

HISTORY OF THE *MEGALOSAURUS* TYPE MATERIAL ON PUBLIC DISPLAY

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ABSTRACT

In 1824, newly appointed President of the Geological Society of London, William Buckland, used his inaugural lecture to introduce *Megalosaurus*. This animal would become the first scientifically named and described dinosaur in the world. The paper that followed Buckland's address contained illustrations of 15 fossils, including the lectotype specimen; a lower right dentary (jawbone). The remaining 14 specimens comprise the paralectotype series. As the basis for the original description of the first named dinosaur, the fossils are of both historical and scientific importance. During the 164 years between Oxford University Museum of Natural History opening in 1860, and the 200th anniversary of the naming of *Megalosaurus* in 2024, the jawbone and a variable number of the paralectotype series specimens have been on display at the Museum in at least four different iterations of 'permanent' exhibitions. An additional four in-house and two external exhibitions have also showcased a variety of the specimens in short, temporary displays. Documentation does not provide a complete timeline, and a gap in knowledge currently exists between 1971 and 1986. This paper provides the known history of public display, with commentary on interpretation and visitor experience, as well as the balance of care and use of these high-profile specimens during activities programmed throughout 2024, to commemorate the bicentenary year.

Keywords: *Megalosaurus*, dinosaur, exhibition interpretation, museum, Buckland

1. INTRODUCTION

Megalosaurus, the 'great lizard' of Stonesfield published in 1824 (Buckland 1824), was the first dinosaur to be scientifically named and described. The genus is defined by morphological characters of a single, partial lower jaw (Benson 2008, p. 419), found in a mineshaft in Stonesfield, Oxfordshire. This, and 14 additional specimens of post-cranial material published with it in 1824, are held in the collections at Oxford University Museum of Natural History (OUMNH). The first known use of any material from the *Megalosaurus* type series relates to

the jawbone. This specimen was held in the collection of the University's Anatomy School at Christ Church College and then the Geological Department of the University's Ashmolean Museum for the purposes of teaching and scientific research. Although specimens in the teaching collection were stored in cabinets and thus in effect 'on display', the intended audience was a purely academic one. In the modern day, scientific research on the Museum's collections, including *Megalosaurus*, continues. However, now part of a public museum, the physical display of the specimens, as with other exhibits at OUMNH, is aimed at engaging a more diverse audience. The evolution of *Megalosaurus* displays reflects the aims of the University as well as the changing needs, resources and knowledge of those in charge of their care and use over the past 200 years.

In 2024, OUMNH marked the 200-year anniversary of the publication of *Megalosaurus* with a year-long series of exhibitions and events. One of the focal points was a symposium held in collaboration with the History of Geology Group (HOGG) entitled *Enormous Fossil Animal and Almost Perfect Skeleton*. The title referenced the Geological Society of London meeting on 20 February 1824 at which William Buckland (1784–1856) announced *Megalosaurus* and William Conybeare (1787–1847) presented a near-complete specimen of *Plesiosaurus dolichodeirus*, originally found by Mary Anning. As part of this commemorative symposium, OUMNH showcased research into the history of the display of the *Megalosaurus* type material. This paper documents that research, as part of the symposium proceedings.

2. THE ORIGIN OF THE MEGALOSAURUS TYPE SPECIMENS

2.1 Acquisition of material

On 24 October 1797, a fossilised partial jawbone was acquired by Prof. Christopher Pegge (1765–1822), Dr Lees Reader in Anatomy, for the teaching collection at Christ Church Anatomy School at the University of Oxford, for ten shillings and six pence (see Figure 1). The specimen had been found in Middle Jurassic rocks in the village of Stonesfield, Oxfordshire. Stonesfield Slate, from the Taynton Limestone Formation, was being quarried for roof tiles from underground mines, along horizontal passages. Stonesfield Slate refers to beds of the Taynton Limestone that split along planes in a slate-like manner, and is not a true slate.

There is no known documentation of the original discovery of the specimen. However, based on archival material pertaining to other specimens from Stonesfield,¹ the jawbone was most likely found by one of the mine workers.

In 1813, sixteen years after the jawbone was acquired by the University, former Oxford University student William Buckland, was appointed Reader of Mineralogy (Howlett 2017, pp. 94–95). At that time, reptile palaeontology was in its infancy. The group Dinosauria was not published until 1842 (Owen 1842). Working within the scientific context available in the early 1800s, Buckland conferred with colleagues including William Conybeare and George Cuvier (1769–1832) to interpret the fossils. Letters in the OUMNH Archives demonstrate that Buckland was actively seeking additional specimens from the Stonesfield miners. Several fossils are mentioned in these letters, although the specifics are often lacking, making it difficult to conclusively match them with existing fossil material. For example, a letter to Buckland dated 3 December 1815 from slate-worker David Oliver describes several discoveries and invites Buckland to view the specimens without revealing what two of the three are (*e.g.*, one is described as “supposed to be some part of a Horse”).²

However, a letter from Stonesfield worker George Griffin to Buckland, dated 17 July 1814, makes specific mention of a large backbone found in a vein through which the mine shaft was dug: “I have noticest in sinking the shafts in that vein whas found that Grate Back Bone wich I sould to Mr Weeb, Christ Church”.³ This specimen, later identified as a sacrum, was sold to Oxford undergraduate Philip Barker Webb sometime before 1814 (Howlett *et al.* 2017 p. 89). Buckland may have purchased it from Webb during his research into *Megalosaurus*, but there is no documentation concerning the acquisition, now held at OUMNH. This second specimen would become crucial to both the initial interpretation of *Megalosaurus*’ anatomy published by Buckland in 1824, and in assigning the defining physical characteristics of the group Dinosauria, in 1842 (Owen 1842; Demetriou *et al.* 2025).

Griffin’s description of the vein in which the sacrum was found has been interpreted to mean that the specimen was recovered from strata overlying the Stonesfield Slate, which formed lenses of a ‘less slate-like’ lithology within the Taynton Limestone Formation (Powell 2025).

¹ OUMNH, William Buckland Archive. Letter from George Griffin to Buckland, 17 July 1814, WB/A/1/214, for example.

² OUMNH, William Buckland Archive. Letter from Oliver to Buckland, 3 December 1815, WB/A/1/340.

³ OUMNH, William Buckland Archive. Letter from George Griffin to Buckland, 17 July 1814, WB/A/1/214, for example.

As stated by Powell, this would explain the scarcity of the fossil material, as these veins have barely been sampled. Many of the fossils from Stonesfield figured in Buckland's paper have been cleaned of matrix (see Section 5.2). However, two lithological samples preserved from the discovery of the jawbone (OUMNH PAL-J.13505), and a portion of matrix originally supporting the ilium (OUMNH PAL-J.13560), are housed at OUMNH. The part and counterpart of matrix that originally encased the jawbone (see Figure 2) contain fossilised bone and enamel material and thus form part of the lectotype specimen.

If samples of the veins (as distinct from the layers being mined) could be acquired, comparisons could be made with these fossil-bearing lithological specimens to ascertain which horizons bore the *Megalosaurus* fossils. Whilst at present that cannot be concluded, the part and counterpart least serve to demonstrate that the state of the specimen, with a single fully erupted tooth in place (see Figures 2 and 5), is how the fossil was originally found. The missing teeth were not, for example, lost due to the manner of excavation, nor disassociated over time whilst in the collections at the University of Oxford (either at Christ Church College, or later, at Oxford University Museum of Natural History).

2.2 Publication

Buckland presented *Megalosaurus* to members of the Geological Society of London at 20 Bedford Street, London, England, on 20 February 1824. This was Buckland's inaugural meeting as President of the Geological Society of London and the same meeting at which Conybeare formally described *Plesiosaurus dolichodeirus*. The minutes of the meeting indicate that Buckland did not take the jawbone with him to the presentation, but shared illustrations of the *Megalosaurus* fossils: "The Author observes that he has been induced to lay before the Society the accompanying representations of the various portions of the skeleton of the fossil animal".⁴ At the end of the meeting, Gideon Mantell (1790–1852), a physician and geologist from Sussex, approached Buckland to discuss some fossil material from his own collections that Buckland's lecture had inspired him to believe may also pertain to *Megalosaurus* (Hawley 2025).

The paper that subsequently documented the announcement, 'Notice on the Megalosaurus or great Fossil Lizard of Stonesfield', was published in the *Transactions of the Geological Society of London* (Buckland 1824). Buckland evidently studied both sets of specimens to form the description: those from Stonesfield, Oxfordshire, held at the University of Oxford, and those in

⁴ MS. Manuscript Minutes of Meetings of the Ordinary Meetings of the Geological Society 1818–1824 GSL/OM/1/2.

the private collection of Mantell, primarily from Cuckfield, Sussex (Buckland 1824). The Stonesfield specimens passed to OUMNH when it opened in 1860 (under the original name of Oxford University Museum). Of the 15 specimens figured in the publication, ten are known to be extant in the Museum's collections.⁵ Mantell's specimens were transferred to the Natural History Museum, London, in a series of acquisitions between 1838 and 1853, when the natural history collections were still part of the British Museum in Bloomsbury, central London (Natural History Museum London, no date).

