Neandertals Reimagined, Pt 5:

Mortuary Practices, Transitional Industries & Denouement

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by

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Neandertal Mortuary Practices

MH mortuary traditions

- Burials
- Mummification
- Embalming
- Throwing in pits
- Cannibalism
- Eating brains
- Native American/Tibetan sky burial
- Cremation
- Graveyards
- “Turning of the bones” reburials
- Viking death ship
- Coffins hung from cliffs

Burials

- Burials: Even for mostly complete bodies, never mind fragments, it's extremely difficult to prove that they were intentionally left at a particular place.

- Numerous reasons could lead to individual Neanderthals taking their last breaths in a cave: succumbing to sickness, injuries received elsewhere, even starvation or violence.

- The problem comes with inflexible tick lists of how the remains of the dead 'should' have been treated, which may overlook otherwise meaningful actions taken by the living.

Burials

- Burials aren't a gold standard, they're simply the most obvious. Moreover, they're also a spectrum, going from a specially dug pit, to a natural hollow or niche, to simply covering with sediments.

- The myriad other ways bodies can be dealt with must also be looked for, even if they're not so easy to identify: being exposed, cut up, burned, curated, displayed, recycled or even eaten

Burials

- Kebara 2 is a largely complete Neanderthal's upper body from Israel; look closely and you can see how small finger and wrist bones fell into the empty stomach cavity as it decomposed.

- In fact, while not taking an unduly credulous position, any site with even a partly complete Neanderthal skeleton is a signal for something singular going on. That's because in general it's vanishingly rare to find entire animal bodies within cave assemblages.

- Thanatology - forensic taphonomy - is vital in assessing how 'natural' any particular Neanderthal skeleton is.

Burials

- Detailed criteria for a “burial” have been proposed:
  - Pits should be artificial and filled by one sediment deposit, very different to the surrounding level.
  - Skeletons should lie complete at the very base of the pit, preferably in an extended or flexed position, and any associated objects should be unusual.
  - Fulfilling these exacting characteristics certainly gives confidence for deliberate burial, yet they're so stringent that even some historical human cases might be rejected.

- But these conditions are met at relatively few Neandertal fossil sites. 1 study recognized only 35 Eurasian Neandertal burials, which underscores the fact that burials were not always a part of Neandertal behavior.

Neandertal Burials

N Burials

- Neanderthals intentionally buried their dead.
- Their burials included simple grave goods like animal bones and stone tools.
- It is clear that they did not just dump their dead with the rest of the trash to be picked over by hyenas
- They often placed the bodies of their dead in a flexed position.

Burials

- The most convincing evidence for deliberately excavated burial pits comes from the French sites of La Chapelle-aux-Saints, La Ferrassie, Le Régourdou, Le Roc de Marsal, and Saint-Césaire; from the Ukrainian site of Kiik-Koba; and from Kebara and Amud in Israel.

- The subadult skeletons of Dederiyeh (Syria) appear to represent intentional burials as well.

- The new Neandertal skeleton, Shanidar Z, from Shanidar Cave in Iraq also seems to have been intentionally buried, which suggests that some of the Neandertal individuals previously recovered from the cave may also represent burials.

Burials

- But even in the best cases, it is not clear whether this represents eschatology or housekeeping.
- Some older authors regard Neandertal burials as evidence of Neandertal religion, the paragon of symbolic behavior (Bergounioux 1958, Defleur 1993).
- Others see them as just an expedient for covering up a stinking corpse.
- Neandertal burials are simple affairs and rarely contain evidence of grave goods. This is also true for the early MH graves from western Asia as well.

Grave goods?

- Burials – Ns had an interest in mortality; Ns took bodies apart, ate them occasionally - note bonobos or elephants fascination (touching of dead; carrying dead babies for days); not accidental burials
- Amud child - single grave good: a deer jaw
- No instances where N skeletons are accompanied by significant grave goods, ala much later MH burials

The Amud baby, found lying close to the cave wall with an unusually intact deer jaw on its pelvis.

