# William Buckland

William Buckland was one of the greatest geologists of his time; a man of great energy, he was the University's first Reader in Geology. This article gives an overview of his life and work, including an account of his description of *Megalosaurus*, the first named dinosaur.

William Buckland, 1832
The hyaena skull in his hands is currently on display in the Museum.

## Child and student 1784-1808

The Axminster coat-of-arms

William Buckland was born in Axminster, Devon, on 12 March 1784, the eldest son of Charles Buckland, Rector of Templeton and Trusham, and his wife Elizabeth. "The first cause of Dr. Buckland's attention to fossil organic remains was the fact, that near his birthplace at Axminster were large quarries of lias, abounding in fossil organic remains. His father ... took great interest in the improvement of roads, &c., and was accustomed to take his son with him on his walks; from the above-mentioned quarries both father and son collected Ammonites, and other shells, which thus became familiar to the lad from his infancy." [1]

At first Buckland was educated at home under his father's instruction, and at Axminster School, but in 1797 he entered Blundell's school in Tiverton, in order to receive a better preparation for university entrance. A year later he moved to St Mary's College, Winchester, where he progressed well enough through the narrow formal education, continuing to develop his interest in natural history in his spare time. In 1801, with the help of some coaching from his uncle, he won a scholarship to Corpus Christi College, Oxford, and thus began his Oxford career.

He obtained his BA degree in 1804 and continued in residence, supporting himself on his scholarship and by taking pupils. Buckland's early friendship with William Broderip, who came up to Oxford in 1807, was described thus by their contemporary, Roderick Murchison: "The study of the collection made by his juvenile companion ... first awakened the dormant talent of Buckland ... So strongly did Buckland feel in after years the deep obligations he was under to young Broderip, that I have myself heard him speak of the latter as his 'tutor in Geology'." [2]

Corpus Christi College, Oxford

Although he never neglected his formal studies, Buckland also found time to enlarge his scientific knowledge, attending the lectures of John Kidd on mineralogy and chemistry and those of Christopher Pegge on anatomy. During the vacations he searched for the field evidence which was then being brought together in order to establish the geological succession of strata in England. In 1808 he obtained his MA degree and was made a Fellow of his college; he was ordained priest the same year.

*What is 'Learning more'?*

'Learning more' presents a series of articles about the Museum and its collections. It is designed for older students, teachers, researchers, and anyone who wants to find out more about particular aspects of the Museum's work and its history.

This article gives an account of the life and work of William Buckland, the geologist, cleric and eccentric.

## The charismatic lecturer 1809-1818

From 1808 to 1812 Buckland made frequent geological excursions on horseback to various parts of England, Scotland, Ireland and Wales. "He rode a favourite old black mare, who was frequently caparisoned all over with heavy bags of fossils and ponderous hammers. The old mare soon learnt her duty, and seemed to take interest in her master's pursuits; for she would remain quiet without anyone to hold her, while he was examining sections and strata, and then patiently submit to be loaded with interesting but weighty specimens. Ultimately she became so accustomed to her work, that she eventually came to a full stop at a stone quarry, and nothing would persuade her to proceed until the rider had got off and examined (or, if a stranger to her, pretended to examine) the quarry." [3]

One of Buckland's geological lectures, 1823

In 1813 Kidd resigned as Reader of Mineralogy, and Buckland was appointed his successor, taking up residence on the ground floor of the Old Ashmolean building in Broad Street (now the Museum of the History of Science). From the outset, Buckland sought to introduce increasing amounts of geology and palaeontology into his lectures, which were always well-attended, not only by students but also by senior members of the university. By all accounts, the lectures were very lively events, with liberal use of specimens, and of large-scale geological maps and diagrams.

