. Buckland and their children in a carriage, known as the bird's-nest, to Bagley Wood, to hunt for moles and nests, or to Port Meadow to gather yellow iris and water-lilies, and fish for minnows, … Or another day to Shotover, to dig in the quarries for oysters and gryphites.[72]

The family also visited Buckland's by now aged Uncle John at Warborough. Frank remembered the tea and cakes served in the rectory study and later, when writing about the naturalist Gilbert White, he recalled that 'the old uncle was a simple country parson, [and] must have lived much in the same style as White did'.[73] More appealing no doubt, were visits to their 'Papa' and 'Grandmama' at Marcham, where their uncle, Thomas Thornhill Morland kept his stable of hunters and the hounds of the Old Berks Hunt.[74] There Frank learned to stop up fox earths and other country pursuits. As the children got older, they would attend the balls and other social events of 'county' life.

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[68] Bompas, *Frank Buckland,* 14-15.
[69] Between 1857 and 1872 Frank Buckland published four volumes of his *Curiosities of Natural History*.
[70] Gordon, *Life and Correspondence,* 105.
[71] Ibid., 105-6.
[72] Bompas, *Frank Buckland,* 18.
[73] Buckland F.T. 'Memoir of Gilbert White' in *Natural History and Antiquities of Selborne*, by Gilbert White (London : Macmillan and Co., 1875), 313.
[74] Richard Girling, *The Man Who Ate the Zoo* (London: Chatto & Windus, 2016), 28.

Thomas Morland must have cut a dashing figure to his impressionable young nephews and nieces. They would have been told tales of his daring deeds when mobs of under-employed farmworkers threatened property across the south-east of England. Thomas, quickly sworn-in as a special constable, had ridden across the county with a posse of fellow huntsmen, to round up unlawful protesters in the Oxford area. Writing in November 1830, Buckland gave a sense of the fear that these events aroused, even in those safe behind the high walls of an Oxford college:

> I shall be very sorry to leave Home on Monday next without a most urgent necessity for my Wifes Father & Brother 6 miles from hence are in hourly expectation of a Mob from Abingdon to set fire to their Premises – & there are threats of a Mob coming into Oxford from the neighbourhood of Benson, & our Streets every night are on the point of a Row between the Town & Gown. … My Brother in law is just come in with 7 prisoners & has lodged them in Oxford Castle for tonight. Tomorrow he will take them to the Jail at Abingdon, … not one Soldier is to be found in the land – & my Brother in law is fighting with a party of Fox Hunters turned into Special Constables & galloping 60 or 70 miles a day during all the last week.[75]

Four years later, during a similar outbreak of rick-burning, Thomas once again played a part in bringing the arsonists to justice.[76]

Fig. 7.8 Sheepstead House, the Morland family home

In the early nineteenth century the fear of popular insurrection weighed heavily on the minds of the English gentry. It was a prospect that clearly disturbed Buckland. But although he and Mary supported Thomas' efforts at law enforcement, they were equally keen to ensure that their children were brought up to be considerate of those less privileged than themselves. Elizabeth specifically mentions her mother's interest in the 'spiritual and bodily welfare of a settlement of Jews living in St Ebbe's parish, a very poor part of Oxford', and later, the children themselves would be sent out 'as a matter of course' to take 'kitchen stuff from our own table' to those 'in need of personal sympathy'.[77]

As a canon, Buckland was duty-bound to attend the Sunday morning service at the cathedral. Mary, however, was less constrained, and as the children grew older, she thought it more suitable to take them the 'the simple morning service at St Ebbe's Church' led, in the early 1840s, by an evangelical and philanthropic curate.[78]

A high standard of personal conduct was demanded from the earliest age. Writing to Frank on his fifth birthday, Mary was already encouraging the boy to 'do all you can to try and make yourself

[75] WB to Murchison, November 1830, DRO/188M/257.
[76] Letter from Thomas Thornhill Morland, NA HO /64/4/130/316-7.
[77] Gordon, *Life and Correspondence,* 106-7; Elizabeth Gordon to Dean Robinson, n.d., but c.1902, WAM 59276A.
[78] Gordon, *Life and Correspondence,* 111.

good and wise by striving to cure yourself of your faults – You must leave off being impatient, and above all you must be obedient to your kind parents, who love you so dearly' – and of course, should he fall short, those twigs on the birch tree in the garden were growing sturdier by the year.[79] To Buckland, who had himself doubtless suffered many a 'tunding' at Winchester, corporal punishment was a necessary and entirely proper sanction. As he wrote: '[t]he surface of the body affords abundant space for punishment by cane or birch which can leave only passing scars but can inflict no permanent injury'.[80] But there were limits. In 1837, at the age of ten, Frank was sent to be a boarder at his Uncle John's school at Laleham near Staines, with Edward evidently following soon thereafter. A year later Buckland wrote to his brother in great distress:

> Dear John,
> I have been very unhappy since my boys' return from school and have postponed from day to day the very painful task which I feel is my duty to perform of writing to remonstrate against your mode of punishing children with a round ruler, which is calculated to inflict on their hands and has inflicted on Frank an injury that he will carry to the Grave. … A portion of the joint has been crushed and the injury is irremediable. … On Edward's first return a nail had recently been torn off from a finger by the same instrument. …
> I feel it is therefore my duty to require from you as a condition of my boys' return again to Laleham, an assurance that they shall no more be punished by blows inflicted with a round ruler on the hand more especially on the Right Hand.[81]

Frank would indeed carry his scars to the grave and he was apparently still in the habit of showing them off to friends within a year or two of his death.[82] However, John Buckland's brutal treatment of his charges hardly seems to have affected his own career. No less an authority than the head of Winchester College would later describe him as 'the father of the English Preparatory School'.[83] In the case of his nephews, he clearly gave the necessary assurances since both boys remained at Laleham until they went to Winchester, where further, if less severe, beatings were still very much the order of the day. With no apparent irony, Frank would later write that 'the jolly good hidings … that I got as a lad at Winchester have been of the utmost value to me in after life' – a sentiment not uncommon in the smoking rooms of the London clubs of his day.

These savage interludes aside, the picture presented by the Buckland children's memories is that of an idyllic, if unconventional – and at times even alarming – upbringing. But of course, Oxford, and Christ Church in particular, was never truly conventional.

Several notable men sat alongside Buckland in one or other of the canons' stalls. In 1831 Thomas Gaisford, the professor of Greek, became Dean, despite having been overlooked in favour of Buckland six years earlier. Whatever he thought of Buckland as a neighbour, Gaisford – 'a surly,

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[79] Mary Buckland to Frank Buckland, in Burgess, *Curious World,* facing page 21.
[80] Ibid.,17.
[81] Ibid., 16-17
[82] Spencer Walpole, 'Frank Buckland,' *Macmillan's Magazine* 43 (1881): 303.
[83] Burgess, *Curious World,* 16. John Buckland's harsh treatment of his pupils was probably by no means unusual. In 1858, the Revd. Stephen Rigaud, son of Buckland's colleague, the Reader in Experimental Philosophy S.P. Rigaud, was appointed Bishop of Antigua after his position as Headmaster of Ipswich Grammar School was compromised by accusations of administering unduly severe punishments.

grim, meticulous classical scholar' – did not think highly of his science.[84] According to Tuckwell, it was Gaisford who thanked God that 'we shall hear no more of *this geology*', after Buckland had departed on one of his continental journeys.[85] But despite their differences the families evidently got on well together, Mrs Gaisford being godmother to the young Elizabeth, who recalls being taken by sedan chair across the quadrangle to dine at the dean's house. However, when, in the 1840s, Frank became an undergraduate at Christ Church, his ever-expanding menagerie did occasionally prove too much for the poor dean: 'Mr Buckland', he reportedly told Frank, 'I hear you keep a bear in college; well, either you or the bear must go.'[86]

Another close neighbour was Canon Pusey, the Regius Professor of Hebrew. Descended from an aristocratic family, Edward Bouverie Pusey was a scholar of great distinction and became the intellectual leader of the group of earnest young men known as the Oxford Movement. Inspired by the enthusiastic high-churchman Hurrell Froude and the ascetic John Henry Newman, these men called for the traditions of the early Christian fathers to be reinstated into the life and worship of the Anglican church. Urging the primacy of the mystery of the Eucharist in regular worship, they also espoused such habits as fasting, the confessional and even the mortification of the flesh. It was all very different to Buckland's own devout Anglicanism, based, as it was, on a broad acceptance of the tenets of natural theology. Corporal punishment might – within limits – be a necessary part of the educative process, but self-flagellation had no place in the life of the professor of geology. Despite such differences Pusey too remained on good terms with his neighbours and when Mary Buckland found herself dealing with the loss of her son Adam in the absence of her husband, he was quick to offer words of condolence.[87]

Two decades after the Bucklands moved out in 1845, a later resident of the Christ Church quadrangles, Charles Lutwidge Dodgson, better known by his pen name of Lewis Carroll, gained immortal fame for sending his fictional heroine down a rabbit-hole to a Wonderland where animals spoke and the usual proprieties were upturned. Is it possible that this eccentric, topsy-turvy world might owe something to half-remembered tales of the extraordinary family that once occupied the corner house in Tom Quad?

[84] Annan, *The Dons,* 32.
[85] Tuckwell, *Reminiscences,* 36.
[86] Annan, *The Dons,* 34.
[87] E.B. Pusey to Mary Buckland, 1844, DRO/138M/158.

Chapter Eight

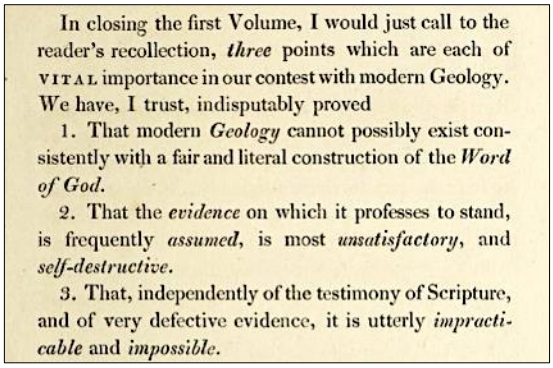
1826-1830

A Deluge of doubt

By the late 1820s Buckland had achieved an enviable position among those few gentlemen of science not sustained by a private fortune. But, despite his achievements and now comfortable circumstances, a germ of disquiet had entered his mind. Was it possible that in his rush to find positive signs of the Biblical Flood he had read rather too much into the available evidence? There were certainly many who thought so.

Most strident were those for whom, above all else, scripture was the final word: for whom any story told by the rocks must be forced to fit their own literal interpretation of the words of Genesis. George Young's belief that the thick layers of secondary rock, like that surrounding the Kirkdale cave, had been laid down almost instantaneously by the Flood was a view he shared with many thoughtful and educated men. But while Young had, initially at least, been content to let his own published account speak for itself, without openly attacking Buckland's views, others had been more forthright.[1] Granville Penn, who, although not in holy orders, was a competent classical scholar and philologist, favoured an alternative theory. He followed de Luc in believing that the land and the sea had simply changed places at the time of the Flood.[2] As soon as *Reliquiae Diluvianae* was published Penn rushed to add a long *Supplement* to his 1822 *Comparative Estimate of the Mineral and Mosaical Geologies* attacking Buckland's ideas which depended on no such interchange.[3]

Perhaps the harshest of Buckland's scripturally based critics was George Bugg, a curate from Kettering and a man of very decided views. Bugg peppered the two volumes of his 1826 *Scriptural Geology* with italics emphasising that 'modern *Geology* cannot possibly exist consistently with a fair and literal construction of the *Word of God*.'[4] Whereas Young and Penn encouraged their readers to look at geological phenomena through the lens of scripture, Bugg would rather his readers averted their gaze altogether, concentrating on the scriptures alone.


In closing the first Volume, I would just call to the reader's recollection, *three* points which are each of VITAL importance in our contest with modern Geology. We have, I trust, indisputably proved

1. That modern *Geology* cannot possibly exist consistently with a fair and literal construction of the *Word of God*.

2. That the *evidence* on which it professes to stand, is frequently *assumed*, is most *unsatisfactory*, and *self-destructive*.

3. That, independently of the testimony of Scripture, and of very defective evidence, it is utterly *impracticable* and *impossible*.

Fig. 8.1 A section from Bugg's Scriptural Geology

Similar messages, as much political as theological, were preached across the land by country parsons who viewed the threat of bloody revolution in this world as gravely as the prospect of eternal damnation in the next. Buckland, a Tory-leaning clergyman himself, understood the threat, but, unlike his more traditional colleagues, he knew that when the actual world was at odds with the Book of

[1] In a second (1828) edition of his Geological Survey of the Yorkshire Coast, Young did in fact attack Buckland' hyena-den theory. Rupke, *Great Chain*, 43.
[2] For de Luc's ideas see Rudwick, *Bursting the Limits*, 154.
[3] Granville Penn, *A Comparative Estimate of the Mineral and Mosaical Geologies* (London: J. Duncan, 1825).
[4] George Bugg, *Scriptural Geology; or, Geological Phenomena Consistent Only with the Literal Interpretation of the Sacred Scriptures* (London, Hatchard,1826), 363.

Genesis, it was the ancient narrative that must give way. In his view the irrational fables concocted by these men – sometimes otherwise-competent geologists – to align geology with the scriptures were dangerous and would ultimately provoke ridicule and disbelief amongst an ever-better-informed public.

Nevertheless, his own concern to reconcile his science and his theology remained paramount. While still hopeful that he might convince his readers about the traces of the Flood, he knew that, at the very least, he could show science's utility in confirming the omniscience and omnipotence of a loving Creator. When, in 1823, he discovered that the *Quarterly Review* had commissioned John Barrow of the Admiralty to review his *Reliquiae Diluvianae* – a not-unreasonable choice given Barrow's interest in the remains found in the Plymouth caves – he had quickly lobbied the *Quarterly's* editor[5], William Gifford to choose instead a reviewer who would emphasise the theological aspects of the work. As Gifford told John Murray, the journal's publisher: 'Buckland … complains that he has been treated solely as a geological writer but he aspires to something higher'.[6] So, despite the fact that Barrow had recently written a most complimentary notice of his Royal Society Kirkdale paper, it was agreed that Buckland's friend Edward Copleston would be asked to review the book.[7]

When, eventually, the review was published Buckland pronounced it 'very flattering' – and so indeed it was. In twenty-seven closely-argued pages Copleston praised the 'masterly arrangement' of Buckland's work, and the 'close inductive logic' he had used to prove that the earth was 'at the period recorded in the sacred history, covered, even to its highest summits, by a sudden, simultaneous, universal, transient flood of waters.'[8] He went on to emphasise that 'an unprejudiced mind will acquiesce in the conclusion that both the universal destruction thus caused, and the preservation of the few survivors, was the immediate work of God'. But almost as importantly, the review stressed that the work demonstrated 'convincing proofs of providential design … the contemplation of which disposes the mind to pious feelings, and to a thirst for that more intimate knowledge of the Creator's will which the revelation of his word has conveyed to us.' Copleston's piece provided just the warrant that Buckland was seeking for his work amongst his Oxford contemporaries.

Although the *Quarterly's* reviews were traditionally anonymous, Buckland made no secret of his own reviewer's identity.[9] Unsurprisingly, and to Buckland's lasting discomfort, it was soon rumoured that he himself might have assisted his friend with some of the more technical aspects.[10]

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[5] Page, 'Diluvial Theory,' 116.
[6] William Gifford to John Murray, July 1823, ibid. Since John Murray published both *Reliquiae* and the *Quarterly*, he might be presumed to have favoured the publication of an appreciative review.
[7] Anon. [John Barrow], [Review of] "'Account of an Assemblage of Fossil Teeth and Bones of Elephant, Rhinoceros...,'' by William Buckland,' *QR* 27 (1822): 459–76.
[8] Anon. [Edward Copleston], [Review of] 'Reliquiae Diluvianae; or Observations on the Organic Remains... by William Buckland,' *QR* 29 (1823): 138–65.
[9] WB to Lady Mary Cole, 3 December 1823, NMW84.20G.D/171.
[10] Rudwick, *Worlds before Adam*, 84; Boylan, 'William Buckland,' [thesis], 127. In a possible indication of Buckland's influence in the matter, his position as Oxford's 'Professor of Geology' is pointedly described in the Review as 'a situation rather of honour than of emolument'. Anon. [Copleston], [Review of] 'Reliquiae Diluvianae,' 146.

A few months later a second anonymous article appeared in the *Edinburgh Review*. It was written by another of Buckland's friends, William Fitton, a current Secretary of the Geological Society. Less flattering than Copleston, the more geologically knowledgeable Fitton was nevertheless respectful of Buckland's work. However, although devoutly Christian, Fitton was unconcerned with the niceties of Buckland's Oxford politics and distrusted attempts to forge links between the traditions of scripture and the new science. He made his position clear from the start, claiming that while he would

> not yield to the author in a zealous desire to diffuse the blessings of revealed religion, [he was] by no means certain that he [Buckland] would not have done better, both as a divine and a geologist, if he had left altogether untouched the connexion of his subject with the Sacred narrative; and contented himself with the confirmation he has given of the fact, of the universal action of a deluge upon the earth's surface[11]

Fitton, whose classical studies in his native Dublin had been followed by a medical degree at Edinburgh, was a punctilious critic. Praising Buckland for his 'lover-like enthusiasm … in pursuit of his favourite objects', he nevertheless castigated him for occasional lapses in style, suggesting that, like the Genevan geologist Horace de Saussure, Buckland had been 'more employed in climbing mountains than in polishing his periods.'[12] Fitton broadly accepted that the earth showed indications of earlier widespread flooding but, unlike Copleston, he was unconvinced that these were the result of a single 'sudden, simultaneous, universal, transient flood of waters'.

Coming from a layman instilled with the empirical traditions of the Geological Society, Fitton's cautious censure was something that Buckland could take in his stride. Less easy to ignore was an assault from a respected naturalist who happened also to be a doctor of divinity and Church of Scotland minister. In an article innocuously entitled 'Remarks illustrative of the influence of society on the distribution of British animals', John Fleming not only argued that it had been human activity that had caused the extinctions that Buckland attributed to the Flood, but that the evidence for any flood ever having taken place was weak.[13] Having undermined *Reliquiae's* main thesis, Fleming ended his piece by decrying, as Fitton had done, Buckland's 'indiscreet union of Geology and Revelation', but he went further by invoking Francis Bacon's dictum that such attempts would always produce '*Philosophia phantastica, Religio haeretica*' – the twin horrors of bad science and heresy.

Buckland was hurt, possibly even angered, by Fleming's article, and was soon persuaded that it demanded a response. Writing in the same Edinburgh journal he claimed that Fleming was operating under a 'mistaken or imperfect view of the facts', accusing him of ignoring crucial evidence and generally belittling Buckland's own work:

> the tone of levity in which [Fleming] speaks of the facts established by the evidence of the den at Kirkdale, as a parallel case to the fables of travellers who have pretended to

[11] Anon. [William Fitton], [Review of] 'Reliquiae Diluvianae; or Observations on the Organic Remains… by William Buckland,' *ER* 39 (1824): 198.
[12] Ibid., 207. Period is used here to signify a complex sentence of several clauses.
[13] John Fleming, 'Remarks Illustrative of the Influence of Society on the Distribution of British Animals,' *EPJ* 11 (1824): 287–305.

> discover the decayed timbers of the Ark, is not the most appropriate to a discussion of the nature now before us.[14]

However, by concentrating on the geological aspects of Fleming's critique, Buckland failed to answer the charge that his work had been 'an indiscreet union of Geology and Revelation'. It was not a strong riposte.

It was left to Adam Sedgwick, his professorial counterpart at Cambridge, to provide a truly comprehensive defence of Buckland's diluvial theory. In a two-part article in the *Annals of Philosophy*, Sedgwick dismissed most of *Reliquiae's* critics as 'undeserving of any animadversion, as they appear entirely ignorant of the very elements of geology'.[15] However he also made an exception of Fleming, whose 'facts and inferences' he says, 'are entitled to a candid examination'.[16] Judging, as Buckland had, that Fleming's position was due to his imperfect appreciation of the evidence, Sedgwick threw his weight behind Buckland's theory by enumerating his own observations of the discernible differences in both mineral and organic content between the most recent 'alluvial' deposits and the 'diluvial' material that he attributed to the Flood. He added to this his own testimony concerning many examples of phenomena that he ascribed to powerful diluvial currents, including the scouring of valleys and the displacement of large erratic boulders. Sedgwick concluded his observations by asserting that 'the floods which produced the diluvial detritus swept over every part of England [and] were put in motion by no powers of nature with which we are acquainted'.[17]

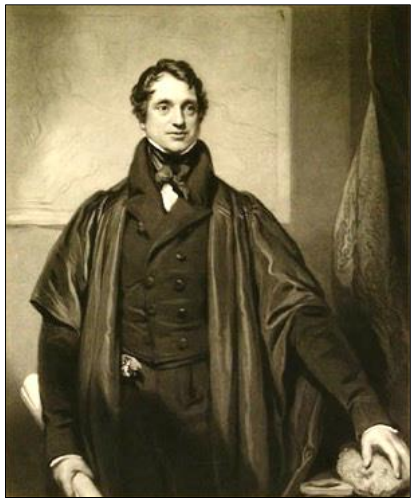

Fig. 8.2 Adam Sedgwick (1785-1873)

However, on the charge of heresy, Sedgwick was more equivocal. He noted that it was 'rash and unphilosophical to look to the language of revelation for any direct proof of the truths of physical science', and emphasised that he himself had 'carefully abstained from an allusion to the sacred records of the history of mankind'.[18] 'But', he went on to say, 'truth must at all times be consistent with itself', and a coincidence between the physical evidence and Biblical testimony had been 'proved legitimately, by an immense number of direct observations … all tending towards the establishment of the same general truth'.

Sedgwick would later claim that he had never really accepted the identity of the geological deluge and the Biblical flood, but nevertheless, at this stage, he was clearly defending Buckland's position,

[14] William Buckland, 'Professor Buckland's Reply to Some Observations in Dr Fleming's Remarks on the Distribution of British Animals,' *EPJ* 12 (1825): 318.
[15] Adam Sedgwick, 'On the Origins of Alluvial and Diluvial Formations,' *AP* (n.s.) 9 (1825): 241.
[16] Ibid., 242.
[17] Adam Sedgwick, 'On Diluvial Formations,' *AP* (n.s.) 10 (1825): 33.
[18] Ibid., 34.

even going so far as to 'deny that Professor Buckland … has *rashly attempted* to unite the speculations of his favourite science with the truths of revelation'.[19]

The second of Sedgwick's pieces was published in the second half of 1825 and Buckland must have left for his honeymoon in 1826 confident that his diluvial theory still enjoyed a large measure of support.

But, despite what Buckland referred to as 'Sedgwick's long 18 pounder', Fleming had not been silenced, and, as the Bucklands journeyed across Europe, he released a devastating broadside.[20] *The Geological Deluge as interpreted by Baron Cuvier and Professor Buckland, Inconsistent with the Testimony of Moses and the Phenomena of Nature* was published early in April 1826.[21] The title speaks for itself. Piqued, perhaps, by some of the personal slights in Buckland's *Reply* to his earlier paper, Fleming now set out his case in forensic detail. He began by showing that the suggested 'geological flood', as described by Buckland was quite dissimilar to the tranquil inundation recorded in the scriptures. Having disposed of the theological connection, he denied the very idea of a universal deluge, refuting most of the evidence that Buckland had advanced. He disputed the possibility that flood waters could ever have been responsible for carving out valleys, pointed out inconsistencies in the arguments concerning diluvial gravel beds and again scorned Buckland's hyena-den theory by suggesting that the remains at Kirkdale were deposited by a subterranean river flowing through the cavern. It was a considered and comprehensive routing of Buckland's position. It is not clear if Fleming's paper reached Buckland before he returned from his travels, but this time, the Oxford professor offered no response.

Whether or not it was the Flood recorded in the Book of Genesis, Buckland remained convinced that there had been a catastrophic inundation in the relatively recent past. One reason for this unwavering belief was the existence of what he termed valleys of denudation: the U-shaped valleys, cut through successive layers of stratified rock, that could not possibly have been created by the relatively feeble rivers that currently ran along their bottoms. But even as he made his honeymoon tour of 1826, George Poulett Scrope, a recent recruit to the Geological Society, was preparing a publication that would raise serious questions on this issue.

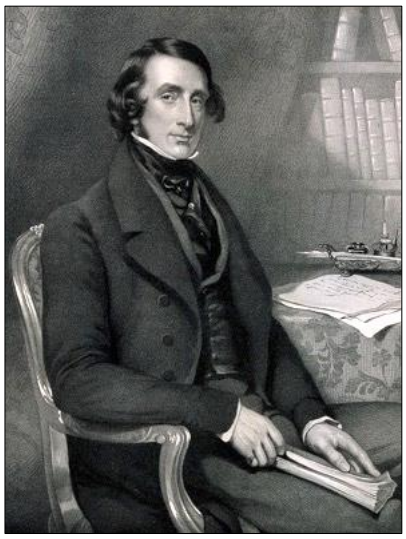

Fig. 8.3 George Poulett Scrope. (1797-1876)

Scrope had begun his studies at Oxford but had transferred to Cambridge where his geological interests were encouraged by the recently appointed Woodwardian Professor, Sedgwick.[22] Having travelled extensively in the volcanic areas of

[19] Ibid.
[20] WB to De la Beche, 7 July 1825, NMW84.20G.D/173.
[21] John Fleming, 'The Geological Deluge: As Interpreted by Baron Cuvier and Professor Buckland, Inconsistent with the Testimony of Moses and the Phenomena of Nature,' *EPJ* 14 (1826): 205–39.
[22] M.J.S. Rudwick, 'Scrope, George Julius Poulett [Formerly George Julius Thomson] (1797–1876),' in *ODNB*, 2004.

Italy (1819-20) and of France's Massif Central (1821), in 1825 Scrope had become one of the two secretaries of the Geological Society. Scrope's aim however, in contrast to the more limited objectives of his older Society colleagues, was nothing less than to formulate 'a new theory of the earth'. He justified this rash ambition by insisting that, unlike earlier theories, his would be free of wild speculation, depending solely on the agency of well-attested phenomena. Nevertheless, he did accept the widely-held belief that the earth was slowly cooling, and having witnessed at first hand the volcanic activity around the Bay of Naples he thought that analogous, but more intense, volcanism had, long ago, been responsible for the sudden raising of areas of land, including huge mountain ranges such as the Alps.[23] This uplift, he thought, might well have created powerful, but relatively localised tsunamis, which might, in turn, explain some of the phenomena that geologists like Buckland viewed as 'diluvial'. This carefully constructed explanation allowed Scrope the possibility of occasional catastrophic events during the history of the earth, despite his stated reluctance to have 'recourse to the gratuitous invention of vague and unexampled occurrences, referable to no known law of nature'.[24]

Fig. 8.4 Charles Giles Bridle Daubeny. (1795-1867)

Scrope was not the first Englishman to visit the Massif Central at that time. As we have seen, Buckland himself had visited the area in 1820 when he had largely concurred with the findings of his friend Charles Daubeny, who had been there the previous year. Daubeny, soon to take over Kidd's Aldrichian chair of chemistry at Oxford, had attended some of Buckland's early lectures and naturally saw things rather differently to Scrope. For him a catastrophic biblical Flood remained both a theological and a geological reality, and when, like others before him, he discerned that lava had once flowed along the bottoms of wide valleys that had themselves been cut through earlier lava flows, he took it for granted that those valleys had been carved out by the Flood. He did not hesitate to describe the earlier flows as 'ante-diluvial' or 'ancient', and the later flows along the valleys as 'post-diluvial' or 'modern'.[25] Despite the evidence that rivers were still slowly carving gorges through these 'modern' flows, Daubeny had been convinced that the large valleys cut into the 'ancient' lavas must have had a more intense, catastrophic cause.

