Why heads matter in palaeoanthropology: The impacts and consequences of collecting skulls

AUTHORS:
Lauren Schroeder[1,2]
Paige Madison[3]
Rebecca R. Ackermann[2,4]

AFFILIATIONS:
[1]Department of Anthropology, University of Toronto Mississauga, Mississauga, Ontario, Canada
[2]Human Evolution Research Institute, University of Cape Town, Cape Town, South Africa
[3]Department of Applied Ecology, North Carolina State University, Raleigh, North Carolina, USA
[4]Department of Archaeology, University of Cape Town, Cape Town, South Africa

CORRESPONDENCE TO:
Lauren Schroeder

EMAIL:
lauren.schroeder@utoronto.ca

DATES:
Received: 20 Apr. 2024
Revised: 06 Sep. 2024
Accepted: 17 Sep. 2024
Published: 07 Feb. 2025

HOW TO CITE:
Schroeder L, Madison P, Ackermann RR. Why heads matter in palaeoanthropology: The impacts and consequences of collecting skulls. S Afr J Sci. 2025;121(1/2), Art. #18481. https://doi.org/10.17159/sajs.2025/18481

ARTICLE INCLUDES:
☒ Peer review
☒ Supplementary material

DATA AVAILABILITY:
☐ Open data set
☐ All data included
☒ On request from author(s)
☐ Not available
☐ Not applicable

EDITORS:
Jemma Finch
Tim Forssman

KEYWORDS:
Taung Child, crania, physical anthropology, postcrania, scientific racism

FUNDING:
Natural Sciences and Engineering Research Council of Canada (RGPIN-2020-04159), South African National Research Foundation (136512)

This piece reflects on the importance of and focus on heads – especially the collecting of skulls and its impacts – in alpha taxonomy, biological anthropology, and Western science more broadly. We consider how the announcement and overall discovery story of the Taung Child revolutionised our understanding of hominin cranial evolution, but also fit within these skull-collecting objectives and contributed to the palaeoanthropological fixation on the skull. We contextualise this within the history of 'physical' anthropology in light of its initial goals in scientific racism, and consider how this process of skull collecting has become normalised in the discipline as a result of this history. As evidence for this, we quantify the possible effects of skull-collecting by collating available data on the number of skulls versus post-crania curated in a representative South African collection and compare the number of skulls versus post-cranial hominin fossils that form part of species hypodigms. We also explore how the ownership of skulls and ownership of narrative in the discipline have been intertwined throughout its history. Finally, we focus on how this early overemphasis on skulls, and especially brain size/intelligence, may have skewed our understanding of human evolution and contributed to ideas of human exceptionalism.

Significance:

- The discipline of palaeoanthropology has a history of skull-focused research rooted in skull collecting and racist research.
- Historical skeletal collections and holotypes of fossil hominins are skull-biased.
- The Taung Child fossil postcranial remains were not included in the original study, which reflects this skull-centrism.
- Palaeoanthropologists need to recognise biases in research choices and the context from which our field developed.

[Abstract in Setswana]

The Taung Child – not just a head

In February 1925, the world was introduced to a fossil declared to be an "intermediate between living anthropoids and [humans]"[1(p.195)]. The discovery was a juvenile skull, with a well-preserved face and mandible, as well as a relatively complete endocast, and was designated *Australopithecus africanus* (the southern ape from Africa) and nicknamed the Taung Child. The announcement – and publications afterward – failed to mention, however, that the skull was not the full extent of the discovery. There were also associated postcranial remains. In the "rock mass containing the facial fragment", the "distal ends of the forearm bones and the small phalanges were present", wrote Australian-born Raymond Dart.[2(p.22)] Dart, who had spent weeks preparing the skull using his wife's sharpened knitting needles, "strove to develop [the postcrania] without success, as they were so friable", adding that "portions are still visible in the stone"[2(p.22)]. While preparing phalanges is undoubtedly significantly more difficult than preparing a skull, the decision to take the preparation no further (as well as the uncertainty around the location of that block of stone to this day) reveals an interesting truth: the skull itself was privileged.

In a science that emerged three-quarters of a century earlier from a European fascination with measuring human skulls in the service of scientific racism, the skull had long held much attention.[3] Focusing on humans' large brains as a defining feature of evolutionary history, 19th-century European naturalists sought to glean information ranging from cognitive capacity to geographical history and even degree of "morality" from the shape of skulls.[4] This partiality to anatomy above the neck was apparent in the discussions of the earliest fossil finds, beginning with the original Neanderthal individual from Feldhofer Cave unearthed in 1856 – the first fossil hominin to gain recognition as an ancient human ancestor. As the specimen rose to scientific importance, debates centred on the "thoughts and desires" that once dwelt within the cranium, and replicas of only the partial cranium circulated across Europe, leaving the associated postcrania behind as a footnote in Germany.[5]

This skull-centrism persisted into the 20th century despite a growing fossil record in Europe and Asia, and a recognition that bipedalism (and the significant modifications it made to the skeleton) was a significant evolutionary adaptation. When the juvenile fossil was blasted from a quarry seven miles southwest of the Taung railway station in 1924[6], the growing evidence for fossil hominins was nonetheless still extraordinarily sparse and piecemeal, and, with the exception of the much younger (now known to be 299 000 years old[7]) Kabwe cranium found in 1921, nonexistent in Africa. Truly ancient-looking finds were rare, partial, and scattered across the globe in ways that made generating narratives challenging, and nothing as old or ape-like as the Taung Child had been found. No consensus existed around topics like where the origin of humankind was located, whether bipedality preceded brain growth, and overall how to recognise a human ancestor.

So when Dart received a block of breccia in late 1924, central questions about human evolutionary history remained open. Yet, despite such uncertainty, certain hypotheses and assumptions were widely subscribed to by naturalists. The most prevalent assumption centred on the importance – and early emergence – of the large brain. Anatomists like Dart's mentor, Grafton Elliot Smith, hypothesised that an increase in brain size was the *first* distinctively human trait to have evolved, preceding upright walking, tool making, and other adaptations. "It was not the adoption of the erect attitude that made [humans] from an ape", Elliot Smith argued the year before Taung was published, but instead the "gradual perfecting of the brain"[8(p.39)]. It follows, then, that the skull would be the most important aspect of an ancestor.

