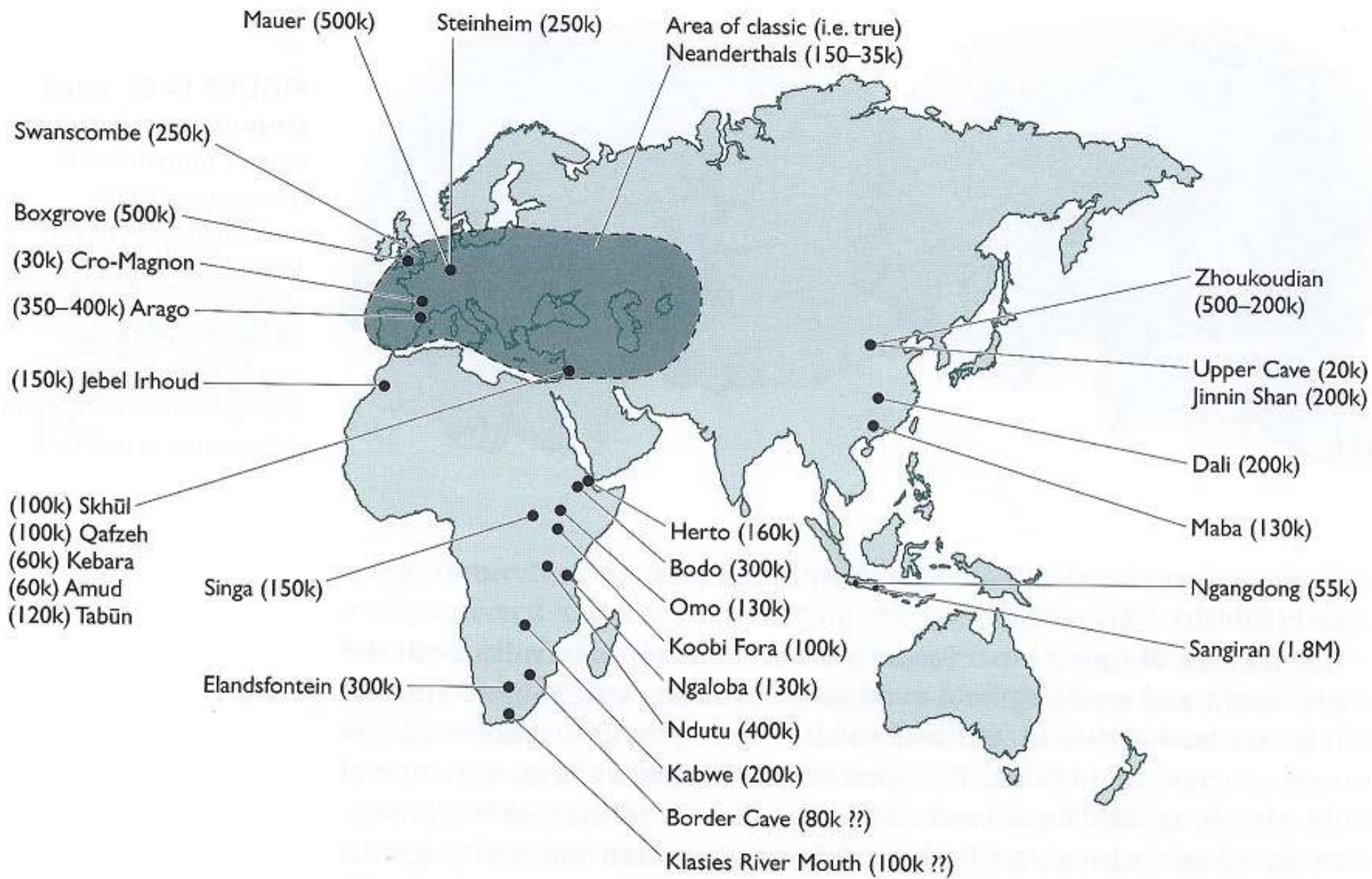


Homo sapiens:
Emergence of Modern Humans

CHARLES J VELLA, PHD
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Human Beings

- ▶ How we humans differ from other living things is the central question of anthropology
- ▶ Fossil and molecular evidence point unambiguously to our species' first appearance in Africa by at least 200 Ka and broad distribution within that continent by 100 Ka.
- ▶ Some human populations began dispersing from Africa by at least 100–40 Ka, reaching southeast Australia by at least 65 Ka.
- ▶ By 12 Ka *H. sapiens* was in the Americas and was present on all major continental land masses except Antarctica

Human Beings

- ▶ **Great debate:** Though some researchers see the **achievement of human “behavioral modernity”**
 - ▶ as a mutational event, a prehistoric “revolution”,
 - ▶ others envision it as a more gradual, sometimes even recursive process of cumulative behavior change.

Homo sapiens = “wise man”

- ▶ Our own species name, *sapiens*, in Latin means “wise”; coined by Carolus Linnaeus in 1758. Only note: “nosce te ipsum”
- ▶ The species was initially thought to have emerged from a predecessor within the genus *Homo* around 300 to 200 Ka.
- ▶ *Anatomically modern humans*: no inclusive definition of our own species
- ▶ There is *no type specimen for *H. sapiens**

Origins

- ▶ The divergence of the ancestral lineage leading to *H. sapiens* out of archaic human varieties (derived from *H. erectus*), is estimated as having taken place over 500,000 years ago.
- ▶ However, the oldest genetic split among modern human populations (such as the Khoisan split from other populations) was more recently calculated by a 2017 study to date between 350 to 260 Ka ago.

Origins

- ▶ The **earliest known *H. sapiens* fossils** also date to about that period, including the
 - ▶ **Jebel Irhoud** remains from Morocco (ca. **300 Ka**),
 - ▶ **Florisbad Skull** from South Africa (ca. 259 Ka), and
 - ▶ **Omo skulls** from Ethiopia (ca. **195 Ka**).
 - ▶ In **2019**, scientists proposed that the **earliest *H. sapiens*** (and last common human ancestor to modern humans) **arose between 350 to 260 Ka** through a **merging of populations in East and South Africa**

Origins: 2 models

- ▶ The **derivation of a homogeneous single species of *H. sapiens* from more diverse varieties of archaic humans** (all of which were descended from the early dispersal of *H. erectus* some 1.8 million years ago) was debated in terms of **two competing models during the 1980s**:
- ▶ "**Recent African origin**" postulated the emergence of *H. sapiens* from a single source population in Africa, which expanded and led to the extinction of all other human varieties,
- ▶ "**Multiregional evolution**" model postulated the survival of regional forms of archaic humans (*H. erectus*), gradually converging into the modern human varieties in a variety of locations by the mechanism of variation, via genetic drift, gene flow and selection throughout the Pleistocene

Origins

- ▶ Since the 1970s, the **Omo remains**, dated to ~195 Ka, have often been taken as the conventional cut-off point for the emergence of "anatomically modern humans" (AMH hereafter). But 2017 discovery of **Jebel Irhoud remains** date to 300 Ka.
- ▶ Since the 2000s, the availability of data from paleogenetics and population genetics has led to the emergence of a much more detailed picture, intermediate between OoA and MR competing scenarios:
- ▶ The recent Out-of-Africa expansion accounts for the predominant part of modern human ancestry, while there were also significant genetic admixture events with regional archaic humans

Origins

- ▶ *H. heidelbergensis*, dated 600 to 300 Ka, has long been thought to be a likely candidate for the last common ancestor of the Neanderthal and modern human lineages.
- ▶ However, genetic evidence from the Sima de los Huesos fossils published in 2016 seems to suggest that European *H. heidelbergensis* in its entirety should be included in the Neanderthal lineage, as "pre-Neanderthal" or "early Neanderthal", while the divergence time between the Neanderthal and modern lineages has been pushed back to before the emergence of *H. heidelbergensis*, to close to 800 Ka, the approximate time of disappearance of *H. antecessor* (who is a sister clade of ancestor of Ns and MHs, and not their ancestor)

Origins of *H. sapiens*: Timeline

- ▶ These lines of evidence increasingly indicate that *H. sapiens* originated in Africa, although not necessarily in a single time and place.
- ▶ Instead it seems diverse groups of human ancestors lived in habitable regions around Africa, evolving physically and culturally in relative isolation, until climate driven changes to African landscapes spurred them to intermittently mix and swap everything from genes to tool techniques.
- ▶ Eventually, this process gave rise to the unique genetic makeup of modern humans.
- ▶ The implication is that the human genome arose in Africa. Everyone is African, and yet not from any one part of Africa.

Timeline of *H. sapiens* evolution: 750-550 Ka

Timeline of *H. sapiens* evolution

- ▶ 750,000 to 550,000 Years Ago:
- ▶ The beginning of the *Homo sapiens* lineage:
 - ▶ Split time between MH and Ns from common ancestor;
 - ▶ Likely *Homo heidelbergensis*, a species that existed from 600,000 to 300,000 years ago, is a popular candidate.
 - ▶ The African family tree of this species leads to *Homo sapiens* while a European branch leads to *Homo neanderthalensis* and the Denisovans.
 - ▶ Unfortunately no ancient DNA (800-10 Ka) from Africa; oldest current ancient DNA is at 10 Ka.

Origins of *H. sapiens*: timeline: 300 Ka

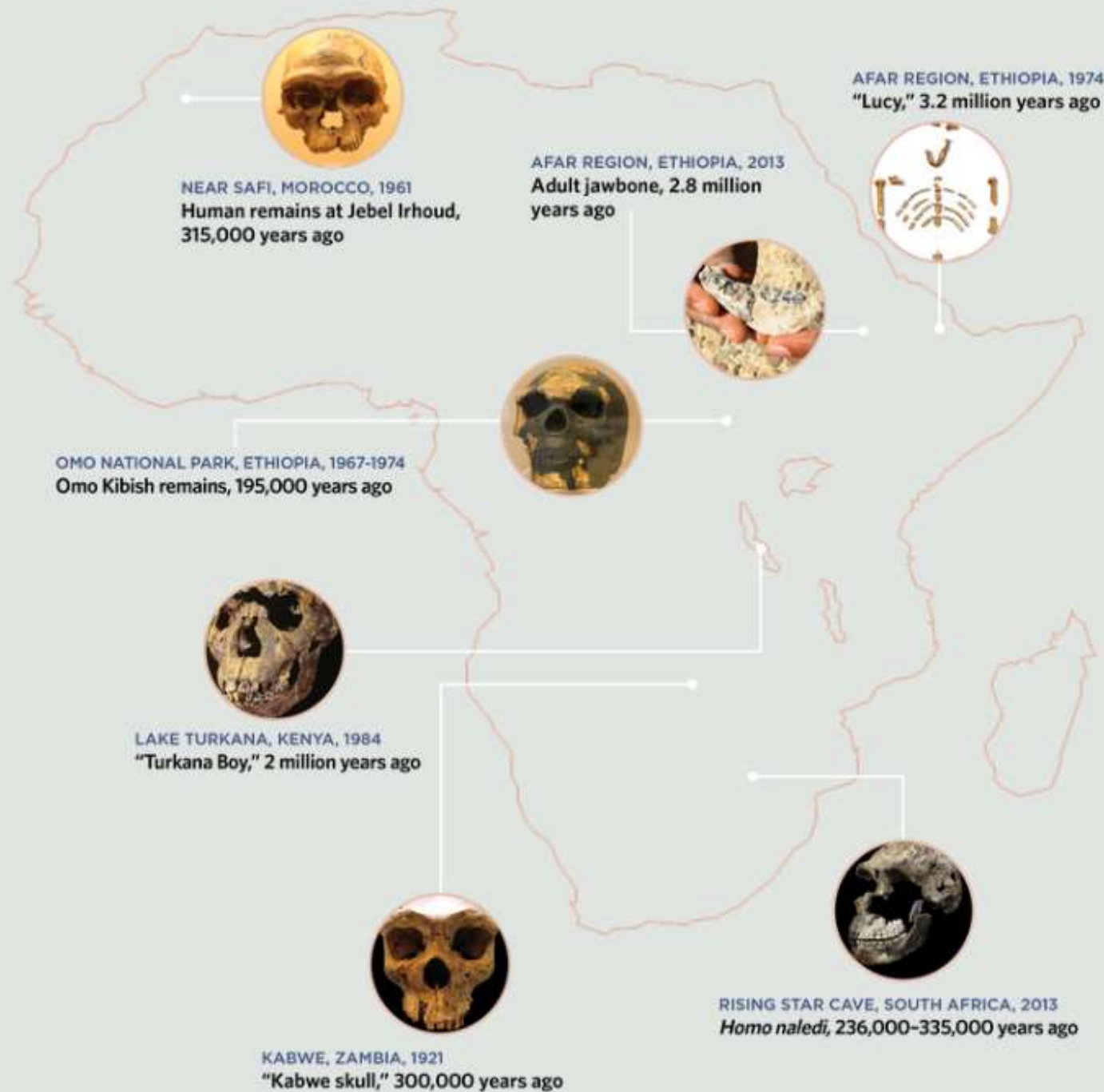
- ▶ 300,000 Years Ago:
- ▶ Fossils found of oldest *Homo sapiens*:
- ▶ Scientists can't always make sense of the wide range of morphological features they see to definitively classify the remains as *Homo sapiens*, or as different species of human relatives.
- ▶ African fossils often boast a mixture of modern and primitive features, and those don't evolve uniformly toward our modern anatomy. Instead, certain features seem to change in different places and times, suggesting separate clusters of anatomical evolution would have produced quite different looking people.

Origins of *H. sapiens*: timeline

- ▶ **Jebel Irhoud, Morocco**: fragments of 300,000-year-old skulls, jaws, teeth and other fossils; advanced stone tools, are the **oldest *Homo sapiens* remains yet found**.
- ▶ No scientists suggest that *Homo sapiens* first lived in what's now Morocco, because so much early evidence for our species has been found in both South Africa and East Africa.
- ▶ The remains of five individuals at Jebel Irhoud exhibit traits of a face that looks compellingly modern, mixed with other traits like an elongated brain case reminiscent of more archaic humans. The remains' presence in the northwestern corner of Africa isn't evidence of our origin point, but rather of how widely spread humans were across Africa even at this early date.

Origins of *H. sapiens*: timeline

- ▶ Other very old fossils often classified as *early Homo sapiens* come from Broken Hill/Kabwe, (299 Ka), Florisbad, South Africa (~269 Ka), Kibish Formation along Ethiopia's Omo River (~195 Ka), Herto, Ethiopia (~160 Ka).
- ▶ The Herto skulls of two adults and a child at Herto, Ethiopia, were classified T. White in 2003 as the subspecies *Homo sapiens idaltu* (“elder”) because of slight morphological differences including larger size. But they are otherwise so similar to modern humans that some argue they aren't a subspecies at all.
- ▶ Ngaloba, Tanzania, skull (~120 Ka) with a mix of archaic traits and more modern aspects like smaller facial features and a further reduced brow.



Origins of *H. sapiens*: timeline

- ▶ Eleanor Scerri: The fact of the matter is that all fossils before about 100 to 40 Ka contain different combinations of so called archaic and modern features.
- ▶ It's therefore impossible to pick and choose which of the older fossils are members of our lineage or evolutionary dead ends.
- ▶ The best model is currently one in which they are all early *Homo sapiens*, as their material culture also indicates.
- ▶ At 300 Ka, MSA originates: Humans took a leap in tool tech with the Middle Stone Age some 300,000 years ago by making those finely crafted tools with flaked points and attaching them to handles and spear shafts to greatly improve hunting prowess.

Origins of *H. sapiens*: 210-100 Ka

- ▶ Projectile points like those Rick Potts and colleagues dated to 320 to 298 Ka in southern Kenya were an innovation that suddenly made it possible to kill all manner of elusive or dangerous prey.
- ▶ By at least 90 Ka barbed points made of bone—like those discovered at Katanda, Democratic Republic of the Congo—were used to spearfish
- ▶ 210,000 to 100,000 Years Ago: Fossils show *Homo sapiens* migrated and lived outside of Africa
- ▶ A jawbone found inside Misliya cave on the slopes of Mount Carmel, Israel, reveals that modern humans dwelt there, alongside the Mediterranean, some ~194 to 177 Ka. Not only are the jaw and teeth from Misliya Cave unambiguously similar to those seen in modern humans, they were found with sophisticated handaxes and flint tools.

Origins of *H. sapiens*: timeline

- ▶ Other finds in the region, including **multiple individuals at Qafzeh, Israel, are dated to 130-100 Ka**, suggesting a long presence for humans in the region.
- ▶ **At Qafzeh, human remains were found with pieces of red ocher and ocher-stained tools in a site that has been interpreted as the oldest intentional human burial.**
- ▶ **A 100 Ka jawbone, complete with a pair of teeth, from Zhirendong, China retains some archaic traits like a less prominent chin, but otherwise appears so modern that it may represent *Homo sapiens*.**

Origins of *H. sapiens*: timeline

- ▶ A cave at Daoxian, China yielded a surprising array of ancient teeth, barely distinguishable from our own, which suggest that *Homo sapiens* groups were already living very far from Africa at 120-80 Ka.
- ▶ While debated, the Apidima skull fragment, in southern Greece, is dated to 210 Ka and might possibly represent one of the earliest modern human fossil discovered outside of Africa.
- ▶ Finally, based on genetic evidence from the Hohlenstein–Stadel femur: DNA evidence of Neandertal and Modern Human genetic admixture between 413 and 268 ka.
- ▶ There were multiple out of Africa dispersals. The question is whether they contributed ancestry to present day individuals and we can say pretty definitely now that they did not. Early genetic dead ends.

Origins of *H. sapiens*: 60-50 Ka

- ▶ 60,000 to 50,000 Years Ago: Genes and climate reconstructions show a final migration Out of Africa
- ▶ All living non-Africans, from Europeans to Australia's aboriginal people, can trace most of their ancestry to humans who were part of a landmark migration out of Africa beginning at 60 to 50 Ka, based on recent numerous genetic studies.
- ▶ Reconstructions of climate suggest that lower sea levels created several advantageous periods for humans to leave Africa through the Arabian Peninsula and the Middle East.

Origins of *H. sapiens*: 40-15 Ka

- ▶ 40,000 to 15,000 Years Ago: Genetics and fossils show *Homo sapiens* became the only surviving human species
- ▶ For most of our history on this planet, *Homo sapiens* have not been the only humans. We coexisted, and as our genes make clear frequently interbred with various hominin species, including some we haven't yet identified.
- ▶ But they dropped off, one by one, leaving our own species to represent all humanity. On an evolutionary timescale, some of these species vanished only recently (Neanderthals, Denisovans, *H. floresiensis*, *H. naledi*, *H. erectus*).
- ▶ Unanswerable question to the story of our evolution—**why were we the only humans to survive?**

Fossil Record of Anatomically Modern Humans - Chris Stringer

- ▶ Evidence points strongly to Africa as the major center for the genetic, physical and behavioral origins of both ancient and modern humans, but new discoveries are prompting a rethink of some aspects of our evolutionary origins.
- ▶ The fossil record from Africa for the last half million years covers less than half the continent and is particularly lacking from central and western areas.
- ▶ Recent genetic and paleontological research suggests more complex scenarios for our origins than had been considered previously.
- ▶ This includes the likelihood of interbreeding between archaic and modern humans, both within and outside of Africa.

Homo sapiens

- ▶ *Type specimen*: Linnaeus did not designate a type specimen.
- ▶ *Source(s) of the evidence*:
 - ▶ Fossil evidence of *H. sapiens* has been recovered from sites on all continents except Antarctica.
 - ▶ The earliest absolutely dated remains are from Africa.
 - ▶ DNA evidence: oldest is African
- ▶ *Nature of the evidence*:
 - ▶ Many are European burials so the fossil evidence is abundant and generally in good condition, but in some regions of the world (for example, Western Africa) remains are few and far between.

Homo sapiens

- ▶ **Characteristics and inferred behavior:**
 - ▶ The earliest evidence of anatomically modern human morphology in the fossil record comes from sites in Africa and the Near East.
 - ▶ It is also in Africa that there is evidence for a likely morphological precursor of anatomically modern human morphology.
 - ▶ This takes the form of crania that are generally more robust and archaic-looking than those of anatomically modern humans yet which are not archaic enough to justify their allocation to *H. heidelbergensis* or derived enough to be *H. neanderthalensis*.
 - ▶ Specimens in this category include Jebel Irhoud from North Africa; Omo 2, and Laetoli 18 from East Africa, and Florisbad

Homo sapiens

- ▶ Habitat and Distribution:
- ▶ **Transitional forms** (fossils exhibiting both archaic and modern traits) have been **found in** Kenya, South Africa, Ethiopia, Tanzania, and Morocco and range in age from **300-100 Ka**.
- ▶ Modern humans also appeared the **earliest in Africa and later migrated** into Southwest Asia, Europe and East Asia.
- ▶ **Later still**, modern humans migrated to Australia, the islands of the Pacific, and North and South America.
- ▶ Diet: *Homo sapiens* utilized the animal and/or plant resources found in almost all environments.

Technological colonizers and Dominant Herbivores

- **General characteristics:**
 - Their morphology is generally large, sometimes greater than 60 kg, with larger cranial capacities well within the range of living humans.
 - Encephalization quotient (EQ) is ~8.
 - There is full bipedalism, and a general loss of extreme cranial superstructures, with facial and dental reduction.
 - Technology is much more complex (Mode 3, 4, and 5t).
 - Extreme habitat tolerance appears to be characteristic, possibly associated with high levels of omnivory (hunting-gathering).
- **Variation:** Variability in this form is quite marked across time. Earlier forms retain more primitive characters and is robust. Early *sapiens* are large and robust, but become increasingly variable, gracile (35-70 kg) and widespread, with the most cultural and technological complexity. Sexual dimorphism is high in early forms of all taxa, but reduced in later *sapiens*.

Some *Homo sapiens* characteristics

- ▶ Cranial capacity: 1350 cc (range 900 to 2000 cc)
- ▶ Brain: 20% of the body's energy consumption; 2% of body mass
- ▶ Speech/language
- ▶ Representational Art
- ▶ Reliance on tools and material cultural
- ▶ Extensive tool kit including new materials (bone, ivory, antler)
- ▶ Symbolic thought
- ▶ 1st molar tooth at 6 years old
- ▶ Protracted childhood; pronounced adolescent growth spurt
- ▶ Longevity: 66 years

Early Modern *H. sapiens*

- Location/sites:
 - **Africa** (Herto, Aduma, Bouri, Omo, Border Cave, Klasies River Mouth, Lothagam, Wadi Kubbania, Wadi Halfa)
 - **Asia** (Skhul 5, Qafzeh, Tianyuandong, Minatogawa)
 - **Europe** (Pestera cu Oase, Mladeč, Predmostí, Dolni Vestonice, Cro-Magnon, Grimaldi)
 - **Australia** (Lake Mungo, Kow Swamp),
- **Chronology**
 - 300 Ka in Africa
 - 90 Ka in western Asia
 - 65 Ka in Australia
 - 60 Ka in eastern Asia
 - 45 Ka in Europe

Early Modern

Biology:

- ▶ Heat-adapted body morphology (small trunk, long limbs)
- ▶ Clear **correlation between latitude and skin pigmentation**; generate more vitamin D from sunlight than darker skin; **three genes associated with paler skin** swept through the European population **only 11,000 to 19,000 years ago**.

Culture and behavior: Upper Paleolithic

- ▶ Increased visible symbolic behavior (cave art)
- ▶ Burial of deceased with grave goods
- ▶ Decreased hunting, increased marine resources, likely more plant gathering
- ▶ Reduced focus on big game animals
- ▶ Technology changes reflect increased focus on fishing (e. g, bone harpoons), small animals

Characteristics of Anatomically Modern People (*Homo sapiens*)

Trait

Homo sapiens

Height (sexes combined)

ca. 5 to 6 ft (140-185 cm)—extremely variable

Weight (sexes combined)

ca. 100 to 200 lb (40-70 kg)—extremely variable

Brain size (sexes combined)

1,350 cc mean (1,000-2,000 cc range)

Cranium

High-vaulted, globular; widest point high on the sides; small brows; high forehead; little facial prognathism; flexed cranial base; canine fossa

Dentition

On average, smaller front and rear teeth and a more lightly built jaw than the archaics; definite chin

Characteristics of Anatomically Modern People (*Homo sapiens*)

Trait

Homo sapiens

▶ Limbs

Relatively long legs and short arms overall; body build that varies strongly with climatic conditions but generally linear

▶ Distribution

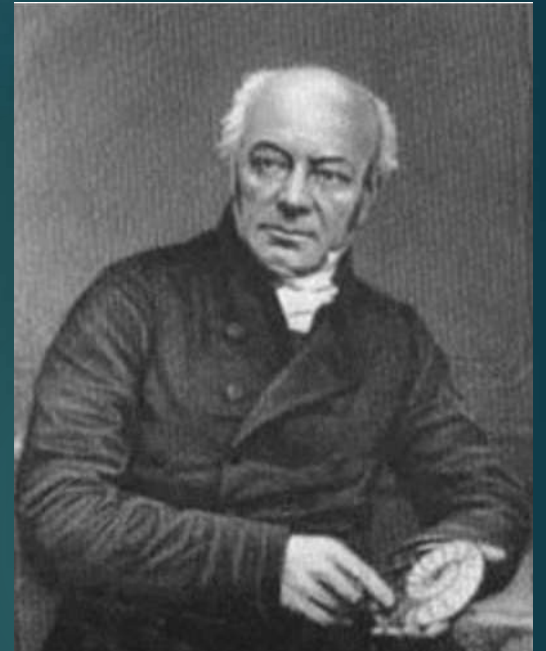
Africa, Asia, Europe, Australia, Americas

▶ Known dates

300 Ka to present

Rev. William Buckland (1784 – 1856): First *Homo sapiens* discovery

- ▶ Oxford professor of geology
- ▶ Theory of global catastrophes
- ▶ First hominin fossil discovery
- ▶ 1823: First found fossils of *Homo sapiens* (Red Lady of Paviland) the bones of a young man, 33K, in Goat's Hole Cave, Paviland, on the Gower Peninsula in Wales, which remains the oldest anatomically modern human found in the United Kingdom;
- ▶ Trained the geologist Charles Lyell
- ▶ (OXA-1815), Buckland, *Reliquiae Diluvianae* , 1823



1823: Red Lady of Paviland



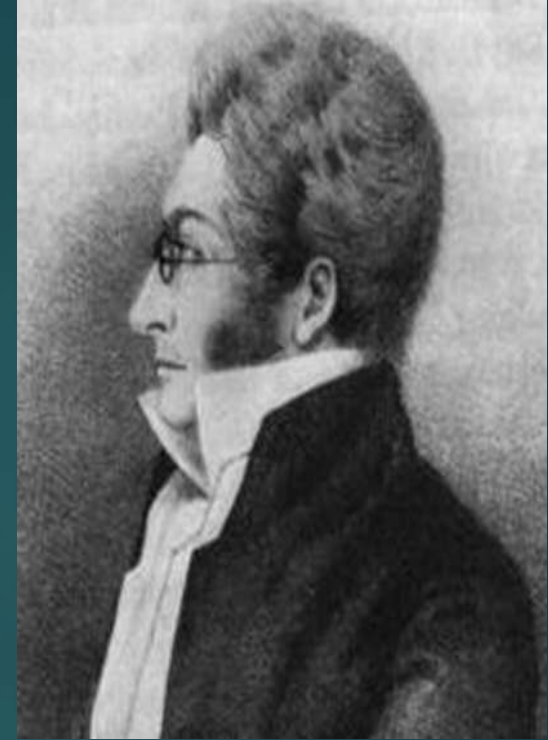
Found with beads and initially described as a woman; actually a young man

First *Homo sapiens*
fossil discovery;
Rev. William Buckland



Peter Wilhelm Lund (1801-1899): Second *H. sapiens* discovery

- ▶ Danish paleontologist, zoologist, archeologist
- ▶ 1842/1843: Excavations at Sumidouro Cave in Lagoa Santa, Brazil discovering fossil *Homo sapiens*
- ▶ Not well publicized
- ▶ The first professional archaeological excavations in Lagoa Santa were carried out by Wesley Hurt and Oldemar Blasi in 1956
- ▶ Cranial morphology of early Americans from Lagoa Santa, Brazil: Implications for the settlement of the New World by Walter A. Neves and Mark Hubbe, 2005



1843: *Homo sapiens*, Sumidouro Cave in Lagoa Santa, Brazil



Two radiocarbon dates: (9,720 ± 128 and 9,028 ± 120)

Louis Lartet (1840-1899): Discovery of *H. sapiens* in Europe

- ▶ Edouard Lartet's son
- ▶ French geologist and paleontologist.
- ▶ 1868: During railroad construction, discovered Cro-Magnon 1 in the Cro-Magnon rock shelter at Les Eyzies, Dordogne, France : the partial skeletons of four fossil modern adults and one infant along with perforated shells, ivory, and worked reindeer antler.
- ▶ Cro-Magnon 1 was made the type specimen of a new species *Homo spelaeus* by Lapouge in 1899
- ▶ Arthur Keith in 1912 placed it in *Homo sapiens*.



Cro-Magnon I

Courtesy, David Frayer



(a)

Courtesy of Milford Wolpoff

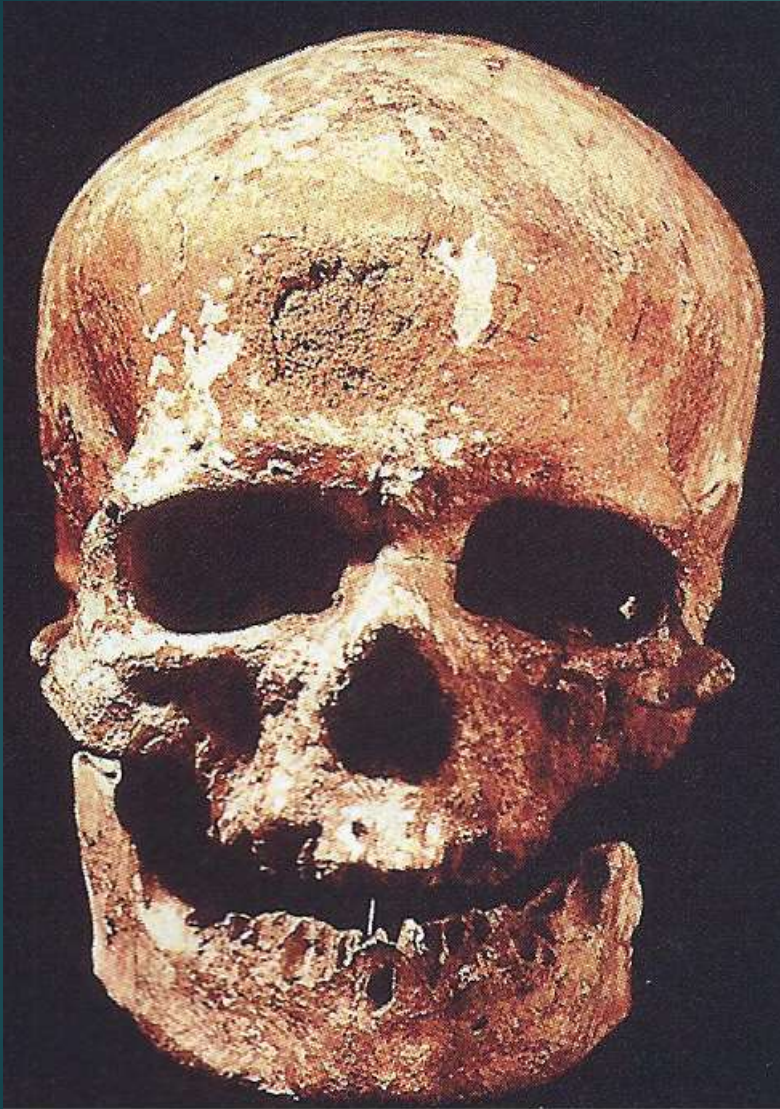


(b)

Cro-Magnon I (France)

Species:	<i>Homo sapiens</i>
Age:	~30,000 years
Date of Discovery:	March 1868
Location:	Les Eyzies, Dordogne, France
Discovered by:	Louis Lartet

1868, European *Homo sapiens*, Cro-Magnon 1, 30 Ka



Original Cro-Magnon Man was **one of 4 individuals** found; he was probably less than 50 years old.
Had distinct bone lesion (fungal pitting?) on skull.

Homo sapiens

(Cro-Magnon 1)

Discoverer: Louis Lartet & Henry Christy

Locality: Abri Cro-Magnon, Les Eyzies,
France

Date 1868

Age: 30-32 K

Cro-Magnon



Cro-Magnons are indistinguishable from MHs, except for being 10-20% more robust

Did Cro-Magnon 1 have neurofibromatosis type 1?



Karel Jaroslav Maska:

Homo Neanderthalensis & Sapiens in Czech Republic

- ▶ Schoolteacher turned prehistorian
- ▶ 1880: Discovered Neandertal mandible of a 9-10 yo child at Sipka, (Moravia) Czech Republic
- ▶ Also Mousterian tools and traces of hearths
- ▶ 1894: modern human materials from Predmosti, Moravia
- ▶ Large Upper paleolithic mammoth-hunter encampment
- ▶ One of founding fathers of central European Paleolithic archeology



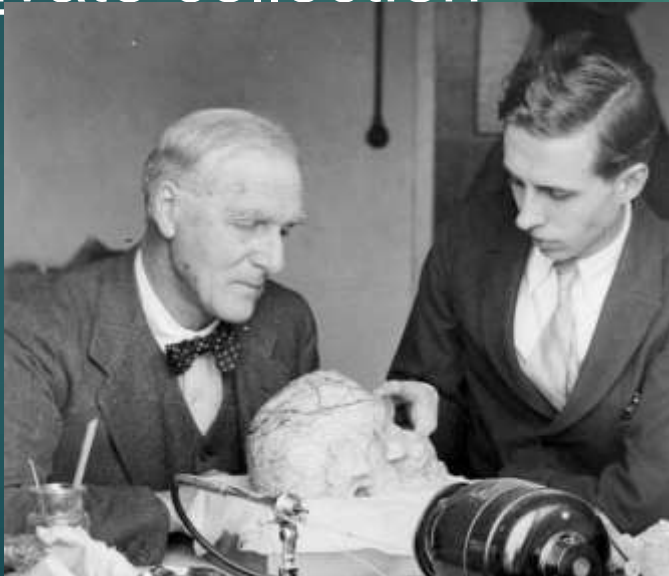
1894: *Homo sapiens*, Predmostí, Czech, 26 Ka



Skull 3; Cranial capacity = 1580 cc

Theodore D. McCown (1908-1969): Excavation at Skhul, transitional skulls

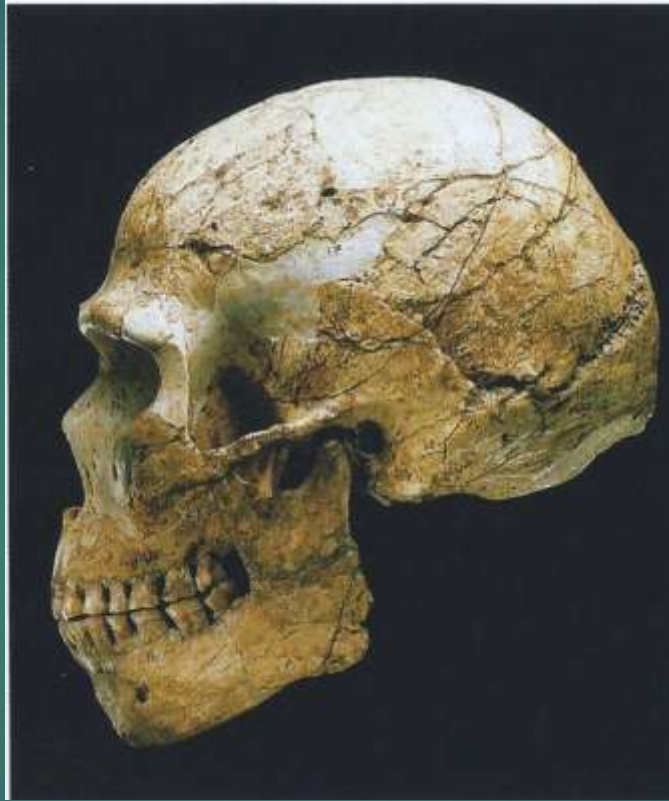
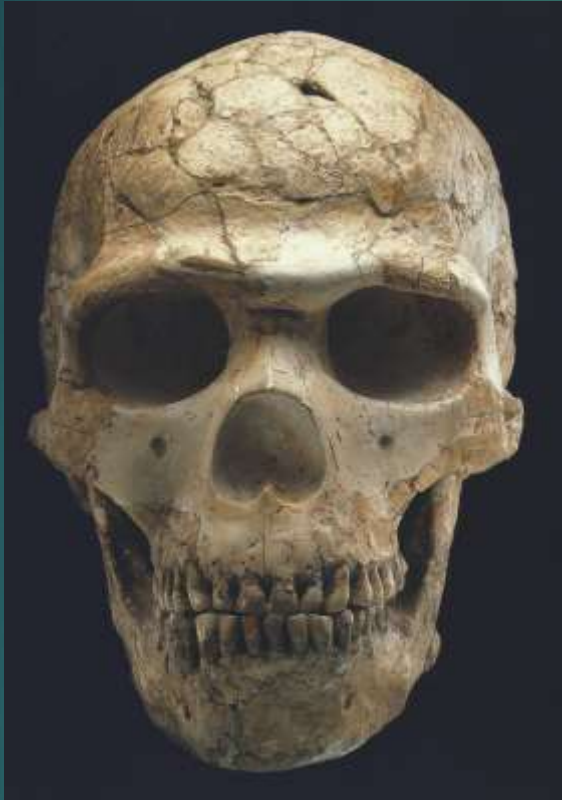
- ▶ American anthropologist; Univ. of Calif. Berkeley
- ▶ Supervised the digging at Skhul; large Neanderthal population sample and some MHs
- ▶ Wrote up the Mount Carmel skeletons with Arthur Keith, who kept some in his private collection



Skhul 5, 90 Ka



~1925: *Homo Sapiens*, Skhul 5, 90 Ka



Homo sapiens
(Skhul V)

Discoverers:

Theodore McCown
& Hallam Movius Jr.

Locality: Skhul cave
Mount Carmel, Israel

Date: 1932

Age: 90K

Skhul/Qafzeh robust *H. sapiens* possess brow ridges, no chin, and a projecting facial profile, similar to the Neanderthals.

Homo sapiens, Qafzeh, 90K



Homo sapiens

(Qafzeh IX, female, 13 yo)

Discoverer: Bernard Vandermeersch

Locality: Qafzeh cave, Israel

Date: 1969

Age: 90-100K

Tim Douglas White (1950-):

H. sapiens idaltu at Herto, Ethiopia

- ▶ American paleoanthropologist; Professor of Integrative Biology at the UC, Berkeley
- ▶ Head of the Laboratory for Human Evolutionary Studies at the UC, Berkeley
- ▶ 1974: White worked with Richard Leakey's team at Koobi Fora, Kenya and then with Mary Leakey at Laetoli, Tanzania.
- ▶ 1974: With Don Johanson, discovered Lucy, *A. afarensis*
- ▶ 1992: with Gen Suwa, discovered *Ardipithecus ramidus* in Aramis, Ethiopia; 4.4M
- ▶ 1996: with Berhane Asfaw, discovered *Australopithecus garhi*; 2.5M, in Bouri Formation, Ethiopia
- ▶ 1997: *Homo sapiens idaltu* co-discovered, with Berhane Asfaw, & F. Clark Howell, at Herto Bouri near the Middle Awash, Afar, Ethiopia
- ▶ Fellow of CAS



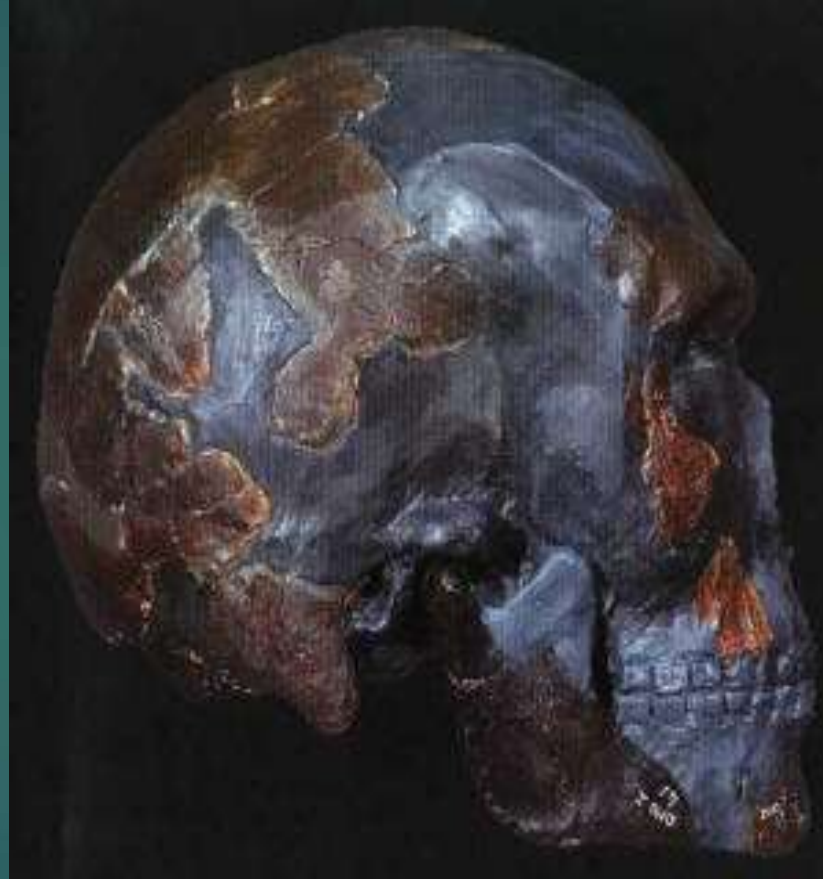
Herto Cranium From Ethiopia



David L. Brill/Atlanta

- ▶ Herto cranium from Ethiopia, dated 160,000–154,000 ya.
- ▶ This is the best- preserved early modern *H. sapiens* cranium yet found.

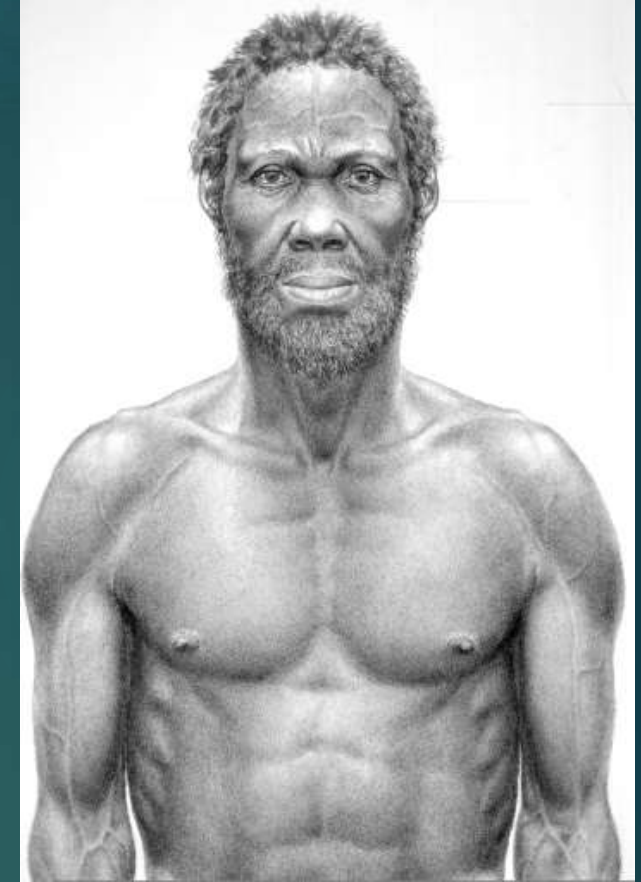
Omo I



- ▶ Reconstructed skull of **Omo I**, an early modern human from **Ethiopia**, dated to **195 Ka**
- ▶ Note the clear presence of a **chin**.