This was precisely the type of analysis that Scrope wanted to refute. In his *Memoir of the Geology of Central France,* finally published in 1827, he demonstrated that the area had witnessed a whole series of major lava flows rather than just the two periods of volcanic activity suggested by Daubeny. After a careful examination of the various layers of rock, Scrope argued that these eruptions had been widely separated in time and that even the latest of them had occurred long before the period recorded by human historians, and therefore well before the alleged date of the Flood. This anti-diluvial view was

[23] George Poulett Scrope, *Considerations on Volcanos, the Probable Causes of Their Phenomena, the Laws Which Determine Their March*… (London: Phillips, 1825), 241.
[24] Scrope, *Considerations on Volcanos,* 241.
[25] M.J.S. Rudwick, 'Poulett Scrope on the Volcanoes of Auvergne: Lyellian Time and Political Economy,' *BJHS* 7 (1974): 208-10.

supported by the existence of loose cinders of lava around the cones of several ancient extinct volcanoes, material which would surely have been washed away had any such cataclysm occurred. Scrope's alternative suggestion was that, given enough time, rivers themselves, aided by forces 'still in operation wherever rains, frosts, floods and atmospheric decomposition act upon the surface of the earth', were more than capable of excavating the huge valleys through which they flowed.[26]

Scrope's arguments, cogent and well-attested as they were, might not have troubled Buckland too much had they not been quickly seized upon by Charles Lyell. Finding the study of geology increasingly more congenial than the practice of law, Lyell was beginning to break with the ideas of his old Oxford teacher. He was starting to formulate the distinctive methodology for geological research that he would present in his vastly influential three-volume *Principles of Geology* (1830-1833). As he and Scrope shared the secretarial duties at the Geological Society in 1825-6, it is more than probable that they also shared their radical ideas about geological research.

Fig. 8.5 Charles Lyell (1797-1875) in ca.1835

When Lyell was asked to review Scrope's book for the *Quarterly Review*, he used the anonymous article to set out his own grand manifesto for the objective investigation of the natural world, free from the constraints of religious dogma. Since the time of Galileo, he argued, men had been free 'to enlarge the boundaries of the experimental sciences' and, far from causing a breakdown of the moral order, it was now clear that 'those who study accurately the works of nature, and reason upon them justly' discover as they do so 'innumerable proofs of the infinite wisdom and power of the Supreme Being'.[27] So far, Lyell was still in tune with Buckland, with whom he discussed his forthcoming article. Beleaguered by the assaults of the scripturalists, Buckland suggested that Lyell should be sure to take 'a hit at the Penn school & the authors of the "Scriptural Geology"'.[28] Lyell was of course happy to oblige, accusing such men of being a group who, 'wholly destitute of geological knowledge … estimate the value of all theories by one standard – their discordance or harmony with their own preconceived notions'.[29] By this forceful attack on the biblical literalists he was pushing at the boundaries of the Tory-leaning *Quarterly*, attempting to establish in the minds of its readers the propriety of the type of 'liberal geology' – 'liberal' in that it valued evidence over dogma and accepted that the earth was much more than 6000 years old – that he and his friends at the Geological Society espoused.[30]

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[26] George Poulett Scrope, *Memoir on the Geology of Central France: Including the Volcanic Formations of Auvergne, the Velay, and the Vivarsais* (London: Longman, 1827),162.
[27] Anon. [Charles Lyell], [Review of] 'Memoir of the Geology of Central France by G. P. Scrope,' *QR* 36 (1827): 475 & 477.
[28] Boylan, 'William Buckland,' [thesis], 162-3.
[29] Anon. [Lyell], 'Geology of Central France by G. P. Scrope,' 482.
[30] Page, 'Diluvial Theory,' 173.

Where Lyell broke with Buckland was in his analysis of Scrope's arguments. Having, with lawyerly skill, weighed up the evidence presented by both Scrope and Daubeny, Lyell gave his cautious endorsement to Scrope. His support was, however, based as much on Scrope's methodology as his conclusions, which Lyell clearly felt still needed more investigation and discussion. The following year he set out to examine the volcanoes of Central France for himself.

Lyell planned a long tour, extending eventually to the southern tip of Italy, about which he was pleased to receive much encouragement and friendly advice from the Bucklands. Communications between them continued even while he was away, as he wrote to his sister from Naples:

> It is a most kind service to have done me, for as they are persons who make no difficulties, I am sure that whatever they recommend is indispensable. So I have bought tea, sugar, cheese, and four bottles of brandy, which Mrs. B. says will keep off malaria, and their weak wine will not. It seems that even in winter this evil attacks those who live poor, and where inns are few and bad, you cannot live well unless you provision your mule.[31]

Lyell's companions for the first part of this journey were Mr and Mrs Roderick Murchison. Murchison, an ex-military man who had seen action as a junior infantry officer in the Peninsular Wars, had but recently begun campaigning in the geological field. He had resigned his commission shortly after marrying the 'clever, highly educated' Charlotte Hugonin, and had briefly contemplated a career in the church – believing, as he later admitted, that 'as parsons then enjoyed a little hunting, shooting, and fishing without being railed at, I thought I might slide into that sort of comfortable domestic life'.[32] But he chose instead a life of fox-hunting and leisure, until, in 1824, encouraged by his wife and an illustrious acquaintance – none other than Sir Humphry Davy, President of the Royal Society, with whom he had shot partridges in Yorkshire – he took up geology.[33] His military training had given him a good feel for the lie of the land, and having attended some lectures on the subject at the Royal Institution, he was elected a Fellow of the Geological Society in 1825. Murchison's energy and enthusiasm soon endeared him to Buckland, who invited him to listen to some of his lectures in Oxford. Murchison's own impression of his new friend is revealed in his graphic recollection of Buckland's bachelor apartments in Corpus:

> Having, by direction of the janitor, climbed up a narrow staircase, I entered a long corridor-like room, which was filled with rocks, shells, and bones in dire confusion, and in a sort of sanctum at the end was my friend in his black gown, looking like a necromancer, sitting on one rickety chair covered with some fossils, and clearing out a fossil bone from the matrix.[34]

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[31] Lyell to Eleanor Lyell, 9 November 1828, in K. Lyell, *Life, Letters and Journals,* Vol. 1, 215. (Also in Boylan, 'William Buckland,' [thesis], 168.)
[32] Archibald Geikie, *Life of Sir Roderick I. Murchison* (London: J. Murray, 1875), 71.
[33] Rokeby Hall, then in the North Riding of Yorkshire, is now known as Rokeby Park and is in County Durham.
[34] Geikie, *Life of Sir Roderick Murchison,*124-5. Murchison's account of Buckland's 'sanctum' also appears in Gordon, *Life and Correspondence,* and has become an almost iconic depiction of Buckland.

While in Oxford Murchison also enjoyed a field trip onto Shotover Hill, leading him to claim later that he had received from Buckland 'some of my first lessons in the field'.[35] It was also the beginning of a deep and lasting friendship between the men themselves and, later, their wives.

However, in December 1828, aspects of Murchison's performance in the Geological Society's newly acquired rooms at Somerset House by no means pleased his friend. Having left Lyell to continue his expedition on the Continent, Murchison had returned to London to present their joint paper *On the Excavation of Vallies, as Illustrated by the Volcanic Rocks of Central France.*[36] The pair had concluded that there was no evidence of any universal deluge, and that the landscape of the Auvergne had indeed been shaped – over vast stretches of time – by ordinary rivers, aided only by meteorological forces such as frost, wind and rain: in other words, causes that were still being witnessed in modern times.

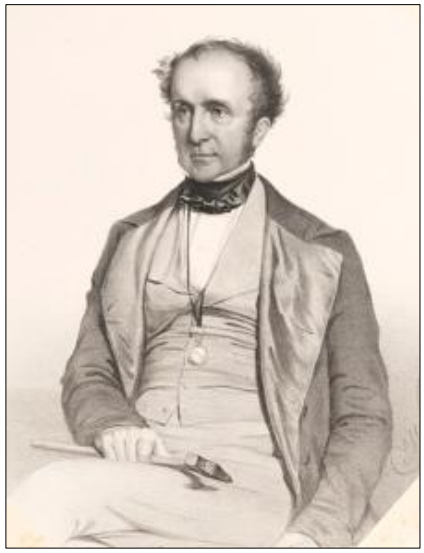

Fig. 8.6 Roderick Murchison. (1792-1871)

Unsurprisingly Buckland was said to be 'furious'. Not only was his specifically Noachian Flood being denied, but the very idea of any such catastrophic event at all. On this occasion his response was voiced by his friend William Conybeare. It took the form of a very specific study of the course of the River Thames. Snappily entitled: *On the Hydrographical Basin of the Thames, with a view more especially to investigate the causes which have operated in the formation of the valleys of that river, and its tributary streams*[37], the paper was read over two nights in May and June 1829. Conybeare not only argued that the present course of the Thames could only have been achieved 'by violent diluvial currents', but he also emphasised that these currents were but the latest in a succession of similar deluges which had 'left distinct traces in the English strata'. Describing adherents to this theory as 'diluvialists', Conybeare coined the term 'fluvialists' for those content to let small rivers and vast tracts of time do the work.

It was a situation very like the proverbial tale of the blind men examining an elephant. On one side of the beast Scrope, Lyell and Murchison had clearly 'seen' that *actual* – in the sense of currently existing – *causes* had been sufficient to carve out large valleys in the Auverge, but on the other, Buckland and Conybeare 'knew' from their own evidence that much greater forces must, on more than one occasion, have also been in play.

In the Thames-side apartments of Somerset House, the tide of opinion was, however, running with the fluvialists. Lyell gleefully reported the events back to John Fleming, who had, years earlier, first opened the sluice.

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[35] F. Buckland, 'Memoir,' xl.
[36] Charles Lyell and Roderick Impey Murchison, 'On the Excavation of Vallies, as Illustrated by the Volcanic Rocks of Central France,' *ENPJ* 7 (1829): 15-48; also in *PGSL* 1 (1834), 89-91.
[37] William Daniel Conybeare, 'On the Hydrographical Basin of the Thames,' *PM* 6 (1829): 61–65; also in *PGSL* 1 (1834),145-49.

> Buckland was so amazingly annoyed at my having had such an anti-diluvialist paper read, that he got Conybeare to write a controversial essay on the Valley of the Thames, in which he drew a comparison between the theory of the Fluvialists, as he terms us, and the Diluvialists, as (God be praised) they call themselves.
> Of course, in defining the Fluvialists, they (for Buckland wrote half the memoir) took care to build up their man of straw, and triumphantly knocked him down again. But in the animated discussion which followed the reading of the first half of the essay, at the Geological Society, we made no small impression on them. And when, last Friday, the remainder came on, we had a hot encounter. Buckland came up on purpose again, and made a leading speech. But after we had exposed him, and even Greenough, his only staunch supporter, had given in in many points, Sedgwick, now president, closed the debate with a terribly anti-diluvialist declaration. For he has at last come round, and is as decided as you are.[38]

Maybe the fluvialists' arguments were simply more convincing, or perhaps the diluvialist camp was still too tainted with scriptural baggage to be taken seriously by the all-too-rational Fellows of the Geological Society. Whatever the case, Buckland's position was becoming increasingly isolated. Even Sedgwick, who, as a fellow cleric, had gamely defended him four years earlier, now appeared aligned against him – a change of heart that cannot be totally explained by the impartiality expected of him as the current president of the Society. In fact, Sedgwick had begun to see things differently a couple of years earlier, when, accompanying Murchison on a visit to the Scottish Highlands, he had recognised that the evidence was more consistent with 'local diluvial operations' than a universal inundation.[39] His views had been confirmed later in 1829 when he met the illustrious traveller and naturalist Alexander von Humboldt who had 'ridiculed beyond measure' any notion of a universal flood.[40]

We cannot know whether Buckland really did write half of Conybeare's paper; but we do know that it was due to him that it was never published. Despite his obvious partiality in the matter, Buckland was nominated to referee the paper which was duly forwarded to his Oxford home. There, for more than a decade it lay, lost amongst the legendary muddle that littered his dining room. Perhaps, as Patrick Boylan has suggested, Buckland did deliberately 'mislay' the document in order to avoid further uncomfortable accusations of the kind that had followed Copleston's review of his *Reliquiae Diluvianae* six years before.[41]

On 5 February 1830, Scrope read a further paper on the formation of the valleys of the rivers Meuse and Moselle. A week earlier, having seen the draft, Buckland wrote to Conybeare seeking his help with a possible response, and when, at the last minute, ecclesiastical duties detained him in Oxford he asked the London-based De la Beche to attend the paper's reading and 'point out to the unlearned the futility of such Doctrines as the paper contains'.[42]

Buckland remained convinced of the reality of a major flood event, but the sheer weight of feeling against him was forcing him to see that his ambition to reconcile such an event with the Biblical

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[38] Lyell to Fleming, 10 June 1829, in K. Lyell, *Life, Letters and Journals,* Vol. 1*,* 254.
[39] Page, 'Diluvial Theory,' 215.
[40] Ibid.
[41] Boylan, 'William Buckland,' [thesis], 176.
[42] WB to Conybeare, 27 January 1830, DRO/138M/? (possibly an unsent draft); WB to De la Beche, 4 February 1830, NMW84.20G.D/178.

Flood was simply asking too much. In February 1831 Adam Sedgwick, speaking for the final time as president of the Geological Society, made his own position on the issue clear: 'Having been myself a believer, and, to the best of my power, a propagator of what I now regard as a philosophic heresy, … I think it quite right … thus publicly to read my recantation'.[43] Ironically, even this contrite admission of fault did not quite satisfy Fleming, who was upset that Sedgwick had not mentioned Fleming himself (or *Phlegm-ing* as Sedgwick later dubbed him) as being 'the f*irst antagonist* of Buckland'.[44]

It would be another five years before Buckland would follow his Cambridge counterpart in publicly admitting that the Biblical Flood had left no conclusive trace upon the earth. Even then, the admission was hidden away in a footnote.

According to Frank Buckland his parents had resumed their honeymoon tour during the summer of 1827, visiting Germany, Austria and Switzerland. Frank makes no mention of how he himself – then barely six months old – was cared for while they were away. However, they had not been back long when Buckland received an intriguing plaster-cast of a rock surface. Henry Duncan, a Scottish clergyman, had found what he believed to be a trace of ancient animal footprints in a quarry near his home in Dumfries. Nothing like it had been seen before, and for a while Buckland was baffled. Then, as recorded by Elizabeth Gordon, late one night:

Fig. 8.7 Fossil footprints in sandstone discovered by Revd. Henry Drummond

> it suddenly occurred to him that these impressions were those of a species of tortoise. He therefore called his wife to come down and make some paste, while he went and fetched the tortoise from the garden. On his return he found the kitchen table covered with paste, upon which the tortoise was placed. The delight of this scientific couple may be imagined when they found that the footmarks of the tortoise on the paste were identical with those on the sandstone slab.[45]

Buckland's own account of the proceedings, though less dramatic, suggests a greater rigour to the experiment. He reported his findings back to Duncan:

> 1st, I made a crocodile walk over soft pye-crust, and took impressions of his feet, which shew decidedly that your sandstone foot-marks are *not* crocodiles.
> 2d, I made tortoises, of three distinct species, travel over pye-crust, and wet sand and soft clay; and the result is, I have little or no doubt that it is to animals of this genus that your impressions on the new red sandstone must be referred…[46]

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[43] Adam Sedgwick, 'Address to the Geological Society, Delivered on the Evening of 18th of February 1831,' *PM* 9 (1831): 287-317; also in *PGSL* 1 (1834): 281–316.
[44] Murchison to Harcourt, 5 December 1831, in Jack Morrell and Arnold Thackray, *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science* (London: Royal Historical Society, 1984), 112-3.
[45] Gordon, *Life and Correspondence,* 217.
[46] Henry Duncan, 'An Account of the Tracks and Footmarks of Animals Found Impressed in Sandstone in the Quarry of Corncockle Muir in Dumfriesshire,' *TRSE* 11 (1831): 202.

Where he acquired the crocodile he did not say, but he did explain that as the fossilised footprints were spaced more widely than those of his modern subjects, he had concluded that 'your wild tortoises … would move with more activity and speed … than my dull torpid prisoners on the present earth in this to them unnatural climate'.[47]

As with Wombwell's hyena, Buckland was using present-day, observable events to explain occurrences from the deep past. It was a scientific philosophy entirely in tune with that of his fluvialist adversaries, Scrope and Lyell. Shortly after Christmas he repeated part of his tortoise experiment before a gathering of friends in the genteel surroundings of the Murchisons' London drawing room. John Murray recorded the event:

> It was really a glorious scene to behold all the philosophers, flour-besmeared, working away with tucked-up sleeves. Their exertions, I am happy to say, were at length crowned with success; a proper consistency of paste was attained, and the animals walked over the course in a rather satisfactory manner; insomuch that many who came to scoff returned rather better disposed towards believing.[48]

One of the scoffers was undoubtedly Murchison himself. Back in October he and Sedgwick had themselves called on Duncan and seen the quarry where the workmen 'assured them that "not only turtles but … Lions, Tiger, Crocodiles and Squirrels"' had all left their mark in the sandstone.[49] Indeed 'Sedgwick found one so original that, as our work was done on a Sunday morning, he was bound to christen it the devil's hoof & explain to the pious sawneys that we intended to shoe the arch fiend to prevent further mischief and scratching'. When Sedgwick heard of Buckland's antics, he told Murchison,

> I wish I had been at your soirée to have had a fight with Buckland … In plain truth I don't in this case know any better argument than that clencher of my uncle Toby, viz. – 'By G - - they are not footsteps.'[50]

But, embarrassingly for both Murchison and Sedgwick, they were; and Henry Duncan's report to the Royal Society of Edinburgh (in which he included Buckland's notes) became one of the founding documents of the new science of ichnology – the study of fossilized tracks and other traces left by animals.

It was, however, animal traces of an altogether different kind that would become forever associated with Buckland's own name. On 6 February 1829, with the memory of Lyell's and Murchison's hurtful paper on French volcanoes still raw, Buckland was back at Somerset House with three brief papers of his own. Each announced a discovery made by Mary Anning in Lyme Regis and

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[47] Ibid., 202-3.
[48] John Murray (IV), *John Murray III, 1808-1892, a Brief Memoir* (London : J. Murray, 1919), 7-8, quoted in Boylan, 'William Buckland,' [thesis], 436.
[49] Murchison to G.W. Featherstonhaugh, 6 October 1827, in Edmund Berkeley & Dorothy Smith Berkeley, *George William Featherstonhaugh: The First U.S. Government Geologist* (Tuscaloosa & London: University of Alabama Press, 1988), 63.
[50] John Willis Clark and Thomas McKenny Hughes, *The Life and Letters of the Reverend Adam Sedgwick* (Cambridge: University Press, 1890),14, quoted in Boylan, 'William Buckland,' [thesis], 164.

was of considerable interest in its own right. Taken together, and presented by Buckland, they made an unusually entertaining evening.

First came news of the unearthing of a new species of 'pterodactyle' – in Buckland's own words, 'a monster resembling nothing that has ever been seen or heard-of upon earth, excepting the dragons of romance and heraldry'.[51] He had identified the flying reptile by reference to work by Cuvier, who, he said, had pronounced them 'incontestably the most extraordinary of all the extinct animals which have come under his consideration'.[52] The discovery of an English species of the beast – he had bought the specimen for his Oxford collection – led Buckland to another speculative reconstruction of a former world.[53] In language quite at odds with the usual staid prose of Society papers, he likened the creature to 'Milton's fiend':

> a fit companion for the kindred reptiles that swarmed in the seas or crawled on the shores of a turbulent planet… With flocks of such-like creatures flying in the air, and shoals of no less monstrous Ichthyosauri and Plesiosauri swarming in the ocean, and gigantic crocodiles and tortoises crawling on the shores of the primaeval lakes and rivers,—air, sea, and land must have been strangely tenanted in these early periods of our infant world.[54]

Later, Buckland would keep audiences in Oxford in roars of laughter when, 'seizing the ends of his long clerical coat-tails, [he] would leap about to show how the Pterodactyl flew'.[55] There was no mention of such a performance at the Geological Society, but then he did have some other indelicate matters to reveal that February evening.

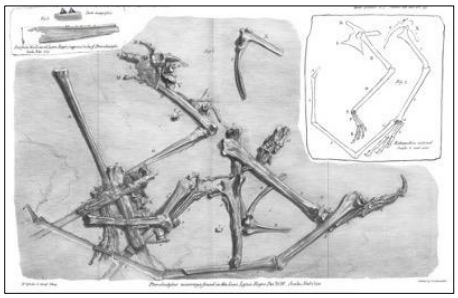

Fig. 8.8 Illustration of 'pterodactyle' remains in Buckland's 1829 paper

For years people had been delighted by the intriguing shiny, rounded pebbles they found on the beaches of Lyme and Charmouth. They called them Bezoar stones, as they looked a bit like the supposedly magical concretions found in the stomachs of goats and other ruminants. Buckland himself would have known them since childhood, and had indeed devised his own, rational, explanation that they were made of clay rolled into balls by the waves. But some years earlier Mary Anning had perceptively surmised that these strange-looking stones might in fact have quite another origin.[56] Like the footprints from Dumfries, she thought they too might be traces from long-dead animals. She had shared her thoughts with Buckland who, as far back as 1825, had sent a specimen to his friend Dr Wollaston, who confirmed that the sample did indeed 'contain much phosphate of lime'.[57] Now, on that February evening in 1829, Buckland must surely have delighted in telling his audience that he was setting before yet another species of fossilized turd.

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[51] William Buckland, 'XI. On the Discovery of a New Species of Pterodactyle in the Lias at Lyme Regis,' *TGSL* s2, 3 (1829): 217-8.
[52] Ibid.
[53] Torrens, 'Mary Anning,' 266.
[54] Buckland, 'Pterodactyle,' 218.
[55] David Elliston Allen, *The Naturalist in Britain : A Social History* (London : Allen Lane, 1976), 63.
[56] Torrens, 'Mary Anning,' 266.
[57] William Buckland, 'XII. On the Discovery of Coprolites, or Fossil Fæces, in the Lias at Lyme Regis, and in

To lend an air of respectability to the matter Buckland had coined the term coprolite, from the Greek, (copros – dung and lithos – stone). Detailed investigation had shown that these Lyme coprolites had come from ichthyosaurs. When broken open they were found to contain the scales, teeth and bones of fish. Some were also very dark in colour, as if stained with dark black dye.

Buckland's third paper that evening concerned some fossilised ink sacs that had also been found in the Lyme Regis lias. He identified these as relics of ancient species of cephalopod like squid or cuttlefish. The pigment they contained was often so well preserved that it could be used to make drawings which were indistinguishable from those made with the 'sepia' ink from a fresh cuttlefish. Analysis by Dr William Prout, a London medical man with a particular interest in the chemistry of digestion, showed that it was this ink that stained many of the coprolites, suggesting that, as well as fish, ichthyosaurs enjoyed at least the occasional snack of squid.

Fig. 8.9 Ichthyosaur head, drawn with fossil sepia

In addition to their diet, the coprolites enabled Buckland to infer something of the structure of the ichthyosaurs' digestive tract, the soft tissue of which otherwise left no trace. Many coprolites exhibited a strange spiral structure which, he suggested, showed that they had come from intestines similar to those of a modern shark, skate or dog-fish – all known to have a kind of inbuilt Archimedes screw to propel the faecal matter through them.[58]

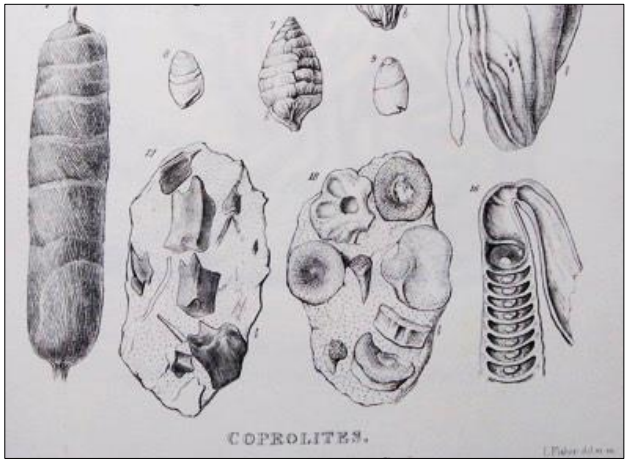

Fig. 8.10 The structure and content of coprolites

A fortnight after Buckland read his coprolite paper, Murchison wrote to say that Prout had told him that a major ingredient of the 'fossil sausages' might be 'lithic [now called uric] acid' or 'condensed urine', implying that these coprolites may have some practical application as a manure.[59] But Buckland had higher aspirations for his discovery. Just as he had used the *album graecum* at Kirkdale to add

Other Formations,' *TGSL* s2, 3 (1829): 223, n.
[58] This structure would have been familiar to Buckland from the description in Paley, *Natural Theology,* 150.
[59] Murchison to WB, 21 February 1829, RS/MS/251/34.

compelling detail to his vision of an antediluvian Yorkshire, so he now employed these new coprolites to help him imagine the life-and death struggles taking place in a yet more ancient Dorset.

> In all these various formations our Coprolites form records of warfare, waged by successive generations of inhabitants of our planet on one another: the imperishable phosphate of lime, derived from their digested skeletons, has become embalmed in the substance and foundations of the everlasting hills; and the general law of Nature which bids all to eat and be eaten in their turn, is shown to have been co-extensive with animal existence upon our globe; the Carnivora in each period of the world's history fulfilling their destined office, – to check excess in the progress of life, and maintain the balance of creation.[60]

The words were well chosen: 'Their destined office, – to…maintain the balance of creation'. If, as he was beginning to suspect, geology would never provide evidence for the Noachian Deluge, it could at least still show that we live in a world that had been designed and was maintained by a benevolent Creator.

Buckland's evocative description of the pterodactyl prompted George Howman, a Berkshire clergyman, to take up his paintbrush. An inscription on the back of the Howman's picture (now in the Lyme Regis Museum) declares that it was inspired by 'Dr Buckland's account of a flying Dragon found at Lyme Regis, supposed to be noctivagous'.[61] Buckland had indeed used this uncommon word (meaning 'wandering at night') to describe his 'pterodactyle', though how he came to that conclusion he did not say. Howman's fantasy duly placed the beast in a cloudy night sky – but not, however, in some imagined former world, but high above a storm-tossed contemporary sailing vessel. Taking to heart Buckland's assertion that the 'pterodactyle' resembled nothing so much as 'the dragons of romance and heraldry', Howman portrayed it not '*like* a dragon, but *as* a dragon'.[62] Romantic, and tending to the sublime, the portrayal was far from scientific.

Fig. 8.11 George Howman's 'pterodactyle'

Within a year, however, a credible reconstruction of the creature's world was being attempted. *Duria antiquior* – 'a more ancient Dorset' – was the work of Henry De la Beche, with some support from Buckland himself. With his intimate knowledge of Lyme and close contact with Mary Anning, De la Beche was well qualified to attempt the task. Nine years earlier, he had collaborated with William

[60] Buckland, 'Coprolites,' 235.
[61] David Martill, 'Dimorphodon and the Reverend George Howman's Noctivagous Flying Dragon,' *PGA* 125 (2014): 122. Howman (later Little) was vicar of Sonning, near Reading in Berkshire, from 1822 to 1841, CCEd Person ID 94968, Foster, *Alumni Oxoniensis*, 857.
[62] O'Connor, *Earth on Show*, 97.

Conybeare in working out the likely forms of the ichthyosaur and the plesiosaur and he was now keen to incorporate the latest discoveries to create as comprehensive a reconstruction as possible.

