

The building blocks of art and its accompanying role and meaning



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In this article, focusing on the building blocks of art with its concomitant role and meaning, we commence with a brief evolutionary overview of the origin of land vertebrates, which culminated in the rise of our species as we view it. We then review three iconic phases of human evolution, colloquially designated as the Neanderthals, the San and the Cro-Magnons, as manifested by their artistic endeavours. We are well aware that the Cro-Magnons are currently regarded as not sufficiently distinct from modern *Homo sapiens* to be separately designated. Therefore, the terms 'anatomically modern humans' (AMH) or 'early modern humans' (EMH) are suggested for these inhabitants of the Upper Palaeolithic as they shared an anatomical resemblance with us but still lacked the full complement of behavioural attributes that typify ourselves. This particular selection was chosen because these groups have partially overlapped historically, yet each represents a distinctive approach to the artistic impulse. Subsequently, we consider more contemporary developments regarding human art intertwined with our interpretation of art's role and meaning. Then, we briefly discuss a broader account of the evolution of art in which these three phases are firmly based and through which our understanding of and engagement with the evolutionary development of these stages are elucidated and complemented. In conclusion, particular views about language and the role and meaning of art are confirmed. Particular views about language and the role and meaning of art are endorsed and supplemented by an extensive body of relevant literature.

Contribution: This article explores the evolution of art and its accompanying role and meaning in an intersectional and interdisciplinary manner that fits well with the intention of this unique collection on the building blocks of our past, present and future and with the nature of this journal and our ongoing engagement with *HTS Teologiese Studies/Theological Studies*.

Keywords: evolution; art; Neanderthal; San; Cro-Magnon; early modern humans; Upper Palaeolithic.

Introduction

The prehistoric conquest of land by essentially aquatic vertebrates was a watershed event that ultimately required unique adaptations throughout the body in respiration, locomotion, reproduction and feeding. The available paleontological, embryological and genetic data unequivocally underline the relationships linking all life, mainly all vertebrates. Meyer et al. (2021:284) pointed out that '[J]ungfishes belong to lobe-fined fish (Sarcopterygii) that, in the Devonian period, "conquered" the land and ultimately gave rise to all land vertebrates, including humans'.

This evolutionary paradigm presents a great historical narrative, which may be unique in the cosmos. The fact that our bodies contain chemical properties virtually of the same age as the Big Bang ties us intimately to a celestial origin, so much so that many thinking individuals recognise, in this regard, a spiritual connection with the cosmos. We would like to suggest that the particular way prehistoric people apparently experienced and visually portrayed their existence through art may represent an incipient, innate cognitive awareness of our place in nature.

One is tempted to speculate on the evolution of wonder, anxiety, joy, loss, ecstasy and awe, encompassing the whole river of human emotions that were eventually experienced billions of years later when animals, uniquely developed into humans, would have words, reflection, rituals, signs and metaphors to stand up to whatever they might face and to plead for whatever they might deem necessary.

Note: Special Collection: Challenging Building Blocks of Our Present, Past and Future, sub-edited by Chris Jones (Stellenbosch University) and Juri van den Heever (Stellenbosch University).

These very brief introductory, evolutionary remarks now bring us to the following section, in which we do not focus on a definition of what art¹ is – that ‘uniquely human activity associated fundamentally with symbolic and abstract cognition’ (Zaidel 2010:177) – but rather reflect briefly on the evolution of art and what its role and meaning is or should be in our opinion, by referring to three different but significant phases of human evolution, as well as later human development.

Art (de)codes and (re)phrases

Billions of years after the Big Bang, the Neanderthals present us with an indication of an inner psychic world (they lived between about 350 000 and 30 000 years ago). As far as we know, they were the first to bury their dead intentionally – at least occasionally (Tattersall 2015; Watson² 2006:39–40). Thus, they could mourn the loss of the living. Their burial sites:

Have left us with signs, epitaphs to interpret and reinterpret. Those signs were their own precious will of words, their numb expression of their longing and loss. With this, art, that most sensitive and sublime form of gesturing, was ‘born’ [Hoffmann *et al.*³ 2018:912–915] – or created [Standish & Pike 2018]. (Van der Walt, pers comm., 05 May 2021)

The production of art is considered a big leap forward in the cultural evolution of humanity. It represents a means of recording and transmitting complex symbolic representation in a durable way. (Martí *et al.* 2021:1)

Standish and Pike (2018) used ‘uranium-thorium dating to investigate cave art from three previously discovered sites in Spain’ – La Pasiega, in northern Spain, Ardales⁴ in southern Spain and Maltravieso in western central Spain:

These results demonstrate that cave art was being created in all three sites at least 20,000 years prior to the arrival of *Homo sapiens* in western Europe. They show for the first time that Neanderthals did produce cave art, and that it was not a one-off event. It was created in caves across the full breadth of Spain, and at Ardales it occurred at multiple times over at least an 18,000-year period. Excitingly, the types of paintings produced (red lines, dots and hand stencils) are also found in caves elsewhere in Europe so it would not be surprising if some of these were made by Neanderthals, too. (n.p.)

Standish and Pike (2018), however:

Don’t know the exact meaning of the paintings, such as the ladder shape (see below), but we do know they must

1. There is no complete agreement on how to define art. For further information regarding a definition of art, see Layton (1991), Haselberger (1961), Gombrich (1960), Morphy (2007) and Zaidel (2010), among others.

2. According to Watson (2006:39), the burying of their (the Neanderthals) dead was a ‘very significant development, perhaps the next purely abstract idea after the standardisation of tools. This is because intentional burial may indicate an early concern with the afterlife and a primitive form of religion’.

3. They ‘present dating results for three sites in Spain that show that cave art emerged in Iberia substantially earlier than previously thought. Uranium-thorium (U-Th) dates on carbonate crusts overlying paintings provide minimum ages for a red linear motif in La Pasiega (Cantabria), a hand stencil in Maltravieso (Extremadura) and red-painted speleothems in Ardales (Andalucía). Collectively, these results show that cave art in Iberia is older than 64.8 thousand years (ka). This cave art is the earliest dated so far and predates, by at least 20 ka, the arrival of modern humans in Europe, which implies Neandertal authorship’.

4. For more information in this regard, see Martí *et al.* (2021).

have been important to Neanderthals. Some of them were painted in pitch black areas deep in the caves – requiring the preparation of a light source as well as the pigment. The locations appear deliberately selected, the ceilings of low overhangs or impressive stalagmite formations. These must have been meaningful symbols in meaningful places. (n.p.)

Standish and Pike’s research results are tremendously significant for our understanding of Neanderthals and ‘the emergence of behavioural complexity in the human lineage. Neanderthals undoubtedly had the capacity for symbolic behaviour, much like contemporaneous modern human populations residing in Africa’ (Standish & Pike 2018:n.p.).