The Old Ashmolean Building

Buckland's own colourful personality also contributed to the popularising of his lectures. Henry Acland, as a student, attended Buckland's lectures and described his lecturing style thus: "He paced like a Franciscan preacher up and down behind a long showcase ... He had in his hand a huge hyaena's skull. He suddenly dashed down the steps - rushed skull in hand at the first undergraduate on the front bench and shouted 'What rules the world?' The youth, terrified, threw himself against the next back seat, and answered not a word. He rushed then on to me, pointing the hyaena full in my face - 'What rules the world?' 'Haven't an idea', I said. 'The stomach, sir', he cried (again mounting the rostrum) 'rules the world. The great ones eat the less, the less the lesser still.'" [4]

Buckland also had responsibilities in the museum on the upper floor of the Ashmolean, as he himself explained, "being [unofficial] Curator of the Collection and shewman of it, or private lecturer to every stranger, foreign or domestic, that comes to Oxford ... I have also to shew hospitality to such strangers and to hold constant correspondence and exchanging of specimens with foreigners of all countrys ... also to give private instruction to young men travelling abroad, or relating to their own property at home." [5] At the same time, he was continually adding to his own large collection of rocks, minerals and fossils, which he kept in his rooms in Corpus.

In 1816 Buckland began his European tours, which would eventually take him to Germany, Poland, Austria, Italy, Switzerland and France. In the course of his travels, he brought to the museum large and valuable collections, and to the geologists of England observations of phenomena then little known to them. He also became acquainted with other European scientists. In 1818 Georges Cuvier visited him in Oxford and was shown a collection of enormous bones from Stonesfield. These bones were later recognised as those of the dinosaur *Megalosaurus*, and would form the basis of one for the most important scientific papers of Buckland's career.

A field trip to Shotover

## Reader in Geology 1819-1824

In 1818 Buckland persuaded the Prince Regent to endow a second Readership, this time in Geology, which he could hold in addition to his mineralogical appointment. He delivered his inaugural address on 15 May 1819; it was subsequently published in 1820 under the title of *Vindiciae Geologiae; or the Connexion of Geology with Religion explained*. The aim of the lecture was to justify the inclusion of the new science of geology alongside the established studies of the University, but the compatibility of geological evidence with biblical accounts of Creation and the Noachian Flood was also addressed. Buckland set out the facts as he saw them, noting clear evidence for a universal deluge, and introducing the hypothesis that the word "beginning" as used in Genesis expressed an undefined period of time between the origin of the earth and the creation of its current inhabitants, a period during which a long series of revolutions had occurred with successive creations of new plant and animal groups.

The Noachian Flood

For the next few years, Buckland was busy developing his understanding of the supposed deluge, as seen in his 1822 account of the fossil bones (elephant, rhinoceros, hippopotamus, horse, ox, deer, hyaena, tiger, bear, wolf, fox, rodents and birds) found at Kirkdale Cave in Yorkshire. Until this time, it was commonly assumed that such remains were testimony to animals that had perished in the Flood and been carried from their original homes in the tropics by the surging waters. To Buckland, however, the great quantity of hyaena remains and the splintered state of all the bones pointed to a quite different conclusion - that the cave had actually been inhabited by hyaenas in antediluvian times, the effect of the Flood being no more than to cover bones already present with a layer of mud.

Buckland enters Kirkdale Cave

By 1823 the account had been expanded into a full-scale treatise on Buckland's cavern research, *Reliquiae Diluvianae*, or, *Observations on the Organic Remains attesting the Action of a Universal Deluge*, in which he argued that the remains of animals found in caves provide clues as to the inhabitants and character of the earth before the Great Flood recorded in Genesis. The book sold rapidly, and recognition of Buckland's achievement was widespread.

Despite his success, financial remuneration for Buckland's work remained modest and, for the moment, he continued to live in college. Roderick Murchison thus describes a visit paid to Buckland's rooms in the winter of 1824-5: "On repairing from the Star Inn to Buckland's domicile in Corpus Christi College, I can never forget the scene which awaited me. 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 the one only rickety chair not covered with fossils, and cleaning out a fossil bone from the matrix." [6]

Paviland Cave, South Wales

In 1824 Buckland became President of the Geological Society, and it was at his first meeting in this office that he finally announced the discovery at Stonesfield of the bones of a giant reptile, which he named *Megalosaurus*, or "great lizard", on account of its vast size. The paper was published later that year, and forms the first full account of what would later be called a dinosaur. The bones Buckland studied are now on display in the Museum.