Fig. 8.12 Duria Antiquior - *Henry De la Beche*

The focal point of De la Beche's watercolour was the bloody death of a plesiosaur, its sinuous neck clamped fast in the toothy jaw of a voracious ichthyosaur. With obvious relish, De la Beche acknowledged Buckland's most recent research by depicting – with what science historian, Martin Rudwick has described as 'pre-Victorian indelicacy' – a number of incipient coprolites dropping from the stricken creature.[63]

The impetus for the picture had come from a desire to help Mary Anning and her family, whose financial position was always precarious. The drawing was reproduced as a lithograph with several variations eventually being produced[64]. De la Beche, Buckland and others sold copies to their friends with the proceeds being forwarded directly to the Annings.[65] In May 1831 Buckland told De la Beche, 'I have a capital Class & your Duria has contributed to its numbers & my entertainment of them', before adding 'I have sent M. Anning £5 for copies sold to Stokes, Lonsdale & Broderip.'[66]

Twenty years later, in Cambridge, Adam Sedgwick would ask his geological museum assistant, a young aspiring artist called Robert Farren, to paint an enlarged copy of Duria Antiquior. Whether this

[63] M.J.S. Rudwick, *Scenes from Deep Time: Early Pictorial Representations of the Prehistoric World* (Chicago: University of Chicago Press, 1992), 46.
[64] Tom Sharpe, 'Henry De La Beche's 1829-1830 Lithograph, Duria Antiquior,' *ESH* 41 (2022), 47-57.
[65] George Scharf was a favourite artist of the Geological Society, especially after 1824 when it adopted lithography as its preferred method of reproduction. See M.J.S. Rudwick, 'The Emergence of a Visual Language for Geological Science 1760-1840,' *HS* 14 (1976), 156.
[66] WB to De la Beche, 25 May [1831], NMW84.20G.D/182.

was to illustrate his lectures or simply as domestic decoration is unclear, but the painting, the largest and most vivid of all the versions of 'Duria', can now be seen in Cambridge's Sedgwick Museum.[67] It is faithful to the original in most particulars, except that, as a concession to changing public sensibilities – or perhaps to Sedgwick's personal sensitivity? – there are no droppings of any sort to be seen.[68]

Fig. 8.13 Robert Farren's copy of Durian Antiquior *in oils*

Fig. 8.14 Henry De la Beche's cartoon A Coprolitic Vision

The transgressive pleasure that Buckland and his friends derived from the fact that so much was to be gained from a close study of fossilized faeces is emphasised in a second sketch by De la Beche created at much the same time. In 'A Coprolitic Vision', the artist imagines his friend, attired in academic cap and gown, hammer in hand, standing at the entrance to a cave, the roof of which is supported by pillars bearing the unmistakable spiral markings of ichthyosaur coprolites. The cave is populated with pterosaurs and ancient reptiles as well as more recently extinct mammals – all plainly in the act of defecation: creating traces by which some later geological professor might discover something of their life and times. As Philip Duncan had written in jest a few years earlier: 'The noble science of Geology' really was, at this time at least, 'founded firmly in Coprology'.[69]

Even the seemingly innocent diluvialist/fluvialist debate of the time inspired De la Beche to produce a slightly improper, if charming, caricature. This time it was not Buckland who was the subject, but his infant son, Frank.[70] In 'Cause and Effect' a small boy stands on a rock calmly urinating into the head of a wide U-shaped valley and causing a tiny stream to meander slowly towards the sea.

[67] Sharpe, 'Duria Antiquior,' 59-60.
[68] Buckland, too, may have had a larger version made for his own lecture room, but no such picture has been found.
[69] F.T. Buckland, *Curiosities of Natural History,* Vol. 2. (London: MacMillan & Co., 1903), 6, quoted in: George Pemberton and Robert Frey, 'William Buckland and His "Coprolitic Vision",' *Ichnos* 1 (1991): 317–25.
[70] The identification of Frank Buckland as the subject of this sketch is suggested in a later hand by a scribbled comment 'I expect F Buckland' on the drawing itself, and confirmed by Roderick Murchison, who, in 1851, referred to De la Beche's drawing of 'Frank Buckland as a baby denuding a valley'. See N.S. Haille, Letter in *Nature*, Vol 387, 12 June 1997.

Fig. 8.15 De la Beche's Cause and Effect

Above the picture are the words 'Bless the baby! what a Walley he have a-made!!!' The very obvious spectacles worn by the boy's companion (usually interpreted, due to her faux-Cockney exclamation, as a nursemaid[71]) were possibly an early deployment by De la Beche of the theoretically-tinted spectacles that he would use in later cartoons to mock the prejudices of his geological adversaries.[72] If this is the case, it is also just possible that the woman might have been a representation of Mary Buckland, with the accent nothing more than a clumsy attempt to show how theoretical preconceptions might reduce even her judgement to that of an uneducated maidservant. There is no indication that this sketch was ever reproduced, but we may be sure that the ironic depiction would have been enjoyed – and possibly even employed – by Buckland as he attempted to defend his long-held conviction that wide U-shaped valleys could only be of diluvial origin.

[71] Rudwick, *Worlds before Adam*, 289 (caption to Fig.20.1).
[72] See M.J.S. Rudwick, T*he Great Devonian Controversy: The Shaping of Scientific Knowledge among Gentlemanly Specialists* (Chicago: University of Chicago Press, 1985), 104 and M.J.S. Rudwick, 'Caricature as a Source for the History of Science: De la Beche's Anti-Lyellian Sketches of 1831,' *Isis* 66 (1975), 534-560.

Chapter Nine

1831-1832

The British Association

The publicity surrounding Mary Anning's extraordinary discoveries had helped to create quite a fashion for fossil hunting across the country. This, in turn, contributed to a surge in the establishment of local 'philosophical societies' during the 1820s. In 1823 William Conybeare helped to found the Bristol Literary and Philosophical Institution, while in Whitby, George Young led the move for a similar body. Although both included a museum for the preservation of local fossil discoveries, neither was to have the impact of the Yorkshire Philosophical Society, founded in York a year earlier, by a group that included Young's fellow Kirkdale investigator, William Salmond. The York society had shrewdly elected as its first president the Reverend William Vernon. Talented and energetic, Vernon was also well-connected, being the son of York's Archbishop, Edward Venables-Vernon. He drove the project forward with such enthusiasm that by 1830 it possessed land in the centre of the city and a fine new building designed in the Greek Revival style by the fashionable architect William Wilkins.

Fig. 9.1 William Vernon, (later Harcourt) (1789-1871) in later life

Both Conybeare and Vernon used their social connections to further the aims of their respective societies. Both men were graduates of Christ Church, where Vernon had been Conybeare's junior by two years. They were also Fellows of both the Royal and the Geological Societies – and of course both were well acquainted with Buckland. There was much exchange of specimens between Bristol and York, as well as with some of the other, longer established Philosophical Societies such as those in Manchester and Birmingham.[1]

However, for many commentators, this healthy localised florescence of scientific interest belied the situation on the national stage. In May 1830 Charles Babbage, Lucasian Professor of Mathematics at Cambridge, published a short but acerbic book, *Reflections on the Decline of Science in England and on some of its Causes*.[2] To Babbage – now largely remembered for his mechanical proto-computers: the Difference and Analytical Engines – English science, as exemplified by its leading institution, the Royal Society, was 'moribund and corrupt'.[3] For forty years, under the imperious Joseph Banks, the Society had catered more for the needs of its powerful aristocratic patrons than for those of the true philosophers amongst its Fellowship. Succeeding Banks as president in 1820, Humphry Davy, despite his own significant scientific accomplishments, had proved too deferential to social rank to effect much

[1] Morrell and Thackray, *Gentlemen of Science,* 38.
[2] Charles Babbage, *Reflections on the Decline of Science in England and on Some of Its Causes* (Shannon: Irish University Press, 1971).
[3] J.A. Secord, *Visions of Science: Books and Readers at the Dawn of the Victorian Age* (Chicago: University of Chicago Press, 2014), 52-79.

reform, and in 1827 he had given way to a fellow Cornishman, the equally ineffectual Davies Gilbert, a man 'whose interest in science rarely drove him to the extremes of publication'.[4]

Babbage's book was enthusiastically received by the respected Scottish optical experimentalist, David Brewster, who, similarly disaffected, used a scathing article in the *Quarterly Review* to criticise both the Royal Society and what he saw as the totally inadequate provision for science in the English universities.[5] Stung by the attack, in late 1830 Gilbert relinquished the chair at the Royal Society, but not before inviting the Duke of Sussex, youngest son of King George III, to succeed him. The prospect that the Society should again be led by an amateur grandee so incensed many working philosophers that they forced an election, putting up as their candidate a reluctant John Herschel, a man of impeccable scientific credentials. Two Geological Society members, Fitton and Murchison, were among the leaders of this revolt. Buckland, despite favouring Herschel, was taken aback by some of the posturing of the dissidents, telling Murchison that he had heard that

> many of [Herschel's] Supporters have intimated their intention to withdraw their names from the Society in case he shd not be elected. Now this appears to me so unjustifiable a mode of attempting to force on a Society the Candidate adopted by the Party using such a Threat that I should feel it my Duty if it be true to abstain from joining a Party so conducting themselves & tho I shd not vote against Herschell I could not vote for Him under such Circumstances as I have just alluded to.[6]

Buckland was anyway disinclined to go to London for this vote as it was just at this time that a mob of disgruntled agricultural workers was threatening to descend upon Oxford causing him to fear for his family's safety.

On 30 November, by a narrow margin, the Duke was elected. Herschel's supporters were plunged into despair and some, including Babbage and Fitton did indeed temporarily withdraw from Society activity.[7] The Edinburgh-based Brewster, however, looked for an opportunity to counter-attack. Knowing that in Germany it had become the custom for natural philosophers to gather together each year in different cities, he wondered whether something similar might not happen in Britain.

Lighting upon York as a location almost equidistant between London, Edinburgh and Dublin and, moreover, a city now boasting a thriving Philosophical Society, he wrote to the Yorkshire Society's recently appointed secretary John Phillips. Phillips, a nephew and protege of the surveyor William Smith, was enthusiastic. As was William Vernon (known, from 1831, as William Vernon Harcourt, or simply William Harcourt), who saw an opening to claim for York an enhanced role in what he had earlier called 'the advancement of science'.

Plans were made, circulars of invitation were issued, and on 27 September 1831 'an assemblage of more than three hundred persons' met in the theatre of the newly-built Yorkshire Museum to hear

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[4] L. Pearce Williams, 'The Royal Society and the Founding of the British Association for the Advancement of Science,' *NRRSL* 16 (1961): 226.
[5] Anon. [David Brewster], [Review of] 'Reflexions on the Decline of Science in England,' *QR* 43 (1830): 305–42.
[6] WB to Murchison, 24 November 1830, DRO/138M/256.
[7] Williams, 'Royal Society and BAAS,' 231.

Harcourt make a long speech proposing that a 'British Association for the Advancement of Science' should be founded. The objectives of this new Association would be: 'first, to give a stronger impulse and more systematic direction to the progress of science; and secondly, to direct the national attention to scientific objects.'[8] The following day the proposal was formally accepted, and work began on setting up a plethora of committees and an appropriate regulatory machinery. The remainder of the week passed with the company listening to an eclectic mix of nearly three dozen presentations, ranging from the respected Manchester chemist John 'atomic Dalton' explaining his 40-year-long personal experiment to 'ascertain the proportion between the weight of food, and ordinary evacuations' to a translated memoir by a Professor Gazari of Florence on 'a method of detecting the traces of writing which had been fraudulently erased'.[9] Oxford's philosophers were represented by Charles Daubeny – now established as professor of chemistry – who made several contributions including a lecture on 'the connexion of Hot Springs with Volcanos'.[10]

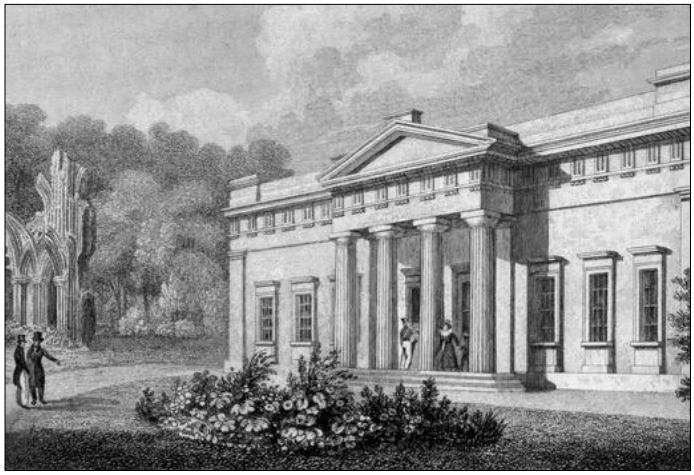

Fig. 9.2 William Wilkins' grand building for the Yorkshire Philosophical Society, where the inaugural meeting of the British Association for the Advancement of Science took place.

Although avowedly keen to attend, Buckland had in the end sent his apologies, his decision possibly determined by difficulties with Mary's fifth pregnancy, which must have begun barely six months after William Oke's birth the previous December.[11] However, his friends among the organisers apparently felt sufficiently confident that he could be persuaded to play a major role in the new Association as, on the Thursday morning of the week-long York meeting, it was announced that not only would the next meeting be held in Oxford, but that, in his absence, Buckland had been elected to preside over it.

An enthusiastic Roderick Murchison sent Buckland a full account of the week's proceedings, causing Buckland to comment that Dalton's contribution 'must have been charmingly edifying to the ladies and would form an admirable sequel to a lecture on coprology'. In response Murchison assured him that regarding 'old John Dalton's *secretions*: all [such] like effusions were read to the *men* of science only … the ladies were never treated with a peep into the cloaca which *you alone* know how to render

[8] 'Great scientific meeting in York,' *Caledoniam Mercury*, 6 October, 1831.
[9] BAAS, *Report of the First and Second Meetings of the British Association for the Advancement of Science* (London: John Murray, 1835), 73 & 90. 'atomic Dalton' is in Murchison to Whewell, 2 October 1831, in Morrell and Thackray, *Gentlemen of Science: Correspondence,* 78.
[10] BAAS, *First and Second Meetings of BAAS*, 83.
[11] WB to Harcourt, 13 August 1831, in Morrell and Thackray, *Gentlemen of Science: Correspondence,* 44.

sweet in the senses of females … But joking apart…'.[12] Oh what fun these 'Gentlemen of Science' had.

Buckland had not been the only absentee from the York meeting. Murchison's enthusiasm for the event was more than balanced by a pervading scepticism among the metropolitan savants. Many, including most medical men and Fellows of the Royal Society, had stayed away, unconvinced of either the usefulness or the viability of such a gathering. The leading surgeon Astley Cooper found himself to be going 'in the very opposite direction' from York that September; Michael Faraday excused himself due to 'pressure of business', adding that he was anyway 'not a social man', and Lord Northampton let it be known that he 'had other things to do'.[13] Nor was there much more support from the English universities. Stung by Brewster's earlier deprecations, the Cambridge men were wary of any scheme that smacked of his influence; though Sedgwick, busy hammering rocks in Wales, did express regret that he would not be amongst the 'deipnosophists'.[14] From Oxford only Daubeny and one other made the journey north.[15]

However, despite their seeming reluctance to engage with Harcourt's national Association, the scientific men of the two universities had, thanks to Buckland, already developed something of an alliance. The summer before the York meeting the Bucklands had hosted a group of Oxford professors. As well as Sedgwick, the astronomer George Biddell Airy, the mathematician George Peacock, the botanist (and one-time mineralogical professor) John Stevens Henslow and the current professor of mineralogy, William Whewell, all descended upon the canon's house in Tom Quad.[16] These 'Cantabs' were all Fellows of the Geological Society, and since Murchison had also been invited, geology was presumably the major topic of conversation.[17] However time was undoubtedly found for other pursuits and entertainments. Henslow's wife was probably there and the recently-married Airy certainly brought along his new bride.[18] Like Mary Buckland, Richarda Airy took a very active interest in her husband's work. Writing later to thank the Bucklands for their hospitality, George Airy enclosed, specifically for Mary's benefit, some notes on the polarisation of light, hoping that they 'may help to give some idea of a most beautiful theory which serves to clarify the most splendid and apparently the most unaccountable phaenomena in experimental science.'[19] The women were clearly not excluded from scientific discussion.

The success of this visit was in large measure due to the warm welcome that guests experienced in the Buckland household. Buckland and Mary were interested and interesting hosts who did not

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[12] Murchison to WB, 12 October 1831, in Morrell and Thackray, *Gentlemen of Science: Correspondence,* 79 & 85.
[13] Morrell and Thackray, *Gentlemen of Science,* 74-5.
[14] Whewell to Forbes, 14 July 1831, quoted in Boylan, 'William Buckland,' [thesis], 345. Murchison to Harcourt, 23 September 1831, quoted in Morrell and Thackray, *Gentlemen of Science: Correspondence,* 76. A deipnosophist is 'a master of the art of dining'.
[15] Morrell and Thackray, *Gentlemen of Science,* 85.
[16] For Whewell's presence see Wilson, *Lyell,* Vol.1, 314, and Clark and Hughes, *Life of Adam Sedgwick*, 383 n.
[17] WB to Murchison, 2 June 1830, GSL/LDGSL/838/B/34/1.
[18] Harriet Henslow's presence may perhaps be inferred from the correspondence: WB to Henslow, 9 June and 6 July 1830, CUL/MS/Add.8176/145 and 150.
[19] Airy to Buckland, 15 July 1830, DRO/138M/265.

much stand upon ceremony, and who happily involved the children – both their own and those of their guests – in their social activities. This was not a policy that appealed to all their visitors. Although the bachelor Adam Sedgwick seems to have appreciated the company of the youngsters, requesting Mary to 'Give my love to your children' and enigmatically telling her of his disappointment that he 'was not with Frank to see the Flying Dragon' – perhaps a reference to Howman's painting of the pterodactyl? – others were more resistant. On one occasion Maria Calcott, the traveller and writer whose descriptive account of a Chilean earthquake would later be unjustifiably called into question by George Greenough, was pleased enough to accept the Bucklands' invitation, but pointed out that her fifteen-year-old niece, who was also invited, 'is a very young one & that she is hardly dinner company yet'.[20] Similarly, the mathematician Mary Somerville, whose daughters were much the same age as Mrs Calcott's niece, wrote that

> Dr Somerville and I are truly sensible of Dr Buckland's and your attention in asking our girls, but as I could not bring them without a maid, and well knowing how inconvenient so many would be when a house is full I must decline your kind request with regard to them.[21]

In contrast, the relaxed and welcoming atmosphere of the Buckland home appealed to William Hooker, who visited with his thirteen-year-old son: 'neither my little Boy nor myself can ever forget the pleasant time we spent … under your roof at Oxford. Joseph often speaks of you & of his little playmate on the rocking-horse'.[22] Twenty years later Joseph Hooker, who eventually succeeded his father as Director of the Royal Botanic garden at Kew, would marry Henslow's daughter Frances. The Buckland home was already an important node in the network of English science.

At the end of May 1831, the year after the visit of the Cantabs, the Bucklands, together with Daubeny, Conybeare and Lyell enjoyed a week in Cambridge, where, according to Lyell: 'We were lionised with a vengeance - lectures, experiments (optics, polarisation), feasting, geologising, and evening-party going, and nocturnal smoking and cigars'.[23] Although quite independent, these reciprocal gatherings of men from the two ancient universities presaged – and eventually facilitated the development of – the more ambitious forum being conceived in York.

Some of those at the York meeting thought that the second gathering of the BAAS should be in one of the northern industrial towns rather than the serene surroundings of Oxford. But the choice was carefully calculated. One reason that the York meeting was so successful was the support given by Harcourt's father, the Archbishop. He had accommodated many of the leading men at his grand Bishopsthorpe palace, and had also provided a sumptuous dinner as a climax to the proceedings. The

[20] Maria Calcott to Mary Buckland, 29 June 1829, DRO/138M/166.
[21] Mary Somerville to Mary Buckland, 13 January 1829, DRO/138M/167.
[22] J.D. Hooker to Mary Buckland, 25 July 1830, DRO/138M/164.
[23] K. Lyell, Life, *Letters and Journals,* Vol. 1, 318, quoted in Boylan, 'William Buckland,' [thesis], 188. Mary Buckland's presence at this gathering is inferred from a letter to her from Sedgwick (Sedgwick to Mary Buckland, 19 April 1831, DRO/138M/162) which refers to her strong wish to visit Cambridge 'as soon as it is possible'. See also WB to Roderick Murchison, 20 May 1831, GSL/LDGSL/838/B/34/4.

assembled philosophers had plainly relished such comforts and it was deemed important that similar provision should be made at the next meeting. The organisers also had in mind the need to attract more of their metropolitan colleagues. So, when Charles Daubeny took it upon himself to offer his own university as the venue for the next meeting, his suggestion had been leapt upon with enthusiasm. Where better to match the splendour of Bishopsthorpe, and – quickly thinking things through – who better to oversee the proceedings than that university's well-connected, astute and affable professor of geology? There had been no time for long debate and before the week was over Buckland had received a letter from John Phillips explaining the honour that had been bestowed upon him in his absence.

Within days Mary Buckland had told Henslow about the proposal. He responded that, though he 'could not conveniently nor yet inconveniently get to York this year', he would do his best to come to the Oxford meeting.[24] Whewell also told her, somewhat cautiously, that he was now prepared to give the fledgling Association his support, since he too had been flattered in his absence.

> I find that I have the honour to be appointed vice President of the Association of Yorkists under Dr Buckland as President. I assure you this latter circumstance makes me proud of the selection. But how do you like the prospect of an incursion of barbarians at Oxford next June? If a few comparatively harmless Cambridge professors were troublesome to deal with and difficult to keep in order, what will you do when the grim philosophers of Birmingham and Manchester descend upon you? I do hope you do not intend to run out of the way of the invasion if it really takes place.[25]

The wide-ranging ambitions of the British Association prompted a humorous response from Henry De la Beche, who offered some caricatures to be printed for Buckland's 'Presidentship's Table' at the 'Grand British Omnilogical Society'.[26] But despite the mild scepticism of his colleagues, Buckland had no fears about the potential barbarian invasion and, encouraged by his friends Daubeny and Murchison, who was now promoting the new Association with almost evangelical fervour, he embraced his new role with relish.

On 16 March 1832, a meeting was held in Daubeny's laboratory in the Ashmolean to appoint a local 'committee of management' for the forthcoming meeting.[27] As one of the two 'local secretaries' (Baden Powell, the professor of geometry was the other), it was Daubeny who took on much of the day-to-day administration and recruitment while Buckland, as president-elect, concentrated on securing support at the highest level. By the time they met, Daubeny had already recruited forty-two members including eight heads of houses and six professors and Buckland now added others including his own patron, the university's septuagenarian chancellor, Lord Grenville, to whom he also promised accommodation at Christ Church during the meeting.[28] Meanwhile Murchison, after hearing a rumour

[24] Henslow to Mary Buckland, 10 October 1831, DRO/138M/161.
[25] Whewell to Mary Buckland, 10 October 1831, RS/MS/251/43.
[26] De la Beche to Buckland, 24 January 1832, DRO/138M/249. It is possible, as suggested by Patrick Boylan, that one of these 'caricatures' might have been 'Awful Changes!', De la Beche's famous cartoon lampooning a passage in Lyell's recently-published *Principles of Geology* in which he imagined a future return of currently extinct species.
[27] MS notice, OUMβ1832, (per J.M. Edmonds notes OUMNH).
[28] A list of members was attached to the 1831 Report of the York Meeting.

that the Duke of Sussex, now president of the Royal Society, 'was not favourably disposed to the *British Association*', had employed his own well-developed social skills, first to win the duke's approval, and then to enlist him as a member.[29] To some, like Babbage, this was a move fraught with danger.

> The Duke of Sussex will be a millstone not on his own account, but because it is in the nature of one class of persons to pay undue deference to rank, and it interrupts freedom. I do however sincerely hope that no indiscreet fool or flatterer will bring him prominently forward in the shape of President Patron or any other form for our British Association[30]

Nevertheless, Buckland saw only advantage in the Duke's patronage, insisting to Murchison that 'the Oxford Committee ought to send him an invitation & our Dean to [sic] offer Him his House in Case He shd come, & if He will not, I must offer mine', adding rather regretfully, 'I fear however that it is most probable He will not come'.[31] A week later, however, a triumphant Buckland reported that he had, through the Royal Society's secretary, John Children, sent an invitation to the Duke and that:

> Yesterdays Post brought me a Reply from Children stating that He had taken my letter to Kensington & told H.R.H. candidly that I was anxious to be certain as to whether I am to expect Him or not at my House & why – & that HRH was evidently pleased at my frankness on this Point & commanded Children to inform me that if no paramount public Duty prevent & his Health permit it is his full intention to attend the Oxford meeting & that He shall not only have Pleasure in accepting my offer but had much rather take up his Quarters with me than any where else, as it is H.R.H intention to come entirely as a private Individual.
> … Thus there is every probability of his Royal presence at the Meeting & we must treat Him quietly…[32]

In the event, though the Bucklands' home overflowed with guests throughout the meeting of the Association, neither Lord Grenville nor the Duke actually made the journey to Oxford.

The problems and opportunities connected with the attendance of the aristocracy were matched by those related to women. On 27 March Buckland wrote to Murchison:

> I was most anxious to see you to talk over the proposed meeting in June[.] Every Body whom I spoke to on the Subject agreed that if the Meeting is [to] be of scientific utility Ladies ought not to attend the Reading of the Papers – especially in a place like Oxford – as it wd at once turn the thing into a sort of Albemarle Dilettanti meeting instead of a serious Philosophical Union of working men.[33]

It was scarcely an uncommon view. Albemarle Street was the address of the Royal Institution, where a one-way system had once been imposed to cater for the throng of carriages bringing fashionable ladies to hear lectures by the charismatic Humphry Davy: the very type of aristocratic patronage that the British Association had been set up to counter. Buckland went on to tell Murchison that even one of the country's most illustrious women of science, the mathematician and astronomer, Mary

[29] Murchison to Harcourt, 12 March 1832, Morrell and Thackray, *Gentlemen of Science: Correspondence*,135.
[30] Babbage to Daubeny, 28 April 1831, Morrell and Thackray, *Gentlemen of Science: Correspondence*,138.
[31] WB to Murchison, 27 March 1832, DRO/138M/244.
[32] WB to Murchison, 5 April 1832, DRO/138M/243.
[33] WB to Murchison, 27 March 1832, DRO/138M/244.

Somerville, seemed to agree that women should be excluded: 'I did not see Mrs Somerville, but her Husband decidedly informed me that such is her opinion of this Matter – & further I fear that She will not come at all'. A week later he wrote:

> I find Mrs Somerville has decided not to come & so also Mrs Chantrey but we depend on seeing Mrs Murchison & giving her Franks Bed in the Attics which we wish were better[.] We have had no Discussion yet as to Ladies attending the Meeting, But Mrs Somervilles opinion is confirmed by her Actions is clearly in the negative. Their Presence at private Parties is quite another Thing – & at these I think the more Ladies there are the better.[34]

Buckland's last point was reiterated by Charles Babbage, writing three weeks later to Daubeny.

> I think also that *ladies* ought to be admitted at some kind of assembly: remember the dark eyes and fair faces you saw at York and pray remember that we absent philosophers sigh over the eloquent descriptions we have heard of their enchanting smiles. It is of more importance than perhaps you may imagine to enlist the ladies in our cause and the male residents throughout the county will attend in greater number if their wives and daughters partake some share in the pleasure. If you will only get up an evening conversazione for them at Oxford I will try and start a ball for them at Cambridge.[35]

The decision had already been taken to hold the 1833 meeting at Cambridge, with the once-reluctant Whewell as president. The benefits of female attendance at these events was clearly recognised, as long as their participation was restricted to providing light relief from the serious masculine business of philosophy. When Buckland heard that his former pupil, Sir Philip Egerton, intended to bring his new fiancée to the meeting he wrote offering congratulations…

> on the brilliant Discovery … of a Jewel of great price which you have resolved to make your own, and to submit to the inspection of the learned, at our proposed scientific meeting in June next. The only rival specimen I have heard of as likely to be present and which has the reputation of being the greatest Beauty in the mineral world, is a specimen that will be brought by the Marquis of Northampton, who has joined our Society, and has lately possessed himself of a fossil lizard enclosed in amber more exquisitely beautiful than the fairest of the fossil Saurians, and which your specimen alone I expect to find possessing the power to eclipse.[36]

Quite how the future Lady Egerton fared in her beauty contest with the fossil lizard is not recorded.