Neandertal Burials

- Roc de Marsal – complete child; 2.5-4 yo; with questionable reindeer, parthrige, and an entire hyena jaw
- Feldhofer – late found skull piece; and pieces of 2 other
- Sima de los Huesos: 28 skeletons
- Krapina, Croatia: 900 bones - 23 to 80 individuals
- La Quina – 20 individuals
- L'Hortus – middle of 300 ft cliff – over centuries or millennia
- Sima de las Palomas – 10 Ns over centuries

Burials

- La Ferrassie rockshelters- 8 individuals at living site
- There are also parts of many children: the youngest of all was LF5, a two-month premature infant, while LF4b was a newborn, LF6 roughly pre-school age, LF3 around 10 years old, and a toddler LF8; dated 47-44 Ka; no pits, but freezing depressions; unclear if burials; no gnawing on bones
- Shanidar, Iraq – 11 Ns – 4 bodies together in a pit that was scooped out; 2 lithics, 1 by the hand of Shanidar Z; flower burial – new 2022 data does not support this theory
- Difficult-to-interpret 'orphan' skulls and other body parts are widespread in caves, but also in the open air. 6 from Germany (1 found in 1816); another 6 at 1 site; 2 near Mt Carmel

N burials

- Intentionally buried some of their dead; big ? = why; ritual or practical purposes? (hygiene, prey avoidance)
- Usually shallow graves
- 35 known N grave sites, including Feldhofer, Spy, Le Moustier, Le Quina, Saint-Cesaire, Kiik-Koba, Mezmaiskaya, Tabun, Amud, Dederiyeh, Shanidar, Teshik-Tash, La Ferrassie
- In 16 of 20 N graves, bodies are tightly flexed (near fetal position): burial ritual or simply smallest grave?
- No evidence that Ns practiced ritual in their burials

