

**REDISCOVERY OF AN *ICHTHYOSAURUS BREVICEPS* OWEN, 1881
SOLD BY MARY ANNING (1799-1847) TO THE SURGEON ASTLEY COOPER
(1768-1841) AND FIGURED BY WILLIAM BUCKLAND (1784-1856)
IN HIS BRIDGEWATER TREATISE**



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An extant specimen of *Ichthyosaurus breviceps* Owen, 1881 is identified as that sold by Mary Anning the younger, fossil collector of Lyme Regis, to the eminent surgeon Sir Astley Cooper in 1831. It was figured by William Buckland in the prestigious Bridgewater Treatise *Geology and mineralogy considered with reference to natural theology* of 1836, thereby becoming a widely known exemplar. Its scientific, historical and cultural significance is discussed.

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INTRODUCTION: ASTLEY COOPER MEETS MARY ANNING

The early 19th Century may be regarded as an heroic age of vertebrate palaeontology. This work was partly founded on the Mesozoic reptiles of England, and especially the ichthyosaurs and plesiosaurs, reflecting their spectacular nature and relative abundance compared to what were later called dinosaurs (Howe *et al.*, 1981; Taylor, 1997; Knell, 2000; O'Connor, 2007; Rudwick, 2008; Evans, 2010; Torrens, 2012). Scientific research today still depends substantially on these early saurian finds, because of the rarity of such fossils, and the loss of old sites with quarry closure and mechanisation, as well as, of course, the type and figured status of many old specimens (for instance, Benson *et al.*, 2012; Benton, 2012; Massare and Lomax, 2014). Locating and identifying such status specimens thus form a useful contribution to palaeontological research, as well as to museums and education more generally. This paper reports the recognition of one such ichthyosaur, and explores its provenance and significance.

Sometime around 1830, Mary Anning the younger (1799-1847), fossil collector of Lyme Regis in Dorset, wrote to the London surgeon and anatomist Sir Astley Paston Cooper (1768-1841), who was then at the peak of his profession as a fashionable London medical man (Cooper, 1843; Bynum, 2008; Burch, 2008). The letter is undated but on paper watermarked 1830, and reads in full (WL Special Collections 9/02/003):

"Mary Anning's best respects to Sir Astley Cooper would feel greatly obliged by a line to say whether the Skeleton arrived safe – with many and best thanks to Sir Astley Cooper Mary Anning begs to subscribe herself Sir Astley Cooper's obliged humble servant [signed] Mary Anning".

Anning's stock in trade was of Lower Lias fossils from the Lyme Regis area, and in that context 'skeleton' strongly suggests a reptile rather than a fish, and most likely an ichthyosaur, given

the rarity of plesiosaurs and pterosaurs. The fossil is therefore presumably the ichthyosaur which Cooper acquired at Lyme during a tour of the West Country in the autumn of 1831, in which he visited many geological and mineralogical museums:

"On his way home, when at Lyme Regis, he purchased a very fine specimen of the Ichthyosaurus, a drawing of which afterwards appeared in Professor Buckland's Treatise on Geology. He bought it from Mary Anning, well known to geologists, and whom he describes as a great genius, whose knowledge, zeal and ability are really surprising." (Cooper, 1843, vol. 2, pp. 385-386).

The ichthyosaur was indeed later illustrated by William Buckland (1784-1856), Reader in Geology at the University of Oxford, in his Bridgewater Treatise, *Geology and mineralogy ... as "a small Ichthyosaurus Intermedius, from the lias at Lyme Regis belonging to Sir Astley Cooper"* (Buckland, 1836, vol. 1, p. 170; vol. 2, p. 21, pl. 8. fig. 2, reproduced here as Figure 1a). The engraving was by 'Scharf' who must be the natural history illustrator George Johann Scharf (1788–1860) (Jackson, 2004). From the scale in the drawing, the specimen was about 0.9 m long, relatively small for an ichthyosaur, but large and inconvenient enough for it to make good sense for Cooper to have the fossil sent directly to his house, rather than taking it with him.