That Lord Northampton – he who 'had other things to do' at the time of the York meeting – had now been won over was a major coup for the BAAS. His attendance at Oxford, together with that of Lord Milton and Egerton's friend Viscount Cole, gave the meeting a seal of aristocratic approval, allaying any unspoken fears of republicanism. However, many still doubted that a congregation of such disparate philosophical interests could have any real value. In 1837 Charles Dickens would delight

[34] WB to Murchison, 5 April 1832, DRO/138M/F243.
[35] Babbage to Daubeny, 28 April 1831, Morrell and Thackray, *Gentlemen of Science: Correspondence*, 137.
[36] WB to Philip Egerton, 23 January 1832, in Gordon, *Life and Correspondence*, 121.

his readers by lampooning the Association in spoof reports of the meetings of the 'Mudfog Association for the Advancement of Everything'.[37]

When Daubeny offered Oxford for the second meeting of the fledgling institution, it had been very much an act of faith and it was to his and Buckland's credit that the university welcomed its visitors in such fine style. Between them they secured not just approval for the visit of the 'grim philosophers of Birmingham and Manchester', but the university's active involvement in the week's events.

The visitors arrived in large numbers during Monday 18 June and the opening session of the meeting took place in the Sheldonian Theatre at one o'clock the following day – 'a large portion of the gallery being filled with ladies'.[38] The Association's outgoing President, Lord Milton, began by thanking the university authorities for their welcome, assuring them that 'they will never have the slightest ground for repenting of their kindness' when they appreciate that the pursuit of science can only 'add incomparably to those feelings of awe, duty and reverence, which we owe to the wisdom, the power, and the beneficence of the Creator'. These words, though doubtless calculated to locate the visitors within a tradition of natural theology with which conservative Oxonians would be comfortable, were in fact an honest reflection of the religious views of the BAAS's own leaders and most members. Even grim philosophers accepted the existence of a divine Creator.[39]

At five o'clock the 300 or so members adjourned 'to partake of a splendid entertainment in the hall of New college', the ladies presumably being left to fend for themselves. In planning this opening dinner Buckland and Daubeny, both themselves Wykehamists, had made the most of their Winchester connections. Speeches were made by New College's warden, Buckland's friend and one-time school-fellow Philip Shuttleworth and by New College fellow, Philip Duncan, keeper of the Ashmolean Museum. After dinner, grace 'having been chaunted', Buckland stood to express gratitude – possibly with more hope than conviction – that by so handsomely accommodating the Association, the University had given proof of its 'sincere wish to foster and cherish that cause which we have so much at heart'. He was careful to praise the absent Lord Grenville – 'a name which I can never utter without feelings of grateful veneration'. After a long series of toasts, the 300 well-fed philosophers erupted into Holywell Street to make the short walk back to the Clarendon Building for some further nourishment of a more philosophical kind.

Two years earlier the University Press had moved to larger premises across the city and after some negotiation the first floor of the vacated building had been converted into three spacious lecture rooms: one each for himself and Stephen Rigaud, the Reader in Experimental Philosophy, and one for those 'Professors who have no Apparatus beyond their Lecture Book'.[40] These, and the committee

[37] Charles Dickens, *The Mudfog Papers* (Richmond: Alma Classics, 2014).
[38] This account of the week's proceedings has been extracted from the reports in *JOJ*, 23 and 30 June 1832.
[39] For a discussion of the mediating role that natural theology played at this time see John Hedley Brooke, 'The natural theology of the geologists: some theological strata,' in *Images of the Earth: Essays in the History of the Environmental Sciences*, ed. L.J Jordanova and Roy Porter (Chalfont St. Giles: BSHS, 1979), 39-64.
[40] WB to Grenville, 14 January 1831, BL Add MS 58995 ff.129-130.

rooms on the ground floor provided convenient accommodation for the visiting philosophers whose business was split between four 'sections', treating respectively: Mathematics and Physics, Chemistry, Geology, and Natural History. In the 'Chemical Room' that evening a Mr Keening demonstrated experiments 'illustrative of his communication on a safety tube for the oxy-hydrogen blow pipe.'

Fig. 9.3 The Clarendon Building, Broad Street, Oxford. The Sheldonian Theatre is to the right and the Ashmolean Museum is the square building to the extreme right. Buckland occupied parts of the first floor and the attic.

The following day, after a morning of varied and earnest scientific endeavour, the company assembled again in the Sheldonian where they were to witness a most moving event.

Fig. 9.4 William Smith (1769-1839)

Fortune and the Geological Society had not looked kindly on the pioneer geological map-maker William Smith. Whereas all agreed that his great solo effort, the now-famous geological map of 1815, was a prodigious achievement, it had brought him little fame and absolutely no fortune. By 1819 his financial position was so dire that he had been committed to a spell in the King's Bench debtors' prison, after which indignity he had fled London to eke out a living as a jobbing surveyor in the north of England. Although a number of poor business decisions had undoubtedly contributed to Smith's woes, his fate had been sealed by the disappointing sales of his map, a circumstance often attributed to the widespread perception that the Geological Society was about to issue a better product. What hope had Smith's production, however remarkable in its execution, when pitched against the combined efforts of the foremost geological talents in the country?[41]

Although Buckland, Conybeare and others involved with the Society's map were clearly influenced by Smith from the start, the map's prime sponsor found it hard to admit that 'his' map owed anything to Smith's work. George Greenough, who held great sway during those early days of the Society, had no time for the man himself or his methods of identifying rock strata by their characteristic fossil assemblages. Smith's homespun manner and his parlous finances excluded him from membership of Greenough's gentlemanly circle and for many years his work went unacknowledged by the Society. But,

[41] For a popular account of Smith's story, see: Winchester, *Map that Changed the World;* for a more nuanced reading: Knell, 'Road to Smith.' The matter continues to be debated.

by the late 1820s, the use of fossils to distinguish otherwise similar-looking strata was widespread, both in England and on the continent, where, almost twenty years earlier, it had been pioneered by Brongniart and Cuvier in their study of the Paris Basin. Now, recognising that in William Smith the English had some claim to priority in this essential technique, several active members of the Geological Society sought to bypass the sceptical Greenough and honour the long-neglected surveyor. In February 1831 Adam Sedgwick, in one of his last actions as President, announced that Smith had been awarded the Society's first ever prize medal, the legacy of chemist William Wollaston who had died three years earlier. To this day the Wollaston Medal remains the most prestigious prize awarded by the Society, but at the time of Smith's presentation in 1831 no actual medal had been struck.

But now the handsome gold medal was ready, and 'by a singular accident', it happened to be in Oxford, where also William Smith, its intended recipient, had 'unexpectedly arrived' the previous night. Never one to miss an opportunity for an 'occasion', Buckland was quick to call Sedgwick forward to complete his task of the previous year. However, mindful of due proprieties, the Cambridge professor insisted that since the 'sceptre had passed out of his hands', his successor should now perform the task. So it was Roderick Murchison, the current President of the Geological Society, who presented Smith with his long-overdue prize, claiming, as Sedgwick had done before him, that Smith was truly 'the Father of English Geology'.[42]

Fig. 9.5 The Wollaston Medal

This emotional episode over, the assembled company settled themselves to listen to yet more scientific reports, after which Buckland led 'a large party of distinguished personages', including the three noble lords, to the High Street. There, at the Angel Inn, they dined 'at the ordinary', though their 'excellent and proper dinner … provided by Mr Griffith at 5s. a head' was augmented by venison kindly sent up by Buckland's friend and sailing companion, the Duke of Buckingham. The aristocratic approval signified by this gift was quite as important as the satisfaction it provided to the diners.

Thursday was a day that would long be remembered by those present. At ten o'clock, after the assembled philosophers had listened to the arctic explorer William Scoresby describe the benefits of lightning conductors on ships, the University demonstrated the sincerity of its welcome by treating them to the spectacle of a ceremonial Convocation. The magnificently robed Vice-Chancellor and the Heads of Houses all processed into the Sheldonian Theatre, whereupon the Public Orator proclaimed, in some hastily contrived Latin phrases, that the degree of Doctor of Civil Law was to be conferred upon four members of the Association. The four, whose names had, till the very last moment, remained a closely guarded secret, were: David Brewster (his earlier censure of the university

[42] In fact this label had been applied to Smith as far back as 1825 when Thomas Webster had written that Smith 'is indeed (I had almost said) the father of modern English geology.' T. Webster, 'Reply to Dr Fitton's Paper,' *AP* n.s. 9 (1825), 39. I am grateful to Hugh Torrens for pointing this out.

apparently forgiven), the botanist Robert Brown, the Manchester chemist (and digestive expert) John Dalton and Michael Faraday, whose work at the Royal Institution was just about to endow the world with the wonder of the electrical generator. The choice of those to be honoured was significant, and to some conservative Oxonians, alarming, for not one of the four was a member of the Church of England. For the University to so break with tradition as to honour a Quaker (Dalton) and even a Sandemanian (Faraday) was a powerful statement and a remarkable testament to the persuasive powers of Charles Daubeny, who had orchestrated the event. Sadly for him – and Buckland – this ostentatious espousal of scientific interest by the University proved to be but a temporary enthusiasm.

In a happy contrast to the morning's formalities, the afternoon provided opportunity for some relaxed instruction in the fresh air. While Professor Henslow, accompanied by Daubeny, merely led 'a large party of Gentlemen and Ladies' for a 'botanical excursion on Shotover Hill', no fewer than '150 members of the association on horseback, accompanied by carriages containing ladies, and many persons on foot, assembled near Magdalen Bridge to attend a Lecture by Professor Buckland on the geology of the neighbourhood of Oxford.' For 'nearly six hours' this peripatetic audience followed the geological professor as he expatiated on the practical utility of his science from the vantage of his saddle.

On Friday the members once again dined 'in ordinary' at the Angel Inn, the menu on this occasion being supplemented by a 'well-fatted buck' from William Harcourt's father, the Archbishop. For those whose stamina allowed it, dinner was again followed by a round of sectional meetings beginning at nine o'clock. Both intellectually and socially, it was a taxing week – as one of the younger men present wrote to his sister: 'from 8a.m. to midnight I have been eternally busy and today *for example* ought to have eat *four* dinners'.[43]

The final Saturday session involved a great deal of administrative business leavened by a few scientific reports, including one from the engineer Marc Brunel concerning his ongoing attempts to drive a tunnel under the Thames. There were then many speeches and expressions of thanks and when Sedgwick's turn came to speak, he lifted his eyes 'to that blazing crescent which had decorated the meetings of the Society in Oxford' and made an earnest plea to the ladies in the gallery to be sure to attend the next year's meeting, which was to be in Cambridge, and over which he had been elected to preside. As he told the assembled ladies, their attendance would shake 'to its very foundations' the monastic character of that institution. Before that happened however, Oxford had its own foundation-shaking finale to present.

As President, it was Buckland's prerogative to give the closing lecture of the Meeting. Just the week before, he had made a considerable impact at the Geological Society during the discussion that followed a paper by the anatomist William Clift. The subject had been a remarkable, almost complete, fossil skeleton that had recently arrived in England from Buenos Ayres.[44] Named the megatherium, or

[43] James Forbes, 22 June 1832, Morrell and Thackray, *Gentlemen of Science,*130.
[44] Now Buenos Aires.

'great beast', the skeleton had been discovered in a dried-up riverbed. According to Charles Lyell, 'Buckland was really powerful last night on the megatherium – a lecture of an hour before a crowded audience: only standing room for a third'.[45] Clift's paper had been full of detailed measurements and careful scientific description, but Buckland had gone much further, using the animal's anatomy to draw sweeping conclusions concerning its diet and way of life. Now, calculating that what had gone down so well at the Geological Society, would be bound to please the members of the Association, he proposed to give a repeat performance. Unusually for a man whose notes were often barely legible jottings on the backs of old tradesmen's bills, this lecture survives entire, carefully prepared and neatly written out by Mary Buckland.

Fig. 9.6 The Megatherium as described by Buckland

Likening the 'great beast' to the sloth, which parts of its skeleton most nearly resembled, Buckland's theme was that far from being an ill-proportioned monstrosity unfit for its existence on earth, and deserving of its own extinction, the megatherium was in fact perfectly constructed for its particular niche in nature. Each part of its anatomy, from its gigantic claws to 'the structure of [its] posterior extremities' was designed to fit it for a role as a digger and eater of roots. 'He is', Buckland announced, 'the Prince of sappers and miners',

> I speak it in the presence of Mr Brunel, the Prince of diggers. Mr Brunel eyes him and says, "I should like to employ him in my tunnel". "No," say I, "he is not a workman for you; he is not a tunneller; he is a canal digger … he will not go an inch below a foot and a half; he would dig a famous gutter; he would drain all Lincolnshire in the ordinary process of digging for his daily food."[46]

Buckland gave many instances to support his thesis before concluding, as the *Oxford Journal* reported, that the megatherium

> was but one of the many examples afforded by Comparative Anatomy of the inexhaustible richness of contrivances whereby Nature has adapted every animal to a comfortable and happy existence in that state wherein it was destined to move. … all have derived their existence from the same Almighty and Everlasting Creator.[47]

It was midnight before the crowd at the Music Room dispersed, variously excited by Buckland's antics. A few may have agreed with the reporter for *Frazer's Magazine*, who thought it 'blamable, if not

[45] Lyell to Mantell, 14 June 1832, in K. Lyell, *Life, Letters and Journals,* Vol. 1, 388, and quoted in Gordon, *Life and Correspondence,* 126.
[46] Gordon, *Life and Correspondence,* 132.
[47] 'Account of the proceedings of the British Association,' *JOJ*, 30 June 1832.

disgusting in such a place, and at such an institution as Oxford'.[48] But to most, and to the authorities at both Oxford and Cambridge, Buckland's conclusion provided a grand reassurance that the philosophers of the BAAS posed no threat to the principles of natural theology and the *status quo*. Their science was, after all, quite 'safe'.

On the domestic front, Buckland must surely have been relieved that the week had come to an end. On top of his many administrative duties and public performances, his house had been full to overflowing with guests. However, keen to make the most of the phalanx of friends present, he planned one further ceremony. On Sunday 24 June, the Bucklands' second daughter, four-month-old Charlotte Jane Eva, was baptised. Her godparents were Charlotte Murchison, Adam Sedgwick and the Marquis of Northampton, together with the Bucklands' neighbour, Dean Gaisford's wife, Jane. It was a very satisfying conclusion to what had been a week of triumph.

[48] Rupke, *Great Chain*, 244.

Chapter Ten

1830-1836

The best-selling 'Bridgewater'

Once he had said goodbye to the last of his visitors, Buckland was able to turn his attention back to another important matter. Eighteen months earlier he had accepted an extremely lucrative commission to write one of eight treatises demonstrating the 'Power, Wisdom, and Goodness of God as manifested in the Creation'. Now, with the agreed time for publication fast approaching, Buckland was feeling some pressure to deliver. The family spent the summer in a rented house at Beckley, a village five miles outside Oxford, where Buckland could work on his book 'free from the interruptions of genial Oxford', and also well 'out of the way of Cholera', an outbreak of which occurred in the city that summer.[1]

The book was one of eight, commissioned by the President of the Royal Society as the result of an unusual provision in the will of an obscure English aristocrat. The foibles and peculiarities of the eighth, and last, Earl of Bridgewater have been – not altogether unfairly – caricatured in Bernard Falk's 1942 book, *The Bridgewater Millions: a Candid Family History*. But, as science historian Jonathan Topham has pointed out, to understand the Earl's posthumous commission, we must dig below his more spectacular eccentricities and uncover something of the inner life of the man himself.

The Reverend Francis Henry Egerton had not expected to become an Earl. Since the ascension of their distinguished ancestor, Lord Chancellor Ellesmere, to the Woolsack in 1603, various members of the Egerton family had been honoured with knighthoods, baronetcies, earldoms and even a ducal coronet. However, Francis' own branch – descended from the second son of the third Earl – although steeped in family tradition and self-regard, had had to make do with distinctions of a more spiritual kind. Francis' grandfather had been Bishop of Hereford, and his father, Bishop of Durham. It was only when his father's cousins, the fifth and sixth Earls, died without issue that the peerage passed, first to Francis' elder brother, General John Egerton, and then, on the untimely death of the General in 1823, to Francis himself. He would be the last of the line but, for the few years that he held the title, he made the most of it.

Fig. 10.1 Revd. Francis Henry Egerton, 8th Earl of Bridgewater

[1] K. Lyell, *Life, Letters and Journals,* Vol. 1, 385-6, quoted in Boylan, 'William Buckland,' [thesis], 195. WB to Sir John Trevelyan, 25 October 1832, BL Add MS 31026, ff. 113-4.

Egerton had been brought up acutely conscious of his lineage. Born in 1756, he had progressed, via Eton and Christ Church, to ordination and then – just two days after his twenty-fourth birthday – appointment by his father to a prebendal stall at Durham cathedral. Although it is doubtful that the polished wooden seat of his stall was ever much burnished by the young canon's behind, the position assured him of a comfortable and life-long income.[2] Three months after his installation at Durham he was presented to the valuable living of Whitchurch in Shropshire, the gift of his cousin, the sixth Earl – but better known as the third Duke of Bridgewater, whose canal building exploits initiated England's 'canal mania' of the late eighteenth century. At Whitchurch the freshly ordained young parson threw himself into improving the rectory and buying up as much of the land surrounding it as he could. He enjoyed hunting and kept a cellar of fine port, but, as he was at pains to tell members of his vestry committee, his pastoral duties were not totally neglected:

> Gentlemen, with regard to myself I have only one object in view, the general prosperity, welfare and accommodation of the Parish of Whitchurch. To this object (though I care little to say anything of myself) I have devoted much care, attention and trouble.[3]

However, despite Egerton's self-proclaimed pastoral zeal, relations within the parish were sometimes strained. Having fallen out with a senior member of his vestry – probably over the payment of tithes – he set about tormenting his opponent in a most un-clerical way by causing a field near the poor man's house to be used for all manner of noisy and noisome proceedings: from the sharpening of saws to the burning of animal carcasses. A wind-powered rattle was set up and, by the inventive expedient of chaining a dog just out of reach of a similarly tethered fox, almost incessant barking was added to the cacophony. The matter went to court, with the result that the rector was forced not only to sell the field to his adversary, but to pay '6 or 700£ damages and costs'.[4]

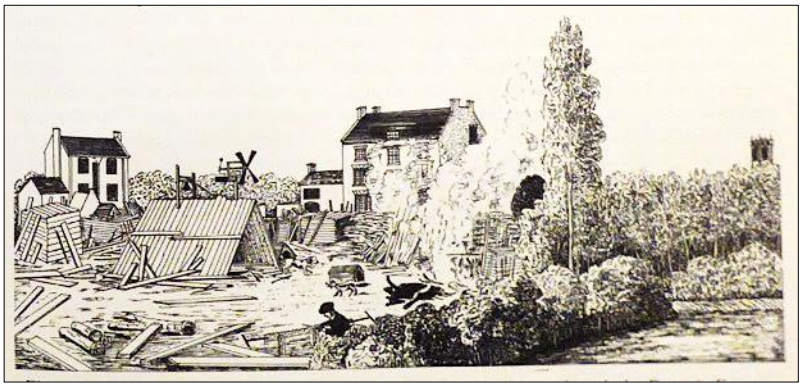

Fig. 10.2 Print from 1797 showing the field bought by Francis Egerton and the nuisances which he created on it to annoy his neighbour

Rather than a simple country clergyman, the young rector clearly saw himself as a man of letters. Ostentatiously devoted to classical learning, he acquired and relished something of a scholarly reputation. However, the depth of his scholarship rarely reflected the heights of his enthusiasm. His

[2] Of all English cathedrals, Durham was particularly well-endowed. In the 1830s its twelve canons were each receiving an income of about £3000. Owen Chadwick, *The Victorian Church, Part 1(1829-1859)* (London: SCM Press, 1971), 39.
[3] Jean North, Madge Moran and Joan Barton, *The Old Rectory, Whitchurch, Shropshire* (Woonton: Logaston Press, 2007), 26.
[4] Ibid. This early example of 'exemplary damages' might be ca. £100,000 today.

mind was too easily diverted along pathways interesting but irrelevant to his subject. When, in 1796 there was talk that he might be offered a bishopric, he managed to produce and publish a creditable Latin translation of Euripides' *Hippolytus*. 'I thought it my duty', he wrote, 'to show that I had turned my mind to such studies as became the High Station to which I was called; and that, in obtaining that important office, I was not solely indebted to my birth and family interest.'[5] Admitting that much of the work was drawn from notes taken during his lessons at Eton, Egerton was nevertheless keen to make the most of its favourable reception. He even went so far as to suggest that his interpretation of the steadfast honour of its eponymous hero – who suffered banishment and death rather than break a solemn oath – might be held up as a model for the edification of modern youth. Grand plans to combine his text with similarly inspiring narratives from Hebrew scripture and other oriental literature sadly came to nought. When, in 1821, he republished the work in France, complete with an *Addenda and Corrigenda* that included a long-winded deliberation on the subject of natural theology, the reviews were not encouraging, claiming that 'the erudition was diffuse and the notes confused'.[6] Nor did the rumoured bishopric ever materialise.

Always conscious of his noble patrimony, Egerton managed always to extol his forebears' virtues in ways that reflected at least some of their glory towards himself. In his flattering account of his own father, he contrived to present the bishop's evident cupidity as a philanthropic concern for the souls of his under-rewarded servants. He also wrote a nineteen-page article on the life of his ancestor, Lord Chancellor Ellesmere.[7] This was later expanded into eighty folio pages in which he emphasised his kinsman's munificence and made much of the fact that recipients of Ellesmere's patronage had included such luminaries as John Milton and Francis Bacon, Ellesmere's successor as Chancellor. However, despite the undoubted merits of his subject, Egerton's work was described by a later Lord Chancellor as 'the worst piece of biography I have ever had the misfortune to be condemned to read'.[8]

Having thus established, in his own mind at least, his credentials as a biographer, the young clergyman turned his attention to his illustrious cousin. For ten or eleven years from the early 1790s Egerton deserted his rectory to become the frequent companion of the immensely wealthy 'canal Duke' as he gathered information for a projected biography. Quite how congenial the astute but singularly uncultured Duke found the effete young cleric's company is open to question; nevertheless, Egerton enjoyed the use of an apartment at Bridgewater House, the Duke's grand and newly remodelled London home and frequently accompanied his cousin on trips to inspect the latter's many country estates.

When, in 1802, the Peace of Amiens made continental travel once again possible, Francis Egerton joined many of his countrymen and journeyed to Paris. He would later claim that the Parisian climate was beneficial to his health. We can only surmise as to whether his weak constitution and

[5] Topham, 'An Infinite Variety,' 24.
[6] Bernard Falk, *The Bridgewater Millions: A Candid Family History* (London: Hutchinson, 1942), 190.
[7] Anon., 'Earl of Bridgewater,' *GM* 99, 1 (1829), 558-60.
[8] John Campbell, *The Lives of the Lord Chancellors and Keepers of the Great Seal of England,* Vol. 2 (London: J. Murray, 1846), 181 n.

prognathous lower jaw were linked to the close consanguinity of his parents – it was, after all, not so unusual at the time for a father and mother to be first cousins – but the fact remained that he was never robust, and a change of air might well have been recommended. However, there might also be substance to the suggestion, mooted both in Topham's sober account and Falk's more sensationalist biographical sketch, that his move was an attempt to avoid scandalising his parishioners – to say nothing of his reverend colleagues at Durham – with the knowledge that their absentee rector was the father of several illegitimate daughters. Whatever the reason, unlike the majority of his compatriots, Egerton did not rush back to England when hostilities resumed the following year. He remained in Paris until his death.

In March 1803, two months before the war with France recommenced, the canal Duke died. Egerton, for so long the Duke's self-appointed companion, had hoped to be well remembered. So, when he heard that he was to receive a 'mere' £40,000, whereas his brother would have, as well as the earldom, a large house and estate at Ashridge in Hertfordshire and a portfolio of investments valued at well over £500,000, his disappointment was evident. He halted his plans to write a hagiographic biography of his cousin, asking:

> How could I bring my mind to the task, how pourtray a domestic tyrant, selfish in all things; living for himself alone; regardless of those duties which attract to one who inherits immense estates from a long line of Ancestry; unacquainted with even the persons of most of his family, his own name, his own blood; giving nothing in charity; with no service at home, and yet, never attending any place of public worship! Under all these considerations .. I confess I faulter and I cannot bring myself to the task.[9]

Fig. 10.3. The third Duke of Bridgewater. (1736-1803), the 'Canal Duke'

Nevertheless, the £40,000, together with the income from his church appointments, hardly left him destitute. In 1814, with Napoleon safely tucked away on Elba, Egerton felt safe in offering £26,000 of his capital for the Hôtel de Noailles on the Rue St-Honoré. According to the author Mary Macdermot Crawford, the property – which, to local disdain, he promptly re-named Hôtel Egerton – was 'wider, longer, and in every detail ten times as magnificent as the palace de l'Elysee. It was almost a small

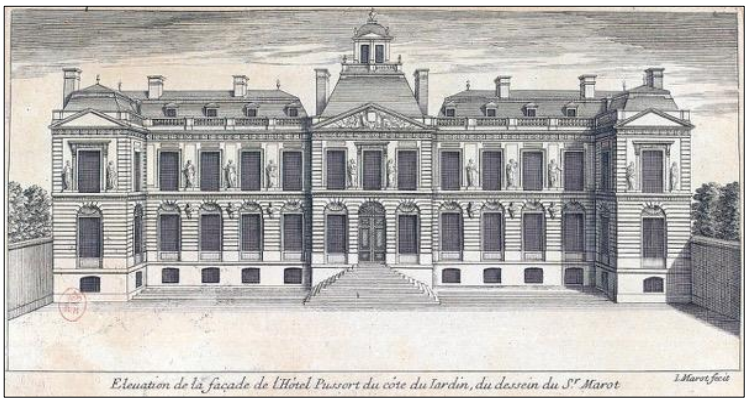

Fig. 10.4. The Hôtel Egerton, formerly the Hôtel de Noailles (and before that the Hôtel Poussort)

[9] Topham, 'An Infinite Variety,' 27.

village, and once within its walls the outside world ceased to exist.'[10] The reverend Englishman had found his proverbial castle. When, the following March, a resurgent Napoleon returned to Paris and attempted to evict him, Egerton stood his ground, as he would a little later when various Allied commanders, including Prince Leopold of Saxe-Coburg (later King of the Belgians), tried to requisition the house as an official residence. 'I have travelled much,' Egerton is reported to have said as he stood, hunting rifle at the ready, 'but always wherever I have drunk, eaten or lodged, I have paid. You are nothing more than a brigand in my eyes. Get out and keep out!'[11]

Increasingly infirm, Egerton shut himself up in his grand home pursuing literary interests and engaging in acrimonious quarrels over money with his brother. Then, unexpectedly, in 1823, John Egerton died.

Egerton now found himself not only the eighth Earl of Bridgewater, but also in possession of an *annual* income of around £40,000. He was sixty-seven years old, blind in one eye and suffering from the effects of a stroke. Nevertheless, he now had ample means to indulge his increasingly eccentric whims, and, as the popular *Gentleman's Magazine* reported after his death, his 'singularities [became] a general topic for conversation at Paris'.[12] One famous story concerned two favourite dogs, Bijou and Biche, that were made to sit with their master at table, where they were served by liveried footmen. According to rumour, on one occasion when his canine friends upset him, he called for his tailor, declaring that,

Fig. 10.5 A satirical sketch, dated 3 December 1823, of the new Earl of Bridgewater wearing a French styled hat

> These blackguards have deceived me. I have treated them like gentlemen, they have behaved like rascals. Take their measure! They shall wear for eight days the yellow coats and knee breeches of my valets, and stay in the anteroom, and be deprived of the honour of seeing me for a week.[13]

However, although Egerton's inheritance undoubtedly encouraged him in many such trivial indulgences, it also made this peculiarly sensitive man more acutely aware of 'what he considered to be the age-old and divinely-instituted duties of aristocratic patronage and *noblesse oblige*'.[14] If he was to measure up to his illustrious ancestors, his own biography must demonstrate that, like them, he had

[10] Mary Macdermot Crawford, *Madame de Lafayette and Her Family* (New York: James Pott, 1907), 34.
[11] Ibid., 38.
[12] Anon., 'Earl of Bridgewater,' 559.
[13] Crawford, *Madame de Lafayette*, 38-9.
[14] Topham, 'An Infinite Variety,' 20.

used his wealth and his position to benefit his fellow man and to support and encourage the talent of others less well-endowed than himself.