The 1824 paper included five plates, comprising a series of drawings by Mary Morland (subsequently Mary Buckland), lithographed by Henry Perry. The fossils are documented from multiple angles, including a cross-section of a rib and the reconstructed outline of the transverse process of an anterior caudal vertebra (Buckland 1824). The plates comprise illustrations of 15 different specimens, ten of which are extant in the OUMNH collections: the anterior extremity of a right lower dentary (OUMNH PAL-J.13505), a sacrum (OUMNH PAL-J.13576), a posterior dorsal vertebra (OUMNH PAL-J.13577), an anterior caudal vertebra (OUMNH PAL-J.13579), a right ilium (OUMNH PAL-J.13560), an anterior rib (OUMNH PAL-J.13585), a right femur (OUMNH PAL-J.13561), a left metatarsal (OUMNH PAL-J.13572), a 'clavicle' (later reidentified as an ischium) (OUMNH PAL J.13565), and a right pubis (OUMNH PAL-J.13563). Although Mantell's collection was discussed in Buckland's paper, the specimens were not figured. Morland drew her illustrations up to two years prior to the paper being published (Newell 2025), well before the Mantell collection came to light. This would not have prevented further illustrations being made, but a letter to Buckland from Henry Warburton dated 12 March 1824,⁶ specifically warned Buckland against using illustrations of the Mantell material for the publication. Consequently, the only specimens figured in the paper were those from Stonesfield. This proved fortuitous for the University of Oxford and OUMNH, as it is the fossils illustrated in the paper, subsequently traceable and verifiable, that were allocated type specimen status for the first scientifically described dinosaur (Molnar *et al.* 1990).

It is clear from the surviving documentation, as well as the fossil types, that the Stonesfield material figured in Buckland's description was not found in association, represents more than one individual, and was acquired at different times. Furthermore, due to the lack of articulated material and disassociation of the finds, they cannot all be unequivocally assigned to the genus

⁵ Untraced specimens include: a single tooth (Plate XL); a rib, a fragment of pubis or coracoid, a fragment of scapula, an ischium (Plate XLIII). Anatomical descriptions from Buckland (1824).

⁶ OUMNH, William Buckland Archive. Letter from Warburton to Buckland, 12 March 1824, F71.

Megalosaurus. As a result, the jawbone was awarded the status of lectotype with the other 14 specimens designated as the paralectotype series (Molnar *et al.* 1990). A taxonomic review in 2008 tested the validity of *Megalosaurus* and ascertained diagnostic physical characters in the jawbone that now define the genus (Benson 2008, p. 420).

The species name, *Megalosaurus bucklandii*, was assigned by Mantell in honour of William Buckland, in *Illustrations of the geology of Sussex: a general view of the geological relations of the southeastern part of England, with figures and descriptions of the fossils of Tilgate Forest* (Mantell 1827).

2.3 Scientific and historical importance

A year after *Megalosaurus* was described, Mantell published “Notice on the Iguanodon, a newly discovered fossil reptile, from the sandstone of Tilgate forest, in Sussex” (Mantell 1825). He also subsequently published the first armoured dinosaur, the ankylosaur *Hylaeosaurus*, in 1833 (Mantell 1833). Comparative anatomist Richard Owen studied the fossil material of these three animals and established a series of shared morphological characters which he used to erect the group Dinosauria (Owen 1842). *Megalosaurus* thus holds status in a historical sense, not just as the first scientifically named and described dinosaur, but also as the first of three animals upon which the group Dinosauria is based. The importance of the lectotype jawbone (OUMNH PAL-J.13505) thus expands beyond its diagnostic features and it can justly be considered the fossil that symbolises the start of dinosaur science.

Megalosaurus has not historically received the same high-profile multi-media-format exposure as some North American taxa such as *Tyrannosaurus* and *Triceratops* over the course of the last two centuries,⁷ most likely largely due to the poorer understanding of its anatomy. However, the display of the Oxfordshire specimens has been of primary importance to OUMNH over the last 100 years or more, and the bicentenary of *Megalosaurus*’ naming was a unique opportunity for the Museum to engage the public and draw attention to the importance of Oxfordshire’s palaeontology to both history and science.

⁷ The popularity and wide-spread knowledge amongst the public of many North American dinosaur taxa has undoubtedly been, at least in part, fuelled by more complete skeletal material, prominent displays of fully articulated skeletons (dating back to 1915 at the American Museum of Natural History, in the case of *Tyrannosaurus rex* for example), and several high-profile film appearances. The first feature-length film to incorporate dinosaurs was the 1925 black and white, silent, big screen adaptation of Sir Arthur Conan Doyle’s *The Lost World*, featuring the North American taxa *Allosaurus* and *Triceratops*.

3. BALANCING THE CARE AND USE OF HIGH-PROFILE SPECIMENS

Museums exist to facilitate access to collections for all, be it as part of a public display where a specimen is largely interpreted via the context the museum has given it, or for a researcher behind the scenes, analysing specimens within a scientific framework. However, it is also a museum's responsibility to ensure the longevity of specimens in its care so that they remain available for purposes such as research, teaching, and display, for as long as possible. For those who manage museum collections, there is a constant balance between the care for, and use of, collections. It is a particular concern for specimens that receive a lot of attention and use but are too unique to be replaced by substitutes, and/or for high profile specimens that are at greater risk from a security point of view.

3.1 *Care of collections*

Caring for collections includes their safety and security both in-house and off-site. This begins with meeting basic physical needs, including adequate storage, appropriate mounting if on display, good security (particularly for high profile specimens), and appropriate environmental conditions. Visitors are crucial to museums and yet they cause hazards such as museum pests, environmental fluctuations, and vibrations. Fossils would be safer in flood- and fire-proof cabinets, in a dark, environmentally controlled room, but museums exist to educate, excite and engage the public, and thus instead require, for example, glass fronted cases, lighting that is adequate for audiences with as many needs as possible, and dynamic or aesthetic mounting of the specimens.

The avoidance of unnecessary handling of high-profile material such as the *Megalosaurus* jawbone is a major consideration for OUMNH. However, physical handling is an important part of public engagement, particularly for those that would benefit from a more tactile experience. A compromise often used for public engagement activities is to have high profile specimens visible but not physically accessible, with casts of those specimens, and/or other relevant but less scientifically, historically and/or financially valuable specimens available in conjunction, for tactile engagement.

3.2 *Use of collections*

Using collections includes research, teaching and engaging visitors. Public engagement is a topic with innumerable facets, and incorporates everything from permanent⁸ and temporary displays, through digital content to facilitating family sessions and school groups. This paper focusses on public display of the *Megalosaurus* type material through temporary and permanent exhibitions, from the earliest known use in the University of Oxford teaching collections through to the celebrations to commemorate the *Megalosaurus* bicentenary in 2024.

One of the most important aspects of a museum exhibition is to connect the public with the collections. Exhibits need to be relevant, engaging and exciting, which in turn, helps to keep the museum relevant, engaging and exciting as well. Interpretation is the way in which museums exhibit, label and explain collections and has a multitude of iterations from simple text to in-depth panels conveying complex scientific concepts. The depth of information given depends on many things, starting with the intended audience. In a world ruled by digital, it is no simple task to engage visitors with, in the case of the *Megalosaurus* type material, largely mono-colour, disarticulated, fossil material that forms an incomplete picture of a prehistoric animal. The way in which museums display specimens impacts significantly on visitor experience, which in turn, can affect the success and longevity of the museum.

The requirements of temporary and permanent exhibits differ, with physical stability of collections, current relevance of content, and changing usage of specimens, all being important considerations. The *Megalosaurus* type material has featured in both temporary and permanent displays throughout its history. The dynamism and aesthetic appeal of the exhibit types, and the interpretation that has accompanied the material, have both gone through several iterations since the late 1700s, and are discussed in the following sections in chronological order.

4. MEGALOSAURUS TYPE MATERIAL: PRIOR TO PUBLIC DISPLAY

4.1 Christ Church Anatomy School and the Old Ashmolean Museum: circa 1797 to circa 1830

The *Megalosaurus* jawbone was acquired in 1797 by Christ Church Anatomy School, at the University of Oxford, 16 years before Buckland began in post in 1813. Material held in the teaching collections at this time would likely have been on display for students and academics in a manner similar to that in Figure 3, which shows the Anatomy School as it was many years

⁸ The term 'permanent' is used for displays that do not have a fixed installation period. In reality, no exhibit in a museum can truly be described as permanent.

later, in 1860. It is likely that the jawbone would have been part of such displays. There is no known documentation to suggest that additional material subsequently included in the *Megalosaurus* type series had also been acquired prior to 1813. John Phillips (1800–1874), who took charge of Oxford University’s geological collections in 1854, noted that “The discovery of the nature of these reliquia [Megalosaurus bones] is due to Dr. Buckland’s zealous researches among the spolia of the Stonesfield quarries”. He also noted, “it seems probable that some of the specimens in the Oxford Museum were collected before his [Buckland’s] day” (Phillips 1871, p. 196).

The letter mentioned in Section 2.1 from Griffin to Buckland is dated 1814, one year after Buckland was appointed as Reader of Mineralogy. This shows he began work on gathering additional fossil material almost as soon as he started teaching at Oxford. Between 1813 and 1830, Buckland’s Geological Lecture Room was located in the original Ashmolean Museum on Broad Street (Newell 2023, p. 52), now the site of the University’s History of Science Museum. From 1823 he took great care to organise the geological and mineralogical displays there with glass-fronted wall and desk cases, in addition to framed and mounted drawings, maps and prints.⁹

Members of the public were granted access to the University’s collections at different sites on an individual basis, arranged via application to an authoritative member of Oxford University. Students attending courses had free access to the University’s collections during term-time. On application to Buckland or other university officials, members of the public could also gain access by appointment (Newell 2023, pp. 115, 188).