It is very likely that this is the ichthyosaur mentioned by the noted geologist Charles Lyell (1797-1875) in a letter of 10 April 1832 to the palaeontologist and surgeon Gideon Mantell (1790-1852), who knew Cooper professionally and was on friendly terms with him (Wennerbom, 1999; Torrens and Cooper, 1986; Cooper, 2010). At dinner the previous evening Lyell had met Cooper, who talked of Anning and of his purchase of an ichthyosaur, presumably from her (Wennerbom, 1999, letter 90). There is no known indication that Cooper ever bought more



Figure 1. (a) Engraving by George Scharf of Astley Cooper's specimen of 'Ichthyosaurus intermedius', reproduced from Buckland (1836, vol. 2, pl. 8, fig. 2). The pale staining is water damage to the original print. (b) NHMUK PV R.8437. The matrix as seen is about 96 cm long (centimetre tape). Photograph copyright and courtesy of the Natural History Museum.

than one ichthyosaur; he did not publish on them, as far as is known; and the timings are consistent with all references being to the one specimen.

Another possible archival reference to the ichthyosaur is in an earlier letter of 1 May 1831 by William Buckland to the geologist and former Lyme inhabitant Henry T. De la Beche (1796-1855). Anning, Buckland reported, had a “*small & very perfect Ichthyosaurus for wh[ic]h she asks £40 - the best she says she has ever seen*” (ACNMW, 84.20G.D.180). Buckland had told Professor Adam Sedgwick (1785-1873) of the University of Cambridge about the specimen (of which there appears to be no mention in the correspondence published by Price (1986)). But Buckland also noted that “*she has promised the first offer to Mr. Botfield & Mr. Saul has also applied for the choice of the next*” - presumably the antiquary Beriah Botfield (1807-1863) (Courtney, 1885), and the London merchant William Devonshire Saul (1783-1855) (Cleevly, 1983; Torrens, 2012, 2014). It is not clear whether this is the ichthyosaur which Cooper was to buy. The timing of Buckland’s letter is rather early, and the description “*small & very perfect*” is not quite consistent, though this, like the competing purchasers, may have owed something to Anning’s salesmanship (cf. Taylor and Torrens, 1987). I leave the matter open pending further evidence.

Cooper’s fossil appears to have disappeared from the published record after Buckland’s book of 1836 and its later editions. Richard Owen (1804-1892) did not mention it in his landmark *Report on British fossil reptiles* for the British Association for the Advancement of Science, although he examined Cooper’s private collection (Owen, 1840, p. 44), and Delair’s review (1969, p. 12) gave no location for the specimen.

Repositories and abbreviations

ACNMW, Amgueddfa-Cymru, National Museum Wales, Cathays Park, Cardiff CF1 3NP; BL, British Library, www.bl.uk; BMNH, British Museum (Natural History), renamed Natural History Museum in 1992, see NHMUK; BRSMG, City of Bristol Museum and Art Gallery, Queen’s Road, Bristol BS8 1RL; NHMUK, Department of Palaeontology, Natural History Museum, Cromwell Road, London SW7 5BD; TNA, The National Archives, Kew, Richmond, Surrey TW9 4DU, some wills accessed via www.ancestry.co.uk; WL, The Women’s Library, London School of Economics, 10 Portugal Street, London WC2A 2HD.

IDENTIFICATION OF THE SPECIMEN

An inquiry to Professor Judy Massare led to her recognition of the specimen in Buckland’s drawing as NHMUK PV R.8437 (pers. comm. 10 June 2012). This fossil is, not unusually for specimens of its vintage, covered in a thick dark varnish or shellac and is hard to photograph clearly, and the loss of some bones since the 1830s also confuses matters somewhat. However, the fossil’s identity is clear from the detailed pattern of disruption of skeletal elements caused by the vagaries of death, decomposition and burial (Figures 1 to 4). This identity is further confirmed by dimensional comparison with the scaled 1836 drawing: any differences seem well within reasonable limits given the errors caused by selection of measuring points, scaling on the drawing, and damage to the specimen. Some dimensions measured by Professor Massare versus those scaled from the drawing are: snout to tail tip in straight line, 89.5/90 cm; vertebral column along curve, 74.5/75 cm, forefin length 11/11.5 cm. There has, however, been damage and loss to the specimen since 1836, because of lack of care, and perhaps minor vandalism (Figures 2 and 4 especially). Such cased specimens, in wood and plaster or cement mounts, were routinely displayed vertically, like paintings in frames, but this orientation meant that any pieces would fall off once loosened by abuse or deterioration (for instance, the cracking of the clay shale matrix under repeated cycles of humidity and temperature).