Egerton died, at the age of 72, in February 1829. He had never married, and his five natural daughters had all predeceased him. The complex wills of his cousin, the canal Duke, and his brother, the seventh Earl, had, between them, distributed most of the Bridgewater millions to more distant relatives, but still Francis Egerton died a rich man with personal property valued at £70,000. He had little or no contact with his extended family, and, despite title and wealth, his failing health and increasing eccentricity made his final years difficult and lonely. After writing his will in February 1825 he spent many hours reconsidering and refining it; by November there were four codicils, with two more added in August 1828, six months before his death.

Egerton's will was not so much a distribution of his assets as a prospectus for his immortality. Yet, rooted as it was in a worldview unique to his time and background, it was not entirely self-seeking. Its main provisions fell into two closely related categories: first, the memorialisation of himself and his antecedents; and secondly, the establishment of some kind of literary legacy for the benefit of his fellow man. In the first group, having initially stipulated a sum 'not exceeding four thousand pounds sterling' for his own memorial – to be placed in the family vault at Little Gaddesden, near the Ashridge estate – he used various codicils to bequeath a total of £8,500 for the embellishment of Lord Ellesmere's tomb and for the erection of 'obelisks' commemorating his parents and the canal Duke. In addition, casts of a marble bust, together with bronze medallions and engraved portraits of himself, were to accompany smaller bequests to the libraries of Whitchurch Rectory, Durham Cathedral and All Souls College.[15] But these overtly self-memorialising measures did less to perpetuate Francis Egerton's name than his gifts to the world of letters.

Fig. 10.6 Francis Egerton's memorial in Little Gaddesden Church

The first of these, his 'dear and favourite' collection of manuscripts, was left to the trustees of the British Museum, together with £7000 to fund a librarian for its care. Originally comprising sixty-seven volumes of manuscripts, including autographed letters from men as prominent as Galileo and Voltaire, the 'Egerton Collection' has, since 1973, been housed at the British Library. Augmented over time thanks


Fig. 10.7 Bronze medallion with profile of Francis Egerton

[15] The original bust was by the Parisian sculptor Jean-Jacques Flatter, the medallion by the Italian medallist Donadio, and the engraving was by Henri Grevedon after an original portrait by Francois Gerard.

to Egerton's further bequest of £5000 plus land in Shropshire and Cheshire, it remains a major national asset. But, at the time of his death, it was the second, and more unusual, of the Earl's endowments that caused the greatest stir. This was a stipulation that £8000 – more than one tenth of his total estate – should be paid to some person or persons selected by the president of the Royal Society

> to write print publish and expose to public sale 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 arguments as also by discoveries ancient and modern, in arts, sciences and the whole extent of literature[16]

It reflected Egerton's long-standing interest in natural theology, or, as he saw it, the business of inferring the 'power, wisdom and goodness' of the Creator through consideration of the natural world. In 1821 he had included a rambling forty-page footnote on the subject in the *Addenda and Corrigenda* to his *Hippolytus*. Although it might be thought that this late-flowering theological enterprise and then the bequest were simply atonements for his evident failure to live up to the expectations of his priestly calling, as Topham has argued, Egerton's motives were almost certainly more nuanced.

Throughout his life, Egerton had been almost morbidly conscious that he and his family occupied a specific and privileged place in a divinely ordered creation, and that with this privilege came great responsibilities. Not least of these responsibilities was the proper exercise of patronage. It was a duty decreed by a sense of enlightened self-interest. Through patronage, those who lacked the material advantage of the aristocrat might yet be encouraged to achieve satisfaction in their humble endeavours. Potential resentment and the danger of rebellion would be allayed. Egerton's long years in France had convinced him that the French aristocracy had not fulfilled their God-appointed role in this regard and that, as a result, the divine order had been violently overthrown. His views on recent French history were made clear when he wrote:

> I cannot but observe upon the term '*Egalité*' of which I have heard so much. If '*Egalité*' means only that all men are equal before the law, so, in truth, they are or ought to be. One law there is for the King; one and the same law for the peasant. If '*Egalité*' is tortured into pretending to a meaning which denies infinite variety it is absurd; it is contrary to the constitution of things; it is in opposition to the will of God.[17]

Now, by an act of posthumous patronage, Egerton not only fulfilled his duty as patron but also gave the world a work that proclaimed the divine origins of the created order. An order that depended on 'infinite variety', not just of arguments, or creatures of nature, but of sorts and conditions of men.

Egerton may not have realised that the Royal Society to whose president he entrusted his unusual bequest was already a rather different institution from that to which he had been elected in

[16] Will of Francis Henry Egerton, Earl of Bridgewater, NA/PROB 11/1754/3.
[17] Topham, 'An Infinite Variety,' 40.

1781. Agitators such as Brewster and Babbage had changed the climate and by 1829 the current president, Davies Gilbert, was faced with strident calls to make the Society less aristocratic and more 'scientific'. Egerton's bequest, coming from an aristocratic *litterateur* and involving an overtly theological project can hardly have been very welcome. In the event, Gilbert insulated the Society, and himself, from too much criticism by choosing as coadjutants not, as may have been expected, members of the Society's Council, but two senior bishops: William Howley, Archbishop of Canterbury, who was a FRS, and Charles Bloomfield, Bishop of London, who wasn't.

Eventually this triumvirate decided that the £8000 should be split equally between eight authors. There was scarcely any consideration of the prospective authors' sympathy with the theological aspects of the project. They knew that very few in Britain would deny God altogether and, from avowed deist to evangelical Christian, all might see some evidence of design in the natural world. However, Egerton's stipulation that the work should present 'an infinite variety of arguments [taken from] discoveries ancient and modern, in arts, sciences and the whole extent of literature' was somewhat narrowed as, with one exception, Gilbert and his colleagues confined their selection to men with very specific scientific expertise.[18]

In January 1831, almost two years after Egerton's death, Buckland informed Lord Grenville that Gilbert and the bishops had appointed:

> 8 Persons each of whom is to write a Book of not less than 300 Pages on the following Subjects to be ready in 2 Years from this time & when the work is finished each Author is secure one Thousand Pounds
> List of Authors & Subjects
> Revd Mr Whewell – Astronomy & general Physics
> Revd Mr Kirby – The Habits & Instincts of Animals
> Revd Dr Buckland – Geology & Mineralogy
> Dr Prout – Chemistry including digestion
> Mr C. Bell The Mechanism of the human frame including the Hand & Organs of Voice
> Dr Roget Human & Comparative Anatomy & Animal & Vegetable Physiology
> Dr Kidd The Adaptation of external Nature to the Physical Condition of man with a View to the Exercise of his faculties the Supply of his Wants & the Relief of his Infirmities
> Dr Chalmers of Glasgow The Adaptation of External Nature to the Moral Condition of Man
> These 8 Subjects are to make 8 distinct Volumes of the same size 8o & to be sold either separately or as an entire Work.[19]

Although the very generous terms of the Bridgewater will were widely known, no formal announcement of the authors' appointment had been made, leaving plenty of scope for rumour and gossip. On 5 February the Literary Gazette reported on a recent meeting of the Linnean Society:

[18] See ibid., 38-50 for an analysis of Egerton's own concept of natural theology.
[19] WB to Grenville, 14 January 1831, BL Add MS 58995 ff.129-130.

> At the conversazione after the meeting, amongst other subjects connected with literature and the arts, which were spoken of, it was stated that Professor Buckland , Mr Charles Bell, Dr Roget, and others, had nearly completed their works, as competitors for the legacy left by the late eccentric Duke of Bridgewater for the best essay on the structure of the earth and the human hand.[20]

Although the Earl's legacy had indeed provoked a number of unsolicited applications, the chosen authors had been recruited solely by invitation. Buckland, fearful that it might be construed that he and his colleagues had entered some unseemly scramble for the prize, wrote requesting Gilbert to make matters clear.[21] Gilbert's statement, published in the March edition of the *Philosophical Magazine*, set out the terms of the Earl's will and enumerated the prospective authors and their topics. It also begged readers to appreciate 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.'[22] Unsurprisingly, not all were mollified. Charles Babbage was so incensed at being overlooked that he eventually wrote and published his own, unofficial, *Ninth Bridgewater Treatise – a Fragment*.[23]

On the other hand, although Buckland himself had 'very readily' accepted both the commission and the fee, at least one prospective author had refused specifically because of the remuneration entailed. John Herschel, the multi-gifted son of musician-turned-astronomer William Herschel, was considered by his scientific colleagues to be the very epitome of a true man of science. He was even, as mentioned earlier, their chosen candidate against the Duke of Sussex for the chair at the Royal Society. However, in July 1830 he declined Gilbert's invitation to write on astronomy, telling him:

> 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 testimony in their favour by promulgating them under the direct and avowed influence of pecuniary reward.[24]

Herschel's refusal may not have been totally unexpected. Six months earlier he had agreed to contribute a volume to the *Cabinet Cyclopaedia* edited by Dionysius Lardner. Aimed at a less exclusive readership than the Bridgewater Treatises, Herschel's *A Preliminary Discourse on the Study of Natural Philosophy* set out a prescription for the study of science and the conduct of those engaged in it.[25] He had seen an early draft of Babbage's self-serving *Decline* and, horrified by its tone, had advised the author to 'Burn it, or rewrite it'.[26] For Herschel science was a high calling and it was his aim to persuade his readers

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[20] Anon., 'Linnaean Society,' *LLGJBL* 733 (1831), 88.
[21] WB to Davies Gilbert, 8 February 1831, John D Enys, ed. *Correspondence Regarding the Appointment of the Writers of the Bridgewater Treatises between Davies Gilbert and Others* (Penryn: privately printed, 1877), 20-1.
[22] Davies Gilbert, 'Statement Respecting the Legacy Left by the Late Earl of Bridgewater, for Rewarding the Authors of Works, to be published in Pursuance of His Will, and Demonstrative of the Divine Attributes, as Manifested in the Creation,' *PM* ser.2, 9 (1831): 201.
[23] Charles Babbage, *The Ninth Bridgewater Treatise: A Fragment* (London: John Murray, 1837). See Topham, 'An Infinite Variety,' 63-4, for an examination of Babbage's motives.
[24] Herschel to Gilbert, 1 July 1830, in W.H. Brock, 'The Selection of the Authors of the Bridgewater Treatises,' *NRRSL* 21, (1966): 167.
[25] See Secord, *Visions of Science,* 80-106.
[26] Ibid., 88.

that the mere reading of accounts of scientific discoveries would, of itself, bring them 'nearer to their Creator'.[27] But this could only be true if the makers of these discoveries were themselves beyond reproach. It was not that he was averse to due reward – *The Preliminary Discourse* itself had earned him a fee of £250 – but he took the view that the Bridgewater money would be better used to encourage young and struggling men of science for whom 'a thousand pounds … would indeed be a more material and noble assistance'[28]

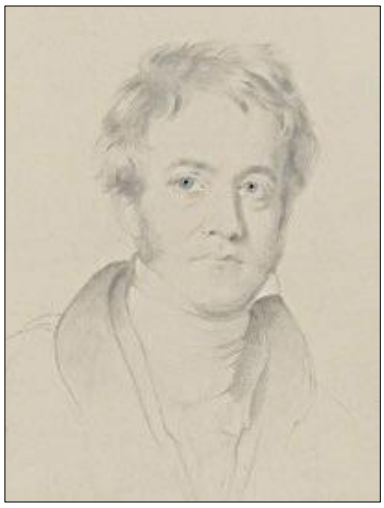

Fig. 10.8 John Herschel. (1792-1871)

Gilbert himself had initially envisaged just two octavo volumes containing the work of all eight authors but by the time of Buckland's letter to Grenville eight distinct volumes were assumed.[29] By then, with Gilbert out of office and his royal successor taking little interest, the management of the project had fallen to the writers themselves.[30] Between them the eight authors eventually produced twelve volumes, with Buckland, Chalmers, Roget and the aged entomologist William Kirkby each splitting their work into two. The works varied in length, Kirby's being the longest and that of Buckland's erstwhile mentor John Kidd being 'but a moderate thousand pounds' worth'.[31]

In Britain, 'natural theology' is most often linked to the name of William Paley whose 1802 work of that name came to define the term.[32] But it actually has a much longer and richer heritage. From the time of Plato onwards the idea that the natural world shows evidence of purposive design was developed by sages and philosophers of a variety of traditions.[33] The early ideas of the statesman-philosopher Cicero and the physician Galen were developed by the Fathers of the Early Church. Later, however, the influential theologian Thomas Aquinas would warn that knowledge obtained from nature must always be subservient to that achieved by faith and revelation. In the early seventeenth century this distinction was again emphasised by Francis Bacon. Even as he promoted the systematic study of the natural world, Bacon asserted that 'the works of God … show the omnipotency and wisdom of the maker, but not his image'.[34] Nevertheless, in Britain, arguments that stressed the beauty, order and hierarchy of the cosmos – self-evidently the work of a divine creator – continued to be employed as an antidote to the potentially atheistic materialism of philosophers like Descartes and Hobbes.

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[27] John F.W. Herschel, *A Preliminary Discourse on the Study of Natural Philosophy* (London: Longman, 1831), 17, quoted in Secord, *Visions of Science*, 91.
[28] Herschel to Gilbert, 1 July 1830, in Brock, 'The Selection of the Authors,' 167.
[29] Topham, 'An Infinite Variety,' 67.
[30] Ibid., 88-9.
[31] Ibid., 144.
[32] Paley, *Natural Theology*.
[33] David C. Lindberg, *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, Prehistory to A.D. 1450* (Chicago: University of Chicago Press, 2007), 149.
[34] Francis Bacon, quoted in Neal C. Gillespie, 'Natural History, Natural Theology, and Social Order: John Ray and the "Newtonian Ideology",' *JHB* 20, (1987): 13.

Although, in the eighteenth century, Immanuel Kant in Germany and David Hume in Scotland, both demonstrated the logical impossibility of proving the agency of God in the creation of the world, natural theology continued to be an important strand in British intellectual life. Whereas, on the Continent, scientific men largely welcomed the freedom to pursue their investigations without the necessity of ascribing a divine first cause to every phenomenon, the British remained convinced that the natural world clearly bore the signature of its divine Creator. It was this simple so-called 'physico-theology' that was epitomised in William Paley's *Natural Theology* at the century's end.

However, despite the influence of Paley's work in Britain, Egerton's own conception of natural theology seems to have been rooted in earlier traditions. There is no evidence that he possessed a copy of Paley's book. His own attempt at writing on the subject in the *Addenda and Corrigenda* to his *Hippolytus* certainly suggest a very different approach to Paley's. Much of the *Addenda* was, according to Topham, 'unintelligible metaphysical verbiage' derived more from the classics than from any notion of modern science. Part of his argument was even framed through an imaginary conversation between a learned 'doctor' and a 'fool' – perhaps an allusion to Salviati and Simplicio, the imaginary interlocutors in the *Dialogue Concerning the Two Chief World Systems* that got Galileo into so much trouble.[35]

Although the terms of Egerton's bequest allowed the authors freedom to use 'all reasonable arguments', the illustrative examples he gave revealed his own deeper aspirations. His intention was, it seems, not merely for the work to demonstrate 'the Power, Wisdom and Goodness of God', but also to assert the special place afforded to mankind in His creation. The very specific suggestion that the work should treat 'the effect of digestion, and thereby of conversion', only makes sense when we realise that, in his *Addenda*, Egerton himself had used some convoluted reasoning on this topic as evidence for the immortality of the human soul.[36] Similarly, the seemingly arbitrary reference to 'the construction of the hand of man' derived from a wish to repudiate the claims of those, like Jean-Baptiste Lamarck (his near-neighbour in Paris), whose work implied a lineal connection between human and 'orangutang'.[37] Finally, Egerton's instruction concerning 'the variety and formation of God's creatures' demonstrated his intention that the work he was commissioning should demonstrate the hierarchical nature of creation and thus confirm that the English aristocracy, to which he was so proud to belong, was itself divinely ordained.

Fortunately, Buckland did not have to worry about the more specific stipulations of Egerton's will. The chemist William Prout was assigned to draw what theological conclusions he could from the chemistry of digestion, while the matter of the hand was to be dealt with by Charles Bell, professor of surgery at Edinburgh. Like all the authors, Bell and Prout also managed to insert some account of their own favourite researches into their work, and although Egerton might have been disappointed at Prout's failure to address the issue of immortality, he would surely have been pleased with Bell's

[35] Topham, 'An Infinite Variety,' 45.
[36] Ibid., 48.
[37] Lamarck (1744-1829) was a professor of zoology at the Jardin du Roi – just across the Seine from the Rue St-Honoré.

dismissal of any doctrine that might hint at the transformation of species, scotching any suggestion of man's descent from the monkeys.

The Bridgewater authors did not, initially, anticipate the task taking longer than two years. When Mary Buckland asked her husband how he would earn his £1000, he had allegedly replied, 'Why, my dear, if I print my lectures with a sermon at the end, it will be quite the thing.'[38] It is understandable that he should make light of this new commission, occupied, as he already was, with lectures, the writing of papers, and frequent six-hour coach journeys to London – to say nothing of college and cathedral duties. As he had admitted to Murchison a few months earlier: 'I have about as much Command of my time here as the Keeper of a Turn Pike Gate & as I have not your valuable military Talents of early rising I can not steal a march upon the enemy by getting over the Ground before Breakfast.'[39]

Work on the book would have to be fitted around other duties, and inevitably the task ate into the Bucklands' private life. It became the stuff of family legend. Writing more than two decades later, Frank Buckland tells us that:

> During the long period that Dr. Buckland was engaged in writing the Bridgewater Treatise, my mother sat up night after night, for weeks and months consecutively, writing to my father's dictation; and this, often till the sun's rays, shining through the shutters at early morn, warned the husband to cease from thinking, and the wife to rest her weary hand.[40]

Gradually Buckland's notion of some lecture notes topped off with an uplifting sermon expanded into *Geology and mineralogy considered with reference to natural theology*. But it took not two years, but nearly six.

In style and structure, Buckland's treatise owed much to Paley's *Natural Theology*. Both authors began by evoking the experience of an innocent traveller; Paley's opening words: 'In crossing a heath, suppose I pitched my foot against a stone…' becoming in Buckland's hands: 'If a stranger, landing at the extremity of England…'. But while the Archdeacon famously went on to demonstrate the evidence of a purposeful creation by comparing an amorphous lump of rock with the contrived mechanism of a watch, Buckland was able to dispense with allegory and dive straight into his subject, using his innocent observers to inform readers about the varied composition of the English landscape.

Having established the fruitful analogy between watch and cosmos, Paley went on to devote fully half of his book to enumerating examples of what he took to be divine contrivance in the natural world. This too was the pattern followed by Buckland, whose book was essentially a catalogue of the evidence of design he had discerned in his geological investigations. In this way he not only fulfilled his theological commission, but also – almost incidentally – provided an up-to-date account of 'a science [that has] been so little regarded, and almost without a name, until the commencement of the

[38] Lyell to Mantell, 18 January 1832, in K. Lyell, Life, *Letters and Journals,* Vol. 1, 368.
[39] WB to Murchison, 10 March 1830, DRO/138M/274.
[40] F. Buckland, 'Memoir,' xxxvi.

present century'.[41] Buckland, now at the height of his powers, was fulfilling the prospectus he had set out in his inaugural lecture.

Buckland began his treatise with an introductory chapter on the 'Extent of the Province of Geology', in which he invoked the words of the scrupulous John Herschel to assert that "Geology, in the magnitude and sublimity of the objects of which it treats, undoubtedly ranks in the scale of sciences next to astronomy".[42] In his second chapter, 'The Consistency of Geological Discoveries with Sacred History', he emphatically refuted the ideas of those who clung to the notion of a young earth, calling upon no less an authority than his Christ Church colleague, Edward Pusey, Regius Professor of Hebrew, to explain that the original sacred text allowed the world to have existed long before the advent of man. Then came several chapters giving a lucid scientific account of the various rock strata to be found over the surface of the planet. Determined to fulfil the terms of his commission, Buckland augmented these geological chapters with one suggesting that although 'the Great Architect of that Globe' might not have arranged the strata '*solely* and *exclusively* with a view to the benefit of man', surely, as an omniscient creator, He must have had man's eventual requirements in mind.

Almost two-thirds of the book, however, was devoted to the description of fossilised remains, a subject in which Buckland had become the country's acknowledged authority. Following the methodology of his hero Cuvier, he had developed a particular expertise in working out the former lifestyle of fossilized vertebrates, but now, for this more comprehensive study, he also drew on the skills of a wide range of friends and acquaintances. Among these was Mary Buckland, whose knowledge of molluscs and other invertebrates made her so much more than the mere amanuensis suggested by her son. Meanwhile their home became an entrepot for the latest discoveries, as information flowed in from across the globe to be interpreted and explained as evidence of divine design.

The first animal described in the book was the dinotherium.[43] Buckland's information about this extraordinary creature, formerly classified by Cuvier as a type of giant tapir, was taken from the recent work of a German naturalist, Johann-Jacob Kaup. Kaup had discovered, in a sand pit in the region of Darmstadt, an immense fanged jawbone, almost four feet in length. Recognising that the creature must have been larger than even the mastodon or other fossilised elephants, Kaup named it dinotherium, meaning terrible beast, thus anticipating by

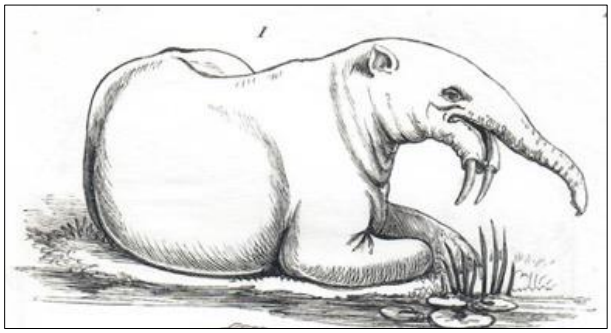

Fig. 10.9 Dinotherium

[41] William Buckland, *Geology and Mineralogy Considered with Reference to Natural Theology* (London: William Pickering, 1836), 6.
[42] Ibid., 10.
[43] Now usually spelled deinotherium. Buckland's 'restoration' of the animal (Fig. 10.9) was only made (following the discovery in Germany of a complete skull) after the first edition of Geology and Mineralogy had been issued. It appeared in a set of 'Supplementary Notes' issued in 1837 and in subsequent editions of the work.

a decade Richard Owen's use of the dino- prefix. Having extracted information from Kaup's detailed but terribly dry description of the bones, published in French in 1832, Buckland treated his readers to a speculative reconstruction of the animal's habitat and habits – just as he had done for the megatherium in the Holywells Music Room. Concentrating on the dinotherium's enormous tusks, he inferred that, like the megatherium, it had also survived by digging up roots. But, because the animal's tusks would have made them 'cumbrous and inconvenient' on dry land, he deduced that the dinotherium was probably aquatic. Finally, indulging a flight of fancy, he surmised that the vast, downward-curving tusks might also have been used by the animal to hook itself onto the bank so that its nostrils remained just above water-level allowing it to 'breathe securely during sleep, whilst the body remained floating, at perfect ease, beneath the surface'.[44] Although this is perhaps another case where we can't be sure how far Buckland himself believed his own statements, it does reflect a passage in Paley's *Natural Theology*, with which he would surely have been familiar. Paley, taking Buffon and the eighteenth-century Irish playwright Oliver Goldsmith as his source, had asserted that the 'babyrouessa', a species of wild boar with '*bent* teeth, more than half a yard long', used these teeth – otherwise 'a superfluidity and an incumbrance' – to hitch itself onto the branch of a tree.[45] The babyrouessa's strange 'manner of taking repose … both easy in its posture and secure [from predators]' was, in fact, widely accepted by naturalists well into the nineteenth century.

Fig. 10.10 Babyroussa (now babirusa)

Paley's book, as befitted the work of a theologian, had been devoid of illustration. In contrast, Buckland's, which – despite its theological theme – was primarily a scientific work, required pictures. The material he was treating was so alien to everyday experience that without some graphical reference, the text would be all but meaningless. But whereas Roget was content with a large number of tiny woodcuts inserted into his pages of text, and Kirby was happy with twenty full-page plates spread over his two volumes, Buckland required no fewer than 87 plates containing 705 individual figures. These together with 110 pages of explanatory notes, comprised the whole of his second volume.

Taking pride of place as the first of the plates was a magnificent, fold-out 46 inch long, hand-coloured *Ideal section of a portion of the earth's crust*, drawn by Thomas Webster. This now-iconic diagram was the sole illustration for the first, geological, section of the book. It was constructed to demonstrate the correspondence between the positions of the various rocks in the sequence and their relative ages. Above Webster's colourful section Buckland added a series of delightful woodcuts giving a 'minute but spirited representation of the principal characteristic races of animals and vegetables' associated

[44] Buckland, *Geology and Mineralogy*, 138.
[45] Paley, *Natural Theology,* 134; Babyrousessa is now usually spelled babirusa. The belief that this animal slept while dangling by its tusks was widely accepted in the eighteenth century.

with each formation.[46] Altogether the plate provided a powerful visual summary of the history of earth. It certainly made a deep impression on the young Caroline Fox:

> We listened with great and gaping interest to [Buckland's] description of his geological map, the frontispiece to his forthcoming Bridgewater Treatise. He gave very clear details of the gradual formation of our earth, which he is thoroughly convinced took its rise ages before the Mosaic record.[47]

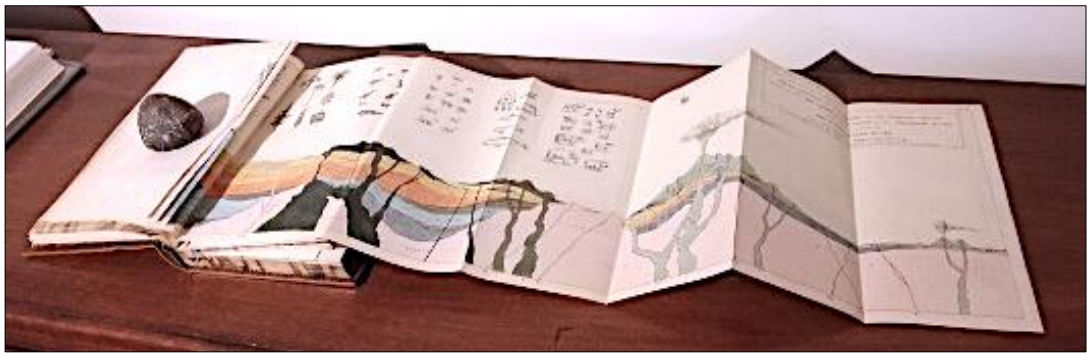

Fig. 10.11 'Ideal Section of a Portion of the Earth's Crust' – the frontispiece to Buckland's Bridgewater Treatise

The procurement of so many detailed illustrations was both costly and time-consuming. The financial burden, met from Buckland's own pocket, almost certainly absorbed the greater part of the thousand pounds he was due to receive and the execution of the wood-cuts, engravings and lithographs contributed to the ever-delayed date of publication.[48]

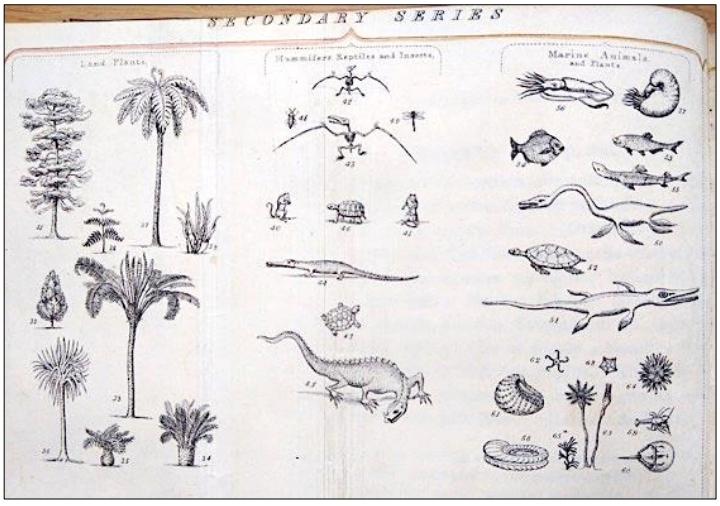

Fig. 10.12 Detail of the 'Plants and Animals selected and arranged by Dr Buckland' on the 'Ideal Section' (see Fig. 10.11)

Buckland was generous in his acknowledgement of the help he had received from others, including the botanist Robert Brown and the anatomist Richard Owen as well as his longstanding friend William Broderip. He also mentioned Louis Agassiz, a man who would later play an important role in helping him to resolve his diluvial conundrum. Agassiz, a professor of natural history at Neuchâtel in his native Switzerland, was applying Cuvier's methods to the study of fossil fish. When he came to Britain in 1834, Buckland had helped him, not only in his quest for specimens, but also in securing some financial support for his work from the BAAS.[49] In return Agassiz had made some detailed and constructive comments on Buckland's chapter concerning fossilised fish.