Anatomically Modern *Homo sapiens*: In Our Own Image

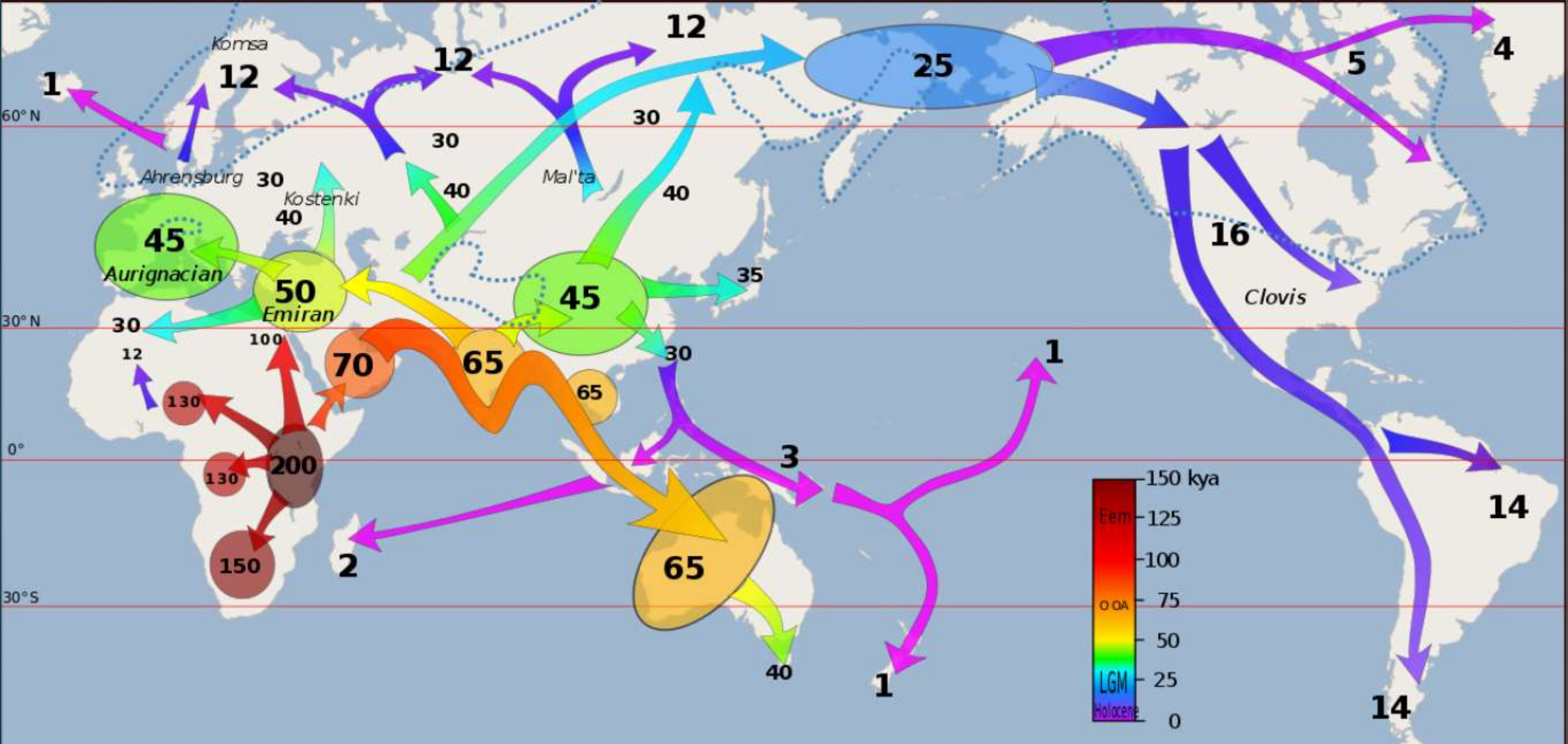
- ▶ First appear about 300 Ka
- ▶ Defined morphologically, not behaviorally
- ▶ Tall, almost vertical forehead
- ▶ Small to minimal brow ridges
- ▶ No retromolar gap (thus impacted wisdom teeth)
- ▶ Pointed chin (uniquely modern trait)
- ▶ High rounded cranium : widest point on sides of parietals; expansion of parietal lobes; Jebel Irhoud more elongated



Early Modern Homo sapiens Discoveries - Europe, Asia, Australia

Site	Dates (ya.)	Human Remains
Ordos (Mongolia, China)	50,000	1 individual
Kow Swamp (Australia)	14,000- 9,000	More than 40 individuals (adults, juveniles, infants)
Lake Mungo (Australia)	60,000	3 individuals, one a cremation

Modern human migration out of Africa showing approximate dates



Homo sapiens



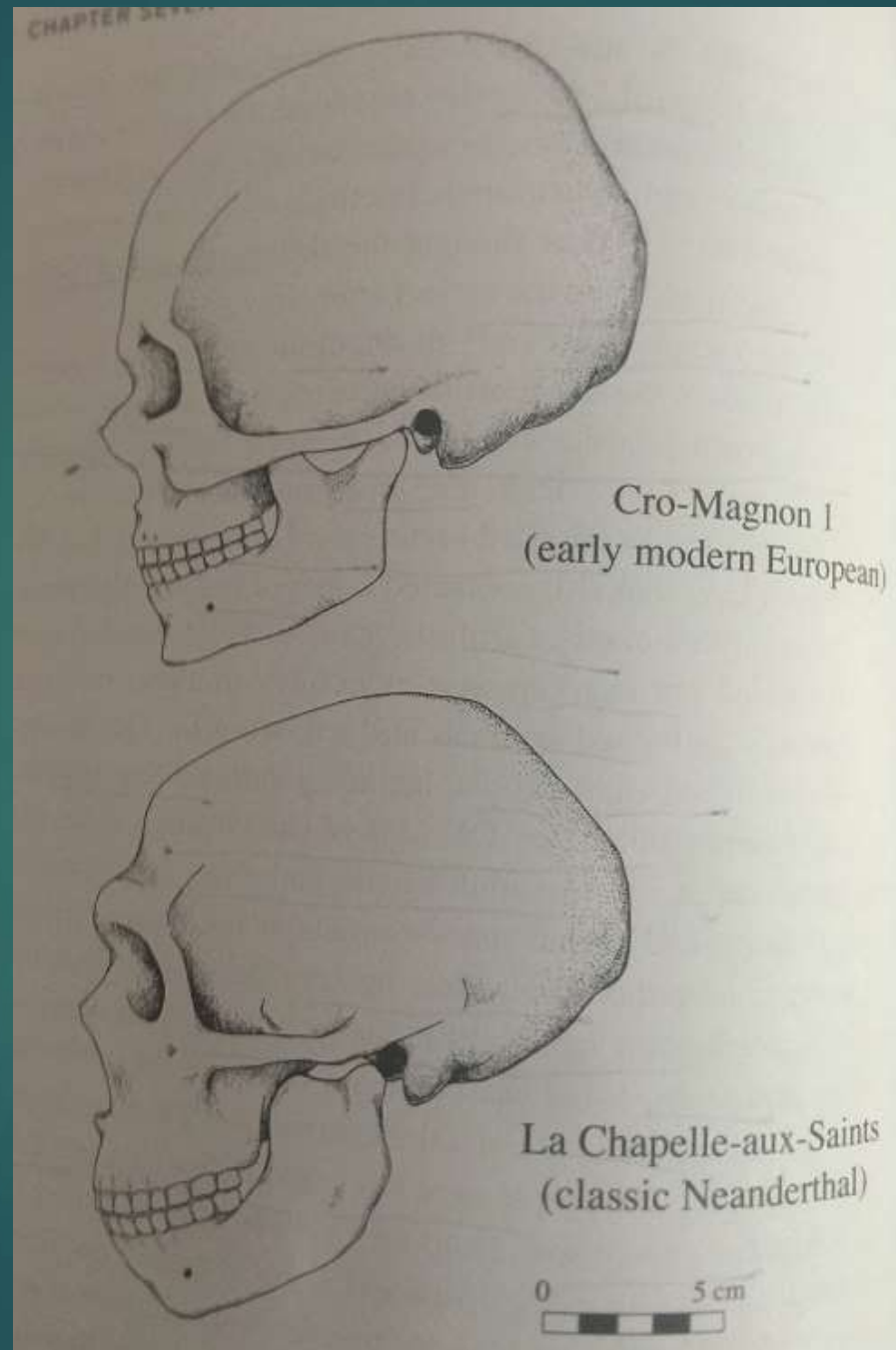
Homo sapiens

Neandertal

- ▶ New geometric morphometrics have shown parietal & cerebellar expansion in modern humans (resulting in globular skull), beginning in early postnatal development

AMHs vs Ns

Colloquially, all early-modern Europeans are often called Cro-Magnons



Vertical forehead

Cranium globular

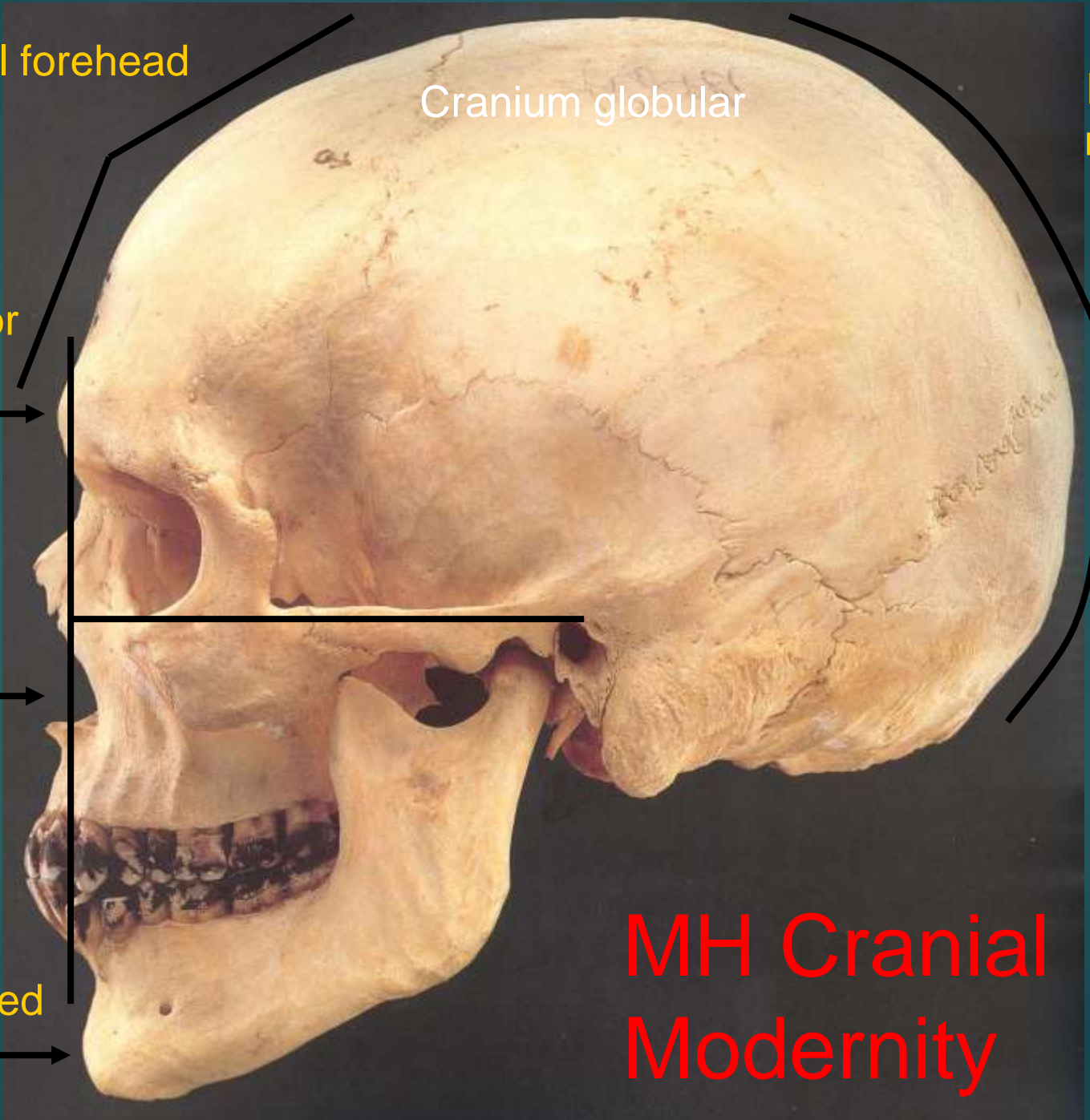
Rounded rear vault

Reduced or absent brow ridges

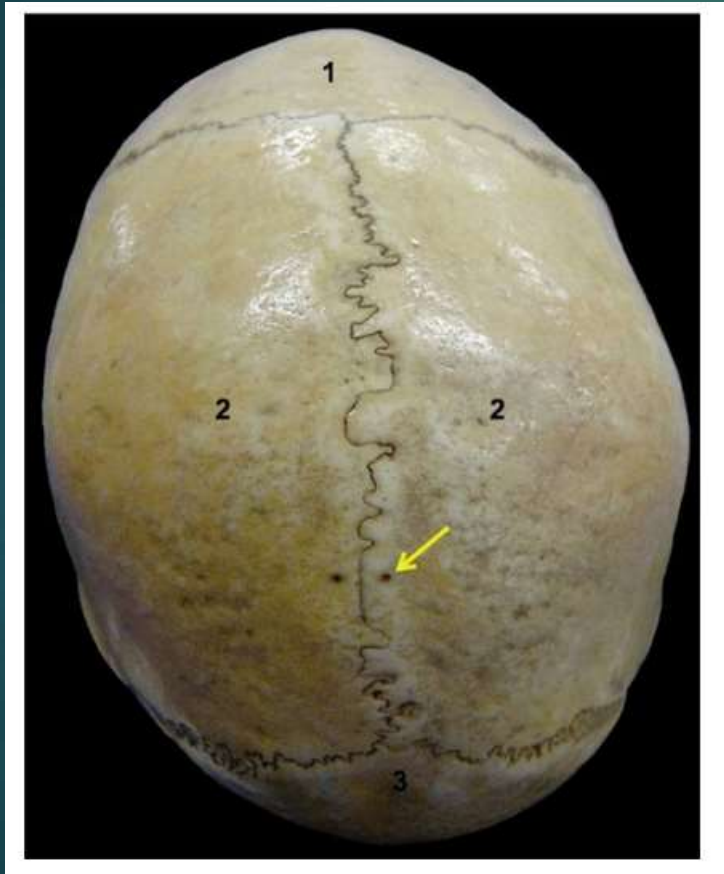
Reduced face

Pronounced chin

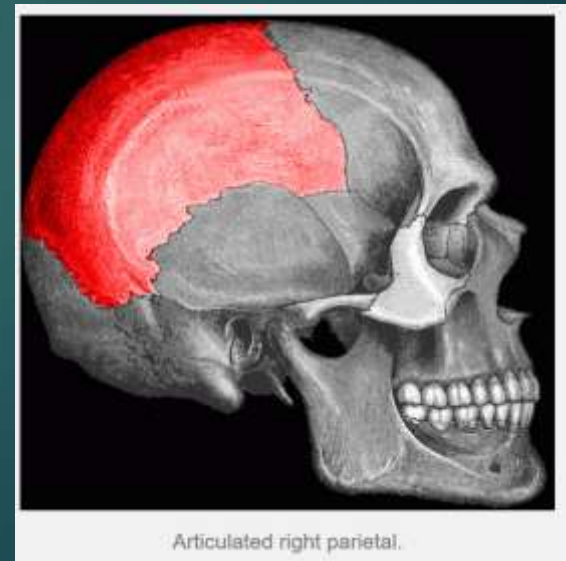
MH Cranial Modernity



Anatomically Modern Human superior view: Parietal bosses

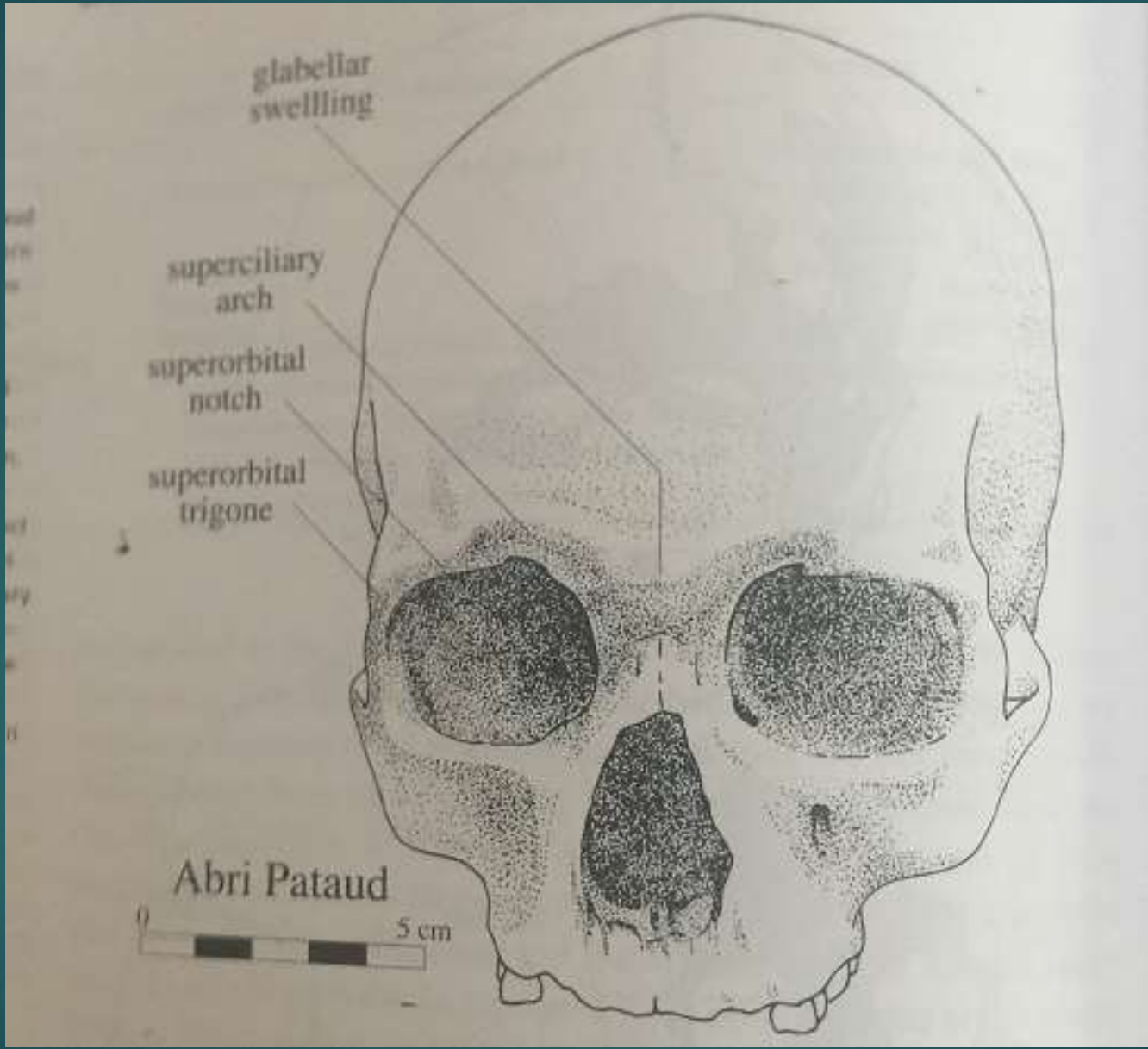


- “2”s indicate the left and right parietals; the bosses are the areas where the parietals bulge out posteriorly
- This convexity is most easily observable to the right of the “2” label
- Yellow area = parietal foramina



Articulated right parietal.

AMHs



Diagnostic traits for *Homo* vs *Neandertals*

- ▶ Traits distinguishing this species from *Homo neanderthalensis*:
 - ▶ cheekbones lack swept-back appearance of N
 - ▶ midfacial prognathism lacking
 - ▶ lower, squarer orbits
 - ▶ smaller supraorbital tori (browridge)
 - ▶ reduced mean brain size
 - ▶ prominent temporal mastoid processes
 - ▶ smaller anterior teeth
 - ▶ hip sockets are less laterally (more ventrally) oriented
 - ▶ pubic ramus shorter and thicker
 - ▶ postcranial skeleton generally less robust

** Main Morphological & Behavioral Differences btw MHs and Ns

Morphology	Modern Humans	Neanderthals
Brain size	Large	Very Large
Brow ridges	Weak	Thick and arched
Nose and mid-face	Flat	Projecting
Cranial vault	Straight sides	Bulging sides
Occipital region	Round	Bulging
Incisor teeth	Small	Large
Thorax	Narrow	Broad
Pelvis	Small & narrow	Large & wide
Limb bones	Straight	Curved
Limb joints	Small	Large
Hand-thumb	Short	Long
Development – bones & teeth	Slow	Fast

** Important cranial features of Modern *Homo Sapiens*

- ▶ Cranial vault enlarged & elevated esp. in frontal & parietal regions
- ▶ Cranial bones reduced in thickness
- ▶ Biparietal breadth greater than or equal to the breadth across the ear region (biauricular breadth)
- ▶ Occipital region rounded; reduced angulation & reduction of nuchal (neck) musculature
- ▶ Reduction &/or loss of sagittal keeling & parasagittal flattening
- ▶ Reduction of supraorbital tori into glabellar and supraciliary elements with development of crest-like superior orbital margins
- ▶ Shortened cranial base with increased flexion of basicranial axis

** Cranial features of Modern *Homo Sapiens* 2

- ▶ Reduction of both facial prognathism & height with progressive facial shortening; development of a canine fossa (hollowed cheeks)
- ▶ Reduction of maxilla and mandible associated with reduction in tooth crown and root size; dental reduction
- ▶ Reduction of robusticity of mandible
- ▶ Development of a bony chin
- ▶ Brain size averages around 1350 cc but varies from 900 to 2000 cc
- ▶ Vocal tract with low larynx and long pharynx
- ▶ Brain and vocal tract fully adapted for speech, including the presence of cerebral asymmetry with language centers in poster frontal areas of both hemisphere

Homo sapiens: Increasingly less robust morphology

- ▶ Within the last 100,000 years, long-term trends towards smaller molars and decreased robustness are seen in *Homo sapiens*.
- ▶ Modern pattern of cranial variability only after 10 Ka
- ▶ Upper Paleolithic humans (about 30,000 years ago) are about 20–30% more robust than the modern condition in Europe and Asia.
- ▶ The face, jaw and teeth of Mesolithic humans (about 10,000 years ago) are about 10% more robust than ours.
- ▶ Interestingly, some modern humans (aboriginal Australians) have tooth sizes more typical of archaic *H. sapiens*.

Increasingly less robust morphology

- ▶ Modern humans are less robustly built than either *H. erectus* or *H. neanderthalensis*.
- ▶ Softer food: The smallest tooth sizes are found in those areas where food-processing techniques have been used for the longest time. This is a probable example of natural selection that has occurred within the last 10,000 years.

AMHs: Morphology

▶ Postcranials (skeleton):

- ▶ decreased overall robusticity (robust limb bones with pronounced muscle markings, but less robust than earlier ancestors);
- ▶ distal phalanx of thumb 2/3rds length of proximal one (N was equal);
- ▶ smaller fingertips than Ns;
- ▶ cortical bone of femur and tibia thinner than N;
- ▶ shorter and thicker pubis, but large pelvic inlet;
- ▶ linear physique; long
- ▶ limbs and short trunks;
- ▶ greater reliance on culture than physical strength

** Other Anatomically MH characteristics

- ▶ Hip and lower limb structures fully adapted to strident bipedal gait
- ▶ Upper limbs capable of fine movements of hand and thumb
- ▶ Pronounced overall reduction in upper limb muscularity
- ▶ **Tools**: Increasing number of blades relative to flakes & endscrapers relative to side scrapers in Upper vs Middle Paleolithic & for development of polished bone technology
- ▶ Unusually **prolonged lifespan**, protracted child dependency, pronounced adolescent growth spurt
- ▶ Most importantly, our **complete reliance on tools & material culture for survival**

Human jaw has a chin: outside buttress



Why a chin?

- Most common explanation is that our chin helps buttress the jaw against certain mechanical stresses
- Others think the chin evolved to safeguard the jaw against forces generated by chewing food.
- Flora Gröning tested difference between N and MH jaws withstanding structural loads. Chin does help support the jaw during chewing. They suggested the chin may have evolved to maintain the jaw's resistance to loads as our ancestors' teeth, jaws and chewing muscles got smaller early on in our species' history.
- Or chin evolved in response to our unique form of speech
- Or sexual selection as the driver of the evolution of the chin. A small distinct difference in chin shape between the sexes, with men having a taller, more pronounced chin.

Brain and Mind

- ▶ Advent of anatomical modernity involved the shape of the skull and the cognitive capacity of the brain
- ▶ Mean brain size of 1330 cubic centimeters:
 - ▶ 10 percent increase over *H. heidelbergensis*
 - ▶ 8 percent smaller than in the Neandertals
- ▶ Encephalization quotient (EQ), brain-to-body mass ratio, score of 8.1
- ▶ Parietal lobe enhancement
- ▶ Enhanced working memory (EWM) now in place (allowing "higher levels of innovation, thought experiment, and narrative complexity" than in archaic humans); requires PFC and Parietal co-ordination
- ▶ Uniquely modern human diseases: schizophrenia, autism

Selected Human Fossils from Africa, 400 to 50 Ka, by date

Site	Anatomical Type	Approx. Age	Discovery Date
Ndutu, Tanzania	Archaic	~400,000	1973
Elanddsfontein, RSA	Archaic	~400,000	1953
Ilerst, Kenya	Intermediate?	300,000-270,000	1992
Jebel Irhoud	Modern	300,000	2017
Kabwe, Zambia	Archaic	~300,000	1921
Florisbad, RSA	Intermediate	~260,000	1932
Omo Kibish 1, Ethiopia	Modern	195,000	1967
Omo Kibish 2, Ethiopia	Modern?	195,000	1967
Singa, Sudan	Intermediate	170,000-150,000	1924
Ngaloba, Laetoli, Tanzania	Intermediate	150,000-90,000	1978
Dar-es-Soltan, Cave 2, Morocco	Modern	127,000-40,000(?)	1975
Klasies River Mouth, RSA	Modern	115,000-60,000	1972
Border Cave, RSA	Modern	90,000-50,000	1941
De Kelders Cave, RSA	Modern	71,000-45,000	1976
Equus Cave, RSA	Modern	71,000-27,000(?)	1985

**** Earliest
Modern
Human
Fossils before
diaspora**

Specimens	Age
Morocco, Jebel Irhoud	315 K
Omo-Kibish KHS & PHS	150-195 K
Herto	150-160 K
Singa	140-150 K
Mumba	110-130 K
Klasies River mouth LBS	100-120 K
Qafzeh	90-100 K
Skhul	90-110 K
Aduma	80-105 K
Bouri	80-105 K
Sea Harvest	82-123 K
Klasies River mouth SAS	65-90 K
Die Kelders 1	60-70 K
Blombos	65-70 K
Taramsa Hill	50-80 K
Pinnacle Point	57-81 K

A Partial Record of Fossil AMH *Homo sapiens* Sites

Site	Age (Years bp)
Africa	
Jebel Irhoud, Morocco	300,000
Omo Kibish, Ethiopia	195,000
Herto, Ethiopia	160,000-154,000
Klasies River Mouth, South Africa	115,000-60,000
Border Cave, South Africa	90,000-50,000
Middle East	
Skhûl and Qafzeh, Israel	120,000-80,000
Australia and Indonesia	
Niah Cave, Borneo	~40,000
Lake Mungo, Australia	60,000
Europe	
Bacho Kiro, Bulgaria	45,000
Asia	
Liujiang, China	30,000-10,000
Zhoukoudian, China (Upper Cave)	29,000-11,000

Sources: Bowler et al., 2003; Center for the Study of Chinese Prehistory; Churchill and Smith, 2000; Conroy, 1997; Klein, 1999; McDougall et al., 2005; White et al., 2003.

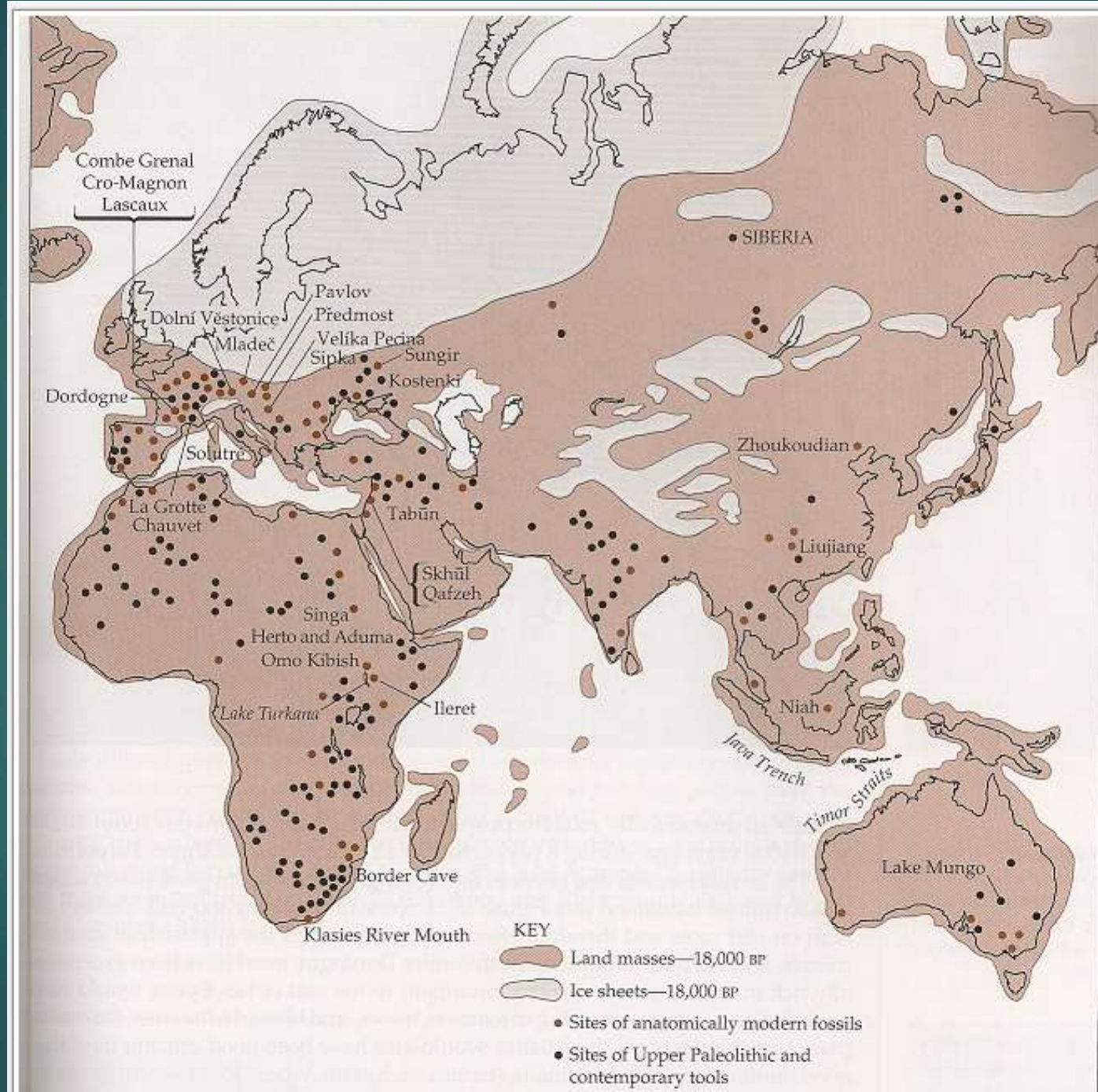
Last Glaciation:

Land masses—18 Ka

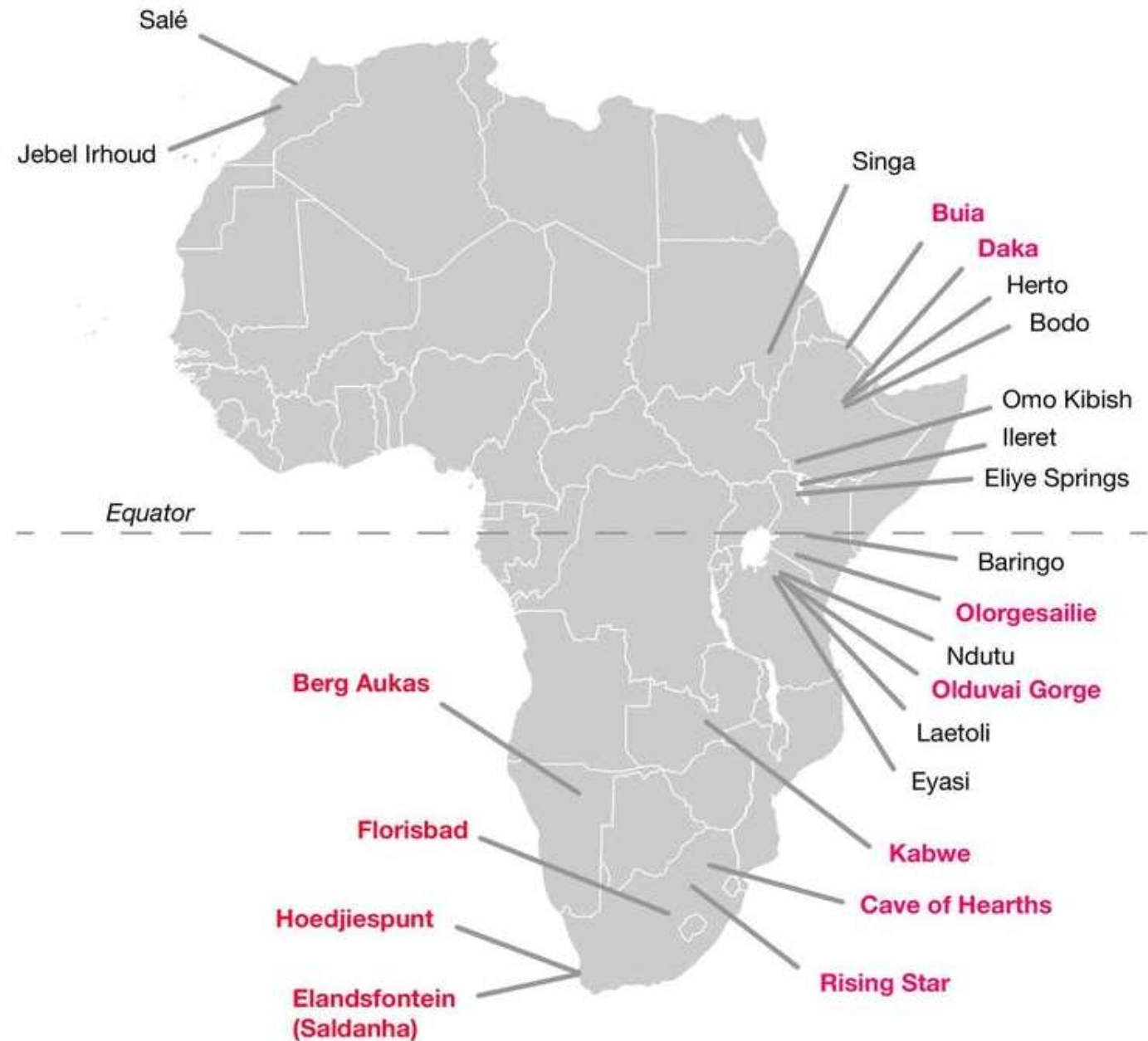
Ice sheets—18 Ka

Sites of Anatomically Modern Human fossils

Sites of Upper Paleolithic and contemporary tools



Hominin Sites in Africa



African fossil sites from the Middle and earliest Late Pleistocene which have produced hominin fossils, often in association with stone tool assemblages.

Lee Berger et al. *Life Journal*

Early African immigration of MHs

- ▶ Earliest genetically documented exodus >270 Ka from Africa to Hohlenstein-Stadel (HST), Germany
- ▶ Final African exodus event of AMHs occurred around 60 to 50 Ka
- ▶ Exits:
 - ▶ Either across the **Bab-el-Mandeb** ('Gate of Grief'), roughly from modern Djibouti in Horn of Africa to Yemen in Arabian Peninsula, at bottom of Red Sea
 - ▶ Or alternately around the **northern rim of the Red Sea**
- ▶ Humans reached Australia circa 65 Ka

Exits:



African immigration of AMHs circa 80-50K

- ▶ **Europe reached by 45K**, probably via Turkey, Bulgaria, and Romania, where they discovered the Danube to central Europe, where earliest European art found
- ▶ **Earliest European MH sites** are Oase Cave, Romania & Temnata Cave and Bacho Kiro Cave in Bulgaria (45 Ka)
- ▶ **Kent's Cavern**, Torquay, England by 41K

Historical Eurocentrism in Paleoanthropology

- ▶ Early idea suggested that continental Europe was birthplace of *Homo sapiens*
- ▶ First published discovery of fossil MH: “Red Lady” from cave at Paviland near Swansea, Wales, in 1822-23
- ▶ But most often cited as first MH discovery: 1868 at Cro-Magnon rock shelter at Les Eyzies in the Dordogne, France
- ▶ Historical priority of Cro-Magnon discovery, with evidence of small stone tools, needles and fishhooks from bone, recovered from Europe

Cradle of Humanity

- ▶ 2 developments outside of Europe challenged this assumption:
 - ▶ **Fossil evidence** of human ancestors more primitive than Ns **in Asia** & later, evidence for earlier fossils in Africa
 - ▶ **Discovery in 1930s by Dorothy Garrod** (Cambridge archeologist) of fossil remains resembling MHs in **Mt Carmel caves in Palestine** & stone tools found by **Leakeys in Kenya** & in Egypt by Gertrude C. Thompson
- ▶ In 1946 Dorothy Garrod introduced a course in “World Prehistory” into undergraduate archeology course at Cambridge
- ▶ **By 1950's and 1960's**, theory of origins of humans outside Europe established.

Africa as cradle of Humanity

- ▶ In 1980s, idea that Africa was cradle of Humanity takes hold;
- ▶ 3 lines of evidence:
 - ▶ 1 - **Redating of Levant fossils**: modern-looking fossils from **Qafzeh (MHs)** were older than the **Ns fossils** from **Kebara and Amud**; meant that researchers could not use dating evidence to make case that Ns evolved into MHs.
 - ▶ 2 – **African fossils**: **Discovery of MH looking fossils in 1968 at Klasie River Mouth in South Africa dated to 120 Ka**; also MH-like cranium at Omo region in Ethiopia (Omo 1) at 195 Ka; fossils from Herto, Ethiopia dated 190 Ka; the Omo1 and Herto skulls in Ethiopia suggest that the early modern human morphology emerged in East Africa possibly as early as 190,000 year ago

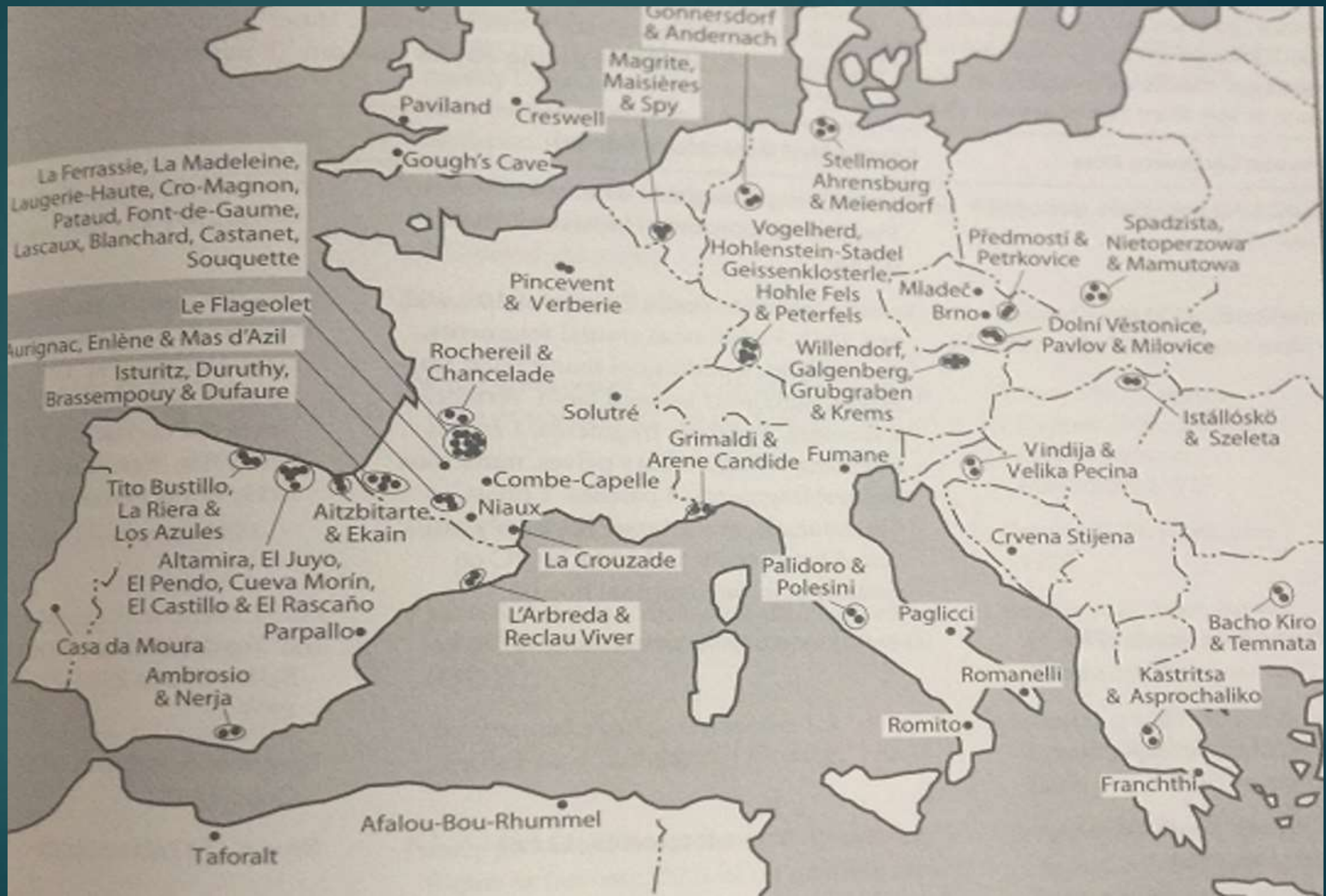
Africa as original locale: mtDNA evidence

- ▶ 3 – Molecular genetic method published in 1987 by R. Cann, M. Stoneking, & A. Wilson: mtDNA study of 147 MHs – higher mutation rate in mtDNA; 133 different versions of mtDNA:
 - ▶ found deep African branch & 2nd nonAfrican branch
 - ▶ more variation in the sub-Saharan African mtDNA than in the rest of the world
 - ▶ most of the mtDNA variants had an African origin
 - ▶ Based on mutation rate, MH originated in Africa ~180 Ka
 - ▶ Mitochondrial Eve hypothesis: all MHs descend from African woman ~180K
 - ▶ Wrongly, they claimed that all MHs had only African genes

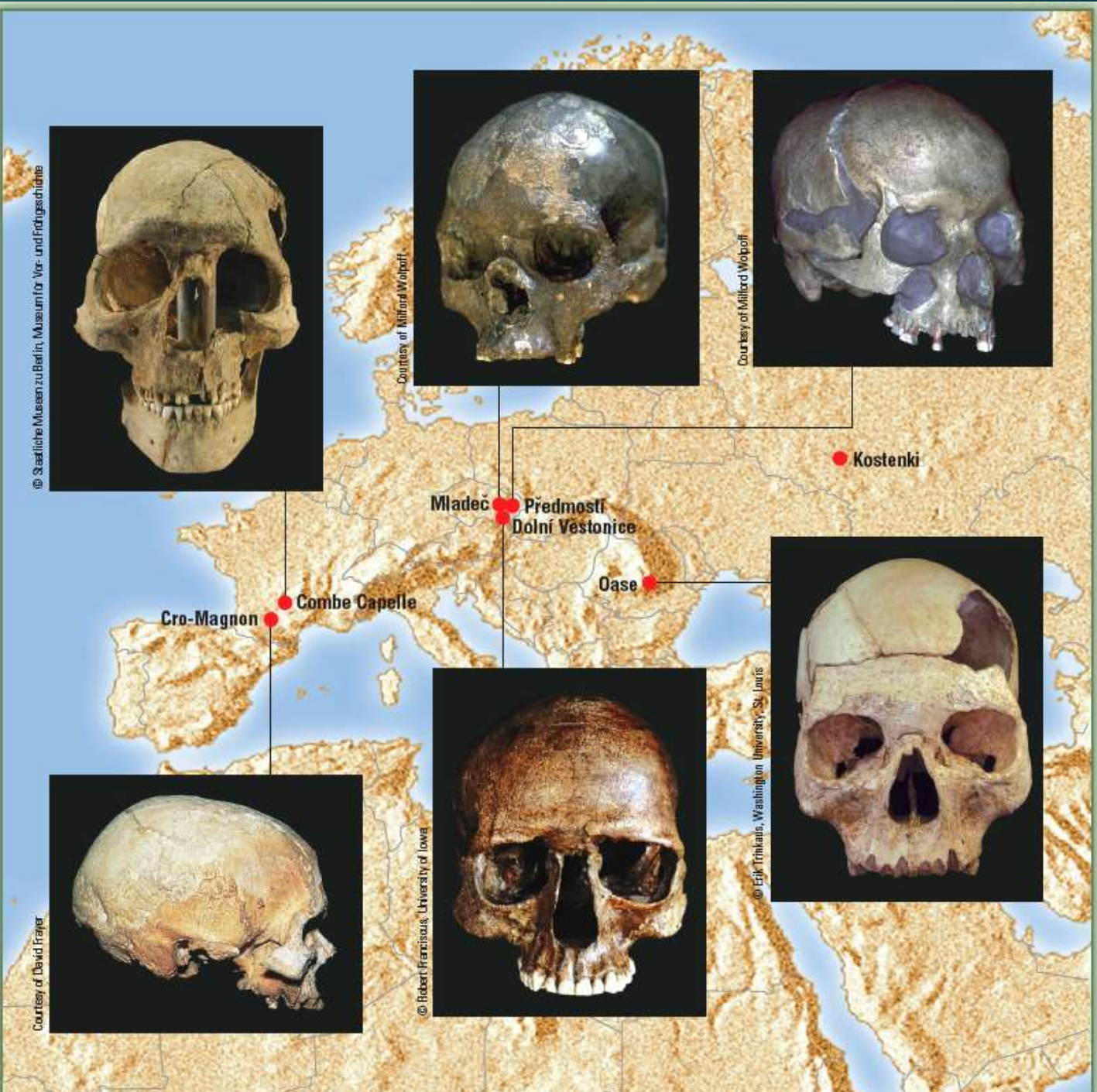
Human Career: Richard Klein -- Anatomically Modern Humans

- ▶ **First widely accepted discovery of AMHs:** Cro-Magnon in 1868; with mammoth, lion, reindeer bones and numerous Aurignacian tools, and perforated seashells; 5 to 8 individuals; ~30 Ka
- ▶ Then **19th century European discoveries** made at Mladeč (1881-1904), Brno (1885, 1891), Predmostí (1894) – all in Czech Republic; then Chancelade Shelter (1888) and Combe Capelle Cave (1909) in France; Grimaldi Caves (1874-1901) in Italy; AMH in Europe since 45 Ka
- ▶ **Non-European AMHs:** Wajak skeletons (1888) in Java at 7 Ka; Zhoukoudian China; Qafzeh, Israel; Niah Cave, Borneo; Liujiang, China; Tabon, Philippines; Know Swamp and Lake Mungo, Australia

Locations of UP sites in Europe



Anatomically Modern Humans in Europe



AMH and Ns in Central Europe

- ▶ **Central Europe**: Mladeč (Moravia/Czech), Zlatý Kun, Vindija, Brno, Předmostí (Moravia), Dolní Vestonice
 - ▶ **MRegionalists** argue continuity between N and MHs; earlier than Cro-Magnon
- ▶ **Mladeč**: mosaic UP fossils and Aurignacian tools; necklace of drilled animal teeth & flat bone points (Aurignacian)
 - ▶ **morphologically clearly MH (with chins) but some N features** (occipital bun, thick cranial bones, massive supraorbitals)

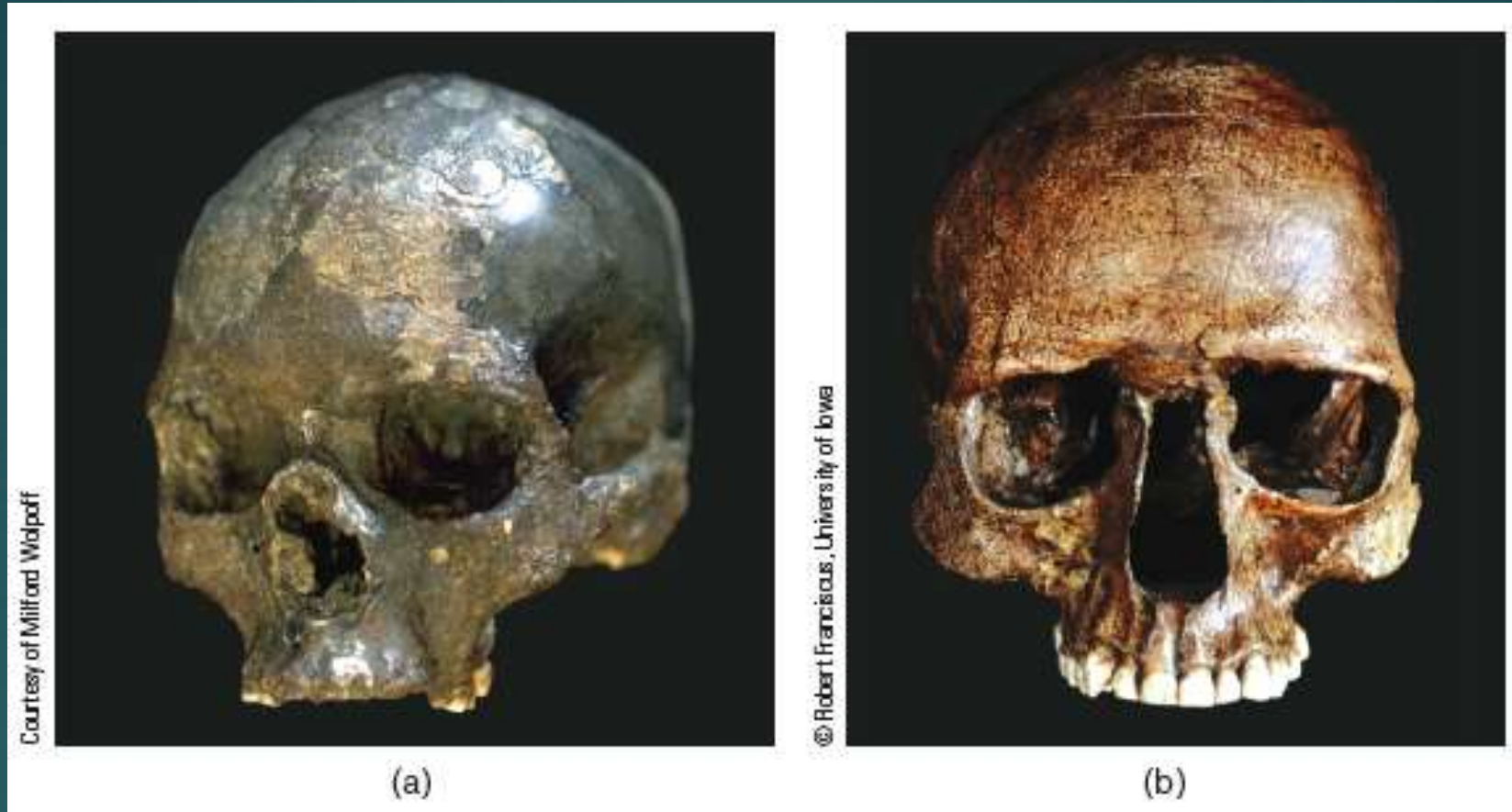
AMH and Ns in Czech Republic

- ▶ **Predmostí**: largest sample of UP hominins in open air site; communal grave of 18 individuals, covered with limestone slabs and mammoth bones. Thousands of stone and bone tools;
 - ▶ Predmostí 3 skull had large browridges and gracile dental size and chin
- ▶ **Dolni Vestonice (Moravia)**; dated to 30-25 Ka; tent like huts, mammoth bones, central hearths; 35 individuals; one triple familial grave with ochre; pendants, beads, nets, clay figurines

Dolni Vestonice (Moravia): triple burial



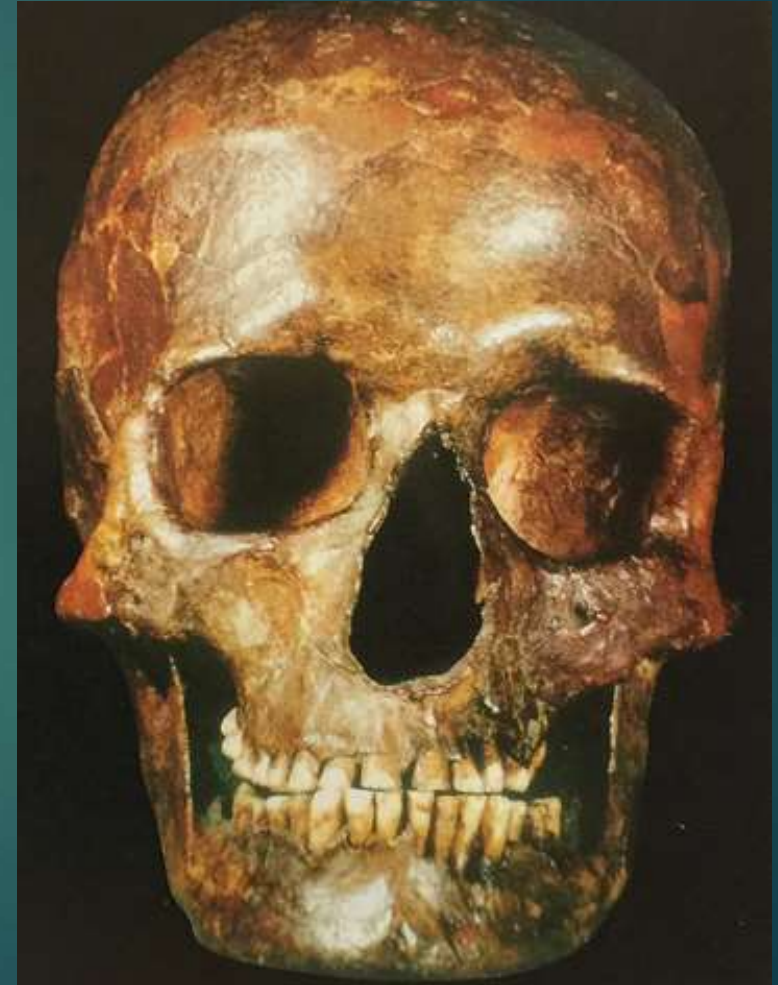
Early Modern Homo Sapiens in Central Europe



The **Mladec (a)** and **Dolní Vestonice (b)** crania, from the Czech Republic, are good examples of early modern *Homo sapiens* in central Europe.

