

Part I

Introduction and Concepts

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Excerpt
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An Introduction to the Development of Palaeopathology

1.1 BEGINNINGS

There is a widely held view that the discipline of palaeopathology began in 1774 with the publication of Esper's account of fossil bones found in caves in Bavaria, although there is very little hard evidence to support this view, as I will discuss further below. What is almost certain is that an interest in, and fascination with, bones has a very much longer history, perhaps because in them resides the last tangible evidence for individual existence. The wish to have one's bones buried either close to those of a loved one, or (if not that, then) in one's own country, for example, can be traced back at least as far as the *Iliad* and the Trojan War; '... inter my bones not far from thine ...' urges the ghost of Patroclus to Achilles,¹ while Nector suggests to Atreides that '... the friends of the dead ... bring their bones home to their children ...'² For none was the desire for the return of one's bones to home soil expressed more fervently than by those who died during the Crusades, although the practice predated them, having earlier been followed on behalf of others who had died far from home, especially by the Germans who died in foreign lands, and later by the French and the English.³ Following their death in the Holy Land, the bodies of the rich and the nobility might be boiled and the flesh removed so that their bones could be taken back for burial by those who survived them.

¹ *The Iliad*, xxiii, 86.

² *The Iliad*, vii, 334–335. This passage has proved problematic to Greek scholars, not least because it was the general custom for the Greeks to cremate their dead. See D Shive, Ομηρον εξ Αισχυλου σαφηνιζειν: *Iliad* 7.332–338 and Agamemnon, *Phoenix*, 50, 433–455.

³ But not, apparently, by the Italians, who were amazed by what they referred to as the *mos teutonicus* (the German custom). Further details can be found in K Park, The life of the corpse: division and dissection in late medieval Europe, *Journal of the History of Medicine and Allied Sciences*, 1995, 50, 111–132.

This practice was condemned by the Church, and it was eventually forbidden by Pope Boniface VIII in the bull *Detestande feritatis* issued on 27 September 1299. In its place Boniface decreed that all those who died in a foreign catholic country should be immediately buried at the site chosen by the deceased, or, failing that, temporarily buried at or near the place of death and transferred to the final place selected for burial only after the body had turned to ashes, a process that might be long delayed.⁴

During the medieval period, a rather more macabre interest in the skeleton was displayed by artists depicting *memento mori* such as the Three Quick and the Three Dead, the *danse macabre* and skeletons with a caption taking a form such as: ‘As you were, so was I, and as I am, so shall you be’.⁵ In depictions of the Three Quick and the Three Dead, three richly dressed princes or noblemen are seen riding to the hunt, only to be greeted by themselves as skeletons; as we are, so shall you be. The lesson of all the various forms of *memento mori* was presumably to focus the medieval mind on the vainglorious of earthly life and, in its place, prepare it for the rewards that will hopefully come in the life hereafter. Many illustrations of this kind are to be found in churches and cathedrals throughout Europe, and it is often said that this art form was particularly stimulated by the coming of the Black Death, which was certainly enough to remind one that life was indeed transitory and uncertain.⁶ Another popular image, the *danse macabre* or dance of death, first appeared in the Cimetière des Innocents in Paris in 1424 and quickly spread throughout the rest of Europe. In these pictures, death is shown as a skeleton, sometimes wearing a crown on his head, inviting people of all kinds to a dance that leads inevitably to the grave;

⁴ Boniface reissued the bull on 18 February 1300, and this explains the confusion in much of the literature where either date may be quoted for its origin. For further details, see: EA Brown, Death and the human body in the later Middle Ages: the legislation of Boniface VIII on the division of the corpse, *Viator*, 1981, 12, 221–270.

⁵ Similar inscriptions may also sometimes be found on graves or gravestones, sometimes in the form of Latin tags such as *Tu fui, ego eris* (What you are, I was, what I am you will be), or *Eram quod es, eris quod sum* (I was what you are, you will be what I am).

