Ancestral Minds and The Spectrum of Symbol

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Ancient rock markings fascinate us not only because they are strange and mysterious but because they offer tangible traces of the lives and minds of those who made and lived with them in the distant past. Although on a world scale the petroglyphs and pictographs in the American West are relatively recent, to contemporary Americans they are reminders of the native populations that were here long before us. Their enduring images suggest a life more elemental, more spiritual than ours—especially in comparison to the mundane and often toxic or trashy residue that we are leaving to our descendants. We want to know what the engravings and paintings *meant* to their makers. Some depict life forms such as game animals and humanoid figures, ceremonial scenes, or weather phenomena such as lightning and rain. But how can we interpret the early abstract or geometric marks? What did they signify?

Questions of meaning and interpretation in rock art are often phrased as questions about their *symbolism*. Some figurative images represent animals that were sources of food, or animals as spirits or gods. More abstract designs are undecipherable, but because people spent enormous amounts of time and energy making them, it seems reasonable that they too were symbolically important. We, however, do not attempt to analyze individual marks or sites as to what they "mean" or "symbolize."

Of more interest in this chapter are theoretical ideas about interpretation and discussion of an important and contentious ongoing debate in Old World paleoarchaeology, namely the problem of when "anatomically modern" humans became "cognitively and behaviorally 'modern.'" What is at issue in this debate is the attempt to understand the "early human mind"—how it was different from, and similar to, the human mind of today. Participants in the debate agree that the pivotal point of being considered modern rests on the capacity to invent, use, and make symbols. There is a difference of opinion, however, in what constitutes a symbol and therefore when this important "cognitive/behavioral" capacity developed.

Before discussing this hot, and important, topic, we first briefly summarize what is known today about the origin of our species, *Homo sapiens,* and its achievement of both anatomical and cognitive "modernity."

A Brief History of *Homo sapiens*

The overall picture of the history of our species changes with each new discovery of yet another hominin fossil in yet another part of the world, and of earlier and earlier signs of material culture. Keeping up with evolutionary archaeology is like trying to keep track of the fast-moving puck in an ice-hockey game. New techniques for dating and for

sequencing fossil DNA have revolutionized our view of human evolution and its timeline. The influence of past climates and environments is now also better appreciated. Taken all together, these advances in our knowledge make clear that the single origin ("Garden of Eden," "Noah's Ark") hypothesis and the "multiregional" hypothesis of the 1970s and 1980s are no longer tenable in their earlier forms. It is also now accepted that the movements of our *sapiens* ancestors (and their aunts, uncles, and cousins) around the globe was extremely complicated.

At the time of writing, it appears that the origin of anatomically modern *Homo sapiens* was relatively recent and most likely restricted to East Africa where along the banks of the Omo River in southwestern Ethiopia the earliest fossil specimens of our own species, approximately 195,000 years old, were recovered.[1] Some of these modern humans dispersed to southern Africa and to the Middle East around 100,000 years ago, where populations ebbed and flowed, and by about 60,000 years ago some had reached Australia. *Homo sapiens* probably did not enter Europe until around 40,000 years ago, after developing more advanced Later Stone Age tools and complex behaviors starting about 50,000 years ago.[2]

Anatomical modernity refers to the physical characteristics of *Homo sapiens*—all humans who are alive today. Despite minor variations in size and shape, we all have such traits as a large, domed skull that houses a large brain (around 1,300cc in size), a flat face with slender jaws and small teeth, and a light skeleton—especially compared with the size and shape of these features in earlier species of the genus *Homo.* As just described, anatomical modernity was achieved about 200,000 years ago in Africa. But until recently, the dominant view was that behavioral and cognitive modernity emerged much later—at about 50,000-40,000 years ago—and only in Western Europe, where Ice Age humans created spectacular (and clearly symbolic) artworks such as the ca. 40,000-year-old biomorphic figurines in the Swabian Jura of Germany and the ca. 36,000-year-old paintings and engravings at Chauvet-Pont d'Arc Cave, France).[3]

Compared to anatomical modernity, the achievement of *behavioral* and *cognitive* modernity is difficult to assess, since it refers to changes in the human mind that cannot be directly observed or measured but only conjectured from material remains that suggest "modern" behavior. Impressively realistic paintings in deep caves or sculpted female statuettes are no longer required as evidence of modernity by most researchers. A variety of other indicators now suffice—specialized tools, in particular those with sharp blades, burials, long-distance trade, use of pigment or beads presumably for decoration of artifacts and bodies, and so forth. [4]

The earliest inhabitants of the New World have not been part of the discussion of the claims about Ice Age Europeans' possession of cognitive and behavioral modernity. This is true even though the first settlers on the North American continent probably arrived no earlier than the Upper Paleolithic in Europe, when Ice Age *sapiens* living there, especially in France and Spain, were certainly full-fledged makers and users of symbols.[5] Yet the first paleomarks made in the Americas were cupules and abstract designs, in the media of both parietal art and portable art. The overwhelming majority of representational imagery appeared considerably later. One especially puzzling element of the geometric enigma is that the people who found their difficult and precarious way into the Americas were presumably cognitively and behaviorally modern, yet their earliest

markings resemble those of Old World inhabitants who lived tens or scores of thousands of years earlier.

This discrepancy suggests that the body of WAT parietal art brings at least two significant considerations to current thinking about cognitive and behavioral modernity. First, reliance on symbol use as modernity's distinguishing feature may be unnecessary and certainly requires further probing.[6] Second, even though symbolic cognition and behavior indisputably conferred unique benefits on our *sapiens* predecessors, other important mental capacities and concerns were also essential to their ways of life—capacities and concerns that many paleoarchaeologists in their fixation on symbol seem to have ignored, dismissed, or not even recognized. Later in the chapter, we examine these in some detail.

The Great Debate: Creative Explosion or Gradualism

In 1982, science writer John Pfeiffer used the term "Creative Explosion" for the title of his best-selling book.[7] Other labels for this phenomenon include the "Human Revolution,"[8] "Big Bang,"[9], and "Great Leap Forward."[10] Until very recently, this has been the mainstream view in cognitive archaeology.[11] It proclaimed that around 60,000-40,000 years ago, "something happened" in Western Europe—probably a mutation in the brain—that created "fully modern humans," *Homo sapiens*, with minds essentially like ours today. They could make and use symbols, as evinced in their invention of language, art, and religion. Although this assumption has been largely modified or replaced, as will be discussed shortly, it still is the *popular* view, as described in a publicity statement for the blockbuster 2013 exhibition at the British Museum called *Ice Age Art: Arrival of the Modern Mind*:

> This unique exhibition will present masterpieces of Ice Age sculpture, ceramics, drawing and personal ornaments from across Europe together for the first time in the UK. These will include the oldest known ceramic figures in the world, as well as the oldest known portrait and figurative pieces, all of which were created over 20,000 years ago. These striking objects will be presented as art rather than archaeological finds and will enable visitors to see the meaning of art made long ago by people with developed brains like our own.
>
> Through archaeological evidence from Southern Africa, we can ascertain that the modern brain emerged just over 100,000 years ago with the appearance of art and complex behavior patterns. This exhibition will demonstrate how the creators of the work on display had brains that had the capacity to express themselves symbolically through art and music.[12]

Note the emphasis on the words "symbol" and "art," which are among the major characteristics that are claimed to indicate modern cognition.[13]

In contrast to the "Creative Explosion" adherents, those who began to advocate a longer piecemeal or "mosaic" development of modern traits, are called "gradualists" or "discontinuists." In the year 2000, an influential paper by American archaeologists Sally McBrearty and Alison Brooks challenged the Creative Explosion position and argued for a different model of the development of human cognitive ability and behavior, stemming from their archaeological work in Africa. As a result, most researchers accept that many

of the traits that were supposedly indicative of the Upper Paleolithic Cognitive Revolution appeared earlier in Africa, in separate times and places during the African Middle Stone Age. By coincidence, also in 2000, the discovery of elaborate figurative paintings—human hand stencils and stick-legged animals—on the Indonesian island of Sulawesi was reported. Uranium-thorium dating placed some of the images at a minimum of 39,900 years B.P.[14] That is, cognitive and representational art anywhere before the European Ice Age material dated at about 40,000 years before the present.[15] Consequently, the orthodox belief that *Homo sapiens* in Western Europe was the first "artist" and symbol-maker is no longer tenable.

Although some early geometric marks were known, they had not entered into anyone's idea of "art," much less were they considered evidence of cognitive or behavioral modernity. For example, in 1988, when the parallel and subparallel line engravings on elephant bone at Bilzingsleben were reported and associated with *Homo erectus* (in the age range of 400-300,000 years ago)[16] they were not considered to be "symbolic" or "art,"[17] nor were finds of markings on rocks from early *sapiens* sites, such as ocher coloring on stones in Bambata and Pomongwe Caves in Zimbabwe from 125,000 years ago.[18]

In their groundbreaking paper, McBrearty and Brooks provided many other indicators of cognitively and behaviorally modern abilities in Africa and elsewhere. These include advanced stone technologies (diverse toolkits, more complex tools, use of a wider range of materials to make nets, traps, clothing, and fire); increased geographic range; specialized foraging capacities (use of a wider range of natural resources for food, including colonization across sea barriers in Southeast Asia); complex processing of plants, fruits, and tubers; long distance trade; burial of the dead; evidence of foresight, planning, and group coordination; and evidence showing distinct local styles of material culture. They and numerous other scholars also described the systematic use of pigments, at sites such as Kapthurin in Kenya[19] and Twin Rivers in Zambia[20] (270,000 years ago), Sai Island in Sudan 200,000 years ago,[21] Pinnacle Point in South Africa (164,000 years ago),[22] and Bambata and Pomongwe Caves in Zimbabwe (125,000 years ago).[23]

Twentieth-century findings of early geometric marks further challenged (or confused) the emphasis on Upper Pleistocene pictorial art as the cornerstone of the modern mind. Two instances of geometric incisions by Neanderthals, one from Bulgaria (47,000 years ago) and the other at Gorham's Cave in Gibraltar (39,000 years ago) were described in Chapter 1. And, if we include evidence of a capacity for constructing a geometric form in space, there are the two large ring-like structures made from pieces of broken-off stalagmites deep inside Bruniquel Cave, also made by Neanderthals, as early as 175,000 years ago.