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[46] Anon. [William Broderip, and George Poulett Scrope], [Review of] 'Geology Considered with Reference to Natural Theology...,' *QR* 56 (1836): 37.
[47] Fox, *Memories of Old Friends,* 5.
[48] Topham, 'An Infinite Variety,' 290-1; Brock, 'Selection of Authors,' 178.
[49] British Association, *Report of the Fourth Meeting of the British Association for the Advancement of Science* (London:

Later, in 1839, Aggasiz oversaw a translation of Buckland's treatise into German – although, in doing so, he carefully and pointedly disassociated himself from Buckland's 'theological-teleological interpretation of many facts'.[50]

By his act of translation Agassiz tacitly acknowledged the value of Buckland's treatise. But by dismissing the very parts that qualified it for a share in Lord Bridgewater's largesse he confirmed that its importance lay in its science rather than its theology. In continental Europe, the very idea of a divine first cause had become an embarrassment to scientific men. In Britain, however, where any hint of materialism provoked suspicions of atheism and sedition, a dependence on God's providence was still a token of trustworthiness. At Oxford, Buckland knew that his position depended upon an accommodation between his science and the faith he shared with his university colleagues – and, by extension, with a large part of British society. He had once entertained hope that sufficient relics of the 'Mosaic inundation' would enable the establishment of a positive union between science and scripture. Student notes taken by Edwards Jackson in 1832, show that even then he was still equivocating on the point. But in 1836 Buckland finally accepted that he had lost the argument. A footnote to Chapter IX of his treatise provided quiet public acknowledgement of his capitulation:

> one of the last great physical events that have affected the surface of our globe, was a violent inundation, which overwhelmed great part of the northern hemisphere … it seems more probable, that the event in question, was the last of the many geological revolutions that have been produced by violent irruptions of water, rather than the comparatively tranquil inundation described in the Inspired Narrative.[51]

But the treatise itself was evidence that all was not lost. Even in his inaugural lecture the Flood had shared the stage with the arguments of natural theology and, whatever Agassiz's views, for Buckland these arguments remained compelling. They reflected the simple and inherently optimistic theology of the late eighteenth century in which he had been brought up. They also appealed to his own ebullient, but practical personality. Wherever one looked one saw evidence that 'the Great Architect' had thought of everything. Even the seemingly vicious instincts of the carnivore would, when carefully analysed, be seen to have been designed for the greater good. Sandwiched between the geological and the palaeontological sections of his work, he included a short chapter entitled 'Aggregate of Animal Enjoyment increased, and that of Pain diminished, by the existence of Carnivorous Races'. Using a simple utilitarian calculus – again heavily reminiscent of Paley – Buckland showed that predatory animals not only controlled the 'excessive increase' of their prey but saved the aged or sickly the pain of a lingering death. Thus, even the 'perpetual warfare, and incessant carnage' of the animal kingdom

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John Murray, 1835), xxxv.

[50] Rupke, *Great Chain*, 161; Topham, 'An Infinite Variety,' [thesis], 294; Gowan Dawson, *Show Me the Bone: Reconstructing Prehistoric Monsters in Nineteenth-Century Britain and America* (Chicago: University of Chicago Press, 2016), 83.

[51] Buckland, *Geology and Mineralogy,*94-5 n.

was, when considered as a whole, 'a dispensation of benevolence'.[52] It was, as Paley himself had claimed, 'a happy world after all'.[53]

Buckland's was the last of the eight treatises to find its way to the booksellers' shelves. The commercial uncertainty that preceded the passing of the 1832 Reform Act had entailed a last-minute change of publisher, and when, in October that year, six of the eight authors met to discuss the situation they agreed a six-month extension to the publication deadline. In the event only Whewell, Kidd, Chalmers and Bell produced their works before the newly agreed date of 1 July 1833. Prout's and Roget's were a little over six months late and the septuagenarian William Kirby did not complete his 900 pages of text until the summer of 1835. In April 1833, Buckland negotiated with the Duke of Sussex at the Royal Society for more time, claiming that, although his treatise was not yet complete, 'I have written as much as I engaged to prepare by the time originally agreed upon, and … the further extension of time to which HRH is pleased … to indulge me will I trust enable me to extend the text as well as the plates much beyond the amount originally contemplated'.[54]

By the end of 1835 this 'extended' work was complete enough for George Scrope and William Broderip to begin work on an article for the *Quarterly Review*. In December Buckland wrote to the *Quarterly's* editor, J.G. Lockhart, requesting that this review should be delayed from February until May or June.[55] It was eventually published in the April edition – still five months ahead of the volumes themselves. The two 'anonymous' reviewers informed the journal's predominantly Tory-leaning readers that '*here*, in the work of a dignitary of the church, writing, *ex cathedra*, from the headquarters of orthodoxy' was ample assurance that the discoveries of geology were 'not in any degree at variance with the correct interpretation of the Mosaic narrative'. Moreover, they asserted that no science other than geology could 'produce more powerful evidence in support of natural religion'.

In August, gratified by what he called this 'splendid' judgement on his work, Buckland travelled to Bristol for the sixth meeting of the British Association. As chairman of the Geology Section, he was able to use the meeting as a sort of extended launch-party for his book, presenting a copy, fresh from the press, to Lord Northampton, the Association's president. Expounding a little on some of its content, Buckland then caused a minor sensation by strutting about the stage flapping his coat-tails in imitation of the enormous birds whose fossilised footprints were depicted in the book. Most of the audience lapped up his antics, but some found them hard to bear. Even Murchison, who had never quite accepted his friend's explanation of such prints, was less than impressed, declaring that 'the grossness of [Buckland's] Buffoonery acted on me like an emetic'.[56] Unabashed, Buckland travelled directly from Bristol to Penzance, where he attended the annual meeting of the Royal Geological

[52] Ibid.,129-134.
[53] Paley, *Natural Theology,* 238.
[54] Topham, 'An Infinite Variety,' 100.
[55] WB to Lockhart, 17 December 1835, NLS/925/22, (per J.M. Edmonds notes OUMNH).
[56] Rudwick, *Great Devonian Controversy*, 170.

Society of Cornwall: another opportunity to promote his new publication.[57] First the launch-party, then the book-tour.

William Pickering, the usually cautious publisher of the Bridgewater Treatises, had been encouraged by the success of the early volumes. So, gambling on its author's celebrity and the current interest in geology, he had printed an unprecedented 5000 copies of Buckland's work, five times the number stipulated in Egerton's will. This had given Buckland certain bragging rights. Back in February 1835, after asking Henslow to furnish him with some of Darwin's recent discoveries concerning the megatherium, he emphasised that he could 'insert a Note of any desirable length for the benefit of the Purchasers of the intended 5000 copies of my first Edition'.[58] It also proved to be a shrewd decision. Despite its high price of £1 15s – three and half times the cost of Whewell's treatise and a figure representing almost a month's wages for Ralph O'Connor's imaginary lawyer's clerk – the entire print run had been spoken for before the official publication date of 24 September.[59] A second edition of 5000 copies had been set in motion straight away, and of these a mere 28 copies remained in stock when the publisher's affairs were wound up in 1853.[60] Although Buckland remarked that 'coming at the fag end, mine had the advantage of making up every bodies set', these outstanding sales were evidently due to much more than fortuitous timing.[61]

Unlike Herschel's *Preliminary Discourse*, and despite Buckland's claim to have written a 'popular general view of the … subject avoiding technical detail', *Geology and Mineralogy*, like the other Bridgewater Treatises, was not intended for the edification of the masses. With its rich illustrations, all beautifully printed on high quality paper – and priced accordingly – this was a book destined for the libraries and drawing rooms of fellow philosophers and of the landed and professional classes. Buckland himself admitted as much when he wrote that the technical descriptions that accompanied the Plates were such that 'the Country Gentleman may skip'.[62]

Buckland assumed that, like him, his genteel readers would take for granted the truth of his preliminary assertions regarding the long pre-history of the earth. Crucial as the theological aspects may have been, the book was hardly a theological polemic. Its real interest lay specifically in those pre-human periods of the earth's history and the details of the creatures with which God had populated them. This had been well understood by the *Quarterly's* sympathetic reviewers, but it can hardly have come as a surprise to Buckland that some, less literary, sections of the popular press continued to pursue arguments that he had considered long resolved.

An early sign of the upset he would cause in some quarters had been a series of sermons preached three years earlier in the University church of St Mary's. The preacher was Frederick Nolan, a theologian of conservative views who had just completed a traditional 'chronological' study that predicted that the Millennium – an event fervently longed for by many evangelicals – would begin in

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[57] Fox, *Memories of Old Friends,* 5.
[58] WB to Henslow, 23 February 1835, NYPL Manuscripts and Archives, MssCol/7948.
[59] See O'Connor, *Earth on Show,* 222.
[60] Topham, 'An Infinite Variety,' 346.
[61] WB to Irvine, 25 February 1837, ChCh/Ms/531, quoted in Topham, 'An Infinite Variety,' 288.
[62] Ibid., 203.

A.D 1996.[63] It was probably not entirely coincidental that this uncompromising man had been elected to give the prestigious series of 'Bampton Lectures' during the summer of 1833, a year after the university had hosted the 'philosophers' of the British Association. Nolan showed his indignation at the reception afforded to the Association by denouncing what he saw as the cultivation of science to the inevitable detriment of revealed religion.[64] Halfway through his programme of sermons Mary Buckland reported to Whewell that,

> the Bampton Lecturer [has been] holding forth in St. Mary's against all modern science (of which it need scarcely be said he is profoundly ignorant), but more particularly enlarging on the heresies and infidelities of geologists … Alas! My poor husband – could he be carried back half a century, fire and faggot would have been his fate, and I dare say our Bampton Lecturer would have thought it his duty to assist at such an 'Auto da Fe'. Perhaps I too might have come in for a broil as an agent in the propagation of heresies.[65]

Buckland could hardly ignore so blatant an attack on his very doorstep, telling Harcourt that 'the time is now arrived when this school must be put down – singly they are unworthy of the notice of any scientific man'.[66] Both Daubeny and Powell, the two secretaries of the 1832 British Association meeting, went further, publishing spirited defences of their science and their Association. Powell even accused Nolan of playing into the hands of the infidel: 'The handle to unbelief is afforded by fallacious physical speculations, insisted upon as necessary to uphold the credit of Scripture'.[67] To state, as Nolan had, that the Flood had occurred precisely 1656 years after the Creation was so contrary to rational thought that it risked undermining the whole edifice of Christian teaching.[68]

In fact, by the 1830s only a small minority of educated men continued to hold views as inflexible as Nolan's. It was, however, a vociferous minority, and its simple message exerted a disproportionate influence on some sections of an otherwise apathetic public. This may have been why, despite advice from his wife 'not to lower your dignity by noticing newspaper statements', Buckland felt impelled to respond when a few newspapers objected to the liberal interpretation of the Genesis creation story in his Bridgewater Treatise.[69] Or, just possibly, it might have been because he had a book to sell – at the very least these gadfly literalists provided opportunities for a little more valuable publicity.

The most biting criticism came in the high-Tory weekly *John Bull*. Referring to Buckland's performance at the Bristol meeting of the Association, this populist defender of the *status quo* had expressed astonishment that 'a dignified Clergyman of the Church of England' had apparently told an audience that 'millions of years must *henceforward* be assigned to the age of the world' and – worse still – that that announcement had been 'received with applause that lasted several minutes'. In feigned

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[63] Frederick Nolan, T*he Time of the Millennium Investigated; and Its Nature Determined on Scriptural Grounds* (London: T. and W. Boone, 1831), 104.
[64] Frederick Nolan, *The Analogy of Revelation and Science Established in a Series of Lectures* (Oxford: J.H. Parker, 1833).
[65] Mary Buckland to Whewell, 12 May 1833, quoted in Boylan, 'William Buckland,' [thesis], 203.
[66] Morrell and Thackray, *Gentlemen of Science*, 235.
[67] Ibid., 236.
[68] Nolan, *Analogy of Revelation and Science*, 440.
[69] Gordon, *Life and Correspondence,* 196.

disbelief, *John Bull* assured its readers of its own 'firm conviction that no such thing occurred'.[70] In response Buckland sent a copy of his treatise with a letter addressed directly to the eponymous 'John Bull', telling him that 'Had these pages met your eye three weeks ago, I feel assured the strictures alluded to would never have appeared in your Paper.'[71] However, *John Bull*, speaking – as its masthead proclaimed – 'For God, the King and the People!' was unmoved:

> while we express a sincere conviction that nothing could be further from the thoughts or intentions of Dr. BUCKLAND than to unsettle the faith of his readers or hearers, we cannot conscientiously retract the opinion we expressed of the danger of adopting new interpretations of the Holy Scriptures … over what we believe to be Divine truth.
>
> … we must maintain our original opinion, that unsettling the faith of the believer, by correcting the text of the Bible … is not the most certain method of strengthening religion or increasing piety.[72]

To 'A Reader of the Bible' who had written, rather more respectfully, expressing similar views to *The Standard*, Buckland began by explaining that

> Although I deem it unnecessary to reply to any kind of anonymous publications, and do not think the pages of a newspaper a fit place for theological controversy, I consider it due to those of your readers who may have seen a letter respecting geological chronology, in the Standard … to write a few lines, in the hope of placing this question before the public in its proper light.

He then then went on, politely and patiently, to set his antagonist's mind at rest:

> The objections and difficulties proposed by "A Reader of the Bible" are nearly the same as occurred to myself, and which I believe occur to most persons when the results of geological researches are first laid before them, without those explanations which show that when fully understood and rightly interpreted they … are … strictly consistent with the literal interpretation of the Mosaic account of the Creation…

and to promote his book…

> As the explanations I allude to are fully stated in my Bridgewater Treatise, which will be published in a few days, your correspondent will, I trust, do me the justice to peruse what I have stated respecting this matter, in my second and concluding chapters…[73]

Further attacks were made, not least being a slim volume entitled *A Letter to Professor Buckland concerning the Origin of the World* by the dean of York, Robert Peel's irascible brother-in-law, William Cockburn.[74] This time Buckland did not deign to acknowledge the attack; although these ill-informed assaults were an irritation, he knew that they did not represent the views of the majority of thinking churchmen.

By far the greater part of the comment he received was positive. Even Lyell, who had been so dismissive of Buckland's diluvialist stance, was gracious in his compliments, telling his father that:

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[70] *JB* 16 (1836), 293.
[71] Ibid., 313.
[72] Ibid.
[73] *TS*, 22 September 1836.
[74] William Cockburn, *A Letter to Professor Buckland Concerning the Origin of the World* (London: Hatchard, 1838).

> Buckland's edition of 5,000 of the 'Bridgewater' is all sold, and 5,000 more printing, each of which editions, Fitton says, will produce the professor £2,000 - a piece of news I am truly glad to hear, for from what I have read of the book, I think it will do much good in spreading correct notions of the science, and probably popularise it much. Murchison calls it 'Bridge-over-the-water;' and really that part which is to carry us over the abyss of cosmogony is better constructed than I expected… the splendid sale shows that you were right in thinking that the newspaper attacks of the Nolans would prove mere fleabites.[75]

The following February Lyell ran over time as he eulogised the book in his presidential address at the Geological Society's annual meeting, praising Buckland for 'filling up one of the greatest blanks which existed in the literature of our science'. The treatise was one of the more important scientific publications of its day and achieved wide and continuing popularity. When, in 1858, two years after Buckland's death, a third edition was offered for sale, at the still substantial price of £1 5s, the whole run of 5000 copies sold out 'within three days of publication'.[76]

Like the 1832 British Association meeting, Buckland's Bridgewater Treatise was generally acknowledged to have forwarded both the cause of science and his own standing, both in Oxford and in the wider world. He and his scientific allies had defended themselves against the criticism of ill-informed evangelicals with well-founded, rational arguments. Buckland's early hope of providing material proof of the Mosaic Flood would not now be satisfied, but he had instead produced a solid volume of evidence for the 'power, wisdom, and goodness' of the Creator. He had fulfilled the promise given in his inaugural lecture and demonstrated that 'this geology' posed no threat to the moderate Anglican faith that Oxford stood to perpetuate. It is therefore ironic, that it was at just this time that Buckland's position at Oxford should begin to be undermined by a new type of religious fervour that descended upon the university. The immodest triumphalism of the British Association that had so provoked Frederick Nolan, had also stirred the breasts of a group of men cast in quite a different mould.

According to John Henry Newman, one of its main protagonists, the 'Oxford Movement' began with a sermon preached – also from the pulpit of St. Mary's in 1833 – before the judges and attorneys convened for the city's Assizes. The preacher was John Keble, a former Scholar of Corpus Christi (he matriculated six years later than Buckland), who was now a Fellow of Oriel and the current professor of poetry. Keble was a gentle man of wide intellect but narrow experience. He inherited from his clergyman father some rather old-fashioned Royalist sympathies combined with a devout belief in Apostolic succession, all of which he accepted as incontestable truths[77]. Like any High Tory, Keble had been scandalised by the Whig-led reforms of recent years, believing that they signalled a weakening of the close bond between church and state. Although the Great Reform Act itself, being a largely

[75] Lyell to Charles Lyell snr., 4 October, 1836, in K. Lyell, *Life, Letters and Journals,* Vol. 1, 473.
[76] Burgess, *Curious World*, 72.
[77] Geoffrey Faber, *Oxford Apostles: A Character Study of the Oxford Movement* (Harmondsworth: Penguin Books, 1954), 93-104.

secular matter, may not have troubled him much, the repeal of the Test Act in 1828 and the Catholic Emancipation Act a year later certainly did.[78] Then, in 1832, the feting of the 'philosophers' of the British Association at his own university, an event which culminated in the award of Oxford degrees to four avowed dissenters, demonstrated to him the treacherous path that even that bastion of orthodoxy was treading.[79] However, the immediate target of Keble's sermon in July 1833 was the Church Temporalities Bill, whereby parliament was so far meddling in church affairs as to actually abolish ten Irish bishoprics. Although Keble's sermon, later published under the title *National Apostasy*, appears to have had little immediate effect, its message resonated so well with Buckland's former 'pupil', John Henry Newman, who was now the vicar of St Mary's, that within two months Newman had issued a short, anonymous tract entitled: *Thoughts on the Ministerial Commission respectfully addressed to the Clergy*.[80] In a rhetorical challenge to his fellow clergy Newman asked: 'On *what* are we to rest our authority, when the State deserts us?' before emphasising that the answer must be 'OUR APOSTOLICAL DESCENT.'[81] By the end of the year twenty similar short publications had been written, half of them by Newman himself, two by Keble and others by Oxford men sympathetic to the cause, including Buckland's friend and neighbour Edward Pusey. Their common theme was to point the way back to the traditional observances and authority of the early church, passed down, generation by generation, from Christ's apostles to the bishops of the present day, through the laying on of hands.

Fig. 10.13 John Henry Newman. (1801-1890)

Almost at once the Tractarians, as the proponents of this 'Oxford Movement' became known, were seen to be offering a churchmanship and a theology quite different from the comfortable liberal Anglicanism espoused by Buckland and his colleagues. Newman himself was a powerful and engaging preacher and his earlier inclination towards evangelicalism, and even Calvinism, had left a residual earnestness to his pronouncements. It was hardly surprising that his own heart-felt sermons at St Mary's would appeal to an undergraduate audience seeking an intensity of feeling missing from the formulaic expositions to be heard in their college chapels. The net result was that while the pews of St Mary's became ever fuller, the numbers attending 'philosophical' lectures such as Buckland's went into decline. To the Tractarians, the natural theology espoused by Buckland and the British Association was a shallow doctrine that held no prospect of leading a man to true Christian faith. As John Bowden, author of several tracts (a total of ninety were issued between 1833 and 1841), explained

[78] Ibid., 242.
[79] Chadwick, *Victorian Church,* 563.
[80] Faber, *Oxford Apostles*, 332.
[81] [J.H. Newman], *Tract No. 1*, http://anglicanhistory.org/tracts/tract1.html.

in an anonymous article in the *British Critic*, to the philosophers of the British Association 'the God of Christianity' was no more than

> an Author of Nature mainly known to us through the wonders of his visible creation; … a Deity, who, if adored as such, is practically imagined to regard as a matter of very slight moment the reception or non-reception by his rational creatures of a creed revealed to them through any other medium than the outward display of the material universe.[82]

Exciting though Buckland's revelations of former worlds might be, they were a meagre offering compared to the eternal truths and sacred mysteries that Newman held out to his congregation.

In November 1836, two months after the publication of *Geology and Mineralogy*, an audience of forty-eight signed up for Buckland's 'Course of Eight Lectures demonstrating the principal Organic Remains of a former World which are figured and referred to in his Bridgewater Treatise'.[83] It was a respectable number, but a long way short of the ninety who had come to hear him after the publication of *Reliquiae Diluvianae*. The following year he gave two courses in geology, attracting a combined attendance of just over fifty. But in 1838 the numbers had fallen to barely half this and by 1840 he had just ten pupils.[84] The fashion for geology in Oxford was, it seemed, at an end.

[82] *BCQTR* 25 (1839), 36. See also O'Connor, *Earth on Show*, 208.
[83] Printed notice of lecture course, DRO/138M/291. Attendance figures from Buckland's register, per J.E. Edmond's notes at OUMNH.
[84] Attendance figures taken from Nicolaas Rupke, 'Oxford's Scientific Awakening and the Role of Geology', in *The History of the University of Oxford,* Vol. 6, ed. M.G. Brock and M.C Curthoys (Oxford: Clarendon Press, 1997), 547.

Epilogue

Despite the dwindling numbers attending his classes, outside the lecture-room Buckland was now a celebrity. He and Mary, both warm and generous hosts themselves, participated to the full in the social life of Oxford and London, as well as the many country houses whose doors were thrown open to them. They enjoyed travel, and having made provision for the children – at boarding school or lodged with suitable guardians – Mary would often accompany him to scientific assemblies at home and abroad. Buckland continued to work on various geological projects and in 1839 he began a second two-year term as president of the Geological Society.

In 1838 the couple travelled to Switzerland where Buckland was gradually converted to a radical theory recently espoused by his friend Agassiz. He began to reconsider the loose gravel, wide valleys, and displaced 'erratic' rocks which he had, up to then, attributed to the action of diluvial currents – and once, perhaps, even to the biblical Flood. Might not these features be better explained as the result of vast glaciers covering large parts of the northern hemisphere 'at a period immediately preceding the present condition of the globe'?[1] Further research in Scotland and northern England convinced him that ice was indeed the cause of at least some of these phenomena and was the true origin of his much contested 'diluvium'. Following yet another visit to Scotland and northern England in the summer of 1840, Buckland recruited Lyell to his cause and in November that year Agassiz, Lyell, and Buckland himself, all presented papers on the subject to the Geological Society. Despite their copious evidence that the landscape of much of northern Britain displayed characteristics similar to those observed in glacial regions of the Swiss Alps, the reaction was overwhelmingly hostile. Even his friends Conybeare, Murchison and Whewell joined in condemnation.[2] Within months Lyell withdrew his paper. He had reverted to his earlier view that it was not sheets of ice but merely floating icebergs that were responsible for the placement of huge erratic boulders.

The following October, Buckland, apparently undeterred by Lyell's change of heart, travelled to Snowdonia where he found yet more evidence to support Agassiz's thesis. He reported his findings to the Geological Society in December 1841.[3] But the attitude at the Society had not changed and when it became clear that his papers on the subject would not be published Buckland followed Lyell's example and withdrew them.[4]

However, despite the general scepticism, one man, at least, was open to the possibility of an earlier ice-age. It was now almost five years since Charles Darwin had returned from his long voyage aboard the *Beagle*. During his journey he had made many perceptive geological observations and his enthusiasm for geology remained strong. In 1842, he overcame his increasingly debilitating bouts of sickness to follow in Buckland's footsteps and see the contested phenomena for himself. He set out

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[1] Agassiz, Louis, 'On glaciers, and the evidence of their once having existed in Scotland, Ireland and England,' *PGSL* 3 (1842), 328.
[2] Davies, *Earth in Decay,* 287-8.
[3] Tom Sharpe, 'A Case of Mistaken Identity: Is Mary Anning (1799-1847) Actually William Buckland (1784-1856)?' *ESH* 40 (2021): 71-3.
[4] Patrick Boylan, 'Lyell and the Dilemma of Quaternary Glaciation,' in *Lyell: The Past is the Key to the Prese*nt ed. Derek Blundell and Andrew Scott (London: GSL, 1998), 156.

from his in-laws' home in Staffordshire – where he had spent a month quietly sketching out his early ideas regarding evolution – to undertake a ten-day expedition 'examining glacier action' in North Wales.[5] He was not fit enough to climb the higher hills, but like Buckland, he was convinced by what he saw. Later he would write of Cwm Idwal, an amphitheatre-like valley in the Glyderau mountains to the north of Snowdon: 'a house burnt down by fire did not tell its story more plainly than did this valley. If it had still been filled by a glacier, the phenomena would have been less distinct than they now are.'[6] But few at the Geological Society would give the matter as much attention as Darwin. Most shared Greenough's view that the glacial theory was the 'climax of absurdity in geological opinions' or agreed with Conybeare that it was 'a glorious example of hasty unphilosophical & entirely insufficient induction'.[7]

In February 1841 Murchison succeeded Buckland in the Geological Society's presidential chair from which he denounced the theory in his two annual addresses, stating in 1842 that 'The glacial theory, as at first propounded, has now, I apprehend, very few supporters.'[8] Despite having always held strong opinions, Buckland was never comfortable with controversy and now, as he approached his sixtieth year, this disagreement must have been particularly upsetting.

In the meantime, Buckland was also becoming increasingly disenchanted with life in Oxford. Numbers at his lectures had dwindled to single figures – a stark contrast to the crowd that had filled his Ashmolean lecture room twenty years earlier. His scientific colleagues, whose lectures had never been quite as popular, were faring no better. For several years Baden Powell had no students at all. The optimism with which Buckland had delivered his inaugural lecture back in 1819 had turned to disillusion; he now saw no hope that geology, or indeed any science, would ever serve more than a very 'subordinate ministry in the temple of [his particular] Academical Institution'.[9] But Buckland himself not only had a distinguished record as a man of science, he was also a doctor of divinity and a canon of Christ Church. And, importantly, his friend, Sir Robert Peel, was serving his second term as prime minister.

If Oxford University appeared to be turning its back on science in the 1840s, the same cannot be said of its one-time MP. Peel, whose father had made a fortune through the technological advances of the industrial revolution, understood the importance of science for the nation's prosperity. His house parties at Drayton Manor frequently included engineers and other scientific men. It was at just such a gathering that Peel revealed the news that the Queen had appointed Buckland to the Deanery of Westminster. Peel had in fact used his considerable political skill to secure this position for his old friend, commenting later that he had 'never advised an appointment of which I was more proud, or the result of which was, in my opinion, more satisfactory'.

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[5] Adrian Desmond and James Moore. *Darwin* (London: Penguin Books, 1992), 292; Sandra Herbert, *Charles Darwin, Geologist* (Ithaca: Cornell University Press, 2005), 279.
[6] Herbert, *Charles Darwin, Geologist*, 283.
[7] Davies, *Earth in Decay,* 287-8.
[8] Murchison, R.I., Anniversary Address, 17 February 1843. *PGSL* 4 (1846), 65-151 , p.93.
[9] Buckland, *Vindiciæ,* 3.

