

Geology and Art: Humans and the Earth

Introduction:

Geology is the study of the earth and art is the creation of images of the world and ourselves in it; so geology and art have been inextricably interconnected since humans first became capable of abstract thought, of wondering about their place in the world. This talk is about the earliest understandings humans had of the nature of the world..

Slide 1 – Red Jasper water worn pebble in the shape of a human head

In 1925, explorers of a cave a Makapansgat in South Africa discovered bones of *Australopithecus*, a predecessor of modern humans who lived some 3 million years ago in the Pliocene. Associated with the bones was a water worn reddish brown jasperite pebble that resembles a face. The nearest known source of this variety of ironstone is 20 miles away from the cave. One of the early hominids who took refuge in the rock shelter at Makapansgat must have noticed the pebble in a streambed and, struck by the “face” brought it back to the cave for safekeeping: a rock that seems alive, a face of stone. This image embodies the first major idea I want to talk about: the identification of the earth and the body. For most of human history, humans have conceptualized our bodies as having come from the earth and the earth as a living body, the great body.

Slide 2 – Demonstration of pre-shaping stone tools on the core to produce “blanks” for Acheulean handaxes.

The evolution of the human brain is tied to its manipulation of materials in the natural world. Some time in the lower Pleistocene, roughly 2 million to 1.5 million years ago, early hominids began using stones who had been using whatever stones lay at hand as tools, and had observed the properties of stones as they broke, began to intentionally shape stone tools. This marks an important step in human evolution: the development of a body of knowledge and skill, a technology, that is transmitted from one generation to the next. It is really the point at which early humans part company with other animals who make some use of found objects as tools, such as apes, and become distinctly human. The earliest well-dated stone industries come from deposits like those at Olduvai Gorge in Tanzania, and the fossil bone traces are of a species called *Homo habilis* man the tool maker. *Homo habilis* had a brain that was approximately 680cc, considerably smaller than modern humans (1700cc). The Paleolithic (old stone) cultures of humans are identified by their distinctive stone-tool industries as much as by changes in the fossil bone remains.

Slide 3 – Figure showing the progressive stages of human evolution and their corresponding stone tool industries

The middle Pleistocene, 400,000- 100,000 years ago, find the remains of an early human scientists call *Homo erectus*, a hominid with a markedly larger brain size (950-1050cc). With the fossil bone remains were associated with a new way of working flint and stone, characterized by the production of bifacial hand axes. While we tend to think of more sophisticated tool use as being a result of early humans having larger brains, Paleoanthropologists hypothesize that it was as much a cause of brain develop as a consequence, a stimulus to neural development.

By about 100,000 BC, the start of the Holocene, early humans, *Homo sapiens neanderthalensis* had developed roughly the same brain capacity as modern humans, a development that went hand in hand with the development of yet more sophisticated uses of stone as tools. Neanderthal man was well adapted to glacial environments of the last ice age, living in shelters of mastadon bone and hide.

Slide 4 – Neanderthal burial from Iraq. Pollen analysis suggests that flowers laid by the head.

It was apparently Neanderthal man who initiated the practice of careful burial of the dead in the earth, the first evidence of abstract thinking about time, and about an existence beyond the immediate. Ritual burial is an effort to exert an influence over what occurs after death. These burials indicate a conception connecting the human body with the earth as both its source, and its means of passage to whatever existence comes next.

Overlapping Neanderthal man is the appearance of *Homo sapiens sapiens*, fully modern populations, and the start of the cultural and symbolic 'explosion' of the upper Palaeolithic (old stone) period. Paleolithic peoples were nomadic hunter-gatherers who subsisted primarily on gathered plant foods, supplemented by game. They followed the yearly migrations of the herd of large mammals that were plentiful toward the end of the last ice age. Human population was very small compared to the populations of large mammals (bison, antelope, mammoths, aurochs (wild cattle), etc., near the end of the ice age. The estimated human population of all of Europe around 14,000 B.C. was 35,000 people – what we would find in a small town. People lived in small bands of 20-30, sparsely distributed, living part of the year in overhanging rock cliff shelters and part of the year down on the plains in hide shelters.

Slide 5 – Cave bear form modeled from clay

In rock shelters in southern France and eastern Europe were found what are the oldest known man-made “art” objects - life size bear forms, modeled of wet clay, dating to approximately 35,000BC. These were found with bear skulls that had been placed on the head, and are thought to originally have been covered with bear hides to make an effigy of a killed cave bear. Scholars believe that these cave bear statues were ritual substitutes created from the earth to compensate for the killing of the large animal.

Slide 6 – Bear festival among the Glyaks of the lower Amur River region in eastern Siberia; the sacrificed bear, as a revered guest, is served a ritual meal of its own meat.