⁶ That the *memento mori* were stimulated by the Black Death is by no means held by all authorities; for a relatively recent contrary view, see RE Lerner, Fleas: some scratchy issues concerning the Black Death, *Journal of the Historical Society*, 2008, 8, 205–228. An even starker reminder of the transitory nature of life appeared in the later fourteenth or early fifteenth centuries, the transi tomb in which the dead person was shown as he or she was during life, resting above themselves as a corpse in varying stages of decomposition and decay, sometimes shrouded and with maggots or worms making a meal of their body. These tombs first appeared in France from where they spread to northern Europe, and many examples still survive. They spread to England in the fifteenth century, the first being that of Bishop Richard Fleming in Lincoln Cathedral (K Cohen, *Metamorphosis of a death symbol: the transi tomb in the late Middle Ages and the Renaissance*, Berkeley, University of California Press, 1973).

again the intention seems to be to act as a reminder of the closeness of death and the necessity to be prepared for it at all times.⁷

1.2 RELICS

Nor should we overlook the importance to the medieval mind of relics, the physical remains, usually, but not exclusively, bones of saints and other holy men and women, which were imbued with special powers and with special access to the divine. The cult of the relic can be traced back to the persecution of the Christians during the second and third centuries, and by the eighth century relics were required for the consecration of altars; by the twelfth and thirteenth centuries body parts were required for the procedure of canonisation to take place.⁸ Churches were built or altered to contain relics,⁹ and a huge trade in relics grew up throughout the medieval world and so, naturally, did fraud. Many bones were certainly not from those to whom they were attributed, and in many cases, they were not even human. Nevertheless, great collections were made, most notably perhaps by Charlemagne, whose collection came to reside in Aachen Cathedral,¹⁰ and by Frederick Barbarossa, who took the bones of the Magi from Milan and presented them to Cologne Cathedral in 1164. Relics attracted visitors to the churches and cathedrals in which they lay, and pilgrims might travel many miles to see part of a saint or the reliquary in which it was housed. The churches profited greatly from the relic business and so did others. Chaucer's Pardoner, for example, made more money in a day by letting some poor person see the relics he carried with him than that man made in two months, even though the relics on display were from no saint but were nothing more than pig's bones.¹¹

⁷ JM Clark, *The dance of death in the Middle Ages and Renaissance*, Glasgow, Jackson, 1950.

⁸ CW Bynum and P Gerson, Body-part reliquaries and body parts in the Middle Ages, *Gesta*, 1997, 36, 3–7.

⁹ See, for example, EM Shortell, Dismembering Saint Quentin: Gothic architecture and the display of relics, *Gesta*, 1997, 36, 32–47.

¹⁰ Some of Charlemagne's relics, including the arm of St Anne and the tooth of St John the Baptist, are illustrated in a fifteenth-century German woodcut (C Dodgson, A woodcut illustrating the relics of the Holy Roman Empire, *The Burlington Magazine for Connoisseurs*, 1917, 30, 96–98).

¹¹ And in a glas he hadde pigges bones.

But with thise relikes, whan that he fond

A povre person dwellynge upon lond,

Upon a day he gat hym moore moneye

Than that the person gat in monthes tweye (*Canterbury Tales Prologue*, lines 700–704).

See also R Malo, The Pardoner's relics (and why they matter the most), *The Chaucer Review*, 2008, 43, 82–102. Nor should we suppose that the cult of the relic is dead, witness the great public interest when the bones of St Thérèse of Lisieux (who died of tuberculosis in 1897) went on tour in Britain in 2009 (*The Times*, 16 September 2009).

6 PALAEOPATHOLOGY

1.3 CURIOSITIES

The artists who created the various forms of *memento mori* referred to above clearly had some knowledge of the anatomy of the human skeleton, even if they are rarely accurate as to detail.¹² Although the dance of death persisted in some parts of Europe into the nineteenth century, most of these art forms had disappeared by the early modern period, but for a short time in the seventeenth and eighteenth centuries, human bones were incorporated on gravestones in place of the otherwise overly comfortable or sentimental images that were the norm.¹³ The skull was now the element most frequently depicted, sometimes with both full face and side view being shown, giving it a quasi-three-dimensional appearance. It is usually reasonably accurately depicted, but when other bones are shown as well, they are often hard to recognise and sometimes are more like animal than human bones, which supposes that the stonemasons may not have been so well informed anatomically as their medieval forebears and, instead, tended to take their models from the butcher rather than the ossuary.