Dart, too, favoured the skull in terms of its theoretical contribution, declaring it precisely the piece of anatomy needed to identify a significant, transitional human ancestor. While some others claimed "if missing links are to be traced with complete success, the foot, far more than the skull, or the teeth...will mark them as Monkey or Man"[9(p.195)], Dart, agreeing with his mentor, declared this "preposterous"[2(p.58)]. Instead, the skull told the anatomist everything they needed to know about the creature's character, behaviour, posture, and taxonomic status. Notably, Dart and Elliot Smith agreed on the skull's importance despite disagreeing on the timing and significance of increased brain size. Following Elliot Smith's logic that the brain led the way in human evolution, the Taung Child with its small brain, not to mention its location in Africa, was all wrong as a candidate for human ancestor. Yet, as a neuroanatomist, Dart argued that the *organisation* of the brain revealed that *Australopithecus* had "shot ahead of all apes in intelligence"[2(p.210)]. Thus, Dart elevated his specimen to a position of prime importance *despite* its small brain – seemingly a feature that would preclude it from an important evolutionary role. Indeed, he turned the small brain size around to be the central significance of the fossil. This illustrates that, regardless of the theoretical commitments a scientist had about the expansion of brain size, the skull was seen as the key to unlocking the human evolutionary story.

The Taung Child clearly contributed to the palaeoanthropological fixation on the skull, but the head-collecting objectives of the discipline go well beyond this important find. In this article, we use the discovery of the Taung Child as a jumping-off point for further interrogating the focus on skulls in alpha taxonomy and its history in racist research. We demonstrate that skull-centrism in palaeoanthropology is widespread, as evidenced by a skeletal inventory from a well-known historical South African human skeletal collection, as well as what bones comprise type specimens of currently recognised hominin species, and that this has impacted hypothesis generation and narrative construction in the discipline.

Heads on a mantle, scientific racism and taxonomy

How can we understand the privileging of the skull in palaeoanthropology through the lens of the Taung Child and what can we learn from such skull-centrism? Importantly, this theme pervades the entire story, as the Taung skull even found its way to Dart through *another* skull, that of a cercopithecoid monkey loaned by Mr E.G. Izod, Director of the Rand Mines. That specimen had sat proudly on the mantle of Pat Izod's home, the son of E.G. Izod, to be recognised by anatomy student Josephine Salmons and brought to Dart at the University of the Witwatersrand, instigating his interest in the area.[1(p.195),10(p.40)] This cercopithecoid skull was not only an important moment in the history that led to the Taung Child discovery, but also its placement, as a curiosity on a mantle, provides a poignant image that exemplifies the history of skull collecting in scientific pursuits. This skull-centric approach was consistent with the history of 'physical' anthropology, and we would argue that the process of head collecting has remained normalised in the discipline as a result of this history.

The long sordid history of body (skeleton) and especially head (skull) collecting is intertwined with Euro-colonial conquest, dehumanisation, and white supremacy.[11,12] Beginning in the late 18th and into the early 19th century, colonial violence extended beyond conquest and colonial expansion to the looting of objects of cultural significance, collecting of specimens of natural history importance, and the acquiring of humans (including body parts, skeletons, and living people) from colonies as trophies (e.g.[13–15]), curiosities, exhibitions, and scientific study[16–19]. The collection of human remains through grave robbing, murder, trophy-collecting and warfare, served a dual purpose for colonisers and colonial explorers.[20,21] First, it was used as a method of subjugation and a grotesque exertion of colonial power (e.g.[22]), and second, it was central to the scientific advancements of these colonial powers at a time when race science was being developed. These human remains were considered important "scientific" evidence for the inferiority of Indigenous peoples to justify their colonisation, enslavement, and genocide[15], with anthropologists, physicians, and anatomists involved in their study, and the skull as the main subject of interest.[3]

Building on the previous taxonomic classification of *Homo sapiens* into four racial "subspecies" (as well as a fifth category that has been called a racist and "non-geographical grab-bag", *Homo monstrosus*[23]) by Carl Linnaeus in his Systema Naturae[24], Johann Blumenbach divided living humans into five human groups based on the study of his large collection of skulls[25–27]. Although there is disagreement about whether Blumenbach himself was an active participant in race science and therefore a proponent of the superiority or inferiority of certain races (as argued by Junker[28]), his classic image of five human skulls in a row, with the Georgian "Caucasian" individual in the centre – reflecting a Eurocentric prejudice – inspired the development of race science alongside methods of craniology, craniometry and phrenology. This iconography also features prominently in early physical anthropology works (Figure 1).

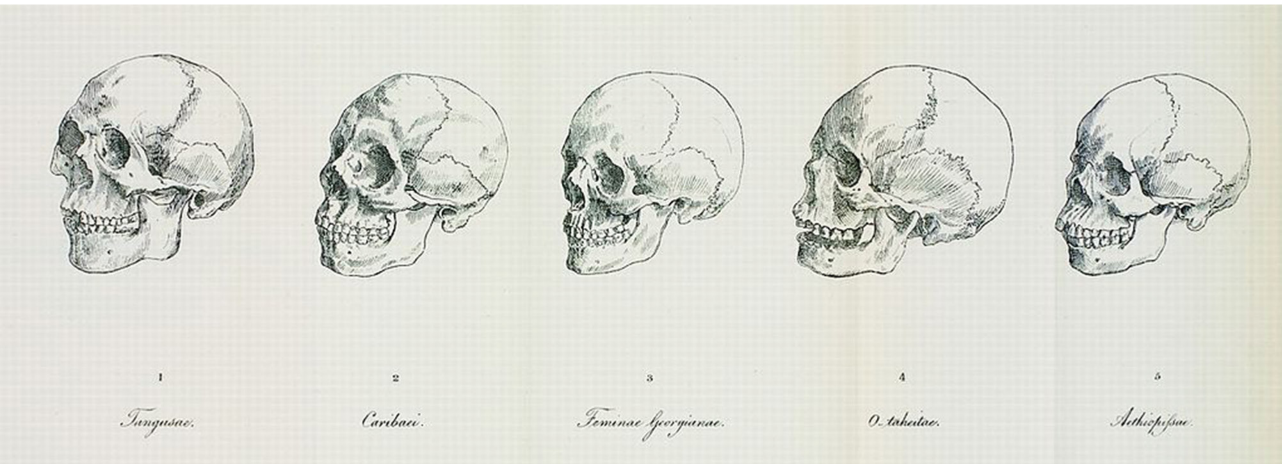

Image source: Johann Friedrich Blumenbach, public domain, via Wikimedia Commons.

Figure 1: Blumenbach's five skulls[27], labelled *Tungusae, Caribaei, Feminae Georgianae, O-taheitae,* and *Aethiopissae,* depicting his characterisation of Mongolian, American, Caucasian, Malayan and Ethiopian races.