The San⁵

The San’s rock art is an important indication of their rich symbolic life and worldview (see, for example, Figure 1). It especially gives us a glimpse into these hunter-gatherers’ spiritual beliefs and rituals. The San people believed that the shaman induces a trance and then enters a spirit(ual) world where he is filled with sacred potency, which enables him to fight evil spirits, heal the sick and make rain. The women sat in a circle, with the men and the shaman dancing around them.

During the San ritual dances, the shamans were filled with the potency of power animals such as the eland and the elephant to guide them in the spirit world. Ritual dancing induces out of body travel – a sensation likened to dying. In rock art, the shaman is depicted resembling a dying eland as he absorbs the power of the animal.

The rock surface on which the paintings were executed was perceived as a veil, separating the present from the spirit(ual) world. The eland, a significant symbol and the animal most often executed, thus formed an integral part of the San’s ceremonies. For example, a boy became an adult after shooting his first giant antelope – preferably an eland. When a girl reached her first menstrual period, she sat in a hut on an animal skin while the other women danced like eland cows and the men like eland bulls. When a young man wished to marry, he presented the fat of an eland’s heart to the chosen girl’s parents.

The San executed their art with fingers, sharpened reeds and brushes of bird feathers. The paint was prepared from ochre: a natural clay, mixed with juices squeezed from plants, eggs, water or blood. Although charcoal was also employed, red or yellow ochre was the most popular.

5. For more information, see Witelson *et al.* (2021), <https://www.sahistory.org.za/article/rock-art-expression-hunter-gatherer-society-and-world-view>, <https://www.sahistory.org.za/article/rock-art>, https://www.bradshawfoundation.com/south_africa/, Blundell (2001), https://www.metmuseum.org/toah/hd/san/hd_san.htm; and <http://ringingrocks.wits.ac.za/>.

Early modern humans

The early modern humans (EMHs) of the Upper Palaeolithic (UP) in Europe presented rock paintings⁶ to express human emotions, perspectives and thinking – visual ‘wording’ to communicate the yearning, the longing of their inner beings. They made their evolving views clear in the creation of their rock art:

For at least 25,000 years before the dawn of civilization, ragged bands of mammoth hunters and seed gatherers – the Cro-Magnon peoples of the ice age – roamed the rolling valleys of Europe and the flat steppe of Asia, hurling spears at wild horses and woolly mammoths, and grubbing in the dirt for roots. (Rensberger 1978: n.p.)

According to Rensberger (1978):

[A]n extraordinary collection of sculptures, paintings and engravings ... [d]ating back as far as 30000 B.C... display astonishing beauty and skill and reveal our cultural roots – for the Cro-Magnon artists who made them were of our own kind. (n.p.)

In this respect, we want to refer to the dated painted stone of the Apollo 11 site in southern Namibia. These stones also dated to 30000 years ago (Wendt 1974):

The ‘cave men’ of popular belief, these ancient peoples have long been considered primitive, hulking brutes, able to withstand the rigors of their environment by virtue of a thick skull as much as a thick skin. (n.p.)

Although these mysterious, prehistoric wanderers built no lasting structures and wrote nothing in what we understand as language, they did create art of astonishing beauty and technical mastery. Through a vast collection of paintings, sculptures and engravings, some of which have only recently been discovered and many of which have not been closely studied until now, it is becoming apparent that the Cro-Magnons possessed not only a highly developed artistic sensibility but also a capacity for creating and using symbols that is far beyond anything attributed to them. (Rensberger 1978:n.p.)

Rensberger strikingly indicates that these:

Aesthetic creations of these peoples can, on one level, be appreciated for their artistic excellence; but, because art is also a way of expressing one’s mind, ice age art can also be analysed as fossil thought. (n.p.)

She then continues:

In these artworks, and in the stone tools and other artifacts that have been found with them, lie all we are likely to know of the roots of our own culture: for the Cro-Magnons were us. They were, despite their pervasive but erroneous cave-man stereotype, the earliest known representatives of our own kind – Homo sapiens sapiens (sic). (n.p.)

Later development of human beings – interpreting the role and meaning of art

Many unnerving words and clichés have stagnated our consciousness over centuries, but are we approaching the

6.Watson reasons that the ‘Suspicion is ... that cave art is in fact to be understood as writing as much as art, a secret and sacred recording of the animals which early man relied upon for food. (This is an idea supported by the fact that many contemporary tribes who create rock paintings have no word for art in their language)’ (Mithen 1996:175; Watson 2006:46).

quintessence of life or just treading water? Are we sketching life with a proverbial ‘comma’ or a classic, dogmatic and fundamentalistic ‘full stop’?

The in-depth psychologists Sigmund Freud (Freud 1920, 1923; McLeod 2019) and Carl Jung (Jung 2013; McLeod 2018):

Endeavoured to show us that we all carry a ‘river’ of unconscious memories and intentions with(in) us. A river that we succeed to sublimate, to deform into dry docks. Freud emphasized a personal instinctual world that we handle by ways of light or deep dark lying to ourselves (Freud 1920, 1923; McLeod 2019). Jung emphasized the collective unconsciousness of humanity. The mythical, symbolic, cultural inheritance of being human. (W. Van der Walt pers. comm., 05 May 2021; Jung 2013; McLeod 2018)

How did it then happen that the multi-dimensional depth of a deep dark river, forever in turmoil, so often turned into oversimplified daylight configurations? How did fascism, nationalism, ethnicity, materialism, classism, dogmatic religious speculation, Facebook personas, and one-dimensional soapies, succeed to sever the focal cords of our souls? (W. Van der Walt pers. comm., 05 May 2021)

With French philosopher René Descartes’ *cogito, ergo sum* (Duignan 2015) – I think therefore I am – we humans (comfortably) centralised ourselves in the universe. With philosophers and theologians, gods were created, assigned and then universally proclaimed. Human beings let unknown gods do ventriloquism with limited vocabulary.

‘In the dark deep waters of the mythical river’, Lethe⁷ (one of the five rivers of the underworld of Hades) – ‘the river of forgetfulness or forgetting – drifts (just) too much substance, that should be part of authentic existence’ (Van der Walt 2021). Our own world of existence is unfortunately shamelessly shrunk. We communicate with each other daily with the help of canned language and dictionaries, and in small talk. Our common aquatic ancestors who initially colonised the land and eventually evolved an infinitely more complex existence lie deep within the memory cells of our bodies and we have, for all intents and purposes, simply forgotten about them. From time to time, we scratch the proverbial skins under which they lie stunned.

In addition to Freud, the French novelist Proust (2003) and others, David Levin, author of the book *The Body’s Recollection of Being* (Levin 1985), joins, among others, the French philosopher Maurice Merleau-Ponty in emphasising the pre-conscious depth of the body’s life experiences.

The German philosopher Heidegger (2004:9–14) referred to ‘Seinsvergessenheit’, that is, a forgetting of the mystery or secret of being. Therefore, we should peel off the shells of our human delusion of greatness to return to the essence of being, of meaningful existence.