Gradually, other authors have proposed additional defining criteria of cultural modernity.[24] But despite general agreement among most paleoarchaeologists today that the "Eurocentric" viewpoint—that Cro-Magnons were the first modern people—has been largely abandoned,[25] and] that there was a more gradual development that began around 150,000 years ago in Africa in separate times and places,[26] the question remains: What was it that changed between Middle Stone Age and Ice Age *sapiens*?[27] By 200,000 years ago, human brains had achieved essentially modern volume. If African Middle Stone Age humans had the same "cognitive horsepower" as those of the much later European Ice Age, why did the former take so long to catch up? Some suggest that changes around

50,000 years ago must have been in the organization of the brain (thanks to a mutant gene), not in its sheer size.[28] Still other recent scholars look to the influence on various human populations of changing environmental, cultural, historical, social, and demographic factors.[29]

The predominant response to these questions identifies "symbolically mediated behavior" as the breakthrough capacity or distinctive signature of the modern mind.[30] As British physical anthropologist Chris Stringer puts it, "We do need to find the earliest evidence for symbolic behavior in the archaeological record—a key factor in resolving this debate—and whether it ever extended beyond our species . . ." And he adds: "A critical question [is] how to recognize symbolism."[31]

The examples that archaeologists now take to be the earliest evidence of "symbolicity" (symbolically mediated thought and behavior) are kinds of mark-making: pigment manipulation and use (application on objects and bodies), engraving on stone, and bead manufacture (in the sense that beads are made to be used to decorate or "mark" bodies and clothing).[32] Although the early geometric marks made by Neanderthals, very early *Homo sapiens*, and even *Homo erectus* were (and are) unexpected and confounding, they are often construed to be "art" or "symbolic" (or both), as if it were impossible to be one without being the other.

Although I question the dictum that symbol use was the *sine qua non* of cognitive and behavioral modernity, I appreciate its critical importance in the evolution of *Homo sapiens*. Language, mythologies and their pictorial and poetic representations, and other clear evidence of symbolicity are unquestioned hallmarks of our species. Nor do I advocate an extreme view that says that no early mark was symbolic. And in particular, I certainly do not mean to discount or discredit the valuable contributions of the "discontinuist" or "gradualist" archaeologists (those who challenge the Creative Explosion view) whose work on the African continent has revolutionized thinking about human behavioral and cognitive evolution

Mark-making activities (whether with pigment, engraving tools, or perforated shells), however, can be understood not only as symbol-making but as instances of the broader and chronologically earlier capacity of artification. Indeed, in cognitive archaeology, the label *Homo symbolicus* could be conceptually replaced by *Homo aestheticus*, because all modern humans have the capacity to artify, and the ability to make and use marks symbolically is a *subset* of this primary capacity. Although not all ancient marks are symbols, they are all examples of artification, a distinctive cognitive capacity that deserves inclusion in any discussion of the early human mind. Virtually all symbolic marks are instances of artification, but not all artifications are symbolic.[33]

What is a Symbol and How Do We Recognize Symbolically Mediated Behavior?

In their concern—or obsession—with symbolic behavior as a defining feature of cognitive and behavioral modernity in humans of the past 200,000 years, paleoarchaeologists have focused on manifestations of "art-like" abilities such as markings on small pieces of stone or ostrich eggshell, the non-utilitarian use of pigment, and the manufacture of beads and pendants, all of which are assumed to be evidence of symbolic thought.

Many scholars who call an early mark "symbolic" tend to employ the term almost by default—as if it referred to something self-evident. As the debate about symbolicity has intensified, others have looked to the academic field of semiotics, which is concerned with symbols as a kind of "sign." Signs, which include words, sounds, images, acts, or objects, have no intrinsic meaning apart from our interpretation of them through other signs.[34] Signs allow us and other animals to understand the world—they are the way that our minds make meaning from its vast complexity. From birth, human brains are prepared to seek out and respond to some signs rather than others—to the sight of human faces and the sounds of human voices, to the taste of milk, to the soothing warmth and touch of loving hands and bodies. And as we grow and develop, we further seek out and respond to other signs. What psychologist James Gibson has called "affordances"[35] are signs—things in our environment that contribute to our survival.

From a biobehavioral point of view, everything that we pay attention to can be thought of as a "sign"—a sign of its meaning to our well-being or its opposite, which we then pursue or try to avoid; if a sign has no particular importance, we ignore it. This is the same for other living creatures, for snails and sparrows (who pay attention to different signs), as well as humans. So far, semiotics seems like common sense.

Human minds and brains, however, are unimaginably complex, and so are the signs that we respond to. In addition to simple iconic and indexical learned meanings (e.g., that a drawing of a dog in a children's book resembles or "means" dog; that thunder and lightning indicate or "mean" rain), there are more complicated learned associations with various iconic and indexical signs and *particularly with symbols*, which are connected in our minds by convention[36] rather than by resemblance or causal connection to something in the world. Common examples of symbols are signs with cultural and institutional significance—linguistic, religious, political, or material. Like other signs, they usually have biological significance as they relate to our physical and social environment, including our relationships with other people. Members of a particular cultural group also know the meanings of these symbols: a recent definition of symbolic thinking is "the capacity to attribute specific meaning to conventional signs."[37] Most semioticians would say that other animals, even other higher primates and our earliest hominin relatives, do not make and use symbols.[38]

Paleoarchaeologists Christopher Henshilwood and Francesco d'Errico define a symbolically mediated culture as "one in which individuals understand that artefacts are imbued with meaning and that these meanings are construed and depend on collectively shared beliefs. This criterion is crucial. It explains how human norms and conventions differ from the ritualized behaviours found in nonhuman primates."[39] But focusing on this strict criterion ignores other pre-symbolic cognitive and emotional sources for mark-making that would also have been essential in early human mentality.

The Search for Early "Symbolic" Behavior in Africa: Pigment, Engraving, Beads

Exciting discoveries of apparently non-utilitarian behavior have been reported in South Africa from nearly a million years ago and in East Africa from at least 270,000 years ago. Mineral pigment such as colored ocher (often red), is indicated at every level of Wonderwerk Cave, a *Homo erectus* site in the north Cape region of South Africa, as early as 800-900,000 years ago.[40] It will probably never be known what the substance

was used for so long ago, but certainly, over succeeding millennia, ocher becomes common in anatomically modern *sapiens* sites of at least 270,000 years ago, such as Kapthurin in Kenya,[41] Twin Rivers in Zambia[42] and others in East and South African sites described earlier. At Pinnacle Point in South Africa an excavation dated to 164,000 years ago yielded over fifty pieces of red ocher including some that showed traces of grinding and scraping—indicating "all the hallmarks of pigment for body painting and perhaps coloring of other organic surfaces."[43]

A 100,000 year-old assemblage of items found in Blombos Cave, South Africa can justifiably be called a "paint processing kit,"—including quartzite tools (to hammer and grind powder from blocks of ochre), abalone shells with ocher residues still visible inside, pieces of charcoal, and seal bones from which oil may have been extracted and mixed with the powder as a binder—provides evidence of the use of ocherous coloring materials to mark objects and probably bodies.[44]

Other evidence of behavior thought to have been symbolically mediated includes engravings on thirteen small pieces of ocher that were also found at Blombos at levels between 100,000 and 75,000 years old. They are incised with lines—vertical, horizontal, and diagonal—many of them parallel or crossed and others coming together in dendritic or fan shapes.[45]

The most unusual artifact from Blombos is the famed "zigzag" ocher piece (labeled M1-6, dated 77,000 years ago) with a complex pattern composed of a series of superimposed oblique lines that resemble Xs, framed with three vertical bands—one on each of the outside edges and one in the approximate midpoint of the row of Xs.[46]. Two simpler inscribed zigzag markings were mentioned in Chapter 1, the first by a Neanderthal—the 47,000 year old bone fragment from Bacho Kiro, which has received drastically different readings. Paleolithic scholar and archaeologist Alexander Marshack regarded the zigzag form as symbolically related to water.[47] Interdisciplinary researcher John Feliks, on the other hand, after reversing the horizontal alignment of the jagged marking, considers it a literal portrayal of "a person hiking across the Balkan Mountains 47,000 years ago," and goes on to characterize it as "one of the most important examples of Neanderthal mental ability known."[48]

The second zigzag marking--that of a *Homo erectus* at Trinil, Java—was made by hominins who were not even anatomically modern, much less cognitively modern. Dated to between 540 and 430 thousand years ago, it is four to five times earlier than the earliest markings at Blombos made by *Homo sapiens*.[49] When asked by a science publication to comment, archaeologist Curtis Marean said that the Trinil find could arguably be considered evidence for "symbolic activity," and neuroscientist David Edelman claimed that it could indicate that *Homo erectus* was equipped with "a mind capable of a uniquely abstract form of conscious 'wandering.'"[50]

Although the most recent abstract marks or designs at Blombos can be dated from about 75,000 years ago, there is a 15,000-year hiatus before further known geometric marks appear in South Africa. These are dots and grids incised on broken pieces of ostrich eggshell found in Diepkloof Rock Shelter, Western Cape, and dated to about 60,000 years ago.[51] (When intact, the empty eggshell was probably used as a storage vessel). Although more sites with zigzag engravings may be found, at present it is difficult to maintain that there was a continuous South African *tradition* of abstract or even symbolic marks.