Early physical anthropology in the 19th century was seen as a way to scientifically validate race, defined as a physical disposition, as well as the complete race complex, which also included behavioural, intellectual and character differences between human groups.[29–33] At this time, the skull was considered the key to understanding human races and behaviours.[34] Essentialist ideas from phrenology (the idea that mental traits/faculties could be predicted on the basis of scalp morphology) influenced the belief that the brain's faculties, including character strengths and weaknesses, revealed themselves through the skull.[35] Although phrenology lost its appeal and support in the mid-19th century, concepts spilled over to physical anthropology and its racist and typological beginnings.

One major debate that raged during this time, rooted in Euro-Christian theology, was whether human races were of monogenetic or polygenetic origin. Monogenists believed that there was a common origin for races in the deep past (and that some had "degenerated") whereas polygenists argued for different origins and therefore different species.[36] To find evidence for these different viewpoints, scientists required vast collections of skulls to study. These were systematically collected by all means necessary and subsequently commodified and traded through international colonial trade networks.[15] Museums and other academic institutes in Europe and their settler colonies amassed thousands of human remains obtained from the latter, with skulls making up the majority of these collections. This skull bias reflects the importance placed on skulls for racial typology, but also the durability and transportability of skulls compared to other skeletal elements.[14] Prized in these collections were the "near-extinct primitive races" that were decimated through colonial warfare and disease; another level of colonial dehumanisation.[20] For example, in the USA, physical anthropologist Samuel Morton, inspired by Blumenbach's five skull based races, acquired a large collection of crania (n=867 when he died in 1851[13]) to provide evidence, through measurement of cranial features and cranial volume, for the polygenetic origin of races and the idea that Indigenous people (Americans in his case) had smaller brains and therefore lower intelligence.[32] Morton relied on an extensive network to collect these crania, which were acquired through grave looting and warfare.[15,37]

When Charles Darwin published *On the Origin of Species* in 1859 promoting a monogenetic view of humans[38], it triggered an even greater investigative frenzy among scholars of race to test and/or refute this theory, as most at the time followed the polygenetic school of thought[39]. It is important to note here that monogenetic views were not necessarily non-racist. Even Darwin, whose theory of evolution via natural selection seemingly supported a monogenetic origin, argued in *The Descent of Man* in 1871 that, although there was common descent, the differences between races through geographic isolation were subspecific and each subspecies had different mental faculties – a reflection of his bias as a 19th-century Eurocentric scientist[40] (as discussed in detail by Fuentes[41]). With Darwin's theory of evolution, specifically the evolution of humans from an ape ancestor, what also occurred was a conceptual change from the horizontal view of Blumenbach's skull forms to a "vertical ranking of Blumenbach's varieties"[42(p.234)] by many scholars, which essentially created a hierarchy of humanness[43]. Thomas Huxley's influential view that there was a bigger difference between human races than between the lowest or most "primitive" race and great apes[44], which was supported by the writings of Ernst Haeckel[45], epitomised this change, leading to the widespread proliferation of scientific racism. The pre-Darwinian skull-centric anthropology now had an evolutionary framework.

Skulls and their power

Collections of human remains across the world ballooned in the late 19th and early 20th centuries. As a way to legitimise the scientific study of race (and racism), quantitative statistical methods for examining human differences became popular[46], necessitating greater sample sizes – a trend that occurred in conjunction with the gradual growth of the fossil record of human evolution. Scholars at the time needed examples of "primitive" human races for their "evolutionary" analyses and played a prominent role in both the study of Indigenous peoples and the collection and trade of bodies, and especially skulls.[15]

Anthropological collections around the world were amassed for race science by powerful researchers in the field, including Samuel Morton (discussed above), Paul Broca and Aleš Hrdlička, who all engaged in dubious collection and preparation practices, and colonial powers such as Germany that violently collected thousands of skulls to populate their research institutes (as described in[13,15,43,47,48]). The importance of skulls for these scientists was obvious. In his manual, *Directions for Collecting Information and Specimens for Physical Anthropology*[49], Aleš Hrdlička, the founder of the *American Journal of Physical Anthropology* wrote: "The skull…preserves the zoological as well as the racial characteristics of the individual, and also the general form and size of by far the most important human organ, the brain."[49(p.8)] These collections also created a competition amongst colonial powers.[20] As Joost Van Eynde notes, "national collections in London, Paris, Berlin and elsewhere in Europe and America competed with one another for these limited human resources"[50(p.7)]. Collections also provided the necessary data for narrative building in anthropology and beyond, thus giving researchers affiliated with collections power over early theories about human evolution and human variation.

In South Africa, museums and institutes were not immune to this human remains collection frenzy and competition.[20] Scotland-born palaeontologist Robert Broom was both collector and trader of human remains in the late 1890s and early 1900s, sending indigenous South African skulls to the University of Edinburgh after sometimes repulsively using his stovetop to prepare the bones.[17,51] Some of the individuals that he acquired, usually through disturbing means, also ended up at the McGregor Museum in Kimberley, for which Broom served as the unofficial curator, where they were described using a racial typology.[17,52,53(p.130)] Broom's motivation for his collecting practice was race science and especially craniology, a method he used to argue for the prehistoric nature of living Khoesan peoples.[51,53]

Louis Péringuey, then curator of Anthropology at the South African Museum, was inspired by comments made in 1905 by A.C. Haddon, president of the British Association for the Advancement of Science, to collect anthropological data on "primitive" native races within colonies that were dying out.[54] He proceeded to accumulate skeletons for his museum collection through trade, excavation, and grave plundering.[54,55] Péringuey collected close to 200 individuals, most of them skulls, and together with collaborators analysed this collection under the belief that "Bushmen" essentially represented the missing link between apes and other human races[56], and separated individuals into different Indigenous types[20,54,55]. In addition, Péringuey initiated the body-casting programme at the South African Museum to preserve a physical reproduction of these 'pure' "dying races".[54] These casts were also studied within a racial typology and formed the basis for the controversial "Bushman diorama" that was finally closed in 2001.[20,57,58]

Raymond Dart was introduced to the idea of human skeletal collections in 1921 as a Rockefeller Fellow visiting Robert Terry in the Anatomy Department of Washington University in St. Louis, USA, just two years before he immigrated to South Africa as the Chair of Anatomy at the University of the Witwatersrand.[59–62] He also visited the Anatomy Department at Case Western Reserve University in Cleveland, USA.[59] Both of those institutions had skeletal collections based on cadaver material of known age and sex, and Dart made it a priority to assemble a comparable collection at the University of the Witwatersrand.[59] For Dart's collection, before 1958, the skeletons came from donations and unclaimed bodies, with a bequeathment programme additionally (and increasingly) contributing to the collection after 1958.[59] The collection also includes several skulls labelled as having no provenience.[59] In addition to the skeletal collection, Dart, in collaboration with Lidio Cipriani, also amassed a large collection of facemasks through sometimes questionable and coercive acquisition practices between 1927 and sometime in the 1980s.[63] Like the body casts at the South African Museum, they were utilised in typological research and race science.[63]