Heidegger (1975:102–123) emphasised the Greek word *Aletheia*. As already referred to, lethe, the stem part means the hidden, the forgotten. Aletheia then means that the hidden

7. See Lotha (2022), Lethe, Greek mythology, *Britannica*, <https://www.britannica.com/topic/Lethe>.



Source: Breuil et al. 1913, cited in Standish, C. & Pike, A., 2018, 'How we discovered that Neanderthals could make art', *The Conversation*, viewed 10 January 2022, from <https://theconversation.com/how-we-discovered-that-neanderthals-could-make-art-92127>

FIGURE 1: 'Drawing of the ladder symbol painted on the walls'.

must be exposed. That what we have forgotten must be revealed again. Thus, the hesitant truth, the dark essence of things, then reappears time and time again – however, never final and never fully visible.

We believe it is the artists who can save our species. Not necessarily the politicians, theologians or the military. The artists: people with a strange unconditioned hypersensitivity to life who help us not only to look differently at art as such but also at the world around us. Where they come from, often surprises us. But just as one loses heart or nerve, they are there: people who keep peeling the 'lethe'; people who cannot help but make things visible, brighter with amazement; to give us pride and courage and especially hope; individuals who continue to dream on our behalf.

As the old Christian church father Augustine said of one of the biblical gospels, and which we use here merely as a

successful metaphor: 'The Gospel of John is deep enough for an elephant to swim and shallow enough for a child not to drown' (Wellman 2019 n.p.). So too is the case with art.

Art that provides only first-level enjoyment, that only creates one code of understanding, and that records one-time wording and one-time phrasing against a 'rock wall' is art that handles the spiritual, prophetic, protesting respect for the millions upon millions of years of existence on ever-evolving earth and the immeasurable universe, with simplistic hands.

Artists with integrity do not play for the pavilions. They cannot help but continually express the wonder and mystery of the totality of life, involved with their full being, although hesitantly. They are hypersensitive mouthpieces of the earth, carrying an inherent moral obligation to address the spirit of the times, the 'Zeitgeist', people's artificial dealings with life. They decode oversimplified codes with indignation – they reinterpret, re-code, rephrase, so that through their art certain calls and protests can lead to increased interaction with the breadth and depth of life.

Serious artists struggle with their prejudices and comfort zones, refuse cheap art and admiration, they often walk alone, back into a cave, a studio – picking up a brush, a pencil, a piece of art material and again start to become new, fresh, with deep marvellous earthly intuition, messengers of the demythologised existence of things. They begin to draw lines and colours again so that old views and codes can be decoded, thus 'rephrasing' the constant mystery of everything that exists, everything that is difficult to grasp. This is what happens, although hesitantly, on a canvas – the constant re-coding, the re-wording of the mysterious; the refinement of a human's vague touches on the mystery of life to give breath and vibrations.

As authentic prophets and priests, serious artists illuminate the full circle of life. On the shoulders of our predecessors in history, they acknowledge the timeline from the first conquest of land up to the present. Over the centuries, artists have grappled in the lonely cave 'studios', simple roof rooms, garages, back rooms, with life, with reformulated life codes, to take us all a little further down the significant path of life.

In their reply to a *New York Times* critic's comments on the exhibition of their work in 1942, Mark Rothko and his fellow artist Adolf Gottlieb wrote that art is 'the significant rendition of a symbol' (Morriss-Kay 2010:171). Gillian Morriss-Kay refers to their (Rothko & Gottlieb's) 'manifesto of aesthetic beliefs' and writes that:

[T]hey asserted that the point of a painting did not lie in an 'explanation' but in the interaction with the viewer, who must be persuaded by the paintings to see the world 'the artists way', not his own way. (Morriss-Kay 2010:171; Baal-Teshuva 2003:n.p.)

It is about 'intention and perception' – and 'communication between artist and viewer' (Morriss-Kay 2010:171).

In addition, Adams (2020:6), Director of the Centre for Contemporary Art and the Natural World, pointedly referred to the fact that art lends itself to an appreciation of the natural world and ecological consciousness that is often lacking in scientific approaches and conventional education.

Now that we have reflected on three different but significant phases in human evolution (the Neanderthals, San and the EMHs of the UP) and the interpretation accompanying the role and meaning of art as we view it, let us broadly review the evolutionary building blocks of art of which these three phases are fully part, and through which our understanding of and engagement with the evolution of these phases are richly illuminated and complemented.

Discussion: Broad views on the evolution of art

'Art, in its many forms, is practiced by almost all human cultures and can be regarded as one of the defining characteristics of the human species' according to Morriss-Kay (2010):

In all societies today, the visual arts are intimately intertwined with music, dance, ritual ... and language ... Vocalization, ritualized movement and visual display are part of animal courtship and dominance competition as well as human ritual and communication, so it is likely that the roots of music, dance and body decoration lie deep in the evolutionary history of the animal kingdom. Nevertheless, with the evolution of human cognition, they were deployed in new ways, with complex symbolic meaning becoming attached to them. (p. 158)

Morriss-Kay (2010:158) further argued that there 'is good evidence for a neurological relationship between visual creativity and language'. She referred to Stout et al. (2008), who studied subjects' brain activity who had become experts:

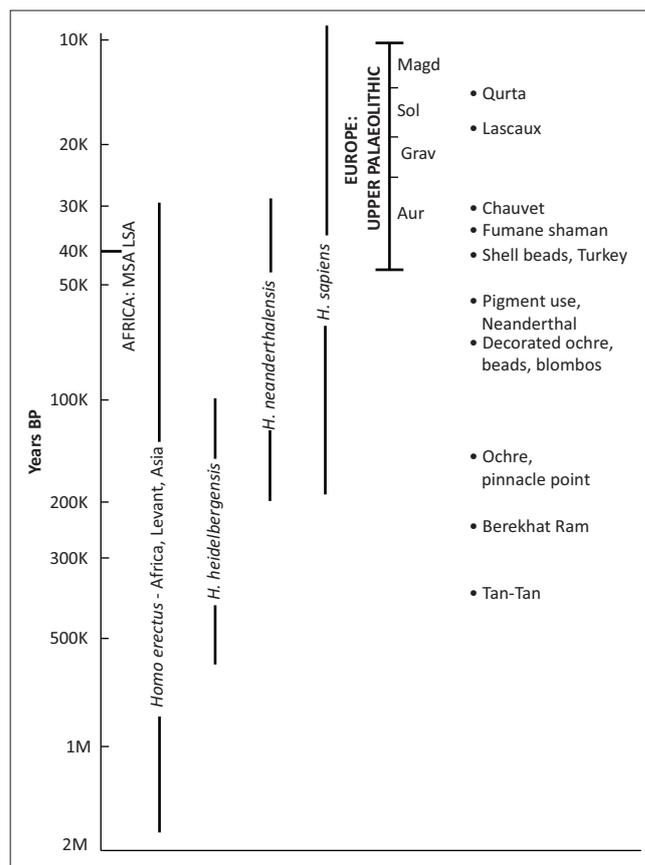
[I]n Early Stone Age tool-making. The tools were of the Oldowan and Acheulian types, representing a period of some 2 million years during which the brain of our hominin ancestors expanded and tools became more advanced. (Morriss-Kay 2010:158; Stout et al. 2008:1930–1949)

She reasoned that 'tool-making and language share a basis in the human capacity for complex goal-directed manual activity':

As this includes artistic creativity, evidence of the increasing sophistication of tool technology, as well as evidence from crania of increasing brain size, suggests that our ancestors had the ability to create art or proto-art much earlier in evolution than is suggested by current knowledge of art-related artefacts. (Morriss-Kay 2010:159)

'The periods of human evolution to be covered', according to Morriss-Kay (2010:159), and some artefacts referred to in her article 'The evolution of human artistic creativity', are summarised in her timeline in Figure 2.