The specimen’s absence from Lydekker’s (1889) catalogue of fossil reptiles in BMNH implies that it came into BMNH after the book went to press, but even this is not certain as the specimen might have arrived, not as an acquisition, but as an identification inquiry, or a research loan to a staff member such as Richard Owen, who indeed worked on *I. breviceps* during his time there (Owen, 1881). Otherwise all that can be said is that the specimen was in the museum by 1968 when it was registered as BMNH R.8437 ‘*Ichthyosaurus breviceps?*’, without any provenance data (NHMUK register, Ms Sandra Chapman pers. comm. 2014). It is likely that this specimen was found unlabelled and without a provenance in store during Mr. (now Professor) Christopher McGowan’s doctoral research on Liassic ichthyosaurs, and that it was registered to enable him to cite it in his review of, amongst other species, *I. breviceps* Owen, 1881 (McGowan, 1974, pp. 14-18, as a specimen without provenance data, and as ‘8437’, omitting the R prefix in error).

THE GAP FROM 1836 TO 1968

Several possible routes to BMNH are suggested by published sources but despite archival inquiries it has proved impossible to confirm any one in particular, and I outline them here in the hope that further evidence will emerge. Astley Cooper’s collections were mainly of human and animal anatomical and pathological specimens. He deposited specimens in various medical institutions during his lifetime, including St Thomas’s Hospital and Guy’s Hospital, both in London, and when he died in 1841, he left his remaining collection to his nephew Bransby B. Cooper FRS (1792-1853), also a surgeon at Guy’s, with the request (but not condition) that the collection be kept together (will, TNA Prob 11/1942; Cooper, 1843, vol. 2, p. 258; Wilks and

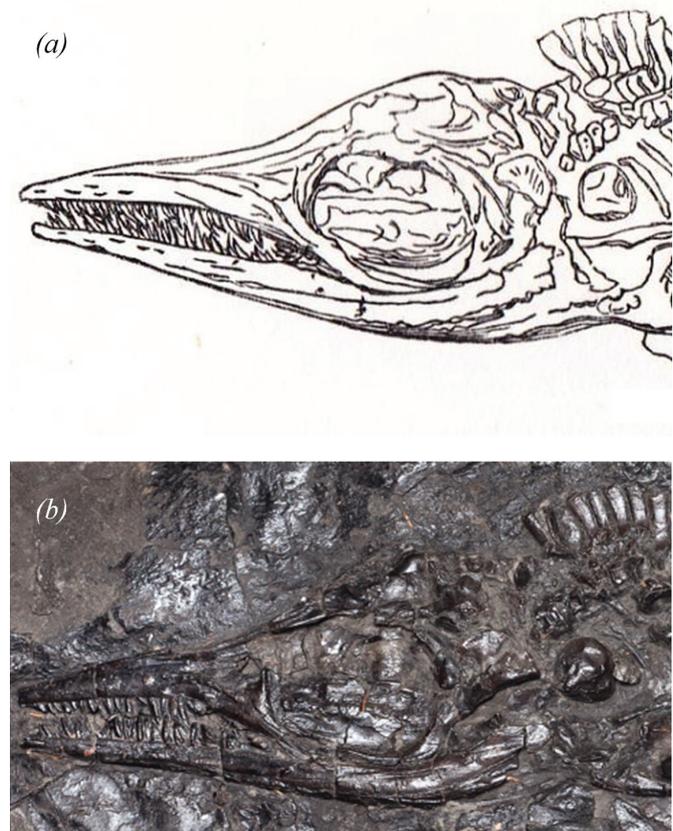


Figure 2. (a) Detail from Buckland (1836, vol. 2, pl. 8, fig. 2). (b) Equivalent area of NHMUK PV R.8437, showing skull and mandible, and first few vertebrae. There has been some damage since the 1830s but the drawing is of the same specimen. Points of similarity include the disposition of teeth loosened post mortem. Photograph copyright and courtesy of the Natural History Museum.