Among the bones that were returned for burial from distant lands, or were removed by the medieval gravediggers to be placed in ossuaries, there must have been some with pathological abnormalities, but there seem to be no early published accounts of such material. What are to be found, however, are published accounts of extraordinary skeletons, appearing many years before Esper's supposed foundation stone was laid in the palaeopathological edifice, and almost always the authors were medical men. One might cite, for instance, Bernard Connor's account in 1695 of a skeleton 'all the Bones whereof were so united as to make but one continued Bone without Articulation . . .'¹⁴ Connor encountered this unusual skeleton during his travels on the continent, and he supposed that it had come from a graveyard or charnel house. What is almost certain, however, is that this was

¹² The relative crudeness of some of the anatomical drawing in the early modern period can be seen in some of the illustrations for Francis Quarles's *Emblems and hieroglyphics of the life of man*, first published in 1637. Two skeletons are shown, one in the eighth emblem of Book 5 (Man is Death's prisoner) and the other, the sixth in Book 6 (Angels our guard). Although the illustrations are correct insofar as the number of arm and leg bones is concerned, the number of ribs is incorrect, and none of the bones is true to shape. Doubtless anatomical veracity was not the main factor in the construction of these figures, but they stand in very sharp contrast to the beautiful woodcuts of Calcar, which illustrated Vesalius's *De fabrica* published almost a century earlier in 1543.

¹³ For further details on tombstones, see F Burgess, *English churchyard memorials*, London, SPCK, 1963. See also, T Waldron, Bones on stones, *Archaeology International*, 2017, 20, 85–90.

¹⁴ B Connor, An extract of a letter giving an account of an extraordinary humane sceleron, whose vertebrae of the back, the ribs, and several bones down to the os sacrum, were all firmly united into one solid bone, without jointing or cartilage, *Philosophical Transactions of the Royal Society*, 1695, 19, 21–27.

a case of ankylosing spondylitis, probably the first to have been described, and that Connor recognised the difficulty in respiration that would have resulted to the individual during life consequent upon the fusion of the costo-transverse and costo-vertebral joints.¹⁵ Some ten years previously, Thomas Molyneux, on his own journeys through Europe, had come across a ‘prodigious large’ *Os Frontis* in the medical school at Leyden that was more than twice the size of several normal bones with which he compared it. Extrapolating from this to the general size of the skeleton (although by what means he neglects to tell us), Molyneux supposed that his subject must have been at least eleven or twelve feet tall and ‘the greatest Monster the World ever saw’.¹⁶ The gigantic theme was further explored some years later by William Cheselden, better known for his operation for the bladder stone than for his anthropology. In a very short report (of fourteen lines) Cheselden commented on some, presumably Romano-British, bones that had been unearthed at St Albans. The left femur was reported to be twenty-four inches long, the right, twenty-three inches, and each tibia was twenty-one inches long. According to Cheselden’s calculations the bones must have belonged to a man who was ‘eight foot high’.¹⁷

These specimens and others like them were regarded as mere curiosities by those who described them, and in this respect they were like the other anatomical curiosities collected, mostly by medical men, during the seventeenth and eighteenth centuries, a number of which formed the basis of a collection belonging to the Royal Society, found to be sadly neglected by a Committee for Inspecting the State of the Repository in the first quarter of the eighteenth century.¹⁸

¹⁵ MT Pugh, Bernard Connor (1666–1698), *Rheumatology*, 2002, 41, 942–943.

¹⁶ His measurements from nasion to bregma were 9.1 inches (23.1 cm) for the giant and 4.5 inches (11.4 cm) for the largest of his normal skulls; from pterion to pterion the distance was 12.2 inches (31 cm) for the giant and 6 inches (15.2 cm) for the largest of the normal bones. The giant frontal was half an inch thick (1.27 cm) compared with a maximum of quarter of an inch (0.64 cm) for the normal bones. Eleven or twelve feet corresponds to 3.35 and 3.66 m, respectively; prodigious indeed! (T Molyneux, Part of 2 letters concerning a prodigious *Os frontis* in the Medicine School at Leyden, *Philosophical Transactions of the Royal Society*, 1685, 15, 880–881).

¹⁷ W Cheselden, The dimensions of some human bones, of an extraordinary size, which were dug up near St. Albans in Hertfordshire, *Philosophical Transactions of the Royal Society*, 1710, 27, 436. Unfortunately, Cheselden does not tell us the means by which he calculated the height of this man. The length of the left femur is equivalent to 61 cm, of the right to 58.4 cm, and of each tibia, 53.3 cm. Using these lengths in the appropriate regression equation suggests that the height was more likely to have been closer to seven than to eight feet. (For the left femur and tibia combined, the estimated height is 2.07 m, and for the right femur and tibia combined, 2.11 m. These heights are equal to 6 ft 11½ in and 7 ft 1 in, respectively.)