The African Middle Stone Age (MSA) dates from at least 285 000 BP, based on the earliest use of stone point technology



Source: Morriss-Kay, G.M., 2010, 'The evolution of human artistic creativity', *Journal of Anatomy* 216(2), 158–176. <https://doi.org/10.1111/j.1469-7580.2009.01160.x>

FIGURE 2: 'Periods of time and species of *Homo*, and some of the artefacts mentioned in the text alongside their dates (right column); the vertical axis is log scale. *Homo* dates are taken from Wood and Lonergan (2008).'

and hafted tools in East Africa, succeeding the use of Acheulian stone technology characterised by cleavers and hand axes (Tyron & McBrearty 2002). The transition to the Later Stone Age (LSA) does not coincide precisely with the beginning of the European UP. The UP periods (Aurignacian, Aur, Gravettian, Grav, Solutrean, Sol, Magdalenian and Magd) are named after tool technology characteristic of key sites but the actual dates show geographical variations. The European Middle Palaeolithic is divided into Mousterian and Châtelperronian, after Neanderthal tool types made before and after the arrival of modern humans. (Morriss-Kay 2010:159)

Although it is not possible to delve into all the periods mentioned here and artefacts, this figure provides a broad and informative timeline on the evolution of art:

Recent excavations, most revealingly in South African caves, have provided significant insight into symbolising activity including the use of colour, engraving patterns, bone technology and bead-making, dating from up to 164 000 years ago. (Morriss-Kay 2010:160; see also d'Errico & Henshilwood 2007; d'Errico et al. 2005; Henshilwood et al. 2001, 2002; Jacobs et al. 2006; Marean et al. 2007)

Morriss-Kay (2010) argues that these findings:

Confirm that European Upper Palaeolithic paintings, engravings and carvings, many of which are mature works of skilled

craftsmanship, have a long history in terms of human evolution and culture behind them. The unrivalled wealth of European material, which clearly indicates a highly developed artistic culture, may indeed be due to a sudden flowering of a more sophisticated symbolic creativity. Alternatively, it may be a historical artefact arising from a change in the use of locally available sites, materials and traditions, e.g. from rock surfaces exposed to the elements to the protected environment of enclosed caves for paintings. (p. 160)

Over many years a number of scholars⁸ held the view that human behaviour, including art, developed suddenly. But this 'concept of a rapid revolution that characterised the Middle to Upper Palaeolithic transition has been challenged' by, among others, McBrearty and Brooks (2000), 'on the basis of a reassessment of the archaeological evidence of modern behaviour from Middle Stone Age Africa' (Morriss-Kay 2010:160). The origin of art must surely go back further than 45000 BP 'when *Homo sapiens* migrated from Africa to Europe' (Morriss-Kay 2010:160). Those who support the rapid evolution theory are convinced that there was a sudden 'evolutionary change in the human brain and hence cognition at this time known as the Upper Palaeolithic Revolution' (Morriss-Kay 2010:160; cf. Bar-Yosef 2002; Klein 1999; Wade 2006).

We, however, agree with Morriss-Kay (2010:160) and, among others, Gombrich (1956, 1960), that it is not possible 'that the first real drawings and paintings by a Cro Magnon' person could have been drawn against the walls of caves only 30000 years ago (see also McBrearty & Brooks 2000; McBrearty & Stringer 2007; Morgan & Renne 2008) – and that the first sculptures and clay models originate from the Upper Palaeolithic of Eurasia. Morriss-Kay refers to Gombrich who emphasised that 'art is tied to tradition – so there cannot be an "innocent eye" or an "original genius"' (Morriss-Kay 2010:160). According to Gombrich (1956, 1960; cited in Morriss-Kay 2010:160), 'art develops through a dialogue between artist and viewer; although based within its cultural context, it develops a life of its own and influences the formation of taste'.

Sculpture has probably begun with wood carving, which is still the favourite material to work within Africa today. We know that wood is perishable unless fossilised. 'The few centuries-old African stone carvings that have survived are sophisticated in representational skill and aesthetic sensitivity, indicating a long-established creative tradition there' (Morriss-Kay 2010:160; see also Koloss 2002; Willett 2002). The problem is that we do not know 'how much art was created in perishable materials and has therefore been lost to the archaeological record' (Morriss-Kay 2010:160).

Consequently, we concur with Morriss-Kay (2010:158) that the 'origins of art are therefore much more ancient [than 30000 years ago] and lie within Africa, before worldwide human dispersal'. She reasons that the:

8. See, among others, Bar-Yosef (2002).

Earliest known evidence of 'artistic behaviour is of human body decoration⁹, including skin colouring with ocre and the use of beads, although both may have had functional origins [like camouflage¹⁰ when they stalked their prey]. Zig-zag and criss-cross patterns, nested curves and parallel lines are the earliest known patterns to have been created separately from the body¹¹; their similarity to entopic phenomena ... suggests a physiological origin. 3D art [for example the Berekhat Ram figurine] may have begun with human likeness recognition in natural objects [the figurine-like piece of quartzite from Tan-Tan, Morocco], which were modified to enhance that likeness¹²; some 2D art has also clearly been influenced by suggestive features of an uneven surface. The creation of images from the imagination, or 'the mind's eye', required a seminal evolutionary change in the neural structures underpinning perception¹³; this change would have had a survival advantage in both tool-making and hunting. Analysis of early tool-making techniques suggests that creating 3D objects (sculptures and reliefs) involves their cognitive deconstruction into a series of surfaces, a principle that could have been applied to early sculpture. The cognitive ability to create art separate from the body must have originated in Africa but the practice may have begun at different times in genetically and culturally distinct groups both within Africa and during global dispersal, leading to the regional variety seen in both ancient and recent art. At all stages in the evolution of artistic creativity, stylistic change must have been due to rare, highly gifted individuals. (Morriss-Kay 2010:158)

According to Miyagawa, Lesure and Nóbrega (2018:1), '[e]arly modern humans developed mental capabilities that were immeasurably greater than those of non-human primates'. They see this:

In the rapid innovation in tool making¹⁴, the development of complex language¹⁵, and the creation of sophisticated art forms¹⁶, none of which we find in our closest relatives. (Miyagawa et al. 2018:1)

While they 'can readily observe the results of this high-order cognitive capacity, it is difficult to see how it could have developed' (Miyagawa et al. 2018:1). They then make a remarkable argument by taking up:

The topic of cave art and archeoacoustics¹⁷, particularly the discovery that cave art is often closely connected to the acoustic

9. For more information, see Marean et al. (2007), McBrearty and Stringer (2007), Henshilwood et al. (2002), Jacobs et al. (2006), McDougall, Brown and Fleagle (2005), Stringer (2003), White et al. (2003), Ambrose (1998), Bischoff et al. (2007), Harvati (2007), Winter et al. (2001) and Bradley (2008).