Dolni Vestonice Skull

This cranium, from Dolni Vestonice, combines modern human and Neandertal characteristics.



Modern Human Regional Variation

African



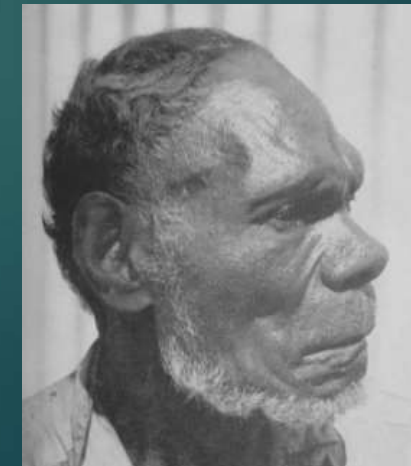
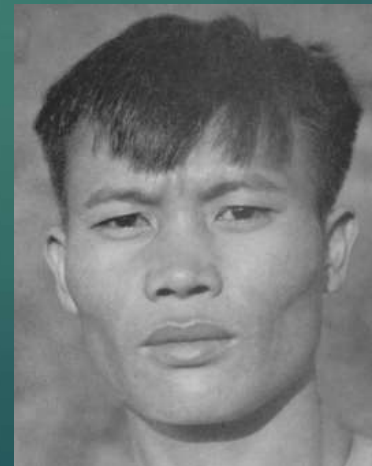
European-SW Asian



East Asian



Australian



AMHs: Modern Human Origins

- ▶ **Human morphological form** came to differ markedly between Europe and Africa after 500 Ka;
 - ▶ by 100 Ka, Europe was occupied exclusively by Neandertals, whereas Africa was inhabited by MHs.
 - ▶ Ns were a unique Eurasian development.
- ▶ **Cranium: MHs** with short, high braincases overhanging face in front vs long, low brain case, forwardly mounted faces of Ns
- ▶ These differences provides **main fossil support for Out of Africa theory**, according to which MHs originated in Africa and then spread to replace Ns and all other Eurasian hominins.

AMHs: Out of Africa vs Multiregional models

- ▶ Out of Africa theory: earlier expansions from Africa followed by evolutionary divergence, culminating by 100 Ka in emergence of 3 continentally distinct human populations:
 - ▶ In Africa, early modern or near modern people
 - ▶ In Europe, Neandertals
 - ▶ In Asia, nonmoderns who were end products of *H. erectus* lineage
- ▶ **Original OofA version**: MHs expanded from Africa circa 60-50 Ka and replaced Ns and archaic Asians without gene exchange (interbreeding)
- ▶ **Weak Garden of Eden version**: adds some gene flow

AMHs: Multiregional theory

- ▶ **Multiregional theory**: MHs originated everywhere that nonmodern humans had lived previously, in Europe and Asia and Africa; human populations tended to diverge morphologically immediately following initial OofA event, but argue that continuous gene flow ensured rapid spread of adaptive novelties (large brain) and kept all human population on same evolutionary track toward modernity
- ▶ In many ways **MR theory is an after-the-fact explanation for proposed morphological resemblances between nonmodern and modern populations in Asia and Europe**: modern Chinese and Chinese *H. erectus*; Australian from Indonesian *H. erectus*; and early European and Neandertals
- ▶ **Fossil evidence strongly favors OofA theory**; MHs replaced Ns; limb proportions of early Europeans indicate African origin; eastern fossils are murky and may or may not support MR model

AMHs: genetic data = OoA wins

- ▶ **Recent genetic data** hugely supports OoA model, but supports some aspects of MR model
- ▶ **1987 evolutionary Eve study: R. Cann** – mtDNA study produces 2 phylogenetic trees: 1 only African, 1 African and everyone else; MH mtDNA root was exclusively Africa; MH mtDNA derived from single woman from Africa ~200 Ka; all other women's mtDNA living at same time went extinct.
- ▶ **2nd and 3rd studies**: confirmed above – 1 African woman is common ancestor of all MHs
- ▶ **Y DNA studies** match above – oldest common Y DNA is African in origin, ~200 Ka
- ▶ **Both mtDNA and Y DNA data strongly support OoA theory**

AMHs: Genetic diversity in *H. pylori* and MHs

- ▶ Africans have greatest diversity in genetic differences, dental morphology, & cranial form
- ▶ Degree of genetic diversity declines with distance from East Africa (rolling succession of founder populations, with each less genetically diverse than African population)
- ▶ *Helicobacter pylori* (stomach bacterium; cause of peptic ulcers) exhibits same genetic pattern of migration: genetic diversity peaks in E Africa and declines away from it in parallel with human diversity; spread from E Africa ~58 Ka with human host
- ▶ **Multiregional theory** now “**Mostly Out of Africa**”: MHs interbreed with various nonMHs

AMHs: Archeology and MH Origins

- ▶ “Sapient Paradox”:
- ▶ Major objection to OofA concerned failure of near-moderns to expand to Eurasia immediately after they appeared 300-200 Ka.
- ▶ Instead seem to have been confined to Africa until 60 Ka; and may have been replaced by Ns in Israel ~80 Ka.
- ▶ Also, If so smart, why the gap of 30 K years between MHs arrival in Europe and first agriculture?

Archeology and MH Origins

- ▶ **Archeology**: helps explain this paradox
- ▶ **African MHs from 300-50 Ka** diverged sharply from Ns in physical form but not in behavior.
- ▶ **Mousterian and MSA tools were highly similar** – shared Levallois (prepared core technique) for 250-50 Ka; shared pigments, fire use, burials, large animal hunting
- ▶ **Sum implies that MSA Africans lacked a competitive behavioral/cultural advantage over Eurasian contemporaries**; only after 60 Ka did MHs seem more advantaged (either neurally or culturally)

AMHs Biological and Cultural change

- ▶ **Behavioral change** included not only art and ornamentation, but more fundamental hunting and gathering technology which enhanced reproduction and survival and increased population growth
- ▶ **Climate in middle of Last Glaciation** also facilitated African expansion: there were 12 closely successive, abrupt temperature oscillations between 60 and 25 Ka
- ▶ **Population crash**: African population was shrinking when Africans moved out. In S Africa, populations crashed around 60 Ka. Genetic analysis suggests only 10,000 breeding adults at this time.
- ▶ **R. Klein** sees Ns as not equivalent to MHs and neural change in MHs ~50 Ka as crucial to expansion

Middle & Early late Pleistocene hominin sites in Africa

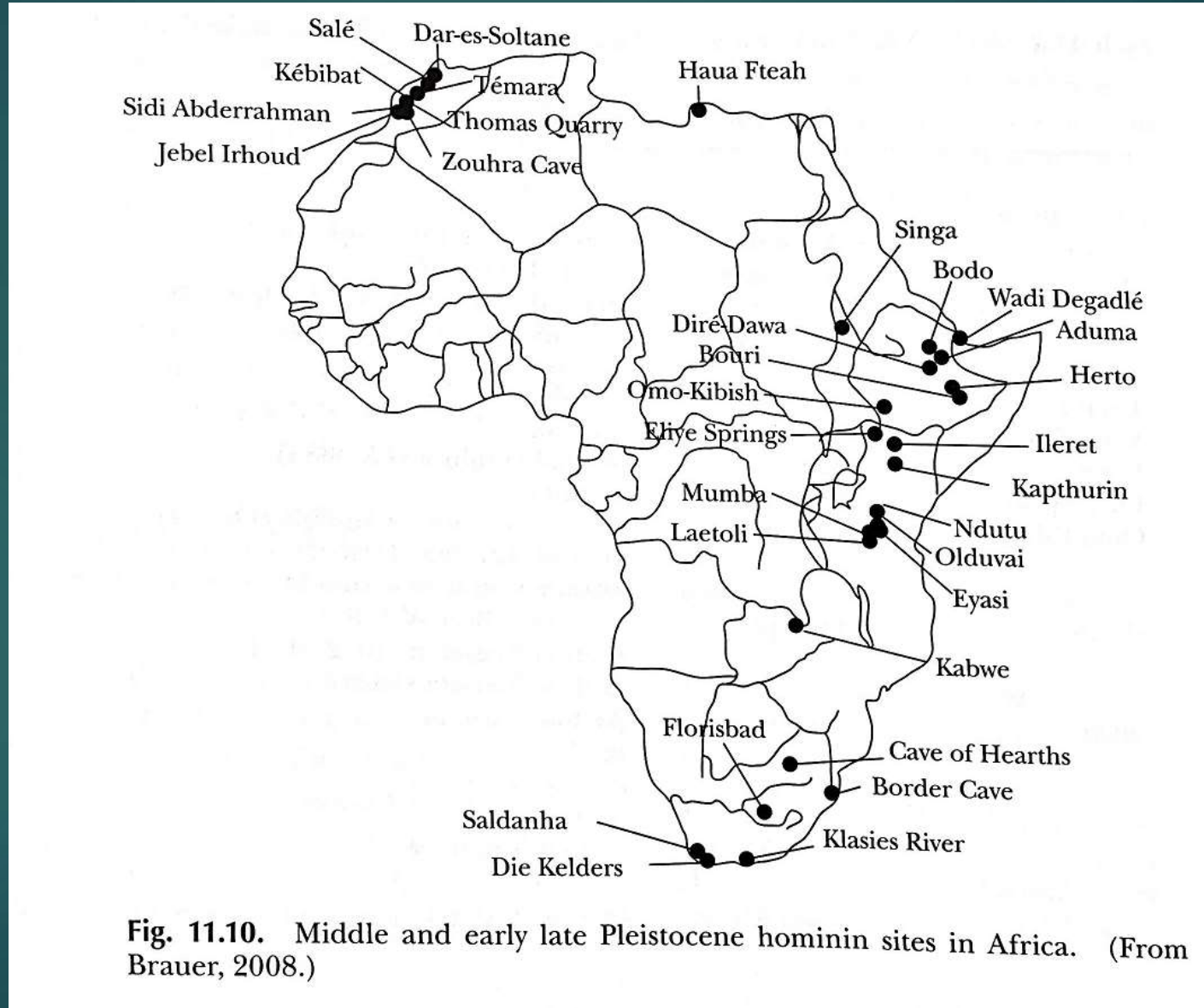


Fig. 11.10. Middle and early late Pleistocene hominin sites in Africa. (From Brauer, 2008.)

** MP to UP transition

- ▶ During the late Middle Pleistocene (150 Ka) only archaic humans are present in the fossil record of Eurasia, all associated Middle Paleolithic tools (= Middle Stone Age in sub-Saharan Africa).
- ▶ In Africa (& Levant), more AMHs. By 30-40 Ka, MHs are present throughout Old World, associated with Upper Paleolithic (UP) tools.
- ▶ MtDNA hints that MP/UP transition was a time of major human population expansion throughout Old World
- ▶ Continued controversy of where, when, and how MHs arose in Africa

Date differences of appearance of AMH behaviors

- ▶ Transition from Middle to Upper Paleolithic cultures
- ▶ In **Western Europe**, cultural transition circa 45-40 ka associated with appearance of AMH
- ▶ **Not the case in Western Asia or sub-Saharan Africa**, where first AMH appearance was 300-200 Ka
- ▶ Especially **higher frequencies of blades & bone tools in sub-Saharan MSA (Middle Stone Age) industries**, which were more like UP
- ▶ In **western Asia**, cultural transition to UP appears earlier than in Europe and in Africa, transition appears from 40-18 Ka
- ▶ **Period of MP/UP transition** witnessed first migrations into Japan & Australia & ended with migrations to New World ~12 Ka.

Archeological evidence of revolution from M to UP

- ▶ **UP tools** dominated by **blades**, esp. for hafting, whereas **MP** dominated by **Mousterian flakes**
 - ▶ **UP lithics** consist mainly of endscrapers, burins, & points; MP were sidescrapers & denticulates
- ▶ **UP tools** exhibit **more regional & temporal distinctiveness**; MP were more static
- ▶ UP include **more bone, antler, & ivory tools**; more **objects of personal adornment & art**; knapping include **soft hammer techniques** (very rare in MP)
- ▶ **UP shelter sites more complex**: shelters more elaborate & substantial

Archeological evidence of transition from M to UP

- ▶ UP include **advanced weapons** such as spear throwers and much later bow and arrow
- ▶ UP sites show more evidence of **different animal specialization**: hunting of birds, fish, sea mammals (seals)
- ▶ UP populations do **more economic exchange & have more mobility over large distances**, incl. over water
- ▶ Up **graves** are more elaborate, suggesting burial rituals

UP 5 major Lithic cultures

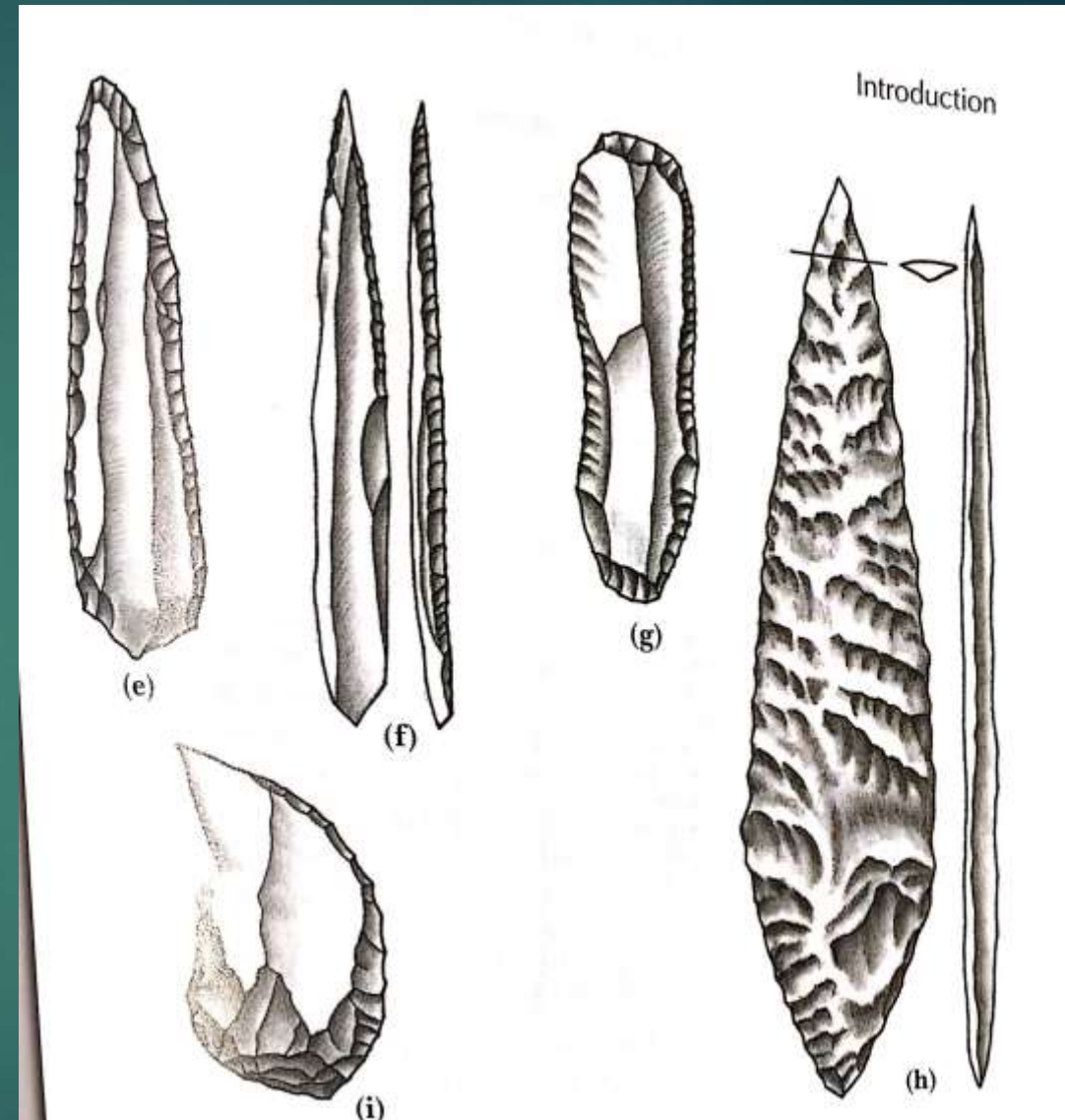
E: Aurignacian blade

F: Gravettian point

G: Gravettian endscraper

H: Solutrean point

I: Magdalenian burin



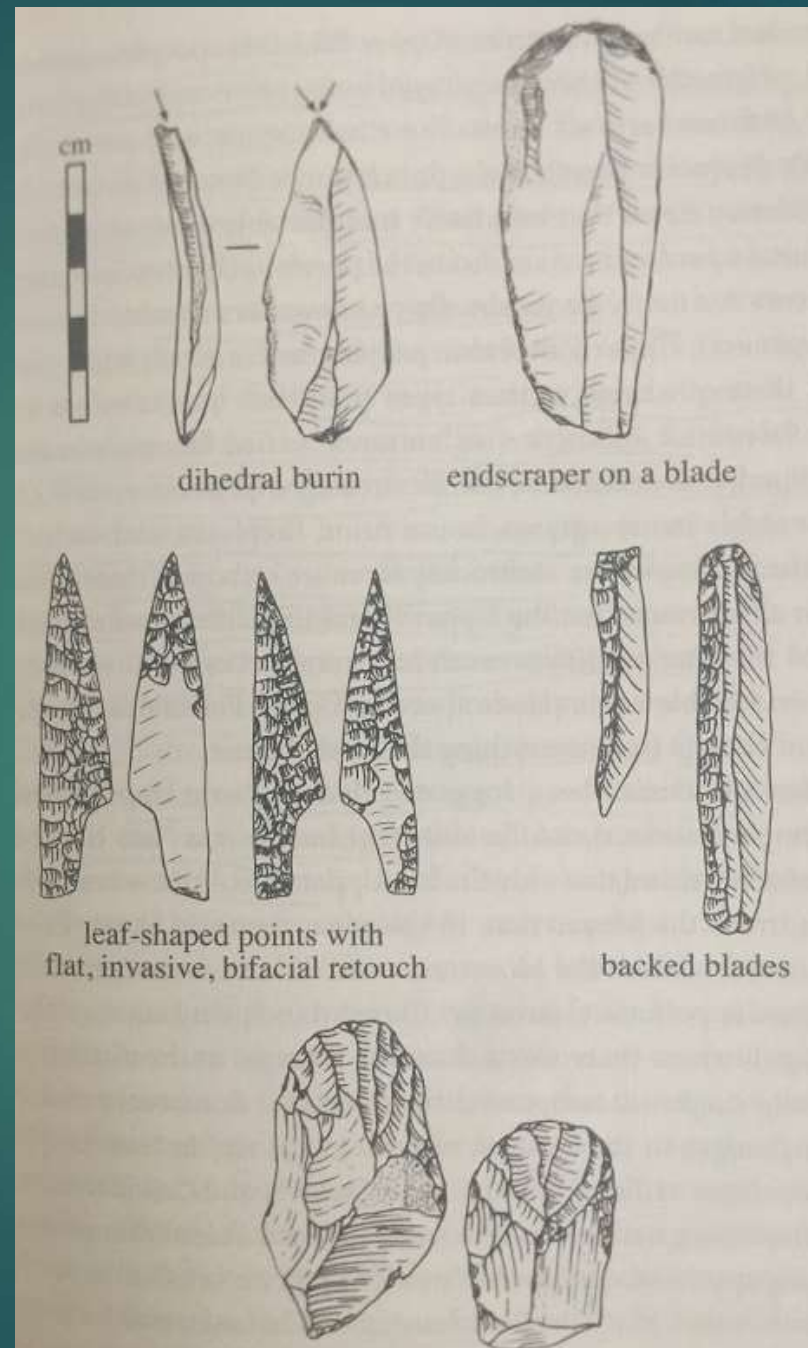
UP tool innovations

1. **Microliths:** tiny blades used to make bone and stone composite tools; widespread in northern regions during last glaciation
2. **Burins:** with chisel-like edges for working with bone, horn, antler, and ivory
3. **Spear thrower:** for increasing the velocity of the spear when thrown
4. **Knotted nets:** for net hunting of hare, fox, fish
5. **Bow and arrow**

AMHs: Does UP represent an abrupt departure?

- ▶ **Blades:** UP emphasis on **stone flakes** whose lengths were twice their widths, produced regularly and consistently vs routine Mousterian Levallois technique, with rarer blades
- ▶ **Leaf-shape points** with flat invasive bifacial retouch, backed or truncated elements, and carinate or nose-ended scrapers distinguish the UP
- ▶ **Use of bone, ivory, antler tool material:** used for projectile points, awls, punches, needles, art objects

UP:
leaf points,
backed blades
carinate end scrapers



Does UP represent an abrupt departure?

- ▶ UP people made **wider variety of artifact types**; UP industries vary far more in time and place
- ▶ **UP recoverable items** (graves, house ruins, fireplaces, etc.) are far more elaborate than Mousterian types
- ▶ Klein: European UP and African LSA signal most fundamental change in human behavior in existing archeological record

Mosaic progression, not revolution

- ▶ **The Debate:** UP behavioral modernity as evolution or revolution
- ▶ **Pro-evolution perspective:** Instead of conceptualizing human evolution in terms of extraordinary moments of origin and revolution, it is more productive to focus on gradual transitions.
- ▶ This shift in thinking regards incremental evolutionary processes as more significant than moments of sudden innovation.
- ▶ Searching for unique traits detracts from the more useful endeavor of pinpointing smaller transitions and recognizing differences of degree rather than kind. The practice of defining uniquely human features is colored by value judgments about what matters to us in the present.
- ▶ By letting go of the belief in the uniqueness of our behavior, we might be able to see how our tendency to view ourselves as terribly special alienates us from the rest of our primate family, and indeed from all of evolution

AMHs: Pro-revolution perspective: Increased Cultural variability

UP as revolution:

- ▶ **Before 40 Ka and UP**, vast areas had uniform stone tools; very slow changes; tool types lasted for 100s of thousands of years
- ▶ **After 40 Ka**, pattern changed radically; qualitative changes in stone tool types with spatial variability: UP in Europe and LSA in Africa
- ▶ **European and African differences**: Punched blades and varied burins that are hallmark of UP never seem to have been an important element in LSA; LSA produced a range of scrapers and flake blades; much smaller, more standardized, routine production of bone artifacts and art objects
- ▶ Sum suggests **a common mindset that is qualitatively different from earlier people.**
- ▶ **In Africa**, UP cultural diversity is conspicuous in Nile Valley where 6 variant cultures evolved from 40 to 17 Ka; **In Europe**, the UP of SW France from 40 to 11 Ka, a remarkable succession of industries

Middle and Upper Paleolithic: tool assemblages

Middle Paleolithic (c. 300–50 ka)

- Mousterian (160–40 ka)
- Aterian (145–20 ka)
- Micoquien (130–70 ka)
- Sangoan (130–10 ka)

Upper Paleolithic (c. 50–12 ka)

Fertile Crescent:

- Emiran (50–40 ka)
- Ahmarian (46–42 ka)
- Baradostian (36–18 ka)
- Aurignacian (35–29 ka)
- Zarzian (20–10 ka)
- Kebaran (18–12.5 ka)
- Trialetian (16–8 ka)
- Natufian (14.5–11.5 ka)
- Khiamian (12.2–10.8 ka)

Europe:

- Bohunician (48–40 ka)
- Châtelperronian (44.5–36 ka)
- Lincombian-Ranisian-Jerzmanowician (43–32 ka)
- Aurignacian (43–26 ka)
- Szeletian (41,000–37,000)
- Périgordian (35–20 ka)
- Gravettian (33–24 ka)
- Pavlovian (29–25 ka)
- Solutrean (22–17 ka)
- Epigravettian (20–10 ka)
- Magdalenian (17–12 ka)
- Hamburg (15.5–13.1 ka)
- Federmesser (14–12.8 ka)
- Azilian (14–10 ka)
- Ahrensburg (13–12 ka)
- Swiderian (11–8 ka)

Upper Paleolithic: tool assemblages

▶ Africa:

- Khormusan (42–18 ka)
- Iberomaurusian (25–11 ka)
- Mushabian
- Halfan (22–14 ka)
- Qadan (15—11 ka)
- Sebilian (15–11 ka)
- Eburran (15–5 ka)
- Magosian (10–8 ka)

▶ Siberia:

- Mal'ta–Buret' (24–15 ka)
- Afontova Gora (21–12 ka}

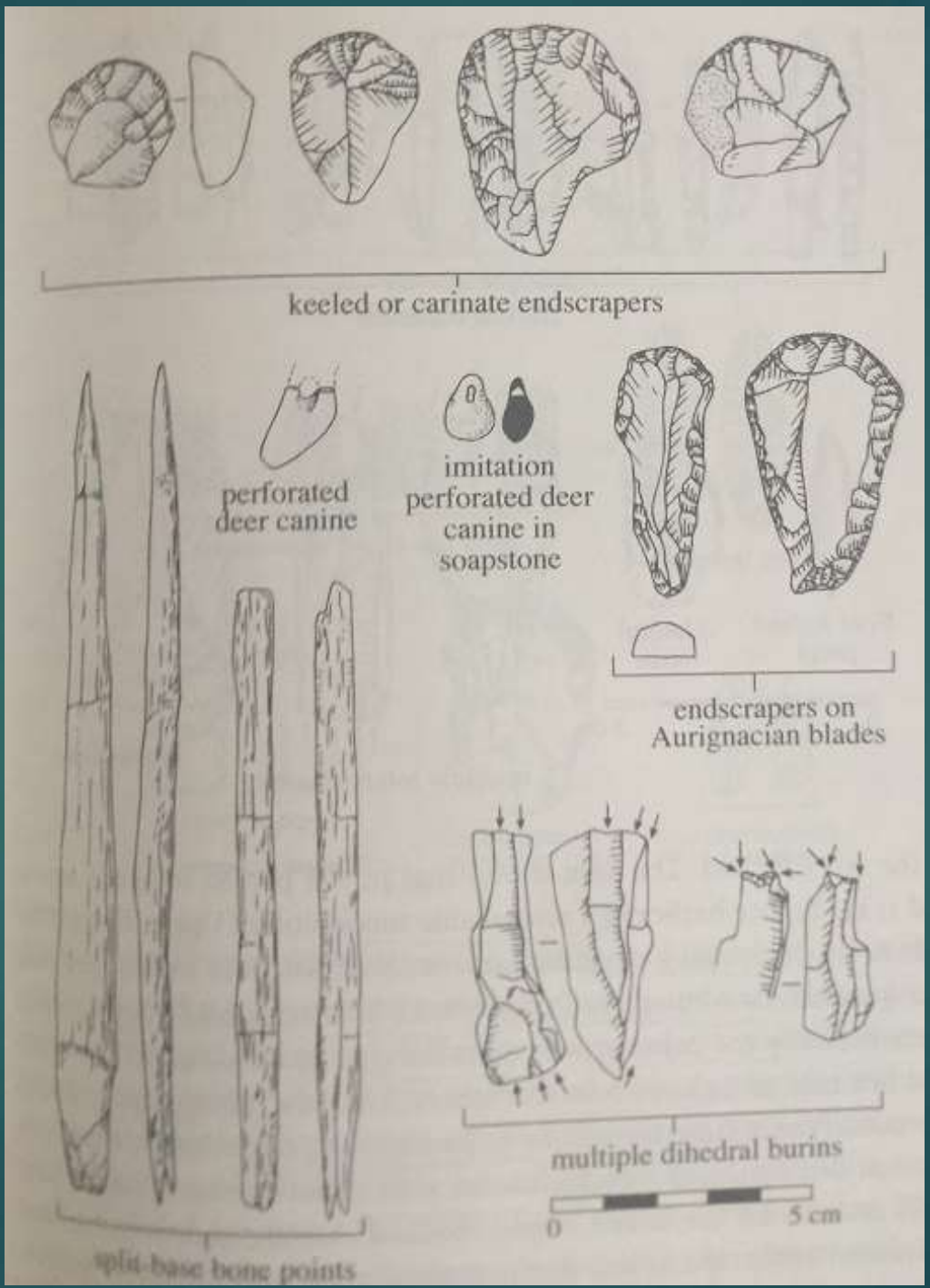
Timeline for Major Upper Paleolithic Cultures of Europe

- ▶ The **Aurignacian** (45,000-30,000 Ka)
 - ▶ Associated with the first AMHs in Europe: large blades with invasive, overlapping retouch; shaped bone/antler/ivory with split bases
- ▶ The **Gravettian** (30,000-20,000 Ka)
 - ▶ The Perigordian in France; also western Russia, Italy, Spain; small, narrow, parallel-edged blades
 - ▶ Earliest art, in the form of carved figurines
- ▶ The **Solutrean** (21,000-17,000 Ka)
 - ▶ France and Spain during the last glacial peak
 - ▶ Made very fine foliate (leaf-shaped) stone points

Major Upper Paleolithic Cultures of Europe

- ▶ The **Magdalenian** (17,000-12,000 Ka)
 - ▶ Bone and antler technology, with points, harpoons
 - ▶ Successful hunters of reindeer and horses
 - ▶ Spread out across Europe as conditions improved at the end of the Ice Age
 - ▶ Made many of the spectacular European cave paintings and carvings

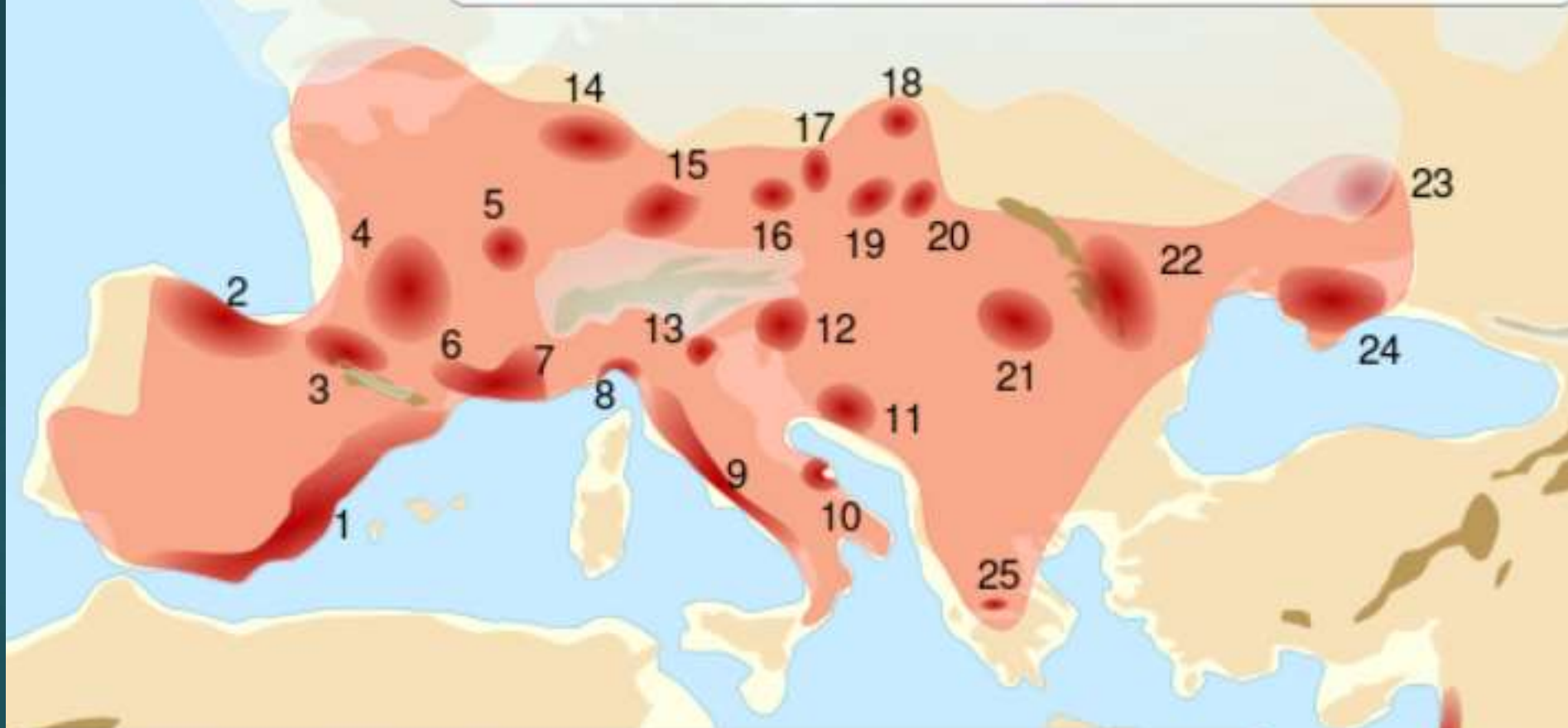
AMHs: Aurignacian



Aurignacian culture 47,000 - 41,000 years ago

- Area of aurignacian presence
- Principal sites

- Maximum extent of land
- Extent of land in aurignacian time
- Mountains
- Maximum extent of glaciers

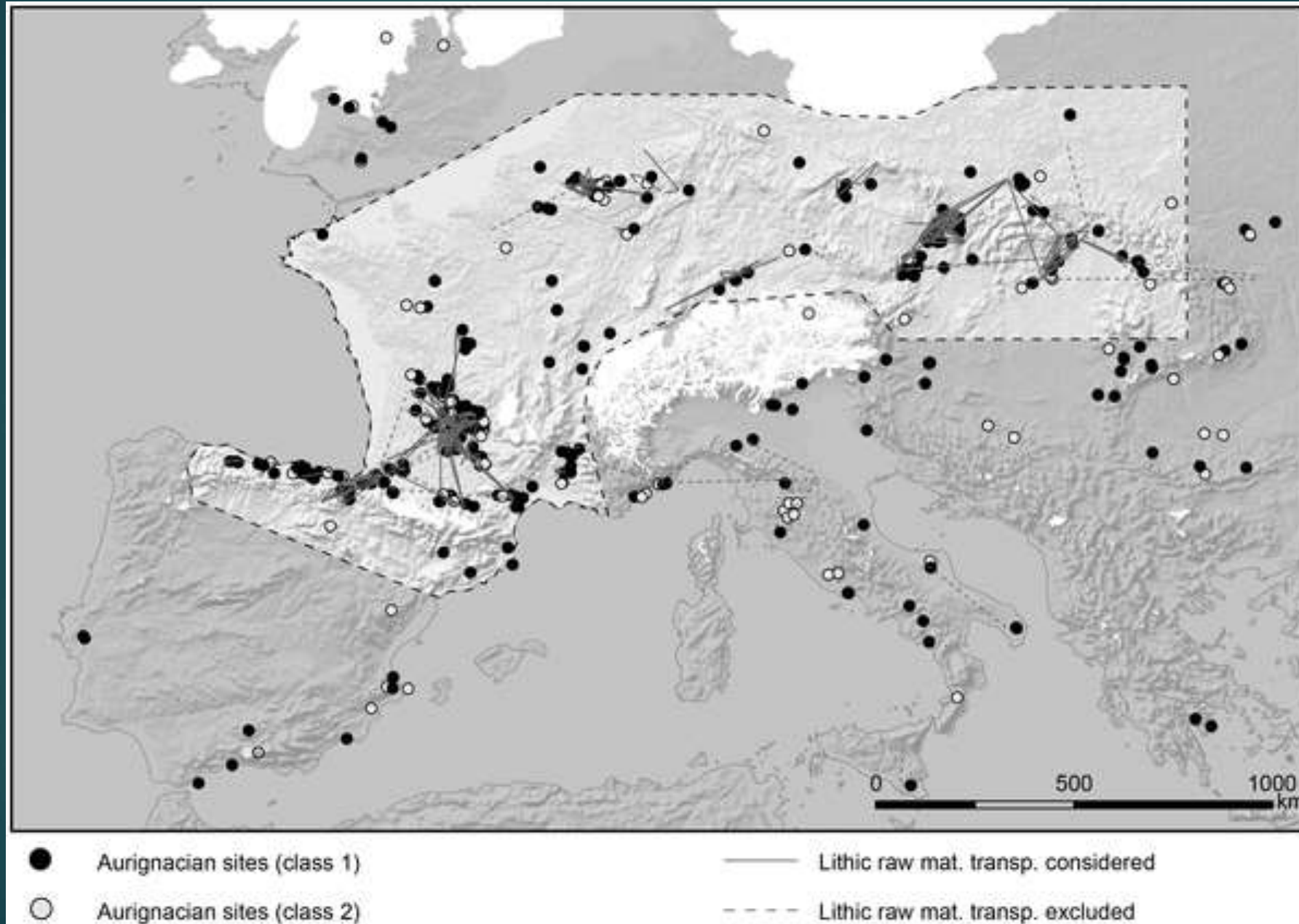


Principal sites			
1. Eastern Spain	6. Languedoc	13. Venice	20. Eastern Slovakia
2. Cantabria	7. Provence	14. Meuse-Rhine	21. Transylvania
3. Pyrenees	8. Liguria	15. Swabia	22. Ukraine-Moravia
4. Aquitaine	9. Central Italy	16. Lower Austria	23. Don Valley
5. Burgundy	10. Adriatic	17. Moravia	24. Crimea
	11. Bosnia	18. Silesia	25. Greece
	12. Slovenia	19. Bükk mountains	26. Levantine Aurignacian

MH invasion of Europe

- ▶ Our species, *Homo sapiens*, arrived in eastern Europe about 45 Ka by association with Aurignacian sites and lithic assemblages assumed to have been made by modern humans rather than by Neanderthals; direct dates reach no farther back than about 45–39 Ka
- ▶ Fragment of human maxilla from the Kent's Cavern site, UK; dates to 44–42 Ka; represents the oldest known anatomically modern human fossil in northwestern Europe

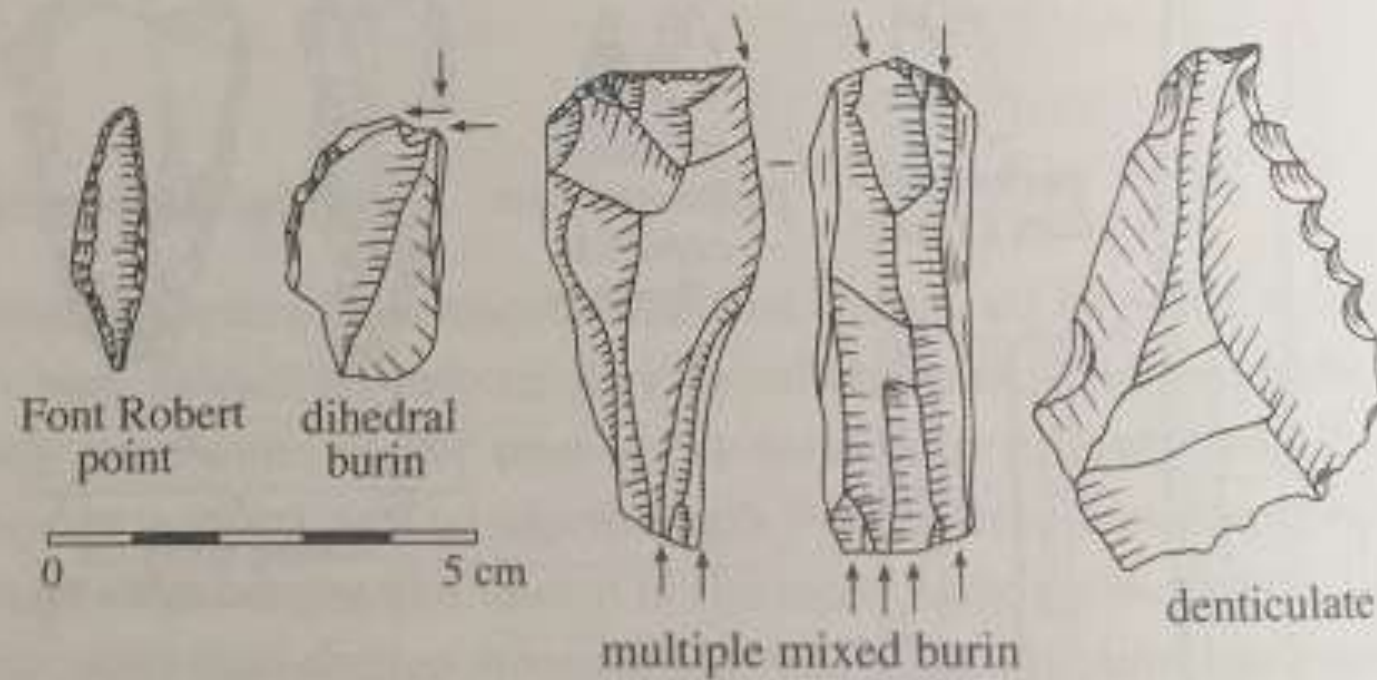
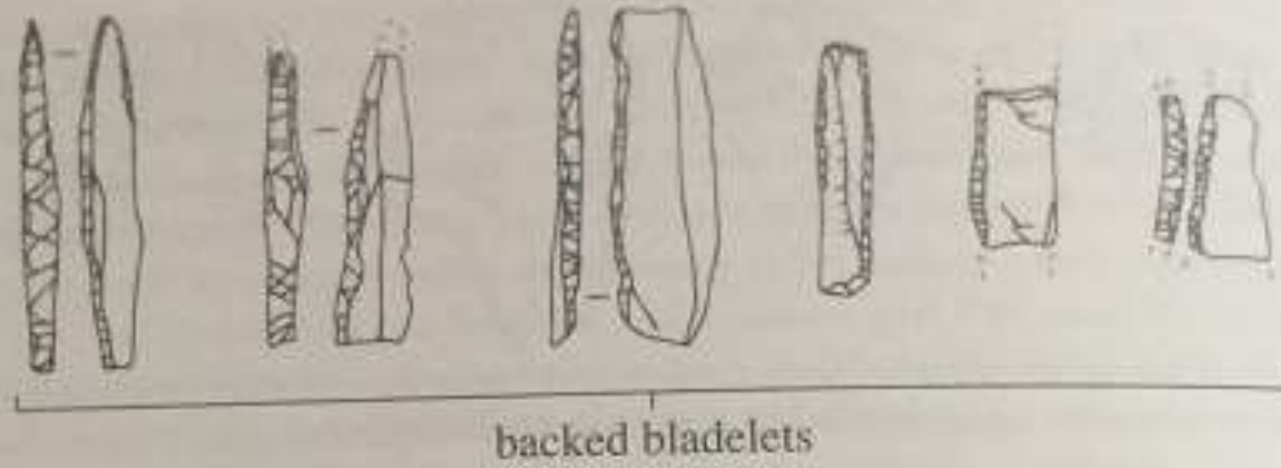
Assemblages / sites attributed to the Aurignacian in Europe