Upon Dart's retirement in 1958, the collection was named The Raymond A Dart Collection of Human Skeletons.[62] Soon after, in 1959, a massive flood in the basement where the collection was stored caused the mixing of bones, affecting a substantial portion of the skeletons.[59] As discussed by Dayal et al.[59], this led to the construction of a new collections facility and the installation of new shelves with a decision to separate the skulls from the postcrania because "a proportionally larger number of researchers had been interested in the study of skulls only"[59(p.326)]. This illustrates very clearly that the skull-centrism of the discipline extended at least into the 1950s.

Today, an examination of the collection of human skeletons at Iziko South African Museum in Cape Town (previously South African Museum) reveals the extent of this skull-centric bias (Table 1). This collection was further split into those that were accessioned before 1960 and after 1960. About half of the individuals in the collection have accession date information. Of the 1013 individuals, 55% are represented by skull remains, and 45% are full skeletons. Indeed, in her extensive skeletal inventory of individuals housed across seven South African institutions, Tessa Campbell[64] demonstrated this skull-centrism by showing that skulls are present at a much higher frequency than postcrania (Figure 7 in [64]).

When split by period, the pattern shows up more obviously before 1960. Out of the 364 skeletons accessioned before 1960, 48% are skulls, and 38% are skulls and postcrania. After 1960, 35% are skulls, and 51% also include postcrania. A chi-square test of independence indicates that the relationship between the date of accession and skeletal element is statistically significant, χ^2 (2, $N = 597$) = 9.97, $p < 0.01$. This indicates that the skull-centric bias in collecting was more pronounced prior to 1960.

Heads and species hypodigms

In the history of physical anthropology, there is a direct link between scientific racism and its manifestations (e.g. study of living people, skeletal collections, head collecting) and the study of human evolution. In South Africa, this played out very clearly. Not only was Dart growing an extensive skeletal collection of primarily Indigenous Africans, biased towards heads, but he was also deeply involved in studies of living Indigenous southern Africans.[51,65] The San or "Bushmen" and the Khoe, in particular, had been the subject of scientific curiosity long before the first fossil hominins were found and became a focus of Dart's resea rch.[17,20,21,46,51,55] Together with the coelacanth and cycad, the "Bushmen" were seen as "living fossils" – assumed to be unchanged from early human ancestors – and collected and researched as such in southern African museums[51] (and "The fossil complex" as discussed in[66]). Like many other indigenous groups, they were studied, and their bodies collected, because they were believed to be inferior to, and less evolved than, Europeans. As such, they were believed to provide insight into primitive peoples and human evolution.[46,51] As Witz and colleagues contend, "At the center of this collecting impulse, conducted through the representational machine of the expedition, was the bushman body, promising to enable direct racial connections to be made between the findings of the new sciences of physical anthropology and paleoanthropology, and providing clues to discovering some of the paths of evolution."[66(p.183)]

For any new fossil discovery, comparative taxonomic assessments of difference or similarity are made with species hypodigms that revolve around a holotype or "type specimen" – a specimen that serves as a morphological guide for comparisons. When we consider type specimens for hominin taxa – both prior and subsequent to the discovery of the Taung Child – we see that species diagnoses are overwhelmingly made on the basis of craniodental and mandibular material. Supplementary table 1 provides a list of currently used species names in palaeoanthropology and their type specimens, including which bone(s) make up those type specimens. This table was compiled using the Origins nomenclature resource on Paleo Core (https://paleocore.org/origins).[67] The type specimen for every single species is either only a skull or skull fragments (including mandibles/teeth) or includes a skull/fragments as part of the type specimen. This does not mean that the description of the species relies solely on these type specimens; for 22 out of 26 species, or 85%, the type specimens consist of *only* skull remains. Even with the recognition that craniodental preservation in a taphonomic sense is generally better than that of other skeletal elements[68], meaning we expect more skull remains in the fossil record, this skull-centric alpha taxonomy is true also for recently described species that have been systematically excavated and which include some postcrania (*Homo luzonensis*[69]), and those that have substantial postcranial material (*Homo naledi*[70]). For *H. naledi*, the choice of the holotype is striking, as Berger et al.[70] discuss at length the "mosaic" morphology evidenced in hominin species with complete skeletons – i.e. some aspects of the skeleton align more closely with one taxon and other aspects with another – cautioning that, "we must abandon the expectation that any small fragment of the anatomy can provide singular insight about the evolutionary relationships of fossil hominins"[70(p.23)].

Scientific racism first developed into a legitimate area of inquiry before the discovery of hominin fossils, meaning that the entrenchment of scientific racism into palaeoanthropology occurred in concert with early historical hominin discoveries. Taking this further, the race-based approaches to considering humankind, which is essentially (unjustifiable) taxonomy below the species level for *H. sapiens*, almost certainly influenced decisions to base hominin taxonomy largely on skull morphology. Or said another way, the decision that what was found represented a new species was only confidently made on the basis of skull differences. This makes sense given the importance of heads in race science and the fact that comparative human collections used for species diagnosis were skewed towards skulls. The same "objective scientific" methodologies and measurement techniques/instruments like callipers are also used in both pursuits: to put people in distinct typological categories in the service of scientific racism and to characterise fossil hominins.[45]

But aren't heads the best for species diagnosis?