Ns at Shanidar Cave, Iraq

c.740 m asl, south-facing

spring

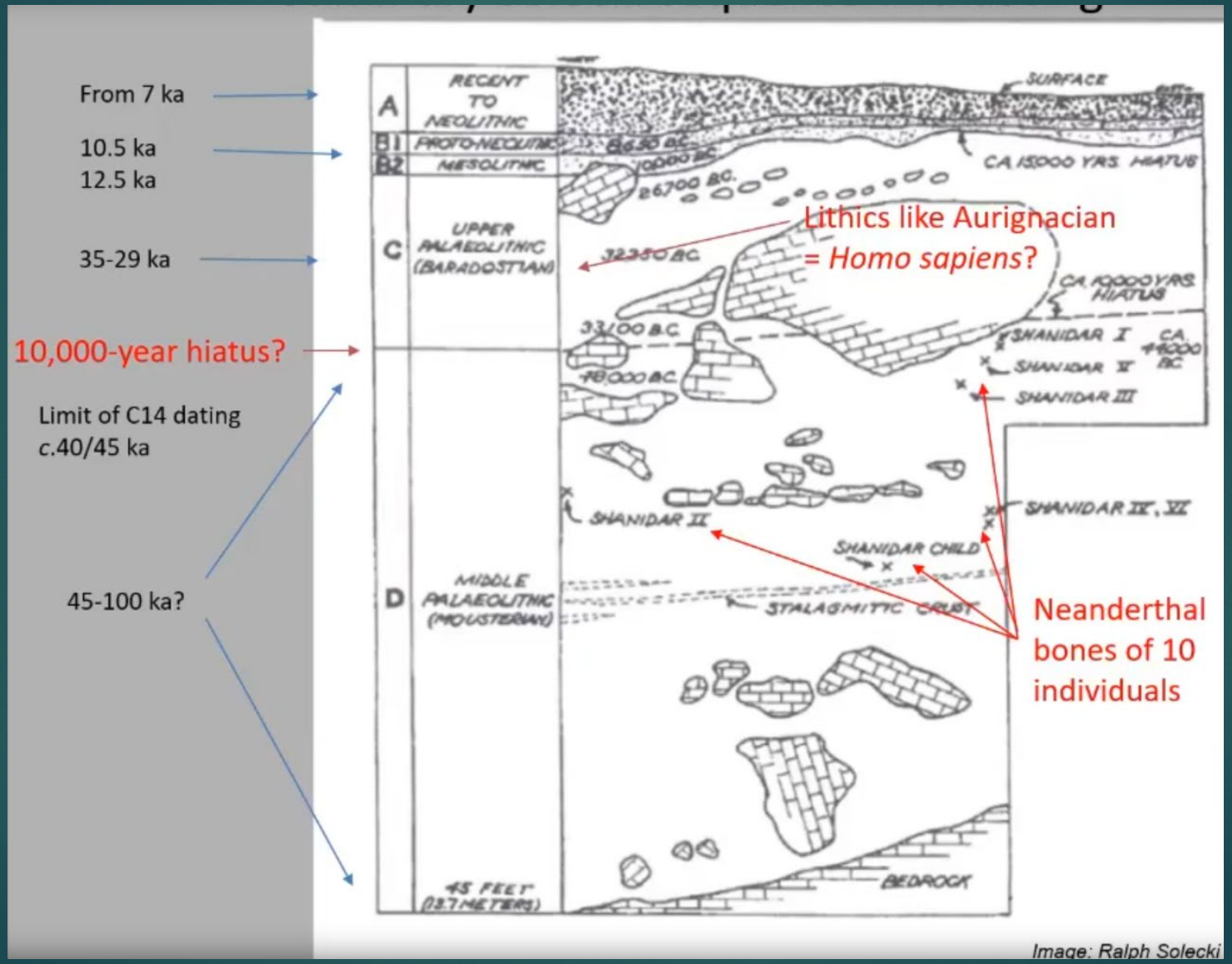
summer

New ongoing excavation: Graeme Barker, 2022

Ralph Solecki excavations 1951-1960

Was used by goatherders in winter; he dug 14-meter rectangular trench in middle of cave

Summary of Solecki sequence: dug to limits of radiocarbon dating



The Shanidar Cave Neanderthals: injuries, compassion, burial?

Trinkaus and Villotte (2017). *PLOS ONE* 12(10): e0186684.

Tim Evanson/Hall of Human Origins, Smithsonian Museum of Natural History

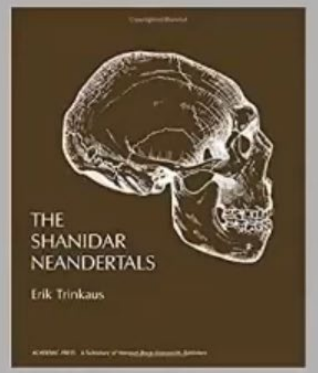
Shanidar 1

Churchill et al. (2009). *Journal of Human Evolution* 57(2): 163-178.