4.2 The Clarendon: circa 1830 to circa 1863

No definitive documentation is known that reveals the whereabouts of the material between 1813 (when it is thought that Buckland began his research) and 1843. However, between 1830 and 1832, Buckland’s lecture room was relocated from the (old) Ashmolean Museum to the Clarendon Building, in Oxford (Newell 2023, pp. 184–188) and a list of Buckland’s specimens in the Clarendon in 1843 includes “Box 52: Stonesfield Saurian”. This may be a portion of the

⁹ See ‘The Geological Lecture Room, Oxford’ print by Nathaniel Whittock, OUMNH WB/Uncatalogued/086.

Megalosaurus material, or it could refer to, either solely or in part, other (non-dinosaur)¹⁰ reptile material from Stonesfield.¹¹ It is possible that the jawbone remained at Christ Church Anatomy School between 1813 and 1843, with Buckland borrowing it when necessary for study, and/or during term-time for teaching. However, it is also conceivable that Buckland arranged for transfer of the specimen from Christ Church to the Ashmolean Museum where he was based, either before or after the 1824 publication.

Figure 4 shows Buckland's lecture room-cum-museum in the Clarendon. Future study by photographic experts may aid in dating the photograph more narrowly, but it was possibly taken to preserve a record of the space before it was dismantled and the specimens removed to the new museum building *circa* 1860. Although it is not possible to identify the *Megalosaurus* material here, it is likely Buckland organised its prominent display in a case similar to those in the image.

In the mid-1850s, a purpose-built scientific hub was conceived for Oxford museums, which opened its doors on Parks Road in 1860 as Oxford University Museum (OUM) (Holmes 2018). John Phillips oversaw the relocation of natural history collections to the site, which subsequently formed the foundation of the future OUMNH (Morrell 2011). The *Megalosaurus* type material would have been moved from the Clarendon to OUM sometime before 1863, as part of the amalgamation project of natural history material from across the museum sites.

5. MEGALOSAURUS TYPE MATERIAL ON DISPLAY: PUBLIC

5.1 *The first display: circa 1863 to circa 1927*

OUMNH first opened its doors in 1860, however, images from newspapers published that year, such as *The Illustrated London News*,¹² show there was nothing on display at this time. Furthermore, the tender for the manufacture of the cabinets is dated January 1862.¹³ In 1863, John Phillips, the first Keeper of the new institution and Buckland's successor as Professor of Geology, published the first known written record of the *Megalosaurus* material on display in

¹⁰ *Megalosaurus* is the only confirmed dinosaur from Stonesfield.

¹¹ OUMNH, William Buckland Archive. Uncatalogued.

¹² *The Illustrated London News*. 6 October 1860. The Central Court and Arcades of the Oxford University Museum. p. 310.

¹³ History of the Building of the Museum Collection. William Bramwell, Description of works proposed to be done in preparing Wainscot Cases for the University Museum, January 1862, HBM02/008.

Notices of Rocks and Fossils in the University Museum Oxford. The Preliminary Notice in the front of the book is dated 1 January 1863, and states:

It is hoped that, when the arrangements of the Museum shall have been further advanced, students and visitors will have the advantage of consulting a ‘Catalogue’ of the several Collections—such as that which illustrates the Physiological Collection—or of seeing the names attached to the specimens, according to the plans now in progress for the Minerals and Fossils. In the mean time, a brief sketch of the contents, such as may constitute an ‘Index’, has been thought likely to give some assistance to those who desire instruction rather than amusement, from the contemplation of the various objects of interest which have been gathered under one roof, and placed in juxtaposition with the highly valuable Library of works of Science, the property of the Radcliffe Trustees. The pages now issued relate principally to specimens of Rocks and Fossils. *Museum, Jan. 1, 1863*. (Phillips 1863, B2).

The text indicates that the displays were not in place by 1 January 1863, but that installation was imminent. In the book, Phillips made specific reference to the location of the jawbone; “Case 28 B includes *Megalosaurus*, selected specimens; lower jaw, teeth, vertebrae, metatarsal. For a large series, see separate case” (Phillips 1863, p. 58). The large series refers to postcranial material, including the femur and sacrum from Buckland’s paper, which can be seen in Figure 6B. The original numbering of Case 28 is still visible today, located in the east corridor of the ground floor. It is therefore concluded that the first public display of the *Megalosaurus* type series was installed at OUMNH in 1863.

The photograph in Figure 5 was found in the Buckland Archive, after its acquisition by OUMNH in February 2023. It is the earliest known image of the jawbone, but the lack of date, and inclusion within the archive of materials that post-date Buckland’s death, mean it is not possible to know when this wood-frame method of display was first adopted. Phillips would have been aware of the importance of the specimen, and the frame may represent an early attempt to isolate it from others in the displays and draw attention to its significance as part of a permanent display. However, it is also possible that the frame is earlier and dates to Buckland’s, or even Pegge’s time (see Section 2.1), when a sturdy frame would have been useful for protecting and displaying the specimen during teaching. The wooden frame is extant, and housed in the collections at OUMNH.

In 1866, a schematic of the ground floor galleries was published by Acland (Acland 1866). Although it does not include the case numbers, it labels the east corridor “palaeontological

collections” which corresponds to the extant location of Case 28, mentioned by Phillips, in the southern end of that area. Case 28, in the southeast corner of the ground floor of OUMNH, is concluded as the first location in which the *Megalosaurus* lectotype was put on public display.

The exact location of the display case in which the postcranial material was displayed was not revealed by either Phillips in 1863, nor Acland in 1866. However, in 1867, Acland published *The Oxford Museum: the substance of a lecture by Henry Acland, Regius Professor of Medicine, with extracts from a letter by John Phillips, Professor of Geology and Keeper of the Museum* which states that the postcranial material was housed in “Case Six of the South Inner Aisle” (Acland 1867, pp. 55–57). The photographs below (see Figures 6A and 6B) show the south aisle of the Central Court and Case Six *circa* 1890. Although there are numerous photographs of the Museum from the late 1800s in the archive, none are from an angle that confirms the contents of Case Six on the relevant side. However, Figures 6A and 6B reveal numerous clues as to the location of Case Six in the Museum. Whilst the top of the cabinet is not visible, the open glass-panelled doors in Figure 6B match those of the prism-topped cases in Figure 6A, and the slanted legs of a table top case behind the cabinet in Figure 6B, match the table top cases in Figure 6A. Furthermore, the column capital and pattern of the brickwork in the background of Figure 6B match the southwest corner of the Museum. The first location of the postcranial material on public display has also therefore been established.

The first interpretation of the *Megalosaurus* material was sparse by modern standards, summarised by an online article about the early history of the Museum:

Although members of the public were welcome in the Museum from the start, the departments which inhabited the building were more concerned with teaching space, research facilities and the storage of their specimens than the needs of visitors (Czerkaszyn 2020).

As mentioned in Section 3.1, modern-day museum exhibits strive to be educational, exciting and engaging. The interpretation panel for Case Six comprised a small white rectangular label, visible in the centre of the photograph in Figure 6B, which reads:

Remains of the *Megalosaurus* great lizard & Carnivorous reptile found in the lower beds of the Great Oolite at Stonesfield near Oxford. Part of the jaws and some of the teeth of this extinct reptile may be seen in the wall case No. 28 of the East Corridor (transcribed by Susan Newell, *circa* 2022).

The earliest evidence of the Museum's efforts to enhance the experience of general visitors appears in Prestwich's *An Index Guide to the Fossils of the University Museum Oxford* (Prestwich 1881). He states "additions made to the collections, and the naming of specimens, render it desirable to follow a somewhat different plan" and "In the Palaeontological Collections, professor Phillips' arrangement of the specimens has been throughout retained" (Prestwich 1881, p. 5). Prestwich specifically refers to the specimen labels in his 1881 volume, and reflects on changes that have taken place since the last edition, published in 1863:

The specific names are, however, now attached to the specimens. This has been done, with the assistance . . . for the Vertebrate remains with the aid of Mr Davies, Palaeontological assistant at the British Museum (Prestwich 1881 p. 6).

These quotes suggest the fossil material likely maintained its appearance as shown in Figure 6B. However, as the photograph is undated, and the resolution is insufficient for the labels to be legible, no conclusions can be drawn as to which iteration of labelling is represented. The labels visible in Figure 6B may have been installed at the same time as the fossils (*circa* 1863), or, assuming no other undocumented changes took place, the image may show the updated display that included additional labelling, which occurred sometime before 1881.

5.2 The first re-display: circa 1927–1971

The next signs of change are noted in the Museum's 1927 Annual Report:

Museum Assistant, Mr Hambidge, has been engaged in preparing for exhibition in the central court the remains of the carnivorous Dinosaur – *Megalosaurus bucklandii*¹⁴, von Meyer, from the Lower Great Oolite Series of Stonesfield, Oxfordshire. (Delegates of the University Museum 1927, p. 23).

