A mammoth history: the extraordinary journey of two thighbones

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Since the renaissance, specimens have been central tools of knowledge production in zoological endeavours. The biographies of CN86 and CN87 of the Zoological Museum of the University of Copenhagen – specimens formerly known as hip-bones of giants – have travelled through 300 years of human history, a journey that reveals how the accumulation of objects and changes in scientific methodology can give rise to radical reinterpretation. Although the material form of these specimens has hardly changed, the ideas associated with them have undergone extraordinary transition.

The giant

In 1643, two respected gentlemen observed some workers unearth a skeleton from a field outside Bruges in Flanders. One of the gentlemen, Dr. Sperling, the court physician to King Frederick III of Denmark, recorded the length of the skeleton as nine Brabantian cubits (more than 4 m). With the bible as their point of reference as was common for seventeenth-century naturalists, this confirmed to the men that the skeleton had belonged to a giant. One of its thighbones found its way first to Dr. Sperling's private collection of naturalia in Copenhagen and subsequently into the Royal Danish Kunstkammer or Museum Regium.

The Museum Regium was a private collection of naturalia and artificialia – objects of nature and art – established by King Frederick III shortly after his ascension to the Danish throne in 1648. A museum building, erected in 1665 to house the expanding collection, contained six 'Chambers'. One of them was dedicated to naturalia, with 'various natural products, rare as well as monstrous, from land and sea, in the earth and above the earth, and also a few objects of human manufacture.'

The Bruges hip-bone, which wound up in the Chamber of Natural Objects more than 50 years later, was by no means the only giant on show. By that time, the King's collection already contained three specimens believed to have come from giants – two incomplete sets of teeth and another hip-bone.

Whilst this other hip-bone was, according to the 1737 catalogue, 'more than three feet long' and 'presumably of a large giant', there was greater certainty over the provenance of the more recent acquisition. 'A still larger hipbone 3.5 feet long, weighing 25 lb, belonging to a large Giant.' This confidence stemmed from the account of its excavation provided by Dr. Sperling's son, the reputable

polymath Otto Sperling the younger (1634–1715), who (according to the 1737 catalogue) presented it to Museum Regium in 1718 [1].

Contemporary naturalists were aware of giants primarily from literary sources from antiquity and from the Bible (Figure 1). Since the extraordinary length of the skeleton relayed by Sperling the younger exactly matched the length of the giant King Og's coffin described in deuteronomy 3:11, there was little doubt that the Bruges hipbone had indeed belonged to a giant.

It is clear from the 1737 catalogue that the 'still larger' Bruges hip-bone had been placed together with the smaller specimen on the same side of the entrance to the chamber. The striking similarity between these bones was clearly obvious to the curator and would have had an impact on spectators viewing the King's collection. The reliable provenance of the Bruges specimen lent considerable weight to the claim that the smaller bone was also of giant origin.

The teeth, by contrast, did not benefit from such certainty. Although one large molar 'more than two inches in diameter' had apparently been 'excavated from a Tumulus or Giant's Grave' in 1692, no information about any of the teeth predates 1674, the oldest surviving catalogue of the collection. So by 1737, with their provenance somewhat doubtful, the teeth found themselves placed together with an eclectic mix of natural rarities, including 'a small dragon, skilfully made', 'Two small Horns 2.5 in. long of a horse from the stable of the blessed Frederik 3rd, which have grown out of the Horse's Ears' and 'A white Sparrow'. Most of this miscellany was auctioned off in 1824 although the giant teeth were relocated to the Royal Art Museum in Copenhagen as Scandinavian antiquities [2].

Naturalist texts doubting the existence of giants began to appear from the early seventeenth-century onwards, but if they reached the curators of the Museum Regium, they did not affect the Kunstkammer interpretation of the giants' bones. From the way these bones were arranged and described in the 1737 catalogue, it is clear that the curator's vision of giants was not dissimilar to that of the ancient Greeks.