Solecki (1971). Alfred Knopf, Inc

Solecki: some natural deaths by rockfall, some true burials, grave markers

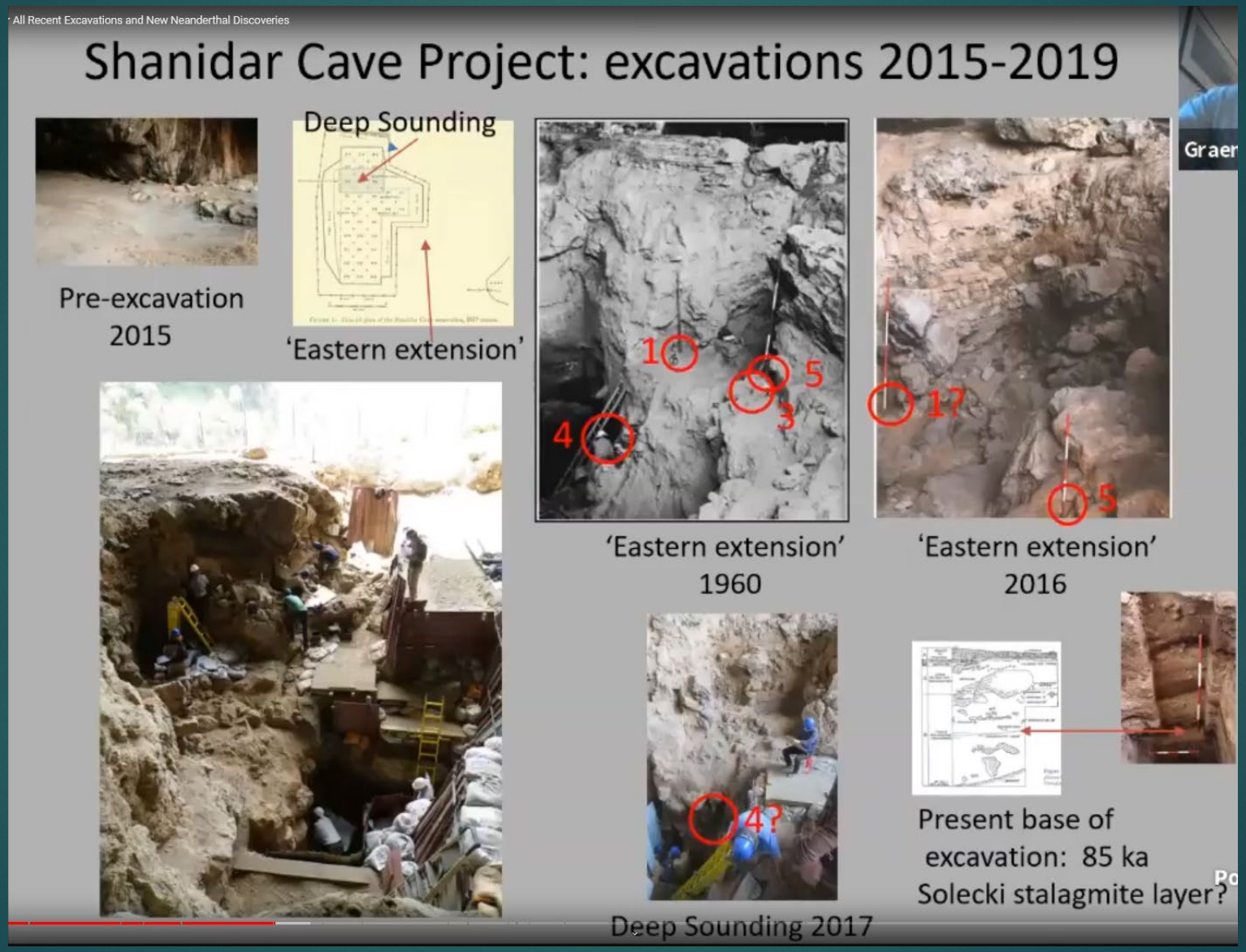
Injured and cared for



Trinkaus (1983). Academic Press.

Reconstructions of Shanidar 4, the 'Flower Burial' from clumps of pollen found by Arlette Leroi-Gourhan in sediments close-by

2023 Data: Down another 10 meters to 85 Ka, 2015-2019



Application of latest analytic field techniques

Field methods

Section cleaning, recording , sampling

C14 and OSL dating

micromorphology

sampling for eDNA

sample columns

area excavation

flotation tanks

sorting washed residues

recovery of finds of 2 mm and above

Ralph Solecki

- Ralph S. Solecki died in March 2019 aged 101. His work at Shanidar Cave in 1951-1960 had a profound impact on our understanding of Neanderthal biology and behavior.

- Evidence of 10 Neanderthal men, women and children at Shanidar Cave that provides key data on Neanderthals in Southwest Asia, but Solecki's subsequent discussion of how they lived and died did much to change perceptions of Neanderthals in general.