The Annual Report for the following year reads:

The bones have been cleared of matrix and repaired. It has been found possible to mount the bones of the right side (pelvis and hind leg) in their natural position relative to one another and so to reconstruct an important part of the skeleton (Delegates of the University Museum 1928, p. 22).

¹⁴ Mantell's original publication of the species name for *Megalosaurus* was *M. bucklandii* (Mantell 1827). The second 'i' of *bucklandii* was erroneously dropped by Hermann von Meyer in 1832 (Meyer 1832), a mistake that has since been widely perpetuated.

428 Having finalised the preparations, the new display was installed in 1931:

429

430 Mr Hambidge has completed the arranging of the exhibit in the Central Court of *Megalosaurus bucklandi*
431 [sic], and has continued the substitution of printed for written labels to the collection during the year
432 (Delegates of the University Museum 1931, p. 53).

433

434 Many of the *Megalosaurus* type series fossils are fragile, heavy, or both. Arranging and
435 mounting material such as this into an articulated pose is a greater challenge and requires more
436 materials than laying them out in rows as shown in the earliest known display (see Section 5.1).
437 Substitution of hand-written labels for typed interpretation also takes additional time and
438 resources. These developments show views of exhibition visuals were changing and the
439 Museum had begun to take steps to provide more dynamic and engaging displays.

440

441 A series of photographs represented in Figure 7 was found in an envelope labelled “Photographs
442 of *Megalosaurus* display in court, before dismantling in 1971”,¹⁵ in the hand-writing of Philip
443 Powell, former Assistant Curator of Geological Collections at OUMNH, from 1963 to 2003.
444 The Museum’s Annual Reports between 1931 and 1971 make no mention of any further
445 alterations between these dates, and the exhibit fits the description of Hambidge’s display
446 (Delegates of the University Museum 1928, p. 22). It is likely therefore, that Figure 7 is the
447 redisplay executed by Hambidge between 1928 and 1931, and the image shows what the public
448 display of *Megalosaurus* would have looked like from 1931 to 1971.

449

450 The fossils used in this display include the complete extant *Megalosaurus* type series from
451 Stonesfield, plus at least 19 other specimens, including a series of articulated left metatarsals
452 (metatarsals II, III and IV (OUMNH PAL-J.13586a-c) from the Kimmeridge Clay in Swindon.
453 By this point, anatomical misidentifications in Buckland’s original description had been
454 corrected. Plate XLIV of the *Megalosaurus* description (Buckland 1824) shows the left ischium
455 labelled as a clavicle and the right pubis labelled as a fibula (Benson 2009), whereas both can be
456 seen in the correct positions within the articulated skeleton in Figure 7. Although by 1971 the
457 lectotype of *Megalosaurus* had been on show at the Museum for nearly a hundred years, Figure
458 7 is the earliest known image of the jawbone definitively on display to the public. The
459 jawbone’s wooden frame shown in Figure 5, is still in use (see Figure 7).

460

Comparisons between the two displays; *circa* 1863–1927 (see Figure 6B) and 1931–1971 (see Figure 7) reveal certain specimens have been cleaned of matrix. In the bottom of Case Six (see Figure 6B), two ribs can be seen embedded in rock. The rib on the left-hand side is the same specimen as at the top of the photograph from 1971 (see Figure 7), but in the latter it is devoid of matrix. The Museum’s Annual Reports show that Hambidge “cleaned the bones of matrix” between 1927 and 1928 (Delegates of the University Museum 1928, p. 22), thus confirming this display must date to between 1928 and 1971.

In addition to improved visitor experience, the more lifelike pose for *Megalosaurus* described in the 1928 Annual Report also represents a shift in the scientific understanding of the animal’s anatomy and behaviour since Buckland’s original description in 1824. By extrapolating body size from modern lizards, Buckland had calculated that *Megalosaurus* would have reached “a length exceeding 40 feet” (12 metres) (Buckland 1824). It was also interpreted to have been a quadruped, partly based on the vertebral column including the sacrum—five vertebrae at the base of the spine that would have been naturally fused in life. These interpretations of the anatomical evidence were used in the first life-size reconstruction of *Megalosaurus*, in the Geological Court at Crystal Palace, southeast London. When designing the *Megalosaurus* (to be accompanied by two *Iguanodon* and a *Hylaeosaurus*), Benjamin Waterhouse Hawkins wrote a letter to the University of Oxford asking for measurements of the Stonesfield fossils.¹⁶ This letter was originally thought to be addressed to Buckland (Howlett 2017, p. 98), however, given the letter is dated 22 March 1854, it is more likely Hawkins was writing to John Phillips (see Sections 4.1, 4.2 and 5.1). Buckland had retired from the University four years earlier, in 1850, due to ill-health (Newell 2022, Appendix p. 271). In addition, the letter refers to the addressee currently being in York “... when you return from York...”. Phillips sister, to whom he was very close, is thought to have been based in York at this time (Morgan 2007, p. 267). The dinosaur sculptures at Crystal Palace Park, with the ~10.7-metre-long quadrupedal *Megalosaurus* (Witton and Michel 2022 p. 116), are a physical representation of the most up-to-date scientific knowledge of the three taxa in the mid-1800s. It was several decades after *Megalosaurus* was named that its anatomy began to be better understood due to discoveries of more complete specimens of other theropod taxa such as *Allosaurus* (Marsh 1877) and *Ceratosaurus* (Marsh 1884). The bipedal reconstruction of *Megalosaurus* in the Hambidge display, reflects these developments.

¹⁶ OUMNH, William Buckland Archive. Letter from Hawkins to Buckland, 22 March 1854, WB/A/1/228.

The physical layout on the left of the 1931–1971 case (see Figure 7) facilitates a better understanding of the animal’s anatomy by a general audience, compared to the earlier display of *circa* 1863 (see Figure 6B). However, the style of written interpretation is similar in both. Although the labels on the right in Figure 7 are illegible in the photograph and are not known to have survived, the size and placement indicate they are specimen-specific and likely contain information such as the taxonomy, anatomical identification, and geographical locality. Over time, the Museum has changed its exhibition aims to focus on engaging visitors on a deeper level, providing more context and overarching interpretation of displays, rather than solely the basic information more typical of a figure caption in an anatomy or geology textbook. Labelling in Figure 7 is more ubiquitous than in the first iteration of *Megalosaurus* displays, but the small labels and—seemingly small, dense writing—suggest they would have been difficult to read for any visitors with visual impairments. In the modern day, accessibility is a top priority for museum displays, and Access Working Groups are becoming common place within institutions.

Figure 7 shows the lighter fossils are held to the backboard with small claw mounts, most likely made of metal. The size of the claw mounts for the smaller material is sympathetic to the visual appeal of the display. The heavier specimens, however, such as the femur and sacrum, required a more robust mounting style which dominates some of the bones. The types of mounts shown in Figure 7 are still used today. However, in a modern exhibit (see subsequent Sections), emphasis is placed where possible on using fixings that are less visible to the public.

5.3 A period of ongoing changes?: 1971–1986

The label accompanying the photograph in Figure 7 demonstrates that Hambidge’s *Megalosaurus* exhibit was dismantled in 1971 (see Section 5.2). The Museum’s Annual Report for that year reveals two reasons: 1) installation of electric lighting units within the cases, and 2) the purchase of a Masson-Seeley printing-embossing machine allowing for coloured labels to be incorporated, to create “better quality exhibits” (Delegates of the University Museum 1970–1971, p. 1). The specific reference to the quality of displays shows the Museum’s aims with regard to visitors.

However, post-1971, there is a 15-year gap in documentation regarding the whereabouts of the *Megalosaurus* type series. No photographic evidence has been found that definitively shows the material during this time. Although it seems unlikely that the dinosaurs would have been

completely removed from display for 15 years, the Annual Reports between 1971 and 1986 provide some evidence that there was an ongoing major redisplay project throughout this period:

During the year the display cases on the south side of the Museum Court were remodelled and a revised display arrangement was planned. (Delegates of the University Museum 1974–1975, p.4).

The final phase of replacement and renewal of geological displays, initiated in 1976, is now under way in the SE sector of the court; the theme is 'Dinosaurs and their relatives'. Mounting of skeletal remains of *Megalosaurus bucklandi*, *Eustreptospondylus oxoniensis* and *Cetiosaurus oxoniensis* is well advanced, that of *Camptosaurus prestwichii* is in the planning stage. (Delegates of the University Museum 1985–1986, p. 10).

The Museum's Collections Management System, EMu, documents some additional activities on *Megalosaurus* material within this time frame, including conservation treatment, scientific research, and field work. However, it was not so extensive as to prevent an immediate redisplay, and did not include the type series, so there is more to the story which has yet to come to light.

Two non-type specimens of *Megalosaurus* underwent conservation treatment in 1972; a maxilla (OUMNH PAL-J.13559) and a lower jaw fragment (OUMNH PAL-J.29813) were acid-prepped to extract the fossils from the matrix. A number of dinosaur specimens, including two non-type *Megalosaurus* fossils (OUMNH PAL-J.29808 and OUMNH PAL-J.29756) are recorded in EMu as having been studied and taxonomically determined by "S. P. Welles" or "P. M. Galton". Numerous records of dinosaur material cite the time period for this as "1970s", but some have a specific year recorded; OUMNH PAL-J.29867 ?*Megalosaurus*: March 1974; OUMNH PAL-J.03303/A04 *Cumnoria*: January 1975; and OUMNH PAL-J.13558/A13 *Eustreptospondylus*: 1976, for example. Finally, Powell collected seven *Megalosauripus* footprints from "Pool below the weir at Thornborough Mill, Buckingham" on 28 August 1979. One of these trace fossils (OUMNH PAL-J.29816) was subsequently put on display in "*Megalosaurus* Case, Central Court, May 1986 - December 1999".¹⁷ Whilst the documented activities do not refer to the *Megalosaurus* type series, it is useful to acknowledge that work was going on at this time.