Their tradition of identifying large earth- or cave-found bones as particular giants still ran strong in renaissance Europe, where newfound giants, such as the 'Giant of Lucerne' and 'Giant of Krems', were often named after the city or region they were unearthed in [3]. In the Antechamber of the Museum Regium, the first room a visitor would enter and a symbolic space describing the character of the collector, a painting of a 'Large Giant' graced the walls up until 1827 after which it was relocated

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Figure 1. Ulysses blinding Polyphemus the cyclops, frieze representing scenes from the Quests of Ulysses (fresco) (b/w photo), Tibaldi, Pellegrino (1527-96)/Palazzo dell'Universita, Bologna, Italy, Alinari/The Bridgeman Art Library. The thighs of the human and the giant are depicted similar in all other regards except size.

to the Royal Gallery – testimony to the special place for these creatures in the King's collection. Unfortunately, this seventeenth-century depiction of giant was destroyed in a fire in 1884 [4].

The elephant

In 1737, there were five elephant specimens situated alongside the two giant hip-bones: 'The Hoof of a very large Elephant', two elephant molars, a rump, and 'A small Piece of an Elephant's Hoof'. On the other side of the door, there were a further eight elephant specimens: four tusks, two molars, a tail, an ear 'from an Elephant shot [in] 1675 by the Danish Captain Magnus Jacobi while it was drinking water at the Cape of Good Hope' and 'The Hoof of a very large Elephant, 18 in. long, 9 in. broad.' All these remains date from the seventeenth-century, although the ear is the only specimen for which a specific date is known [5]. There were usually two or three specimens of a particular species in the Kunstkammer by 1737. Although elephant specimens were rare and exotic in the natural history cabinets of northern Europe and thus prestigious to have, the uncommon abundance of elephantine naturalia in Museum Regium was due to the significance of the animal for the King. The Order of the Elephant – the highest order of Denmark – was depicted by an elephant carrying a watch-tower, a common insignia in the Museum's Chamber of Medals [6] (Figure 2). A 'small-stuffed Elephant', accompanied by a stuffed ox and walrus, also took pride of place in the Kunstkammer's Antechamber [4].

The museum continued to grow throughout the eighteenth-century: although ivory artifacts were more sought after than other remains, elephantine naturalia were still purchased for the collection, like the fairly expensive fetus of an elephant preserved in alcohol



Figure 2. Copper drawing of a medal minted for the Danish victory over the Swedes in 1659. The elephant represents the Danish military power and the other figures depict Swedish leaders. Reproduced with permission from Holger Jacobaeus's Museum Regium of 1696 (pp. 88–90/ZMUC). Copyright© Taika Dahlbom.

acquired in 1788 and the elephant tusk presented to Russia in 1790 [7]. By the early nineteenth-century, however, European natural history collections had generally begun to concern themselves with typicalities rather than curiosities, and following this trend, Museum Regium was broken up into several specialist collections.

Review

In 1824, duplicates, damaged and otherwise inferior objects not considered fit for inclusion in the new collections were sold in a public auction. There were, however, no giants for sale: by this time, they had been reclassified as elephants [8].

Thus, in 1825, the zoological collection of the Royal Natural History Museum acquired the 'thighbone of an elephant', formerly the 'still larger Hip-bone of a Giant'. From a manuscript of 1844, it is clear that this thighbone – specimen 2A – had found its way into the osteological collection. There was no mention of the 'smaller Hip-bone' but it is likely to have been there alongside the larger bone, probably portraying the same species.

There, it was grouped together with a lower mandible and a cranium received from the Scientific Society of Calcutta in 1839 as examples of *Elephas indicus* Linnée [sic]. Two crania of *Elephas africanus* Blumenbach, both missing the lower mandibles and tusks, represented the other known elephant species in the museum.

The author of the manuscript – Johannes Theodor Reinhardt, who became docent of the Royal Natural History Museum in 1848 after returning from a three-year expedition in South-America – made no mention of the thighbone's former incarnation as the 'Hip-bone of a Giant'. Instead, with the benefit of Georges Cuvier's drawings, he decided this specimen had been part of an Asian elephant [9]. The use of zoological texts and visual reference points to help identify species was nothing new. Nevertheless, the scope and abundance of sources available to Reinhardt made the process of classification more objective than ever before.

The mammoth

Reinhardt's inventory of the osteological collection was near perfect. But when an anonymous commentator examined it, he made an amendment to the catalogue. The 'smaller Hip-bone' resurfaced as specimen 2B, added as an independent specimen alongside the *E. indicus* thighbone and both were reclassified as thighbones of *Elephas primigenius* Blumenbach. This species, formerly unseen in the collection and first described in Johann Blumenbach's *Handbuch der Natur* of 1799, later became known as the mammoth, *Mammuthus primigenius* Blumenbach.