In art history and mythology there is a sort of “principle of uniformitarianism” (as in geology), an assumption that a tribal practice that has survived into historical times has probably continued relatively unchanged for long ages. Some tribal cultures in Siberia, and the Ainu in Japan, into historical times had bear rituals that consisted of making likenesses of a captured and sacrificed bear. And many tribal peoples believe that when a large animal is killed, it leaves a great whole in the fabric of existence that needs to be mended, by ritual.

Slide 7 –Drawing of an animal on stone from 23,000 BC.

Slide 8 Amber figurines

From 30,000 B.C. on there was a flourishing of art, ranging from simple shell necklaces to human and animal forms in ivory, clay and stone, to monumental paintings, engravings and relief sculptures covering the huge wall surfaces of caves. These portable objects reflected humans primary concerns about animals, fertility, and the seasonal cycles. Numerous carved bone implements contain markings corresponding to lunar cycles that probably marked the migratory patterns of animals. The stone and bone carvings are mostly images of animals, upon which they were dependent and whom they no doubt mythologized as gods.

Slide 9 Female figurine, 25,000 BC

Slide 10 – Male/female bi-sexual figurines with lunar cycle markings

In addition to the animal images, Paleolithic peoples created many small stylized figurines, thought to be fertility figurines, carved from the rock. While some are clearly female in form, an equal number are both male and female in form. The stone itself was seen as generative, containing both the seed and the womb. It was understood as alive and the source of all other life.

Slides 11, 12, 13 – views of caverns showing the range of biomorphic shapes in the calcite deposits, stalagmites and stalagmites.

The idea that the rock of the earth itself is both alive and generative becomes very clear when you look at the cave art of the upper Paleolithic period, from approximately 20,000 -10,000 BC.

Here again there is an interesting conjunction of geology and art: a lot of what we know about paleolithic culture is due to the peculiar geological history of southern Europe, which led to the existence of large limestone caves. Millions of years before the Holocene, ancient seabed deposits of limestone were created and later uplifted. Underground rivers carved channels and enormous caverns through the limestone running great distances underground. Then over millenia, water percolating through the rock leached out calcium deposits creating calcite stalagmites, stalagmites, and often whitish calcite deposits on the cave walls and ceilings. People did not live in these deep caves; they were extremely inaccessible. Often times the entrance was a narrow tunnel that required one to slither on one's belly for hundreds of yards, like crawling back into the womb. Humans discovering these caves must have felt they had found the literal womb from which all the surface animals and plants originate. The calcite deposits suggest animal and plant forms in an astonishing variety – from great forests to lacey fern forms.

Slide 14, 15, 16 – Painted bison in Altamara Cave

Humps of rocks seen in flickering torch light must have seemed like moving animals, or animals coming to life out of the rock itself. Many of the Paleolithic cave paintings are outlinings of animal shaped rock humps.

Slide 17, Black charcoal bison

The images in these caves were painted using charcoal from burned wood, iron oxide, and yellow earths, ground into powders and mixed with animal fat or blood as a binder. The pigments were applied in a variety of ways: daubing, drawing, and blowing the powdered pigments through hollow tubes of bone.

Slide 18, Incised bull

The incised images were drawn into the soft surface of calcite crystals that had built up on the surface of some caves or into soft limestone. The images speak of a mythology in which the gods were conceived of as animals born directly from the living womb of the earth.

Slide 19 , Bison modeled from wet clay

The caves were used as ritual sites, for recounting and re-enacting the central myths. The animals most frequently depicted (horses and bison) don't correlate with the main food source for Paleolithic peoples (reindeer), meaning that the images were the visual counterparts to myths, rather than a kind of hunting magic. Fragments of bone flutes and drums have been found in the caves. Archaeologists know that the caves were used at intervals of 50 to about 100 years with sometimes longer periods elapsing between evidence of use. Some of the caves were used over tens of thousands of years, others, over shorter time, perhaps due to a landslide that blocked the entrance.

Slide 20, Ceiling of the Hall of the Bulls, Lascaux

In some caves, such as Lascaux, the images form huge compositions, with many drawings superimposed upon one another, as though to literally "draw" as much life from the rock as possible in potent places.

Slide 21 – Stag with symbols, Slide 22 Spotted Horse, Slide 23 Finger Tracings

Along with the animal images, abstract symbols, hand prints and finger tracings were found, the start of abstract symbol systems written on rock. These suggest the importance to Paleolithic peoples of touching the rock, recording on it their presence.

Slide 24 – Breast forms in calcite formations and Neolithic breast jug

In addition to the symbolic animal images and human hand images, many places in the caves suggested female and male sexual organs. Often these would be painted to highlight them, as in the case of these breast shaped calcite deposits. A later Neolithic jar shows the continuance of this idea of the fertile mother.