10. Morriss-Kay (2010:161).

11. See Henshilwood et al. (2002), Marshack (1996), Bednarik (2003b), Clottes and Lewis-Williams (1998), Morphy (2007) and Huyge (2009).

12. See Gombrich (1960), Marshack (1997), d'Errico and Nowell (2000), Cobb (2008), Coqueugnio et al. (2004), Lack (1943), Zeki (2006), Bednarik (2003a, 2003b), Oakley (1981) and Feliks (1998).

13. Gowlett (1984, 2009), Wendt (1974), Bednarik (2003b), Masson (2006), Huyge et al. (2007), Le Quelle (2004) and Huyge and Claes (2008).

14. Tattersall (2017), Henshilwood et al. (2002), Henshilwood et al. (2004) and d'Errico et al. (2005).

15. Huijbrechts (2017).

16. Rodriguez-Vidal et al. (2014) (etchings) and Jaubert et al. (2016) (geometric structures).

17. Reznikoff (1987), Reznikoff and Dauvois (1988), Hoffman (2014) and Waller (2002, 1993).

properties of the cave chambers in which it is found. Apparently, early modern humans were able to detect the way sound reverberated in these chambers, and they painted artwork on surfaces that were acoustic 'hot spots'¹⁸, i.e., suitable for generating echoes. We argue that cave art is a form of cross-modality information transfer, in which acoustic signals are transformed into symbolic visual representations. This form of information transfer across modalities is an instance of how the symbolic mind of early modern humans was taking shape into concrete, externalized language. We also suggest that the earliest rock art found in Africa may constitute one of the first fossilized proxies for the expression of full-fledged human linguistic behavior. (Miyagawa et al. 2018:1)

We know that the 'San produced rock art that has been dated as far back as 70000 years ago'¹⁹ (Miyagawa et al. 2018:5). Miyagawa et al. (2018:5) make another significant point in this regard (as already referred to), namely that the '[t]he rocks were decorated because it was believed that a spirit world existed beneath the surface'²⁰ (Miyagawa et al. 2018:5):

They find this type of rock art in other regions of the world as well, typically those with an animistic tradition²¹. The idea of a spirit world behind the surface of the rock could come from the acoustic property of echo: an acoustic signal is detected despite the absence of a direct source for it at the point of the sound. (Miyagawa et al. 2018:5)

In this regard, it is vital to turn to David Lewis-Williams who:

Is convinced of the shamanistic nature [an important aspect of religion in hunter-gatherer communities as we have already noted] of the first religions and their link to the layout of cave art. He advances the idea that, with the emergence of language, early humans would have been able to share the experience of two and possibly three altered states of consciousness: dreams, drug-induced hallucinations, and trance. (Watson 2006:51; cf. Lewis-Williams 2002:127)

According to Lewis-Williams, in the words of Peter Watson, these 'would have convinced early humans that there was a "spiritual world" elsewhere, with caves – leading to a mysterious underworld – as the only practical location for this other world' (Watson 2006):

No less important ... [are the fact] that many paintings and engravings in the caves make use of naturally occurring forms or features, suggesting, say, a horse's head or bison. (p. 51)

'The art' as suggested by Lewis-Williams, 'was designed to "release" the forms, which were "imprisoned" in the rock' (Watson 2006:51). The "'finger-flutings", marks made on the soft rock and the famous handprints, were a kind of primitive "laying on of hands", designed again to release the forms locked in the rock' (Watson 2006:51; Lewis-Williams 2002:199–200, 216–217).

18. See Blesser and Salter (2009) and Mattioli et al. (2017).

19. Thackeray (2005).

20. Lewis-Williams and Dowson (1990).

21. Bahn and Fossati (1995, 2003).

Lewis-Williams also argues in favour of a 'form of organisation in the caves' (Lewis-Williams 2002:224–225; Watson 2006:51). By this, he means that the general population gathered at the mouth of the cave and that only a select few were allowed in the cave. In the most inaccessible parts of these caves, only shamans were permitted. Watson (2006) reasons in this respect that some of:

[T]hese areas have been shown to contain high concentrations of CO₂, an atmosphere which may, in itself, have produced an altered state of consciousness. Either way, in these confined spaces, shamans would have sought their visions. (p. 52; Lewis-Williams 2002:285–286)

Watson (2006) then makes the intriguing point that this:

[C]ombined with the shamans' need for a new persona every so often (as is confirmed today, among 'stone age' tribes), could be the origin of the idea of death and rebirth, and of sacrifice which ... looms large in later religious beliefs. (p. 52; Lewis-Williams 2002:285–286)

Although the ideas postulated by Lewis-Williams are gripping, they are speculative. But what we can be sure of according to Watson 'is that none of the complex art and the ancient ceremonies that surrounded the painted caves, could have been accomplished without language' (Watson 2006:52).

Although there is much about the origins of art that we do not know, some things are getting clearer. As referred to above, the appearance of art is beautiful, accomplished and, in some cases, very modern-looking ... 'that captures the imagination of all who encounter it', according to Watson (2006):

This art takes three main forms – the famous cave paintings ... the so-called Venus figurines, found in a broad swathe across western and eastern Europe, and multicoloured beads, which in some respects are the most important evidence of all. (p. 44)

Conclusion

In this article, we focussed on the building blocks of art. After a brief narrative introduction of the origin of our species, we reviewed the artistic endeavours of three representative phases in human evolution, represented by the Neanderthals, the San and the anatomically modern humans of the UP, against a broader background of the function of art in society. This was followed by more contemporary human developments intertwined with our interpretation of the role and meaning of art and the artist in society. Subsequently, we explored a broader account of art's evolution, in which the above three phases are firmly embedded. Our understanding of the role and function of art since prehistoric times was meaningfully broadened in different areas, firstly by the realisation that a substantial linguistic and cognitive component gradually became integral to the execution of specific artistic trends. Secondly, the deliberate positioning of images to conform anatomically to the natural undulations on rock surfaces suggests that the artist was not only enhancing the three dimensionalities of the image but also that the shaman used his prowess as a

healer or medicine man to enter the spirit world in an out-of-body experience through the 'veil', the rock face into the nether world, to gain the potency to heal, make rain and restore harmony among the group when he re-entered the ordinary world again. Thirdly, the fact that these artists also seemed to have been well aware of the acoustic properties within specific chambers of caves or the rock shelters that they frequented is borne out by the fact that herds of clattering herbivores are usually depicted in chambers that produce resounding echoes, whilst the 'silent' chambers, lacking the spatial configuration to produce echoes, are reserved for impeccable images of the silent hunters, that is, members of the Felidae.