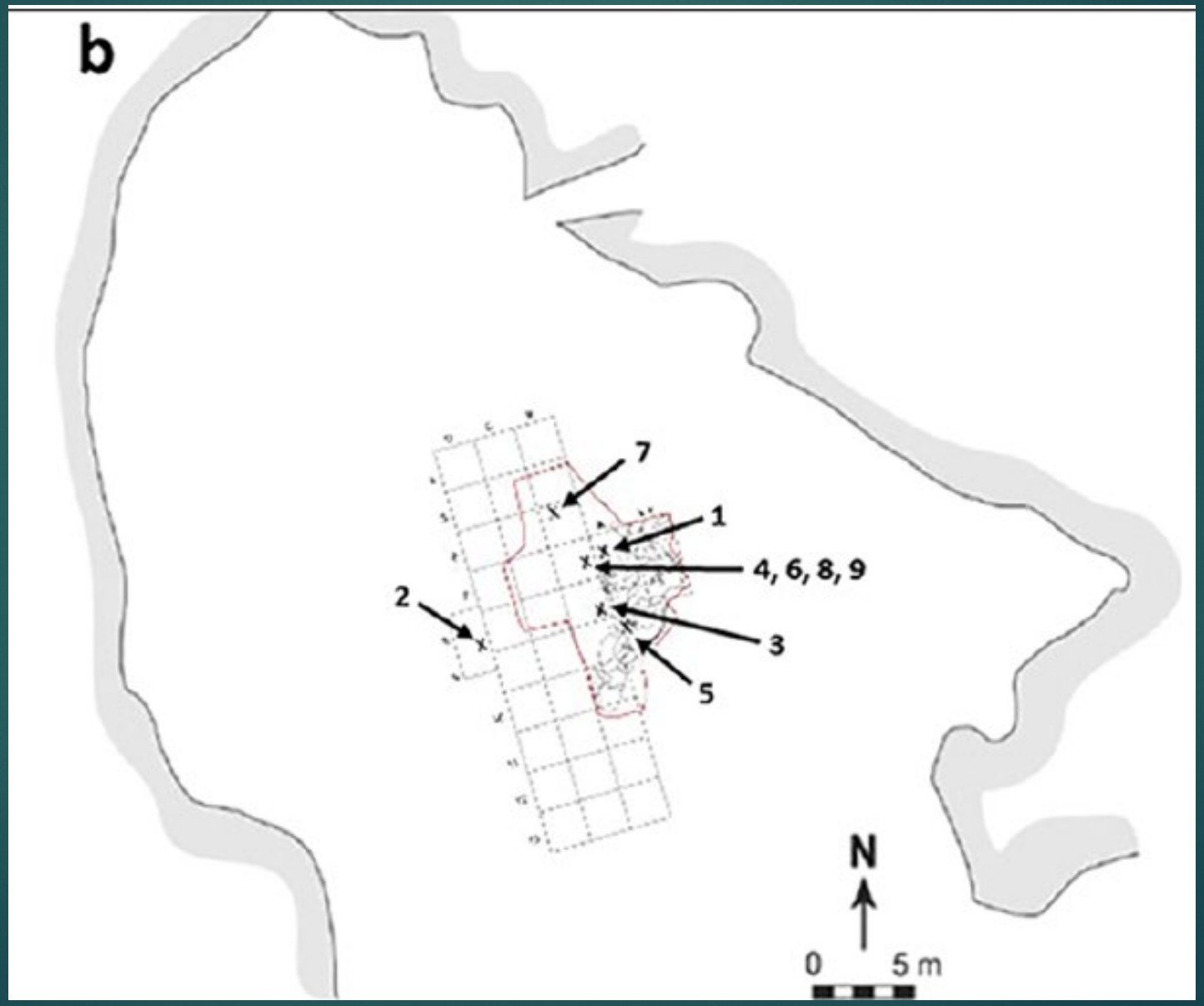
- Perhaps most famously, he argued that Shanidar 4 had been buried with flowers, based on palynological (pollen) work by Arlette Leroi-Gourhan.

Ralph Solecki

- He also argued that the Shanidar 1 skeleton provides evidence of compassion and care for the sick and infirm, and for intentional burial with accompanying ritual activities for several of the Shanidar individuals.

- While the 'flower burial' and some of his other arguments remain controversial, Solecki did much in his writings to 'humanize' Neanderthals and emphasize the similarities to our own species in their thinking and actions, in contrast with widespread conceptions of Neanderthals as brutish cavemen.