Figure 3. (a) Detail from Buckland (1836, vol. 2, pl. 8, fig. 2). (b) Equivalent area of NHMUK PV R.8437, showing left forelimb, with the limb and finger bones compressed into the single paddle characteristic of ichthyosaurs. There are many points of similarity in the disposition of the elements, and especially the pattern of breakage and disturbance of the ribs posterior to the forelimb. Photograph copyright and courtesy of the Natural History Museum.

Bettany, 1892, pp. 340-343; MacCormac, 1894; Brock, 1952; Cooper specimens still exist today in Guy's Hospital). Unfortunately, but unsurprisingly, neither this will nor Bransby's own will (TNA Prob 11/2178) mentions the ichthyosaur. However, it would not be surprising if the ichthyosaur came to the BMNH by way of a medical museum. Medical and anatomical collections generally suffered a severe rundown during the 20th Century, with the frequent disposal and transfer of non-human material to other, and by then seemingly more appropriate, repositories such as BMNH (Alberti and Hallam, 2013).

- 1) *St Thomas's Hospital, London.* This can be ruled out, as Cooper cut his links with it, in a dispute over his nepotism, some years before he bought the ichthyosaur (Bynum, 2008).
- 2) *Guy's Hospital, London.* It is believed that when the Hodgkin Museum was closed and the contents moved to the new Gordon Museum in 1905, most of the non-human material was disposed of to the Anatomy Department at Guy's or to the BMNH (Dr. William Edwards, Gordon Museum pers. comm. 2014). However, no 1905 acquisition of an ichthyosaur was found in the published BMNH history or in an archival inquiry (British Museum (Natural History), 1904-1912; Mr. Jon Shepherd, Library and Archives, NHM pers. comm. 17 March 2014).
- 3) *Royal College of Surgeons of England, London.* Bransby Cooper sold his uncle's collection to the Royal College of Surgeons of England in 1843 (Surgicat database entry, RCS-MUS/11/1/17, www.rcseng.ac.uk, accessed 18 March 2014;

a date of 1842 is given by Cope, 1959, p. 281, perhaps for the physical arrival rather than formal acquisition). But Wilks and Bettany (1892, p. 341) state that “[a]t his death Sir Astley's museum passed to Bransby, and then most of it to the College of Surgeons” which leaves open the question of whether the ichthyosaur was included. The College already had some fossil vertebrates, including important ichthyosaur specimens (Owen, 1854; Delair, 1969; Howe *et al.*, 1981). However, the College was severely damaged in an air raid in 1941 with the loss of much of its anatomical collections and their documentation (Anon., 1947; Webb-Johnson, 1947; Cope, 1959; Dobson, 1959). Some fossil material was transferred to BMNH during post-war reconstruction (Anon., 1947; Cleevely, 1983, p. 251), but no lists of such material have been located, if they were ever done at the time (Ms Kate Tyte, Museums and Archives, Royal College of Surgeons of England pers. comm. 13 March 2014; Mr. Jon Shepherd, Library and Archives, NHM pers. comm. 17 March 2014). However, Cooper's ichthyosaur is not mentioned in Owen's published catalogue of the College's fossil reptiles, which lists other, and sometimes much less substantial, specimens of ichthyosaurs (Owen, 1854). This suggests (but does not prove) that the ichthyosaur never came to the college, especially as Cooper's collection was already being drawn upon for (anatomical) display specimens in the 1840s (Anon., 1846). Owen is admittedly known to have been inattentive to his more menial duties in his final years as Conservator at the College (Dobson, 1959, p. 288), but, given his interests, one would expect him to have paid particular attention to fossils such as Cooper's ichthyosaur.