Gailenreuth Cave, Germany

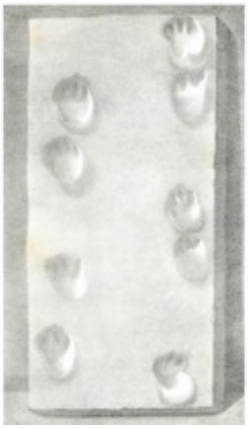
## Canon of Christ Church 1825-1836

Christ Church, Oxford

In 1825 Buckland resigned his college fellowship and accepted the living of Stoke Charity in Hampshire. However, he failed to take up the appointment, for a few months later he was made a Canon of Christ Church, then one of the richest governmental rewards for academic distinction. In December he married Mary Morland of Abingdon, Oxfordshire. Though only 28 at the time, Mary was already an accomplished draughtswoman and collector of fossils, and had contributed illustrations to the works of both William Conybeare and George Cuvier. Their shared passion for geology is evident in their honeymoon tour, which lasted a year and included visits to many famous geologists and geological locations in France, Germany, Austria, Switzerland, Italy and Sicily.

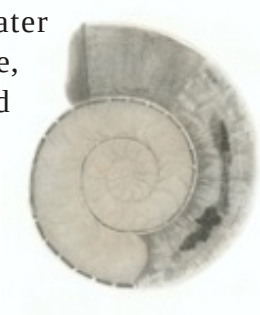
Buckland and his wife had a large family - nine children, five of whom survived to adulthood. The eldest son, Frank, gives the following account of his mother and her contribution to Buckland's work: "Not only was she a pious, amiable, and excellent helpmate to my father; but being naturally endowed with great mental powers, habits of perseverance and order, tempered by excellent judgement, she materially assisted her husband in his literary labours, and often gave to them a polish which added not a little to their merit ... Not only with her pen did she render material assistance, but her natural talent in the use of her pencil enabled her to give accurate illustrations and finished drawings ... She was also particularly clever and neat in mending broken fossils ... It was her occupation also to label the specimens." [7]

It was also in this period of Buckland's life "that a slab of sandstone with ... footmarks was sent him to decipher. He was greatly puzzled; but at last, one night, or rather between two and three in the morning, when, according to his wont, he was busy writing, it suddenly occurred to him that these impressions were those of a species of tortoise. He therefore called his wife to come down to 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." [8]



Fossil footprints

Buckland continued to give his annual courses of lectures in geology and mineralogy, but his working environment was about to change. Until this point the Ashmolean's laboratory and lecture rooms had fulfilled the University's requirements in the teaching of natural sciences, but the explosive development of these disciplines in the early decades of the nineteenth century led rapidly to a need for new and greatly expanded facilities in this field. Between 1830 and 1832 the geological and mineralogical collections, together with their professor, were progressively removed from the Ashmolean to more spacious quarters in the adjacent Clarendon building.



Ammonite, from *Geology and Mineralogy*, 1836

In 1836 Buckland's Bridgewater Treatise made its appearance, after nearly five years of hard work. The series was intended to prove "the Power, Wisdom, and Goodness of God as manifested in the Creation" and Buckland's contribution, *Geology and Mineralogy*, covered similar ground to his *Vindiciae Geologiae* of 1820. It was, however, much larger, forming a compendium of geological and palaeontological science to date, enriched by numerous reflections of a highly philosophic character.

## The scientific celebrity 1837-1844

By 1837, Buckland had attained a high position in the scientific world beyond Oxford. The Royal Society, the British Association and the Geological Society all provided him with a forum, and he was prominent in support of agricultural, civil engineering and archaeological societies. He lectured, entertained and travelled widely, and his friendship with the Tory prime minister Robert Peel gave him access to a wide and influential circle. With Adam Sedgwick and Charles Lyell, he prepared the report that resulted in the formation of the Geological Survey of Great Britain, and he also helped towards the establishment of the School of Mines and the Mining Records Office.

William Buckland, circa 1843

Around this time, Buckland at last discovered a new explanation for some of the geological phenomena which he had previously attributed to the Great Flood. In 1838 he travelled to Switzerland to meet Louis Agassiz and to examine for himself the polished and striated rocks and transported material that Agassiz had attributed to the agency of ancient glaciers. Although sceptical at first, Buckland soon found the evidence overwhelming and became an enthusiastic convert to the theory. Moreover, he began to recognise direct parallels between the glacial phenomena of Switzerland and similar phenomena he had observed in Scotland, Wales and northern England.