Researchers might argue that skulls are simply more taxonomically diagnostic than postcranial remains, which explains our emphasis on them, and that our argument for a connection is therefore correlation but not causation. The supposed lack of phylogenetic usefulness of

Table 1: Skeletal inventory of a South African human skeletal collection

	All individuals	Cranium and postcranium[b]	Cranium and mandible	Cranium only	Mandible only	Total number of skulls[c]	Postcranium only
Iziko[a] (whole collection)	1013	452 (382)	143	364	51	558	116
Iziko (accessioned after 1960)	233	118 (100)	37	29	16	82	29
Iziko (accessioned before 1960)	364	138 (110)	53	99	18	170	44

[a]Iziko South African Museum in Cape Town, South Africa

[b]Numbers in parentheses represent the number of individuals with mandibles

[c]Total includes the number of individuals with only mandibles, only crania, and both crania and mandibles

postcranial morphology is often attributed to the assumption that postcranial morphology is more reflective of function and behaviour, thus increasing the probability of homoplasy specifically in cladistic analyses.[71,72] However, a large body of research suggests that is not always true, and even historical data suggest that other parts of the skeleton might be as valuable for taxonomy. Studies across multiple mammalian taxa have shown that levels of homoplasy are similar for postcranial, dental and cranial traits, with postcranial traits of the primate skeleton even shown to be less homoplastic than craniodental characters.[73–75] Postcranial traits have also been successfully used to reconstruct phylogenetic relationships, for example in papionins and hominins.[76,77] Furthermore, some recent studies of living primates have indicated that other regions of the skeleton, such as the humerus, os coxa, and scapula, would be just as, and sometimes more, effective for species/genus/family differentiation.[78–82] Studies have also shown a much lower efficacy for some regions of the hominoid skull, including humans, for reconstructing phylogenetic relationships.[83,84] This is related to the recognition that morphological evolution and divergence have been influenced by multiple evolutionary processes (natural selection, genetic drift, gene flow), and not all traits represent an adaptation (see discussion in [85]). For hominins, this new understanding has highlighted that certain regions of both the skull and postcranium are more reflective of non-adaptive processes, making these regions less subject to homoplasy and therefore better for determining phylogenetic relationships.[85]

For the Taung Child discovery, as discussed above, we know that postcranial material existed, but it not only did not make it into the scientific publication of Taung[1], it appears to have been lost historically. Ironically, finding postcrania of *A. africanus* (Stw 14) ended up being the nail in the coffin for any arguments that this species was not a bipedal human ancestor, demonstrating the importance of postcranial material in this particular instance. More recently discovered hominins like *H. naledi* have also illustrated how important it is to have information from entire skeletons to accurately understand the complex nature of human evolution.[70] This raises the question: if the postcranial material for Taung had been examined, would acceptance have happened earlier? Or differently? Might it have shifted the hypodigm for the species in a manner that affected how future taxa were evaluated?

As another example, brain size, a characteristic long linked with taxonomy and humanness, and, ironically, the main trait that influenced the initial scepticism about the Taung Child, may not be particularly useful for interpreting either. We now know that hominin brain size did not increase linearly; instead brain size has been variable, within and between taxa, both through time and also in contemporaneous groups from ca. 2 Ma right up to the recent past. For example, *Homo erectus* (sensu lato), and early *Homo* in general, had a wide range of variation[86], as do living humans (*H. sapiens)*. Some large-brained *H. erectus* and small-brained *H. habilis* were contemporaries capable of tool-making, but very different in brain size. Small-brained *H. floresiensis* also lived at the same time (and presumably space) as large-brained hominins, and had cultural capabilities.[87] Neanderthals had very large (on average) brains – larger than *H. sapiens* – an enigma to palaeoanthropologists, given that historically they were considered less capable despite their large brains (although we now know that is not true[88]).

Conclusion: Why does it matter?

This link between scientific racism, research on bodies, and especially heads, and human evolution studies reframes the story of the Taung Child discovery – and indeed both prior and subsequent hominin species discoveries – in a new way. The discovery is embedded in a history and practice that inevitably impacted the interpretation of the fossil find (see also [65]) and contributed ultimately to the skull-centrism of palaeoanthropology. It is essential that we break the link between racism and human evolution, and recognise the ways in which their interconnectedness has impacted our field and shaped its legacy. Discussions about the ethics of comparative collections, the practice of repatriation and restitution (e.g.[89,90]), as well as thoughtful critiques of ancestry estimation in forensic science[91], have moved our broader discipline forward and have paved the way for palaeoanthropologists to look inward.

The tendency to centre skulls in palaeoanthropology has affected the lens through which we interpret the past in multiple ways. First, it has potentially skewed the historical trajectory of the field. Focusing on heads and not on postcrania might mean that evidence for human evolution was overlooked or downplayed in its importance, as evidenced, for example, by the disregarding of the Taung postcrania. Second, an overemphasis on skulls has potentially skewed how we narrate the story of human evolution. Palaeoanthropologists have been obsessed with measuring head/brain size and shape, and linking this to intelligence and capabilities, right from the beginning of the discipline, an obsession that comes directly out of race science. The focus has been on why our heads are bigger or smaller (e.g. intelligence), what fuelled it (e.g. meat-eating), and what advantage it gave us (e.g. culture). Large brains are embedded in humanness, even though we now know that even small-brained hominins appear to have had the capacity for culture. Moreover, comparative primatology, and studies of other organisms (e.g. octopus), are telling us that large mammalian brains are not central to intelligence, or may not be directly tied to meat-eating (e.g.[92]). In this sense, a focus on heads/brains may also have contributed to ideas of human exceptionalism.

Going forward, it is important to recognise the biases that underlie our research choices. Why have we been so insistent on linking brain size to intelligence and capabilities, even in the face of intra- and interspecific variation that illustrates that this is not true? How do we move beyond this skull-centrism? Obviously, with modern techniques, we have the capability to fully examine the entire skeleton. Improved excavation approaches, including the ability to CT scan breccia and the like to identify materials embedded in rocks, give us the capability to identify and prepare (virtually) even the most friable material, including the arm and hand bones of the Taung Child should they ever be located. However, fully moving away from a head-centred approach is going to require a conscious shift in mindset, and the understanding that we risk being typological and essentialist by not shifting our approach. We just have to do it!

Acknowledgements

We are grateful to W. Black, W. Seconna and B. Marais for helping to collate data from the Iziko Museum skeletal inventory.

Funding

L.S. is funded by the Natural Sciences and Engineering Research Council of Canada (Discovery grant RGPIN-2020-04159). R.R.A. is funded by the National Research Foundation of South Africa (grant no. 136512).

Data availability

Data captured in Table 1 of this study are available on request from the curator of the Iziko South African Museum. Data captured in Supplementary table 1 are freely available via https://paleocore.org/origins/nomina/.

Declarations

We have no competing interests to declare. We have no AI or LLM use to declare.

Authors' contributions

L.S.: Conceptualisation, writing – the initial draft, data collection, writing – revisions, data analysis, data curation. P.M.: Conceptualisation, writing – the initial draft. R.R.A:: Conceptualisation, writing – the initial draft, data collection, writing – revisions. All authors read and approved the final manuscript.