¹⁸ JH Appleby, Human curiosities and the Royal Society, 1699–1751, *Notes and Records of the Royal Society of London*, 1996, 50, 13–27. The greatest of all the eighteenth-century collectors was John Hunter (1728–1793), who acquired almost literally anything (or anyone) he could get his hands on. When he died, he had amassed some 14,000 specimens, which he kept in his large house in Leicester Square

1.4 AND SO, BACK TO ESPER

It seems likely that Esper's position as the father of palaeopathology has its origins in a remark made by Moodie in his *Paleopathology*.¹⁹ At page 62, he writes,

The earliest reference, in paleontological literature to the pathological nature of fossil bones was by E. J. C. Esper (1742–1810), Professor at Erlangen, in 1774 as cited by Goldfuss. Esper described on the lower half of the femur of a cave bear (*Ursus spelaeus*), what he regarded as an *osteosarcoma*.

Moodie made two errors in this passage. First, it was not Eugen Johann Christoph Esper who was the author of the work referred to, but his older brother, Johann Friedrich.²⁰ Second, the lesion referred to was most certainly never referred to by Esper as an osteosarcoma. What Esper actually wrote, referring to an illustration of the bone in question, was

Dass es der Rest von einem osse Femoris, und zwar ab der untere Theil desselbigen ist, zeigt sich von selbst. Nur muss ich sagen, dass die grosse Dicke von c. gegen d, ein Callus ist, mit welchem die Natur einem Bruch dieser Röhre wieder geheilt.²¹

Roughly translated, the second sentence reads: I must say that the large thickening from c to d is a callus, with which Nature has again healed the break.

Goldfuss,²² to whom Moodie also refers, did indeed mention Esper and gave the correct reference to his book (on page 144 of his own work) and says (on page 276):

Esper giebt (tab 14 f2 p74) die Abbildung eines Hüftknochens, welcher Spuren eines Bruches zeigt, den ein Callus wieder verband.²³

in London. The collection passed to the Royal College of Surgeons, but much of it was lost when the College was bombed in the Second World War. The Hunterian Museum still holds many of his original specimens, however, including the skeleton of the Irish giant Charles Byrne, which was the most prominent exhibit on entering the museum (see J Kobler, *The reluctant surgeon: a biography of John Hunter*, New York, Doubleday, 1960).

¹⁹ RL Moodie, *Paleopathology. An introduction to the study of ancient evidences of disease*, Urbana, University of Illinois Press, 1923. Moodie repeated this passage, more or less word for word, in another book of that year: *The antiquity of disease*, Chicago, University of Chicago Press, 1923, p 4.

²⁰ EJC Esper (1742–1810) was professor of zoology at Erlangen University; JF Esper (1732–1781), on the other hand, was a pastor having had his theological training at Erlangen.

²¹ JF Esper, *Ausführliche Nachricht von neuentdeckten Zoolithen unbekannte vierfüssiger Thiere*, Nuremberg, Georg Wolfgang Knorr, 1774, p 74.

²² Georg August Goldfuss (1782–1848) was also professor of zoology at Erlangen and subsequently professor of zoology and mineralogy at the University of Bonn.

²³ GA Goldfuss, *Die Umgebungen von Muggendorf. Ein Taschenbuch für Freunde der Natur und Alterthumskunde*, Erlangen, Johann Jacob Palm, 1810.

Or: Esper provides the illustration of a hip-bone, which shows traces of a break, which a callus has connected again.

Various authors who have followed Moodie have perpetuated at least one of the errors in the passage from his book quoted above. There is little doubt that Esper described what he thought was a healed fracture, although the illustration of it is not terribly convincing. There also seems to be some doubt as to whether all those who wrote after Moodie had read the original; Moodie himself certainly had not, as he himself confessed to Henry Wellcome in a letter written in 1931.²⁴

In 1774 one E. J. C. Esper, a professor in one of the schools, possibly a medical school at Erlangen, published a pamphlet [sic] in which he described what he took to be an *osteosarcoma* on the lower half of a cave bear femur. This was probably a healed fracture. I have never seen the pamphlet but it should be possible to secure a copy.