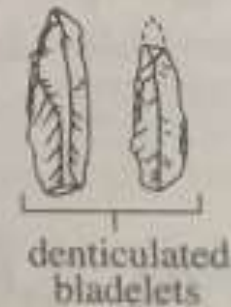
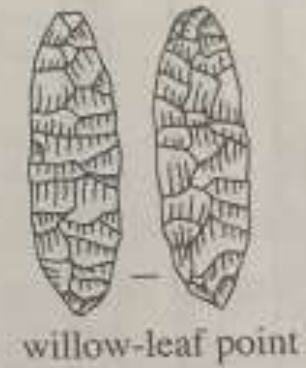
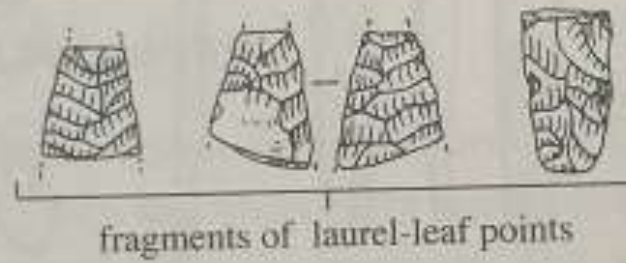
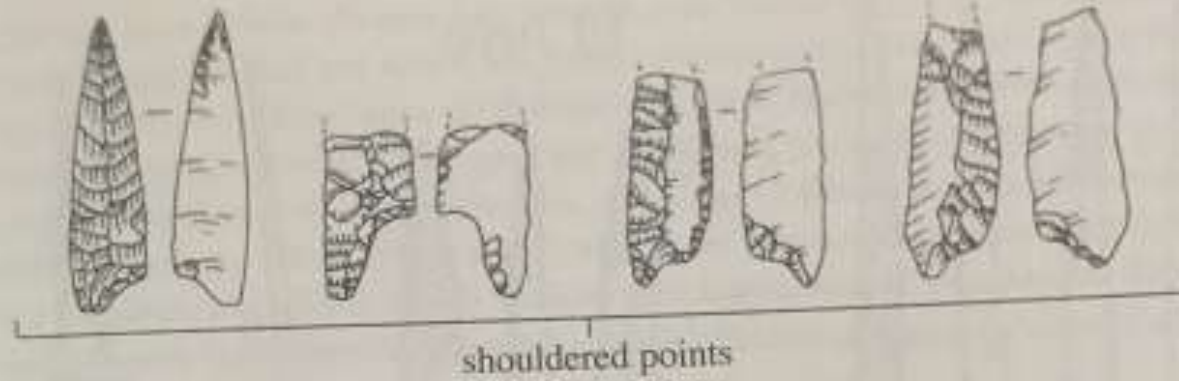
Small MH population size in Aurignacian period

- ▶ 2019 Study: Estimated the average population size in the Aurignacian period, 42-33 Ka.
- ▶ Looked at a large chunk of Europe stretching from northern Spain in the west to Poland in the east. They plotted the location of the approximately 400 known Aurignacian sites across this area. This revealed that **MHs really occupied just 13 small regions of the continent** – leaving most areas effectively uninhabited
- ▶ **Stone tool analysis: no more than about 35 different hunter-gatherer groups.**
- ▶ **Modern hunter gathers: Groups** that most closely resembled the Aurignacians in terms of the animals they hunted **contained about 42 individuals, on average.** So if there were about **35 hunter-gatherer groups, each containing 42 people,** there may have been about **1500 or so people** in this part of Europe.
- ▶ **A mean of 1,500 persons (upper limit: 3,300; lower limit: 800)**

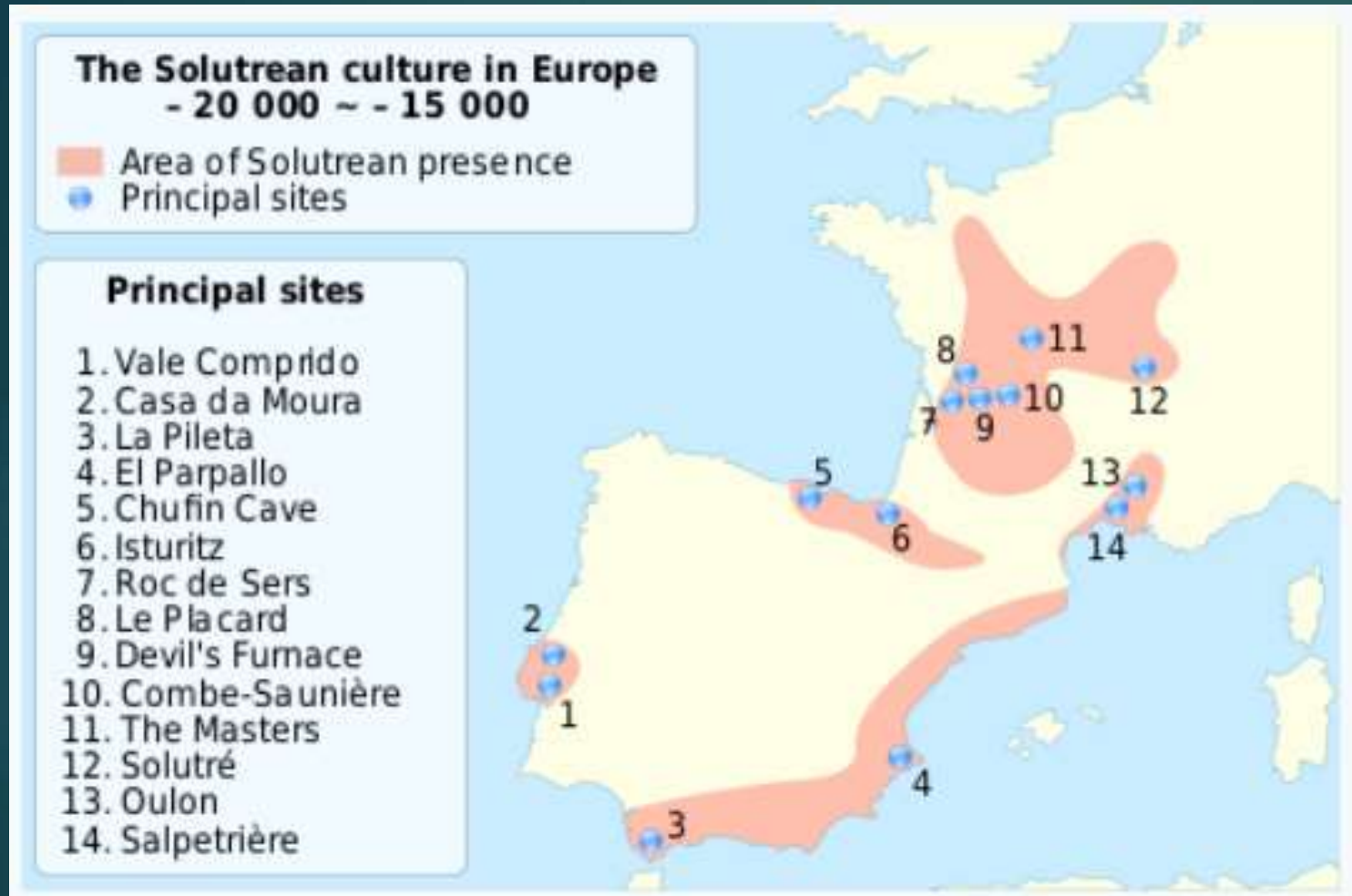
AMHs:
Gravettian



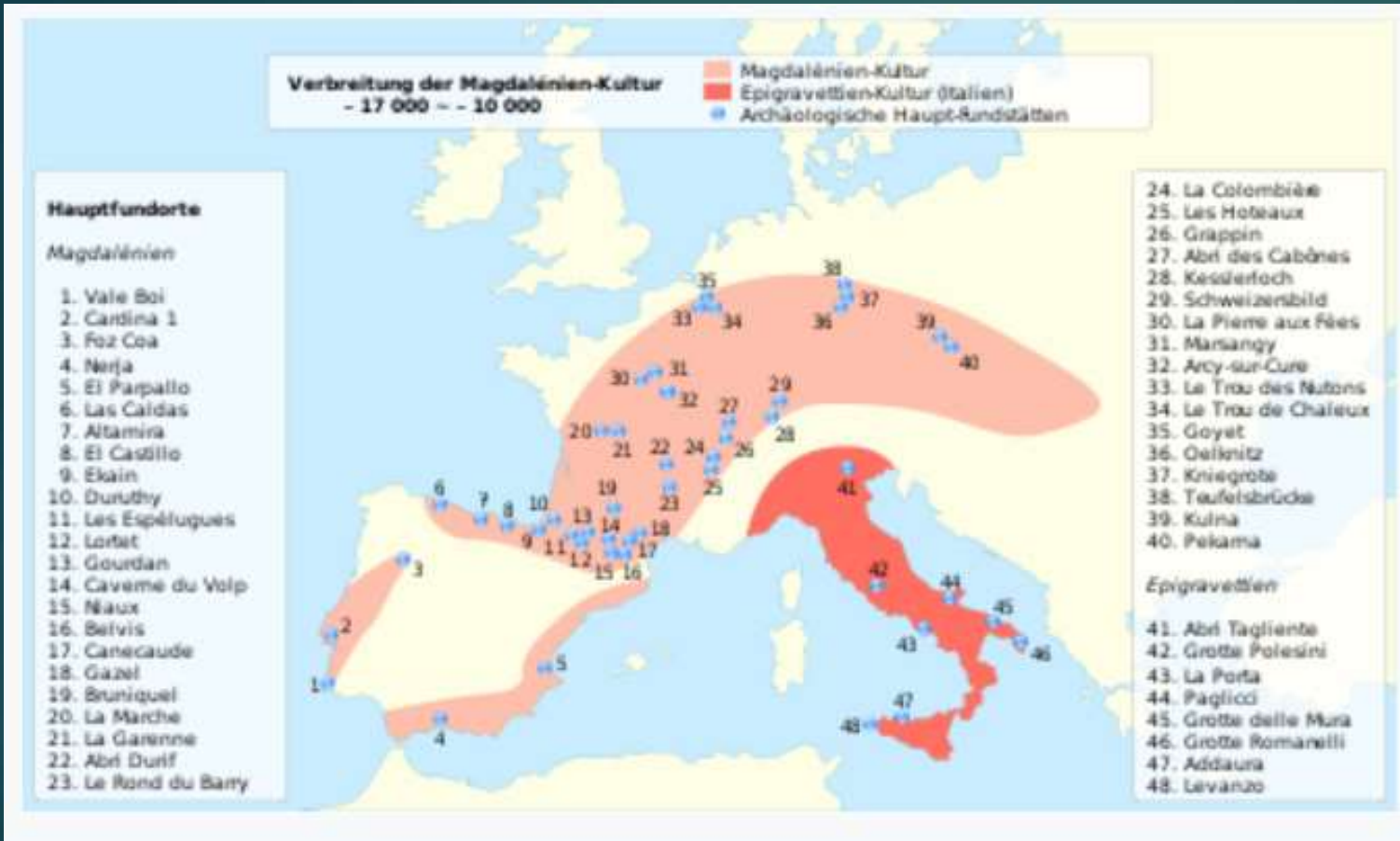
AMHs: Solutrean



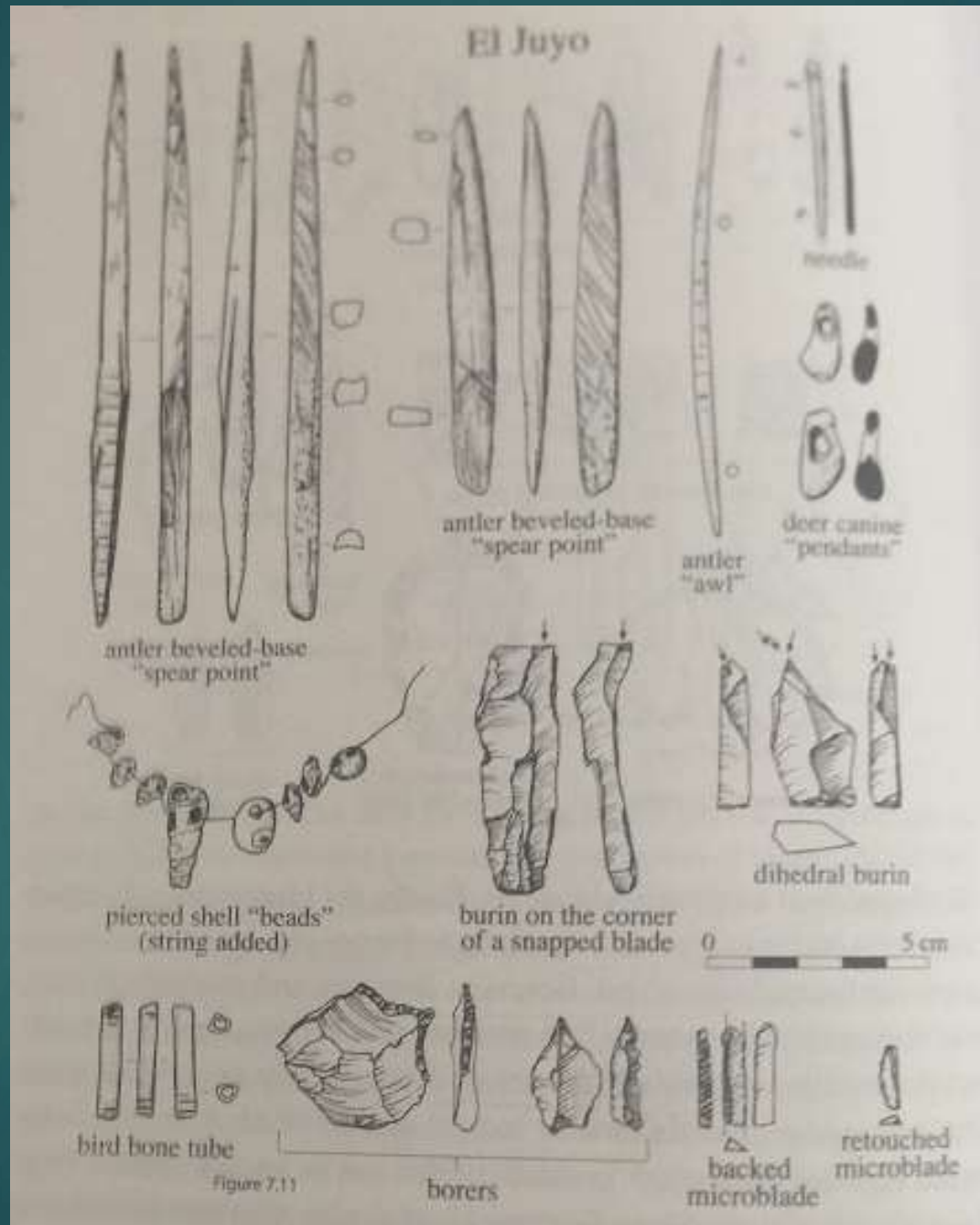
Solutrean



Magdalenian



AMHs: Magdalenian



AMHs: Late Paleolithic (40 to 10 Ka)

- ▶ **Late Paleolithic**: early AMHs replaced predecessors; later part of Last Glaciation; both European UP and African LSA
- ▶ **Hunter-gatherers**; protein source primarily plant;
 - ▶ Ohalo II, Israel – variety of wild cereal grains were ground; steppe ungulates (mammoth, reindeer, bison, horse);
 - ▶ decline in large carnivores
- ▶ **Domestication of animals and plants** only at 10 Ka in SW Asia
- ▶ Increase in **population size**; UP sites larger than Mousterian
- ▶ More **fish and bird remains**

AMHs: AMHs: Late Paleolithic (40 to 10 Ka)

- ▶ **Some sites dominated by 1 animal species remains**; either specialization or major animal in location; mammoths used as building material (some bones decades apart)
- ▶ **Dog domestication** in Eurasia circa 15 Ka
- ▶ **South Africa**: late paleolithic advance in resource exploitation: fish, birds, hunting more dangerous buffalo and pigs; larger populations; newer technology (snares, safer long distance weapons)
- ▶ 60-30 Ka: hyperaridity greatly reduced human populations

AMHs: Technology

- ▶ **LP**: more technological innovation
- ▶ **Bone, ivory, antler** artifacts
- ▶ **More composite tools** (held together by perishable glues and leather thongs)
- ▶ First to **systematically inhabit harsh environments** of Eastern Europe and Northern Asia;
- ▶ **Better clothing and housing**; oldest fur trapping (wolf, arctic fox)

Technology

▶ Clothing:

- ▶ awls, punches for sewing skins together;
 - ▶ oldest eyed needles (35-28 Ka);
 - ▶ clothing documented in burial sites (Sungir' near Moscow = 3 people, with leather clothing – cap, shirt, jacket, trousers, moccasins; with sewn on beads)
- ▶ Louse evidence for clothing: Molecular clock estimate of 72 +/- 42 Ka for time when **human body louse** diverged from head louse; an estimate of origin of tailored clothing; body louse feeds on skin but lives in close fitting clothes; evolved from **head louse** which lives and feeds on scalp

AMHs: Chronology of major LP technology

	WESTERN EUROPE	CENTRAL EUROPE	EASTERN EUROPE	SOUTHERN SIBERIA
ka				
10				
12	bow and arrow			
14	fishhooks domesticated dog			harpoon heads
16	harpoon heads	fishhooks	hunting traps domesticated dog	throwing darts
18			mammoth bone houses	
20	spearthrower			
22	self-barbed points stone lamps with handles			
24	eyed needles		cordage	tailored clothing
26		cordage, basketry & textiles	fat-fueled bone lamps	
28		fired clay & kilns	large winter houses w/ cold-storage pits	
30		storage pits eyed needles	tailored clothing	
32	notational systems? wind instruments		heated shelters	heated shelters
34	fat-burning stone lamps		eyed needles	eyed needles
36	pigment recipes		bone shovels	
38	split-base points	split-base points		
40	bone awls		bone points snares?	bone awls bone points
42			fire dills? bone awls	
44				

AMHs: Shelters

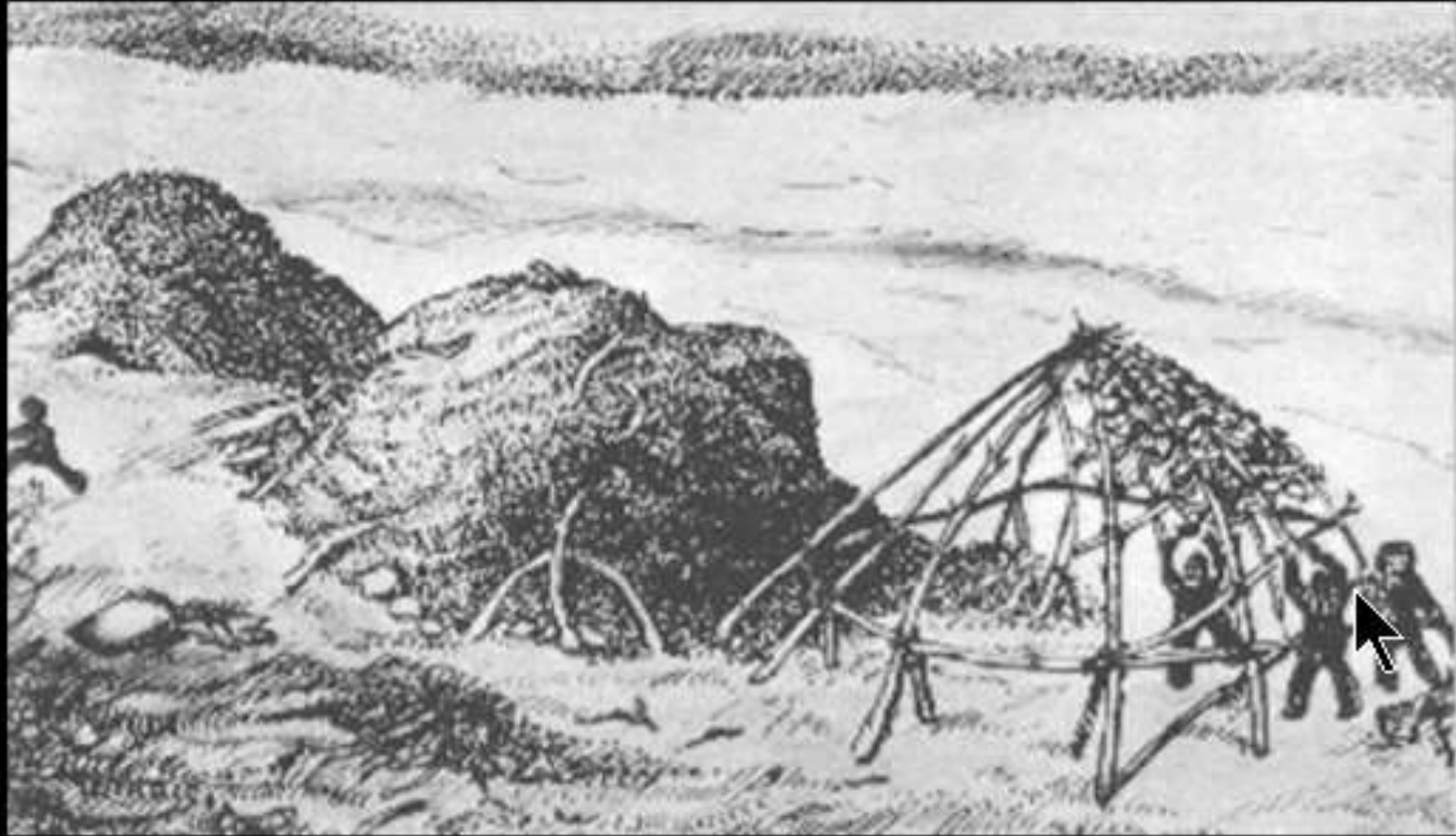
- ▶ **Cuerva Morin and El Juyo in N Spain:**
 - ▶ built walls, modified natural shelters for habitability
 - ▶ more open-air sites
 - ▶ built wood and brush huts at open-air sites
- ▶ **Ohalo II, Israel, near lake:**
 - ▶ oval 5-13 sq meter depressions with brush indicate collapsed shelters destroyed by fire;
 - ▶ grass stems and ash bedding material; well-made bone artifacts,
 - ▶ shell beads, fish bones;
 - ▶ elaborate burial;
 - ▶ wide array of plant remains (grain seeds, acorn, other plant); heavy reliance on plant foods

Shelters

- ▶ Majority of sites **only preserve foundations** (of wooden poles, hides, perishable plants)
- ▶ **Harsh open plains of central and eastern Europe:**
 - ▶ large artificial depressions with regular arrangements of postholes,
 - ▶ concentrations of large bones or stone blocks,
 - ▶ concentrations of cultural debris
- ▶ **Between 18 and 13 Ka**, houses largely out of **mammoth bone**: 14 sites from Milovice (Czech) to Kostenki (Russia); bones used for fuel

Mammoth bone hut





Upper Paleolithic Northeast Asia

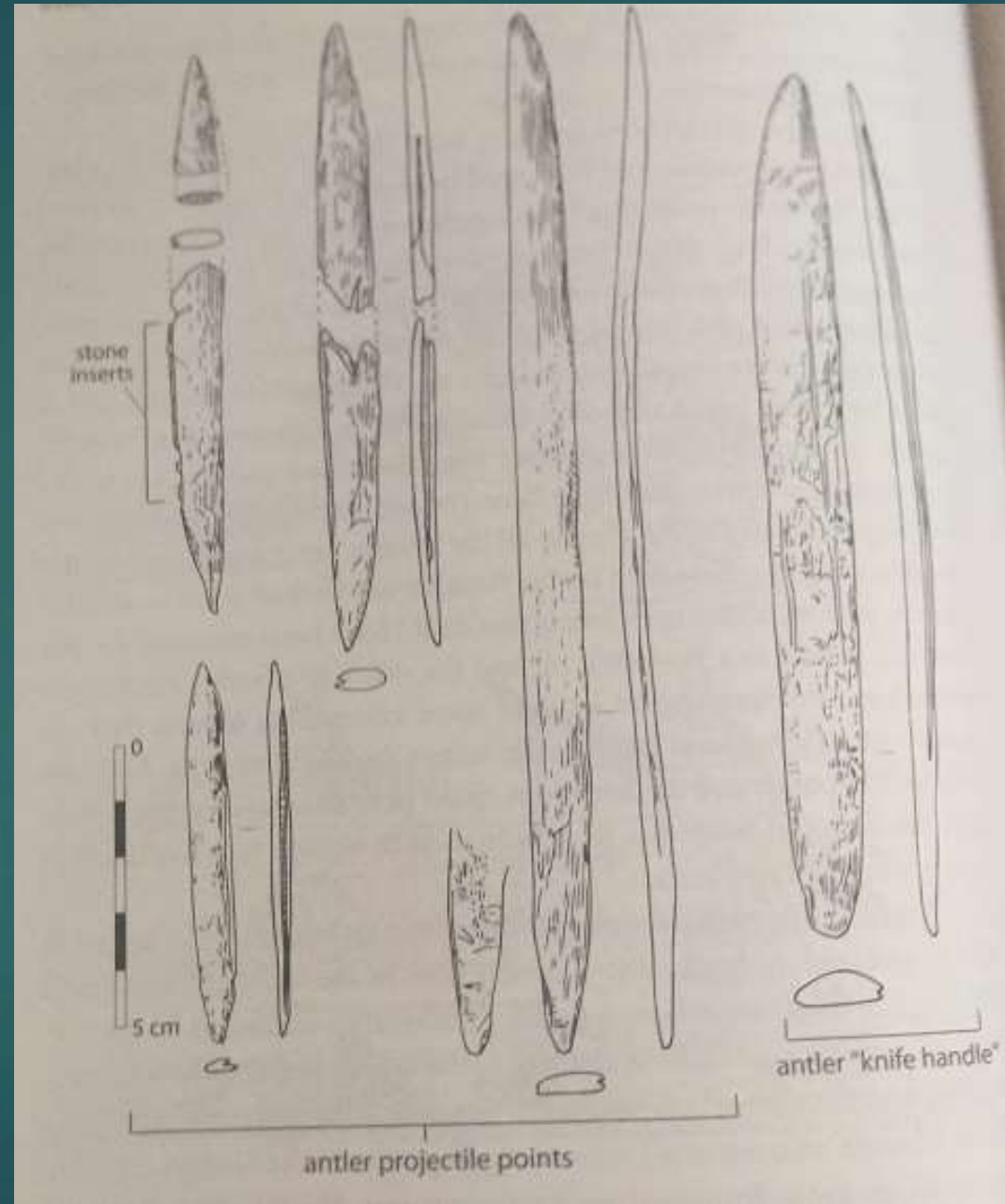
AMHs:
Use of northern
regions:
Siberia –
Mousterian
(below 55° N) &
UP sites
(above 55° N)



AMHs: Shelter

- ▶ Shelter “Ruins” usually have ash or charcoal at center that mark ancient fireplaces; many with corrugated floors for air flow to fire
- ▶ Shelter lighting: Evidence of hollowed out mammoth femur heads with mammal fat for lamps; also fat-fueled lamps from limestone and sandstone slabs in France, some from before 30 Ka; after 20 Ka, some have handles
- ▶ Evidence of nets, cordage, textiles from plant fibers (preserved in imprints on fired clay objects); twisted fibers preserved at Ohalo II

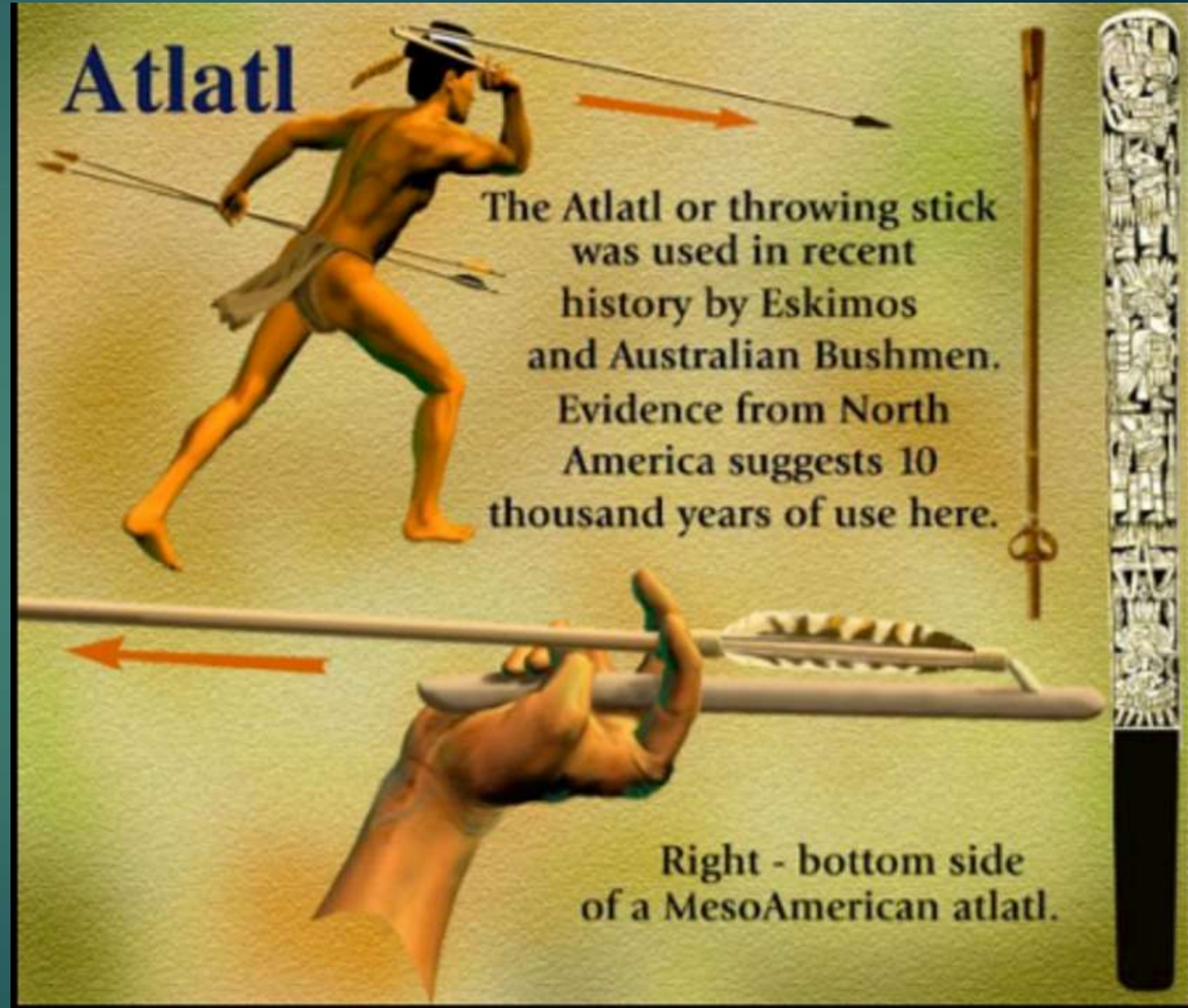
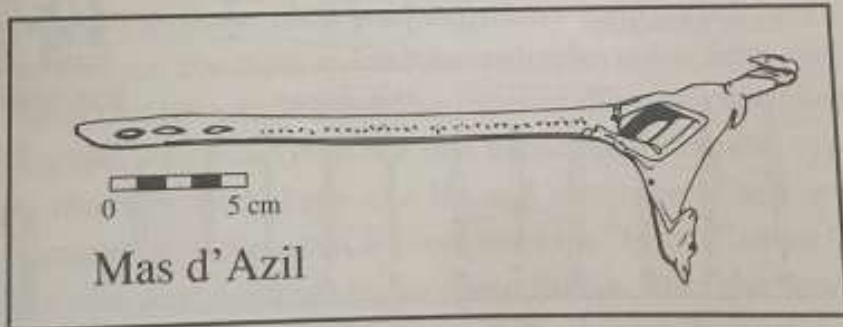
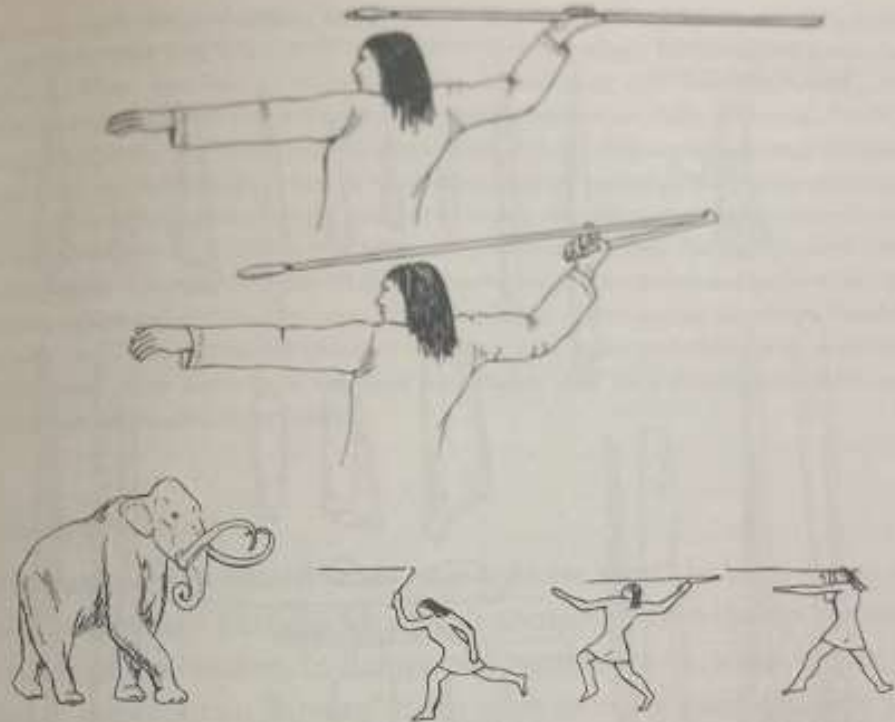
AMHs:
Grooved antler
artifacts –
Siberia, 13 Ka;
held
microblades



AMHs: Weapons

- ▶ Pointed stone and bone artifacts to tip spears; beginning use of barbs; harpoon heads after 15 Ka
- ▶ Larger projectile weapons: spears, spear throwers by 18 Ka, eventually bows and arrows (12-10 Ka; after find abundance of tiny backed bladelets)
- ▶ By 12-10 Ka, LP equivalent to modern hunter-gatherers in technology
- ▶ Including Russian and Japanese fired clay technology, circa 13-12 Ka

AMHs: spear throwers/atlatls



UP weapons



CARVING AND SHAPING

Burins (above, top and bottom) are specialized stone flakes with sharp, chisel-like tips. Humans used them to work bone, antler, ivory, and wood and to carve designs and images, illustrated by the 17,000-year-old engraved

HUNTING FAST AND DANGEROUS PREY

When attached to spears or darts, stone points, like those from Blombos Cave, South Africa (above, top two), enabled humans to exploit fast-moving or dangerous prey. Later, spear-throwers (above, left) provided leverage for hurling

La Madeleine Cave, France: Bone tools, 12K



UP Bone & Antler artifacts



MAKING CLOTHING

Awls and perforators, such as the example from Laugerie Haute, France (above, bottom), were probably invented in Africa and carried to colder climates, where they were used to pierce holes in clothing. Later humans used bone and ivory

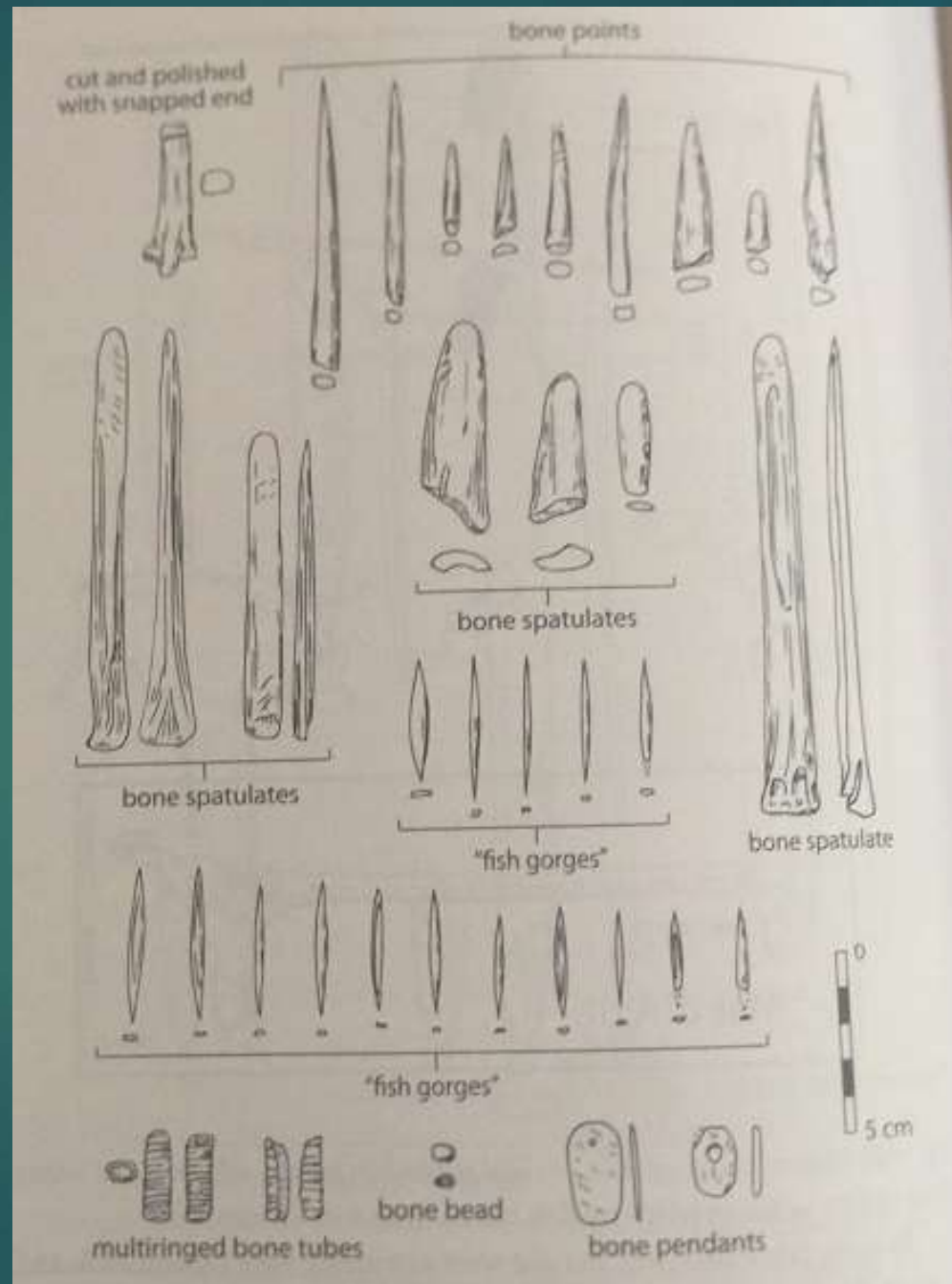
FISHING

More than 70,000 years ago, humans in central Africa made some of the earliest barbed points (above, left) to spear huge prehistoric catfish. Later, humans used harpoons (above, right) to hunt large,

AMHs: **Oldest fishhooks**, Japan, 23 Ka, from sea snail shells



AMHs: bone tools
from LSA, S Africa
incl. baited fish
gages



AMHs: Social organization

- ▶ **Increased social networks**,
 - ▶ based on “luxury” items like amber and seashell trade and
 - ▶ long distance tool material (desirable flint from 100-700 kms away)
- ▶ **Average band size** probably around 30; moving camps seasonally
- ▶ Also “ranked” groupings like American Pacific Northwest societies with 200 people



This obsidian scraper was discovered in a cave in southern Syria in 1930. Recent analysis matched its chemical composition with obsidian from a volcano in central Turkey, meaning the object was transported at least 700 km to the cave.



Obsidian scraper, 30-40Ka, from Syria, matched to obsidian from central Turkey volcano, a distance of 700 kilometers

German archaeologist Alfred Rust discovered the scraper at a cave site near Yabroud, a town located in Syria's Sifta Valley, in the same archaeological layer as hundreds of other stone tools dating to 30,000 to 40,000 years ago. It was the only artifact Rust collected at the site made of obsidian, a type of volcanic glass.

Art

- ▶ Art is the most accepted archeological sign of symbolic/behavioral modernity.
- ▶ Art is a form of social communication
- ▶ Was art something that made humans behaviorally modern?
- ▶ Or is art a side effect of other phenomena in our recent evolution?
- ▶ Hammer = shape is functional; its style is addition, a symbolic representation
- ▶ Acheulean stone tools - usually utilitarian



AMHs: UP Art

- ▶ **UP art**: wall art and portable or home art
- ▶ **Wall art**:
 - ▶ 1879 discovery of **Altamira Cave in N Spain**;
 - ▶ **more than 150 caves have wall art in Europe**,
 - ▶ the **Franco-Cantabria**, the richest cave art region in world;
 - ▶ external rock wall art has not preserved
- ▶ **Franco-Cantabria cave art assigned to UP** because they did representational paintings of mammoth, bison, reindeer, & horses

UP art

- ▶ **Chauvet Cave, France**, paintings dated to **31 Ka**, in Aurignacian: but also ivory figures of rhinos, bears, mammoths, lions
- ▶ **Latest period was Magdalenian at 16-11 Ka**: Lascaux, Les Trois-Freres, Niaux, Altamira
- ▶ **Pigments**: Mixed iron, manganese oxide or charcoal and plant oils; successive generations of artists at same site; use of brushing and spitting
- ▶ Used wooden torches or animal fat with vegetal wicks on limestone slabs

Symbolism & Art

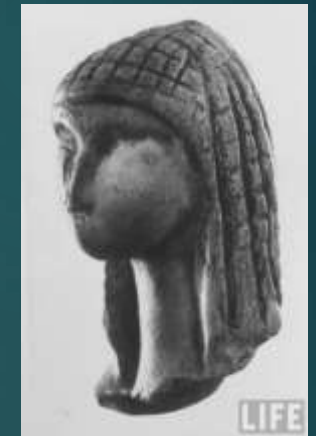
Geometric figures: 77 Ka

Shell beads: 70 Ka

Cave paintings: 44-10 Ka

Earliest musical instruments: 35 Ka

“Venus” figurines: 35-20 Ka



Art

- ▶ **Portable or home art, and ornamentation from 32 Ka:** Vogelherd, Hohlenstein-Stadel, Hohle Fels, Germany: meticulously shaped ivory or soft stone statues; perforated teeth
- ▶ **Practice of ornament production originated in Africa;** early LSA sites, antedating 40 Ka: ostrich eggshell beads
- ▶ **Human figurines in Europe** from 35-20 Ka
- ▶ **Musical instruments:** flute-like bone tubes with spaced holes from 33 Ka
- ▶ **Venus figurines** from 35-20: at least a 100 known

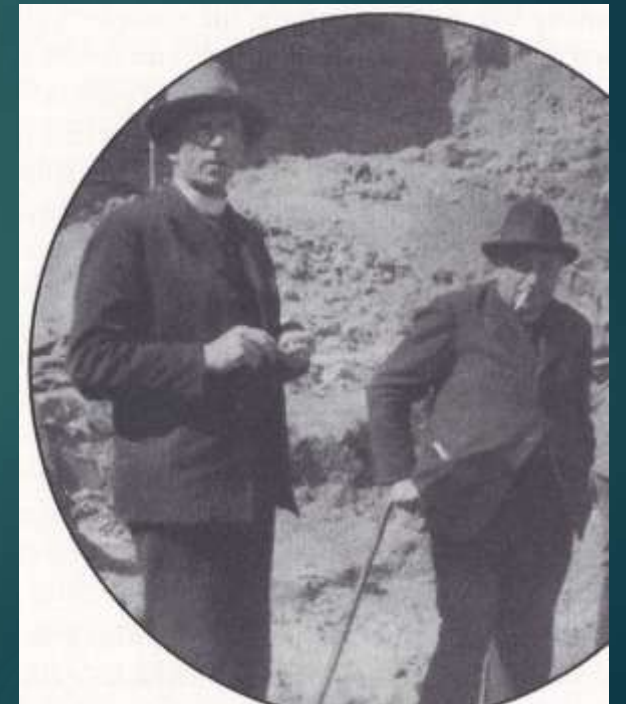
Classical European view of prehistoric art: Lascaux Caves, 17 Ka



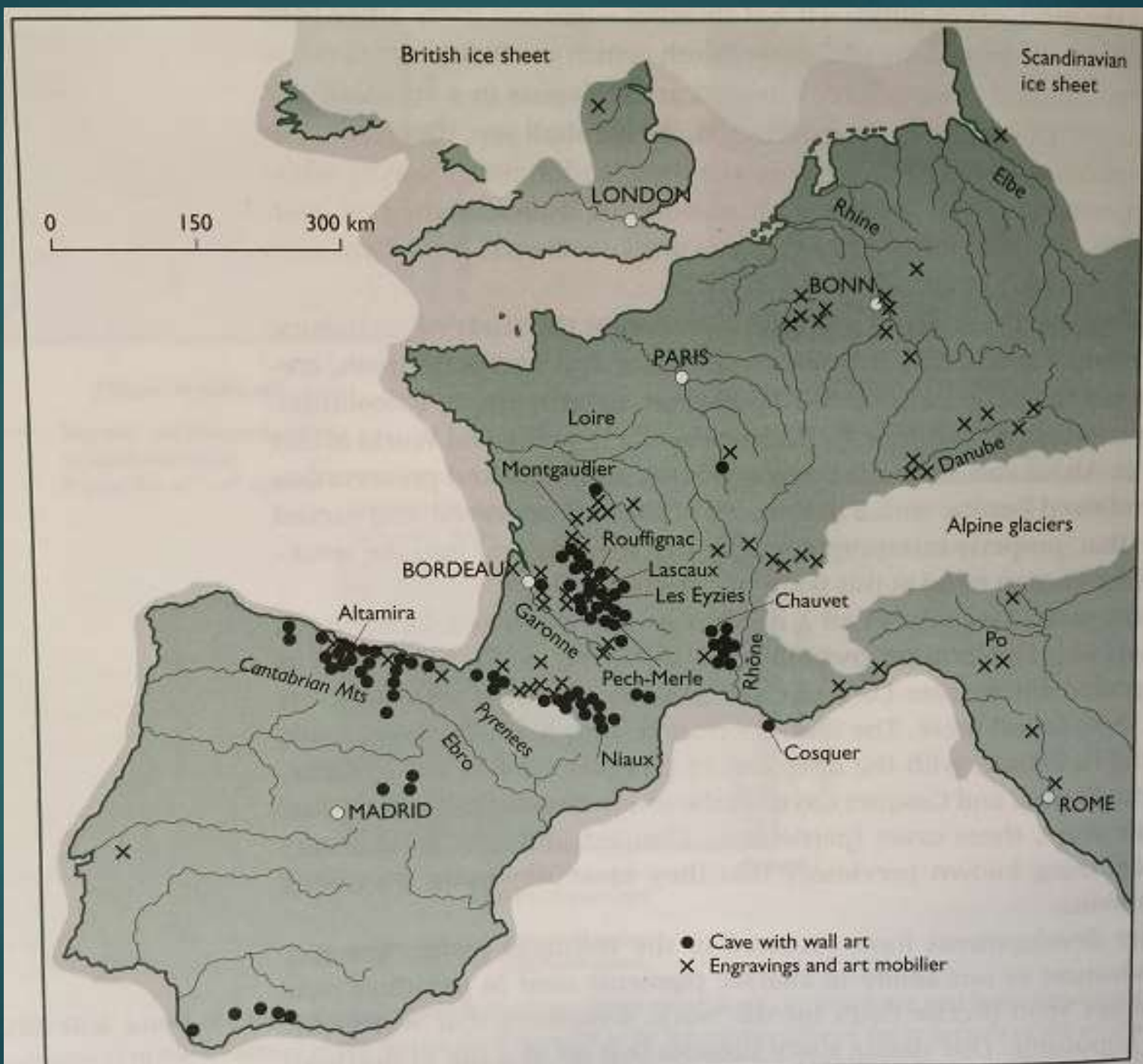
The Lascaux Caves in southwestern France feature clearly narrative scenes in rock art dated to around 17,000 years ago. Credit: Alamy

Father Henri Breuil (1877-1961): Paleolithic cave art

- ▶ French Catholic priest, archaeologist, anthropologist, ethnologist and geologist
- ▶ Published many books and monographs, introducing the caves of Lascaux and Altamira to the general public
- ▶ 1935: Breuil visited the Peking Man excavations at Zhoukoudian, China and confirmed the presence of stone tools at the site. Proposed extensive bone tool use (disproved), and influenced controlled excavation & mapping.
- ▶ Authority on North African and European Stone Age art



European Artistic sites



Palm Prints: among the earliest art



Origins of Iconic Depictions: A Falsifiable Model Derived from the Visual Science of Paleolithic Cave Art and World Rock Art

- ▶ First clue to their creation came from the **ancient hand marks** (positive prints and negative stencils)
- ▶ Second clue came from the widespread inclusion of natural cave features—such as ledges and cracks—as parts of animal depictions.
- ▶ Final clue relates to the environment in which Upper Paleolithic hunter-gatherers, along with other predators, were stalking the large herbivores—such as bison, deer, and horses—that formed their prey and which **often lay hidden in camouflage** in the tundra environment.