Slide 25 – Greek statues of Artemis/Ephesis

The concept of the earth as a bounteous, fertile mother continued into early civilizations and the image of the many-breasted goddess can be found in ancient Greece.

Slide 26 – Engraved vulva symbols, Chalfond, Ca., Slide 27, "Baby rocks"

The concept of the earth as the womb of human and animal life and the source of all fertility has survived in tribal cultures and can be seen in rock art from around the world.

Slide 28 – Animal rock drawing from Helan Shan, China; Slide 29, Engraved giraffe; Slide 30, Crocodile from Libya

Likewise tribal peoples to the present have continued to record their myths and history on the living rock surface of the earth. Some of these images record changes in the geology and weather of an entire region.

Slide 31 – Dancing figure; Slide 32 Geoglyph from Chile; Slide 33, Bronze Age Warriors
Rock art through the centuries also shows the identification of humans and the earth. Many images record mythic ancestors who created the landscape or walked the earth in a time before the time of humans. Some rock art images record early human developments, such as the development of bronze age weapons.

Slide 34 – Creation Myth Patterns

Early art is the visual counterpart of myths, in particular, of creation myths. One sees the concept of earth as living body in the various patterns of creation myths that have been identified by mythologists analyzing myths from around the world.

Slide 35 – Hopi sand painting of the Hopi emergence myth.

Slide 36 – Neolithic Vessel

The idea of the earth as a great body, evident in the Paleolithic cave art, continued through the Neolithic period. The Neolithic period (10,000 BC-5,000 BC) was marked by the gradual domestication of plants and animals, and the invention of pottery making possible the storage of food, permanent settlements, and larger human populations.

Slide 37 – Drawing of restoration of Neolithic shrine room; Slide 38, Slide 27 – Hathor, Egyptian goddess of the earth, protecting King Amenophis

The earth continued to be thought of as alive and depicted in the form of a bull/bison (the animal most depicted in Paleolithic art) in the Neolithic period and on into early civilizations such as Egypt.

Slide 39 – Newgrange passage tomb; Slide 40, Diagram of Newgrange tomb

In the Neolithic period, the tombs that were constructed likewise point to a belief in the earth as the womb, made fertile by the power of the sun. Neolithic peoples in Europe constructed tombs that were cave-like and oriented so that the rising sun of the winter solstice would penetrate the long shaft of the passage, illuminating the inner most alcove. These tombs were not used for the burial of individuals, as later happens; but rather for the ritual storage of bones of various dead who were cremated at sites outside. Scholars hypothesize that the cremated bones would have been moved sequentially through the three alcoves over the course of the year, being ritually reanimated by the sun entering the earth's womb at the winter solstice.

Slide 41 – Interior view of Newgrange tomb

The Neolithic passage tombs and solar observatories also mark the beginning of humans creating monumental works from stone. The stones at Newgrange weigh 2-3 tons each and were hauled distances of 20 miles, manoeuvred into position and laid dry in a cantelievered (corbeled) roof that, even today, is water tight.

Slide 42 – Incised curbstone at Newgrange; Slide 43 – Anazazi solar alignments; Slide 44 - Stonehenge

The spiral markings on this curbstone (one of many surrounding the base of the passage tomb) symbolize the cycle of the year. The same marking is found all around the world. Slide 43 shows an Anazazi (Arizon) solar calendar with the same spiral form.

Slide 45 – Stepped pyramid at Djoser, Egypt

By approximately 5,000 BC, the first cities and city-states had developed, with a priest class, kings, and a hierarchical ordering of society. The earth god/goddess, formerly identified with the earth and its animals, was gradually replaced by more human-like gods, thought to inhabit in the heavens. In agricultural societies the sky is where weather (life-giving or life destroying) comes from, thus where the gods live. The role of the priests/kings/pharaohs is to mediate between earth and sky. The place where this can occur is at the meeting point of these two realms, the top of the world-mountain. Thus we see the creation of man-made mountains in the form of temples and tombs. The earth womb (tomb of the king or pharaoh) is now contained within the center of the man-made world-mountain. The top of the world-mountain is a temple in which communication with the diety is possible.

Slide 46 – Great Egyptian Pyramids; Slide 47, Temple of the Great Jaguar, Guatamala

Slide 48 – Temple of Ramses II, Egypt; Slide 49 – same; Slide 50 – Funerary temple of Hatshepsut, Egypt, Slide 51, Menkaura and a QueenIn addition to creating man-made mountains, we see the idea of the stone/mountain as eternal, a means of transcending time. Thus if the human body can become stone too, it also can transcend time and be eternal. This idea led to the practice of mumification, and the numerous stone copy statues in all sizes made for burial with deceased pharaohs and important persons so that the spirit of the deceased would have an imperishable residence in the eternal.