The earliest known beads consist of deliberately perforated marine or snail shells, variously found in the Middle East (Skhul at Mount Carmel, Israel, 135,000 to 100,000 years ago),[52] North Africa (100,000 years ago),[53] and South Africa (Blombos Cave, 75,000 years ago). There is standardization, as all the shells found at a particular site are from the same species, although different species were used at different sites. Some beads show signs of wear (from having rubbed against a cord) and some bear traces of red ocher. Personal ornamentation findings drop off after 70,000 years ago, although of course perishable organic materials may well have been used both before and after that date. From about 40,000 years ago, beads again appear at African, Eurasian, and Australian sites.[54] Subsequently, beads or pendants made of perforated teeth, bones, stones, ivory, and amber are found, in addition to various kinds of shell. Most archaeologists accept personal ornaments as unqualified evidence of symbolic material culture.[55]

When pigment or beads are found in an archaeological site, they are presumed to indicate the decoration of bodies or possessions, which is often interpreted as displaying the status and identity of individuals or groups. As Australian philosopher Kim Sterelny describes, shells can be standardized and compositionally organized; their pattern and placement can itself be a signal. Various arrangements can encode precise information about rank, role, age, status, gender, even individual identity.[56] Abstract marks also could have been insignia that communicated status or band membership. Certainly in traditional societies that have been observed by ethnographers, self- and object-decoration with pigment, abstract patterns (whether painted, engraved, or tattooed), and material from the natural world such as marine and snail shells, as well as more perishable objects—feathers, flowers and leaves, seeds, fibers, peeled bark—are common. People today communicate their status and group membership by hairstyles, clothing, and possessions. Typically these are viewed as "symbolic."

However, adornment (enhancement) may also be understood more parsimoniously as artification—making the ordinary human body extraordinary because it is important to the individual and society. It need not be automatically considered as symbolic. Using pigment on objects and bodies, as well as making engravings on ocher, could also well have been motivated by practical non-symbolic concerns that had to do with ensuring the achievement of a desired goal.

Rethinking the Criteria for Symbolicity in Early Mark-making

Henshilwood and d'Errico list sixteen indicators that support their a priori assumption of early-appearing engravings as being symbolic.[57] For simplicity's sake in addressing engraved marks on stone surfaces and the other two types of early mark-making (pigment manufacture and bead production used for marking—ornamenting—the body), three of these criteria of symbol use are particularly relevant: that the activity or result (a) shows intentionality or deliberateness, (b) has geometric regularity, and (c) has no obvious functionality. Although the word "art" is not used by most gradualists, they do consider that "non-utilitarian use" of mineral pigment is an important indicator of modern cognition. Non-functionality, of course, is also frequently considered to be one of the characteristics that makes something "art."

Intentionality

The surface of the well-known ocher block (Blombos M1-6) on which a zigzag design was engraved 77,000 years ago appears to have been intentionally and specially prepared—flattened and made smooth—before marks were made on it. Some of the lines that make up the pattern have more than one stroke, as if improving or emphasizing them. The geometric design of diagonal lines, X's, or zigzags implies a pre-existing mental pattern and is evidence of neuro-motor control, also suggesting intentional behavior. Additionally, the piece does not appear to have an obvious utilitarian function.

A careful and persuasive reassessment of this famous artifact by scholar of rock art semiotics, Matteo Scardovelli, who obtained permission to handle and examine it, found that the characteristics used to attribute symbolicity could have a much simpler explanation.[58] Although he emphasizes that the artifact may possibly be symbolic, he concludes that it is not undeniably so. His full paper should be consulted; here, I merely condense the evidence.

To begin, the engraver did use a prepared and polished surface on which to scratch lines. However, the flat, rectangular surface that looks as though it was specifically prepared for being engraved could just as well have been previously used for another purpose—to scrape something, for example, so that it could be more easily held and flattened (abraded) by being rubbed on another surface. Many other stones found at the same site had also been scraped and smoothed for posited utilitarian reasons, but were not engraved. In other words, it is not conclusive that Blombos M1-6 was prepared specifically for the purpose of being engraved.

Examining the sequence of strokes revealed that the zigzag pattern emerged during the act of incising. That is, it was not produced one consecutive X or diagonal at a time, but rather in a haphazard fashion. In fact, the earliest markings on the stone were insecure and imprecise, supporting the conclusion that there was no pre-existing mental pattern.

Geometric regularity

In his study of the Blombos artifact M1-6, Scardovelli also found that the zigzag pattern could be characterized as "more or less regular" rather than resolutely geometric. Like the straight, parallel, perpendicular, cross-hatched, and fan-shaped lines that were engraved on other small stones at Blombos (or the dots and grids on ostrich egg shell fragments from Diepkloof, as mentioned previously), such motifs can all be found in the early mark-making of young children, who are not making symbols.[59] Even chimpanzees who are given drawing materials often make a series of straight lines downward in a fan shape or they cross an existing line or lines with another line or lines—an activity that seems to be satisfying to their eyes and hand.[60]

Scardovelli suggests that the "zigzag" may have been made by juveniles, in a sort of play, perhaps while investigating the inside color of the stone. This idea is not as far-fetched as it might seem, as mark-making may indeed have originated, at least in part, in play (which includes curiosity and exploration), where it provided motoric and cognitive practice and pleasure. Interestingly, prehistorian Jean Clottes also is "far from sure" that the Blombos piece "is an incontrovertible instance of symbolic behavior … it could also have been a kind of doodling."[61]

Several points about play behavior—a complex subject, observable in many animals—are relevant here.[62] First, it is universal and of vital importance in humans. Even without instruction or encouragement from adults, children everywhere play. In any open space, park, or schoolyard in the world, their play looks and sounds recognizably the same. It is essential to child development. "Play is the child's work" has been noted by numerous psychologists who attribute the statement to Jean Piaget and Maria Montessori, among others.

Evolutionary psychologists and anthropologists emphasize the gradual lengthening of the period of childhood in the genus *Homo*, compared to the life history of primates or earlier hominins, and how this additional time provides a longer opportunity for play to contribute to learning and acculturation.[63] Our early human ancestors surely played in childhood and beyond, although, with regard to rock art, to my knowledge, only Sterelny uses the words "play" and "explore" in discussing young *habilines* who, he says, would have had opportunities to explore the physical properties of stone and experiment with its angle and power of imprint.[64]

Apart from Sterelny and Scardovelli, the importance of this common everyday behavior does not seem to have been given its due by most paleoarchaeologists who write about early human mentality and behavior. Notable exceptions are Dale Guthrie and Robert Bednarik, both of whom are convinced that "children" (primarily adolescents) were involved in the production of the Paleolithic art corpus.[65] Cognitive archaeologist Merlin Donald mentions play with vocalizations and discusses games, saying that children can distinguish play behavior (mimesis) from "the real thing."[66] Stringer refers to the evolution of childhood and juvenile phases of development where play is vital.[67] Presenting evidence for his theory that human narrative emerged from playfulness, evolutionary literary scholar Brian Boyd looks both to forms of play in intelligent animals—dolphins and chimpanzees—and to recent neurobiological research.[68]

It is understandable that play is a neglected topic in paleoarchaeology. As ethologist of play Gordon Burghardt has found, just to refer to "play" seems to take on some of the frivolity that the word suggests in ordinary parlance, where it is contrasted with work and adult responsibility.[69] It is often assumed to be not only a non-serious, non-adult kind of pastime, but also a non-serious and childish subject for study.[70]

Yet the seriousness and necessity of play are evident in child development studies, with implications for prehistoric children and adults as well. A study of hand-use in pre-verbal children has revealed a normal developmental sequence that begins with picking up and placing, then moves on to banging, pairing, matching, sorting, building with bricks, sequencing, and drawing (which in the context of this book can be called mark-making).[71] When practiced by toddlers with toys, these activities are often called play, which doesn't take into account the fact that they are at the same time essential hands-on activities that give children of every culture a foundation for future learning, understanding, and communication. As early motor activities, they display continuity, effort, pleasure, and endless repetition. Is it irrelevant to point out, with regard to sophisticated cupule-pounding and mark-making, that banging (or hammering) precedes the fine motor control of scribbling or drawing, and that continuous, effortful, repetitious activities are highly motivated sources of pleasure? It is not difficult to imagine our early ancestors, young and old, fooling around and finding pleasure in the movements of making marks, as well as seriously doing so for a cultural or personal purpose.

With regard to motoric repetition, studies from various fields make clear its deep roots in our species. Only humans, among higher animals, exhibit "pulse-born behavioral synchrony,"[72] sometimes called entrainment.[73] Contributors to the book *Communicative Musicality* describe some of the effects of "pulse" in the coordination of human communication—pulse being "the regular succession of discrete behavioral events through time, vocal or gestural."[74] Studies of entrainment and pulse support a theory that repetition of sound and action in mark-making on stone—sequential rhythmic blows of hammering with a hammerstone or incising with a mallet and chisel—exercise inherent, unconscious, but essential biological mechanisms that evolved in part to allow us to coordinate with other humans. Such repetitions are observable from earliest infancy (and even prenatally), and at any age provide expressive and emotionally satisfying brain activity that more "cognitive" interpretations of the activities of early humans may easily overlook.

Studies of children's drawing on paper also show sequential development: the first scribbles from the age of two evolve naturally and inevitably into meanders and spirals, and eventually into increasingly refined geometric shapes and variations and combinations of those shapes—circles, concentric circles, concentric arcs, circles with radials, and quadrisected circles.[75] Dots, too, are made both outside and inside other configurations. Children find motor, cognitive, and emotional satisfaction in drawing before they have symbolic intent. In their early drawing, they do not intend to represent and symbolize. Even their eventual drawings of people or houses are based on conventions that they learn and traits that they know about; they rarely if ever copy directly from something they see or remember. Although early humans should not be compared to children, the sequence of learning to make marks, arising from neurobiological constraints, would follow the same course at whatever age or cognitive/behavioral stage the behavior begins.