A Falsifiable Model

- ▶ Hand marks initially supplied the idea to archaic humans that a graphic mark could act as a representation
- ▶ In challenging lighting situations—and where prey might be well camouflaged—the hunter becomes hypersensitive to animal contours.
- ▶ It's better to “see” an animal when it's not there—to mistake a rock for a bear—than not see it.
- ▶ Such better-safe-than-sorry, hair-trigger cues are cognitive adaptations that promote survival. In short, **we are preconditioned to interpret ambiguous shapes as animals.** Upper Paleolithic hunters conditioned themselves due to the need to detect animals, but this effect was reinforced by the **suggestive features of the caves.**

A Falsifiable Model 2

- ▶ Caves are full of suggestive cues. They are dangerous places, often inhabited by predators, thereby stimulating increased arousal levels.
- ▶ Hunters entering the caves with an overactive visual system will have regularly “mistaken” the natural cave features for animals. This potentially explains how the very first representational depictions arose.
- ▶ Falsifiable theory: if someone finds depictions of animals that predate the first hand marks, this would overturn our main proposition.
- ▶ Similarly, if earlier figurative depictions come to light that do not derive from natural features, this would also challenge our theory.

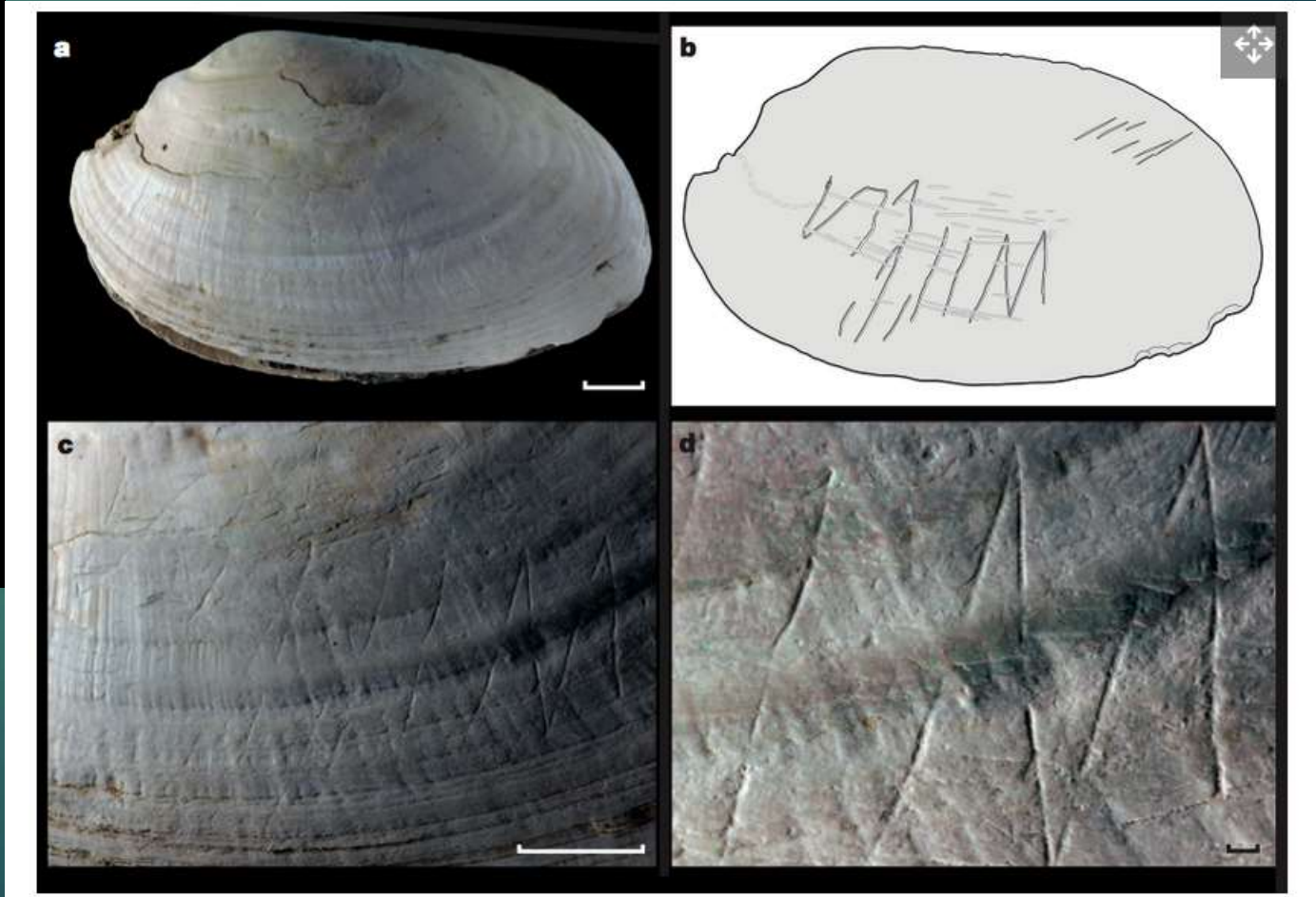
A Falsifiable Model

- ▶ When later humans entered the same caves and saw these, the Neanderthals may literally have “handed on” to our own species the notion that a graphic mark could act as a figurative representation.
- ▶ Thanks to the primed visual system of the later hunter-gatherers—and the suggestive environment of the caves—it *was Homo sapiens who took the final step creating the first complex figurative representations*, with all the ramifications that followed for art and culture.



Although *this map of archaeological and cave art sites is not exhaustive*, it gives a sense of the near universality of the cultural practice of creating rock art. **Cave art has been found on all continents except Antarctica.**

Homo erectus, Trinil, Java: 540 Ka



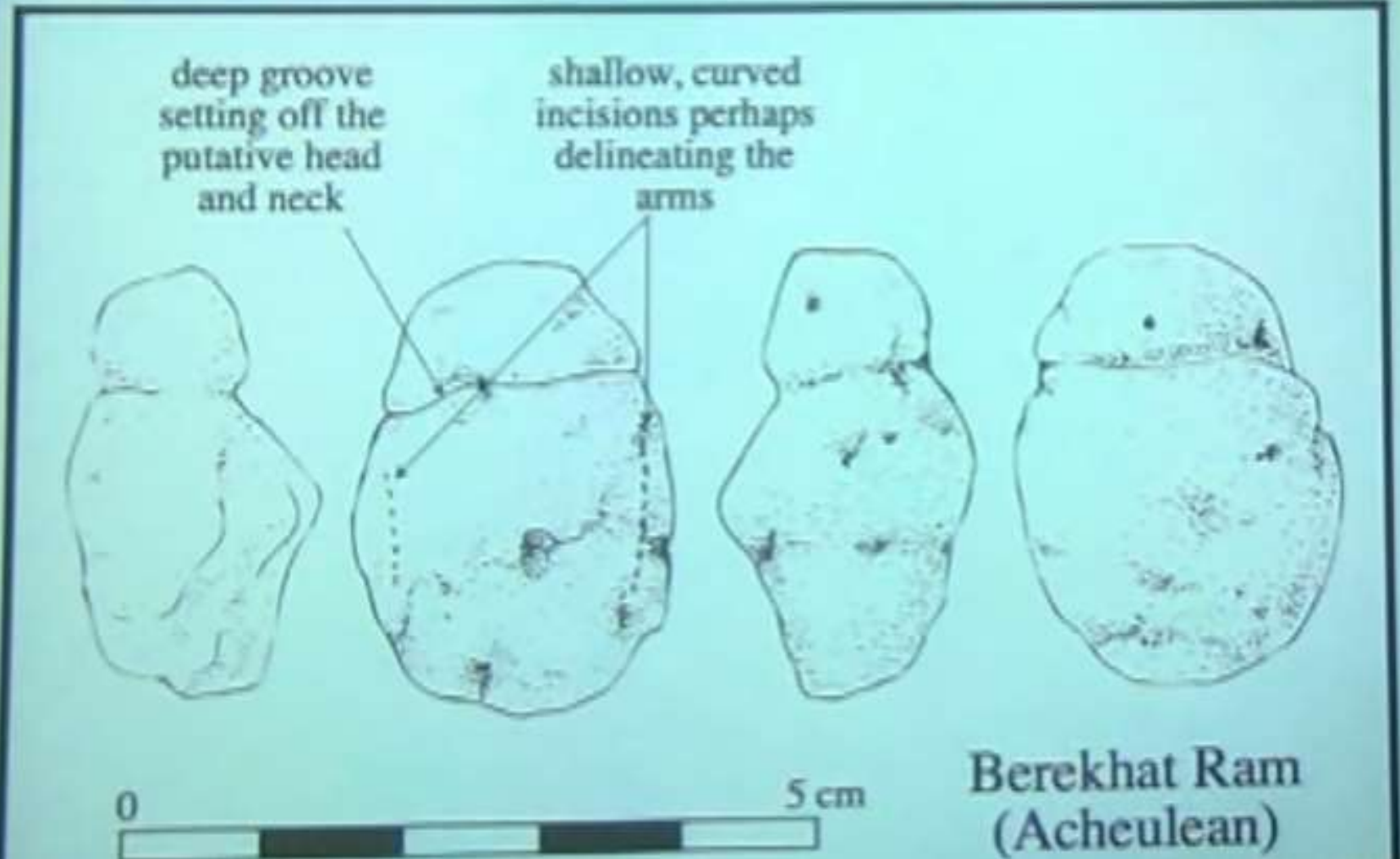
Berekhat Ram, Israel, fist sized rock: 250-400 Ka



Oldest artwork?

Berekhat Ram (Israel): a 250 ka-old figurine on a volcanic pebble?

Klein: unconvinced of any artwork pre 50 Ka



Bilzingsleben, Germany, bone; 400-300 Ka

Bone with series of a dozen parallel incisions



South African carved ostrich eggshell beads with hole,
100 Ka



MH Ornaments: Blombos Cave

- ▶ Early modern human-associated perforated marine shells from Africa and the Near East is widely accepted as evidence for body ornamentation, implying behavioral modernity.
- ▶ Convincing evidence for the use of personal ornaments, consisting of perforated marine shells belonging to a single species at each site, is found from caves in south Africa, north Africa and the Middle East dated to between 120 and 70 ka.
- ▶ At **Blombos Cave**, deliberately perforated *Nassarius kraussianus* **shell beads** with clear evidence of use-wear, some bearing traces of ochre come from ~ **75 ka** old levels.
- ▶ The **perforated Conus shell from Border Cave**, associated with the burial of a young individual may be as old as **76 ka**.

MH Ornaments

- ▶ **Perforated Nassarius gibbosulus shells** were recovered at the Aterian site of Oued Djebbana, **Algeria, and Skhul** from approximately **100 ka** levels that include 10 Homo sapiens burials.
- ▶ **Perforated shells** of the same species showing **traces of intentional modifications, possible deliberate heating to change the color** of the bead, use-wear and traces of red ochre were recovered from approximately **80–70 ka** levels at **Grotte des Pigeons, Rhafas, Ifri n'Ammar and Contrebandiers** in Morocco.
- ▶ **Beads seemingly disappeared in Africa and the Levant between approximately 70 ka and 40 ka, and reappeared almost everywhere in Africa and Eurasia after this time span;**
- ▶ **Later shell beads differ from their approximately 120– 70 ka antecedents in that they take the form of hundreds of discrete types, identifying regional patterns.**

N Ornaments

- ▶ Other marine shells interpreted as beads come from the approximately 90 ka Mousterian levels at Qafzeh Cave in Israel. They consist of 10 naturally perforated *Glycymeris insubrica* shells.
- ▶ The only Neanderthal site that has yielded possible evidence for the use of shell beads by Neanderthals is the Cueva de los Aviones in southern Spain. The Mousterian layers of this site, dated to approximately 45–50 ka BP, contained a marine shell assemblage including three valves of *Acanthocardia* and *Glycymeris*, bearing natural perforations. One of the latter contained a residue of red pigment identified as hematite.

Stringing shells at Qafzeh, 120 Ka

- ▶ **Qafzeh shells:** Five shells were selected for microscopic examination due to their good state of preservation. These shells showed **traces that were produced by contact with a string, coloring treatment with ochre and traces of shell-to-shell contact, all of which indicate that the valves had been arranged on a string**
- ▶ Earlier Misliya shells bore only use-wear consistent with natural abrasion,
- ▶ From as early as the Lower Palaeolithic humans collected shells and carried them to habitation sites, yet **around 120 Ka, they started collecting perforated shells.**
- ▶ Our data suggest that **sometime within the time range of 160 and 120 Ka, the technology for making strings emerged, and that this technology boosted the collection of naturally perforated shells for display, a practice common to this day.**



Fig 4. Shells from Qafzeh Cave on which use-wear was studied, 1. specimen 112; 2. specimen 102; 3. specimen 107; 4. specimen 404; 5. specimen 632. (Photos: Oz Rittner).

Stringing shells

- ▶ That modern humans exhibited symbolic behavior is by now well established and the use of mollusc shell beads is an expression of this behavior is also well documented.
- ▶ Shell beads from the Middle Palaeolithic or Middle Stone Age, dating to 120 to 70 Ka are known from three geographic regions: the Levant, North Africa and South Africa.
- ▶ In the **Levant**, the shell beads found at **Skhul Cave** dated to between 135 and 100 ka, making them among the earliest ever found. **Though naturally perforated**, the shells from **Qafzeh Cave** were suspended.
- ▶ Other sites: marine mollusc shells of considerably older age:
 - ▶ **Pinnacle Point** in South Africa, dated to about 160 Ka and
 - ▶ **Misliya Cave** on Mount Carmel, 240 to 160 Ka. Shells were not perforated

Stringing shells

- ▶ This behavior was facilitated by the development of string, probably related to change in the style of clothing, apparently between 160 and 120 ka, thus the move from non-perforated shells to perforated ones was apparently a two-stage process.
- ▶ Between 160 and 120 ka there was a shift from collecting complete valves to perforated ones, which reflects both the desire and the technological ability to suspend shell beads on string to be displayed on the human body

The **120 Ka perforated shells** from level II of Cueva de los Aviones (after cleaning):
(1) *Acanthocardia tuberculata*; (2–3).



**Holes drilled by a
Marine snail**

Collected by
Neandertals for
stringing together

Perforated *Nassarius gibbosulus*. Cave of Pigeons in Taforalt, eastern Morocco, 82 Ka



South African perforated shells

Panga ya
Saidi
cave,
Kenya
78 Ka

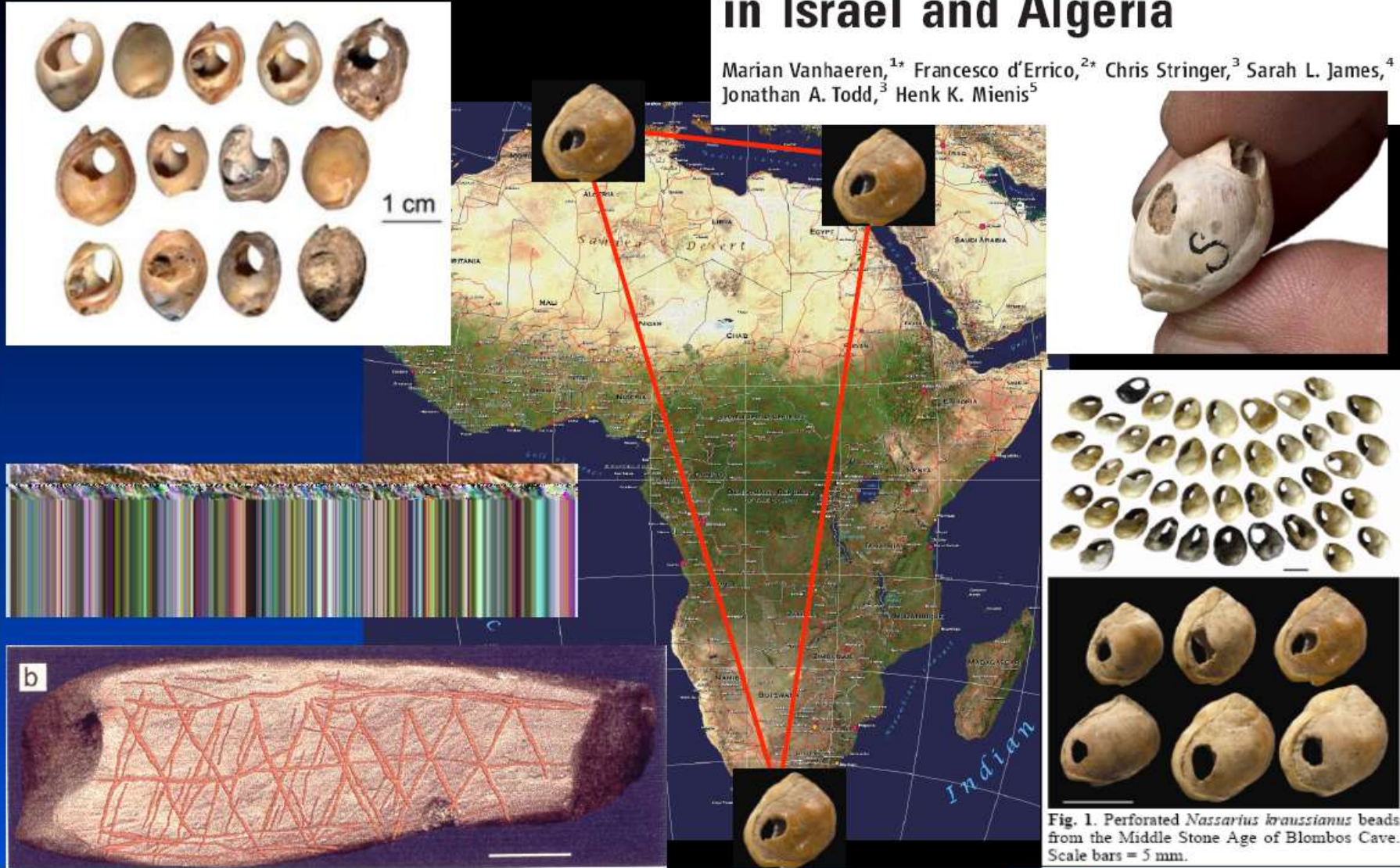


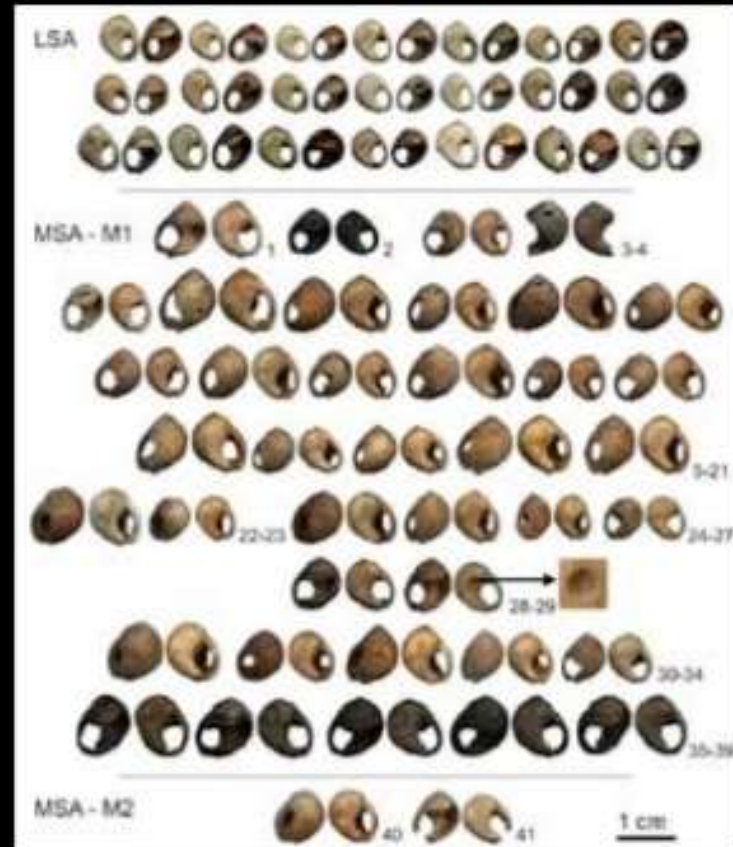
1. A decorated bone 2. A broken bone arrow point 3. An awl made of tusk 4. An ochre crayon. 5-9. Ostrich egg shell beads, 10-13 are marine shell beads. Other items: miniaturized stone tools.

Shell jewellery + red pigments ~70-100 ka

Middle Paleolithic Shell Beads in Israel and Algeria

Marian Vanhaeren,^{1*} Francesco d'Errico,^{2*} Chris Stringer,³ Sarah L. James,⁴
Jonathan A. Todd,³ Henk K. Mienis⁵





South Africa Shell Beads -
75,000!

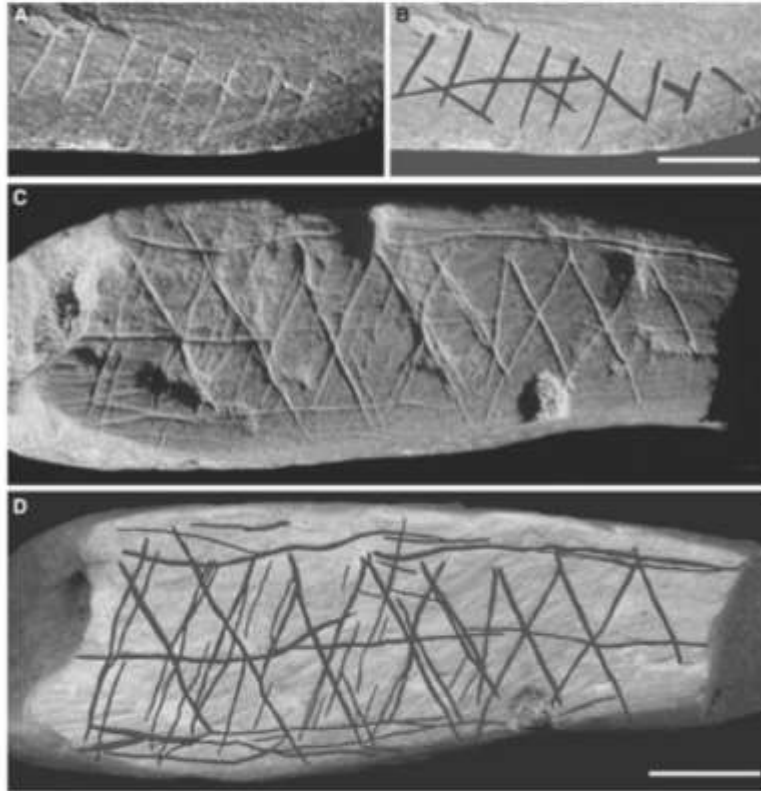
Blombos Cave: Ocher





A 77 Ka slab of ochre with a cross-hatched design, evidence for abstract cognition. Other engraved ochres have been found in earlier layers of Blombos Cave.

Blombos Cave, South Africa: “engraved” red pigment (ocher) fragment and tick shell “beads” dated to 75-77 ka.



Abstract art or incision intended to facilitate the scraping of powder from the surface?



Artifactual (human) or natural perforation?

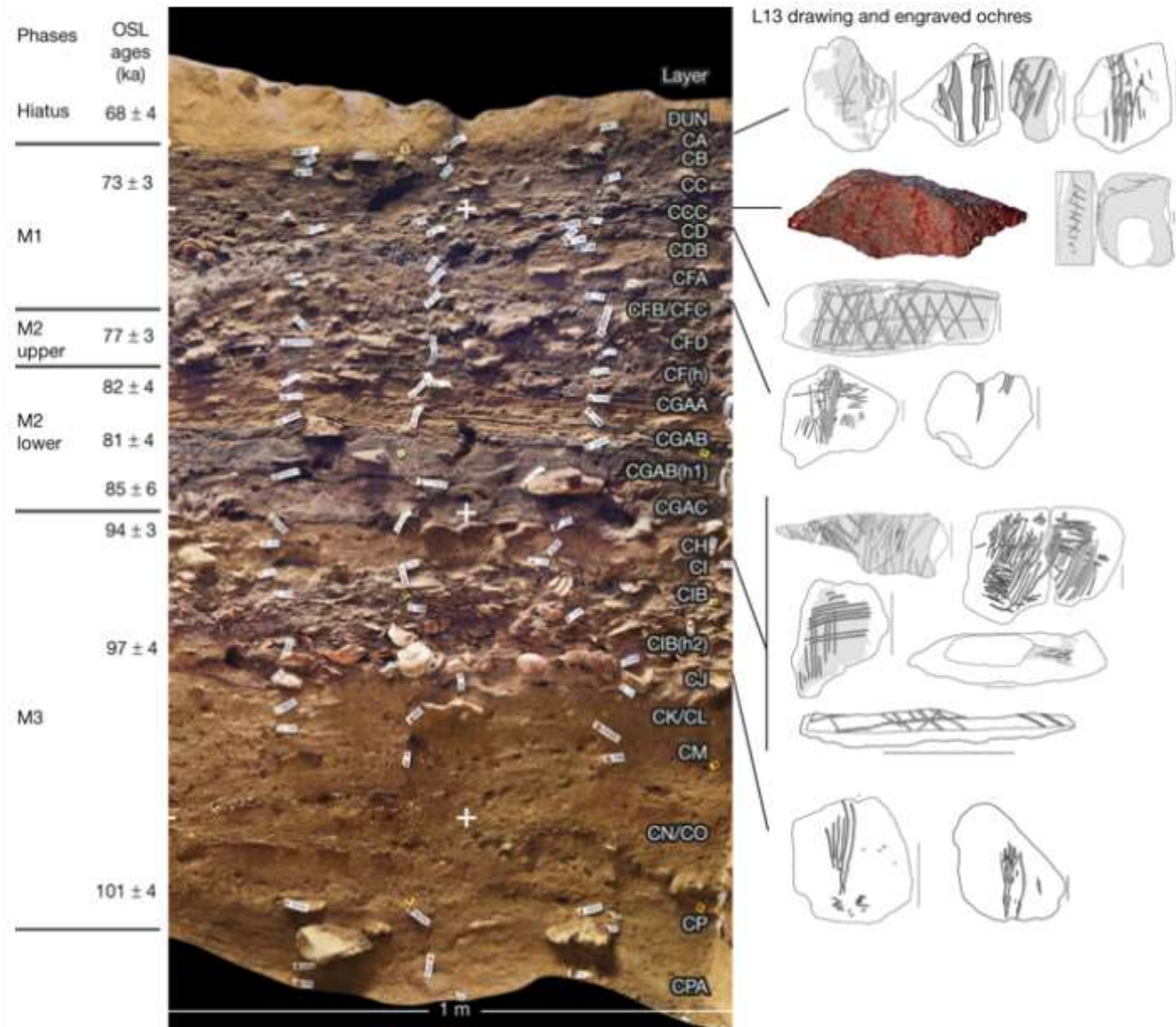
Ironstone:
sandstone
with iron
oxides

Source of
ocher
pigment

Klein: unclear if
perforations are
artifactual

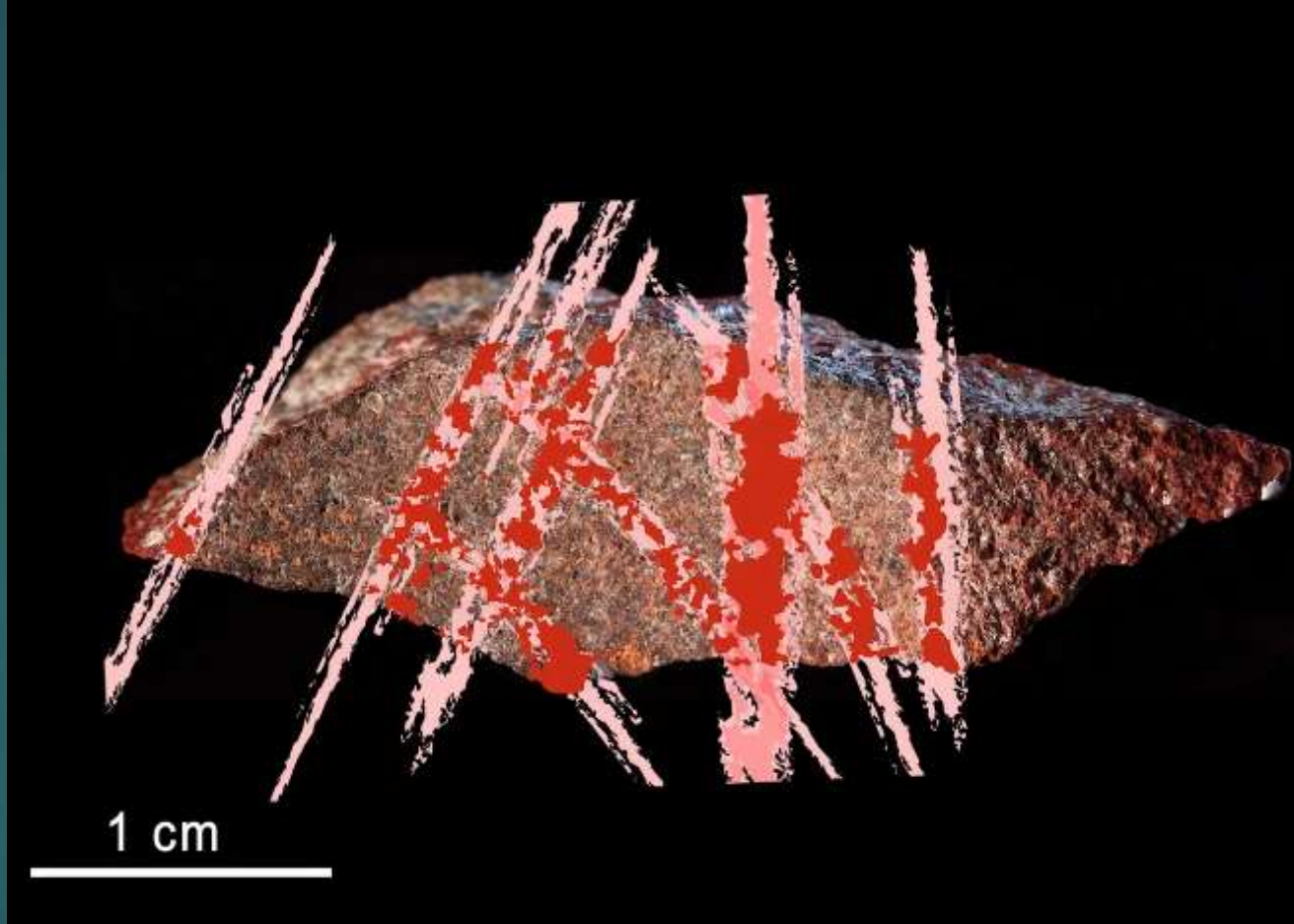
Klein: 1000s of ironstones with scratch marks to test quality of ocher pigment; is it art?

Fig. 1: Stratigraphy of the south section of Blombos Cave.



Left, phases and optically stimulated luminescence dates for the Middle Stone Age levels at Blombos Cave. Centre, labels for individual layers superimposed on section. Right, layers from which the L13 silcrete flake with ochre drawings and previously described engraved ochre pieces were recovered. Scale bars, 1 cm.

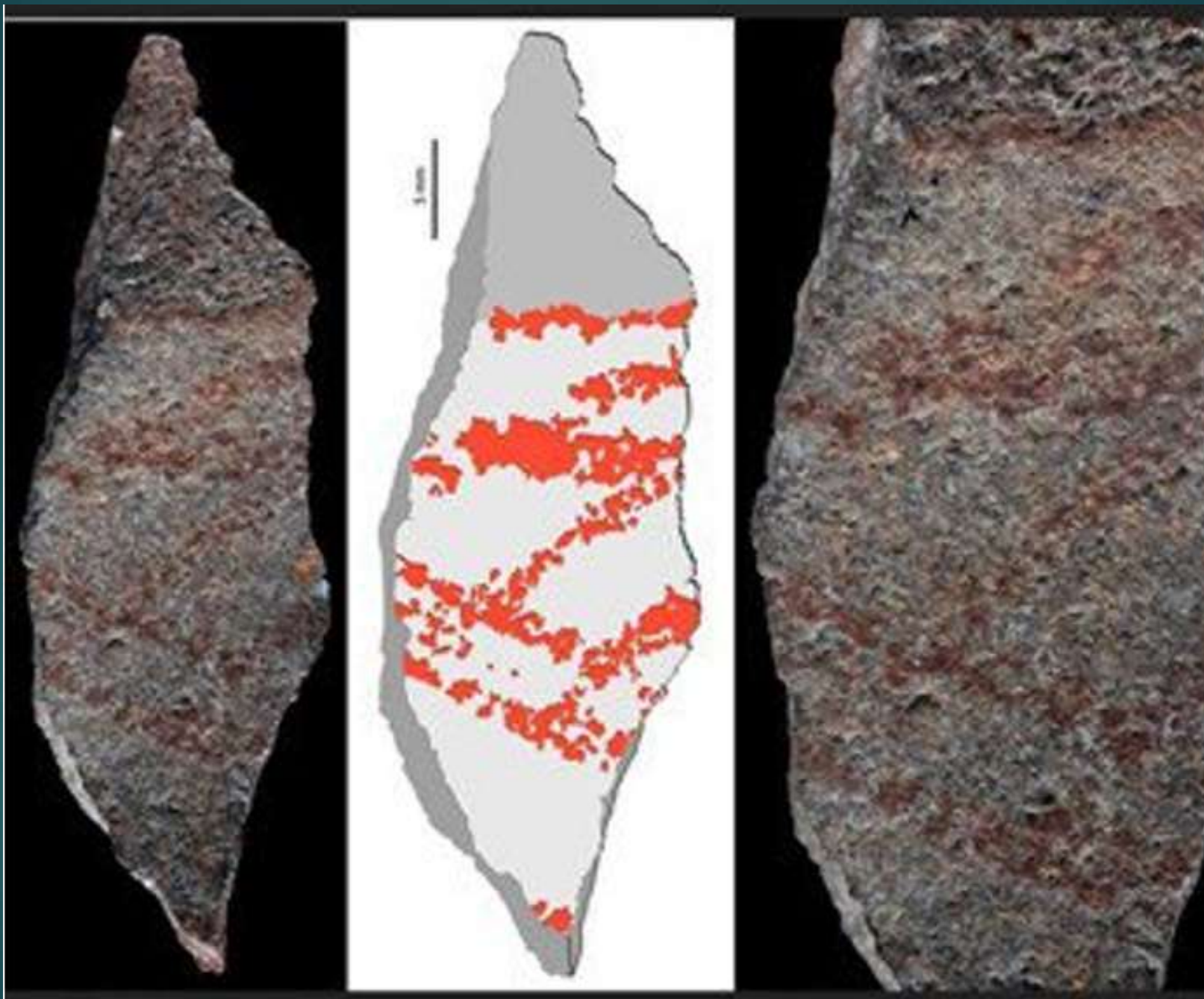
Oldest Human Drawing, 73 Ka, Blombos, South Africa



A cross-hatch design in red on a smooth surface

This animation highlights the other markings by superimposing extended hashmarks.

Found in 2011 in Blombos Cave, a **small flake, measuring only about the size of two thumbnails,** that appeared to have been drawn on; The markings consisted of **six straight, almost parallel lines that were crossed diagonally by three slightly curved lines.**

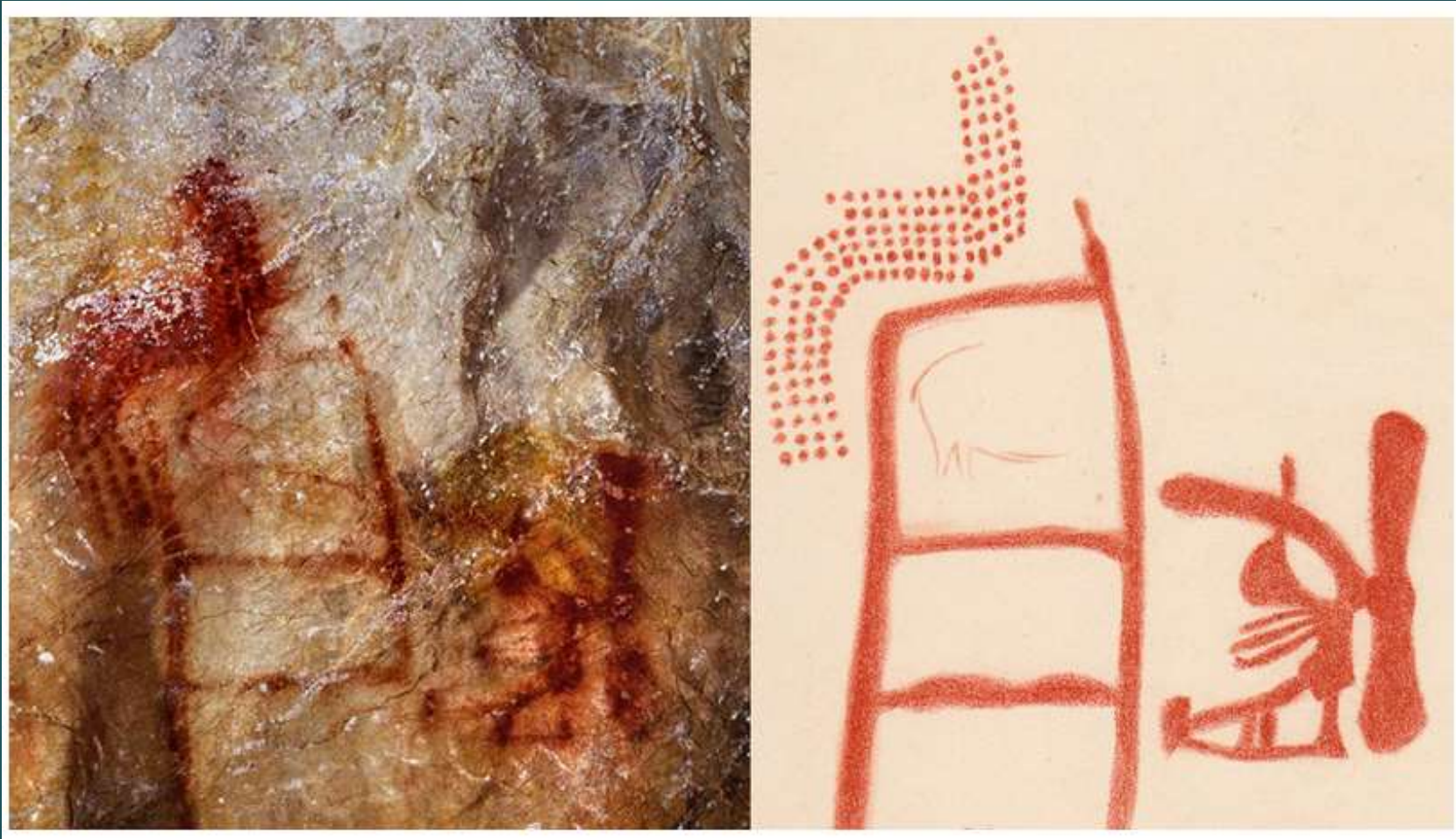


La Pasiega, Spain: Neandertal, 65 Ka



ARTISTIC SURPRISE Red horizontal and vertical lines painted on the walls of a Spanish cave date to at least 64,800 years ago, a new study finds. Since *Homo sapiens* had not reached Europe at that time, Neandertals must have created this art, researchers propose. The animal-shaped figure, right, was not dated and its makers remain unknown.

Neandertal, 65 Ka: First art in Europe



Neandertal ornamentation?



Spain, 50,000

MP vs UP art

- ▶ In 1980s, Univ. of PA anthropologists **P. Chase and H. Dibble**, surveyed **evidence for artistic expression in MP to UP transition**.
- ▶ Their conclusion: “The most striking difference between the Middle and Upper Paleolithic is the contrast between the rich and highly developed art found in the latter period and the almost complete lack of it in the former.”
- ▶ Others disagree and see a more gradual change.

Upper Paleolithic Art: 45 to 10 Ka: Uncontested MH symbolic ability

- ▶ Most archeologists give the presence of representational art as a prime example of “behavioral modernity”
- ▶ Dating from arrival of AMH in Europe and Eurasia
- ▶ The oldest type of cave paintings are hand stencils and simple geometric shapes; the oldest undisputed examples of figurative cave paintings are somewhat younger, close to 35,000 years old
- ▶ “Parietal” (Latin, “wall”) art: cave art

Upper Paleolithic Art

- ▶ Classically the UP cave art of Chauvet, Lascaux, and Altamira Caves in Europe from 35 to 15 Ka
- ▶ Recent discoveries of representational art in Indonesia from 40 Ka
- ▶ Handprints and mammals the most frequently painted, plants, birds, humans less so. Often animals portrayed are not related to animal bones found on cave floors.
- ▶ With end of Ice Age, Cave paintings came to an end about 15-10 Ka
- ▶ Art on external rock walls rarely survives

What Cave Art Means, Justin Smith, 2018

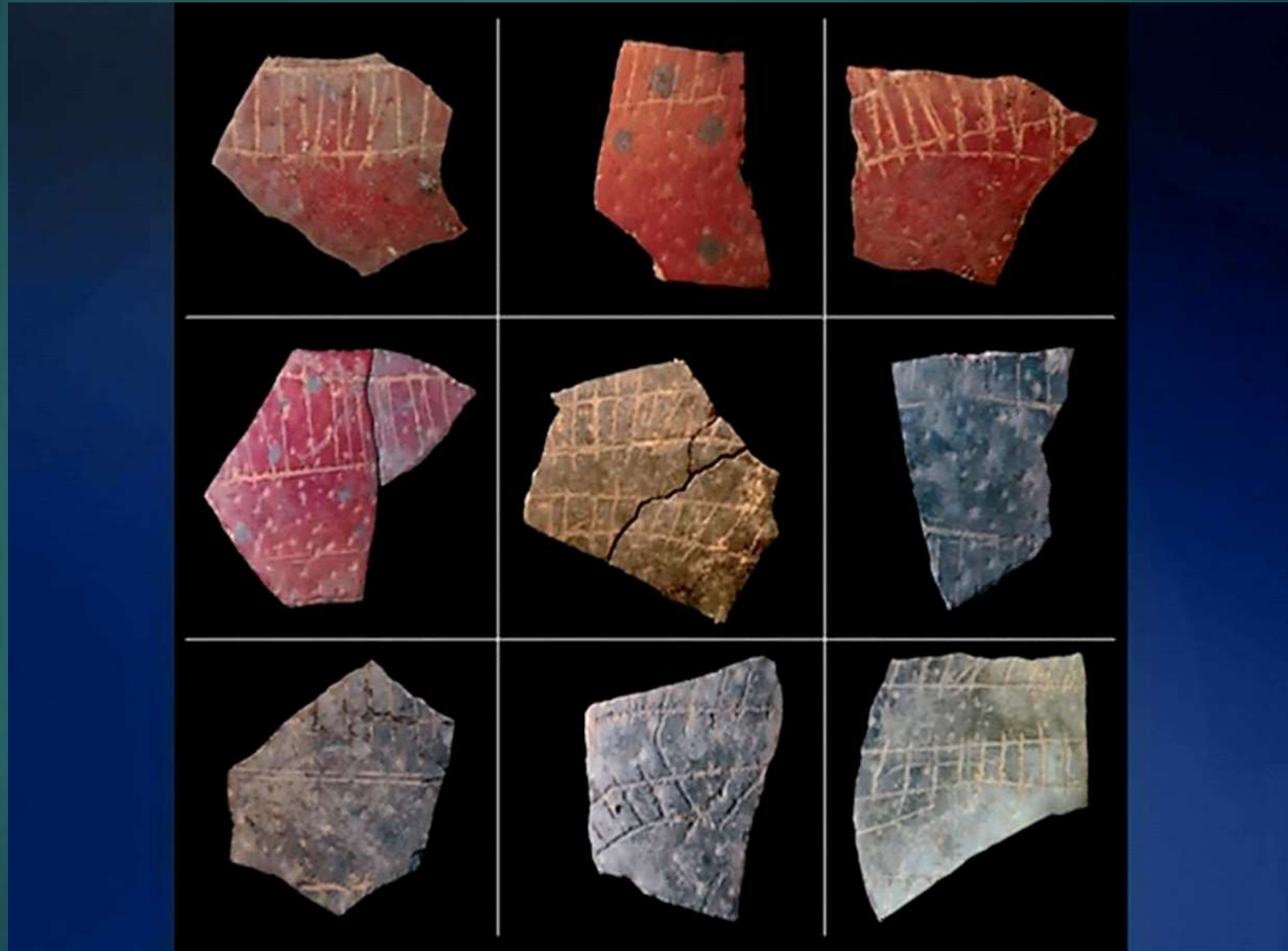
- ▶ There is reverse correlation between the frequency of representations of a given species and its importance as a staple of human diet.
- ▶ Cave art in Europe offers no depiction of landscape, no horizon, no vegetation, almost no depiction of human-animal interaction, almost no hunting scenes, no obvious interaction between different species of any sort. The focus of European cave art is remarkably narrow: it is the depiction, more or less naturalistic though removed from the environment, of various species of megafauna.
- ▶ The relative absence of hybrid creatures, particularly of human-animal combinations, speaks against the interpretation of cave art as serving a shamanistic function.