Slide 52

Not only could the gods be embodied in stone, and the spirits of the pharaohs and important persons inhabit the stone statues after death, but worshipers in early Assyria and Babylonia could make stone or clay effigies of themselves in postures of worship, to take their place in the temples and continuously worship the god for them.

Slide 53, Slide 54 (same)

An extraordinary example of this was discovered in China with the excavation of the tomb of of the emperor Qin Shi Huang, c. 221 BC, who had, in effect, his whole army – soldiers and horses- accompany him into the afterlife, but consented to so by means of

life-size clay substitutes. Each soldier figure had an individual portrait head modeled from the soldier himself.

Slide 55 – Winged bull guardian from Assyria

By the time of these early civilizations, human's knowledge of stone working was extremely sophisticated, unsurpassed even today.

Slide 56 – Ishtar gate from the palace at Babylon – glazed brick mosaic

Their knowledge of ceramics was advancing greatly and the mining, smelting and refining of metal ores had developed.

Slide 57 – Greek Amphora

By the time of the Greeks had ceramic ware that was as sophisticated as any contemporary work. This amphora was done with a black slip over a red clay body, then scratched back through.

Slide 58 – Pebble Mosaic of a Stag Hunt, Gnosis, Greece

Slide 59 – Laocoon and his Sons

But by the time of the Greeks and Romans, the concept of the earth as a great mother/womb was giving way to a dualistic philosophy, articulated by Plato, that set matter and spirit/ in opposition to each other and set Western civilization on a course toward seeing the earth as base, inanimate matter, raw material for consumption and exploitation. This statue not only is an example of the tremendous knowledge the Greeks had developed of how to work stone, the substance of the earth, but it illustrates a myth about man in opposition to, and being killed by Nature, in the form of serpents sent by Poesidon to kill Laocoon and his sons. We see in this statue the start of the view that nature's antipathy towards humans.

Historian Carol Merchant in her book The Death of Nature argues that it was the development of mining that contributed greatly to the shift from seeing nature as the great mother, to nature as inanimate matter.

The age of metallurgy -- the smelting and casting of metal-bearing terrestrial ores -- can be traced back to at least 4500 BC. originating first near the Black Sea, a resource rich area with convenient transportation for metal products. The first and foremost products were copper implements because of the abundance of copper containing ores on the surface in this area. These products that were imported in large quantities to Sumer by 3000 BC, by which time, copper metallurgy can be documented as well in Egypt, China and India. It is also at this date that bronze tools and iron artifacts begin appearing in large quantities in many cultures.

Slide 60 – Inlaid back of throne chair of Tutakamen

Slide 61 - Darius, coin first minted under Darius I of Persia – The first money.

Slide 62 and 63 Illustrations from Medieval tracts on Mining Techniques

In Medieval times, there was a tremendous increase in mining, as most readily available surface ores had been used up. The view of the earth as alive had inhibited mining for

centuries, but as economic pressures grew, they brought about a gradual shift in the view of the earth. The representations of nature underwent a great transformation. Apologists for mining wrote about the earth as mean, fickle stepmother, who wickedly guards her bounty, from deserving and needy children, so that that must be taken from her by force. Merchant traces the shifting language and metaphors used to describe nature up through the Renaissance, when nature undergoes another transformation, into a whore, who can be coaxed or forced by science into revealing her secrets. Following the Enlightenment, the earth became simply inert matter, to be used as a resource.

Now, gradually, it seems we may be coming full circle to a view that again sees the planet as, if not alive, at least a responsive, active system of which we are a part. In 1965, J.E. Lovelock published the first scientific paper suggesting the Gaia hypothesis. The Gaia hypothesis states that the temperature and composition of the Earth's surface are actively controlled by life on the planet. It suggests that if changes in the gas composition, temperature or oxidation state of the Earth are caused by extraterrestrial, biological, geological, or other disturbances, life responds to these changes by modifying the abiotic environment through growth and metabolism. In simple the Earth functions comparably to a self-regulating organism.

Summary

The idea of the earth as body, body as earth is as old as human consciousness and is still strongly in our thinking, reflected in a large number of metaphors:

- Brow of a hill, foot of a hill
- Face of a cliff, or of the moon
- Head of a stream, of a street
- mouth of a river, or cave
- The spine of a ridge,
- shoulder of a mountain
- Leg of a journey
- Veins of ore in rock
- “Feet of clay”
- Finger or land or finger lakes
- Neck of a peninsula
- Breath of air
- Eye of a cyclone
- Heart of the hills, heart of a mountain
- “Your name is mud”

Slide 64 – Mineral Composition of the Human body

The chemicals that compose the human body come from the cycling of air, water and minerals between the earth and the human body. In fact, the earth's crust contains most of the mineral nutrients our body needs, and the chemical composition of a rock, such as granite, is strikingly similar to the composition of the human body. In a very real way we can think of ourselves as soggy, walking rocks.