Moodie, who was working for Wellcome at the time, no doubt hoped that Wellcome would be able to obtain the pamphlet, which is, in fact, a quarto volume of some 148 pages, but there is no evidence that he did so. It seems likely that Moodie took his information from Mayer, whose paper he *had* read. In this paper, Mayer wrote that Esper had described a femur of a cave bear ‘und zwar an dessen oberem abgebrochenen Ende ein Osteosarcoma des Knochens’.²⁵ Mayer felt that the lesion was, in fact, a healed fracture with some necrosis, and it was this opinion that Moodie duly recorded (on page 62 of *Paleopathology*) and that he relayed to Wellcome. Quite how Mayer arrived at the notion that Esper had described an osteosarcoma is by no means clear; I can find no evidence that Esper referred to anything like it anywhere in his original publication,²⁶ and it seems unlikely that an explanation for this misunderstanding will now be forthcoming.

1.5 AN OBSESSION WITH SKULLS

A number of authors have tended to divide the early period of palaeopathology into various phases. For example, Pales described three phases, the first between

²⁴ Correspondence in the Wellcome Library WA/HMM/CO/Chr/H.29.

²⁵ C Mayer, Über krankhafte Knochen vorweltlicher Thiere, *Nova acta Leopoldina*, 1854, 24, 673–689.

²⁶ In this context, there is the not inconsiderable problem that Esper could not, at the time, have used either the term *sarcoma* or *osteosarcoma*. The former term was not introduced into medical parlance until 1804 by John Abernethy (1764–1831), the English anatomist and surgeon, and the latter not until 1805 by Alexis Boyer (1757–1833), who was personal surgeon to Napoleon Bonaparte (LF Peltier, *Orthopedics: a history and iconography*, San Francisco, Norman Publishing, 1993; IM Rutkow, *Surgery: an illustrated history*, St Louis, Mosby, 1993).

1774 and 1870, which was devoted to the study of fossil faunas; the second from 1870 to 1900, when trauma and the origin of syphilis were pre-eminent among the study of human remains; and the third from 1900 given over to the study of infectious diseases.²⁷ Angel, by contrast, proposed a different scheme.²⁸ Activities prior to the First World War he considered to form a descriptive phase, the between-war period he termed the period of specialisation, while the 1950s ushered in the beginning of population-based studies, and the 1960s heralded the modern period. Angel considered that the modern period was announced by three events, the publication of Jarcho's symposium on palaeopathology, held in Washington in 1965; the publication of *Diseases in Antiquity* (edited by Brothwell and Sandison); and the founding of the Paleopathology Association by the Cockburns and others in 1973.²⁹ A different scheme again has been proposed by Aufderheide and Rodríguez-Martin in which the beginnings of palaeopathology are dated from 1870 to the start of the First World War; a consolidation phase occupied the inter-war years, with the 'new' palaeopathology emerging at the end of the Second World War and continuing to the present.³⁰

Whatever scheme may be preferred by the student of the history of palaeopathology, and none of the divisions within them coincides or is consistent between them (see Table 1.1), the theme that was actually pre-eminent in the study of human remains in the latter part of the nineteenth century and for almost the first half of the twentieth was an obsession with skulls and race; pathology was very much second fiddle to the greater part of the work that went on then. The theoretical underpinning for this work on race seems to have stemmed from Blumenbach's³¹ publications, in which he claimed to be able to characterise humankind into five distinct races on the basis of his analysis of their morphology, especially that of the skull,³² and also from Gall's invention of 'cranioscopy', by which means various moral and mental faculties of an individual could be determined from the shape of

²⁷ L. Pales, *Paléopathologie et pathologie comparative*, Paris, Masson, 1930.

²⁸ J.L. Angel, History and development of paleopathology, *American Journal of Physical Anthropology*, 1981, 56, 509–515. The modern period (up to about 1980) is described by JE Buikstra and DC Cook, Palaeopathology: an American account, *Annual Review of Anthropology*, 1980, 9, 433–470.

²⁹ D Brothwell and AT Sandison, *Diseases in antiquity*, Springfield, CC Thomas, 1967; S Jarcho, *Human paleopathology*, New Haven, Yale University Press, 1965. The Paleopathology Association was founded by Adian Cockburn and his wife, Eve, after the dissection of the mummy PUM II (see TA Cockburn, Paleopathology and its association, *Journal of the American Medical Association*, 1978, 240, 151–153).

³⁰ AC Aufderheide and C Rodríguez-Martón, *The Cambridge encyclopedia of human paleopathology*, Cambridge, Cambridge University Press, 1998.

³¹ Johann Friedrich Blumenbach (1752–1840) was professor of medicine at Göttingen.

³² See R Bhopal, The beautiful skull and Blumenbach's errors, *British Medical Journal*, 2007, 335, 1308–1309.