¹⁷ Data from specimen records contained in EMu, Oxford University Museum of Natural History collections management system.

Only two references to displays of *Megalosaurus* material throughout the 1971–1986 period have been found. The rib from the type series (OUMNH PAL-J.13585) is recorded in EMu as being on display in the “W. Buckland case, Upper East gallery” between September 1979 and September 2006.¹⁹ This display period crosses over with the two subsequent permanent exhibits of *Megalosaurus* in the Museum (1986–1999 and 2000–2019), but close inspection of images of those displays (see Figures 8 and 9) show that OUMNH PAL-J.13585 was absent. The second reference is in the 1983 Annual Report which mentions a display that may pertain to a temporary exhibition of the *Megalosaurus* material in the Central Court, however the description is inconclusive:

Temporary displays of fossil reptiles were arranged in the court, and preliminary lay-outs of the systemic invertebrate palaeontology display initiated. (Delegates of the University Museum 1982–1983).

Whilst it seems unlikely that the dinosaurs would have been removed from display for such an extended period, at present, no evidence has been found to contradict this.

5.4 The Oxfordshire dinosaurs: 1986–1999

The next documented iteration of the *Megalosaurus* display was installed in 1986. The earliest known photograph of the 1986–1999 display dates to 1992, however, a description of the Oxfordshire dinosaurs exhibits is recorded in EMu with the year 1986. This date is corroborated by the Annual Reports which describe the exhibit as having been completed that year (Committee for the Scientific Collections 1987, p. 10).

The four Oxfordshire dinosaur cases installed in 1986 comprised; *Megalosaurus* (Buckland 1824) (see Figure 8), *Cetiosaurus* (Owen 1841), *Cumnoria* (Seeley 1888), and *Eustreptospondylus* (Walker 1964). These cases were located in the Central Court from May 1986 until December 1999.

A photograph of the *Megalosaurus* case from 1992 (see Figure 8) shows that the type material was again accompanied by additional specimens, but only approximately 11 additional fossils augmented the case at this time, rather than 19 as between 1931 and 1971. More space around each specimen gave the case a less cluttered look than earlier displays. The cranial material; the dentary (jawbone) (OUMNH PAL-J.13505) and premaxilla (OUMNH PAL-J.13506), are

mounted facing in the opposite direction to the post-cranial material. This is to show the better-preserved sides, allowing for a more visually appealing display. Although both skull elements are in the same life-orientation, the maxilla shows the labial side, whereas the dentary is displayed with the lingual side facing the visitor.

There are two different types of image of *Megalosaurus* in this case, one skeletal reconstruction and one artist's impression of a fleshed-out animal (see Figure 8). The former represents a pose more typical of earlier reconstructions of *Megalosaurus* (Witton 2025, see his figures 14, 16, 17, and 18, for example) in which the tail is held fairly low to the ground, the animal's centre of gravity is quite far forward, and the head and neck are relatively erect. The fleshed-out reconstruction shows what, in the modern day, would be considered a slightly more natural pose. The centre of mass is lower and more centralised to the body's core. Given that one is skeletal and the other flesh, it is probable that these reconstructions were installed at the same time. However, the different styles represent ongoing changes in our understanding of *Megalosaurus* anatomy; one of the issues museums face for permanent displays is the challenge of keeping up to date with current scientific understanding. Retrofitting isolated elements of a display is one method of changing with the times without the resource heavy burden of redesigning and redisplaying entire exhibits. However, some museums reject this approach on the basis minor changes carried out on an *ad hoc* basis can create a disjointed feel to a display space which can have a negative impact on visitor experience. Particularly if done by different staff, and/or over a large timeframe.

As with the 1931–1971 exhibit, the labels comprise small text printed on small white labels, mounted on a low contrast background. However, the prominent, heavy-duty mounts that dominated the previous iteration have now been replaced by more subtle armature which is barely visible, thus creating a more aesthetic display of specimens.

5.5 The Oxfordshire dinosaurs redisplay: 2000–2019

In 2000, the *Megalosaurus*, *Cetiosaurus*, *Eustreptospondylus* and *Cumnoria* cases were overhauled, resulting in more vibrant and visually appealing displays (see Figure 9). The official opening, was 2 June 2000 (Delegates of the University Museum 1999–2000, p. 13). The case

furniture appears to have remained, although the top was replaced or altered, and subsequently matched the base (see Figures 8 and 9). Superficially, the change in layout of the *Megalosaurus* material was not substantial; the pelvic region and hind leg remained in a similar position, and the cranial material was still disassociated from the post-cranial material and facing in the opposite direction for specific reasons of visual appeal related to their preservation.

For this redisplay, the Museum worked with an external design company (Real Studios) for the first time, and many innovative elements were introduced, including a coloured backdrop, numerous large format illustrations, and the maquette of the *Megalosaurus* reconstruction at Crystal Palace Park (see Section 5.2). Maquettes of the Crystal Palace *Megalosaurus* and (one of the) *Iguanodon* statues were created by Hawkins, and sold by the geologist and mineral dealer James Tennant for educational purposes (Witton and Michel 2022, p. 158). Its inclusion added a history of science aspect to the narrative of the exhibit. The addition of an object other than fossils or rocks enhanced the diversity of textures, object types, colours, and focal-depths, for the visitor.

The ‘life-size’ reconstruction of *Megalosaurus* at Crystal Palace was sculpted with a gaping mouth. The maquette’s mouth, however, is closed and whilst several teeth of the left lower jaw protrude on the outside of the flesh, only a single tooth of the right lower jaw is visible. This is the arrangement preserved in the lectotype specimen (see Figure 5) and was presumably a deliberate tribute by Hawkins to the *Megalosaurus* jawbone.

At the time of publication, this iteration of the *Megalosaurus* exhibit was the last permanent display to feature the type series *en masse*. In 2019, the Museum began a major redisplay of large areas of the Central Court and North and South Aisles. As a result, the vast majority of Oxfordshire dinosaur material was removed and put into storage in 2019 until new displays could be installed. However, due to the scientific and historical significance of *Megalosaurus* and the popularity of the Oxfordshire dinosaurs amongst visitors, a small *Megalosaurus* display was created for the interim period (see Section 6.3).

5.6 Transforming the permanent displays at OUMNH for the 21st century

Although the style of exhibit seen in the earliest displays of the *Megalosaurus* type series (see Figures 6B and 7) appeals to some (often due to reasons of nostalgia), it is less engaging for a

diverse audience. In addition, the interpretation has numerous shortcomings regarding accessibility, such as small font size and low contrast labels. These styles were far more commonplace in museums exhibiting natural history collections across England in the late 1800s and early 1900s. However, changing times have led to new types of display but even the much-improved 2000 display no longer fits with the Museum's mission: "To awaken and nurture a lifelong interest in nature by preserving and promoting the Museum's collections and advancing and sharing the sciences of the natural environment." as set out in the strategic plan for 2024–29 (OUMNH 2024, p. 7). The challenge for OUMNH in displaying *Megalosaurus* in the next iteration of permanent displays, lies in using incomplete fossilised remains to engage new audiences in a fast-paced modern world of touchscreens and interactive displays. The redisplay of the dinosaur material also has to complement the exhibits that have already been completed as part of the project, meaning much of the style, visuals, and level of written interpretation is already defined.

6. TEMPORARY DISPLAY OF THE TYPE MATERIAL

Whilst no museum exhibit is truly permanent, the term is used for displays with no fixed or intended end-date (see Section 3.2). Temporary exhibitions in museums typically run for between a few months and a year. Although it is common for them to be extended. As well as the four documented permanent iterations of *Megalosaurus* exhibits, a variable number of the type series fossils have also been included in six temporary exhibitions; four in-house at OUMNH and two at external venues.

6.1 *The 50th Munich Mineral Show: 2013*

In 2013, OUMNH took the *Megalosaurus* jawbone to the Munich Mineral Show by invitation, as part of the Show's 50th anniversary celebration, under the banner 'golden discoveries in palaeontology'. The jawbone was exhibited on a plinth in a glass case, in the centre of an island comprised of rocks. Spotlights were used to add gravitas and highlight the fossil's scientific and historical importance (see Figure 10).

6.2 *OUMNH Presenting Case exhibition series: 2015–2024*

The Presenting Case series uses a medium-sized, single exhibition case for temporary displays of specimens and archive material. The installations typically run for two-months, and rotate primarily through the different collections areas; Earth Collections, Life Collections, and Library and Archives. This manner of small, temporary display allows the Museum's staff to engage visitors with a wide range of topics, often too niche for a permanent display. Although there is an in-house style guide, the characteristics of the Presenting Case facilitate greater freedom in aesthetics and style of content. It also allows for physically sensitive material to be incorporated, such as archive material too susceptible to light damage for permanent display. The case is often used to engage visitors with behind-the-scenes projects that are crucial to the Museum's goals but not appropriate for the focus of permanent displays. *Megalosaurus* type material, or replicas of the jawbone, have been utilised in three Presenting Cases, outlined in the following sub-sections.