Finally, in conjunction with an extensive survey of the relevant literature, we have convinced ourselves that the known artistic compilations across the spectrum of human evolution are visual interpretations of the natural world that represent attempts to cognitively encompass and express the increasing complexity of human mental states and attitudes.

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References

- Adams, C., 2020, 'Voorwoord', in C. Van der Walt (ed.), *Stilspraak*, p. 6, SUN PRess, Stellenbosch.
- Ambrose, S.H., 1998, 'Chronology of the later stone age and food production in East Africa', *Journal of Archaeological Science* 25(4), 377–392. <https://doi.org/10.1006/jasc.1997.0277>
- Baal-Teshuva, J., 2003, *Mark Rotho*, TASHEN GmbH, Köln.
- Bahn, P. & Fossati, A., 1995, *Rock art studies: News of the world I*, Oxbow Books, Oxford.
- Bahn, P. & Fossati, A., 2003, *Rock art studies: News of the world II*, Oxbow Books, Oxford.
- Bar-Yosef, O., 2002, 'The upper palaeolithic revolution', *Annual Review of Anthropology* 31, 363–393. <https://doi.org/10.1146/annurev.anthro.31.040402.085416>
- Bednarik, R.G., 2003a, 'A figurine from the African Acheulian', *Current Anthropology* 44(3), 405–413. <https://doi.org/10.1086/374900>
- Bednarik, R.G., 2003b, 'The earliest evidence of palaeoart', *Rock Art Research* 20, 89–135.
- Bischoff, J.L., Williams, R.W., Rosenbauer, R.J., Aramburu, A., Arsuaga, J.L., Garcia, N. et al., 2007, 'High-resolution U-series dates from the Sima de los Huesos hominids yields 600 plus minus 66 kyrs: Implications for the evolution of the early Neanderthal lineage', *Journal of Archaeological Science* 34(5), 763–770. <https://doi.org/10.1016/j.jas.2006.08.003>
- Blesser, B. & Salter, L.-R., 2009, *Spaces speak, are you listening?*, MIT Press, Cambridge, MA.
- Blundell, G., 2001, *San ethnography*, Origins Centre, University of the Witwatersrand, Johannesburg, viewed 18 January 2022, from https://www.metmuseum.org/toah/nd/san/hd_san.htm.
- Bradley, B.J., 2008, 'Reconstructing phylogenies and phenotypes: A molecular view of human evolution', *Journal of Anatomy* 212(4), 337–353. <https://doi.org/10.1111/j.1469-7580.2007.00840.x>
- Bradshaw Foundation, *Exploring our past – Informing our future*, The Rock Art of South Africa, viewed 18 January 2022, from https://www.bradshawfoundation.com/south_africa/.
- Clottes, J. & Lewis-Williams, D., 1998, *The shamans of prehistory*, Harry N. Abrams Inc., New York, NY.
- Cobb, S.N., 2008, 'The facial skeleton of the chimpanzee-human last common ancestor', *Journal of Anatomy* 212, 469–485. <https://doi.org/10.1111/j.1469-7580.2008.00866.x>
- Coqueugnon, H., Hublin, J.-J., Viellon, F., Houët, F. & Jacob, T., 2004, 'Early brain growth in *Homo erectus* and implications for cognitive ability', *Nature* 431, 299–302. <https://doi.org/10.1038/nature02852>
- d'Errico, F. & Henshilwood, C.S., 2007, 'Additional evidence for bone technology in the southern African Middle Stone Age', *Journal of Human Evolution* 52(2), 142–163. <https://doi.org/10.1016/j.jhevol.2006.08.003>
- d'Errico, F., Henshilwood, C., Vanhaeren, M. & Van Niekerk, K., 2005, 'Nassarius kraussianus shell beads from Blombos Cave: Evidence for symbolic behaviour in the Middle Stone Age', *Journal of Human Evolution* 48(1), 3–24. <https://doi.org/10.1016/j.jhevol.2004.09.002>
- d'Errico, F. & Nowell, A., 2002, 'A new look at the Berekhat Ram figurine: Implications for the origins of symbolism', *Cambridge Archaeological Journal* 10(1), 123–167. <https://doi.org/10.1017/S0959774300000056>
- Duignan, B., 2015, 'Cogito, ergo sum, philosophy', *Encyclopaedia Britannica*, viewed 10 January 2022, from <https://www.britannica.com/topic/cogito-ergo-sum>.
- Feliks, J., 1998, 'The impact of fossils on the development of visual representation', *Rock Art Research* 15, 109–134.
- Freud, S., 1920, *A general introduction to psychoanalysis*, transl. G. Stanley Hall, Horace Liveright, New York, NY.
- Freud, S., 1923, 'The ego and the id', in J. Strachey et al. (transl.), *The standard edition of the complete psychological works of Sigmund Freud*, volume XIX, Hogarth Press, London.
- Gombrich, E.H., 1956, *The story of art*, Phaidon, London.
- Gombrich, E.H., 1960, *Art and illusion*, Pantheon Books, New York, NY.
- Gowlett, J.A.J., 1984, 'Mental abilities of early man: A look at some hard evidence', in R.A. Foley (ed.), *Hominid evolution and community ecology*, pp. 167–192, Academic Press, London.
- Gowlett, J.A.J., 2009, 'The elements of design form in Acheulian bifaces: Modes, modalities, rules and language', in N. Goren-Inbar & G. Sharon (eds.), *Axe age: Acheulian tool-making from quarry to discard*, pp. 203–221, Equinox, London.
- Harvati, K., 2007, '100 years of *Homo heidelbergensis* – Life and times of a controversial taxon', *Mitteilungen Gesellschaft Urgeschichte* 16, 85–94.
- Haselberger, H., 1961, 'Methods of studying ethnological art', *Current Anthropology* 2(4), 341–384. <https://doi.org/10.1086/200209>
- Heidegger, M., 1975, 'Aletheia (Heraclitus, Fragment B 16)', in *Early Greek thinking*, pp. 102–123, transl. D.F. Krell & F.A. Capuzzi, Harper & Row, New York, NY.
- Heidegger, M., 2004, 'Seinsvergessenheit', in *Heidegger studies*, vol. 20, pp. 9–14, Duncker & Humblot GmbH.
- Henshilwood, C.S., d'Errico, F., Marean, C.W., Milo, R.G. & Yates, R., 2001, 'An early bone tool industry from the Middle Stone Age at Blombos Cave, South Africa: Implications for the origins of modern human behaviour, symbolism and language', *Journal of Human Evolution* 41(6), 631–678. <https://doi.org/10.1006/jhevol.2001.0515>