Art teacher Rebecca Burrill finds that movement is primary in mark-making.[76] Early scribbling is exploratory and pleasure-based, first in sensorimotor feeling in which the dynamics (intensity of movement) and shape of the activity directly expresses internal states. Then, between ages three and five, children start to make centered and balanced designs from their store of self-taught geometric forms, which gradually, between four and a half to seven years, overlap with Gestalt imaging processes, becoming more reflective and integrative, intuitive, analogical, and metaphorical. This trajectory emerges naturally, without being taught. Although Burrill is describing mark-making with crayon or marker, not engraving on stone, it seems likely that the latter medium would begin similarly—first drawing in sand or earth with one's finger or a stick and then on soft stone with a sharp implement, and eventually scratching or incising a design on a harder surface before making deeper permanent marks. The motoric and movement aspects of mark-making should not be disregarded.

Philosopher of art, Thierry Lenain,[77] in his comprehensive and fascinating study of painting by captive monkeys and apes, describes spots or dots made by hitting the painting instrument against the page, as the animals enjoy repeatedly banging objects against hard, smooth surfaces. Lenain suggests that this action allows the apes to verify the object's weight and solidity, which is useful in the wild, for instance, when cracking nuts.[78] Then there are clusters of lines obtained by sweeping the painting implement over the page, to and fro, producing elementary rhythmic, sometimes parallel, lines.

Lenain introduces the notion of "disruption," where any mark made on a blank sheet becomes an element that can (and usually does) elicit further marks. Among the commonest and most important of the successive marks are strokes or groups of strokes that cross a pre-existing line.[79] His study, with its many examples and illustrations, repays close reading for showing the similarities of ape art to children's drawing and, by extension, to mark-making in early humans (which his book does not address). He emphasizes that ape art is a kind of play and exploration, as zoologist and ethologist Desmond Morris also described it.[80] Lenain also points out that apes do not seem to use drawing as a means of communication: "the act of marking is the important thing."[81] The same is seemingly also the case for young children and perhaps even our earliest mark-making ancestors. Children, like chimpanzees, do not return to look at or admire their completed work. Making marks on stone that last for millennia is obviously different from making marks on paper with a crayon or paintbrush, so the interest of our ancestors in the finished product may well have been more enduring.

Absence of functionality

Using the absence of functionality as a criterion for calling an object "symbolic" (or, for that matter, "art") may arise unconsciously, we think, from a modern Western idea that was common more than a century ago—that of Art for Art's Sake. In this view, what made an object "art" was not its usefulness (as a container, for example) or the message it conveyed (religious, patriotic, sentimental) but an indescribable "aesthetic" experience or value based on non-utilitarian qualities.

Gradualist paleoarchaeologists do not seem to use non-functionality in its nineteenth-century "art for art's sake" sense, but nevertheless their use of this criterion can be confused, even contradictory. They maintain that the engraved ochers (like painted bodies or objects and perforated shell beads) are "symbolic." And, as symbols, they are said to provide information to others, such as group or personal identity, or an individual's status. These are functions. Indeed, the arts (and symbols) in traditional societies always have "functions": masks are carved or shields painted in order to assure their efficacy, to make them "work" for a particular purpose—such as driving away a demon or enemy. To be symbolic is in itself to have a function, though non-symbolic objects and actions can be functional as well. In other words, while some functional objects and actions are non-symbolic, *all* symbolic objects and actions have a function—that of conveying a signal or message.

What Cupules Contribute to the Cultural Modernity Debate: Are they Symbolic?

It is interesting to realize that cupules—along with pigment manufacture and use, geometric engravings, and bead-making and use—also meet the gradualists' criteria of symbolicity. They are made intentionally, their cup-shaped form is "geometrically regular," and they lack obvious functionality. However, they are rarely mentioned in the context of the cognitive modernity debate,[82] even though—like engraved lines on ocher—they were carefully made by hand with tools on rock surfaces by modern humans and even by earlier species.

Cupule-making indicates the capacity to intentionally make a rock wall or boulder different from its natural state—that is, a capacity to artify. Inasmuch as the earliest

cupules date from 200,000 years ago at Sai Island in Sudan[83] and some were made at La Ferrassie by anatomically non-modern Neanderthals,[84] artification of rock surfaces seems to have been under way in some places well before their makers were "modern," either anatomically or behaviorally. They were made before people in South Africa began to make engraved marks on small pieces of ocher. As a vestige of ancient human behavior, cupules add crucial new considerations to the debate about the criteria for defining cognitive and behavioral modernity, especially to core assumptions in both camps about the relationship between art and symbol.

Are Cupules Symbolic?

Cupules were manufactured early and continuously in the American West. Known or speculative reasons or motivations for making cupules include their use as receptacles for medicinal or sacrificial substances, to produce rock powder in order to enhance fertility or for ingesting, making percussive sounds to attract thunder and rain, summoning people to an important event, inducing a trance experience, or demonstrating strength and persistence.

It is important to note that none of these suggested "functions" of cupules is symbolic. Almost without exception, the cupule is made in order to produce a "product" or effect, from the powder that ensues to the sound that the hammering produces. The cupule itself is incidental to the hoped-for or actual result (fertility, demonstrating one's ability to work hard, entering a trance state, calling people together). The effect is their "function," rather as wetting the ground is the effect of rain. The effector—the cupule-pounding or the rain—is not a symbol.

The cupule itself is there not because someone wanted to make a mark that is symbolic of something. Rather, this hemispheric depression is what is left after the effort that produced it (along with any accompanying wish) and the desired effect have been accomplished. Those who regard it in the future may or may not know what particular effect was sought. My point is that it need never have been "symbolic"—but, rather, inadvertently or deliberately *indexical*—indicating even to us many thousands of years later that something happened here, someone cared about cupule-pounding, even though leaving a mark may not have been the sole or even primary intention of the hammerer.

Such a mental operation—caring enough to pound a cupule—is not symbolic but, rather, *analogical*. That is, evidence of great effort shows, by analogy, that something was of importance to the person who took the time and trouble to make the effort. The resulting cupule thus inadvertently remains as a visual marker or sign of a presumed important cultural occasion or site.

What Symbol-Fixation Leaves Out

Although representations of animals are surely symbolic, and some abstract glyphs, like some geometric designs, may well be symbolic, many cupules and other non-iconic marks need not have been made with symbolic intent, despite the now almost axiomatic assumptions that the origin of mark-making (or of any other ancestral behavior that appears to "lack obvious function") necessarily required the intention or even the ability to symbolize, or that any mark found on rock is "symbolically mediated." In fact, arguments attributing symbolic value are no more convincing than those questioning it.

There are at least three noteworthy problems with the assumption that cognitive and behavioral modernity rests upon the ability to make and use symbols:

(1) Imprecise or casual use of the term "symbol";

(2) Conceptualizing the early human mind as primarily linguistic and cognitive rather than non-verbal and affective;

(3) Overlooking *proto*-symbolic (or even *non*-symbolic) behaviors that were arguably of vital importance to the lives of early humans.

Imprecise or Casual Use of the Term "Symbol"

Too often the term "symbol" is naively, loosely, and idiosyncratically used—reminiscent of the term "art," which many archaeologists have abandoned for the same reason. The word is frequently not defined and, as used, could be conceptualized more accurately with another semiotic term or category such as sign, signal, icon, index, or related mental activity such as analogy or association.

Henshilwood and d'Errico define symbol as "a sign that has no natural connection or resemblance to its referent,"[85] a definition that shows their familiarity with concepts used by semioticians such as Charles S. Peirce.[86] In this sense, a word (the name for something) is a symbol: the spoken sound or written equivalent of the word or concept CAT (or CHAT or KATZE) has no natural connection or resemblance to an actual cat, whether in England, France, or Germany. As with this example, typically a symbol is considered to be a linguistically based sign that others agree on.[87] For Terrence Deacon, author of a seminal study on the development of symbolism in the human animal, the transition from icon to symbol in the evolution of language is a *cognitive* revolution, because a symbol's meaning cannot be learned by an associationist mechanism.[88]

No one knows whether the purported "symbolic" meanings of 100,000 year-old incised marks in South Africa were linguistically based. It is possible that people named rows of incised lines or grids with words that referred to shared meanings such as "adult male," "initiate," or "Mary's container." However, it is possible that such words were not needed, and everyone understood those meanings from associating the marks (or beads) with those categories, rather as children learn by observation that wrinkled skin is a characteristic of old people or that Uncle John has a distinctive laugh. In that case, the paint on someone's face or beads around their neck would not be symbolic but rather an indication by association. Even animals understand associated or indexical meaning: to a cat, its owner's opening a certain cupboard means food, and to a dog the jangling of a leash means that going outdoors is imminent.

For Peirce, signs initiate and mediate all human feeling, thought, and action—they comprise a broad category. Briefly, a sign is anything perceived by an observer that stands for or calls to mind something else and by doing so creates an effect in the observer. This seems sufficient to characterize cupules and other rock art markings, but it also characterizes many other things in the world. Although this chapter is not the place for a short course in Peircean semiotics, it should be said that Peirce identifies three aspects: the sign (or "sign vehicle"); the object (the idea indicated by the sign); and the affect or meaning of the sign-object relation in the person. Furthermore, he distinguishes between three basic ways that people make the connection between a sign and what it stands for (its object); he calls these "icon," "index," and "symbol."