Shanidar Cave and 9 Ns



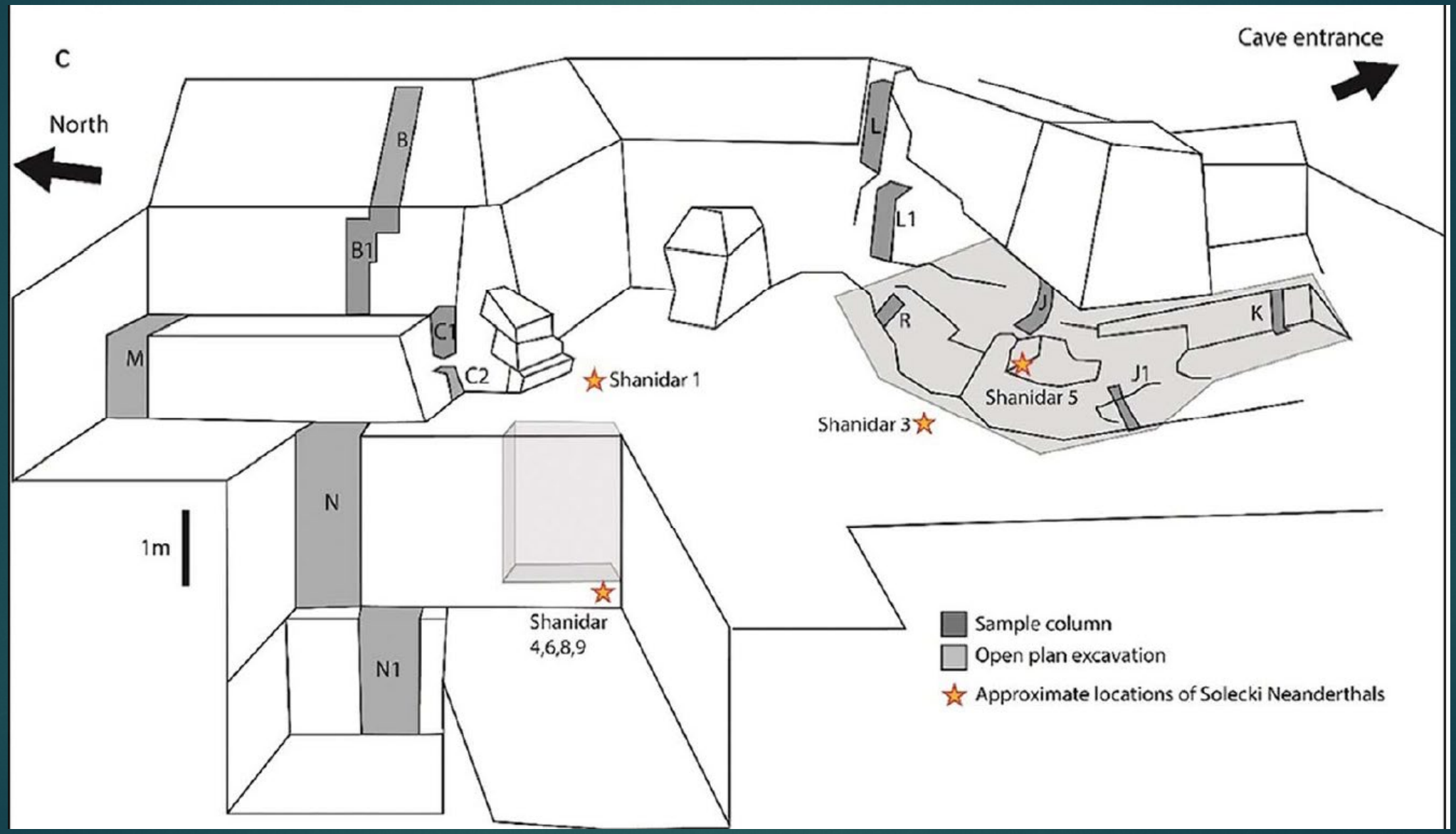
Importance of Shanidar Ns: compassion, violence, burials

- Although the 'flower burial' hypothesis was subsequently questioned, the Shanidar individuals play a central role in shaping our understanding of Neanderthal biology and behavior.

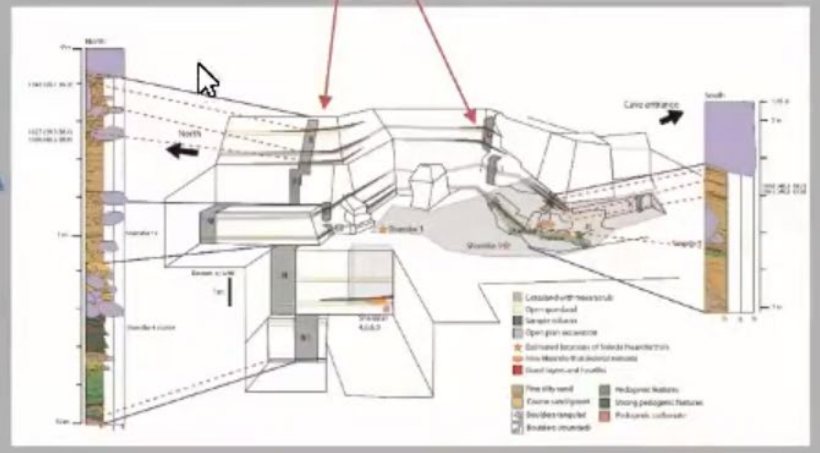
- The disabling injuries exhibited by Shanidar 1 suggest care for group members, while the puncture wound to Shanidar 3's ribs suggests interpersonal violence.