Rock scratched by a glacier

In 1840, Agassiz came to Britain for the Glasgow meeting of the British Association, at which he described the action of glaciers and the deposits associated with them, before accompanying Buckland on an extended tour to examine the evidence for former glaciation in Scotland. They returned to London to present their findings to the Geological Society, of which Buckland was again President. Despite the powerful arguments put forward by the two men, the response from the Society was almost uniformly hostile. Nevertheless, Buckland was satisfied that he had found the true origin of many of the surface deposits covering Britain.

Louis Agassiz

Needless to say, Buckland's growing family continued to play a large part in his life, as described by his daughter Elizabeth: "Buckland was a kind and affectionate father, and always liked to have his children about him ... The young people were always presented to the numerous learned foreigners and illustrious travellers who came to Oxford to see the Professor's world-famed collection of fossils and bones at the Clarendon; and at dessert in the evening they were told, shortly and graphically, what these great men were famous for." [9]

At the same time, Buckland's eccentricities seemed to be becoming increasingly pronounced. He used to say that he had eaten his way straight through the animal kingdom, and guests attest to the many curious delicacies served at his table - John Ruskin, for example, always regretted a day of unlucky engagement on which he missed a delicate toast of mice. At times, however, this propensity seemed to get a little out of hand, as related by the famous raconteur Augustus Hare: "Talk of strange relics led to mention of the heart of a French King preserved at Nuneham in a silver casket. Dr. Buckland, whilst looking at it, exclaimed, 'I have eaten many strange things, but have never eaten the heart of a king before,' and, before anyone could hinder him, he had gobbled it up, and the precious relic was lost for ever." [10]

Costume of the Glaciers, 1841

## Dean of Westminster 1845-1856

In 1845, much to his surprise, Buckland was appointed Dean of Westminster on the recommendation of his friend Robert Peel. He immediately instigated repairs to the abbey and the school. He was also determined to make the school an effective modern educational institution. "Rising soon after seven, he worked on incessantly till two and three o'clock the next morning, allowing himself scarcely any time for meals and still less for recreation; ... notwithstanding his important occupations, he still found time to travel to and fro from Oxford, to lecture on his favourite science." [11]

William Buckland, circa 1845

Westminster Abbey

Despite his continuing passion for geology, Buckland seems to have lost heart in the battle to establish it as a formal part of the university curriculum, for in 1847 he refused to add his signature to a document, prepared by some of his scientific colleagues, asking for a building to house the natural science teaching collections and provide the necessary accommodation and laboratory facilities for the scientific professors. His reasons for his refusal to sign were rather an expression of despair than of lack of regard: "Some years ago I was sanguine, as you are now, as to the possibility of Natural History making some progress in Oxford, but I have long come to the conclusion that it is utterly hopeless." [12]

With Buckland's appointment as Dean of Westminster came the living of Islip, a village seven miles from Oxford. Here Buckland laid out allotments for the labourers, conducted agricultural experiments, fitted up a recreation room for the village lads, started a night school, and preached earnest, practical sermons, thoroughly adapted to the needs of his rural congregation. Meanwhile, in the village school, "Mrs. Buckland ... gave the boys instruction on geography and the use of the globes, which she had made out of paper and inflated, showing them at the same time ... the homes of foreign products, and supplying specimens of the sugarcane, the tea tree, and other articles of daily use." [13]

Professor Buckwheat

Sillouette of Mary Buckland

Towards the end of 1849, Buckland contracted a debilitating illness characterised by apathy and depression. His doctors recommended the quiet and fresh air of Islip, and the sight of the garden and his favourite allotments seemed to cheer him for a time, but his symptoms continued to worsen. He lingered on in a poor state for a further seven years, finally dying on 14 August 1856. It was only when the grave-digger came to excavate the reserved plot in the local graveyard that Buckland's final geological jest was revealed, since the chosen spot was, as he must have known, on an outcrop of solid Jurassic limestone just a few inches below the ground. In the end explosives had to be used to excavate the grave, inevitably reminding all who heard about it of Richard Whatley's Elegy intended for Professor Buckland, written in 1820:

Old Rectory, Islip

*Where shall we our great*
*Professor inter*
*That in peace may rest his bones?*
*If we hew him a rocky sepulchre*
*He'll rise and break the stones*
*And examine each stratum that*
*lies around*
*For he's quite in his element*
*underground.*

## *References*

[1] Buckland, F.T. 1858. Memoir of the Very Rev. William Buckland, D.D., F.R.S., Dean of Westminster. XIX-LXX. In Buckland, W. 1858. *Geology and Mineralogy considered with reference to Natural Theology*, 3rd edition, edited by F.T. Buckland. George Routledge & Co., London, LXXXIII + 552 pp.