What Cave Art Means, Justin Smith, 2018

- ▶ Overlap and repetition of same animal is intended to convey motion; most evident when a flickering light is moved over the wall of the cave.
- ▶ We go to movies to see stories.
- ▶ Exterior-world beasts, reproduced in caverns, brought there by human beings intent on conjuring in their imaginative realm what mattered most to them in the external domain, in reality: this is what is certain in Paleolithic cave art.

Ostrich eggshells with incisions from Diepkloof, S Africa: 60 Ka

Modern Bushman
use ostrich
eggs for
containers;
Decorate them



Indonesia: New dating method for art: Ur of flowstones

- ▶ When water trickles down cave walls, it can leave behind a translucent curtain of minerals called a flowstone.
- ▶ If a flowstone contains uranium, it will decay steadily — and at a predictable rate — into thorium.
- ▶ In 2014, Dr. Aubert and his colleagues dated the age of a flowstone that covered a picture of a pig-like animal called a babirusa in a cave in Sulawesi. They discovered that the image was at least 35,400 years old.
- ▶ The earliest art in the caves: reddish-orange hand outlines and drawings of animals. The oldest of all was covered by a flowstone that formed 40,000 years ago.

Indonesian flowstones

- ▶ That drawing depicts a four-legged animal, a **species of wild cattle called a banteng**.
- ▶ Since the 40,000-year-old flowstone covers the banteng image, the artwork must be older than that — and thus the oldest known figurative art on the planet.
- ▶ Hand stencils: people started making art in the Borneo caves sometime between 52,000 years ago and 40,000 years ago.



Limestone karsts in East Kalimantan, an Indonesian province of Borneo, where the cave drawings were found. Pindi Setiawan

Hands Up: 40 Ka



HANDS UP Paint-framed outlines of human hands on the walls of a Borneo cave date to around 20,000 years ago, top, and nearly 40,000 years ago, lower left. Other hand stencils are even older, dating to as early as 51,800 years ago.



Hand stencils, similar in style to those found with the cattle drawing, in another Indonesian

Aside from their artwork in Borneo, no one has found a trace of the people who once lived there.

Indonesia, 40K: Babirusa & handprints



2018: Oldest Representational art, 40 Ka, Borneo

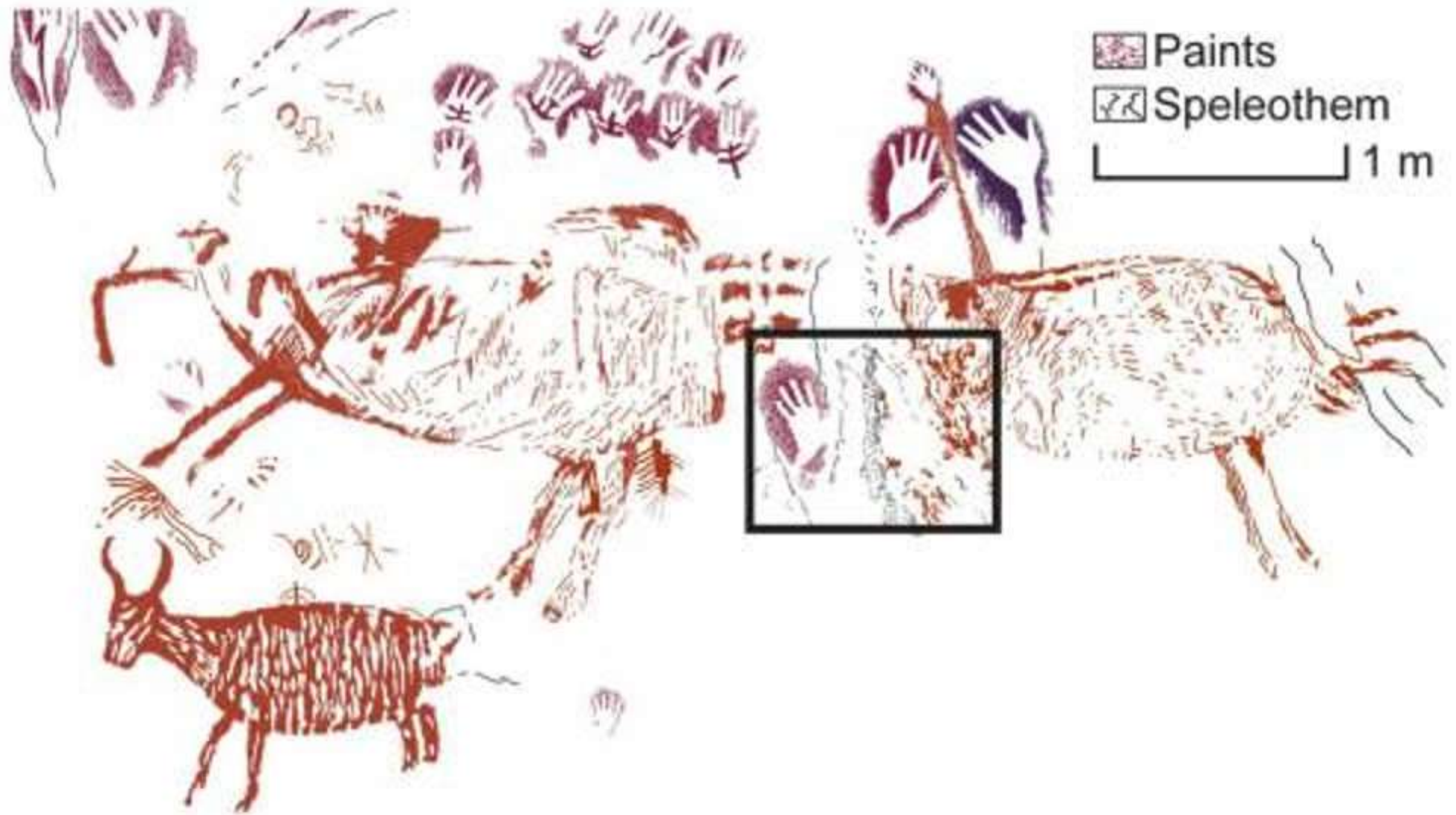


M. Aubert, et al., 2018

The drawing at lower left is the **oldest known figure made by humans**. It may represent a type of wild cattle.
Credit Luc-Henri Fage



OLD PAINT A reddish-orange animal, lower left, painted on a cave wall in Borneo dates to at least 40,000 years ago, scientists say.



Paints

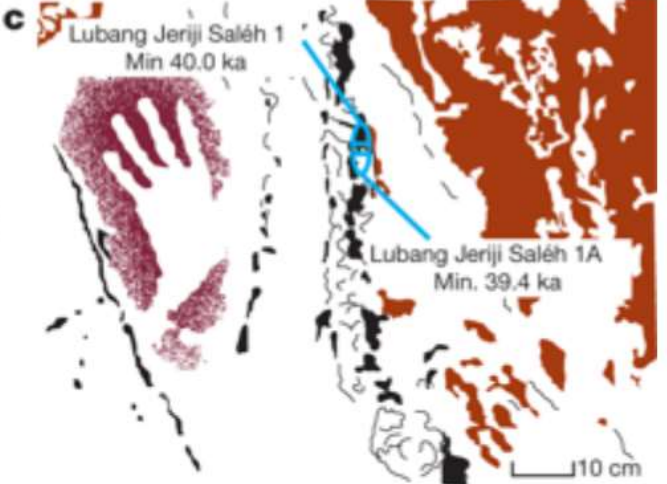
Speleothem

1 m

Figurative painting, Kalimantan, Borneo, 40K: oldest figurative art in the world



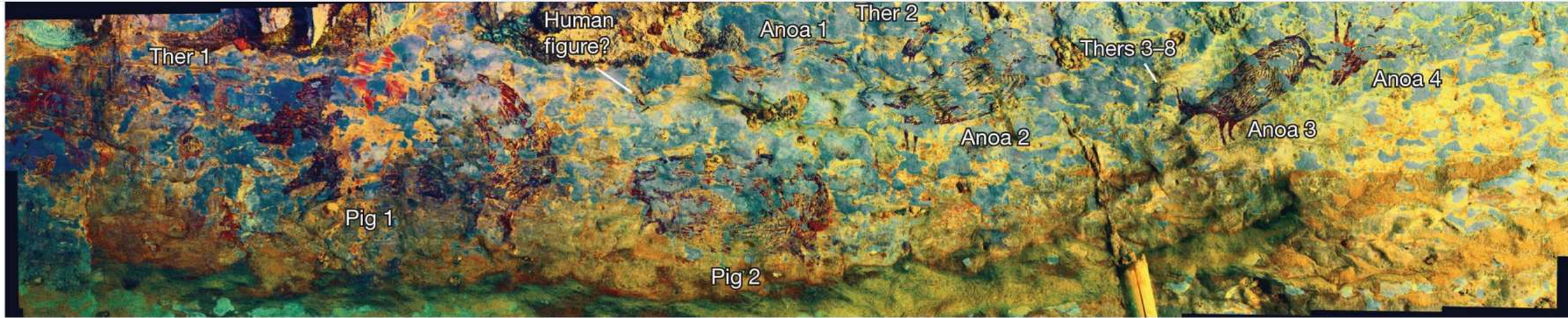
Oldest Representational art, 40 Ka, Borneo



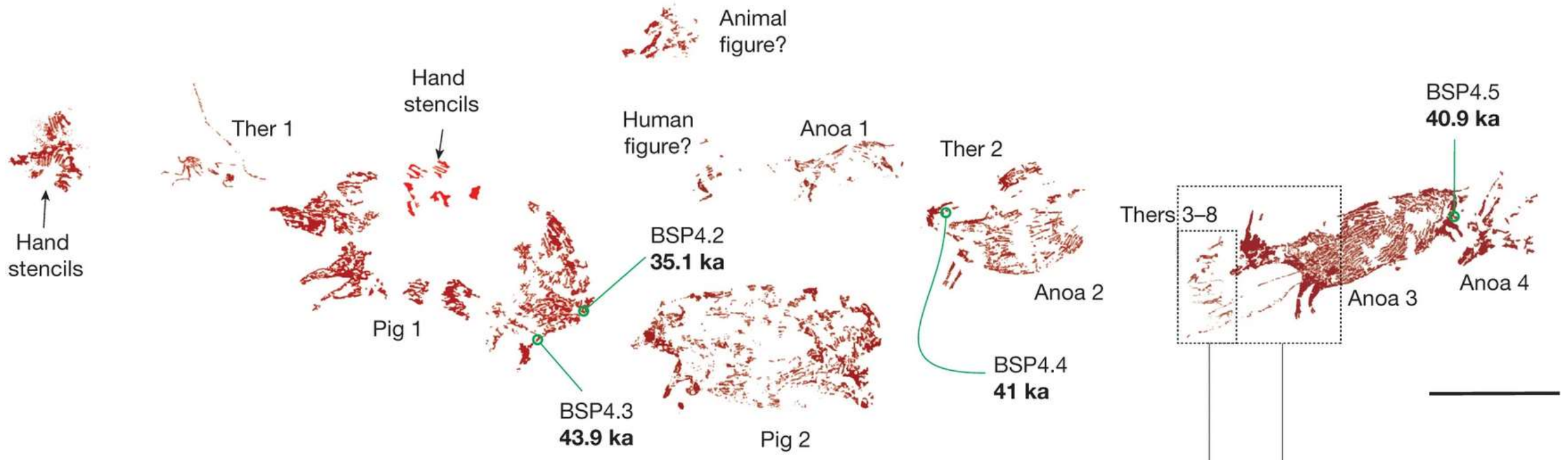
2019: Oldest figurative artworks: 44 Ka, Sulawesi, Indonesia

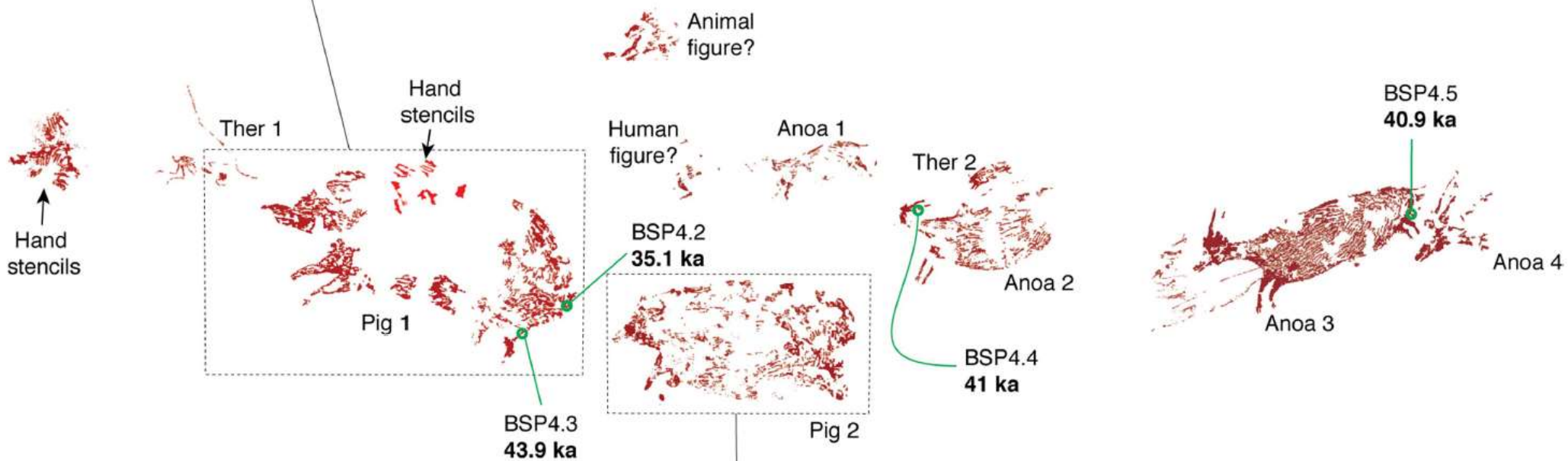
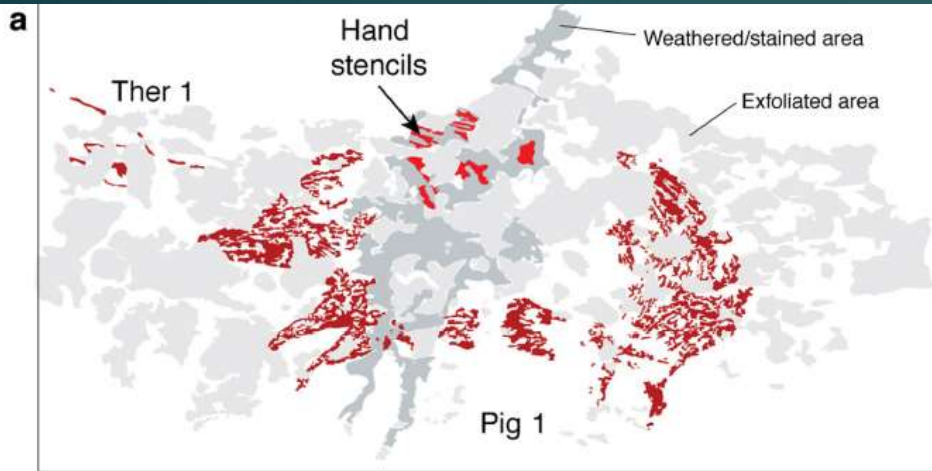
- ▶ A cave-wall depiction of a pig and buffalo hunt is the world's oldest recorded story, discovered on the Indonesian island Sulawesi. The scientists say the scene is more than 43,900 years old.
- ▶ 4.5-metre-long panel features reddish-brown forms that seem to depict human-like figures hunting local animal species
- ▶ Debate as to whether it is a single “scene” or done over long period
- ▶ The panel seems to depict wild pigs found on Sulawesi and a species of small-bodied buffalo, called an anoa. These appear alongside smaller figures that look human but also have animal traits such as tails and snouts. In one section, an anoa is flanked by several figures holding spears and possibly ropes.

43,900 years old 4.5-meter-long panel: in southern Sulawesi, Leang Bulu'Sipong 4 cave

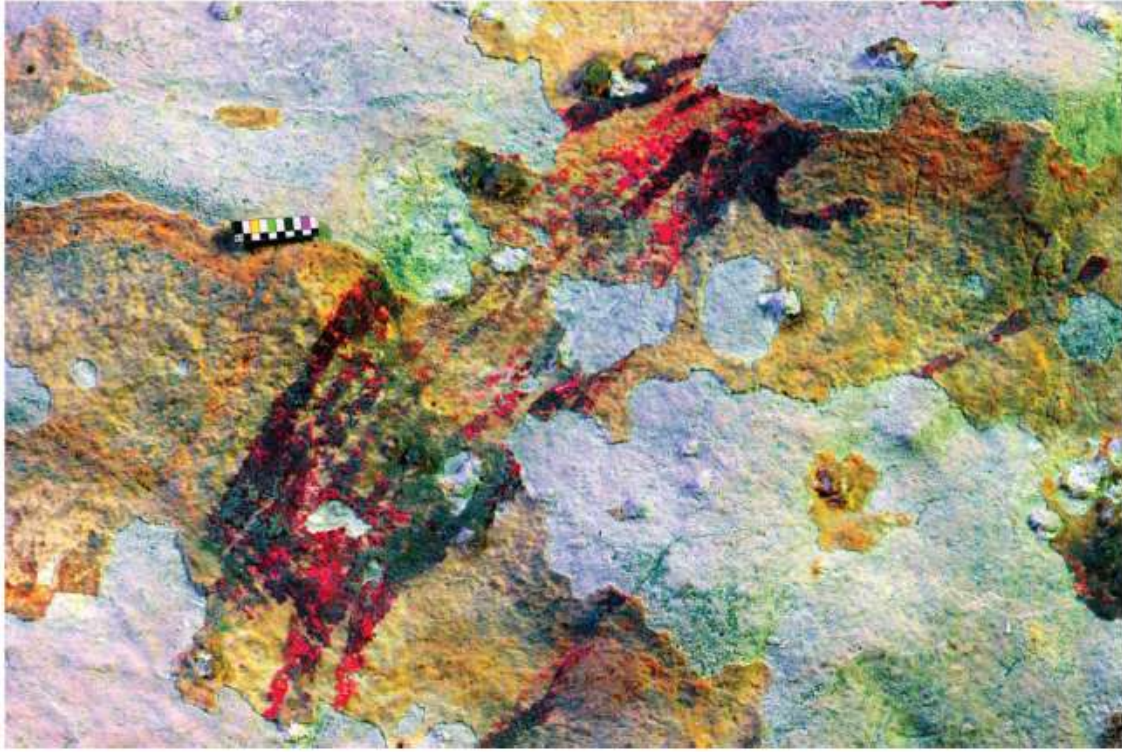


b

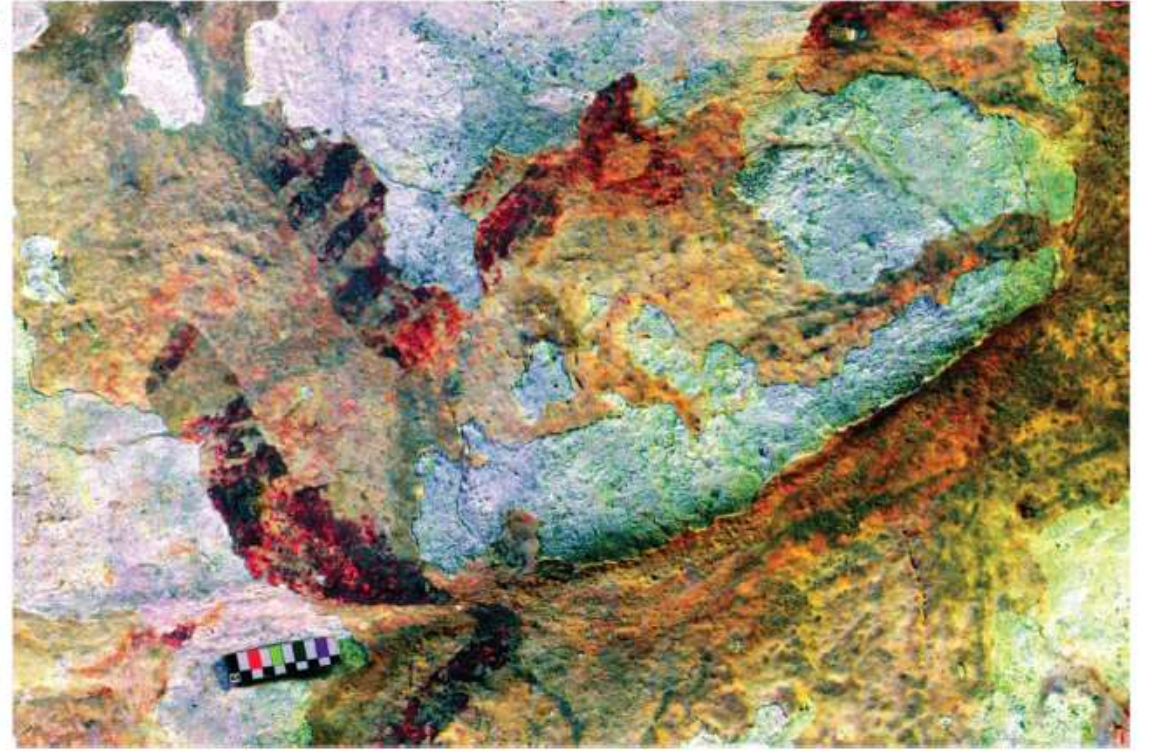


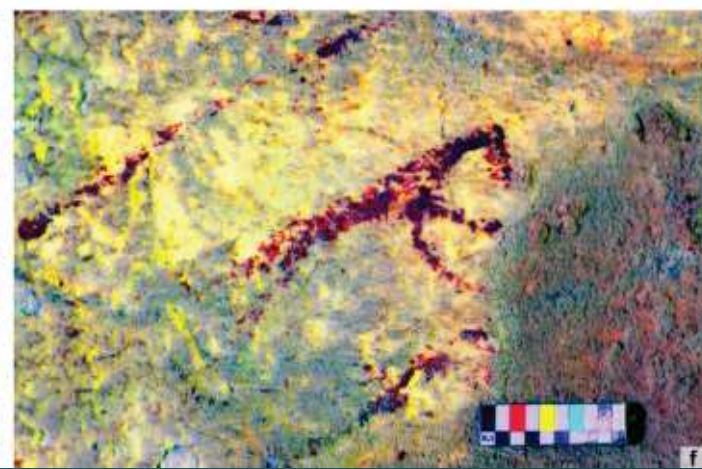
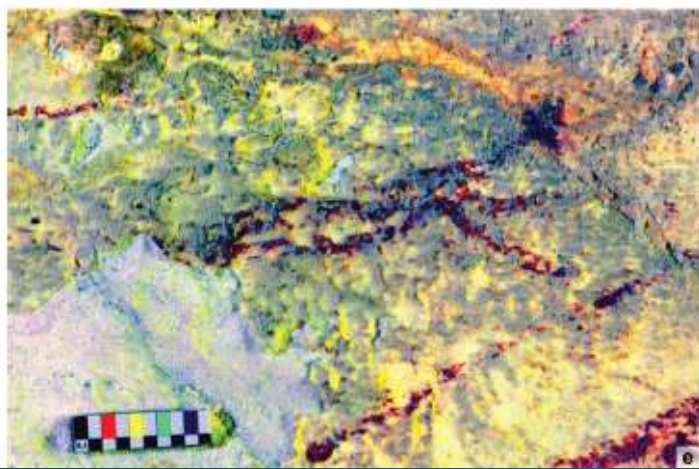
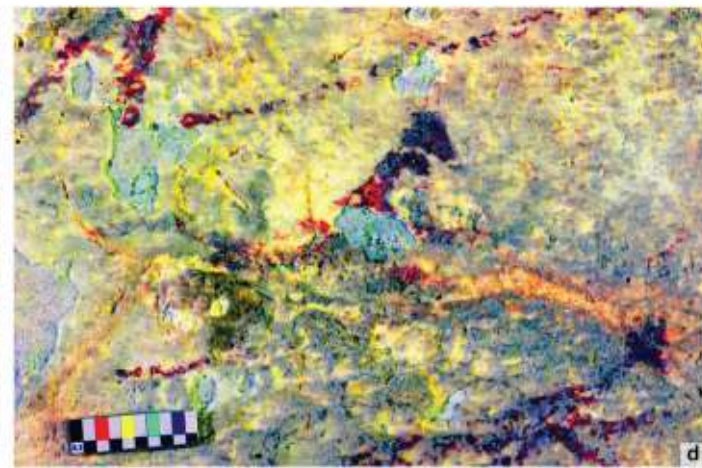
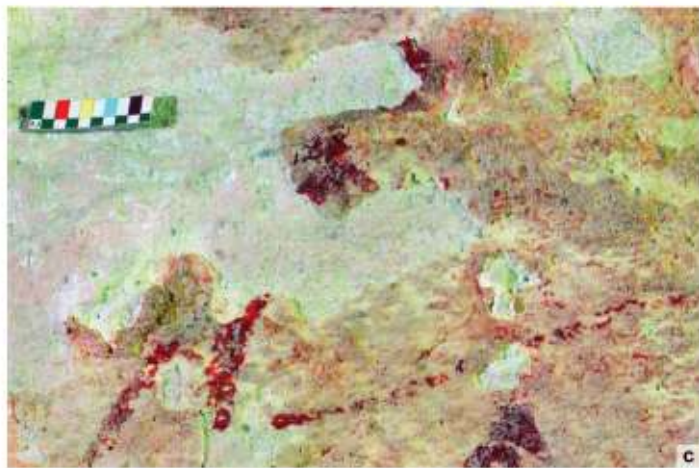
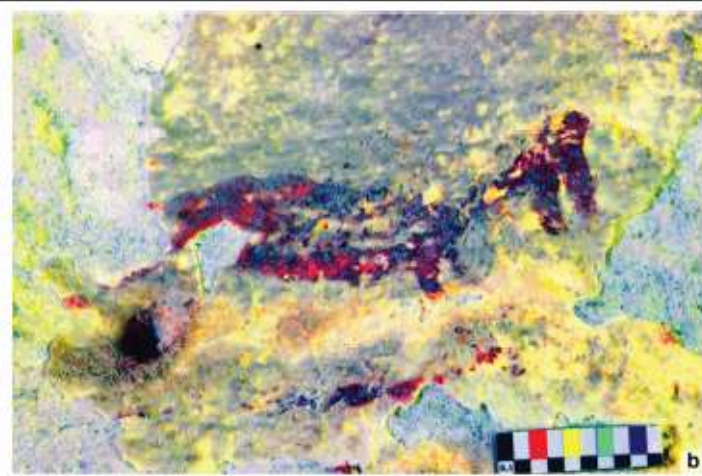
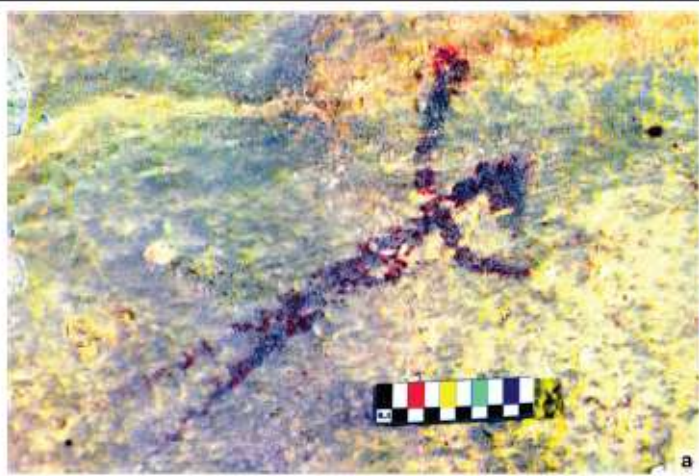


c



d





Oldest artwork: 44 Ka, cave in southern Sulawesi called Leang Bulu'Sipong 4



A section of the ancient cave art discovered in Indonesia that depicts a type of buffalo called an anoa, at right, facing several smaller human-animal figures. Credit: Ratno Sardi

c**d**



A humanoid with a bird-like head was among the eight therianthrope figures depicted in a cave painting on the island of Sulawesi. Ratno Sardi

El Castillo, Spain: Pre-40 Ka



Zambia wall art, 40-35 Ka



Hohle Fels, Germany: 40-30 Ka

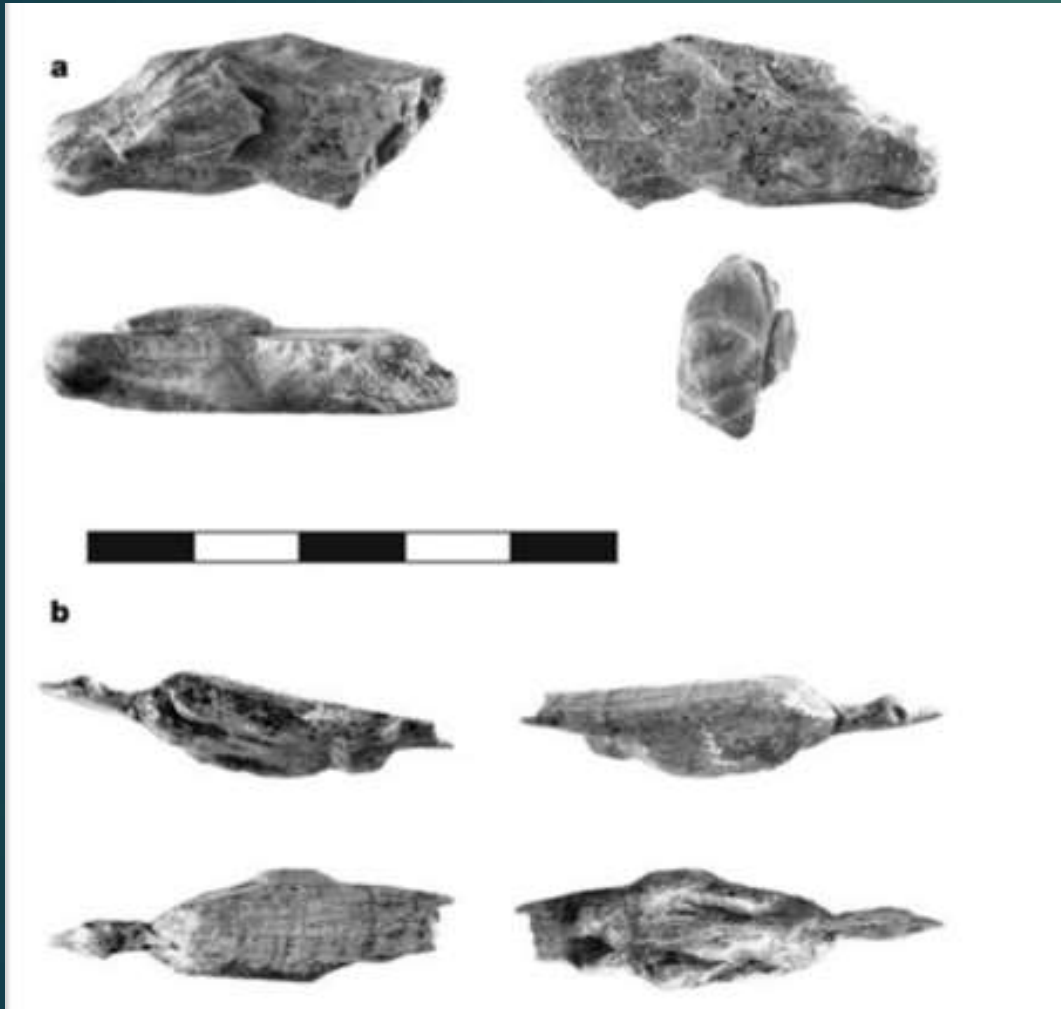
Three figurines carved from mammoth ivory at Hohle Fels Cave in the Swabian Jura of southwestern Germany, which provides new evidence for the appearance of figurative art more than 30,000 years ago.

Views of the three ivory figurines from Hohle Fels, depicting the

a. head of a horse

b. a water bird

c. a therianthrope with the characteristics of a felid and human



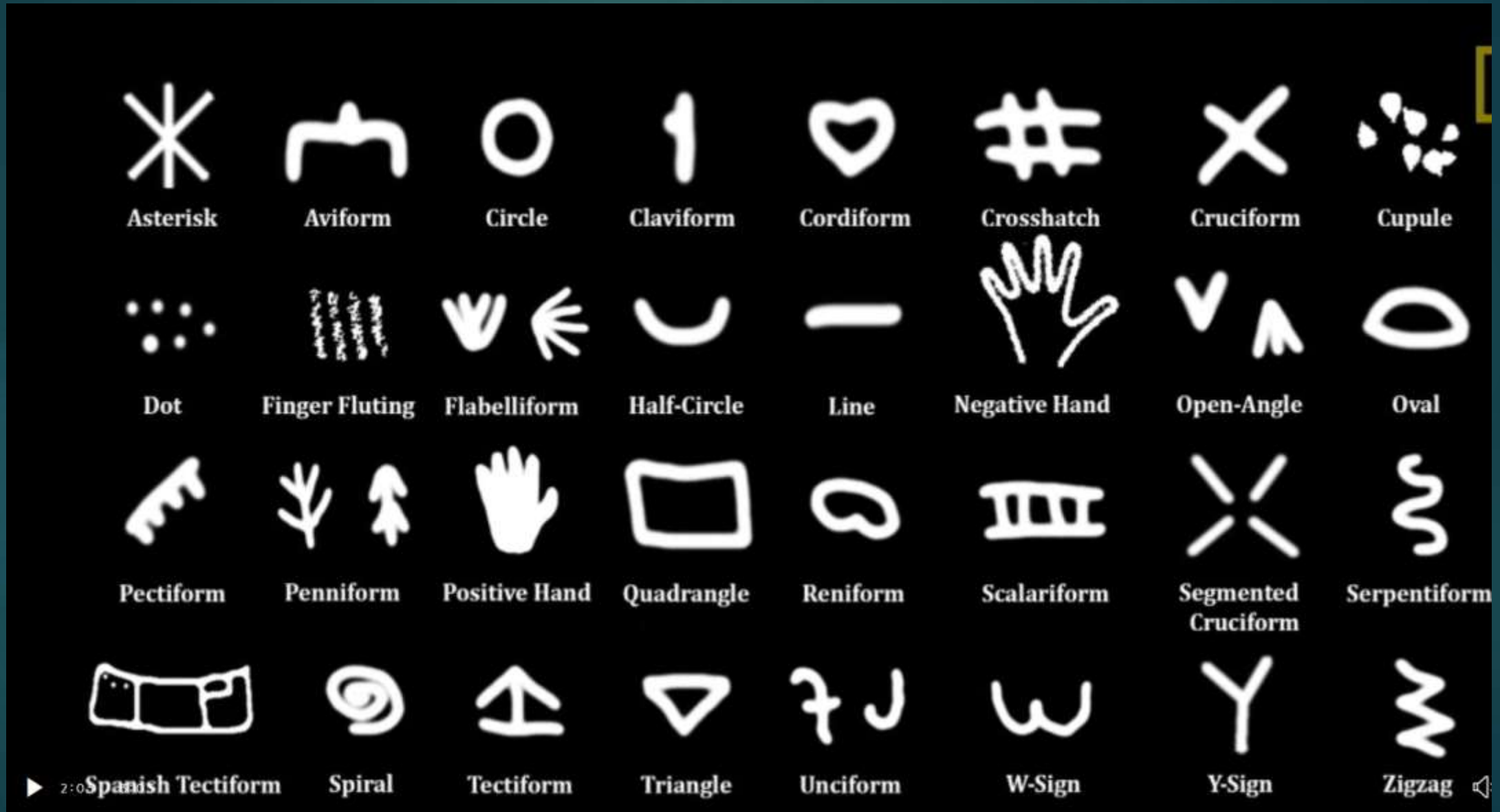
Hand outlines found on a cave wall in Maros Cave, Indonesia are at least 39,900 years old,



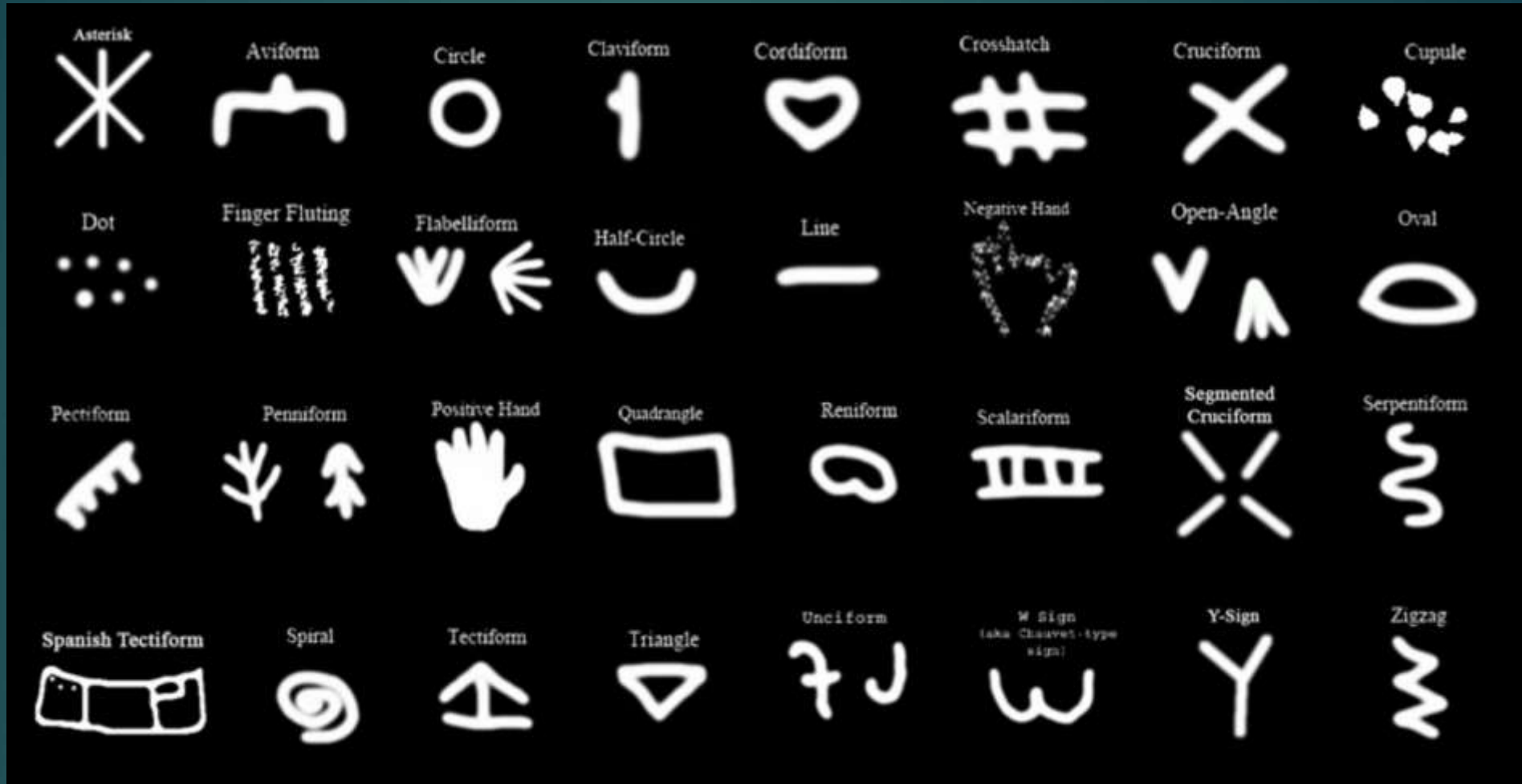
Spanish Hands, 37 Ka, El Castillo Cave



What are these? In Caves: 40-10 Ka



Graphic Communication



52 cave sites in Europe, over 30,000 year period: 75% had symbols; 32 symbols
65% of which stayed in use for entire time period; some clan signs?

Common origin in Africa?

Lion Man: 40 - 35K

Oldest-known zoomorphic (animal-shaped) sculpture in the world, and one of the oldest-known uncontested examples of figurative art.

Aurignacian Ivory sculpture discovered in the **Hohlenstein-Stadel**, a German cave in 1939.

Experimental paleontologist took 370 hours to carve same image

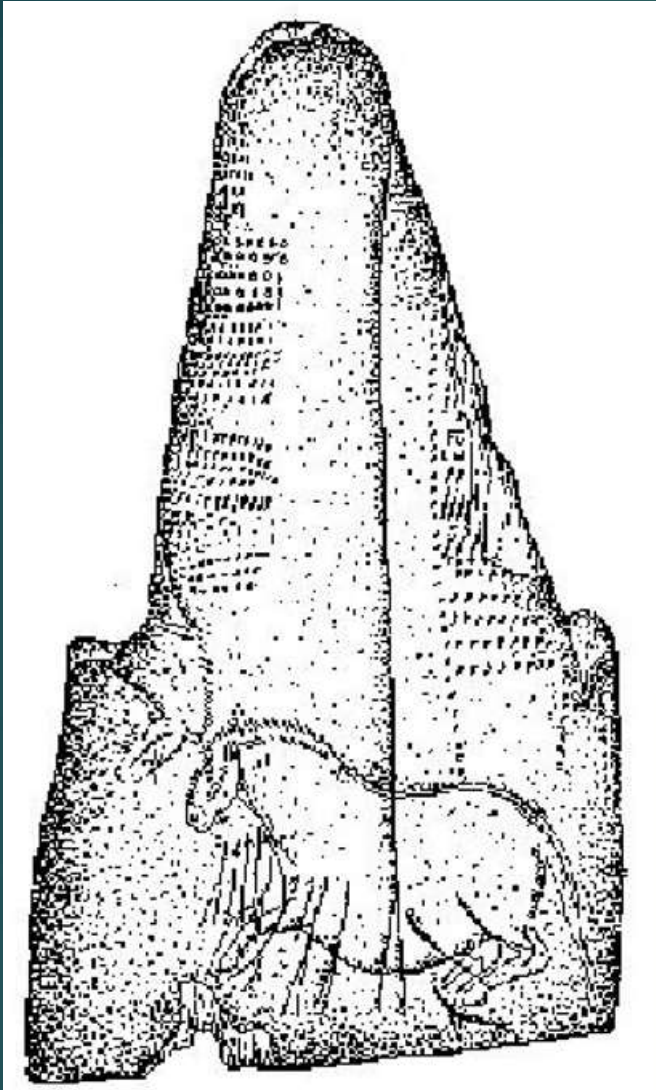


The Löwenmensch figurine after restoration in 2013



Lion Man





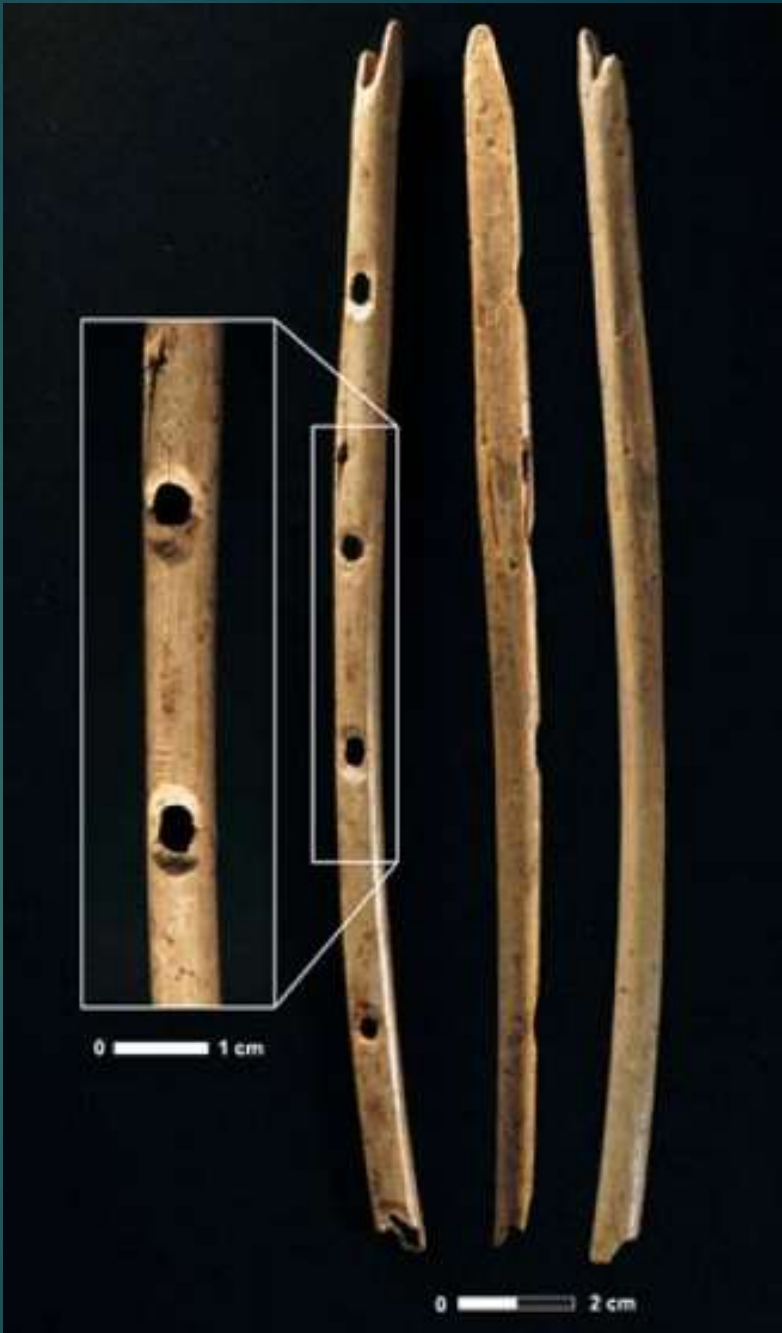
Drawing of the **carved design on a reindeer antler, 30 Ka**

Note grouped rows of carved dots & strokes; may be related to phases of moon

Gabarnmung, Northern Australia, 28 Ka



Hohle Fels, Vulture bone flute, 40-35 Ka



Vogelherd, Germany: Ivory horse, 2", 32 Ka

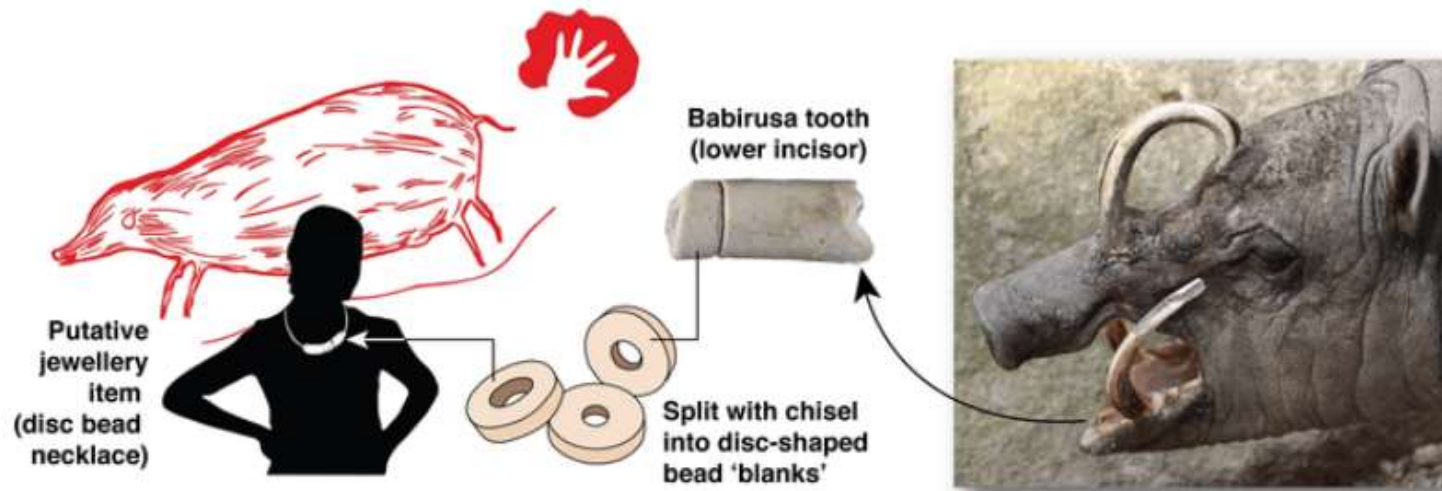
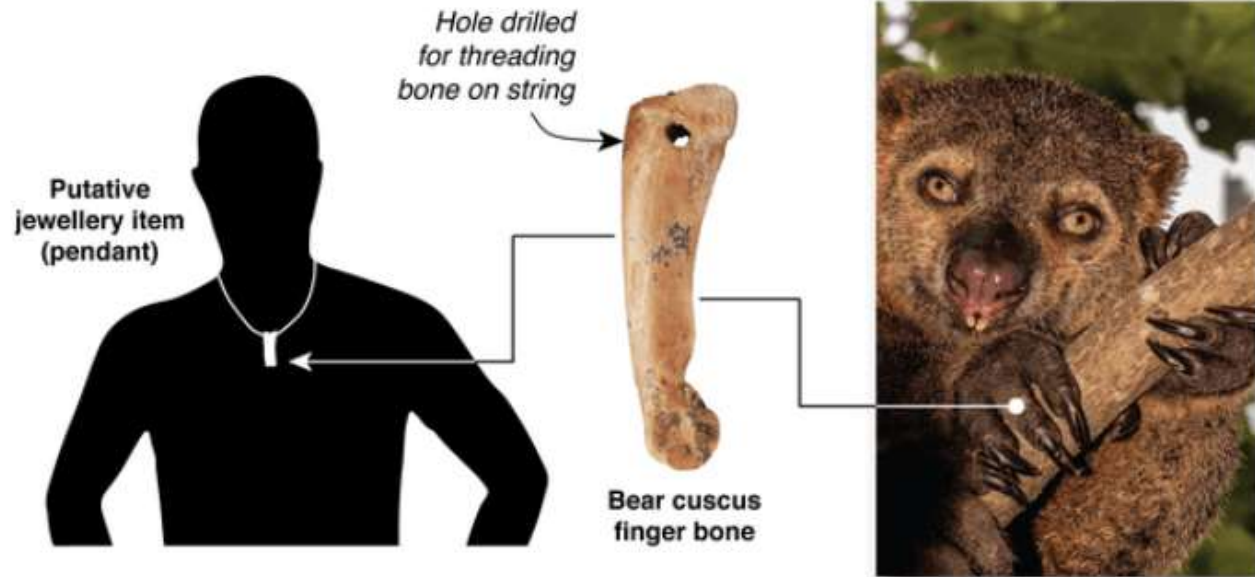


Vogelherd, Germany: 40-30 Ka



30-22 Ka, Sulawesi, pendants

- ▶ A suite of previously undocumented **symbolic artefacts** excavated from a **limestone cavern on Sulawesi**, the largest island in Wallacea.
- ▶ The artefacts were dated using a range of methods to **30-22 Ka**.
- ▶ They include **disc-shaped beads** made from **the tooth of a babirusa**, a primitive pig found only on Sulawesi, and a “**pendant**” fashioned from **the finger bone of a bear cuscus**, a large possum-like creature also unique to Sulawesi.