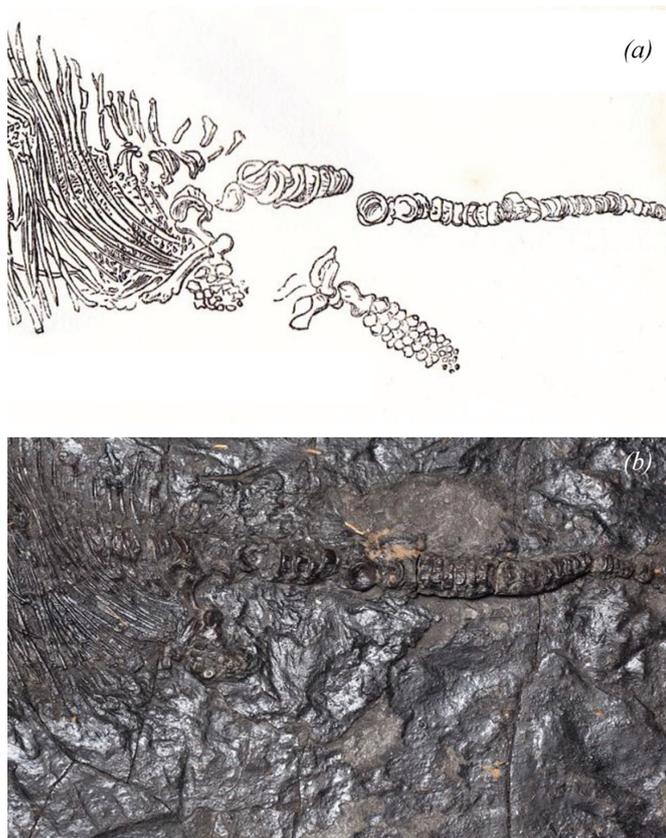


Figure 4. (a) Detail from Buckland (1836, vol. 2, pl. 8, fig. 2). (b) Equivalent area of NHMUK PV R.8437, showing pelvic area. The specimen has evidently suffered the loss of one hindlimb and associated pelvic elements since the 1830s (in right lower quadrant of images, displaced from life position). The drawing and specimen show the same pattern of disturbance of the ribs, the break in the vertebral column, and the telescoping and disruption of the other hindlimb. Photograph copyright and courtesy of the Natural History Museum.

4) *The private museum of P. B. Purnell.* It is possible that Astley or Bransby passed the specimen to their relative, the Gloucestershire landowner Purnell B. Purnell (1791-1866; born P. B. Cooper). Purnell was the son of Robert Bransby Cooper (1762-1845), Astley's eldest brother, author and Member of Parliament for Gloucester (Burke, 1863; Anon., 1866; Bynum, 2008). A 'formidable' magistrate, Purnell is perhaps best known today for his endeavours to root out abuses and liberate wrongfully imprisoned inmates in asylums for the mentally ill (Wise, 2012, pp. 84-86), and for his fine private museum. This museum, at his seat of Stancombe Park, near Dursley, contained mainly archaeological, antiquarian and numismatic material, with some geological specimens (Baker, 1860, p. iii; Popplewell, 1989). Purnell's potential interest in an ichthyosaur, such as his uncle's, is shown by his 1847 purchase of four plaster casts of 'fossil saurians' from the Bristol Institution for the Advancement of Science, Literature and the Arts (now BRSMG: BRSMG Geology File PUR1; Mr. Roger Clark pers. comm. 16 March 1989; Torrens & Taylor, 1990). After Purnell's death, there was a huge sale of the contents of his museum at Sotheby's, London, in 1872 (Anon., 1872b). This was almost entirely of archaeological and antiquarian material. The only fossil lot was No. 1118, "Three large frames of Fossils of Fish and Amphibious Animals found in the blue lias and red sandstone, very curious" (Anon., 1872a), sold for £4 11s 0d to one 'Reynolds', so far unidentified (annotated copy of sale catalogue, Anon., 1872a, BL SC S 668 (3)). The description today suggests a combination of Liassic fossil fish with large Permo-Trias