The results of ancestral use of ocherous paints, the incising of geometric and other non-representational marks on rock surfaces (including the hammering of cupules), and the manufacture and wearing of beads can be considered as signs (icons or indexes) without automatically assuming that they imply complex cognitive capacities such as symbol creation and use.[89] Their lack of obvious practical utility, their costliness in terms of energy expended, and their strikingness (difference from the ordinary; unexpectedness) communicates that they are *special*,[90] whether they do or do not have identifiable symbolic referents. They attract attention, making the person, object, or place more noticeable or noteworthy. Body decorations can make a person startling or threatening and are most plausibly seen as expensive (costly) signs of status, skill, or success.[91]

"Costly" signals, however, can signal more than alarm, threat, or individual fitness. As evolutionary psychologists Lawrence and Michelle Sugiyama have nicely phrased it, costly signals may operate "on several frequencies, capable of sending a variety of messages," not only those that attract mates, demand or advertise status, or demonstrate unfakeable commitment—the usual meanings that are assigned by evolutionary psychologists to costly behaviors.[92] Rather, by their extravagance and apparent non-utility, they can be correlative to or "indexical" of the importance the signal holds for the signaler and those who perceive it.[93]

Thus, before verbalizable (or even "conscious") interpretations of body decoration (paint or beads) or marked objects occur, they can communicate that makers or wearers have invested time, skill, and energy to make something special as an indication of *importance*: they obviously are indicators of matters that an individual (or group) cares about. In ritualized behaviors, animals naturally pay attention and are attracted to unexpected and unusual features in the appearance of their fellows, and we suggest that early humans would have responded to body ornamentation in a similar way, even before imputing cultural meaning.

Archaeologist Paul Pettitt retains the idea of symbol, but suggests that there are different *levels* of symbolic meaning of pigments and shell beads as personal decoration and simple display—from enhancement of a signal ("you will be impressed at red as a sign of my strength"); to showing status or group identity ("it is my right to wear these"); to conveying some environmentally related information ("this is worn at a specific time of year").[94] Stringer agrees that it is certainly possible that some of the earliest uses of red ocher in African sites were not symbolic. That is, it was used for practical reasons such as preserving organic materials or protecting human skin (from sun or insect bites), or its use reflected a low level of symbolic intent (like Pettitt's examples of personal decoration and simple display).[95]

These are not levels of *symbolic* intent, but rather examples of iconic or indexical communication. And there is more to say positively about the enhancements of mark-making than assigning them to "levels" of symbolic communication.

The Early Human Mind as Primarily Linguistic and Cognitive Rather than Non-verbal and Affective

If we consider arts that are non-linguistic or generally non-representational, such as instrumental music, drumming, dance, and mime, we find that they do not as easily or automatically lend themselves to "symbolic" interpretation as do painted and incised

geometric marks or perforated beads.[96] These "arts of time" are ephemeral: they do not leave permanent traces, although they may well have originated along with or even earlier than the making of visual marks. Even if they sometimes imitate an animal sound or movement (and thus might be called "symbolic"), this is not always or even frequently the case.[97]

Gradualists do not include the arts of time in their arguments about the achievement of cognitive and behavioral modernity. I think, however, that insofar as temporal arts are intentional artifications of sounds and body movements, are generally regularized or patterned, and "nonfunctional," they are as relevant to ideas about behavioral and cultural modernity as are ocher, engravings on shell or stone, and beads.

In his influential hypothetical reconstruction of the evolutionary development of the human mind, cognitive anthropologist Merlin Donald includes some of these arts of time. He considers mimetic representation to be at the very center of the arts, mentioning pantomime, ritual dance, visual tableaux (drama without words), and more recent early Chinese and Indian dance or Greek and Roman mime.[98] Yet he claims that even in modern culture (and by implication ancestral culture), mimesis may function *apart from its symbolic and semiotic devices*. For example, mime can convey a social role, communicate emotions, and transmit rudimentary skill more efficiently than words.[99]

Donald additionally lists other examples of typical human culture that function without much or any involvement of symbolic language: trades and crafts, games, athletics, a significant percentage of art forms, various aspects of theater (again including pantomime), and most social ritual.[100] He describes results of nineteenth century studies of illiterate deaf-mutes that found that these non-linguistic persons could operate machines and invent solutions to practical problems, recognize functions of objects, show emotional responses, have social relationships, and be fully able to cooperate and recognize the intentions of others.[101] Donald quotes psychologist Rudolf Arnheim, who argued that language is largely irrelevant to the visual arts.[102] Moreover, Arnheim considered visual thinking to be largely independent of language, as are musical improvisations, athletic activities, and ancient human crafts like pottery and weaving.

Donald's retracing of the origins of the "modern" mind and its pre-literate antecedents may or may not be correct in all details, but his book remains an important and provocative achievement and his thought well ahead of his time. One important contribution is to emphasize that our Pleistocene ancestors were non-literate, as of course were the pre-modern peoples whose ways of life form the body of ethnographic information that makes up our knowledge of pre-industrial societies.[103]

As this book was being written, an article appeared that advised scholars of rock art to take into account the fact that early mark-makers were nonliterate and therefore necessarily had minds different from ours today.[104] Two decades earlier, I devoted the final chapter of *Homo Aestheticus* to the effects of what I called hyper-literacy (and the "anomaly" of literacy), stating that modern thought "is *scriptocentric* in the same way that the pre-Copernican world was geocentric."[105] The fact that some rock art experts are at last recognizing the implications of this difference is welcome, but it suggests that even in the twenty-first century many still do not appreciate the effects of reading and writing (or not reading and writing) on the mind. It is too easy, in thinking about "behaviorally and cognitively modern" humans, to assume that, apart from living outdoors, they were just like us.[106]

In addition to lacking literacy, early pounders of cupules, engravers on stone, fashioners of beads and pendants, and daubers of pigment were born into very different social worlds from ours. Unless one has lived in a small-scale, non-Western cultural group for some time, it is not only difficult, but perhaps even impossible to adequately appreciate how different would be the thought and behavior of people whose environments and ways of life are so unlike ours. Our own societies are technologically and institutionally complex, competitive, and individualistic. Researchers who study and make hypotheses about ancestral minds and behavior of oracy-based peoples are products of decades of practice in reading, writing, rational analysis and argument, and systematic organization of their thoughts. Both Ekkehart and I include ourselves in this group and feel fortunate that events in our lives have allowed each of us to experience traditional cultures in a sustained way so that we can even conceive of the differences.

In bringing up cultural differences, we also do not mean to say that traditional people act only from emotion or that modern people are always cool and rational or motivated by reasoned argument. Nor do we say that non-literate societies of the recent or ancient past were "all the same." A number of scholars point out that it is a mistake to treat all hunter-gatherers as belonging in one monolithic category, as some theorists have done.[107] On the contrary, they occupied diverse habitats and had diverse ways of life, which resulted in different customs and even physiologies. We do not dispute this, but we also find that in important respects hunter-gatherer societies are more like each other than they are like modern societies

The emotional detachment and "disembedded thinking" that modern schooling tries to instill and that scientific description requires were never part of the innate cognitive abilities of archaic or even contemporary humans. On the contrary, even in modern societies they are laboriously, and often only partially, acquired. In addition, our twenty-first-century minds are crammed with ideas, images, and information overload. Symbols pervade our world, from advertising logos to printed matter. Although such minds seem normal and natural to us, they characterize a miniscule proportion of humans both past and present.

Our Paleolithic predecessors, like pre-modern people of the recent past, lived in societies that in comparison with ours were not only technologically and institutionally simpler, but more cooperative and conformist. People were more embedded in their immediate experience, aware of their surroundings, and connected to their fellows and environments in ways that we probably cannot easily appreciate, especially once we enter school and learn to read and write. Many children struggle to acquire the skills of reading and writing because "our brains aren't naturally wired" for these activities: "infants aren't born with the neural pathways needed for" them.[108] Hunter-gatherer lives simply do not require reading and writing; had they been dependent on literacy, their ways of life would have been quite different.

It is also useful for members of highly literate societies to understand that speech, one of humankind's most remarkable endowments, has prosodic (or expressive) as well as symbolic, syntactical, and semantic components. When we talk, we do not merely exchange information or ideas—what linguists call "propositions" (or "complex propositions").[109] As neuroscientist Jaak Panksepp says, "The brain mechanisms for language were designed for social interactions, not for the conduct of science."[110] After living for years with nonliterate Trobriand Islanders a century ago, British anthropologist

Bronislaw Malinowski suggested that language serves not to imitate thought but to move another to act.[111]

These expressive or persuasive aspects of language can be forgotten when we read and write sentences alone in a study, although talking with another person can remind us of "nonverbal" communication, where facial expressions and body movements augment (or confound) the spoken verbal message.

There are techniques that help one to imagine what non-literate experience is like. We can try to remember our own thoughts and preoccupations and understandings of the world before going to school and learning to read. Or we can simply observe preschool children. Thought is often "magical," embedded in sensory experience of the here and now; one is easily fearful or wary, can feel helpless, and rarely if ever is (or wants to be) alone. Also we can try to imagine always living outdoors, with all cultural artifacts (such as dwellings, tools, clothing, ornaments) made by hand from natural materials. Like other animals, one would probably feel a part of—at home in—that environment in a way that most of us in today's complex societies would find hard to imagine. Subsistence foragers would also be ever aware of the resources (the affordances) provided by their surroundings. Their inner life would be "in the present" more than in the past and future—the "mental home" for many modern people. They would use their wits to cope with that environment, and not rely on printed instruction manuals. Their knowledge was lore, passed to the next generation, who watched, imitated, and listened to dramatic stories and engaged in multimedia ritual practices. Their arts were immediate and participatory.

Anthropologist C. R. Hallpike has conducted a provocative, if to some controversial, study that examined the thought processes of members of small-scale societies, using the categories utilized by the Swiss psychologist, Jean Piaget in his influential studies of children's cognitive development from infancy to adolescence. Hallpike demonstrates that with regard to the development of cognitive processes involved in classification, number, measurement, conservation, space, time, causality, and symbolization, premodern people do not require what Piaget called "concrete operations" and that for most purposes of their lives, "preoperatory" thought is sufficient.[112] Preoperatory thought is not "rational," according to modern scientific criteria of rationality. Such terse statements of course may raise hackles influenced by political correctness, especially in those who have not read Hallpike's book thoroughly. He emphasizes that his characterization does not mean that preliterate thinking is conceptually simple, inherently mistaken, or incapable of profundity. Saying that such thought is "prelogical" does not imply that it cannot be true, practical, creative, aesthetic, and wise, or that its users are childlike or inferior forms of humanity.