The Buckland household moved to Westminster in December 1845. The following year, Buckland was also installed as rector of Islip, a parish in the gift of the dean and chapter of Westminster which successive deans had taken as their own. Seven miles north of Oxford, Islip provided a delightful summer residence as well as a useful base from which to travel into the city for the lectures in mineralogy and geology that his readerships still obliged him to give.

Since his early involvement with the Oxford Gas Company Buckland had sought ways in which scientific knowledge and technical innovation could improve the quality of people's lives. He now became increasingly occupied with the application of science to alleviate some of the problems of a rapidly expanding population. He was a strong advocate for the use of Artesian wells, as described in his Bridgewater Treatise, to improve the supply of water to the Metropolis and other towns. In 1840 he had bought some land at the appropriately-named Marsh Gibbon, a few miles from Oxford, where he oversaw the construction of well-ventilated and damp-proofed domestic buildings and experimented with methods of land-drainage to improve agricultural yields. His appointment to Westminster had come shortly after the arrival in Britain of the potato disease that so ravished the nation's crops and caused the Great Famine in Ireland. Buckland examined methods of salvaging the damaged tubers while simultaneously advocating the importation of alternative staples to mitigate the disaster. Later he would also serve with Edwin Chadwick and others on the newly established Commission of Metropolitan Sewers.

At Westminster Abbey he threw himself into his ecclesiastical duties with renewed vigour and with his customary eccentric panache, famously flicking a feather duster about as he showed visitors around the Abbey. Shocked by the sad and insanitary living conditions of the boys attending the even then prestigious Westminster School, Buckland set about an immediate programme of improvement, testing once again his own theories of drainage and sanitation. In both Westminster and Islip he and Mary were instrumental in setting up and running a variety of local projects for the education and edification of the local community.

But despite Peel's personal assessment of the success of Buckland's appointment, not everyone agreed. Those who had attacked him as an Oxford don felt even greater antipathy now that he was a high dignitary of the church. In their view neither his theology nor his frivolity suited him to such office. When Queen Victoria designated 15 November 1849 as a day of 'national thanksgiving' for deliverance from the latest of a series of epidemics of cholera, churches across the kingdom were filled with grateful survivors of the pestilence. At Westminster Abbey a congregation so large that 'hundreds were compelled to stand' gathered to hear a sermon in which Buckland made clear that the scale of the death and suffering had been largely due to a lack of clean water and the insanitary conditions in which many poor people were condemned to live. For this he blamed the 'avarice and neglect of small landlords and owners of the filthy, ill-ventilated habitations'.[10] Although generally well-received, the sermon caused a predictably hostile response from the more extreme Tory press,

[10] Gordon, *Life and Correspondence,* 249.

one newspaper going so far as to say that 'there is no employment, not even agriculture, in which the Dean is so little at home as in the holy office which he has taken on himself.'

It was a harsh and undeserved judgement, but neither his detractors nor his supporters could have known that this sermon would be Buckland's last major public appearance. By Christmas it was clear to his family that he was seriously unwell. His decline was rapid. In February 1850, the Queen, having been made aware 'that his illness makes his attendance [to his duties] if not impossible, yet in the highest degree distressful'[11], formally authorised sub-dean, Lord John Thynne, to deputise for Buckland at the Abbey. Once so ebullient and energetic, he now became lethargic and withdrawn, though occasionally alarming his wife and children with violent outbursts of frustration. Several eminent medical men were consulted and following their advice Mary moved her husband and three daughters to the Islip rectory, far from the noise and bustle of the capital. But it was to no avail. Unable to cope with his increasingly erratic behaviour Mary, already frail herself, was soon forced to hand over care of her husband to John Bush, the surgeon-apothecary proprietor of the Clapham Retreat, a private asylum in south London. There he lived, barely communicating with the outside world, for a further five years. At 3.15pm on 14 August 1856, cradled in the arms of his son Frank, the seventy-two-year-old William Buckland died.

[11] Warrant signed by Queen Victoria, 23 February 1850, WAM/57577.

Bibliography

Manuscript Sources

Cambridge	CUL	Cambridge University Library
Cardiff	NMW	National Museum of Wales (NMW84.20G.D/…)
Chester	CALS	Cheshire Archives and Local Studies
Edinburgh	NLS	National Library of Scotland
Exeter	DRO	Devon Heritage Centre, ex Devon Records Office (DRO/138M/…)
Kew	NA	National Archive
London	BL	British Library
London	GSL	Geological Society of London
London	RS	Royal Society (RS/MS/251/…)
London	UCL	Greenough papers
London	WAM	Westminster Abbey Muniments
London	ZSL	Zoological Society of London (NZSL/BUC/…)
Newcastle	NCL	Newcastle University Special Collections (GB/186/WCT/…)
New York	NYPL	New York Public Library
Oxford	ChCh	Christ Church Oxford
Oxford	CCC	Corpus Christi College
Oxford	OHC	Oxfordshire History Centre
Oxford	OUA	Oxford University Archives (Bodleian Library)
Paris	MNHN	Museum National d'Histoire Naturelle
Winchester	WCA	Winchester College Archives

All transcriptions are the author's except NMW84.20D.G/…, which are courtesy Department of Geology, NMW.

Printed Sources – Primary

AP	Annals of Philosophy (new series: 1821 to 1826)
BAAS	British Association for the Advancement of Science
BCQTR	British Critic, and Quarterly Theological Review
ENPJ	Edinburgh New Philosophical Journal
EPJ	Edinburgh Philosophical Journal
ER	Edinburgh Review
GM	Gentleman's Magazine
JB	John Bull
JOJ	Jackson's Oxford Journal
LLGJBL	London Literary Gazette & Journal of Belles Lettres
PGSL	Proceedings of the Geological Society of London
PM	Philosophical Magazine
PSANHS	Proceedings of the Somersetshire Archaeological and Natural History Society,

PTRSL	Philosophical Transactions of the Royal Society of London
QJGSL	Quarterly Journal of the Geological Society of London
QR	Quarterly Review
SM	Sherborne Mercury
TEFP	Trewman's Exeter Flying Post,
TGSL	Transaction of the Geological Society of London
TLH	The Leisure Hour
TS	The Standard
TRSE	Transactions of the Royal Society of Edinburgh

Printed Sources – Secondary

ANH	Archives of Natural History
AS	Annals of Science
AP	Annals of Philosophy
BBM(NH)	Bulletin of the British Museum (Natural History)
BHO	British History Online (https://www.british-history.ac.uk)
BJHS	British Journal for the History of Science
CCEd	Clergy of the Church of England Database (https://theclergydatabase.org.uk)
DCNQ	Devon and Cornwall Notes and Queries
EHR	The Economic History Review
ESH	Earth Sciences History
HS	History of Science
Ichnos	Ichnos
JHB	Journal of the History of Biology
JHE	Journal of Human Evolution
JSBNH	Journal of the Society for the Bibliography of Natural History
ONDB	Oxford Dictionary of National Biography (https://www.oxforddnb.com)
Nature	Nature
NRRSL	Notes and Records of the Royal Society of London
PGA	Proceedings of the Geologists' Association
PQ	Print Quarterly
PUBSS	Proceedings of the University of Bristol Spelaeological Society
PYGS	Proceedings of the Yorkshire Geological Society
SDNQ	Somerset and Dorset Note and Queries
SS	Studies in Speleology
TCNS	Transactions of the Cardiff Naturalists' Society
TDAAS	Transactions of the Devon Association for the Advancement of Science
TRSE	Transactions of the Royal Society of Edinburgh

Online Sources

Historical research in the twenty-first century is greatly facilitated by the ever-increasing volume of digital material available online. Invaluable at any time, this has been essential during the Covid-19 pandemic of 2020-22. Since most URLs are easily found by means of a search engine, only in exceptional cases have these been listed in the following bibliography. However, due acknowledgement is made of the following essential aids in particular:

> The online **Oxford Dictionary of National Biography** (ONDB) has been extensively used for background information on many of the dramatis personae. Only those entries that have specific references in the text have been included amongst the entries below.
>
> The **Biodiversity Heritage** Library (BHO) (https://www.biodiversitylibrary.org), **Google Books** (https://books.google.co.uk/) and **Project Gutenberg** (https://www.gutenberg.org) have, between them, provided convenient access to many texts from the nineteenth century and earlier.

A Selective Bibliography including all works cited

Anon. 'XXIV. On the Vitreous Tubes Found near to Drigg, in Cumberland.' *TGSL* s1, 2, (1814): 528–32.

Anon. [Barrow, John]. [Review of] "'Account of an Assemblage of Fossil Teeth and Bones of Elephant, Rhinoceros...," by William Buckland'. *QR* 27 (1822): 459–76.

Anon. 'Earl of Bridgewater.' *GM* 99, 1 (1829), 558-60.

Anon. 'Linnaean Society.' *LLGJBL* 733 (1831), 88.

Anon. [Brewster, David]. [Review of] 'Reflexions on the Decline of Science in England'. *QR* 43 (1830): 305–42.

Anon. [Broderip, William J.]. [Review of] 'Buckland's Bridgewater Treatise'. *Fraser's Magazine* 59, 1 (1859): 227–43.

Anon. [Broderip, William and G.P. Scrope]. [Review of] 'Geology Considered with Reference to Natural Theology. By the Rev Wm. Buckland…' *QR* 56 (1836): 31–64.

Anon. [Copleston, Edward]. [Review of] 'Reliquiae Diluvianae; or Observations on the Organic Remains... by William Buckland.' *QR* 29 (1823): 138–65.

Anon. [Fitton, William]. [Review of] 'Reliquiae Diluvianae; or Observations on the Organic Remains... by William Buckland.' *ER* 39 (1823): 196–234.

Anon. [Lyell, Charles]. [Review of] 'Memoir of the Geology of Central France by G. P. Scrope.' *QR* 36 (1827): 437–83.

Anon. *The Oxford and district gas company, 1818-1948*. Stroud: Walter King, 1949.

Agassiz, Louis. 'On Glaciers, and the Evidence of Their Once Having Existed in Scotland, Ireland and England.' *PGSL* 3 (1842): 327–32.

Allen, David Elliston. *The Naturalist in Britain: A Social History*. London: Allen Lane, 1976.

Annan, Noel G. *The Dons*. London: HarperCollins, 1999.

Austen, Jane. *Mansfield Park*. London: Pan Books, 1972.

Babbage, Charles. *Reflections on the Decline of Science in England and on Some of Its Causes.* Shannon: Irish University Press, 1971.

———. *The Ninth Bridgewater Treatise: A Fragment.* London: John Murray, 1837.

Barfoot, Peter, and John Wilkes, *The Universal British directory of trade, commerce, and manufacture...*, Volume 2. London: Champante and Whitrow, 1791-[8].

Barlow, Nora, ed. *The Autobiography of Charles Darwin, 1809-1882*. London: Collins, 1958.

Bate, David G. 'Sir Henry Thomas De La Beche and the Founding of the British Geological Survey'. *Mercian Geologist* 17 (2010): 149–65.

Beechey, F. W. *Narrative of a Voyage to the Pacific and Beering's Strait ... in the Years 1825, 26, 27, 28 ...,* Volume 1. London,: H. Colburn and R. Bentley, 1831.

Beilby, R., T. Bewick and S. Hodgson. *A General History of Quadrupeds*. Newcastle: Hodgson, Beilby and Bewick, 1790.

Bennett, G.V. 'Against the Tide: Oxford under William III.' In *The History of the University of Oxford, Volume 5: The Eighteenth Century*, edited by L.S. Sutherland and L. G. Mitchell, 31-60. Oxford: Clarendon Press, 1986.

Berger, J. F., and W. Conybeare. 'III. On the Geological Features of the North-Eastern Counties of Ireland.' *TGSL* s1, 3 (1816): 121–222.

Berkeley, Edmund and Dorothy Smith Berkeley. *George William Featherstonhaugh: The First U.S. Government Geologist.* Tuscaloosa & London: University of Alabama Press, 1988.

Bill, E.G.W. *Education at Christ Church, Oxford 1660-1800.* Oxford: Clarendon, 1987.

Bishop, T.J.H and Rupert Wilkinson. *Winchester and the Public School Elite: A Statistical Analysis*. London : Faber, 1967.

Bompas, George C. *Life of Frank Buckland.* London: Smith, Elder, and Company, 1885.

Boot, H.M. 'Real Incomes of the British Middle Class, 1760-1850: The Experience of Clerks at the East India Company.' *EHR* 52, 4 (1999): 638–68.

Bowler, Peter J. and Iwan R. Morus. *Making Modern Science: A Historical Survey*. Chicago: University of Chicago Press, 2005.

Bowley, Arthur L. *Wages in the United Kingdom in the Nineteenth Century*. Cambridge: Cambridge University Press, 1900.

Boylan, Patrick J. 'Dean William Buckland, 1784-1856. A Pioneer in Cave Science.' *Studies in Speleology* 1, 5 (1967): 237–53.

———. 'An Unpublished Portrait of Dean William Buckland, 1784-1856'. *JSBNH* 5, 5 (1970): 350–54.

———. 'William Buckland, 1784-1856: Scientific Institutions, Vertebrate Palaeontology and Quaternary Geology.' PhD thesis, 2 volumes, continuously paginated. University of Leicester, 1984.

———. 'William Buckland (1784–1856) and the Foundations of Taphonomy and Palaeoecology'. *ANH* 24 (1997): 361–72.

———. 'Lyell and the Dilemma of Quaternary Glaciation.' In *Lyell: The Past is the Key to the Present* edited by Derek J. Blundell and Andrew C. Scott, 145-59. London: GSL, 1998.

———. 'The Geological Society and Its Official Recognition, 1824–1828.' In *The Making of the Geological Society, London,* edited by C.L.E. Lewis and S.J. Knell, 319–30. London: GSL, 2009.

Brent, Richard. 'Whately, Richard (1787–1863).' In *ODNB*, 2004.

Bridie, Marion Ferguson. *The Story of Shute: The Bonvilles and Poles*. Axminster: Shute School, 1955.

Briggs, Asa. *The Age of Improvement. 1783-1867*. London: Longman, 1959.

British Association. *Report of the First and Second Meetings of the British Association for the Advancement of Science*. London: John Murray, 1835.

British Association. *Report of the Fourth Meeting of the British Association for the Advancement of Science.* London: John Murray, 1835.

Brock, W.H. 'The Selection of the Authors of the Bridgewater Treatises'. *NRRSL* 21 (1966): 162-79.

Brooke, John Hedley. 'The natural theology of the geologists: some theological strata.' In *Images of the Earth: Essays in the History of the Environmental Sciences*, edited by L.J Jordanova and Roy Porter, 39-64. Chalfont St. Giles: BSHS, 1979.

———. *Science and Religion: Some Historical Perspectives.* Cambridge University Press, 1991.

Brox, Jane. *Brilliant: The Evolution of Artificial Light.* London: Souvenir Press, 2012.

Buckland, Adelene. 'Losing the Plot: the Geological Anti-Narrative.' In *19: Interdisciplinary Studies in the Long Nineteenth Century* 11 (2010). doi: https://doi.org/10.16995/ntn.578.

———. *Novel Science: Fiction and the Invention of Nineteenth-Century Geology*. Chicago Ill. & London: University of Chicago Press, 2013.

———. 'The World Beneath Our Feet.' In *Time Travellers: Victorian Encounters with Time and History*, edited by Adelene Buckland and Sadiah Qureshi, 42-64. Chicago: University of Chicago press, 2020.

Buckland, Francis Trevelyan. *Curiosities of Natural History*. 2. London: MacMillan & Co., 1903.

———. 'Memoir of the Very Rev, William Buckland, D.D., F.R.S.' In *Geology and Mineralogy Considered with Reference to Natural Theology*, 3rd edition. London: Routledge, 1858.

———. 'Memoir of Gilbert White' in *Natural History and Antiquities of Selborne*. by Gilbert White, 311-24. London : Macmillan and Co., 1875.

Buckland, William. 'III. Description of an Insulated Group of Rocks of Slate and Greenstone in Cumberland and Westmoreland, on the East Side of Appleby, between Melmerby and Murton.' *TGSL* s1, 4 (1817): 105–16.

———. 'XXV. Description of the Paramoudra, a Singular Fossil Body That Is Found in the Chalk of the North of Ireland; with Some General Observations upon Flints in Chalk, Tending to Illustrate the History of Their Formation.' *TGSL* s1, 4 (1817): 413–23.

———. *Vindiciæ Geologicæ; or, the Connexion of geology with religion explained.* Oxford: University Press, 1820.

———. 'XXVIII. Description of the Quartz Rock of the Lickey Hill in Worcestershire, and of the Strata Immediately Surrounding It; with Considerations on the Evidences of a Recent Deluge …' *TGSL* s1, 5, (1821): 506–44.

———. 'Notice of a paper laid before the Geological Society on the Structure of the Alps and adjoining Parts of the Continent, and their Relation to the Secondary and Transition Rocks of England.' *AP* n.s., 1 (1821): 450-68.

———. 'XVI. Account of an Assemblage of Fossil Teeth and Bones of Elephant, Rhinoceros, Hippopotamus, Bear, Tiger, and Hyaena, and Sixteen Other Animals; Discovered in a Cave at Kirkdale, Yorkshire, in the Year 1821.' *PTRSL* 112 (1822): 171–236.

———. 'VIII. On the Excavation of Valleys by Diluvian Action, as Illustrated by a Succession of Valleys Which Intersect the South Coast of Dorset and Devon.' *TGSL* s2, 1 (1822): 95-102.

———. *Reliquiae Diluvianae or Observations on the Organic Remains contained in caves, fissures, and diluvial gravel, and on other geological phenomena, attesting the action of an universal deluge.* London: John Murray, 1823.

———. 'XXI. Notice on the Megalosaurus or Great Fossil Lizard of Stonesfield.' *TGSL* s2, 1 (1824): 390–96.

———. 'Professor Buckland's Reply to Some Observations in Dr Fleming's Remarks on the Distribution of British Animals.' *EPJ* 12 (1825): 304–19.

———. 'The Discovery of a Number of Fossil Bones of Bears in the Grotto d'Osselles.' *PGSL* 1, (1827): 21–22.

———. 'XII. On the Discovery of Coprolites, or Fossil Fæces, in the Lias at Lyme Regis, and in Other Formations.' *TGSL* s2, 3 (1829): 223-36.

———. 'On the Discovery of a New Species of Pterodactyle in the Lias at Lyme Regis.' *TGSL*, s2, 3 (1829): 217–22.

———. 'On the Occurrence of the Remains of Elephants, and Other Quadrupeds, in Cliffs of Frozen Mud, in Eschscholtz Bay, within Beering's Strait, and in Other Distant Parts of the Shore of the Arctic Seas.' In Beechey, F. W. *Narrative of a Voyage to the Pacific and Beering's Strait ... in the Years 1825, 26, 27, 28*, Volume 2: 331–56. London: Colburn and R. Bentley, 1831.

———. 'On the Vitality of Toads enclosed in Stone and Wood.' *ENPJ* 13 (1832): 26-32.

———. *Geology and Mineralogy Considered with Reference to Natural Theology*. London: William Pickering, 1836.

[———, and W. D. Conybeare]. 'A Critical Dissertation on "King Coal's Levee".' Appended to [John Scafe]. *A Geological Primer in Verse*, 45-68. London: Longman, 1820.

———, and W. D. Conybeare. 'XV. Observations on the South-Western Coal District of England.' *TGSL* s2, 1(1824): 210–316.

Bugg, George. *Scriptural Geology; or, Geological Phenomena Consistent Only with the Literal Interpretation of the Sacred Scriptures.* London: Hatchard, 1826.

Burgess, G. H. O. *The Curious World of Frank Buckland.* London: John Baker, 1967.

Burke, Edmund. *The Annual Register of World Events: A Review of the Year*. London: Longmans, &c. 1811.

Burnet, Thomas. *The Theory of the Earth: Containing an Account of the Original of the Earth, and of All the General Changes Which It Hath Already Undergone, Or Is to Undergo Till the Consummation of All Things ...* London: R. N[orton], 1697.

Cadbury, Deborah. *The Dinosaur Hunters: A Story of Scientific Rivalry and the Discovery of the Prehistoric World.* London: Fourth Estate, 2001.

Callaway, Ewen. 'Date with History: By Revamping Radiocarbon Dating, Tom Higham Is Painting a New Picture of Humans' Arrival in Europe.' *Nature* 485, 7396 (2012): 27–29.

Campbell, John. *The Lives of the Lord Chancellors and Keepers of the Great Seal of England: From the Earliest Times Till the Reign of King George IV*, Volume 2. London: J. Murray, 1846.

Cannon, W.F. 1970. 'Buckland, William.' In *Dictionary of Scientific Biography* Volume 1, edited by C.C. Gillespie, 566-572. New York: Charles Scribner's Sons, 1970.

Chadwick, Owen. *The Victorian Church, Part 1(1829-1859).* London: SCM Press, 1971.

Challinor, John, 'Some Correspondence of Thomas Webster, Geologist (1773–1844) – I.' *AS* 17, 3 (1961): 175-95.

Challinor, John, 'Some Correspondence of Thomas Webster, Geologist (1773–1844) – II.' *AS* 18, 3 (1962): 147-75.

Chalmers, Thomas. *The Evidence and Authority of the Christian Revelation*. Edinburgh: William Blackwood, 1816.

Chapman, Allan. *Caves, Coprolites and Catastrophes: The Story of Pioneering Geologist and Fossil-Hunter William Buckland*. London: SPCK, 2020.

Chapman, Geoffrey. *A History of Axminster to 1910*. Wilmington: Marwood Publications, 1998.

Charles-Edwards, Thomas, and Julian Reid. *Corpus Christi College, Oxford: A History*. Oxford: Oxford University Press, 2017.

Clark, John Willis and Thomas McKenny Hughes. *The Life and Letters of the Reverend Adam Sedgwick.* Cambridge: University Press, 1890.

Cleal, Christoper, Helen Fraser, and Maureen Lazarus. 'Sternberg's Missing Fossil Paintings.' *The Linnean* 28, (2012): 37–45.

Cobbett, William. *Rural Rides in the Counties of Surrey, Kent &c.* London: William Cobbett, 1830.

Cockburn, Sir William. *A Letter to Professor Buckland Concerning the Origin of the World*. London: Hatchard & Son, 1838.

Conybeare, John Josias. 'XXII. Memoranda Relative to the Porphyritic Veins, &c. of St. Agnes in Cornwall.' *TGSL* s1, 4 (1817): 401–3.

Conybeare, William Daniel. 'XV. On the Origin of a Remarkable Class of Organic Impressions Occurring in Nodules of Flint.' *TGSL* s1, 2 (1814): 328–35.

———. 'On the Hydrographical Basin of the Thames, with a View More Especially to Investigate the Causes Which Have Operated in the Formation of the Valleys of That River, and Its Tributary Streams.' *PM* 6 (1829): 61–65; also *PGSL* 1 (1834): 145-49.

———. 'Fragment of Autobiography.' In *Letters and Exercises of the Elizabethan Schoolmaster John Conybeare,* edited by F.C. Conybeare, 114-145. London: H. Frowde, 1905.

———, and William Phillips. *Outlines of the Geology of England and Wales*. London: Phillips, 1822.

Cornwell, John. *Newman's Unquiet Grave: The Reluctant Saint*. London: Bloomsbury Publishing, 2011.

Crawford, Mary Macdermot. *Madame de Lafayette and Her Family*. New York: James Pott, 1907.

Curthoys M.C. 'The Examination System.' In *The History of the University of Oxford. Volume 6, Nineteenth-Century Oxford. Pt. 1,* edited by M.G. Brock and M.C Curthoys, 339-374. Oxford: Clarendon Press, 1997.

Cuvier, Georges. *Essay on the Theory of the Earth,* Translated by Robert Kerr. Edinburgh: William Blackwood, 1817.

———. *Recherches Sur Les Ossemens Fossiles de Quadrupèdes.* Paris: Deterville, 1812.

Daubeny C.G.B. *Fugitive Poems Connected with Natural History and Physical Science*. Oxford and London: J. Parker, 1869.

Davies, G.L. Herries. *The Earth in Decay: A History of British Geomorphology, 1578-1878*. London: London: Macdonald Technical and Scientific, 1969.

Dawes, Margaret, and Nesta Selwyn. *Women Who Made Money: Women Partners in British Private Banks 1752-1906*. Trafford Publishing, 2010.

Dawkins, W. Boyd. Preface to *The Life and Correspondence of William Buckland,* by Mrs Gordon, v-xii. London: John Murray, 1894.

Dawson, Gowan. *Show Me the Bone: Reconstructing Prehistoric Monsters in Nineteenth-Century Britain and America.* Chicago: University of Chicago Press, 2016.

———, and J.R. Topham. 'Scientific, Medical, and Technical Periodicals in Nineteenth-Century Britain: New Formats for New Readers.' In *Science periodicals in nineteenth-century Britain: constructing scientific communities*, edited by Gowan Dawson, Bernard Lightman, Sally Shuttleworth, and Jonathan R. Topham, 35-64. Chicago: University of Chicago Press, 2020.

De La Beche, H. T. 'II. Remarks on the Geology of the South Coast of England, from Bridport Harbour, Dorset, to Babbacombe Bay, Devon.' *TGSL* s2, 1 (1822): 40-47.

Desmond, Adrian J. 'Designing the Dinosaur: Richard Owen's Response to Robert Edmond Grant'. *Isis* 70 (1979): 224–34.

Desmond, Adrian, and James R. Moore. *Darwin*. London: Penguin Books, 1992.

Dickens, Charles. *The Mudfog Papers.* Richmond: Alma Classics, 2014.

Duffin, Christopher J. 'William Buckland (1784–1856).' *Geology Today* 22 (2006): 104–8.

———. '"Records of Warfare…embalmed in the Everlasting Hills" : A History of Early Coprolite Research.' *Mercian Geologist* 17 (2009): 101-11.

Duncan, Henry. 'An Account of the Tracks and Footmarks of Animals Found Impressed in Sandstone in the Quarry of Corncockle Muir in Dumphriesshire.' *TRSE* 11 (1831): 194–209.

Eastmead, William. *Historia Rievallensis: Containing the History of Kirkby Moorside*. London: Baldwin, Chadock and Joy, 1824.

Edmonds, James Marmaduke. 'William Buckland (1784-1856).' *Nature* 178 (1956): 290–91.

———. 'Patronage and Privilege in Education: A Devon Boy Goes to School, 1798.' *TDAAS* 110 (1978): 95–111.

———. 'The Founding of the Oxford Readership in Geology, 1818.' *NRRSL* 34, 1 (1979): 33–51.

———. 'Vindiciae Geologicae, Published 1820; the Inaugural Lecture of William Buckland.' *ANH* 18, 2 (1991): 255–68.

———, and James Douglas. 'William Buckland, FRS (1784-1856) and an Oxford Geological Lecture, 1823.' *NRRSL* 30, 2 (1976): 141–67.

Elliott-Binns, Leonard Elliott. *Religion in the Victorian Era*. London : Lutterworth Press, 1964.

Engel, Arthur J. *From Clergyman to Don: The Rise of the Academic Profession in Nineteenth-Century Oxford*. Oxford: Clarendon Press, 1984.

Enys, John D. ed. *Correspondence Regarding the Appointment of the Writers of the Bridgewater Treatises between Davies Gilbert and Others.* Penryn: privately printed, 1877.

Faber, Sir Geoffrey. *Oxford Apostles: A Character Study of the Oxford Movement.* Harmondsworth: Penguin Books, 1954.

Falk, Bernard. *The Bridgewater Millions: A Candid Family History.* London: Hutchinson & Co, 1942.

Farey, John. 'Observations on the priority of Mr Smith's investigations of the strata of England,' *PM* 45 (1815): 333-444.

Firth, John D'E. *Winchester College.* London: Winchester Publications, 1949.