Prehistoric ornaments excavated from the Sulawesi cave site Leang Bulu Bettue. Michelle Langley and Adam Brumm/Bear cuscus bone image, Luke Marsden/Bear cuscus and babirusa, Shutterstock., Author provided

Indonesian



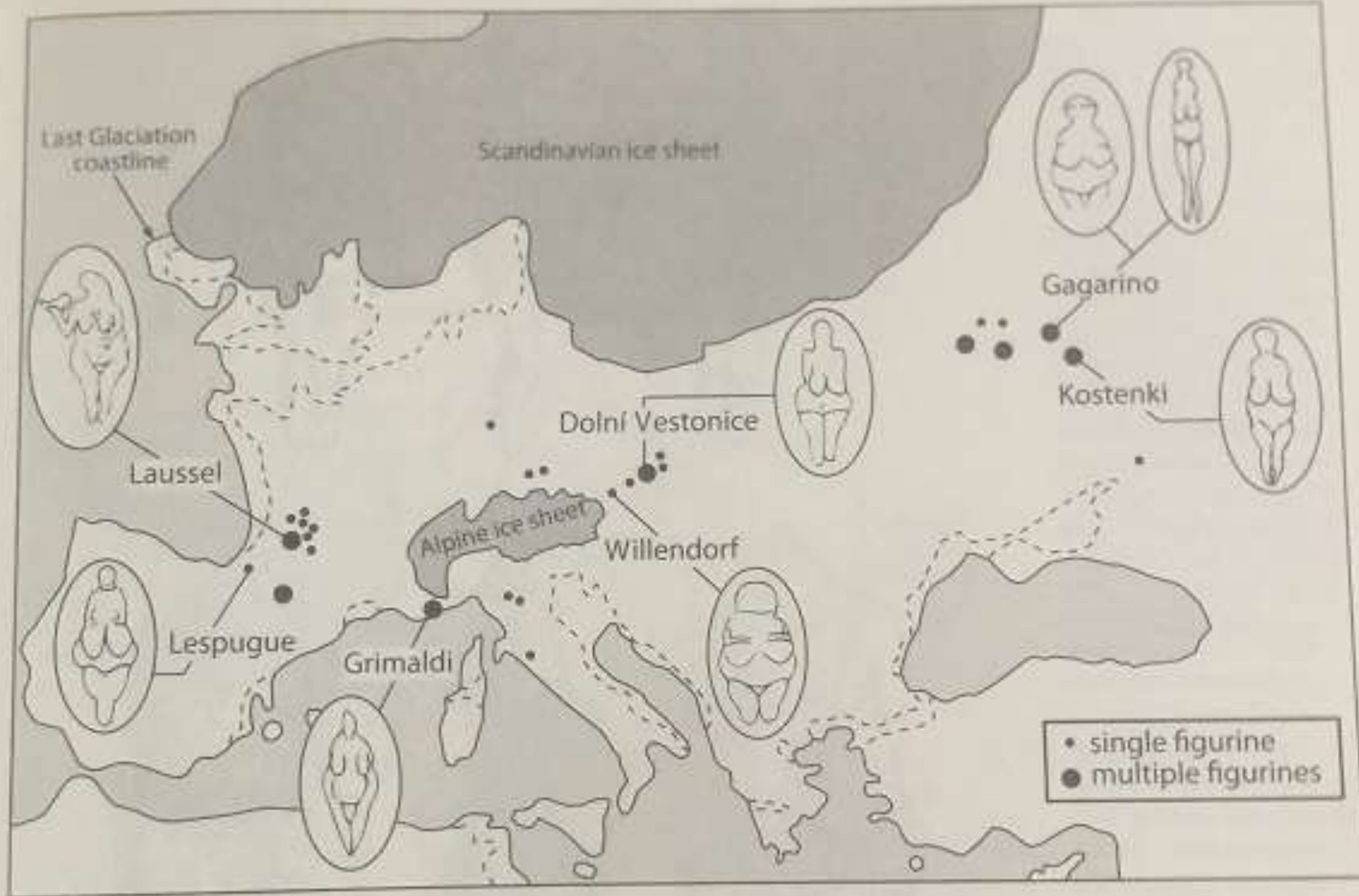
South African Rock art, 27 Ka



Venus Figurines

- ▶ These figurines were carved from soft stone (steatite, calcite, limestone), bone or ivory, or formed from clay and fired.
- ▶ Over 100 such figures are known; majority in 25-20 Ka period
- ▶ Mostly of modest size, between 4 cm and 25 cm in height
- ▶ **Theories:** fertility magic, used as tokens to help a woman get pregnant; part of a Mother Goddess cult; could represent a social network; form of pornography; self representations; origin research rare

AMHs:
Venus
figurines



Location of Venus figurines



Venus of Hohle Fels
Germany:
Mammoth Ivory,

Oldest Venus
figurine, 35 Ka



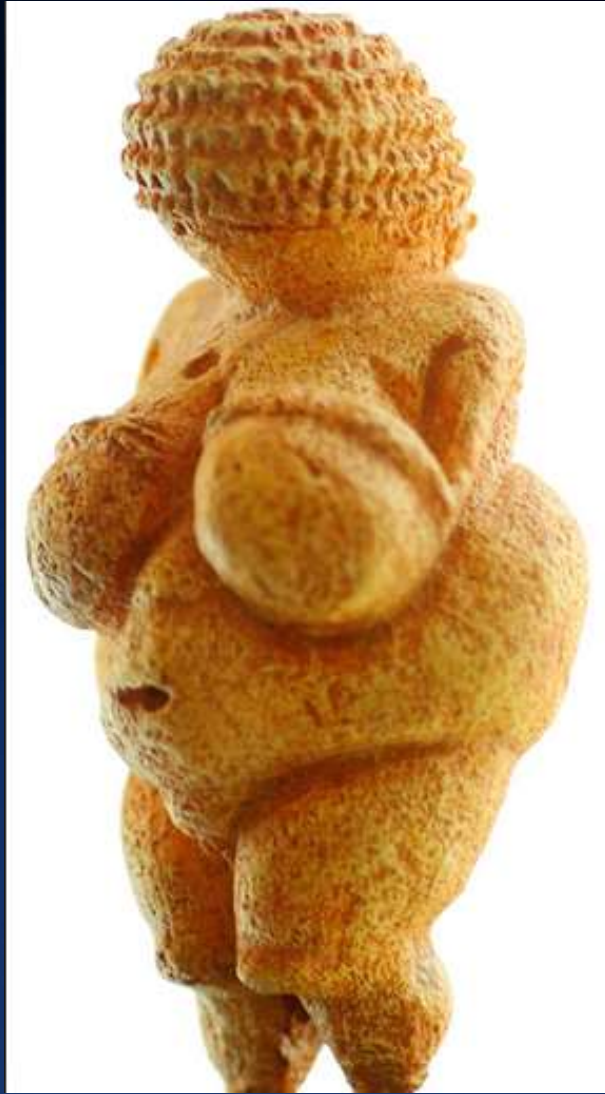
Venus of
Galgenberg,
Germany,
made of
green serpentine
30 Ka:
Dancing woman?



Venus of
Petřkovice, Czech
23 Ka



Venus of Willendorf, Austria, 4", 28 to 25 K: fertility talisman



Venus of Willendorf



Venus of Laussel,
France,
23-18 Ka:
bas-relief



The Venus of Laussel

Venus of Renancourt, in Amiens, France: 23 Ka



Venus of
Dolni Vestonice,
Czech:
oldest examples
of kiln-fired clay
artifact



Black Venus of Dolni Vestonice
by Don Hitchcock (CC BY-NC-SA)

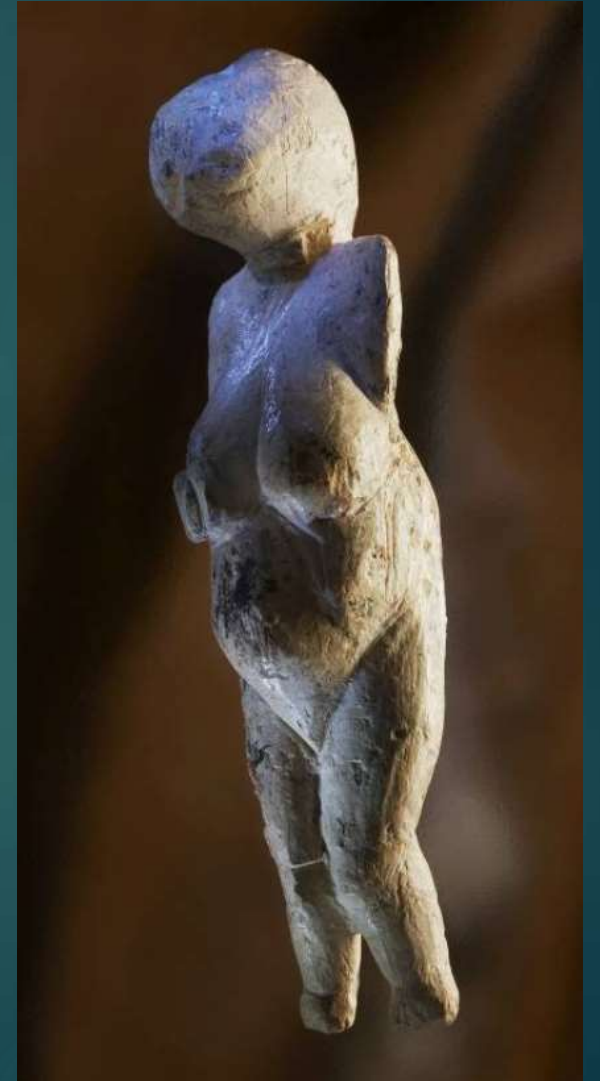
Venus of Savignano
24 Ka



Venus of Monpazier
25 Ka



Venus of Kostenki,
23 Ka



Mal'ta Venuses, Siberia



Venus of Grimaldi,
Italy: 24 Ka



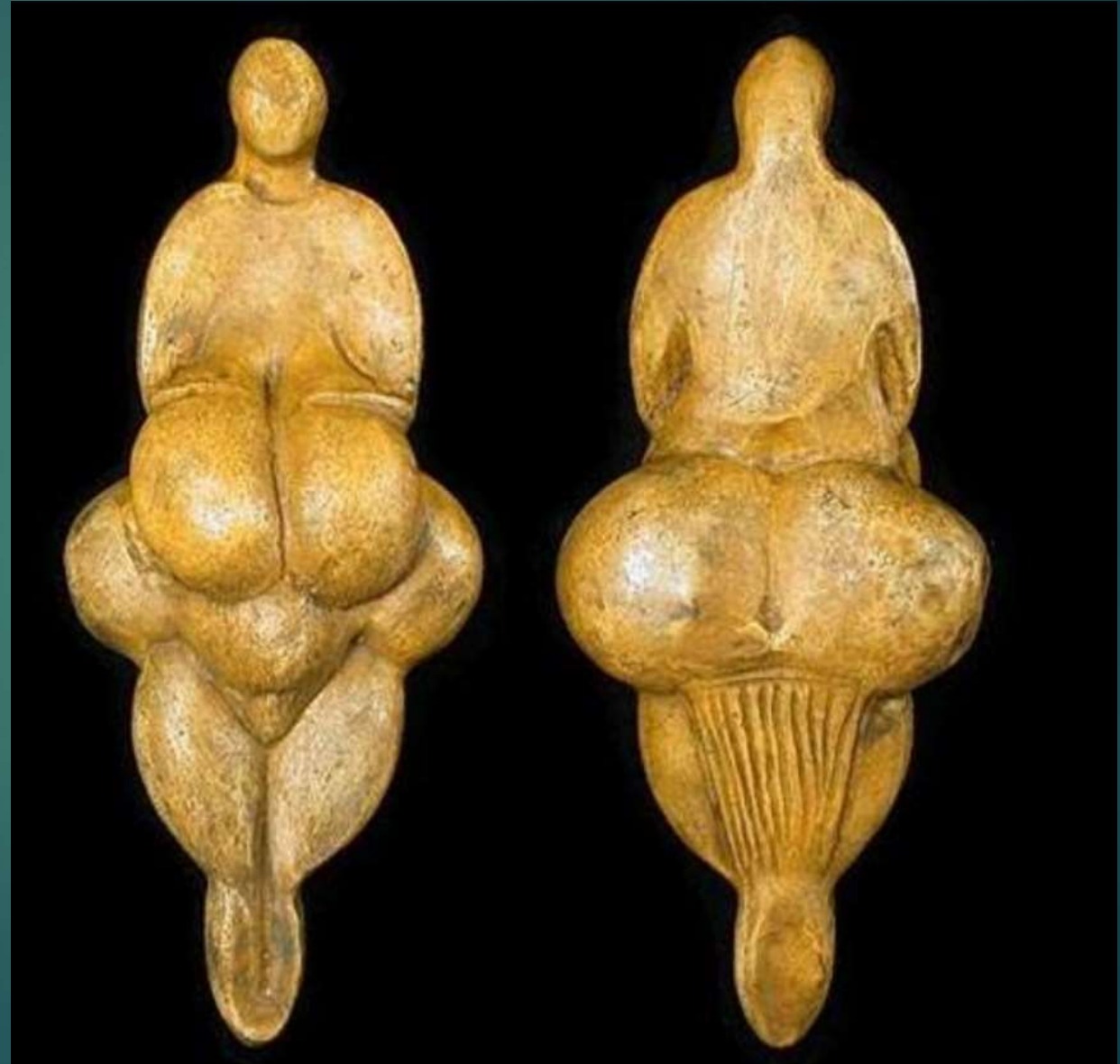
Venus of Menton



Venus of el
Rombo



Venus of Lespugue, 23 Ka



Venus of Moravany

23 Ka



Avdeevo Venuses, Eastern Europe, 20 Ka



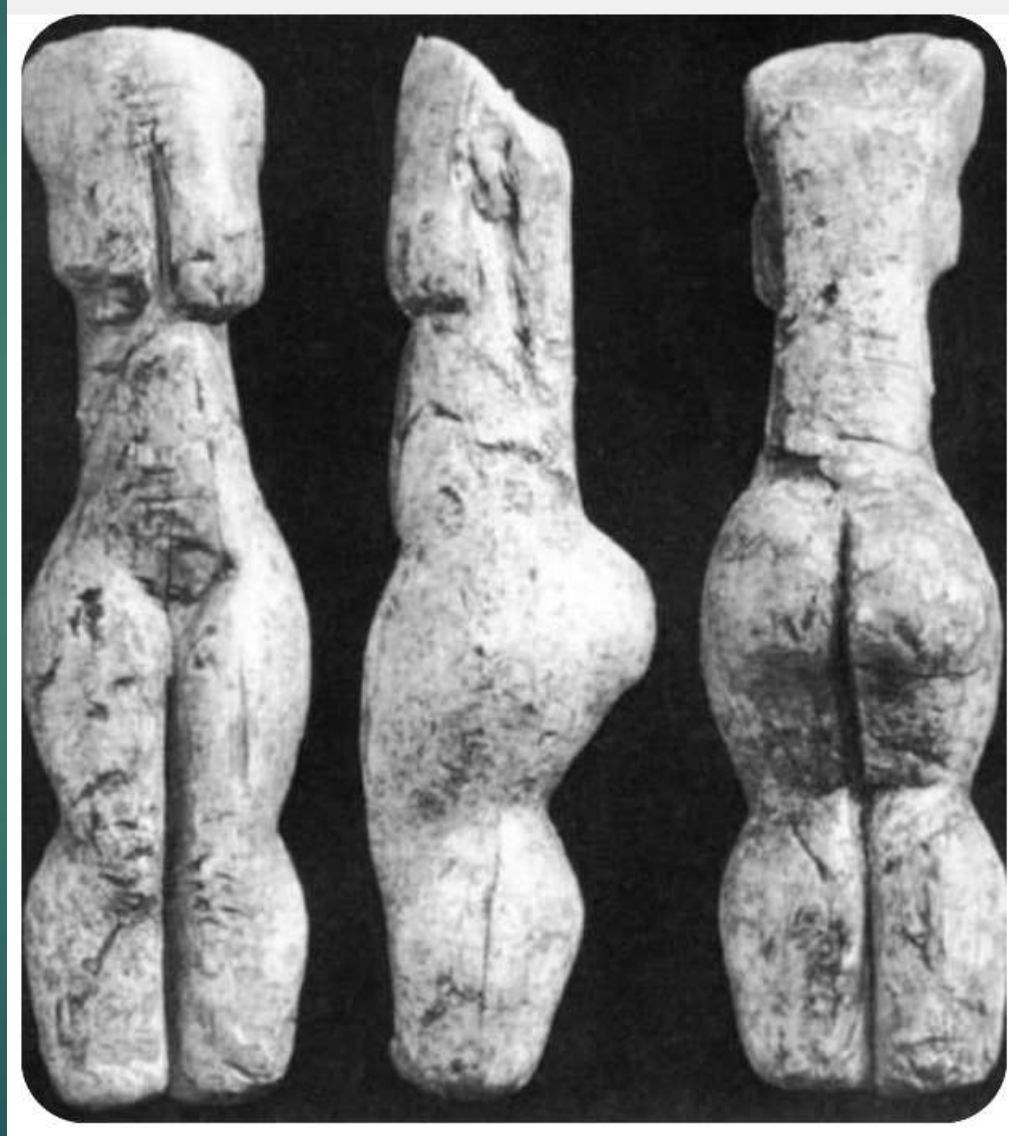
Mal'ta & Buret, Siberia, 20 Ka



Zaraysk Venuses, Russia, 20 Ka



Venus of Eliseevichi, Russia, 14 Ka (a la Modigliani!)



Venus of Zaraysk,
Russia,
19 Ka



Venus of
Abri Pataud,
France,
21 Ka



Venus of Monruz

18 mm pendant

11 Ka



Dolni Vestonice Venus

Brno, Moravia

30 Ka, 4"



Venus of Brassempouy

France:

Woman's head,
24 Ka



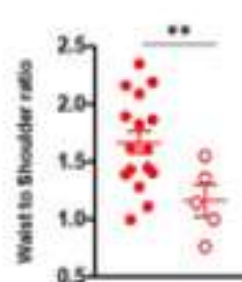
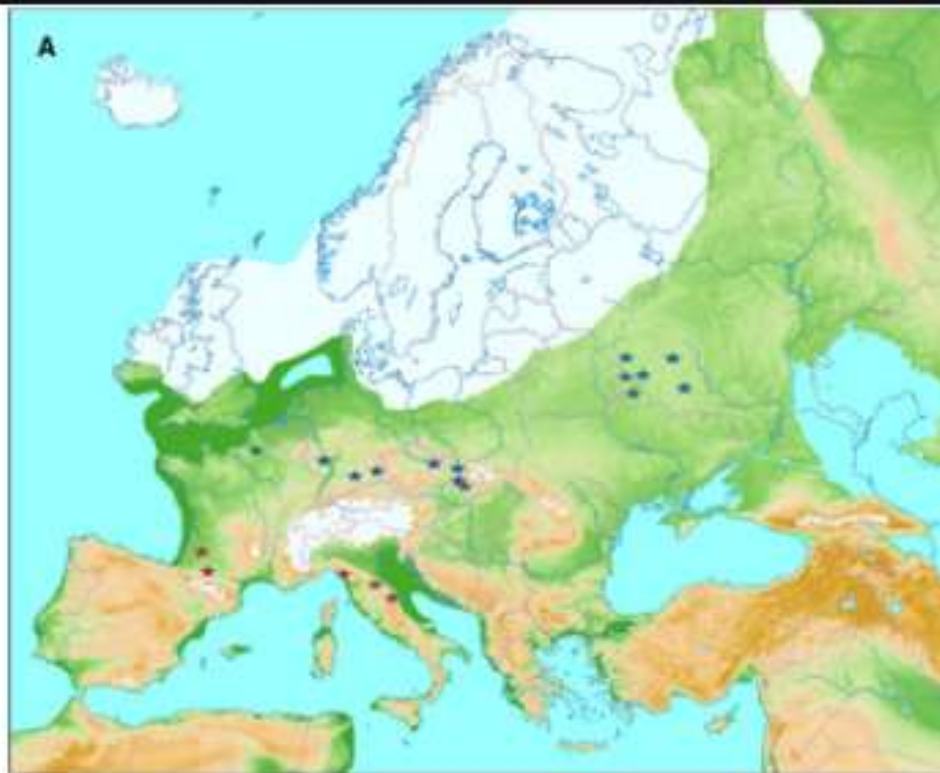
Ain Sakhri Lovers, Bethlehem, Israel
11 Ka



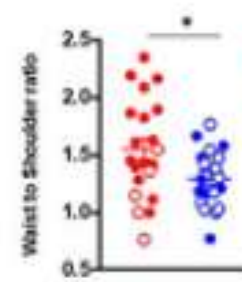
Gonnersdorf and
Andernach – Martinsberg,
Germany, 15 Ka



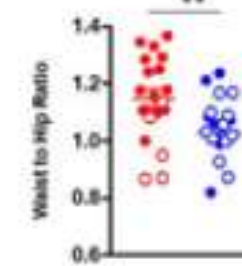
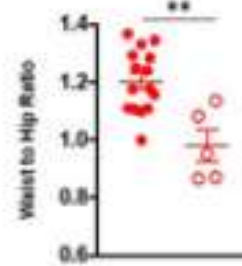
Relationship of obesity of Venus figurines and closeness to glaciers: more obese as distance from the glaciers decreases



Distance from Glaciers Before 22k BP



Ice Age Advance VS Glacial retreats



Venus figurines, starvation, and climate

- ▶ Upper Paleolithic figurines showing women with obesity may represent survival symbols of climatic change: figurines correlate to times of extreme nutritional stress
- ▶ Figurines of women with obesity or who are pregnant (“Venus figurines”) from UP Europe rank among the earliest art and endured from 38 to 14 Ka, one of the most arduous climatic periods in human history.
- ▶ We propose that the Venus representation relates to human adaptation to climate change. During this period, humans faced advancing glaciers and falling temperatures that led to nutritional stress, regional extinctions, and a reduction in the population.

Venus figurines, starvation, and climate: totems of survival, not sex

- ▶ We analyzed Paleolithic figurines of women with obesity to test whether the more obese figurines are from sites during the height of the glacial advance and closer to the glacial fronts.
- ▶ Figurines are less obese as distance from the glaciers increases. Body size proportions were highest when the glaciers were advancing, whereas obesity decreased when the climate warmed and glaciers retreated.
- ▶ Because survival required sufficient nutrition for child-bearing women, we hypothesize that the overnourished woman became an ideal symbol of survival and beauty during episodes of starvation and climate change in Paleolithic Europe.

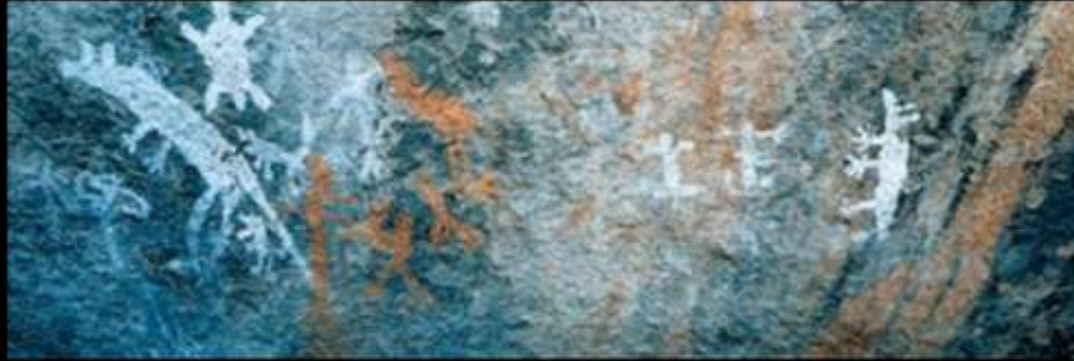
Font de Gaume Cave, France: 14 Ka



Galerie principale. Frise des cinq bisons polychromes située à mi-hauteur de la paroi gauche.



Aboriginal Rock art, 15,500 years old



Spear
Thrower:
Post 20 Ka



Depiction of wall painting methods



Pont-d'Arc Cavern, Replica of Chauvet Cave



Chauvet Cave, 33-30 Ka: 13 species, 100s of images



Detail of horses at Chauvet (31k)



Horse Panel





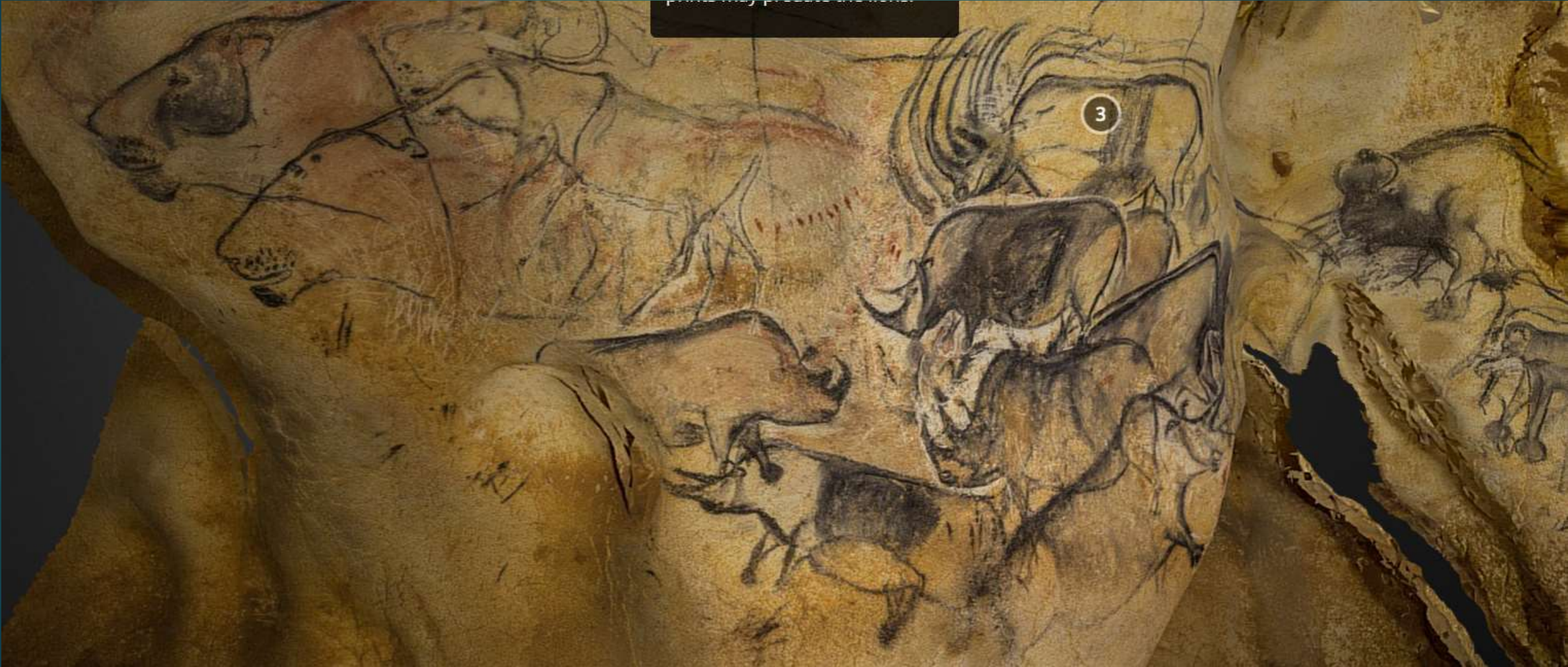
Chauvet Cave, 33-30 Ka



Great Panel

0:57 / 2:50
CAVE OF CHAUVET-PONT-D'ARC, FRANCE

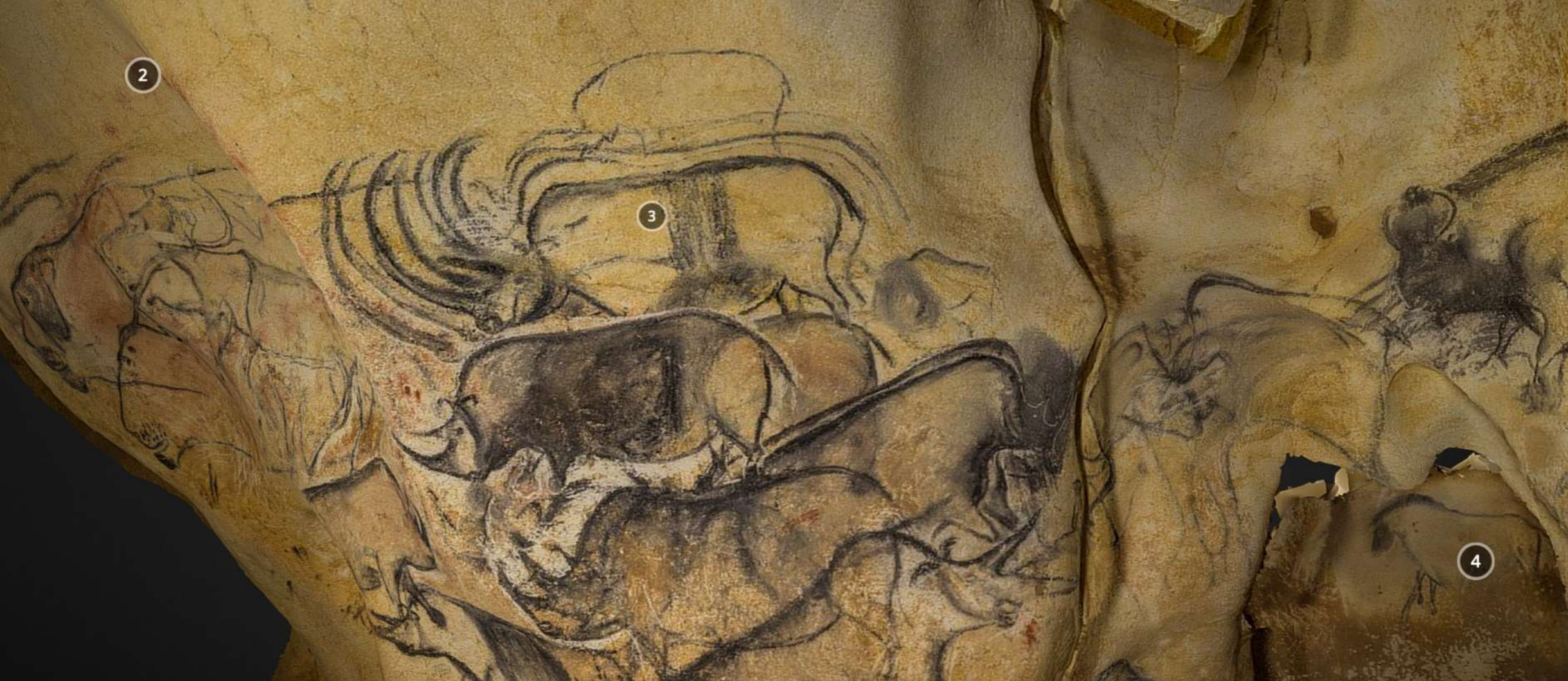
Chauvet Cave



Panel of Rhinos

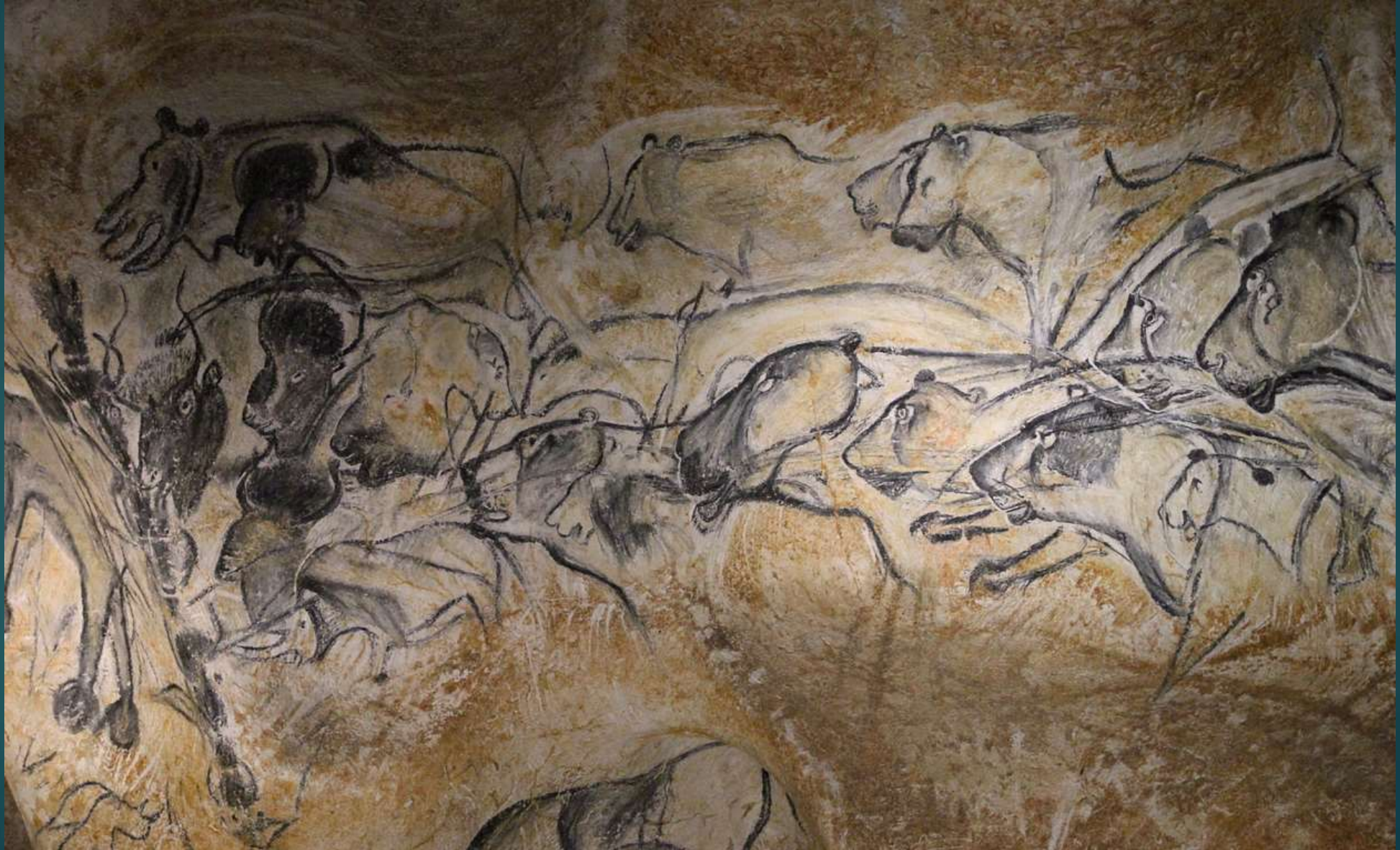


Chauvet Cave





Panel of Lions







1

5

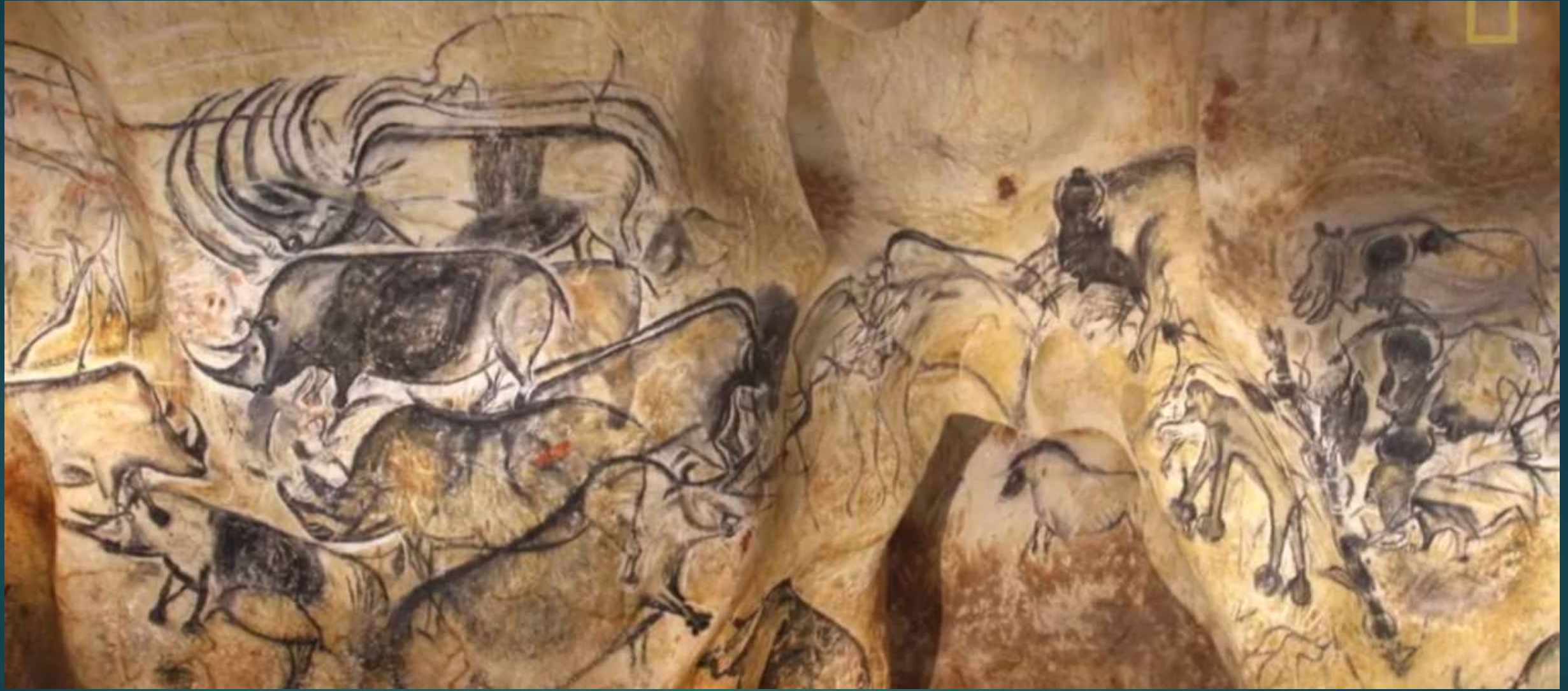
6

7







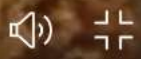


Panel of Lions





▶ 1:10 / 3:03



Chauvet-Pont d'Arc, Ardèche, France



One from 33,500 years ago, and the other from 31 to 28,000 years ago.



Chauvet: Red Dot Panel



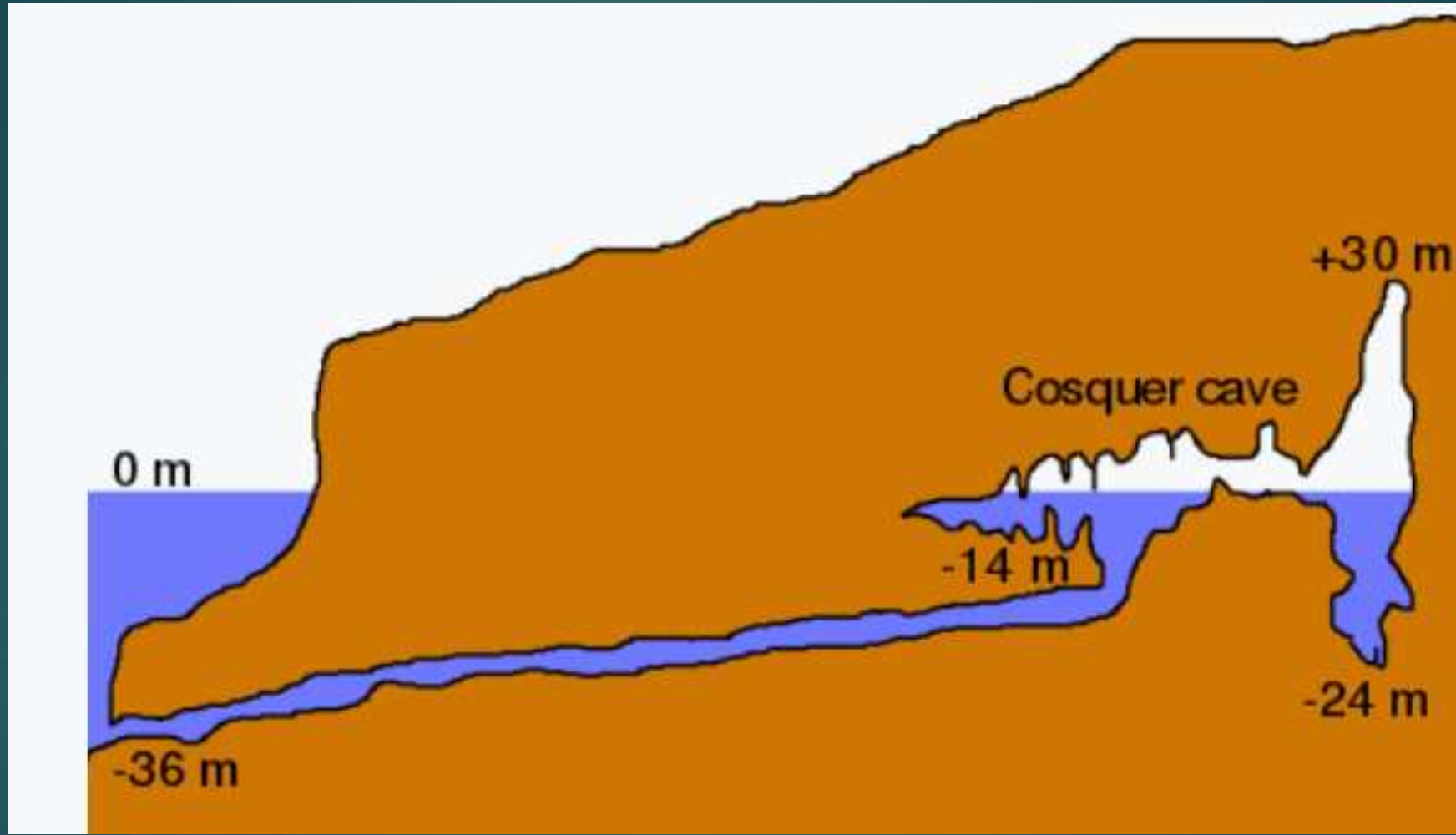
Underwater Cosquer Cave on coast near Marseille, France



Underwater Cosquer Cave in Marseille, France



1985 discovery by diver Henri Cosquer: entrance to the cave is located 121 ft underwater; 574 ft long entrance tunnel



Underwater Cosquer Cave in Marseille, France



Underwater Cosquer Cave in Marseille, France



Underwater Cosquer Cave in Marseille, France



Underwater Cosquer Cave in Marseille, France



Underwater Cosquer Cave in Marseille, France



Underwater Cosquer Cave in Marseille, France



Underwater Cosquer Cave in Marseille, France: 27 Ka



Underwater Cosquer Cave in Marseille, France: 65 hand prints



Zoomorphic pictogram on stone slab from the MSA of **Apollo 11 Cave, Zambia; 22 Ka; animal + human**



Lascaux Cave, 18-17 Ka: Great Hall of the Bulls

Discovered in 1940. 2000 images. The **wall decorations in the Great Hall of the Bulls** are the most impressive of all Paleolithic art. They extend on **both sides of the vaulted walls of a sloping floored rotunda**.