Rationality and scientific thought are indeed narrow aspects of mental functioning and humans possess an entire cerebral hemisphere that is not rational or scientific. Because preliterate people are not preoccupied with the analytic and sequential tasks that consume the time of us digitalized humans, they pay attention to their right hemispheres more than we academics do (although of course every human uses both hemispheres).[113] Ancestral human minds evolved with myriad adaptive abilities that use the kinds of thought that served them well in a forager way of life rather than scientific rationality or skill in reading and writing. Psychologist Howard Gardner's theory of "multiple intelligences" holds that individuals possess varying degrees of eight broad cognitive

capacities: linguistic, logical-mathematical, spatial, bodily-kinesthetic, mechanical, interpersonal, intrapersonal, and naturalist. Although all humans have all these capacities, each individual has a unique mixture, a mosaic that is composed of different proportions of each.

An adequate description of the components of these capacities and their interrelationship requires more space than is desirable or possible here.[114] However, it suffices to say that the intelligences described by Gardner have definable neural substrates and would have emerged as adaptive during human evolution. It is not difficult to appreciate that they would all contribute to hunter-gatherer lives or to realize that modern schooling tends to emphasize and reward the first two (verbal skill as reading and writing—not oratory, and mathematical or logical analysis) and generally to disregard the others. All of them, according to Gardner, can be used in making and experiencing art. All require "thinking" (cognition), although in most of the intelligences, formal operational thought or propositional language would not be required.

The questions scholars ask of archaic humans and the interpretations that are made of the traces they leave on stone are probably strongly affected by assumptions that have been made possible by literacy (not just language).[115] The degree to which thought depends on language ("Do people think in words?") has been a long-standing subject of discussion in linguistics, psychology, and philosophy, with an increasing agreement that thought does not require words.[116]

Yet the habit dies hard: It has been suggested, for example, that reorganization of the early human brain during the Middle and Later Stone Ages in Africa could result in new networks or links among frontal, temporal, and parietal lobes, hence allowing for "inner speech."[117] That may well be so. Yet what archaeologist ponders the possibility that our ancestors thought in *pictures*, which may be the way that prelinguistic humans thought and preverbal babies think and all of us think some of the time?[118] The articulate spokesperson for autism, Temple Grandin, tells us that she thinks in pictures, and when she learned that others thought with words, could not imagine what that would be like.[119] She suggests that it is likely that animals think in pictures and use memories of smell, light, and sound patterns much more than people do today. Perhaps in all of us, thought and memory are more pictorial than verbal. Again, try an experiment of thinking, say, of a beloved person far away or of remembering an incident from the past. Do words come to mind first? If we are tracking an animal or preparing a meal, do we think in words or do we use some kind of non-verbal spatial and pictorial mentation?

Even if we decide to call cupules and early engraved or painted marks "symbolic," we should not forget Donald's observation that the value of a symbol depends on the kind of mind that puts it to use. That is, "episodic" or "mimetic" minds (Donald's terms) create episodic or mimetic models of the world, so that attributing our signs or symbols to people with these minds will not change the way they think. Similarly, our modern literate or "theoretical" (in Donald's terminology) minds create and rely on other symbolic models of the world because our thought processes are different.[120] In later work he characterizes "theoretical culture" as "symbol-based, logical, bureaucratic, and heavily dependent on external memory devices, such as writing, codices, mathematical notations, scientific instruments, books, records, and computers"[121]

In sum, as our modern minds try to reconstruct the mental world (or "thought processes") of our ancestors, we need to be aware that their lives were far less mediated by symbols (and by the kinds of symbols), than are our lives. At the very least, we suggest that rock art study would be better off positing something like a *spectrum* of symbol, rather as prehistoric art scholar James Harrod has done with his "taxonomy" of symbolic behavior.[122] At one end there is little or no *symbolic* intention (although a kind of intention can be attributed by someone who sees or hears a cupule being made or who sees it after the fact) and at the other end, one finds obvious symbolic intent whose meaning may be clear or unknowable.

Overlooking Proto-symbolic (or Non-symbolic) Behaviors Vital to Human Evolution

Emphasis on nonliterate and nonrational modes of thought in the previous section, and on the role of play in mark-making in the section before that, may seem to some readers condescending or demeaning, depicting Pleistocene adults as child-like (or ape-like). The roots of artification can be traced to our prehuman, even preprimate, past and specifically to basic emotions (called *affects*) that prompt all mammals to seek survival and reproductive success. Like archaeologists, we are looking for the origins of human behavior in earlier hominins but, like psychologists, we gain insights from infants and animals.[123] Continuity with other life forms can be seen instead as part of the mystery and miracle of existence.

It is important to remember that ancestral humans lived as wild animals, concerned with survival in ways that few people today can imagine. In the Pleistocene past, humans desired and sought the same primal requirements that face any wild, group-living animal: sustenance (food, water, shelter, warmth), social acceptance and participation, sex and mutuality, care of offspring, safety, and competence (knowing what to do to survive—to achieve one's goals and satisfy one's needs). Similarly, we evolved to fear and flee from pain and the threat of destruction (sources of anxiety, alarm, and foreboding), social loss (sources of loneliness, grief, separation distress, sorrow, and panic), and body surface irritation, restraint, and frustration (leading to indignation, hate, anger, and rage).[124]

Jaak Panksepp and a few other neuroscientists say that emotions evolved to direct animals (including humans) to promising solutions to survival problems such as: How do I obtain goods? How do I keep goods? How do I remain intact? How do I make sure I have social contacts and supports?[125] Missing from these welcome psychological as well as evolutionary accounts of human emotions, unfortunately, is any mention of the effects of what I call the "aesthetic operations" of artifications in allaying anxiety and contributing to group bonding.

Early manifestations of aesthetic cognition and behavior were further used and developed by ancestral humans in what became ceremonial practices performed to obtain good outcomes necessary for life. Myriad ethnographic studies of premodern societies confirm that the arts are regularly found in ritual practices. In fact, they are indispensable.[126] If beliefs and dogma are stated only as rational propositions, without artification, people will be less able to remember, accept, or guide their lives by them. Instead, attention-grabbing visual, aural, and movement artifications were found by early

humans to be essential in creating and sustaining their emotional investment, as individuals and as a group, in obtaining the life needs they had evolved to care about.

Art-filled ceremonies also address and satisfy strong psychoneural emotional needs that humans evolved to have: for mutuality (close relationship with an other or others),[127] belonging to a group,[128] a sense of meaning in life, a sense of competence in being able to address the material and non-material problems of life, and artification—that is, the propensity for physically and behaviorally demonstrating, often with others, that one cares about survival-related outcomes, as in traditional rites and ceremonies.[129] In modern secular societies, these needs are often left unsatisfied in at least some respects, compared to traditional societies, and attempts to satisfy them may take aberrant forms. This cultural "mismatch" is another reason that people today may misinterpret the psychology and behavior of early modern humans.

How Artification Precedes and Embraces Symbolism

It is a mistake to frame the question of why it took so long for anatomically modern humans of the African Middle Stone Age to "catch up" with their European Ice Age descendants in terms of the "cognitive horsepower" that they presumably shared. Instead of using symbolization as the *sine qua non* for cognitive and behavioral modernity, artification is a more appropriate standard. Or, better said, although anatomically modern and even earlier groups may or may not have been making and using symbols, they were unequivocally making and using artifications—a universal behavior that is not present in other animals and has been adaptive in ancestral and later hunter-gatherer populations. Although it is sometimes difficult to recognize symbolically mediated behavior, it is not difficult to recognize artification. And artifying something that one cares about is a unique human activity in its own right, concomitant with the psychobiology of hunter-gatherer societies.

To put it yet another way, whether or not early mark-making demonstrates the capacity for symbol use in early humans, it does reliably show the capacity for artification. Cupule-pounding, engraving of lines on small stones, the perforation of shells so they can be strung and worn as beads, painted or engraved marks on bodies or shells—all these make rock surfaces, stones, marine or snail shells, and bodies "special," different from their ordinary appearance. They employ some or all of what were identified in chapter 1 as "aesthetic operations"—simplification (formalization), repetition, exaggeration, elaboration, and manipulation of expectation.

These features are means to making ordinary objects and behaviors extraordinary, and by doing so, they attract attention to, sustain interest in, and create and shape emotion with regard to these objects and behaviors. They first appear in mothers' behavior with their infants, then in children as they play—in both instances spontaneously (that is, without being taught). The predisposition to artify was later co-opted for use in ritual and even practical contexts, where aesthetic behavior and features in themselves produce an emotional effect on participants or observers, as Malinowski described for the Trobriand Islanders when he said, "In gardening, fishing, building of houses and industrial achievements, there is a tendency to display the products, to arrange them and even adorn certain classes of them, so as to produce a big, aesthetic effect,"[130] and as various speculations about the functions of cupules suggest.

This view does not contradict the established anthropological view that rituals and the artifications employed in them are symbolic. However, the symbolic content of artifications may not be the most important thing about them. Regarding the subject matter or messages of the activity, whether presented directly or symbolically, I want to emphasize that it is artification that makes the content compelling. A simple example provides clarification. The Gogime of Chimbu Province in Papua New Guinea participate in a celebratory ritual at the time *kairuku* nuts are harvested. Adult men adorn themselves with headdresses fashioned of bird of paradise plumes, headbands of red parrot feathers and cuscus fur, bone ear ornaments, shell necklaces, and aprons made of striped woven plant fibers. The men assemble in a group, drumming and singing. If they were to remove the headdresses, headbands, aprons, and adornments, if they were not to carry and play drums or sing and move in unison, there would be no ritual: there would be just a bunch of guys standing around, perhaps exchanging banal comments such as "We're lucky that there were lots of nuts this year," or "The spirits were good to us."