At the end of 2023, OUMNH worked with David Sudlow Designers to create a visual identity for the *Megalosaurus* bicentenary, primarily in the form of a logo, using a colour palette devised from Morland's watercolour of the 1839 Axmouth landslip (painted in 1840). The Museum used the visual identity for all bicentenary-related exhibitions, digital content, advertising, and programming. In 2024, two Presenting Cases were curated by Collections Manager Emma Nicholls to commemorate the bicentenary (see Sections 6.2.2 and 6.2.3). The cases incorporated the bicentenary logo, as well as a link to the Museum website (including a specially overhauled webpage on *Megalosaurus*) provided via both a QR code and a website address. This allowed the Museum to give visitors more detail on *Megalosaurus*, as well as information on the year-long programme of commemorative exhibitions and events.

6.2.1 Presenting... *Megalosaurus bucklandii*: 2015

In 2015, Collections Manager Phil Hadland curated 'Presenting ... *Megalosaurus bucklandii*' which showcased the jawbone, accompanied by material from the OUMNH Archives. The exhibit gave visitors a potted history of the naming of *Megalosaurus*, as well as some anatomical and physiological information. Both an original letter, and historical lithographic print from Buckland's 1824 paper (plate XLIII) were included. The letter was written to Buckland by David Oliver, a slate-worker from the mines in Stonesfield, revealing the discovery of several fossil bones (see Section 2.1). Dated 1815, this letter refers to three

specimens, two unidentified anatomically (one described as possibly from a horse) and one rib.¹⁸ The lithograph, executed by Henry Perry after original drawings by Mary Morland, depicts the ilium, two ribs, and three further fragments of bone assigned at the time to the *Megalosaurus* genus (Buckland 1824).

6.2.2 200 years of *Megalosaurus*: 2024

The first of the two bicentenary-themed Presenting Cases was in place over the 200-year anniversary of Buckland's presentation of *Megalosaurus* to the Geological Society of London (20 February 1824)¹⁹. The case documented the story of the origin of *Megalosaurus* and Dinosauria in a way that celebrated type specimens and celebrated the lectotype as the symbol of the first 200 years of dinosaur research. The objects included a replica of the jawbone, the *Megalosaurus* maquette from Crystal Palace, and Henry Perry's lithograph, created from Mary Morland's illustration of the jawbone for plate XLI of Buckland's 1824 paper.²⁰

A replica was used for this display due to the high use predicted for the jawbone during the bicentenary year. The replica was hand-cast in Jesmonite acrylic resin and painted by Earth Collections Conservator Juliet Hay, in 2015. It demonstrates a level of skill and attention to detail that renders it almost indistinguishable from the original. A study at the Grant Museum of Zoology, London, in 2011 invited visitors to give their opinion on whether museums should always be truthful about the identity of specimens, even if not in the best interest of exhibition interpretation. The conclusion of the study indicated that museums are held up as icons of education and "should never lie" (Ashby 2011). Despite the similarity of the replica *Megalosaurus* jawbone to the original, it was consequently clearly labelled as such. In addition, one of the part and counterpart specimens (OUMNH PAL-J.13505b, see Figure 2) of the matrix that originally encased the jawbone (see Section 2.1) was also included. This specimen contains fragments of bone and enamel from the jawbone and is thus accessioned as part of the lectotype specimen. Visitors were therefore able to see several object types, relevant to, and even part of, the famous jawbone, without incorporating the lectotype itself.

6.2.3 Replicating the magnificent *Megalosaurus*: 2024

¹⁸ OUMNH, William Buckland Archive. Letter from Oliver to Buckland, 3 December 1815, WB/A/1/340.

¹⁹ MS. Manuscript Minutes of Meetings of the Ordinary Meetings of the Geological Society 1818–1824 GSL/OM/1/2.

²⁰ OUMNH, William Buckland Archive. Under Jaw and Teeth of *Megalosaurus*, Plate XLI, 1824, WB/C/0/4/132.

759

760 The second bicentenary-themed Presenting Case aimed to engage museum visitors by
761 showcasing advances in technology used by palaeontologists, and demonstrate how a specimen
762 that has been under scrutiny for 227 years (from point of acquisition in 1797, to the bicentenary
763 year of 2024) is still providing new information. As with the *200 years of Megalosaurus* case,
764 OUMNH's visual identity for the bicentenary was maintained, along with the link to digital
765 content.

766

767 Four different replica types of the jawbone were displayed, alongside Perry's lithograph from
768 1824, showcasing Morland's depiction of the specimen.²¹ An artistic reconstruction of
769 *Megalosaurus* by Julius Csotonyi (2018) created a backdrop and the colour palette from the
770 visual identity was used throughout.

771

772 The earliest replica of the jawbone represented was a plaster cast given to the Geological
773 Society of London in 1831 by Buckland, now in the collections at the British Geological Survey
774 (BGS), Keyworth. This addition was made possible by BGS which, having loaned the original
775 back to the Geological Society of London for the bicentenary year, supplied OUMNH with a
776 newly manufactured 3D printed replica and full-colour labels. The replica was hand-painted by
777 Hay to mimic the original 1831 cast in its present-day state. The second, chronologically, was
778 Hay's 2015 Jesmonite acrylic resin replica, hand-painted to resemble the original fossil (see
779 Section 6.2.2). The third was created by Warwick Manufacturing Group, at the University of
780 Warwick, which created computed tomography (CT) scans of the jawbone and subsequently
781 printed a 3D replica using transparent resin for bone material and opaque resin for teeth. Such
782 cutting-edge technological developments allowed the Museum to communicate important
783 palaeontological details to visitors through the display, as the transparency of the material
784 revealed replacement teeth growing below the jawline. Polyphyodonty (constant tooth
785 replacement) is persistent in theropod dinosaurs, and the CT scan data of the *Megalosaurus*
786 jawbone both demonstrated this visually, and confirmed lateral tooth replacement for this taxon.
787 Although the interpretation explained the replica, the use of two-tone resin allowed the Museum
788 to engage visitors with the science using striking visuals. The final replica was created for
789 OUMNH by ThinkSee3D to commemorate the bicentenary. ThinkSee3D used the latest
790 techniques in photogrammetry (three-dimensional rendering of an object using two-dimensional
791 data) to create the highest resolution digital surface render of the jawbone, as of 2024. The

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²¹ OUMNH, William Buckland Archive. Under Jaw and Teeth of *Megalosaurus*, Plate XLI, 1824, WB/C/0/4/132.

jawbone was printed in colour using gypsum resin and coated in a mix of resin and lacquer for durability.

6.3 An interim case: 2019–2026

When the Oxfordshire dinosaur exhibits were removed from display in 2019, a smaller *Megalosaurus* display was created for visitors to avoid a loss of representation of this important material. OUMNH also has several Museum trails, primarily aimed at families, of which the *Megalosaurus* jawbone is a popular component. Consequently, Hay’s 2015 hand-painted replica of the jawbone was put on show in a small case, with light-touch interpretation about the dinosaur. Throughout 2024, this case included the bicentenary visual identity as well as the link to further information on *Megalosaurus* and the Museum’s event programme on the website. This case was removed during the two Presenting Case runs (see Sections 6.2.2 and 6.2.3), to avoid duplication of some information and to allow the use of the 2015 Hay replica in the Presenting Cases. When the redisplay of the vertebrate palaeontology material outlined in Section 5.6 is completed (estimated 2026), this exhibit will be de-installed as the real jawbone will once again be on permanent display to the public.

6.4 Breaking Ground: The scientific legacy of a 19th century power couple: 2024–2026

The culmination of the bicentenary celebrations at the Museum was a major temporary exhibition celebrating the lives and legacy of William and Mary Buckland, in collaboration with David Sudlow Designers. This exhibition detailed the scientific methods used in the early 1800s and explored how 200 years later in the present day, palaeontologists often use both the same practises, as well as more advanced techniques facilitated by modern technology. The exhibition led visitors through stories of discoveries, networks, analyses, and hidden voices from the past.

The real jawbone was put on display, along with two large, visually appealing specimens from the paralectotype series; the sacrum (OUMNH PAL-J.13576) and right femur (OUMNH PAL-J.13561) (see Figure 11). The sacrum was of particular importance in Buckland’s initial interpretation of *Megalosaurus*, as outlined in Section 2.2, which was explored as part of the exhibition narrative.

A new, conservation-grade display case was purchased to display the three fossils, alongside a modern Asian water monitor skull (*Varanus salvator*) for comparison with the *Megalosaurus* jawbone.

The visitor response to *Breaking Ground* was extremely positive. Comments included; “... myself and a few friends visited the Buckland exhibition on the weekend and were blown away. A fantastic addition to the museum”, “A wonderful new exhibition. What a great job”, and “The new displays are magnificent. I look forward to seeing them again - several times”. Much of the feedback complimented the overall design, as well as the high number of genuine specimens from the Museum’s collections. The aesthetic used throughout the exhibition was based on the colour palette used by David Sudlow Designers to create the visual identity for the bicentenary.