tetrapods or their footprints such as *Chirotherium*, all in the usual wood and cement wall mounts of the day. However, 'amphibious' was sometimes used to describe ichthyosaurs, either from a misunderstanding of their relationships, or simply because they were thought able to crawl on land as well as swim. So perhaps the Cooper ichthyosaur came onto the wider fossil market as part of this lot, or with the rest of the collection, whose fate is so far unknown apart from one of the plaster casts noted above.

5) *The fossil market.* Finally, it is possible that the ichthyosaur was sold onto the open market at some point, perhaps by Bransby.

The lack of any documentation on how and when the fossil came into BMNH make it impossible to judge between those options on the available evidence, though the fossil's present condition perhaps hints at open display and petty vandalism in a medical collection rather than Purnell's museum. A simple label indicating the provenance and status of the specimen would have greatly accelerated its recognition. Perhaps Cooper never made one; a College of Surgeons curator complained about the poor documentation and labelling of Cooper's pathological specimens (Anon., 1846, p. vi).

SIGNIFICANCE OF THE SPECIMEN

Astley Cooper probably bought the ichthyosaur for its biological rather than geological significance. The ichthyosaur would be a fine display piece. It also sat well with his interest in comparative anatomy (Cooper, 1843; Burch, 2008). At this time, anatomy as taught in medical schools included the comparative anatomy of other animals, as reflected in collections such as that of John Hunter (1728-1793), which contained many zoological items alongside the purely human anatomical specimens. Cooper had himself studied under Hunter, attended his lectures, and helped him dissect a whale (Brock, 1952, pp. 145-147; Burch, 2008; Bynum, 2008). Accordingly, 19th Century anatomical museums routinely collected comparative anatomical material, often including fossils. It was evidently found appropriate to include ichthyosaurs and other fossils in a select guide to display specimens in the Royal College of Surgeons (Anon., 1865, and see also Owen, 1854; for another if rather earlier example of a mixed collection, see Liston, 2012a & b, 2013).

The ichthyosaur would have been especially interesting at the time of Cooper's purchase. This was not just because ichthyosaurs were extinct saurians, which made dramatic display items. As a novel and problematical group of vertebrates, ichthyosaurs had major theoretical importance, being firstly extinct, and secondly needing to be given their correct position in the Great Chain of Being, the way in which order and diversity in nature were organised in the Aristotelian thought of the time. There was something of a false start by the politically powerful surgeon Sir Everard Home (1756-1832), a predecessor of Cooper's as a Professor at the Royal College of Surgeons, who wrote a series of papers, partly based on specimens at the College. He possibly plagiarised the unpublished work of his brother-in-law John Hunter, as with other research, though the truth cannot now be established thanks to his destruction of Hunter's papers (Howe *et al.*, 1981). The anatomy of ichthyosaurs was, however, properly described during the early 1820s by W.D. Conybeare (1787-1857) and De la Beche, who placed them between fishes and reptiles in the pre-Darwinian Great Chain (Taylor, 1997; Taylor and Torrens, 1987; Rudwick, 2008). Cooper was therefore buying an attractive and interesting fossil which was also topical within the comparative anatomical community. However, he is not known to have published on ichthyosaurs himself.

From the modern scientific perspective, the fossil has already been identified (McGowan, 1974) as a useful addition to known material of the relatively rare species *I. breviceps*. I do not offer

a full scientific and taxonomic assessment here, as a review of *Ichthyosaurus* species is being carried out by Professor Judy Massare and Mr. Dean Lomax (pers. comm. 2014). However, some preliminary remarks may be made. The specimen's identification as the Cooper fossil plainly adds to its scientific value, as the fossil's source locality and therefore horizon are now known. Its status as a 'figured' specimen contributes significantly to an accurate nomenclatorial history of the species *I. breviceps*, as it is probably the earliest figured specimen referable, although with hindsight, to that taxon. Moreover, the dates of collection of c. 1830, and sale in 1831, disappointingly, but usefully, exclude the fossil from consideration as the lost type specimen, or one of the type series, of *Ichthyosaurus intermedius* Conybeare, 1822.