In east-central Arizona, the Hopi kachina dance provides a dramatic example of the power of multiple artifications in ritual, here foremost a "prayer for rain." The fundamental need for life-sustaining moisture, which could be expressed by simply saying "We really need rain" or "If only it would rain!" is instead couched in a public multimedia ceremony whose visual, vocal, verbal, gestural and performative aspects involve virtually all the arts—ritualized dance choreography involving rhythmic swaying, shuffling and stomping; complex, specially composed song-poems, often accompanied by drumming and rattles; elaborate costuming and masking; body decoration; and oratory by dance leaders. While the proximate reason for the dance is rain, fertility, and subsistence, the ultimate effect is social cohesion, group harmony, and survival as a culture.

The power of the kairuku or kachina rituals arises not only from their message or subject matter—the expression of thanks and relief in having a source of food for the coming season, in the first example, and the expression of communal yearning for life-giving rain, in the second. It is the specialness of the artifications of body, movement, voice, and message that accomplishes the rituals and creates emotional effects of relief and solidarity.

The late Australian anthropologist Arnold Gell was ahead of his time in recognizing that most art theory, including anthropology of art, was top-heavy with Western assumptions about aesthetic appreciation of objects. He instead looked at aboriginal arts as devices for affecting individuals. He described the arts of Australia and Melanesia as being a "technology of enchantment," in which objects or performances were intended by their makers and users to tantalize, frustrate, or entrance viewers by means of complex patterns, repetitive dots, and other psycho-perceptual techniques, thereby gaining power over them.[131]

Although most of the anthropological literature on the idea of art as technology comes from Oceania, the idea applies to the artifications of the various inhabitants of the New World and of our early ancestors in Africa and Eurasia as well.

Consider the Trobriand *masawa* (ceremonial canoe used for trading journeys to distant neighboring islands). A canoe is a tree trunk that humans have extracted from nature and turned into a cultural product—a vessel that is seaworthy and will hold the required number of men. But that is not enough. Because the journey is culturally

important and physically dangerous, they must ensure, by artifying it, that the vessel will perform as desired.

A canoe's prow board is a hydrodynamic necessity, but the Trobriand artifiers go further and make it special, carving it into complex symbolic shapes that are painted with bold contrasting colors, both for spiritual protection during long sea voyages and also to work a kind of psychological warfare on viewers when the competitive exchanges begin. It is hoped that the trading partners will be dazzled, beguiled, captivated, and confused, and therefore susceptible to surrendering their *kula* (shell exchange) valuables.[132]

Similarly, shields of the Asmat in Papua New Guinea bear symbolic apotropaic (evil-deflecting) patterns that entrance and ward off dangerous spirits; they are also important in the psychological warfare of headhunting.[133] Both "decorative" and "representational" art can enchant in this way. Asmat shields and Trobriand canoe prows use stylized motifs of birds (e.g., ospreys), insects (e.g., praying mantises), and mammals (e.g., bats) that have traits of strength, power, and agility—motifs that not only symbolize these qualities but are further enhanced by their perceptual/emotional strikingness. With the Yolngu and other peoples of northwestern Arnhem Land (Australia), ancestral power is indicated by the brilliance of painting and repainting and the shimmer and dazzle of cross-hatched designs.[134] The concept of symbolic mediation does not satisfactorily cover these sorts of effects. At many rock art sites one can experience similar effects that appeal to the senses and emotions, even when the symbolic content, if any, is unknown.

Body enhancement may, but need not be, symbolic, as Paul Pettitt suggests. Here is a simple question: When a modern woman wears lipstick or a necklace, is she "symbolizing" her beauty, status, or wealth? She may be enhancing or drawing attention to her personal qualities, but is looking better "symbolic"? If people make their ordinary bodies extraordinary, or special with paint, feathers, or leaves, it certainly indicates that they *care* about showing themselves as more attractive than or different from their ordinary bodies. Anthropologist James C. Faris found that the striking and individualized geometric face painting of the Nuba of the Sudan was entirely abstract and non-symbolic.[135] Other instances of non-symbolic designs are documented for Australian Aborigines[136] and for the Suriname Maroon.[137] In his indispensable book, Franz Boas presented fifty-eight figures that illustrate nonrepresentational and nonsymbolic examples of artistry from people in small-scale societies.[138]

Additionally, the importance of body decoration need not reside wholly in its symbolic meaning but in the further message its extravagance (artification) may convey. Tattooing or cicatrization, for instance, usually indicates the attainment of a life stage such as adulthood. The marks can be said to demonstrate to all that the now-adult person has undergone and borne pain—it is what evolutionary psychologists have called an unfakeable "costly signal." Although such a costly message could be conveyed by random slashes or scars from burning or beating, it is interesting to note that body mutilations are generally artified. For example, Maori facial tattoos with complex designs or decorative scars placed in rows on the bodies of Nuba males attract attention and admiration over and above their status as life history marks. Because these are permanent records of a significant transformation, they are made special in order to underscore their importance both to the decorated individual and to the society.

Conversely, not all symbols require artification—for instance, a crude map scribbled on a sheet of paper or scrawled in the sand. For reasons of expediency, a cross

may be hastily made with two sticks tied together to mark a grave. Because these objects are ephemeral and have no continuing value after they serve their immediate purpose, they are not artified.

Many archaeologists today, like the early proponents of the Creative Explosion hypothesis,[139] postulate openly (or unconsciously assume) that for a work to be called "art", it must be symbolic. Such a position automatically—and I think erroneously—considers art to be a subset or example of symbolizing ability, as when *New York Times* science writer Nicholas Wade reports that "archaeologists tend to equate full fledged modern language with art, which only becomes common in the archaeological record some 45,000 years ago," and that "the creation of art implies symbolic thinking in the mind of the artist, and therefore the possession of language to share these abstract ideas."[140] It is limiting to regard art as a sort of late-born stepsister of symbolization. Indeed, it is more reasonable to see artification as the *parent*—that is, to have given rise to mental capacities that led to symbolizing ability.

The readiness to respond to presymbolic affect-laden proto-aesthetic operations, in place at the beginning of life in individual development as in the early evolution of our species, precedes and influences the development of human aesthetic capacities that may but need not always be symbolic. In small-scale societies of the past, symbolic thought and behavior might not have been a priority, but artification was central.

By searching for the earliest evidence of *Homo symbolicus*, scholars have overlooked clues from the archaeological past that indicate that before we were symbol-users or language-users, we were *Homo aestheticus*, a remarkable creature that modern archaeology does not sufficiently recognize and honor.

NOTES

[1] Shea 2008. In 2017, at the Moroccan site of Jebel Irhoud, new discoveries of 300,000-year-old tool assemblages and directly associated human remains with overriding *sapiens* features have challenged the long-held orthodox view that modern humans evolved in East Africa 195,000 years ago (Richter et al. 2017).

[2] Stringer 2011: 26, 202-3.

[3] Conard 2007: 2023.

[4] For other criteria of cognitive modernity, see following discussion.

[5] For more information about the peopling of the Americas, a contentious and unresolved topic in North American paleoarchaeology, see chapter 2 of this book

[6] For example, Nowell 2010: 447.

[7] Pfeiffer 1982. As late as 2005, archaeologist Nigel Spivey describes the cave paintings of Paleolithic Europe as "the best-preserved and most visible signs of the global creative explosion," a phenomenon that in his eyes "marks the ascendancy of a particular biological species, the 'knowing human' type that has come to dominate the Earth's surface" (Spivey 2005, 23-4).

[8] Mellars and Stringer 1989.

[9] Klein and Edgar 2002.

[10] Diamond 1999.

[11] Additional well-known proponents and adherents were Mithen (1996) and White (1992).

[12] The curator, Jill Cook, also says: "All art is the product of the remarkable structure and organisation of the modern brain. By looking at the oldest European sculptures and drawings we are looking at the deep history of how our brains began to store, transform and communicate ideas as visual images. The exhibition will show that we can recognize and appreciate these images. Even if their messages and intentions are lost to us the skill and artistry will still astonish the viewer."

[13] Although Jill Cook mentions archaeological evidence from South Africa that indicates modern cognition from about 100,000 years ago, the exhibition concentrates on Ice Age "art." For most late twentieth-century archaeologists, Aurignacians were the first modern humans.

[14] Aubert et al. 2014; Brumm and Aubert 2015.

[15] Stringer 2011: 208-209.

[16] Mania and Mania 1988; Steguweit 2003.

[17] Mania and Mania, n.d., however, speak of a "symbolic-like representation" in regard to the incisions that in their eyes "preconditions … the capacity of abstract thinking and consequently also of speech."

[18] Jones 1940; Cooke 1963; Klein 1978.

[19] Barham 2002: 189; McBrearty and Brooks 2000: 428.

[20] Barham 1998, 2002.

[21] See, for example, van Peer et al. 2003.

[22] Marean et al. 2007.

[23] Beaumont and Bednarik 2013.

[24] E.g., Conard 2007. For a longer list, see d'Errico and Stringer 2011: 1061. In company with other gradualists, Conard (2010: 7622) argues for gradual "polycentric" (rather than "monocentric") origins of cognitive/cultural modernity.

[25] Stringer 2011: 214.

[26] Sterelny 2012: 47.

[27] As Stringer (2011: 214) put it: "something special" happened in the Upper Paleolithic of Europe.

[28] Klein, in Stringer 2011: 133; Mithen 1996; White 1992.

[29] Nowell 2010: 438-439.

[30] For a representative sample, see Wadley 2001; Henshilwood and Marean 2003; Zilhão et al. 2010; d'Errico and Stringer 2011; Stringer 2011: 115; Sterelny 2012: 49.

[31] Stringer 2011: 125.

[32] Without using the word symbolicity, Trinkhaus (2013: 413) makes the point that "humans are unique in routinely using extrasomatic material to alter one's social persona, and the earliest evidence of this behavior consists of beads of various materials and natural inorganic pigments."

[33] One can think of symbolic marks that are not artifications—e.g., an information-bearing mark like a directional arrow. See other examples in following text.