- Henshilwood, C.S., d'Errico, F., Yates, R., Jacobs, Z., Tribolo, C., Duller, G.A.T. et al., 2002, 'Emergence of modern human behaviour: Middle Stone Age engravings from South Africa', *Science* 295(5558), 1278–1280. <https://doi.org/10.1126/science.1067575>
- Henshilwood, C.S., Vanhaeren, M., Van Niekerk, K. & Jacobs, Z., 2004, 'Middle stone age shell beads from South Africa', *Science* 304, 404. <https://doi.org/10.1126/science>
- Hoffman, J., 2014, 'Q&A: Acoustic archaeologist', *Nature* 506, 158. <https://doi.org/10.1038/506158a>
- Hoffmann, D.L., Standish, C.D., García-Diez, M., Pettitt, P.B., Milton, J.A., Zilhão, J. et al., 2018, 'U-Th dating of carbonate crusts reveals Neandertal origin of Iberian cave art', *Science* 359(6378), 912–915. <https://doi.org/10.1126/science.aap7778>
- Huijbregts, M.A.C.R., 2017, 'Phonemic clicks and the mapping asymmetry: How language emerged and speech developed', *Neuroscience & Biobehavioral Reviews* 81(Part B), 279–294. <https://doi.org/10.1016/j.neubiorev.2017.01.041>
- Huyge, D., 2009, 'Late Palaeolithic and Epipalaeolithic rock art in Egypt: Qurta and El-Hosh', *Archéo-Nil* 19, 109–120. <https://doi.org/10.3406/arnil.2009.982>
- Huyge, D., Aubert, M., Barnard, H., Claes, W., Darnell, J.C., De Dapper, M. et al., 2007, 'Lascaux along the Nile': Late pleistocene rock art in Egypt, *Antiquity* 81, Project Gallery, viewed 11 January 2022, from https://perstoremyr.files.wordpress.com/2011/02/2008_storemyr_et_al_rockartwadisubeira_sahara.pdf.
- Huyge, D. & Claes, E., 2008, 'Ice Age' art along the Nile, *Egyptian Archaeology* 33, 25–28.
- Jacobs, Z., Duller, G.A., Wintle, A.G. & Henshilwood, C.S., 2006, 'Extending the chronology of deposits at Blombos Cave, South Africa, back to 140 ka using optical dating of single and multiple grains of quartz', *Journal of Human Evolution* 51(3), 255–273. <https://doi.org/10.1016/j.jhevol.2006.03.007>
- Jaubert, J., Verheyden, S., Genty, D., Soulier, M., Cheng, H., Blamart, D. et al., 2016, 'Early Neandertal constructions found in Bruniquet Cave in southwestern France', *Nature* 534, 111–114. <https://doi.org/10.1038/nature18291>
- Jung, C.G., 2013, *The undiscovered self*, transl. R.F.C. Hull, Taylor & Francis, Abingdon-Thames.
- Klein, R.G., 1999, *The human career: Human biological and cultural origins*, University of Chicago Press, Chicago, IL.
- Koloss, H.-J., 2002, 'Traditions of African art', in H.-J. Koloss (ed.), *Africa: Art and culture*, pp. 8–31, Prestel Verlag, Munich.
- Lack, D., 1943, *The life of the robin*, Witherby, London.
- Layton, R., 1991, *The anthropology of Art*, 2nd edn., Cambridge University Press, Cambridge.
- Le Quellec, J.-L., 2004, *Rock art in Africa: Mythology and legend*, Flammarion, Paris.
- Levin, D., 1985, *The body's recollection of being*, Routledge, London.
- Lewis-Williams, D., 2002, *The mind in the cave*, Thames & Hudson, New York, NY.
- Lewis-Williams, D.J. & Dowson, T.A., 1990, 'Through the veil: San rock paintings and the rock face', *The South African Archaeological Bulletin* 45(151), 5–16. <https://doi.org/10.2307/3887913>
- Lotha, G., 2022, *Lethe*, 'Greek mythology', Britannica, viewed 11 January 2022, from <https://www.britannica.com/topic/Lethe>.
- Marean, C.W., Bar-Matthews, M., Bernatchez, J., Fisher, E., Goldberg, P., Herries, A.I.R. et al., 2007, 'Early human use of Marine resources and pigment in South Africa during the Middle Pleistocene', *Nature* 449, 905–908. <https://doi.org/10.1038/nature06204>
- Marshack, A., 1996, 'A middle palaeolithic symbolic composition from the Golan Heights: The earliest known depictive image', *Current Anthropology* 37(2), 357–365. <https://doi.org/10.1086/204499>
- Marshack, A., 1997, 'The Berekat Ram figurine: A late Acheulian carving from the Middle East', *Antiquity* 71(272), 327–337. <https://doi.org/10.1017/S0003598X00084957>
- Martí, A.P., Zilhão, J., d'Errico, F., Cantalejo-Duarte, P., Domínguez-Bella, S., Fullola, J.M. et al., 2021, 'The symbolic role of the underground world among Middle Paleolithic Neanderthals', *Proceedings of the National Academy of Sciences* 118(33), e2021495118. <https://doi.org/10.1073/pnas.2021495118>
- Masson, J., 2006, 'Apollo 11 cave in Southwest Namibia: Some observations on the site and its rock art', *The South African Archaeological Bulletin* 61, 76–89.
- Mattioli, T., Farina, A., Armelloni, E. & Díaz-Andreu, M., 2017, 'Echoing landscapes: Echolocation and the placement of rock art in the Central Mediterranean', *Journal of Archaeological Science* 83, 12–25. <https://doi.org/10.1016/j.jas.2017.04.008>
- McBrearty, S. & Brooks, A.S., 2000, 'The revolution that wasn't: A new interpretation of the origin of modern human behavior', *Journal of Human Evolution* 39(5), 453–563. <https://doi.org/10.1006/jhevol.2000.0435>
- McBrearty, S. & Stringer, C., 2007, 'The coast in colour', *Nature* 449, 793–794. <https://doi.org/10.1038/449793a>
- McDougall, I., Brown, F.H. & Fleagle, J.G., 2005, 'Stratigraphic placement and age of modern humans from Kibish, Ethiopia', *Nature* 433, 733–736. <https://doi.org/10.1038/nature03258>
- McLeod, S.A., 2018, 'Carl Jung', *Simply Psychology*, viewed 12 January 2021, from www.simplypsychology.org/carl-jung.html.
- McLeod, S.A., 2019, 'Id, ego and superego', *Simply Psychology*, viewed 12 January 2021, from www.simplypsychology.org/psyche.html.
- Meyer, A., Schloissnig, S., Franchini, P., Du, K., Woltering, J.M., Irisarri, I. et al., 2021, 'Giant lungfish genome elucidates the conquest of land by vertebrates', *Nature* 590, 284–289. <https://doi.org/10.1038/s41586-021-03198-8>
- Mithen, S., 1996, *The prehistory of the mind*, Thames & Hudson, London.