[2] Buckland, F.T. 1858. As above.

[3] Buckland, F.T. 1858. As above.

[4] Gordon, Mrs [E.O.]. 1894. *The life and correspondence of William Buckland, D.D., F.R.S., sometime Dean of Westminster, twice president of the Geological Society, and first president of the British Association*. John Murray, London, XVI + 288 pp.

[5] Edmonds, J.M. 1979. The Founding of the Oxford Readership in Geology, 1818. *Notes Rec. R. Soc. Lond.*, 34, 33-51.

[6] Geikie, A. 1875. *Life of Sir Roderick I. Murchison, BART., K.C.B., F.R.S., sometime director-general of the Geological Survey of the United Kingdom, based on his journals and letters with notices of the scientific contemporaries and a sketch of the rise and growth of palaeozoic geology in Britain*. John Murray, London, 2 vols.

[7] Buckland, F.T. 1858. As above.

[8] Gordon, Mrs [E.O.]. 1894. As above.

[9] Gordon, Mrs [E.O.]. 1894. As above.

[10] Hare, A. 1952. *The story of my life*. Vol. 5. George Allen, London, XIX + 470 pp, 6 pls.

[11] Buckland, F.T. 1858. As above.

[12] Edmonds, J.M. 1956. William Buckland (1784-1856). *Nature*, 178, 290-291.

[13] Gordon, Mrs [E.O.]. 1894. As above.

## *Further reading*

Boylan, P.J. 1978. The Role of William Buckland (1784-1856) in the Recognition of Glaciation in the British Isles. *Zusamm. VIII Symposium INHIGEO Munster 12-24 Sept.* 1978, 33.

Boylan, P.J. 1997. William Buckland (1784-1856) and the foundations of taphonomy and palaeoecology. *Archs Nat. Hist.*, 24 (3), 361-372.

Cannon, W.F. 1970. Buckland, William. pp. 566-572. In Gillespie, C.C. (ed.). *Dictionary of Scientific Biography*. Vol. 1. Charles Scribner's Sons, New York, 620 pp.

Delair, J.B. and Sarjeant, W.A.S. 1975. The Earliest Discoverers of Dinosaurs. *Isis*, 66 (231), 5-25.

Edmonds, J.M. 1956. William Buckland (1784-1856). *Nature*, 178, 290-291.

Edmonds, J.M. 1978. Patronage and Privilege in Education: A Devon Boy Goes to School, 1798. Rep. *Trans. Devon. Ass. Advmt. Sci.*, III, 95-111.

Edmonds, J.M. 1979. The Founding of the Oxford Readership in Geology, 1818. *Notes Rec. R. Soc. Lond.*, 34, 33-51.

Edmonds, J.M. 1991. Vindiciae Geologicae, published 1820; the inaugural lecture of William Buckland. *Archs Nat. Hist.*, 18 (2), 255-268.

Edmonds, J.M. and Douglas, J.A. 1976. William Buckland, F.R.S. (1784-1856) and an Oxford Lecture, 1823. *Notes Rec. R. Soc. Lond.*, 30 (3), 141-167.

Hunt, R. 1908. Buckland, William (1784-1856). pp. 206-208. In Stephen, L. and Lee, S. (eds). *Dictionary of National Biography*. Vol. 3. Smith Elder & Co., London, 1335 pp.

Kölbl-Ebert, M. 1997. Mary Buckland (née Morland) 1797-1857. *Earth Sci. Hist.*, 16 (1), 33-38.

MacGregor, A. and Headon, A. 2000. Re-inventing the Ashmolean: natural history and natural theology at Oxford in the 1820s to 1850s. *Archs Nat. Hist.*, 27 (3), 369-406.

MacGregor, A. 2001. *The Ashmolean Museum: A brief history of the institution and its collections*. Ashmolean Museum, Oxford in association with Jonathan Horne publications, London, 80 pp.

Rupke, N.A. 1983. T*he Great Chain of History: William Buckland and the English School of Geology (1814-1849)*. Oxford University Press, Oxford, XII + 322 pp.