References

1. Dart R. *Australopithecus africanus*: The man-ape of South Africa. Nature. 1925;115:195–199. http://dx.doi.org/10.1038/115195a0
2. Dart R. *Australopithecus africanus*: And his place in human origins. Raymond Dart Papers, University of the Witwatersrand. 1929. Unpublished.
3. Goodrum MR. The beginnings of human palaeontology: Prehistory, craniometry and the 'fossil human races'. Br J Hist Sci. 2016;49(3):387–409. http://dx.doi.org/10.1017/s0007087416000674
4. Madison P. Brutish Neanderthals: History of a merciless characterization. Evol Anthropol. 2021;30(6):366–374. http://dx.doi.org/10.1002/evan.21918

5. Madison P. The most brutal of human skulls: Measuring and knowing the first Neanderthal. Br J Hist Sci. 2016;49(3):411–432. http://dx.doi.org/10.1017/s0007087416000650

6. Young RB. The calcareous tufa deposits of the Campbell Rand, from Boetsap to Taungs Native Reserve. South Afr J of Geol. 1925;28:55–67.

7. Grün R, Pike A, McDermott F, Eggins S, Mortimer G, Aubert M, et al. Dating the skull from Broken Hill, Zambia, and its position in human evolution. Nature. 2020;580(7803):372–375. http://dx.doi.org/10.1038/s41586-020-2165-4

8. Elliott Smith G. The evolution of man: Essays. London: Oxford University Press; 1924.

9. Morton DJ. Human origin. Correlation of previous studies of primate feet and posture with other morphologic evidence. Am J Phys Anthropol. 1927;10(2):173–203. http://dx.doi.org/10.1002/ajpa.1330100203

10. McKee JK. The Riddled chain: Chance, coincidence, and chaos in human evolution. New Brunswick, NJ: Rutgers University Press; 2000.

11. Roque R. Headhunting and colonialism: Anthropology and the circulation of human skulls in the Portuguese empire, 1870–1930. Basingstoke: Palgrave Macmillan; 2010. http://dx.doi.org/10.3917/mond1.201.0177

12. Turnbull P. Collecting and colonial violence. In: Fforde C, McKeown CT, Keeler H, editors. The Routledge companion to indigenous repatriation. London: Routledge; 2020. p. 452–468. http://dx.doi.org/10.4324/9780203730966-27

13. Fabian A. The skull collectors: Race, science, and America's unburied dead. Chicago, IL: University of Chicago Press; 2010. http://dx.doi.org/10.7208/chicago/9780226233499.001.0001

14. Redman SJ. Bone rooms: From scientific racism to human prehistory in museums. Cambridge, MA: Harvard University Press; 2016. http://dx.doi.org/10.1126/science.abk3114

15. Stahn C. Confronting colonial objects: Histories, legalities, and access to culture. Oxford: Oxford University Press; 2023. http://dx.doi.org/10.1093/oso/9780192868121.001.0001

16. de Rooy L. The shelf life of skulls: Anthropology and 'race' in the Vrolik craniological collection. J Hist Biol. 2023;56(2):309–337. http://dx.doi.org/10.1007/s10739-023-09716-w

17. Morris AG. The reflection of the collector: San and Khoi skeletons in museum collections. S Afr Archaeol Bull. 1987;42(145):12–22. http://dx.doi.org/10.2307/3887769

18. Qureshi S. Peoples on parade: Exhibitions, empire, and anthropology in nineteenth-century Britain. Chicago, IL: University of Chicago Press; 2019. http://dx.doi.org/10.7208/chicago/9780226700984.001.0001

19. Spennemann D. Skulls as curios, crania as science: Some notes on the collection of skeletal material during the German colonial period. Micronesian J Hum Soc Sci. 2006;5:70–78.

20. Legassick M, Rassool C. Skeletons in the cupboard: South African museums and the trade in human remains 1907–1917. Cape Town and Kimberley: South African Museum and McGregor Museum; 2000.

21. Rassool C. Re-storing the skeletons of empire: Return, reburial and rehumanisation in Southern Africa. J S Afr Stud. 2015;41(3):653–670. http://dx.doi.org/10.1080/03057070.2015.1028002

22. Webb DA. War, racism and the taking of heads: Revisiting military conflict in the Cape Colony and Western Xhosaland in the nineteenth century. J Afr Hist. 2015;56:37–55. http://dx.doi.org/10.1017/s0021853714000693

23. Marks J. Long shadow of Linnaeus's human taxonomy. Nature. 2007;447(7140):28. http://dx.doi.org/10.1038/447028a

24. Linnaeus C. Systema naturae per regna tria naturae: Secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis [The system of nature through the three kingdoms of nature: According to classes, orders, genera, species, with characters, differences, synonyms, places]. Volume 1. 10th ed. Holmiae: Laurentii Salvii; 1758. Latin. http://dx.doi.org/10.5962/bhl.title.156772

25. Blumenbach JF. De generis humani varietate nativa. Editio tertia. Praemissa est epistola ad virum Josephum Banks [Of the native variety of the human race. The third edition. A letter addressed to Mr. Joseph Banks]. Göttingen: Vandenhoek & Ruprecht; 1795. Latin. http://dx.doi.org/10.5962/bhl.title.35972

26. Böker W. Blumenbach's collection of human skulls. In: Rupke N, Lauer G, editors. Johann Friedrich Blumenbach: Race and natural history, 1750–1850. London: Routledge; 2018. p. 80–95. http://dx.doi.org/10.4324/9781315184777-5

27. Rupke N, Lauer G, editors. Johann Friedrich Blumenbach: Race and natural history, 1750–1850. London: Routledge; 2018. http://dx.doi.org/10.4324/9781315184777

28. Junker T. Blumenbach's theory of human races and the natural unity of humankind. In: Rupke N, Lauer G, editors. Johann Friedrich Blumenbach: Race and natural history. London: Routledge; 2018. p. 96–112. http://dx.doi.org/10.4324/9781315184777-6

29. Blakey ML. Skull doctors: Intrinsic social and political bias in the history of American physical anthropology; with special reference to the work of Aleš Hrdlička. Crit Anthropol. 1987;7:7–35. http://dx.doi.org/10.1177/0308275x8700700203

30. Blakey ML. Understanding racism in physical (biological) anthropology. Am J Phys Anthropol. 2021;175(2):316–325. http://dx.doi.org/10.1002/ajpa.24208

31. Caspari R. Race, then and now: 1918 revisited. Am J Phys Anthropol. 2018;165(4):924–938. http://dx.doi.org/10.1002/ajpa.23417

32. Gould SJ. The mismeasure of man. New York: WW Norton; 1981.

33. Marks J. Is science racist? Hoboken, NJ: John Wiley & Sons; 2017.

34. Turnbull P. Surveying craniometry. In: Fforde C, Howes H, Knapman G, Ormond-Parker L, editors. Repatriation, science and identity. London: Routledge; 2023. p. 51–73. http://dx.doi.org/10.4324/9781003144953