Fleming, John. 'Remarks Illustrative of the Influence of Society on the Distribution of British Animals.' *EPJ* 11 (1824): 287–305.

———. 'The Geological Deluge: As Interpreted by Baron Cuvier and Professor Buckland, Inconsistent with the Testimony of Moses and the Phenomena of Nature.' *EPJ* 14 (1826): 205–39.

Ford, Trevor D. 'White Watson (1760-1835) and His Geological Sections.' *PGA* 71 (1960): 349–63.

Foster, Joseph. *Alumni Oxonienses : The Members of the University of Oxford, 1500-1714* ... Oxford: Parker and Co., 1888.

Fowler, Thomas. *The History of Corpus Christi College: With Lists of Its Members*. Oxford: Oxford Historical Society, 1893.

Fox, Caroline. *Memories of Old Friends: Being Extracts from the Journals and Letters of Caroline Fox, of Penjerrick, Cornwall, from 1835 to 1871*. Edited by Horace N. Pym. London: Smith, Elder, 1882.

Franklin, Benjamin. *The Works of Benjamin Franklin,* Volume 6. London: Benjamin Franklin Stevens, 1882.

Garrod, Lawrence. 'Mervyn Henry Gordon. 1872-1953'. *Obituary Notices of Fellows of the Royal Society* 9, 1 (1954): 153–63. https://doi.org/10.1098/rsbm.1954.0011

Gathorne-Hardy, Jonathan. *The Public School Phenomenon, 597-1977*. London: Penguin Books, 1979.

Geikie, Archibald. *The Founders of Geology.* London: Macmillan & Co, 1897.

———. *Life of Sir Roderick I. Murchison: Based on His Journals and Letters.* London: J. Murray, 1875.

Geological Inquiries.' Appendix to *The Making of the Geological Society, London,* ed. C.L.E. Lewis and S.J. Knell, 449-56. London: GSL, 2009.

Gilbert, Davies. 'Statement Respecting the Legacy Left by the Late Earl of Bridgewater, for Rewarding the Authors of Works, to Be Published in Pursuance of His Will, and Demonstrative of the Divine Attributes, as Manifested in the Creation.' *PM* ser.2, 9 (1831): 200-202.

Gillespie, Neal C. 'Natural History, Natural Theology, and Social Order: John Ray and the "Newtonian Ideology".' *JHB* 20 (1987): 1-49.

Gillispie, C.C. *Genesis and Geology: A Study in the Relations of Scientific Thought, Natural Theology, and Social Opinion in Great Britain, 1790-1850*. New York: Harper & Row, 1959.

Girling, Richard. *The Man Who Ate the Zoo: Frank Buckland, Forgotten hero of natural history.* London: Chatto & Windus, 2016.

Gordon, Mrs [Elizabeth Oke]. *The Life and Correspondence of William Buckland, DD, FRS: Sometime Dean of Westminster &c.* London: John Murray, 1894.

Gould, Stephen Jay. *The Flamingo's Smile: Reflections in Natural History*. New York & London: Norton, 1985.

Haile, Neville. 'Buckland, William (1784–1856).' In *ODNB*, 2004.

Hall, Marie Boas. *All Scientists Now: The Royal Society in the Nineteenth Century.* Cambridge: University Press, 1984.

Herbert, Sandra. *Charles Darwin, Geologist*. Ithaca: Cornell University Press, 2005.

Herschel, John F.W. *A Preliminary Discourse on the Study of Natural Philosophy.* London: Longman, 1831.

Hewitt, Rachel. *Map of a Nation: A Biography of the Ordnance Survey*. London : Granta, 2010.

Hilton, Boyd. *The Age of Atonement: The Influence of Evangelicalism on Social and Economic Thought, 1785-1865.* Oxford: Clarendon Press, 1991.

Hobsbawm, Eric J. *The Age of Revolution: Europe 1789-1848*. London: Cardinal, 1973.

Hole, Charles *The Life of the Reverend and Venerable William Whitmarsh Phelps*. London: Hatchards, 1871.

Home, Everard. 'XXVIII. Some Account of the Fossil Remains of an Animal More Nearly Allied to Fishes Than Any of the Other Classes of Animals'. *PTRSL* 104 (1814): 571-7.

Home, Everard. 'XII. An Account of some fossil remains of the Rhinoceros, discovered by Mr. Whitby, in a cavern inclosed in the lime-stone rock, from which he is forming the Break water at Plymouth.' *PTRSL* 107 (1817): 176-182.

Home, Everard. 'XIII. An Account of the Fossil Skeleton of the Proteo-Saurus'. *PTRSL* 109 (1819): 209–11.

Howes, C.J. 'The Dillwyn Diaries 1817-1852, Buckland, and the Caves of Gower (South Wales).' *PUBSS* 18, 2 (1988): 298–305.

Howlett, E. A., W. J. Kennedy, H. P. Powell, and H. S. Torrens. 'New Light on the History of Megalosaurus, the Great Lizard of Stonesfield.' *ANH* 44, 1 (2017): 82-102.

Hunt, Robert. 'Buckland, William.' In *Dictionary of National Biography* Volume 7, edited by Leslie Stephen, 206-8. London: Smith Elder, 1886.

Hutton, James. 'Theory of the Earth; or an Investigation into the Laws Discernible in the Composition, Dissolution and Restoration of Land upon the Globe.' *TRSE* i (1788): 209–304.

Jacobi, R. M., and T. F. G. Higham. 'The "Red Lady" Ages Gracefully: New Ultrafiltration AMS Determinations from Paviland.' *JHE* 55 (2008): 898–907.

Jerdan, William. *Men I Have Known.* London: Routledge, 1866.

Kerr, Ian, and Thomas Gornall. *The Letters and Diaries of John Henry Newman,* Volume 1. Oxford: Clarendon Press, 1978.

Kidd, John. *Outlines of Mineralogy*. London: Longman, Hurst, Rees, & Orme, 1809.

———. *A Geological Essay on the Imperfect Evidence in Support of a Theory of the Earth*. University Press, 1815.

Klaver, J. M. I. *Geology and Religious Sentiment: The Effect of Geological Discoveries on English Society and Literature between 1829 and 1859.* Leiden: Brill, 1997.

Knell, Simon J. 'The Road to Smith: How the Geological Society Came to Possess English Geology.' In *The Making of the Geological Society, London,* edited by C.L.E. Lewis and S.J. Knell, 1-47. London: GSL, 2009.

Kölbl-Ebert, Martina. 'Mary Buckland (née Morland) 1797-1857.' *ESH* 16, 1 (1997): 33–38.

———. 'George Bellas Greenough's "Theory of the Earth" and Its Impact on the Early Geological Society'. In *The Making of the Geological Society, London,* edited by C.L.E. Lewis and S.J. Knell, 115-28. London: GSL, 2009.

Lartet, Édouard, Henry Christy, and T.R. Jones. *Reliquiae Aquitanicae : Being Contributions to the Archaeology and Palaeontology of Pèrigord and the Adjoining Provinces of Southern France*, part 2, Description of the plates. London: Williams and Norgate, 1875.

Laudan, Rachel. *From Mineralogy to Geology: The Foundations of a Science, 1650-1830.* Chicago: University of Chicago Press, 1987.

Lawson, John, and Harold Silver. *A Social History of Education in England*. London: Methuen, 1973.

Lewis, Cherry L.E. 'Doctoring geology: The medical origins of the Geological Society.' In *The Making of the Geological Society of London,* edited by C.L.E. Lewis and S.J. Knell, 49-92. London: GSL, 2009.

Lindberg, David C. *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, Prehistory to A.D. 1450* Chicago: University of Chicago Press, 2007.

Lyell, Charles. *Principles of Geology.* London: Penguin, 2005.

Lyell, Charles, and Roderick Impey Murchison. 'On the Excavation of Vallies, as Illustrated by the Volcanic Rocks of Central France.' *ENPJ* 7 (1829): 15–48; also *PGSL* 1 (1834): 89-91.

Lyell, Katharine, ed. *Life, Letters and Journals of Sir Charles Lyell, Bart.,* Volume 1. London: John Murray, 1881.

MacGregor, Arthur. 'The Ashmolean as a museum of natural history, 1683-1860.' *Journal of the History of Collections* 13 (2001): 125-44.

Magalotti, Lorenzo. *Travels of Cosmo the Third, Grand Duke of Tuscany, through England during the Reign of King Charles the Second (1669)*. London: J. Mawman, 1821.

Mantell, Gideon Algernon. *The Fossils of the South Downs: Or, Illustrations of the Geology of Sussex*. London: Lupton Relfe, 1822.

Marchini, Lucia. 'Review - Settlers: Genetics, Geography, and the Peopling of Britain.' *Current Archaeology* 340 (2018).

Martill, David M. 'Dimorphodon and the Reverend George Howman's Noctivagous Flying Dragon: The Earliest Restoration of a Pterosaur in Its Natural Habitat.' *PGA* 125 (2014): 120–30.

Mather, John. 'Well Sinker'. In *STRATA, William Smith's Geological Maps*, 222–29. London: Thames and Hudson, 2020.

McGowan, Christopher. *The Dragon Seekers: How an Extraordinary Circle of Fossilists Discovered the Dinosaurs and Paved the Way for Darwin.* Cambridge, Mass.: Perseus, 2001.

Meyrick, Samuel Rush. *The History and Antiquities of the County of Cardigan: Collected from the Few Remaining Documents Which Have Escaped the Destructive Ravages of Time, as Well as from Actual Observation*. London: Longman, 1808.

Miller, David Philip. 'The "Sobel Effect"'. *Metascience: An International Review Journal for the History, Philosophy and Social Studies of Science* 11 (2002): 185–200.

———. 'The Story of "*Scientist* : The Story of a Word"'. *AS* 74 (2017): 255–61.

Morrell, Jack, and Arnold Thackray, eds. *Gentlemen of Science: Early Years of the British Association for the Advancement of Science / Jack Morrell & Arnold Thackray.* Oxford: Clarendon Press, 1981.

———. *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science.* London: Royal Historical Society, 1984.

Murray, John (IV). *John Murray III, 1808-1892, a Brief Memoir.* London: J. Murray, 1919.

Musson, A.E. *Science and technology in the Industrial Revolution.* Manchester: Manchester University Press, 1969.

Naturalists' Pocket Magazine, Volume 7. London: Harrison & Co., 1802.

Newman, John Henry. *The Idea of a University : Defined and Illustrated*. London: Longmans, Green, 1886.

[Newman, J.H.] *Tract No. 1*, http://anglicanhistory.org/tracts/tract1.html.

Nolan, Frederick. *The Analogy of Revelation and Science Established in a Series of Lectures*. Oxford: J.H. Parker, 1833.

———. *The Time of the Millennium Investigated; and Its Nature Determined on Scriptural Grounds.* London: T. and W. Boone, 1831.

North, Frederick John. 'Dean Conybeare, Geologist.' *TCNS* 66 (1933): 15-68.

———. 'Verses about Buckland.' *Nature* 142 (1938):1040-41.

———. 'Paviland Cave, the "Red Lady", the Deluge, and William Buckland.' *AS* 5 (1942): 91–128.

North, Jean, Madge Moran and Joan Barton. *The Old Rectory, Whitchurch, Shropshire: The Story of a House, Its Occupants and Its Secret Wartime Eavesdroppers.* Woonton: Logaston Press, 2007.

Numbers, Ronald L., ed. *Galileo goes to jail.* Cambridge, MA: Harvard University Press, 2010.

O'Connor, Ralph. *The Earth on Show: Fossils and the Poetics of Popular Science, 1802-1856*. Chicago, Ill. & London: University of Chicago Press, 2007.

———. 'Hyena-hunting and Byron-bashing in the Old North: William Buckland, Geological Verse and the Radical Threat.' In *Uncommon Contexts: Encounters between Science and Literature, 1800-1914*, edited by Ben Marsden, Hazel Hutchison and Ralph O'Connor, 55-82. London: Pickering & Chatto, 2013.

Orr, Mary. 'Keeping It in the Family: The Extraordinary Case of Cuvier's Daughters.' In *The Role of Women in the History of Geology,* edited by C.V. Burek and B. Higgs, 277-86. London: GSL, 2007.

Osborne, Roger. *The Floating Egg: Episodes in the Making of Geology*. London: Jonathan Cape, 1998.

Ovenell, R.F. *The Ashmolean Museum 1683-1894*. Oxford: Clarendon Press, 1986.

Oxford University Calendar. University of Oxford, various years.

Page, Leroy Earl. 'The Rise of the Diluvial Theory in British Geological Thought.' PhD thesis, University of Oklahoma, 1963.

Paley, William. *Natural Theology: Or, Evidence of the Existence and Attributes of the Deity, Collected from the Appearances of Nature.* Oxford: Oxford University Press, 2006.

Parker, Charles Stuart. *Sir Robert Peel: From His Private Papers,* Volume 3. London: John Murray, 1899.

Parkinson, James. *Organic Remains of a Former World. An Examination of the Mineralized Remains of the Vegetables and Animals of the Antediluvian World; Generally Termed Extraneous Fossils,* Volume 3. London: Sherwood, Neely and Jones, 1811.

Pemberton, S. George, and Robert W. Frey. 'William Buckland and His "Coprolitic Vision".' *Ichnos* 1 (1991): 317–25.

Penn, Granville. *A Comparative Estimate of the Mineral and Mosaical Geologies, Revised, and Enlarged with Relation to the Latest Publications on Geology*. London: J. Duncan, 1825.

Plot, Robert. *The Natural History of Oxfordshire, Being an Essay towards the Natural History of England*. Oxford: The Theatre, 1677.

Porter, Roy. *The Making of Geology: Earth Science in Britain, 1660-1815*. Cambridge: Cambridge University Press, 1977.

Powell, Christopher. *William Daniel Conybeare (1787-1857): His Family and Axminster*. Llandaff: Christopher Powell, 2008.

———. *William Buckland (1784-1856): His Family and Axminster*. Sheffield: Christopher Powell, 2010.

Pulman, George Philip R. *The Book of the Axe*, London: Longman, 1854.

Qureshi, Sadiah. 'Looking to our Ancestors.' In *Time Travelers: Victorian Encounters with Time and History,* edited by Adelene Buckland and Sadiah Qureshi, 3-23. Chicago: University of Chicago Press, 2020.

Rands, Susan. 'William Buckland at Stinsford House.' *SDNQ,* 36 (2010): 393-4.

Reeve, A. 'Arnold, Thomas (1795–1842).' In *ODNB,* 2004.

Richardson, Reginald. *The Red Book; or, a Peep at the Peers!!...* London: John Cleave, 1841.

Rigaud, Stephen Peter, ed. *Miscellaneous Works and Correspondence of The Rev. James Bradley, DD, FRS*. Oxford: University Press, 1832.

Riper, A. Bowdoin Van. 'Ralph O'Conner, The Earth on Show (Review)'. *Confgurations*, (2010).

Roach, John. *Roach's London Pocket Pilot, or Stranger's Guide through the Metropolis.* London: J. Roach, 1796.

Roberts, David. *Paternalism in Early Victorian England*. London: Routledge, 2016.

Roberts, George. *The History and Antiquities of the Borough of Lyme Regis and Charmouth.* London: London, 1834.

Robinson, Andrew. 'Huntingford, George Isaac (1748–1832).' In *ONDB*, 2004.

Ross, Sydney. '*Scientist:* The Story of a Word,' *AS* 18, no. 2 (1962): 65–85.

Rubinstein, W.D. 'The End of "Old Corruption" in Britain 1780-1860.' *Past & Present* 101 (1983): 55-86.

Rudwick, Martin J.S. 'Poulett Scrope on the Volcanoes of Auvergne: Lyellian Time and Political Economy'. *BJHS* 7 (1974): 205–42.

———. 'Caricature as a Source for the History of Science: De La Beche's Anti-Lyellian Sketches of 1831.' *Isis* 66 (1975): 534-60.

———. 'The Emergence of a Visual Language for Geological Science 1760-1840.' *HS* 14 (1976): 149–95.

———. *The Great Devonian Controversy: The Shaping of Scientific Knowledge among Gentlemanly Specialists.* Chicago: University of Chicago Press, 1985.

———. *Scenes from Deep Time: Early Pictorial Representations of the Prehistoric World.* Chicago: University of Chicago Press, 1992.

———. 'Scrope, George Julius Poulett [Formerly George Julius Thomson] (1797–1876).' In *ODNB,* 2004.

———. *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution*. Chicago: University of Chicago Press, 2005.

———. *Worlds before Adam: The Reconstruction of Geohistory in the Age of Reform*. Chicago: University of Chicago Press, 2008.

———. 'Biblical Flood and geological deluge: the amicable dissociation of geology and Genesis.' In *Geology and Religion: A History of Harmony and Hostility*, edited by M. Kölbl-Ebert, 103-10. London, GSL, 2009.

Rupke, Nicolaas A. *The Great Chain of History: William Buckland and The English School of Geology (1814-1849).* Oxford: Clarendon Press, 1983.

———. 'C. C. Gillispie's Genesis and Geology'. *Isis* 85 (1994): 261–70.

———. 'Oxford's Scientific Awakening and the Role of Geology'. In *The History of the University of Oxford. Volume 6, Nineteenth-Century Oxford. Pt. 1,* edited by M.G. Brock and M.C Curthoys, 543-62. Oxford: Clarendon Press, 1997.

Ryder, R.D. 'Martin, Richard (1754–1834).' In *ODNB*, 2004.

Sabben-Clare, J. P. *Winchester College : After 600 Years, 1382-1982*. Southampton: Paul Cave, 1981.

Sampson, Mike. *A History Of Blundell's School*. Tiverton: Blundell's School, 2011.

Sarjeant, William A.S., and Justin B. Delair. 'An Irish Naturalist in Cuvier's Laboratory. The Letters of Joseph Pentland 1820-1832.' *BBM(NH)* (hist. ser.) 6, 7 (1980): 245–319.

Scafe, John. *King Coal's Levee: Or Geological Etiquette, with Explanatory Notes, to Which Is Added The Council of the Metals*. J. Graham, 1819.

———. *A Geological Primer in Verse: With A Poetical Geognosy, … To Which Is Added a Critical Dissertation on 'King Coal's Levee,' Addressed to the Professors and Students of the University of Oxford.*. London: Longman, etc., 1820.

Scott-Fox, Charles. *Bickham House and the Short(e) Family: The History of a Devon Country House and the Family Who Built It.* C. Scott-Fox, 2006.

Scrope, George Poulett. *Considerations on Volcanos, the Probable Causes of Their Phenomena, the Laws Which Determine Their March, the Disposition of Their Products, and Their Connexion with the Present State and Past History of the Globe: Leading to the Establishment of a New Theory of the Earth*. London: Phillips, 1825.

———. *Memoir on the Geology of Central France: Including the Volcanic Formations of Auvergne, the Velay, and the Vivarsais*. London: Longman, 1827.

Secord, James A. *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation.* Chicago: University of Chicago Press, 2003.

———. *Visions of Science: Books and Readers at the Dawn of the Victorian Age.* Chicago: University of Chicago Press, 2014.

Sedgwick, Adam. 'Address to the Geological Society, Delivered on the Evening of 18th of February 1831.' *PM* 9 (1831): 287-317; also in *PGSL* 1 (1834): 281–316.

———. 'On the Origins of Alluvial and Diluvial Formations.' *AP* (new series) 9 (1825): 247–57.

———. 'On Diluvial Formations.' *AP* (new series) 10 (1825): 18–37.

Serres, Marcel de. 'Note on the Bone-Caves of Lunel-Viel, Herault.' *QJGS* 18, 1–2 (1862): 1-3.

Shadwell, Lionel L. *Enactments in Parliament : Specially Concerning the Universities of Oxford and Cambridge, the Colleges and Halls Therein and the Colleges of Winchester, Eton & Westminster*. Volume II. Oxford: Clarendon Press, 1912.

Sharpe, Tom. *The Fossil Woman: a life of Mary Anning*. Wimborne Minster: The Dovecote Press, 2020.

———. 'A Case of Mistaken Identity: Is Mary Anning (1799-1847) Actually William Buckland (1784-1856)?' *ESH* 40 (2021): 68–83.

———. 'Henry De La Beche's 1829-1830 Lithograph, Duria Antiquior.' *ESH* 41 (2022), 47-63.

———. and P.J. McCartney. *The Papers of H.T. De La Beche (1796-1855) in the National Museum of Wales.* Cardiff: National Museums & Galleries of Wales, 1998.

Shaw, George. *General Zoology, or Systematic Natural History*. Volumes 1 & 2 (of 14) London: G. Kearsley, 1800-1801.

Shortland, Michael, and Richard Yeo. *Telling Lives in Science: Essays on Scientific Biography*. Cambridge: Cambridge University Press, 1996.

Simcock, A.V. *The Ashmolean Museum and Oxford Science, 1683-1983*. Oxford: Museum of the History of Science, 1984.

Sollas, William Johnson. *The Age of the Earth and Other Geological Studies*. London : Fisher Unwin, 1905.

Sommer, Marianne. "'An Amusing Account of a Cave in Wales": William Buckland (1784–1856) and the Red Lady of Paviland.' *The British Journal for the History of Science* 37, 1 (2004): 53–74.

———. *Bones and Ochre: The Curious Afterlife of the Red Lady of Paviland.* Cambridge, Mass. & London: Harvard University Press, 2007.

Sowerby, James. *The Mineral Conchology of Great Britain,* Volume. 2. London: J. Sowerby, 1818.

Stevens, Charles, and Christopher Stray. *Winchester Notions: The English Dialect of Winchester College*. London: Athlone, 1998.

Stillingfleet, Edward. *Origines Sacræ: Or, A Rational Account of the Grounds of Natural and Revealed Religion.* Oxford: Clarendon Press, 1817.

Sumner, John Bird. *A treatise on the records of the creation, and on the moral attributes of the Creator.* London: Hatchard, 1816.

Sutherland, L.S. 'The Curriculum.' In *The History of the University of Oxford, Volume 5: The Eighteenth Century*, edited by L.S. Sutherland and L.G. Mitchell, 469-493. Oxford: Clarendon Press, 1986.

Szrajber, Tanya. 'Marcel De Serres: Documents on Early Lithography.' *PQ* 17, 2 (2000): 123–32.

Taquet, Philippe. 'Cuvier's Attitude toward Creation and the Biblical Flood.' In *Geology and Religion: A History of Harmony and Hostility*, edited by M. Kölbl-Ebert, 127-134. London, GSL, 2009.

Taylor, Michael A., and Hugh S. Torrens. 'An Anonymous Account of Mary Anning (1799–1847), Fossil Collector of Lyme Regis, England, Published in Chambers's Journal in 1857, and Its Attribution to Frank Buckland (1826–1880), George Roberts (c.1804–1860) and William Buckland (1784–1856)'. *ANH* 41 (2014): 309–25.

Thackray, John C. ed. *To See The Fellows Fight*. Norwich: BSHS, 1999.

Thomas, Joan. *Curiosity*. Toronto: McClelland & Stewart Ltd, 2010.

Thompson, F.M.L. English Landed Society in the Nineteenth Century. London: Routledge & Kegan Paul, 1963.

———. 'Grenville, Richard Temple-Nugent-Brydges-Chandos-, First Duke of Buckingham and Chandos (1776–1839).' In *ODNB*, 2004.

Thorne, R. G. ed., *The House of Commons, 1790-1820*. London : Secker & Warburg, 1986. https://www.historyofparliamentonline.org/research/members/members-1790-1820.

Topham, Jonathan. "'An Infinite Variety of Arguments": The *Bridgewater Treatises* and British Natural Theology in the 1830s'. PhD Thesis, University of Lancaster, 1993.

Torrens, Hugh S. 'Mary Anning (1799-1847) of Lyme; "The Greatest Fossilist the World Ever Knew".' *The British Journal for the History of Science* 28 (1995): 257–84.

———. 'Geology in peace time: An English Visit to Study German Mineralogy and Geology (and Visit Goethe, Werner and Raumer) in 1816.' *Algorismus* 23 (1998): 147–75.

———. 'Buckland [née Morland], Mary (1797–1857).' In *ODNB,* 2004.

———. 'Scafe, John (1776–1843).' In *ODNB*, 2004.

Tuckwell, W. *Reminiscences of Oxford*. London: Cassell, 1901.

Turner, G.L'E. 'The Physical Sciences.' In *The History of the University of Oxford, Volume 5: The Eighteenth Century*, edited by L.S. Sutherland and L.G. Mitchell, 659-682. Oxford: Clarendon Press, 1986.

Vai, Gian Battista, and William Cavazza. *Four centuries of the word geology: Ulisse Aldrovandi 1603 in Bologna*. Bologna: Minerva, 2003.

Venn, John, and J. A. Venn. *Alumni Cantabrigienses : A Biographical List of All Known Students, Graduates and Holders of Office at the University of Cambridge, from the Earliest Times to 1900*. Cambridge: Cambridge University Press, 1922-1954, 1922.

Walpole, Spencer. 'Frank Buckland.' *Macmillan's Magazine* 43 (1881): 303-66.

Walters, S.M. and E.A. Stow. *Darwin's Mentor: John Stevens Henslow, 1796-1861* Cambridge: Cambridge University Press, 2001.

Ward, W. R. *Victorian Oxford*. London: Cass, 1965.

Warne, Arthur. *Church and Society in Eighteenth-Century Devon*. Newton Abbot: David & Charles, 1969.

Warren, John. *Sermons upon Several Subjects, Preached in the Cathedral Church of St. Peter in Exeter. To Which Is Prefixed an Account of the Author* . London: 1739.

Watson, White. *A Delineation of the Strata of Derbyshire, Forming the Surface from Bolsover in the East to Buxton in the West*… Sheffield: W. Todd, 1811.

Webster, C. 'The Medical Faculty and the Physic Garden.' In *The History of the University of Oxford, Volume 5: The Eighteenth Century*, edited by L.S. Sutherland and L.G. Mitchell, 683-724. Oxford: Clarendon Press, 1986.

Webster, Thomas. 'Reply to Dr Fitton's Paper.'*AP* n.s. 9 (1825), 33-51.

Weston, Russell. 'John Traherne, FSA and William Buckland's 'Red Lady': an archaeological perspective.' *The Antiquaries Journal* 88 (2008): 347-64.

Whiston, William. *A New Theory of the Earth, from Its Original, to the Consummation of All Things: Wherein the Creation of the World in Six Days, the Universal Deluge, and the General Conflagration, as Laid Down in the Holy Scriptures, Are Shewn to Be Perfectly Agreeable to Reason and Philosophy. With a Large Introduction Concerning the Genuine Nature, Style and Extent of the Mosaick History of the Creation*. London: J. Whiston and B. White, 1755.

Whitehouse, Elizabeth. 'The Morlands of Sheepstead House, Marcham.' *The Coral Rag: Marcham Society Journal* 9 (2012): 1–11.

Williams, L. Pearce. 'The Royal Society and the Founding of the British Association for the Advancement of Science.' *NRRSL* 16 (1961): 221–33.

Wilson, Leonard G. *Charles Lyell, The Years to 1841: The Revolution in Geology* [Vol.1]. New Haven and London: Yale University Press, 1972.

Winchester College : A Guide. Winchester : Winchester College, 1963.

Winchester, Simon. *The Map That Changed the World: A Tale of Rocks, Ruin and Redemption.* London: Penguin, 2002.

Woodward, Ernest Llewellyn. *The Age of Reform, 1815-1870*. Oxford: Clarendon Press, 1962.

Woodward, Horace B. *The History of the Geological Society of London*. London: Geological Society, 1907.

Wulf, Andrea. *The Invention of Nature: The Adventures of Alexander von Humboldt, the Lost Hero of Science.* London: Hodder & Stoughton, 2015.

Wyatt, John. *Wordsworth and the Geologists*. Cambridge: Cambridge University Press, 1995.

Yeomans, Russell. 'Paramoudra: Observations on Large Flint Structures from the Chalk (Upper Cretaceous) and Flint Formation'. *PYGS*, 2018.

Young, George, and John Bird. *A Geological Survey of the Yorkshire Coast.* Whitby: G. Clark, 1822.

Ziegler, Philip. *Addington; a Life of Henry Addington, First Viscount Sidmouth.* London: Collins, 1965.