7. USE OF TYPE MATERIAL IN COMMEMORATIVE EVENTS

Throughout the bicentenary, one of the Museum’s primary aims was to connect the public with the ‘Oxfordshire dinosaur that started it all’ and to showcase the importance of Oxfordshire geology to both science and the history of palaeontology. As a consequence, the jawbone was in regular demand for programming, including events, tours, and social media outputs. To avoid unnecessary risk, the jawbone was rarely on open public display. Glass topped, prism cases were used to showcase the specimen, augmented by other material from the paralectotype series, most often one of the vertebrae and the femur. The care and use of the *Megalosaurus* material for programming throughout the bicentenary are discussed.

7.1 200 Years of Dinosaurs: New Perspectives on an Ancient World

On 11 and 12 January 2024, the Natural History Museum London (NHM) held a two-day conference, *200 Years of Dinosaurs: New Perspectives on an Ancient World*, to mark the *Megalosaurus* bicentenary. Due to the importance of the occasion and the specialist interest of the audience, OUMNH took the decision to facilitate a one-day display of the *Megalosaurus* jawbone, on the first day of the conference. OUMNH staff (Dr Emma Nicholls and Dr Duncan Murdock) collaborated with NHM colleagues (Professor Paul Barrett, Dr Mike Day, Dr Marc Jones and Professor Susannah Maidment) to ensure a conservation-grade display case was available, and attended at all times. For security purposes, the specimen and plate XLI lithograph showing Morland’s illustration of the jawbone from Buckland’s 1824 paper, on loan from OUMNH Library and Archives, were installed in a display case before delegates arrived.

As an added security measure, delegates were not informed ahead of time. Although transporting any specimen carries risk, particularly over long distances, the commemorative conference, attended by two hundred international delegates, was an important opportunity for OUMNH to engage audiences with *Megalosaurus* and the University of Oxford collections. As predicted, social media content generated by delegates served to engage a digital audience, promoting OUMNH globally, via numerous platforms.

7.2 Marking the 200th anniversary of the Geological Society of London presentation

OUMNH programmed a day of public engagement to mark the 200-year anniversary date of Buckland's presentation of *Megalosaurus* to the Geological Society of London on 20 February 1824. It included behind-the-scenes 'Meet *Megalosaurus*' tours, 3D scanning and printing of fossils in the Central Court (not utilising the type material for security reasons), and a birthday party in the evening. Safety and security of the specimens was paramount, however, OUMNH was keen to have the jawbone on show for the public as much as possible to mark the significance of the date.

The behind-the-scenes events were open to all members of the public but kept to a maximum of 15 people, accompanied by a minimum of two members of Museum staff. The jawbone, sacrum, femur and one of the two sections of matrix (OUMNH PAL-J.13505c) that originally encased the jawbone were laid out on open display, alongside numerous pieces of material from OUMNH's Buckland Archive. After a short introduction to the fossils and archives, visitors were encouraged to ask questions and get close to the material. Open display presents a far greater risk of theft and damage than utilising showcases, but touching was strictly prohibited, cameras and phones could not be held directly above the material, and the limit on visitor numbers made the event manageable.

A select number of the type series (including the jawbone), as well as associated archive material were displayed at the evening event. The Museum branded the event the '*Megalosaurus* 200th Birthday Party' to engage the public with the 200th anniversary date. The number of guests (100) and the presence of liquid refreshments meant the fossils and accompanying archive material could not be on open display, but were on show in secure, prism cases, attended at all times by Museum staff. Numerous additional members of staff were present throughout the event to safeguard the collections. This allowed the Museum to create

somewhat of a party atmosphere, important for engaging the public with the meaning and significance of the date, but with limited additional risk to the specimens and archives.

7.3 *Enormous fossil animal and almost perfect skeleton symposium*

On 21 February 2024, OUMNH hosted nearly 100 delegates for a history of science symposium, organised in collaboration with HOGG. The title was chosen to reference the descriptions given by Buckland and Conybeare of *Megalosaurus* ('enormous fossil animal') and *Plesiosaurus dolichodeirus* ('almost perfect skeleton') respectively, at the Geological Society of London meeting, 20 February 1824.²² The Symposium comprised 13 platform presentations and four tours of the collections at OUMNH.

Consideration was given to a cased display of the jawbone on stage in the lecture theatre throughout the Symposium, as had been facilitated for the NHM's *200 Years of Dinosaurs* conference. However, it would have presented a constant security issue and logistical challenge for staff that were otherwise involved in hosting the Symposium, unlike at the London Conference where OUMNH staff had been present specifically and solely to accompany the jawbone and lithograph. This fossil and a number of additional type series specimens were therefore made available to view as part of a behind-the-scenes collections tour. This provided a higher quality viewing experience for the delegates, divided into four groups to be rotated around the four tour types, and less of a security concern for the specimens. Two prism cases exhibited the jawbone, femur, a vertebra, the matrix with original bone material from the jaw, the sacrum and accompanying historical label thought to be in Richard Owen's handwriting, and a bound copy of the plates from Buckland's 1824 *Transactions of the Geological Society of London* paper (on loan from OUMNH Library and Archives). The remaining three tours comprised; '*Archive material: related to William Buckland, W.D. Conybeare and Mary Morland*' led by Librarian and Archivist Danielle Czerkaszyn, '*Plesiosaurus dolichodeirus: contemporary cast, by Sir Frances Chantrey, of the specimen displayed at the 1824 meeting*' by HOGG Chair Duncan Hawley, and '*Stonesfield Quarry, beyond the Megalosaurus*', conducted by Head of Earth Collections, Eliza Howlett.

This manner of engagement, with limited numbers per tour, facilitated closer viewing of the specimens for delegates as well as the opportunity for one-to-one conversations with collections

²² MS. Manuscript Minutes of Meetings of the Ordinary Meetings of the Geological Society 1818–1824 GSL/OM/1/2

staff from across the Museum. Particularly in the case of a symposium that attracts delegates with a wide variety of extensive specialist knowledge, this manner of close interaction often benefits the Museum as well as the individuals.

8. CONCLUSIONS

The University of Oxford acquired the *Megalosaurus* lectotype—the jawbone—on 24 October 1797. At first, the jawbone would have been used to teach University of Oxford students at Christ Church Anatomy School. Provenance for much of the type series is missing, however, archival material suggests they were likely acquired by Buckland in the early 1800s. It was not until after the Ashmolean Museum’s natural history collections were gathered under one roof at the new Oxford University Museum, which opened in 1860, that the type material was put on public display for the first time. The earliest known date of public display is 1863, at which time the *Megalosaurus* type series was put on show in two separate areas. The jawbone was mounted in a wall-case in the east corridor on the ground floor. The post-cranial material was exhibited with isolated fossil elements of other dinosaurs, in a freestanding case located in the southwest area of the ground floor.

Since 1863, the *Megalosaurus* jawbone and a varying number of accompanying specimens from the paralectotype series have been on public display at OUMNH in four known iterations of permanent exhibitions, in intervals of 64 years, 40 years, 13 years, and 19 years (1863–1927, 1931–1971, 1986–1999, and 2000–2019). Between 1860, when the Museum opened, and 1863, the material was awaiting display cases to be built. From 1927 to 1931, the material was undergoing conservation and remounting. However, the 15-year gap from 1971 to 1986 is more mysterious, as no documentation has been found that confirms whether the material was in storage or on display during this time.

The jawbone and some additional material from the type series has also been on display in on-site temporary installations four times (2013: Presenting Case exhibit, 2024: two separate Presenting Case exhibits, and 2024–2026: *Breaking Ground* exhibition). The jawbone alone, has also been displayed at external venues twice (for one week in 2013: 50th Anniversary Munich Mineral Show, and one day in 2024: Natural History Museum, London, 200 Years of *Dinosaurs* Conference).

The combination of these four permanent exhibits, and six temporary displays, means the type fossils of the first dinosaur ever scientifically named and described have been on public display almost constantly for 161 years at the time of the bicentenary, and for approximately 66 years at the University of Oxford, prior to public display.

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The archive material referenced herein, is from the William Buckland Archive, held by Oxford University Museum of Natural History, in Oxford, United Kingdom.

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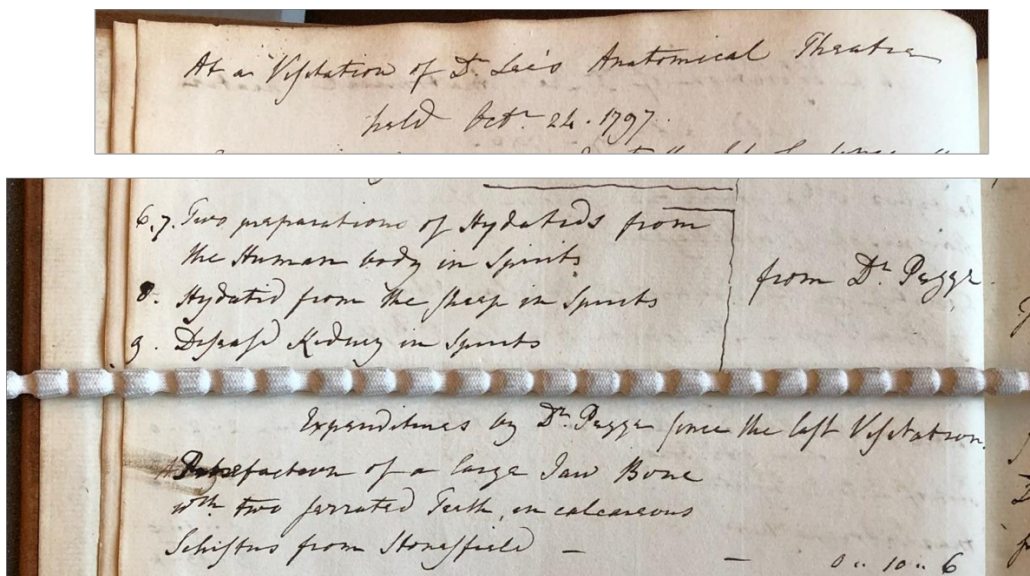


Figure 1. The Visitations Book for Christ Church Anatomy School, 1797. Photograph by Susan Newell, used with permission of Governing Body of Christ Church, Oxford. The entry reads: "Large jawbone with two serrated teeth, in calcareous schistus from Stonesfield, purchased for 10s. 6d."