35. Poskett J. Materials of the mind: Phrenology, race, and the global history of science, 1815–1920. Chicago, IL: University of Chicago Press; 2019. http://dx.doi.org/10.7208/chicago/9780226626895.001.0001

36. Haller JS Jr. The species problem: Nineteenth-century concepts of racial inferiority in the origin of man controversy. Am Anthropol. 1970;72(6):1319–1329. http://dx.doi.org/10.1525/aa.1970.72.6.02a00060

37. Gulliford A. Bones of contention: The repatriation of Native American human remains. Public Hist. 1996;18(4):119–143. http://dx.doi.org/10.2307/3379790

38. Darwin C. On the origin of species by means of natural selection: Or, the preservation of favoured races in the struggle for life. London: Murray; 1859. http://dx.doi.org/10.5962/bhl.title.68064

39. Brown BR. Until Darwin, science, human variety and the origins of race. London: Routledge; 2011. https://doi.org/10.4324/9781315655826

40. Darwin C. The descent of man, and selection in relation to sex. London: John Murray; 1871.

41. Fuentes A. 7 "On the races of man": Race, racism, science, and hope. In: DeSilva J, editor. A most interesting problem: What Darwin's descent of man got right and wrong about human evolution. Princeton, NJ: Princeton University Press; 2021. p. 144–161. http://dx.doi.org/10.1515/9780691210810-011

42. Rupke N. The origins of scientific racism and Huxley's rule. In: Rupke N, Lauer G, editors. Johann Friedrich Blumenbach: Race and natural history. London: Routledge; 2018. p. 233–247. http://dx.doi.org/10.4324/9781315184777-12

43. Dias N. Nineteenth-century French collections of skulls and the cult of bones. Nuncius. 2012;27(2):330–347. http://dx.doi.org/10.1163/18253911-02702006

44. Huxley TH. Evidence as to man's place in nature. London: Williams and Norgate; 1863.

45. Haeckel E. Natürliche Schöpfungsgeschichte [Natural creation story]. Berlin: Reimer; 1868. German.

46. Clever II. The lives and afterlives of skulls: The development of biometric methods of measuring race (1880–1950) [dissertation]. Los Angeles, CA: University of California; 2020.

47. Athreya S, Ackermann RR. Colonialism and narratives of human origins in Asia and Africa. In: Porr M, Matthews J, editors. Interrogating human origins. London: Routledge; 2019. p. 72–95. http://dx.doi.org/10.4324/9780203731659-4

48. Stoecker H, Winkelmann A. Skulls and skeletons from Namibia in Berlin: Results of the Charité human remains project. Hum Remains Viol: Interdiscip J. 2018;4(2):5–26. http://dx.doi.org/10.7227/hrv.4.2.2

49. Hrdlička A. Directions for collecting information and specimens for physical anthropology. Washington DC: US Government Printing Office; 1904.

50. Van Eynde J. Bodies of the weak: The circulation of the indigenous dead in the British world, 1780–1880 [dissertation]. Ann Arbor, MI: The University of Michigan; 2018.

51. Kuljian C. Darwin's hunch: Science, race and the search for human origins. Johannesburg: Jacana; 2016.

52. Broom R. Bushmen, Koranas and Hottentots. Ann Transv Mus. 1941; 20:217–249.

53. Morris AG. Bones and bodies: How South African scientists studied race. New York: NYU Press; 2022. http://dx.doi.org/10.18772/12022027236

54. Morris AG. The British Association meeting of 1905 and the rise of physical anthropology in South Africa. S Afr J Sci. 2002;98:336–340. https://journals.co.za/doi/pdf/10.10520/EJC97516

55. Witz L, Minkley G, Rassool C. Unsettled history: Making South African public pasts. Ann Arbor, MI: University of Michigan Press; 2017. http://dx.doi.org/10.3998/mpub.9200634

56. Péringuey L. The bushman as a palaeolithic man. Trans R Soc S Afr. 1915;5(1):225–236. https://doi.org/10.1080/00359191509519720

57. Davison P. The politics and poetics of the Bushman diorama at the South African Museum. ICOFOM Study Ser. 2018;46:81–97. http://dx.doi.org/10.4000/iss.921

58. Morris AG. Searching for 'real' Hottentots: The Khoekhoe in the history of South African physical anthropology. S Afr Hum. 2008;20(1):221–233. https://journals.co.za/doi/pdf/10.10520/EJC84793

59. Dayal MR, Kegley DT, Štrkalj G, Bidmos MA, Kuykendall KL. The history and composition of the Raymond A. Dart collection of human skeletons at the University of the Witwatersrand, Johannesburg, South Africa. Am J Phys Anthropol. 2009;140(2):324–335. http://dx.doi.org/10.1002/ajpa.21072

60. Tobias P. Dart, Taung and the 'missing link'. Johannesburg: Witwatersrand University Press; 1984.

61. Tobias P. History of physical anthropology in southern Africa. Am J Phys Anthropol. 1985;28:1–52. https://doi.org/10.1002/ajpa.1330280503

62. Tobias P. Memoirs of Robert James Terry (1871–1966) and the genesis of the Terry and Dart collections of human skeletons. Adler Mus Bull. 1987;13:31–34.

63. Houlton TMR, Billings BK. Blood, sweat and plaster casts: Reviewing the history, composition, and scientific value of the Raymond A. Dart collection of African life and death masks. HOMO. 2017;68(5):362–377. http://dx.doi.org/10.1016/j.jchb.2017.08.004

64. Campbell T. Investigating the emergence and spread of tuberculosis in South Africa [dissertation]. Cape Town: University of Cape Town; 2019. http://dx.doi.org/10.15641/ghi.v2i1.728

65. Kuljian C. Contesting a legendary legacy: A century of reflection on Raymond Dart and the Taung skull. S Afr J Sci. 2025;121(1/2), Art.#18323. https://doi.org/10.17159/sajs.2025/18323

66. Witz L, Minkley G, Rassool C. Sources and genealogies of the new museum: The living fossil, the photograph and the speaking subject. In: Witz L, Minkley G, Rassool C, editors. Unsettled history: Making South African public pasts. Ann Arbor, MI: University of Michigan Press; 2017. p. 177–203. http://dx.doi.org/10.3998/mpub.9200634

67. Reed DN, Raney E, Johnson J, Jackson H, Virabalin N, Mbonu N. Hominin nomenclature and the importance of information systems for managing complexity in paleoanthropology. J Hum Evol. 2023;175, Art. #103308. http://dx.doi.org/10.1016/j.jhevol.2022.103308