The vast fresco, covering some **twenty meters**, is composed of **three groups of animals: horses, bulls and stags**. In fact these themes recur repeatedly in the different areas of this underground sanctuary.



This composition is introduced by a strange figure, the Unicorn.







“Hall of the Bulls”, Lascaux Cave, France
(17,000 years old)

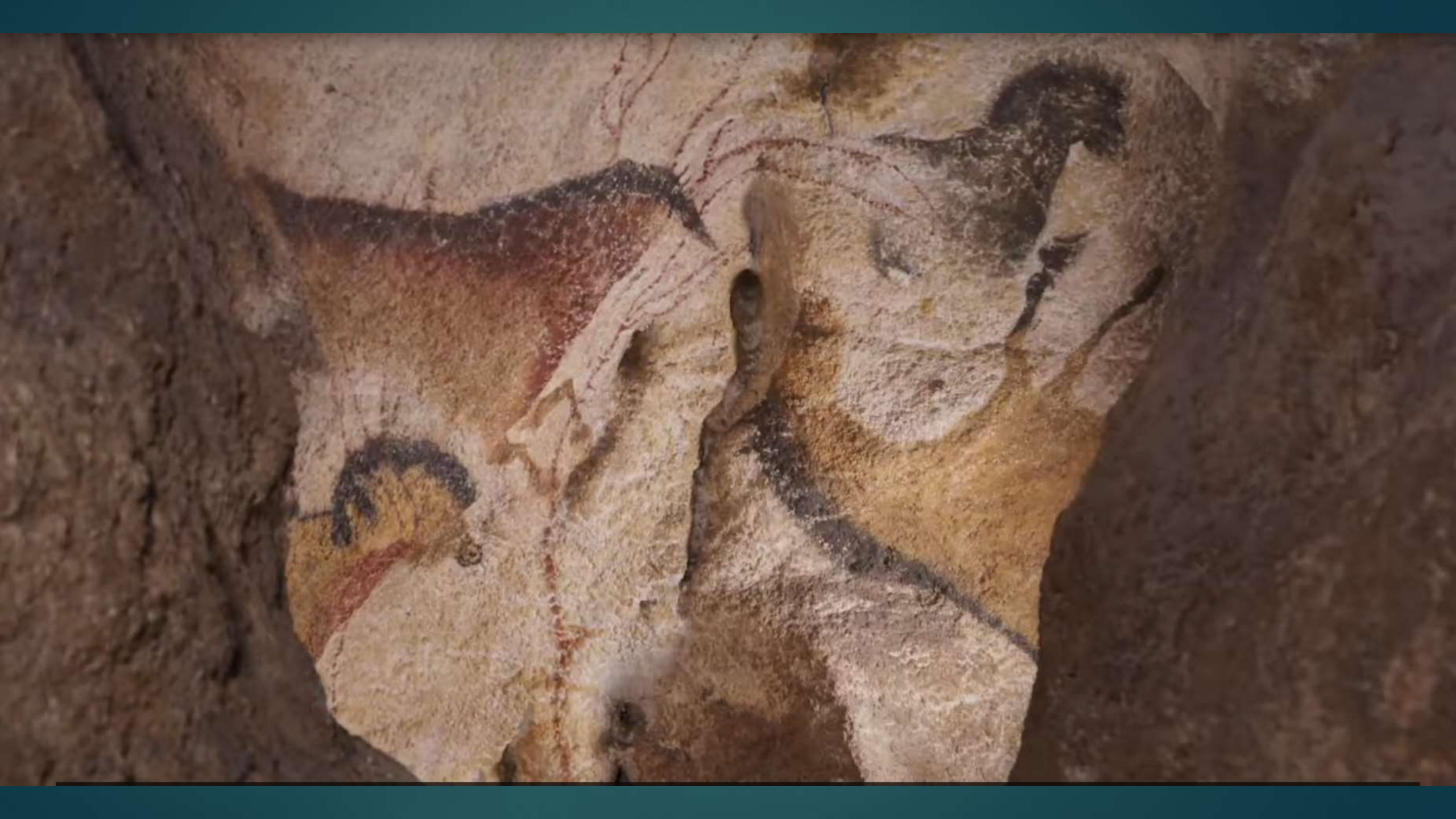


















Horse, bull, and deer
from Lascaux Cave,
France (17,000 years
old)









The so called “Chinese horses” of Lascaux Cave.
Bahn 1995

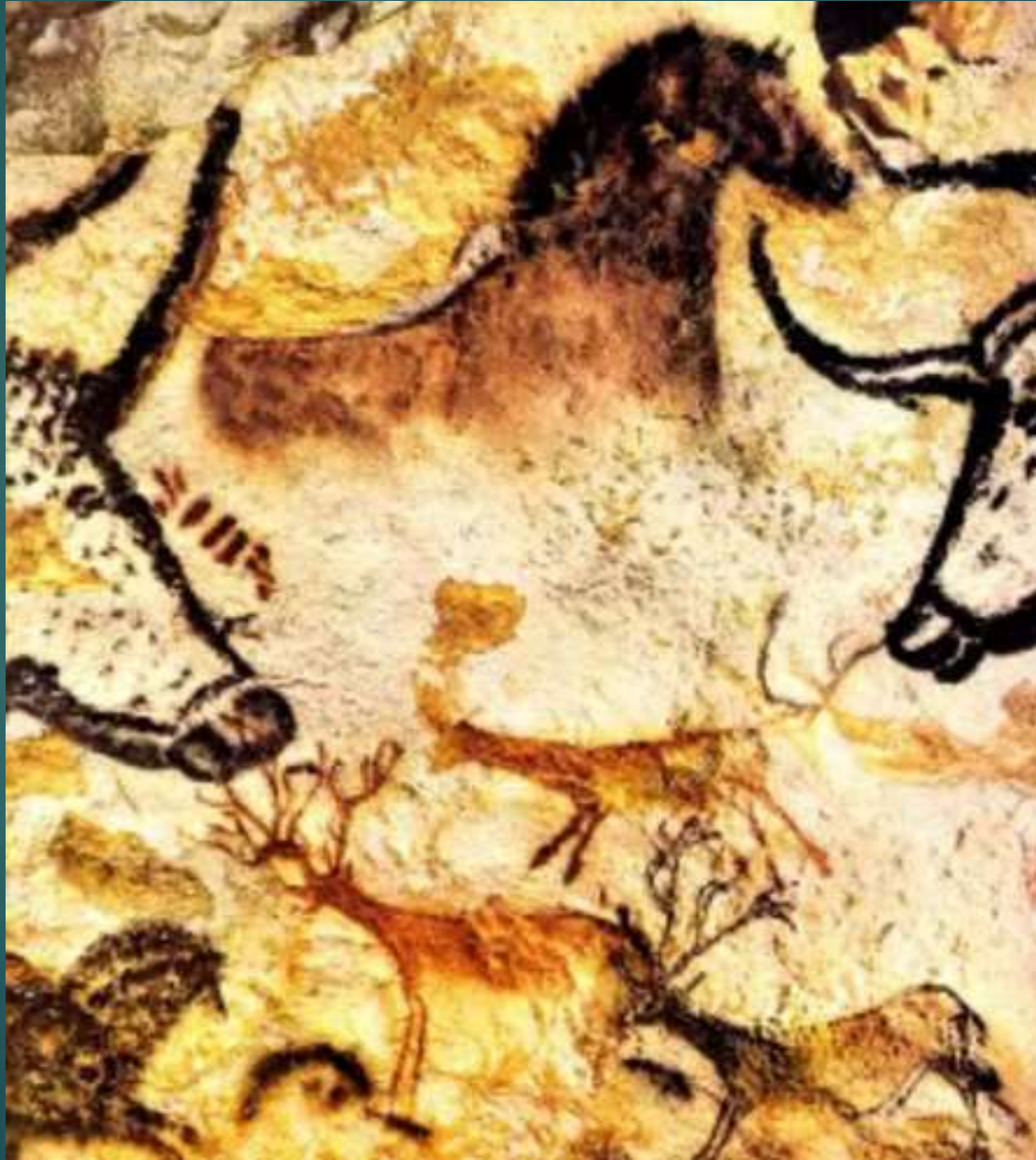


Auroch, Lascaux, France

Lascaux, France: 18K - Stag



Lascaux Cave, France; 17 – 15 Ka



Possible shamanic scene.
17,000 years old. Lascaux, France



“Le Sorcière” man-animal figure.
Les Trois Frères, France



Altamira Cave, Spain

- The Sistine Chapel of Paleolithic art; Discovered in 1868
- A dog, a weaver, an eight-year-old girl and a landowner with a spade formed the cast.
- The opening line by 8-year-old María Sanz de Sautuola y Escalante was:
“Look, daddy! Oxen!”
- Polychrome cave paintings:
charcoal and ochre



Altamira Cave, Spain



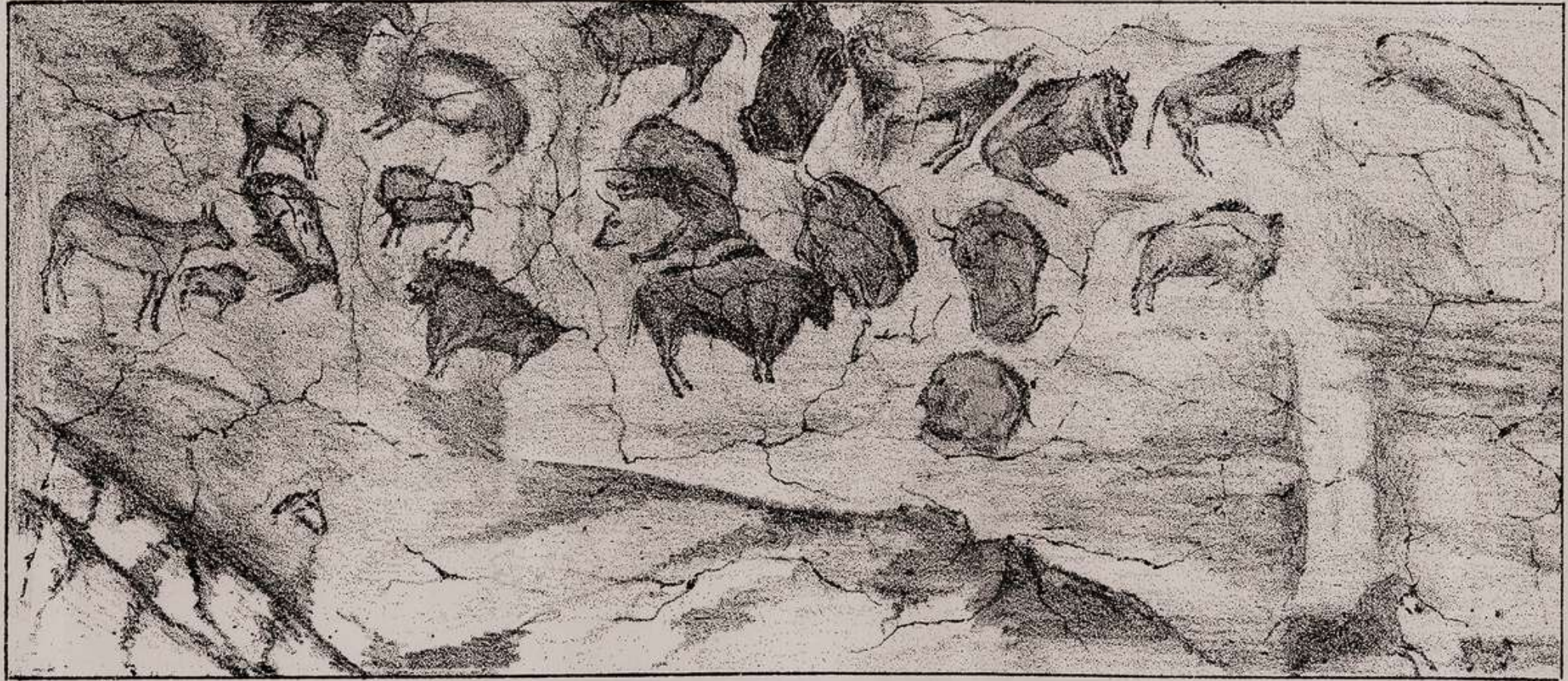
Altamira Bison
c. 15,000 BC
Altamira, Spain

Polychrome bison, Altamira, Spain, 14 Ka



1880 rendition of Altamira





Pinturas en la bóveda de una cueva en el Ayuntamiento de **SANTILLANA DE LA MAR** Lit. Telesforo Martínez, Santander

Replica



Association of animals at Altamira Cave, Spain















Used the contours of cave



Altamira Cave









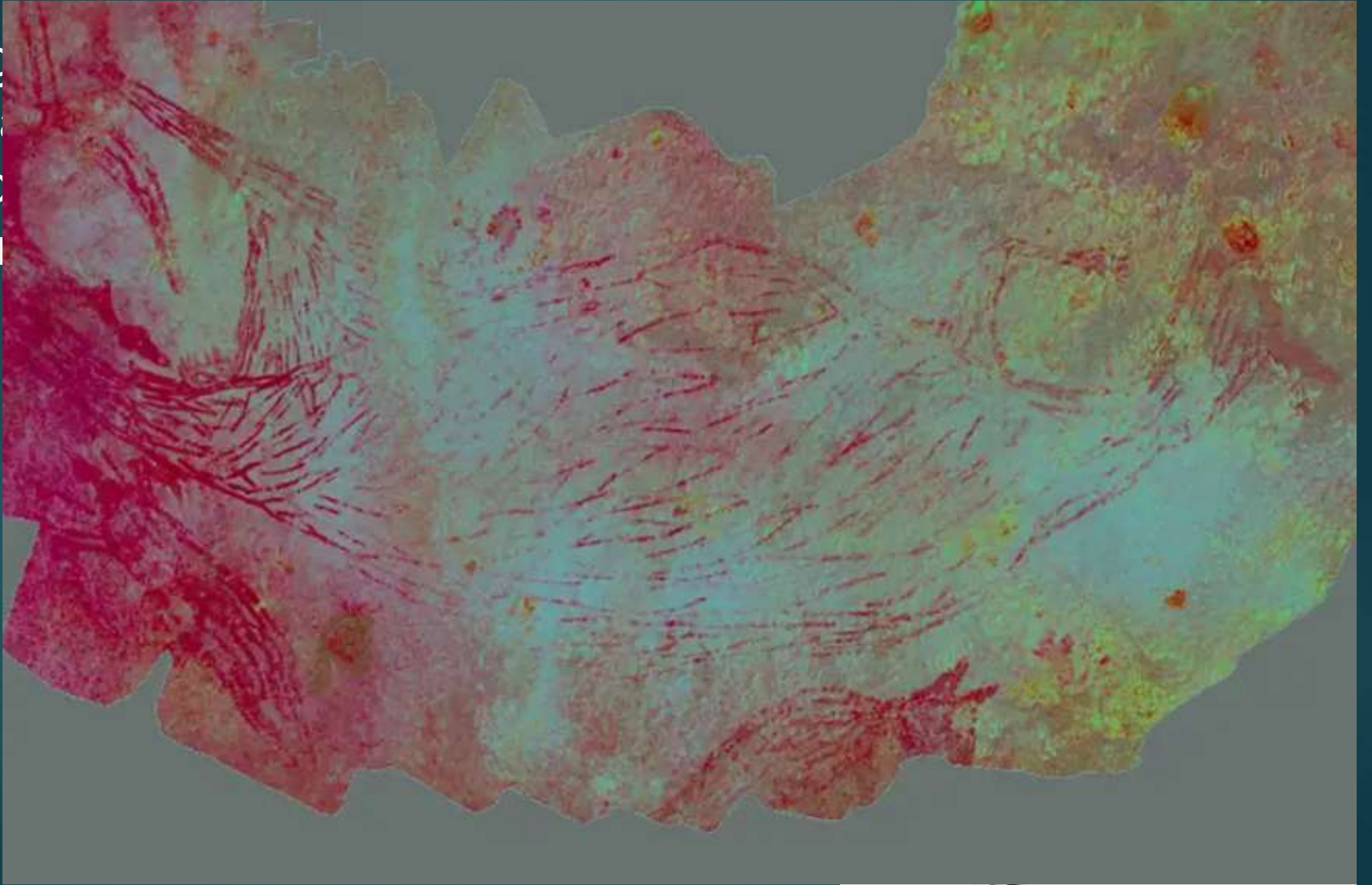
Modern interpretation of the most famous bison



Bradshaw Rock Paintings, Australia, 12 Ka: more than 1 M items



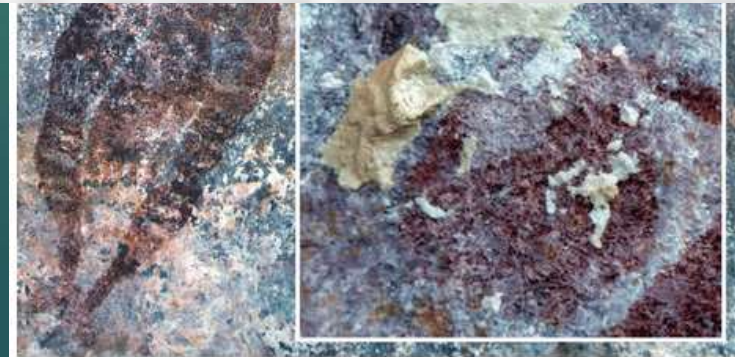
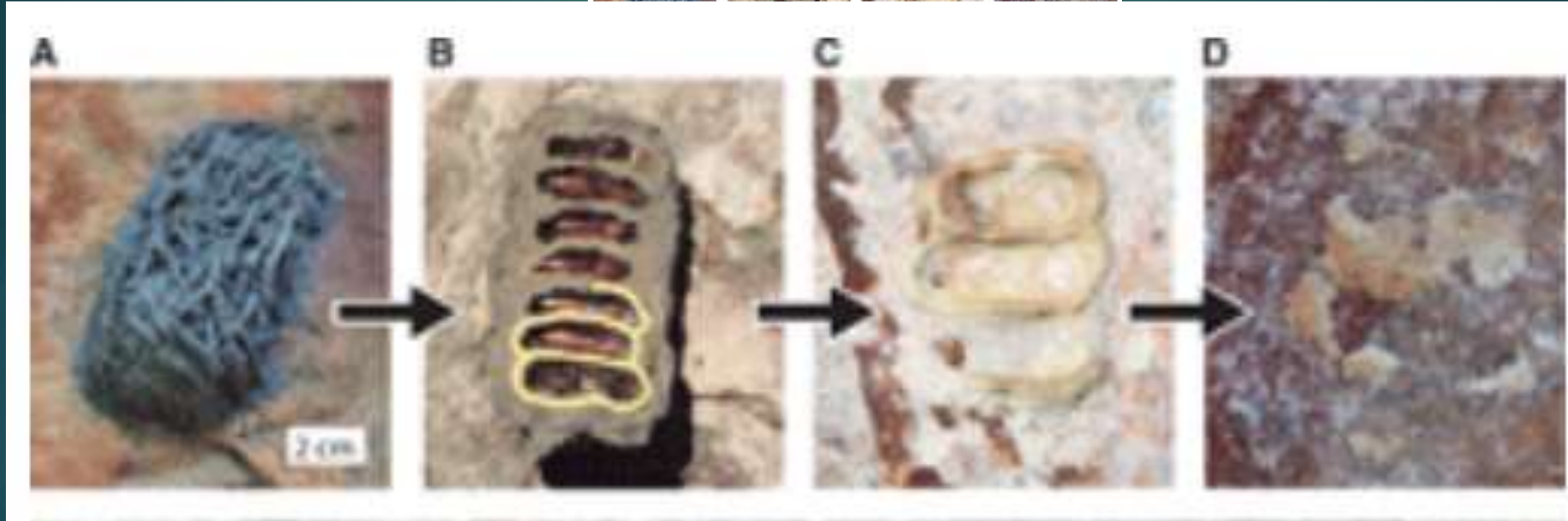
Kang
17 K
Kimb
Aust



New dating method: charcoal in mud wasp nests



Kimberley, Australia: dating with charcoal in mud wasp nests, x 12 Ka; 12 Ka painting





Bison Licking Insect Bite; 15,000-13,000 BC;
antler; National Museum of Prehistory ([Les Eyzies-de-Tayac-Sireuil](#), France)



Rouffignac Cave, France, 13 Ka: playful



Tuc d'Audoubert Cave, 2 ft clay bison, 13.5K



Clay moved from 100s of feet away

Le Tuc d'Audoubert
cave, SW France,
14 Ka
Bison:
Soft clay



Rock carving of *Pelorovis antiquus* at Tassili n'Ajjer, southern Algeria





Magdalenian Horse, c. 15,000 BCE, [Musée d'Archéologie Nationale](#), France



- ▶ *Swimming Reindeer*, 13 Ka mammoth-tusk sculpture now residing in the British Museum, Depicts a female on the left and a male on right.



"Rampant Hyena" carving found at Abri de la Madeleine, France



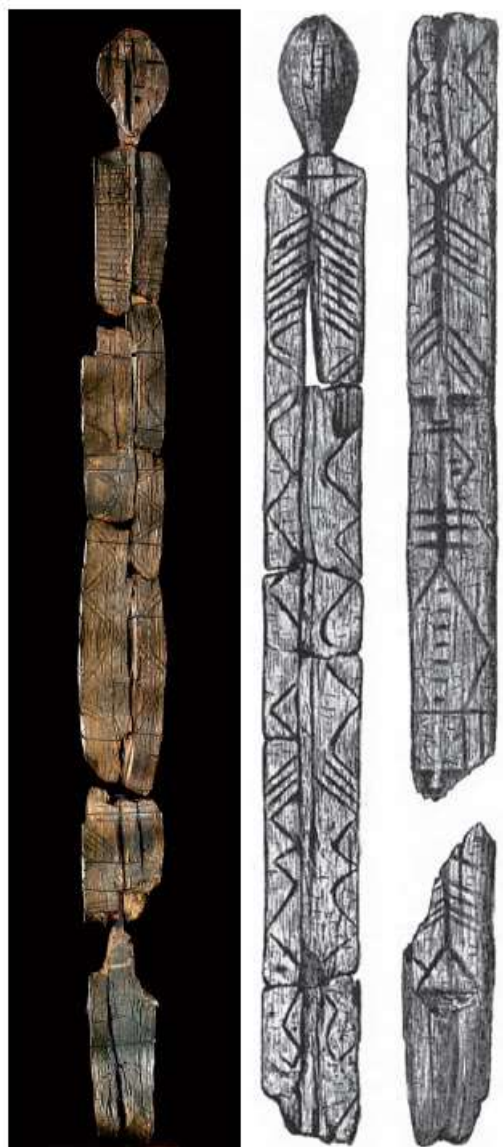
Mammoth spear thrower

Bruniquel, France

12 Ka



Yekaterinburg, Russia: 12 Ka



- In 1894, gold prospectors digging up a peat bog near the Russian city of Yekaterinburg unearthed something bizarre: a carved wooden idol **5 meters long**

Carved markings cover both front and back of the Shigir Idol, which was originally 5 meters tall. Covered front and back with recognizable human faces and hands, along with zigzag lines.

Shows that large-scale, complex art emerged in more than one place—and that it was the handiwork of hunter-gatherers and not, as was once assumed, of later farming societies.

Colombian Amazon: Cerro Azul in Guaviare state, 12 Ka



JOSÉ IRIARTE

Researchers believe this rock art depicts a giant sloth (a); a mastodon (b); a camelid (c); horses (d and e); and a three-toed ungulate with a trunk (f)

8 miles of art: 12 Ka old rock art in the Colombian Amazon

400







The rock art of La Lindosa Guavire in Colombia's Chiribiquete National Park. Image: Judith Trujillo Téllez, Investigador



Painted rock art depicting five red figures, from **Jabbaren, Ajjer Plateau, Djanet, Tassili, Algeria, 9 Ka**

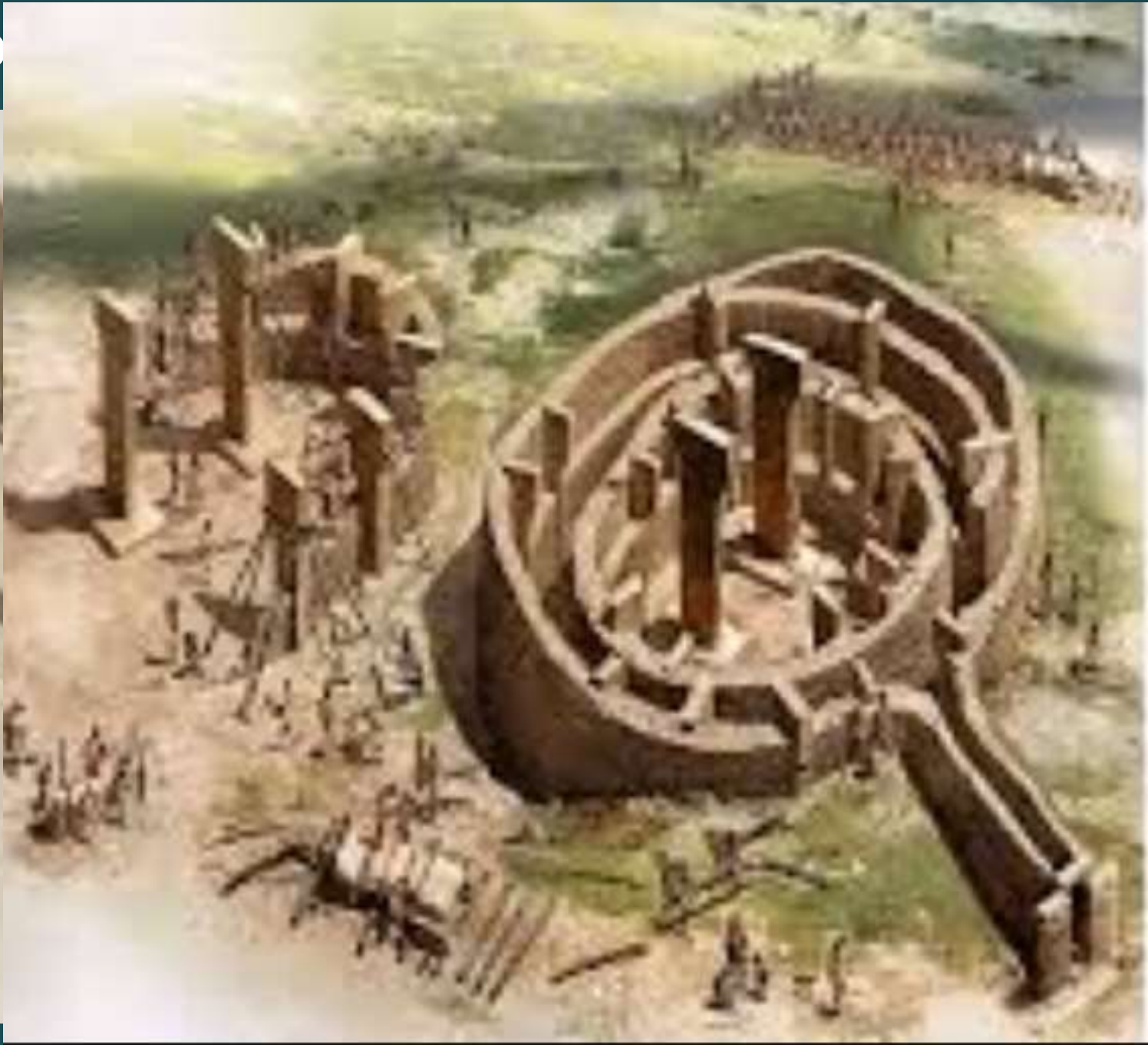


Gobekli Tepe, Turkey; First Temple?

- ▶ Dated to **9100 to 7500 BP**; Predating Stonehenge by 6,000 years,



Gobekli Tep



Cueva de las Manos, Argentina, 7 Ka



Running Horned Woman,
6-4 Ka,
pigment on rock,
Tassili n'Ajjer, **Algeria**



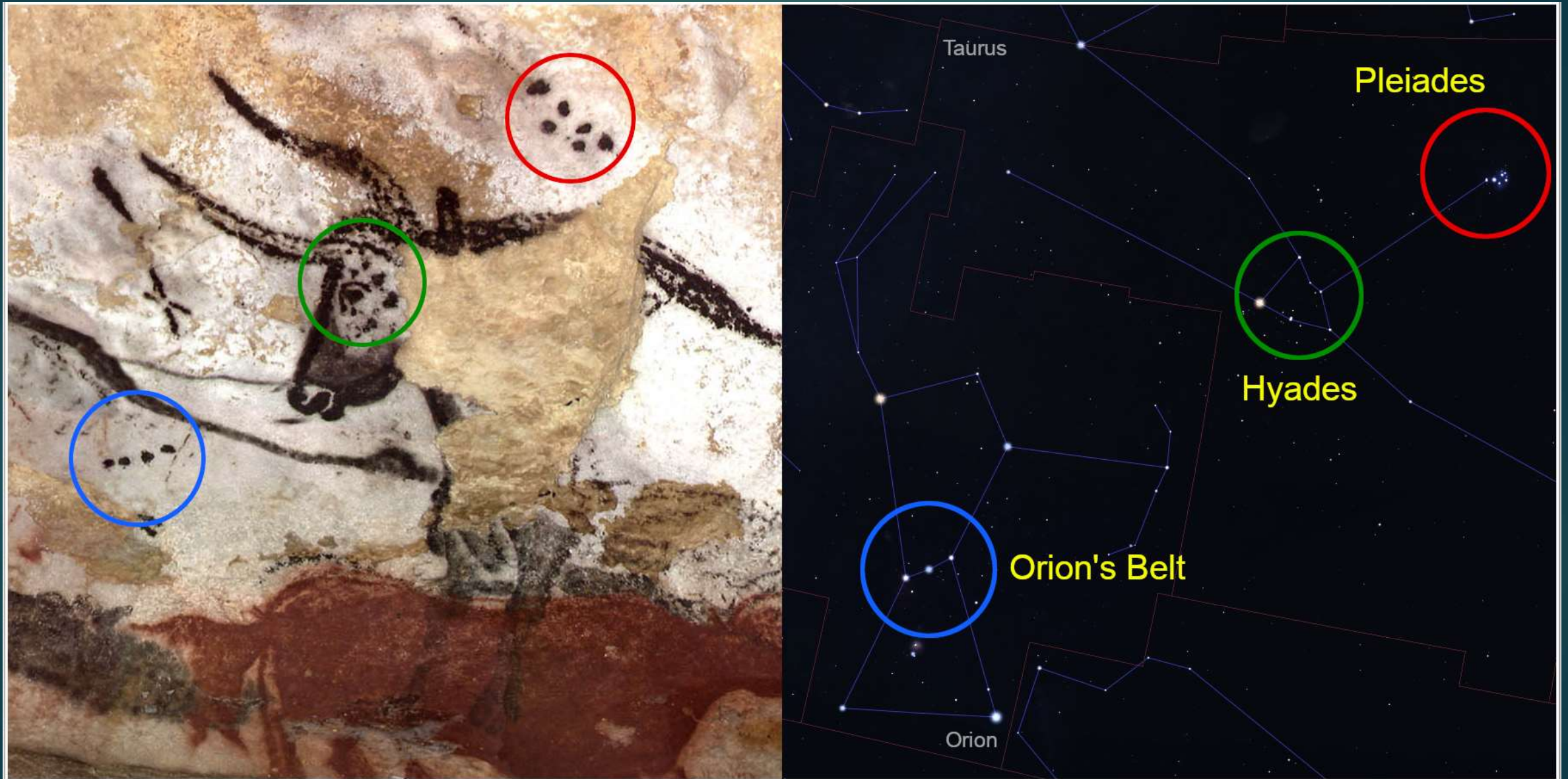
Island of Malta: Sleeping Lady, 5 Ka



Venus of Malta, 3 Ka



Lascaux Cave: Star chart overlays bull



Lascaux Cave: Star chart overlays bull

- ▶ A wall painting from the Lascaux Cave produced by an unknown late Upper Paleolithic artist some 17,000 years ago. On the left is the painting on the wall of an auroch, with black dots shown around its eye, to its lower left, and above its shoulder. On the right is depicted an area of the night sky centered around the constellation of Taurus the Bull. Note the correspondences highlighted by the colored circles between the dots in the painting and the stars in Orion's belt and Taurus' prominent star clusters (Hyades and Pleiades).
- ▶ Note that there are 4 stars in the left circled image—maybe an additional star in the area 17,000 years ago? Image provided by and shown with permission from Damian G. Allis.
- ▶ From the 3rd edition of *Star Maps: History, Artistry, and Cartography*, by Nick Kanas, MD



An acrylic on canvas artwork produced by Aboriginal artist Reggie Sultan, ca. 2012. Entitled **The Seven Sisters Story**, the image measures approximately 11.75 X 17.75 inches (29.8 X 45.1 cm). Note in the upper right, the seven sisters of the Pleiades now on Earth and meeting up with seven Aboriginal hunters, who then sit together by a waterhole. At the bottom are white tracks of animals and black footprints of people by another waterhole and stream, below which are two goanna lizards and wild bush fruit. In the upper left, six of the sisters are ascending back into the heavens on the Milky Way to once again become stars, followed reluctantly by the seventh sister trailing behind.

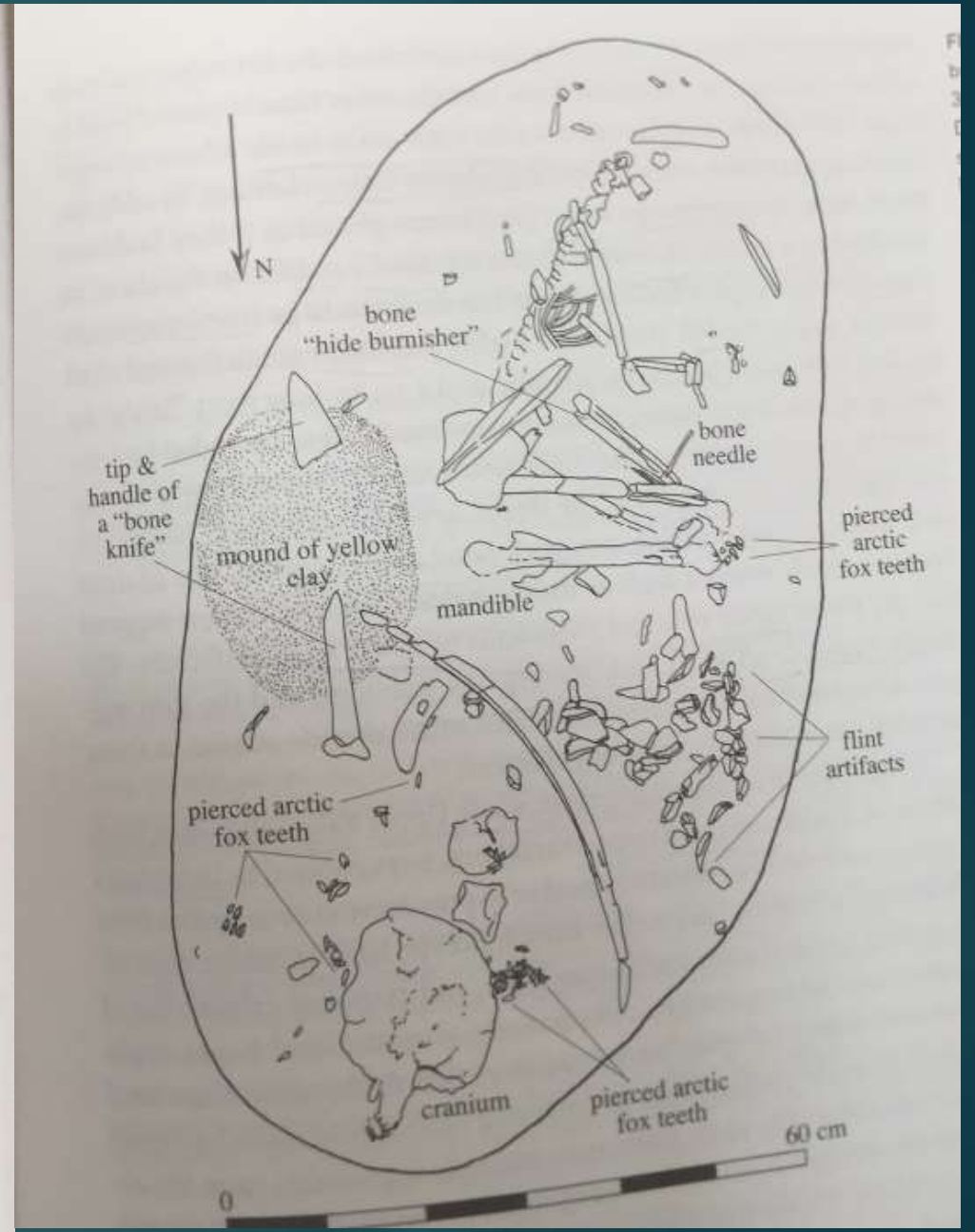
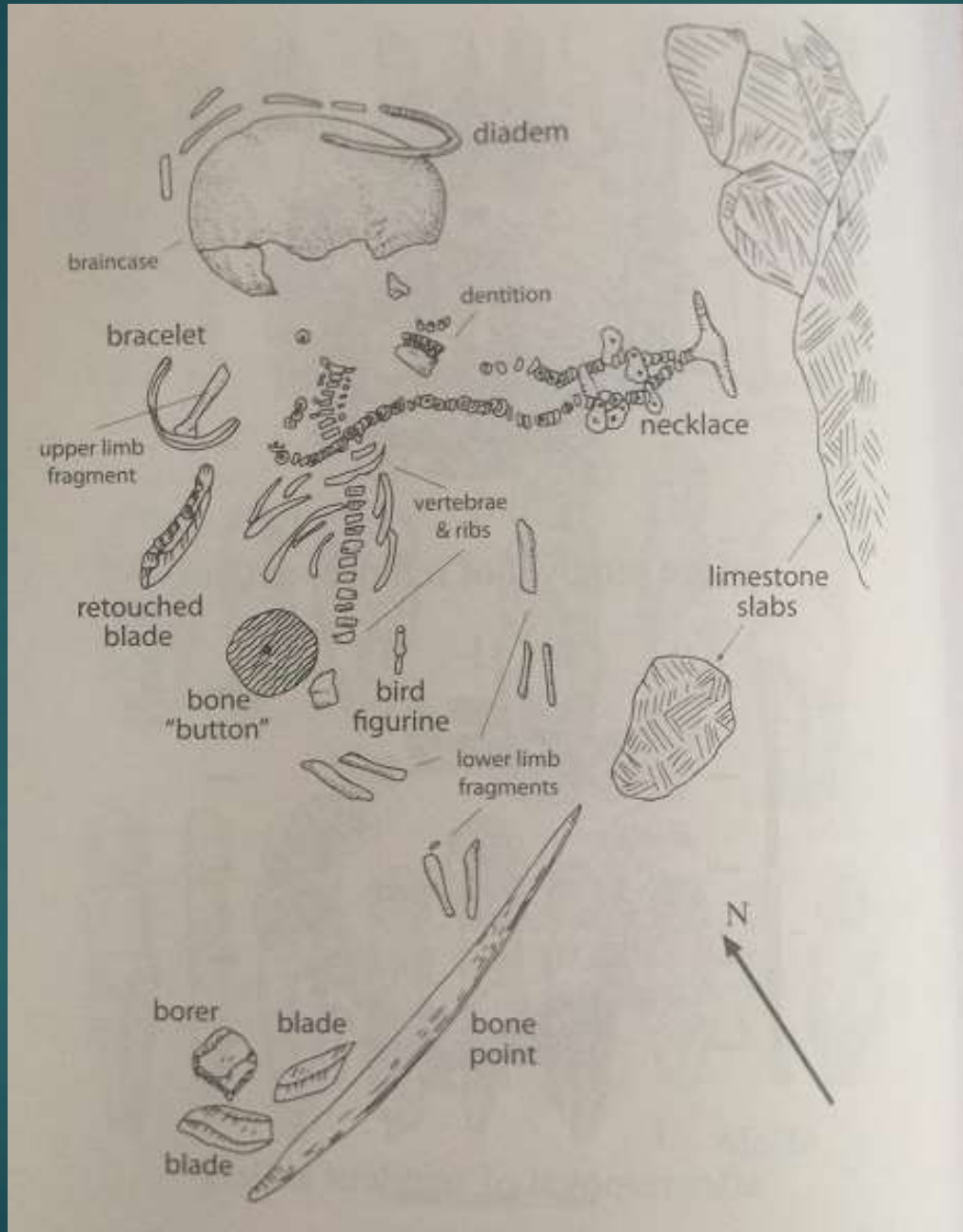
There is an accompanying children's book written and illustrated by Sultan (*The Seven Sisters*) that explains the story and the various images in the painting. Image reproduced from the original artwork and shown with permission from Reggie Sultan and the Nick and Carolyn collection.

AMHs: UP Graves and burials

- ▶ Graves from Mousterian sites; **UP were not first to bury their dead.**
- ▶ **But UP first to do multiple burials in one grave:** Cro-Magnon; Czech sites of Pavlov, Dolni Vestonice; graveyard at Predmostí (18 individuals covered by limestone slabs and mammoth bones)
- ▶ **Mousterian burials were simple**, with no ritual or grave goods; some **UP burials** are simple, but many are rich with bones, perforated shells, stone artifacts, concentrations of ocher, ivory beads
- ▶ **Lagar Velho, Portugal, 24 Ka:** Gravettian: bones stained red from ocher from hide shroud; shell pendant, 4 pierced deer canines from headdress; laid out on his side, fully extended (never seen in Mousterian graves)
- ▶ Many UP graves **covered by large rock slabs or bones**

AMHs:
UP
Child
burials:
Mal'ta,
Siberia,
left;

Kostenki,
Russia,
right



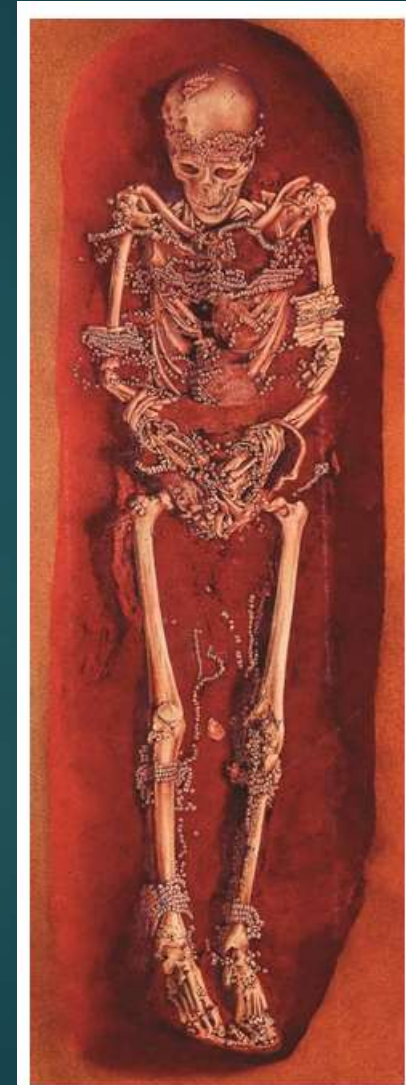
Upper Paleolithic Grave: Sunghir', Russia

- ▶ Elaborate permafrost burials of an adult male covered in beads and ochre, and a juvenile and an adolescent, approximately 10 and 12 years old, buried head to head.
- ▶ Dated 34 Ka, this is the richest find of any Upper Paleolithic grave.
- ▶ Earliest example in Europe of very elaborate UP *Homo sapiens* burials

Diversity and differential disposal of the dead at Sunghir
Erik Trinkaus and Alexandra P. Buzhilova, 2018



N. O. Bader



This photo montage shows the highly decorated remains of a 35- to 45-year-old adult male who was buried at Sunghir.
K. Gavrilov/Trinkaus and Buzhilova/Antiquity

Sunghir



Sunghir

- ▶ The male adult covered in beads and ochre was between 35-45 years of age when he died.
- ▶ Bioarchaeological analysis suggests he might have sustained a sudden death, probably due to an incision in his neck.
- ▶ While his grave—which contains about 3033 mammoth ivory beads (from closely fitting clothing), 250 pierced fox canines (on belt at waist), and ivory pendant, pin and armbands; and ivory mammoth figurine under left shoulder; highly polished femur shaft packed with ocher—is stunning, that of the juvenile and the adolescent is even more so.

Sunghir

- ▶ In addition to 5374 beads and ochre, carefully manufactured mammoth ivory pin, small spears, ivory disks, and pierced cervid antlers were found with the 2 skeletons. The beads alone required 1000s of hours to manufacture.
- ▶ At least three different forms of burials were practiced at Sunghir.
- ▶ 2 adolescents had physical deformities (bowed legs; facial)
- ▶ Genetically the 3 were unrelated

Raqefet Cave, Mt. Carmel, Israel



The excavation of a double burial at Raqefet Cave, Mt. Carmel, Israel, revealed 11,700–13,700-year-old remains from individuals who were placed in a flower-lined grave.

Bibliography

- ▶ Tattersall, Ian – *Masters of the Planet*
- ▶ Tattersall, Ian – *The Fossil Trail*
- ▶ Reader, John – *Missing links (2nd Ed.)*
- ▶ Wood, Bernard – *Human Evolution (A Brief Insight)*
- ▶ Falk, Dean – *The Fossil Chronicles*
- ▶ Stringer, C. – *Lone Survivors*
- ▶ Tattersall, Ian & Schwartz, J. – *Extinct Humans*
- ▶ Johanson, D. & Maitland, E. - *Lucy: The Beginnings of Humankind*
- ▶ Johanson, Don & Edgar, B. – *From Lucy to Language, 2nd Ed.*
- ▶ Finlayson, C. – *The Humans Who Went Extinct*
- ▶ Klein, Richard – *The Human Career, 3rd Ed. (Definitive textbook)*
- ▶ Don's Maps: <http://donsmaps.com/index.html>
- ▶ <http://humanorigins.si.edu/evidence/3d-collection/fossil>

Textbooks recommended by Bernard Wood

- ▶ *Principles of Human Evolution* (2nd ed.) - Robert Lewin & Robert A. Foley, 2004
- ▶ *Human Career: Human Biological and Cultural Origins* (3rd ed.) – Richard G. Klein, 2009 (1024 pp)
- ▶ *Reconstructing Human Origins: A Modern Synthesis* (3rd ed.) – Glenn C. Conroy & Herman Pontzer, 2012
- ▶ *Exploring Biological Anthropology: The Essentials* (3rd ed.) – Craig Stanford, John S. Allen, Susan C. Anton, 2013

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Contact Info

- ▶ Charles J. Vella, PhD
- ▶ www.charlesjvellaphd.com
- ▶ charlesvella@comcast.net
- ▶ 415-939-6175