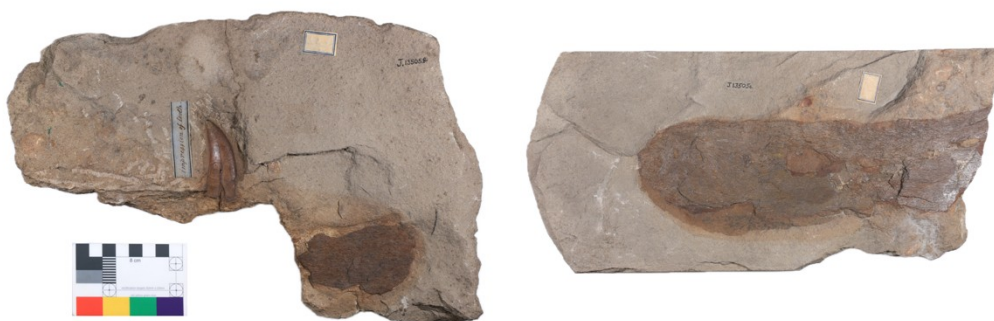


Figure 2. The part and counterpart of Taynton Limestone, showing clear evidence of just one fully erupted tooth. Left: OUMNH PAL-J.13505b. Right: OUMNH PAL-J.13505c. © Oxford University Museum of Natural History.



Figure 3. Christ Church Anatomy School, teaching collection, circa 1860. Photograph courtesy of and © Senior Common Room, Christ Church, Oxford.

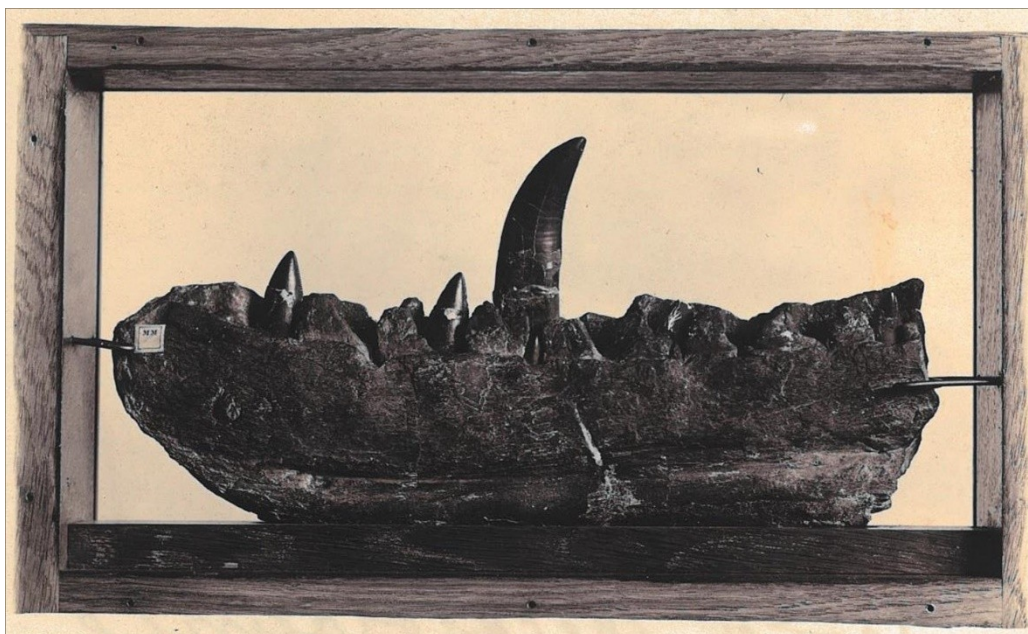


Figure 4. The Clarendon Building, in the 1850s.²³ © Oxford University Museum of Natural History.

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OUMNH, William Buckland Archive. Photograph of The Clarendon Building, circa 1850s, F496.

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Figure 5. *Megalosaurus* jawbone, date unknown. Image from the Buckland Archives²⁴ © Oxford University Museum of Natural History.



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OUMNH, William Buckland Archive. Photograph of *Megalosaurus* jawbone, date unknown, /F432.

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Figure 6A. Location of cases in the Museum, circa 1890. © Oxford University Museum of Natural History.

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Figure 6B. 'Case Six', showing the postcranial Megalosaurus material, and fossils from other dinosaur taxa, on display.

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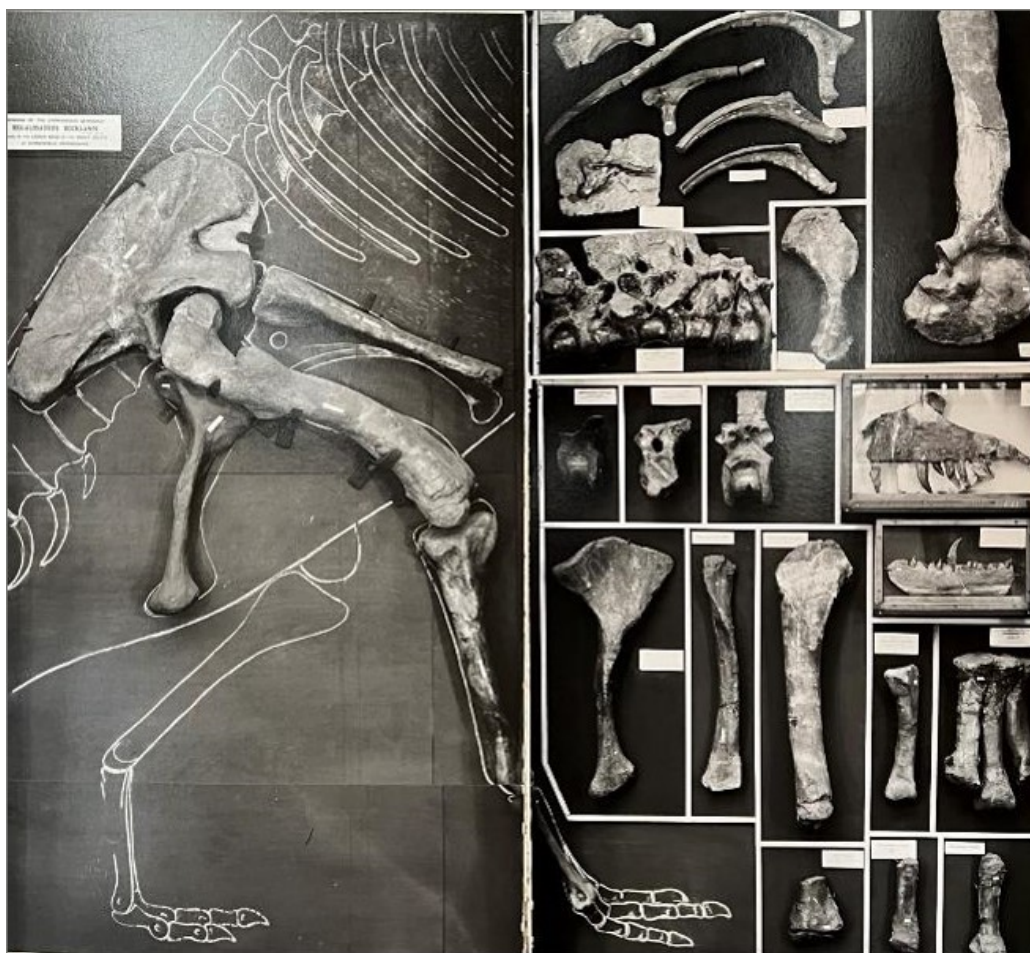


Figure 7. Series of photographs in envelope labelled 'Photographs of Megalosaurus display in court, before dismantling in 1971'. This is the earliest known image of the lectotype jawbone definitively on display to the public. © Oxford University Museum of Natural History.



Figure 8. OUMNH exhibit showcasing the Megalosaurus material, 1986–1999. Photograph dated 1992.²⁵

© Oxford University Museum of Natural History.



Figure 9. OUMNH exhibit showcasing the *Megalosaurus* material, 2000–2019.²⁶ © Oxford University Museum of Natural History.



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Figure 10. Installation at the 50th Munich Mineral Show, 2013. © Oxford University Museum of Natural History.

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Figure 11. The Megalosaurus jawbone, sacrum and femur on display in Breaking Ground. © OUMNH