68. Grupe G, Harbeck M. Taphonomic and diagenetic processes. In: Henke W, Tattersall I, editors. Handbook of paleoanthropology. Berlin/Heidelberg: Springer; 2015. p. 417–439. http://dx.doi.org/10.1007/978-3-642-39979-4_7

69. Détroit F, Mijares AS, Corny J, Daver G, Zanolli C, Dizon E, et al. A new species of *Homo* from the Late Pleistocene of the Philippines. Nature. 2019;568(7751):181–186. http://dx.doi.org/10.1038/s41586-019-1067-9

70. Berger LR, Hawks J, de Ruiter DJ, Churchill SE, Schmid P, Delezene LK, et al. *Homo naledi*, a new species of the genus *Homo* from the Dinaledi Chamber, South Africa. eLife. 2015;4, e09560. http://dx.doi.org/10.7554/elife.09560.030

71. Lockwood CA, Fleagle JG. The recognition and evaluation of homoplasy in primate and human evolution. Am J Phys Anthropol. 1999;110(S29):189–232. https://doi.org/10.1002/(SICI)1096-8644(1999)110:29+<189::AID-AJPA7>3.0.CO;2-3

72. Lockwood CA. Homoplasy and adaptation in the atelid postcranium. Am J Phys Anthropol. 1999;108(4):459–482. https://doi.org/10.1002/(SICI)1096-8644(199904)108:4<459::AID-AJPA6>3.0.CO;2-R

73. Sánchez-Villagra MR, Williams BA. Levels of homoplasy in the evolution of the mammalian skeleton. J Mamm Evol. 1998;5(2):113–126. https://link.springer.com/article/10.1023/A:1020549505177

74. McCarthy RC, DiVito TA, Bains J, Fatima M. Phylogenetic utility of mammalian postcranial characters. FASEB J. 2017;31:578.12. https://doi.org/10.1096/fasebj.31.1_supplement.578.12

75. Williams BA. Comparing levels of homoplasy in the primate skeleton. J Hum Evol. 2007;52(5):480–489. https://doi.org/10.1016/j.jhevol.2006.11.011

76. Fleagle JG, McGraw WS. Skeletal and dental morphology of African papionins: Unmasking a cryptic clade. J Hum Evol. 2002;42(3):267–292. https://doi.org/10.1006/jhev.2001.0526

77. Argue D, Groves CP, Lee MS, Jungers WL. The affinities of *Homo floresiensis* based on phylogenetic analyses of cranial, dental, and postcranial characters. J Hum Evol. 2017;107:107–133. https://doi.org/10.1016/j.jhevol.2017.02.006

78. Kenyon-Flatt B, Conaway MA, Lycett SJ, von Cramon-Taubadel N. The relative efficacy of the cranium and os coxa for taxonomic assessment in macaques. Am J Phys Anthropol. 2020;173(2):350–367. http://dx.doi.org/10.1002/ajpa.24100

79. Kenyon-Flatt B, von Cramon-Taubadel N. Intrageneric taxonomic distinction based on morphological variation in the macaque (*Macaca*) skeleton. Anat Rec. 2024;307(1):118–140. http://dx.doi.org/10.1002/ar.25283

80. Young NM. A comparison of the ontogeny of shape variation in the anthropoid scapula: Functional and phylogenetic signal. Am J Phys Anthropol. 2008; 136(3):247–264. http://dx.doi.org/10.1002/ajpa.20799

81. von Cramon-Taubadel N, Lycett SJ. A comparison of catarrhine genetic distances with pelvic and cranial morphology: Implications for determining hominin phylogeny. J Hum Evol. 2014;77:179–186. https://doi.org/10.1016/j.jhevol.2014.06.009

82. Young NM. Estimating hominoid phylogeny from morphological data: Character choice, phylogenetic signal and postcranial data. In: Lieberman D, Smith RW, Kelley J, editors. Interpreting the past. Leiden: Brill; 2005. p. 1–13. https://doi.org/10.1163/9789047416616_007

83. von Cramon-Taubadel N, Smith HF. The relative congruence of cranial and genetic estimates of hominoid taxon relationships: Implications for the reconstruction of hominin phylogeny. J Hum Evol. 2012;62(5):640–653. http://dx.doi.org/10.1016/j.jhevol.2012.02.007

84. von Cramon-Taubadel N. The relative efficacy of functional and developmental cranial modules for reconstructing global human population history. Am J Phys Anthropol. 2011;146(1):83–93. http://dx.doi.org/10.1002/ajpa.21550

85. Schroeder L, Ackermann RR. Moving beyond the adaptationist paradigm for human evolution, and why it matters. J Hum Evol. 2023;174, Art. #103296. https://doi.org/10.1016/j.jhevol.2022.103296

86. Spoor F, Gunz P, Neubauer S, Stelzer S, Scott N, Kwekason A, et al. Reconstructed *Homo habilis* type OH 7 suggests deep-rooted species diversity in early *Homo*. Nature. 2015;519(7541):83–86. https://doi.org/10.1038/nature14224

87. Moore MW, Sutikna T, Morwood MJ, Brumm A. Continuities in stone flaking technology at Liang Bua, Flores, Indonesia. J Hum Evol. 2009;57(5):503–526. http://dx.doi.org/10.1016/j.jhevol.2008.10.006

88. Sykes RW. Kindred: Neanderthal life, love, death and art. London: Bloomsbury Publishing; 2020. http://dx.doi.org/10.5040/9781472988201

89. Black W, Gibbon VE, Omar R. Navigating shifting sands: Guidelines for human skeletal repatriation and restitution from South Africa. In: Smith C, Pollard K, Kanungo AK, May SK, López Varela SL, Watkins J, editors. The Oxford handbook of global indigenous archaeologies. Oxford: Oxford University Press; 2022. http://dx.doi.org/10.1093/oxfordhb/9780197607695.013.29

90. Meloche CH, Spake L, Nichols KL. Working with and for ancestors. Abingdon: Routledge; 2020. https://doi.org/10.4324/9780367809317

91. DiGangi EA, Bethard JD. Uncloaking a lost cause: Decolonizing ancestry estimation in the United States. Am J Phys Anthropol. 2021;175(2):422–436. http://dx.doi.org/10.1002/ajpa.24212

92. Bryant KL, Hansen C, Hecht EE. Fermentation technology as a driver of human brain expansion. Commun Biol. 2023;6(1), Art. #1190. http://dx.doi.org/10.1038/s42003-023-05517-3