- Miyagawa, S., Lesure, C. & Nóbrega, V.A., 2018, 'Cross-modality information transfer: A hypothesis about the relationship among prehistoric cave paintings, symbolic thinking, and the emergence of language', *Frontiers in Psychology* 9, 115. <https://doi.org/10.3389/fpsyg.2018.00115>
- Morgan, L.E. & Renne, P.R., 2008, 'Diachronous dawn of Africa's middle stone age: New 40Ar/39Ar ages from the Ethiopian Rift', *Geology* 36(12), 967–970. <https://doi.org/10.1130/G25213A.1>
- Morphy, H., 2007, *Becoming art: Exploring cross-cultural categories*, Berg, Oxford.
- Morriss-Kay, G.M., 2010, 'The evolution of human artistic creativity', *Journal of Anatomy* 216(2), 158–176. <https://doi.org/10.1111/j.1469-7580.2009.01160.x>
- Oakley, K., 1981, 'Emergence of higher thought 3.0-0.2 Ma B.P.', *Philosophical Transactions of the Royal Society B: Biological Sciences* 292(1057), 205–211. <https://doi.org/10.1098/rstb.1981.0029>
- Proust, M., 2003, *In search of lost time*, Modern Library, New York, NY.
- Rensberger, B., 1978, 'The world's oldest works of art', *The New York Times*, viewed 02 November 2020, from <https://www.nytimes.com/1978/05/21/archives/the-worlds-oldest-works-of-art.html>.
- Reznikoff, I., 1987, 'Sur la dimension sonore des grottes à peintures du paléolithique', *Comptes Rendus de l'Académie des Sciences* 304, 153–156.
- Reznikoff, I. & Dauvois, M., 1988, 'La dimension sonore des grottes ornées', *Bulletin de la Société Préhistorique Française* 85, 238–246. <https://doi.org/10.3406/bspf.1988.9349>
- Rodríguez-Vidal, J., d'Errico, F., Pacheco, F.G., Blasco, R., Rosell, J., Jennings, R.P. et al., 2014, 'A rock engraving made by Neanderthals in Gibraltar', *Proceedings of the National Academy of Sciences of the United States of America* 111(37), 13301–13306. <https://doi.org/10.1073/pnas.1411529111>
- South African History Online, n.d., *Rock art as an expression of hunter-gatherer society and world-view*, viewed 18 January 2022, from <https://www.sahistory.org.za/article/rock-art-expression-hunter-gatherer-society-and-world-view>.
- South African History Online, n.d., *Rock art*, viewed 18 January 2022, from <https://www.sahistory.org.za/article/rock-art>.
- Standish, C. & Pike, A., 2018, 'How we discovered that Neanderthals could make art', *The Conversation*, viewed 10 January 2022, from <https://theconversation.com/how-we-discovered-that-neanderthals-could-make-art-92127>.
- Stout, D., Toth, N., Schick, K. & Chaminade, T., 2008, 'Neural correlates of Early Stone Age toolmaking: Technology, language and cognition in human evolution', *Philosophical Transactions of the Royal Society B: Biological Sciences* 363, 1930–1949. <https://doi.org/10.1098/rstb.2008.0001>
- Stringer, C., 2003, 'Out of Ethiopia', *Nature* 423, 692–695. <https://doi.org/10.1038/423692a>
- Tattersall, I., 2015, 'Neanderthals, DNA, and creativity', in *The strange case of the Ricketty Cossack: And other cautionary tales from human evolution*, St. Martin's Publishing Group, New York, NY.
- Tattersall, I., 2017, 'Why was human evolution so rapid?', in A. Marom & E. Hovers (eds.), *Human paleontology and prehistory*, pp. 1–9, Springer, New York, NY.
- Thackeray, F., 2005, 'Eland, hunters and concepts of "sympathetic control" expressed in southern African rock art', *Cambridge Archaeological Journal* 15(1), 27–34. <https://doi.org/10.1017/S0959774305000028>
- Tyron, C.A. & McBrearty, S., 2002, 'Tephrostratigraphy and the Acheulian to middle stone age transition in the Kapthurin Formation, Kenya', *Journal of Human Evolution* 42(1–2), 211–235. <https://doi.org/10.1006/jhevol.2001.0513>
- Van der Walt, W., 2021, email, 05 May.
- Wade, N., 2006, *Before the dawn: Recovering the lost history of our ancestors*, Penguin Press, New York, NY.
- Waller, S., 1993, 'Sound and rock art', *Nature* 363, 501. <https://doi.org/10.1038/363501a0>
- Waller, S., 2002, 'Psychoacoustic influences of the echoing environments of prehistoric art', paper presented at the First Pan-American/Iberian Meeting on Acoustics, Cancun, s.n.
- Watson, P., 2006, *Ideas: A history from fire to Freud*, Phoenix, London.
- Wellman, J., 2019, *16 Wise Christian Quotes by Augustine*, viewed 10 January 2022, from <https://www.christianquotes.info/top-quotes/16-wise-christian-quotes-by-augustine/>.
- Wendt, W.E., 1974, 'Art mobilier' from the Apollo 11 cave, South West Africa', *The South African Archaeological Bulletin* 31(121/122), 5–11.
- White, T.D., Asfaw, B., De Gusta, D., Gilbert, H., Richards, G.D., Suwa, G. et al., 2003, 'Pleistocene *Homo sapiens* from Middle Awash, Ethiopia', *Nature* 423, 742–747. <https://doi.org/10.1038/nature01669>
- Willett, F., 2002, 'Ife', in H.-J. Koloss (ed.), *Africa: Art and culture*, pp. 32–40, Prestel Verlag, Munich.
- Winter, H., Langbein, L., Krawczak, M., Cooper, D.N., Jave-Suarez, L.F., Rogers, M.A. et al., 2001, 'Human type 1 keratin pseudogene phi hHaA has functional orthologs in the chimpanzee and gorilla: Evidence for recent inactivation of the human gene after the Pan-Homo divergence', *Human Genetics* 108, 37–42. <https://doi.org/10.1007/s004390000439>
- Witelson, D.M., Lewis-Williams, D., Pearce, D. & Challis, S., 2021, 'An ancient San rock art mural in South Africa reveals new meaning', *The Conversation*, viewed 20 December 2021, from <https://theconversation.com/an-ancient-san-rock-art-mural-in-south-africa-reveals-new-meaning-157177>.
- Wood, B. & Lonergan, N., 2008, 'The hominin fossil record: Taxa, grades and clades', *Journal of Anatomy* 212(4), 354–376. <https://doi.org/10.1111/j.1469-7580.2008.00871.x>
- Zaidel, D.W., 2010, 'Art and brain: Insights from neuropsychology, biology and evolution', *Journal of Anatomy* 216(2), 177–183. <https://doi.org/10.1111/j.1469-7580.2009.01099.x>
- Zeki, S., 2006, 'The neurology of ambiguity', in M. Turner (ed.), *The artful mind*, pp. 243–270, Oxford University Press, Oxford.