As in the Museum Regium, therefore, the existence of two bones rather than one had a profound effect on how they were understood. In spite of their new designation, there remained some uncertainty over the identification of mammoth specimens until the 1850s.

In 1852, for example, a 'fragment of a tusk of an elephant-like animal' found on Danish soil entered the Royal Museum. In the museum journal, which recorded all incoming specimens, there was an assessment of the character and value of the tusk that stands out from other entries in its thoroughness. Although the 'internal or

external characteristics' of the fragment were judged insufficient to decide which species it came from, 'considering all the previous fragments excavated from similar soil', the tusk was 'in all likelyhood that of a Siberian mammoth'.

A few years later, there was greater certainty over the provenance of another acquisition. 'Have received on Museum's Directions a tusk of a Mammoth-Elephant', reads the journal, 'Tooth was found on a bank of [Nirsumfjord]. Tooth has been received for the sum of five Rigsdaler' [10]. In this case, the location of the find was also important for identifying the provenance of the specimen. The taxonomic distinction between elephants and mammoths was becoming clearer.

In 1862, however, the Royal Museum's Zoological collection was administratively fused with those belonging to the city's university to form Zoological Museum of the University of Copenhagen (ZMUC), and a new museum building was built in Krystalgade in the 1860s (Figure 3). When the combined collection was unveiled in the new building in 1870, the mammoth thighbones were on display in the paleontological room on the second floor [11] (Figure 4).

Both specimens remained together even after the ZMUC moved to its current building between 1967 and 1970. By this time, however, the wealth of fossil specimens



Figure 3. The central hall in the new museum in Krystalgade. The drawing is from 1868, 2 years before the opening, and thus shows an imagined version of the exhibits. Although this representation does not depict the central hall in reality, it provides an image of what was expected from the new museum at the time. Reproduced, with permission, from the Royal Library, Denmark.



Figure 4. After the museum moved to its current building, nineteenth-century cabinets and casks from the former museum were used to store the ever-growing paleontological collection. Copyright© Taika Dahlbom.



Figure 5. In 2006–2007, the palaeontological collection was rearranged. The former 'smaller Hip-bone' occupies the top shelf and beneath it the 'larger Hip-bone' sits next to the mammoth molars. Copyright[®] Taika Dahlbom.

meant that the paleontological collection became divided between the public collection and the study collection, where both thighbones ended up (Figure 5).

Given that these bones have travelled together for so long, each informing the identification of the other, it is ironic that they have now parted taxonomic company. Whilst the specimen that began its journey as the 'still larger Hip-bone of a Giant' is still considered to be a mammoth femur, the 'smaller Hip-bone' is now thought to be the left thighbone of Indian elephant (*Elephas maximus*) [12].

Conclusion

The biographies of specimens emerge from the interplay between material and immaterial facts: until recently, the visual resemblance of the two thighbones has been a determining factor in their classification. Initially, they were placed in a broad material context, in relation to the entire macrocosmos. But as zoological endeavour became increasingly specialised, they found themselves in an evernarrowing material environment that has informed their interpretation.

During their lifetime under the zoological gaze, such specimens accumulate layer upon layer of biographical detail. These biographies reveal that the interpretation and reinterpretation of specimens is affected far more by the immediate material and immaterial collection environment than by the innovation or conceptual death of species.

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Free journals for developing countries

The WHO and six medical journal publishers have launched the Health InterNetwork Access to Research Initiative, which enables nearly 70 of the world's poorest countries to gain free access to biomedical literature through the internet.

The science publishers, Blackwell, Elsevier, Harcourt Worldwide STM group, Wolters Kluwer International Health and Science, Springer-Verlag and John Wiley, were approached by the WHO and the *British Medical Journal* in 2001. Initially, more than 1500 journals were made available for free or at significantly reduced prices to universities, medical schools, and research and public institutions in developing countries. In 2002, 22 additional publishers joined, and more than 2000 journals are now available. Currently more than 70 publishers are participating in the program.

Gro Harlem Brundtland, the former director-general of the WHO, said that this initiative was "perhaps the biggest step ever taken towards reducing the health information gap between rich and poor countries".

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