[34] Semiotics is a complex subject, and my description of it here will be, of necessity, simplified.

[35] Gibson 1979.

[36] Deacon 1997: 70-71.

[37] d'Errico, and Stringer 2011: 1060.

[38] A thorough and excellent introduction to the subject of symbolic cognition is Deacon 1997.

[39] Henshilwood and d'Errico 2011.

[40] Beaumont 1990. Harrod (2014) accepts an even earlier beginning for the emergence of symbolic behavior in the form of paleoart. While in his opinion there already exists archaeological evidence for this onset around 1 million years ago—a time line not shared by other paleoanthropologists—he suggests that present archaeological findings might actually support pushing this date back to around 2 million years ago as possibly indicated by several Oldowan artifacts attributed to *Homo habilis* (or a sister species) or even an early *H. erectus*.

[41] Barham 2002: 189; McBrearty and Brooks 2000: 428.

[42] Barham 1998, 2002. For additional locations with ocher finds dated to the Lower Paleolithic period, see Bahn 2015: 327-328.

[43] Marean et al. 2007: 907.

[44] Henshilwood et al. 2011.

[45] Henshilwood, d'Errico and Watts 2009. Readers may remember that similar marks appear on small pieces of stone at the Gault site in Texas that date to the Pleistocene-Holocene transition

[46] Henshilwood et al. 2009.

[47] Marshack 1976: 140. For the actual artifact, see Fig. 6.

[48] Feliks 2011. The significance of a second noniconic Neanderthal engraving, the crosshatch motif found on Gibraltar, has been regarded as definitive proof for the "Neanderthals' capacity for abstract thought and expression" (Rodriguez-Vidal et al. 2014). Grens 2014.

[49] Joordens et al. 2015.

[50] Grens 2014; Joordens et al. 2015.

[51] d'Errico and Stringer 2011.

[52] Vanhaeren et al. 2006.

[53] Bar-Yosef Mayer et al. (2009) found perforated marine shells with signs of wear from stringing at Qafzeh Cave at 92,000 years; Vanhaeren et al. (2006) at Oued Djebbana at 90,000 years; d'Errico and Hombert *(*2009) at Ifri n'Ammar at 83,000 years; and Bouzouggar et al. (2007) at Grotte des Pigeons at 82,500 years ago. At Blombos, "perforated marine shell ornaments" are 75,000 years old (Henshilwood et al. 2004: 2018). At Denisova Cave in the Altai Mountains of Siberia, carefully perforated rounded disc-shaped ostrich eggshell beads, made by a hominin relative of Neanderthals, have been dated to 45,000-50,000 years (Zubchuk 2016).

[54] Vanhaeren 2005.

[55] White 1992. See also numerous references in Henshilwood et al. 2009: 28.

[56] Sterelny 2012: 53-54.

[57] Henshilwood and d'Errico 2011: 89.

[58] Scardovelli 2013.

[59] Kellogg 1969. I emphasize that by referencing children's drawing development here I do not mean to equate the minds or behavior of early human adults with human children of today.

[60] Morris 1962; Lenain 1997.

[61] Cited in Balter 2002: 248.

[62] Burghardt 2005.

[63] Ellis and Bjorklund 2005; Morley 2017.

[64] Sterelny 2012: 33.

[65] Guthrie 2005. I do not concur, however, with Bednarik's extreme view (2008e: 179) that sees only a "possibility that a certain portion of Paleolithic parietal art was created by adults."

[66] Donald 1991: 187 (vocalizations), 120-21 (games).

[67] Stringer 2011: 64.

[68] Boyd 2009. For example, Boyd notes that play "stimulates the release of the neurotransmitter dopamine ... which encourages further play" (p. 93). He notes, furthermore, that imitation and imaginative play are natural in children, occurring before language acquisition and the ability to correctly attribute the mental states of others.

[69] Burghardt 2005.

[70] In my own experience, I have found that similar easy dismissal may occur when the subject of interacting with babies is mentioned, as I do at length in Chapter 7.

[71] Stroh and Robinson 1993.

[72] Merker 2000.

[73] Phillips-Silver et al. 2010; Phillips-Silver and Keller 2012.

[74] Malloch and Trevarthen 2009: 4.

[75] Fein 1993.

[76] Burrill 2010.

[77] Lenain 1997.

[78] Lenain 1997: 120.

[79] Lenain 1997: 129.

[80] Morris 1962; 2014.

[81] Lenain 1997: 165-66.

[82] Bednarik (2008a: 78) is reluctant to call cupules "art," but he does say that "they are important to the origins of symboling because there can be no question about either their intentionality or their semiotic nature. The manufacture of cupules is highly labor intensive and they have no utilitarian roles whatsoever."

[83] Van Peer et al. 2003:190. See also Lorblanchet and Bahn (2017:191-92)

[84] Peyrony 1934.

[85] Henshilwood and d'Errico 2011: 89.

[86] Peirce 1998.

[87] Peirce 1998.

[88] Deacon 1997.

[89] See also Sterelny 2012: 53.

[90] Dissanayake 1988: 92-101; Sterelny 2012: 51.

[91] See "costly signal" in the glossary.

[92] Sugiyama and Scalise Sugiyama 2003: 182.

[93] Tambiah 1979.

[94] Pettitt 2011.

[95] Stringer 2011: 211. Mendoza-Straffon (2014: 47) also agrees that "the mere occurrence of ochre or other pigments should not immediately be taken as evidence for either artistic or symbolic behaviour."

[96] For semiotics of music, see also Turino 2008. Stringer (2011: 116) claims that a series of musical notes can be symbolic, but he seems to refer to a written score (i.e., another person can view and reproduce that series), because in the same passage he also mentions the written word. Elsewhere he says that "in conveying meaning, music [singing and clapping] as a form of communication would have formed an important part of the symbolic revolution" (pp. 121-122).

[97] Bednarik (2003: 127) mentions mime or re-enactment, say by a successful hunter.

[98] Donald 1991: 169.

[99] Ibid.: 198.

[100] Ibid.: 167.

[101] Ibid.

[102] Arnheim 1969.

[103] It is interesting that although Bednarik (2011: 154-159) is highly critical of Donald's thought on early human mentality, he too, like Donald, prominently emphasizes the effects of literacy on the mind.

[104] Helvenston 2013.

[105] Dissanayake 1992: 203.

[106] In H. W. Longfellow's epic poem, *The Song of Hiawatha* (1855), Hiawatha teaches his people the art of painting ("picture-writing") as a means of recording their history. In 1884, George de Forest Brush made a painting called "The Picture Writer's Story" in which a handsome Indian male makes line drawings on an animal hide of hunters with bows riding on horses. Both of these inaccurate depictions come from the fantasies of literate minds trying to present preliterate life.

[107] For example, Kelly, 1995.

[108] See educational psychologist Virginia Berninger, cited in Higgins 2014.

[109] Pinker and Jackendoff 2005.

[110] Panksepp 1998: 302.

[111] Malinowski 1925.

[112] Hallpike 1979; Piaget 1970, 1974. Piaget's scheme is too complex to describe here; interested readers are referred to Hallpike's book or to the original publications of Piaget. It should also be said that Piaget's ideas about successive "stages" of cognitive development are out of favor today in part because of their reliance on the abilities of Western children. I use his scheme here because it makes clear that Western schooling enables and is meant to achieve disembedded, rational cognition that is not required in nonliterate societies.

[113] I do not use this shorthand term for differences in hemispheric function in a naïve way, but with awareness of the broader views of contemporary neuroscientists Allan Schore (1994, 2003a, b) and Iain McGilchrist (2009).

[114] Like the influential theories of Piaget (1970, 1974), Gardner's too (1983, 1999) have been challenged and are not accepted in all their details by all psychologists; my use of them is general and serves my purposes here. This is not the place to defend particular aspects of their complexities. Mithen (1996: 39-42) also discusses Gardner's 1983 ideas with respect to Pleistocene hominin mentality.

[115] Ong (1982) and Goody (1977) are among the early scholars who described differences between oral and literate culture and thought.

[116] Langacker 1973: 36-37.

[117] Stringer 2011: 207-08.

[118] The phenomenon of cupules made by *Homo erectus* and early modern *Homo* certainly supports the possibility of meaningful *pre*-symbolic marks that were unmediated by language. White (1989) accepts that there was visual thinking in the Ice Age.

[119] Grandin 1995.

[120] Donald 1991: 225.

[121] Donald 2006: 8.

[122] Harrod 2014: 139. See also Harrod 2001 (unpub.) and our discussion of Harrod's scheme in Chapter 1.

[123] Schore 1994, 2003a, b; Panksepp 1998; Panksepp and Biven 2012.

[124] Panksepp 1998: 50.

[125] Ibid.: 48-50.

[126] While writing this book, it was brought to my attention that a group of people in the Amazon, the Pirahã, have no elaborate arts or ritual practices (Everett 2008: 69). I discuss the Pirahã more extensively in Chapter 7.

[127] Miller and Rodgers 2001.

[128] Baumeister and Leary 1995.

[129] Dissanayake 2000a.

[130] Malinowski 1922: 146-147.

[131] Gell 1992, 1998. Gell's ideas echo those of Radcliffe-Brown (1948/1922: 234) who said that for the Andaman Islanders, "ceremonies are intended to maintain and transmit from one generation to another the emotional dispositions on which a society depends for its existence," and Cole (1969a, b, c), who treated "art as a verb" in his studies of the *mbari* ceremony in the Owerri Igbo of Nigeria.

[132] Gell 1992.

[133] Thomas 2001: 4-5.

[134] Morphy 1989; Taçon 1991.

[135] Faris 1972.

[136] Berndt 1971/1958.

[137] Price and Price 1980: 108.

[138] Boas 1955/1927.

[139] E.g., Pfeiffer 1982; Klein 1989; Mithen 1996; Wade 2006; Balter 2009.

[140] Wade 2006: 46.

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