Such early specimens, moreover, were (and are) more than embodied repositories of scientific data. They are powerful cultural artefacts, becoming artefacts of the hand when collected and prepared to expose the bones, and artefacts of the mind when studied and published. William Buckland's Bridgewater Treatise, *Geology and mineralogy considered with reference to natural theology*, of 1836, was a review of the then state of geology, including palaeontology, which was both a factual reference and a rhetorical exposition of the natural-theological view of progress in earth history (Rupke, 1983; Rudwick, 2008). Buckland aimed his book as much at lay people as at fellow geologists, although admittedly one should not exaggerate his readership figures, for his book was too expensive for many people unless they could find it in a library (O'Connor, 2007). A central part of the book's interpretive strategy comprised heavy illustration closely linked to Buckland's descriptive writing. Buckland devoted several images of individual fossil specimens, and more of specific details, to just one topic, the ichthyosaurs' divinely ordained functional anatomy and diversity. The Cooper ichthyosaur is one of only some six recognisable specimens of partly or wholly complete ichthyosaurs illustrated in the book, where it exemplified the species *Ichthyosaurus intermedius*. However, there were not many books with pictures of ichthyosaurs in the 1820s and 1830s (for instance, Charles Lyell's (1830-1833) *Principles of geology* lacked drawings of ichthyosaurs). The Cooper ichthyosaur is therefore one of the very few actual fossil ichthyosaurs, as opposed to sketches of reconstructed skeletons or animals in life, to be then published outside specialist journals and monographs: in a real sense, it was a textbook ichthyosaur.

The Cooper ichthyosaur is thus an item of heritage from the wider intellectual world of the 1830s in which it played a direct part as a recognisable individual fossil. But it is also part of the heritage of Lyme Regis and Dorset, because of the contemporary documentation indicating its identity as a Mary Anning specimen, and enabling it to be added to the list of her known specimens in NHMUK (Chapman and Milner, 2010). Given the enormous public interest in Anning (Torrens, 1995; Oldroyd, 2013), this identification is a potential contribution to the public work of the Natural History Museum and its institutional colleagues such as the Lyme Regis Philpot Museum and the Jurassic Coast, the agency which promotes the geology of the coast of east Devon and Dorset. The fossil also connects to the comparative anatomical world of the early decades of the 19th Century, with a personal link to Astley Cooper, one of the most eminent surgeons of his time. Finally, the fossil played its part in William Buckland's exposition of the new science of geology, under the aegis of natural theology, in the Bridgewater Treatise. In summary, therefore, this now rather woebegone and forlorn fossil lay at the centre of the science and culture of its time.

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Professor Massare and Mr. Mark Evans for refereeing the paper. I also thank Professor Hugh Torrens (who had himself previously sought the specimen, posting an appeal during the 1990s, on <http://www.ucmp.berkeley.edu/history/anning.html>) for discussion and information on the Purnell auction catalogue; Ms Sandra Chapman for information in NHMUK records and for arranging photography of the specimen; Dr. William Edwards for information on Guy's and St Thomas's Hospitals collections; Ms Kate Tyte for RCSE archival information; Mr. Jon Shepherd for information in NHMUK archives; Messrs. Roger Clark and Roger Vaughan for information and access to BIASLA records in BRSMG; Ms Cindy Howells for copies of the De la Beche correspondence in ACNMW; and Dr. Druin Burch, Dr. Chris Duffin and Professor Ralph O'Connor for discussion. I thank also Ms Sonia Gomes and the staff of The Women's Library for assistance and permission to cite the Anning letter, and the staff of the libraries of the University of Leicester and National Museums Scotland. I thank Amgueddfa-Cymru, National Museum Wales, and the Natural History Museum for permission to publish archival and copyright materials.

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