- The assemblage continues to feature heavily in debates over Neanderthal mortuary practice and the evolutionary origins of intentional burial.

Shanidar N fossils and locations



2. Upper Palaeolithic 'Baradostian' (Modern Human?) occupatic

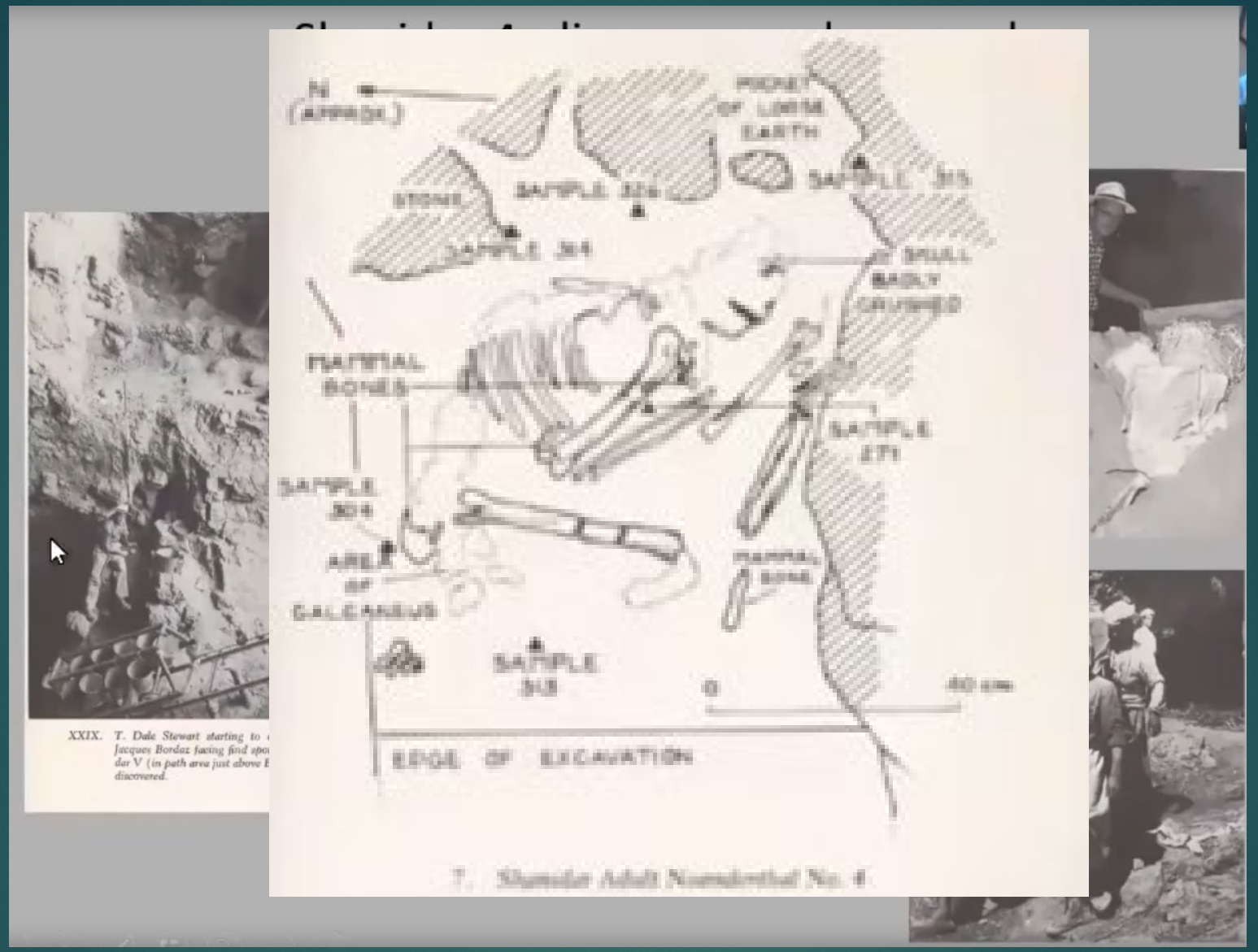


Single event hearths 45-33 ka, especially 42-38 ka

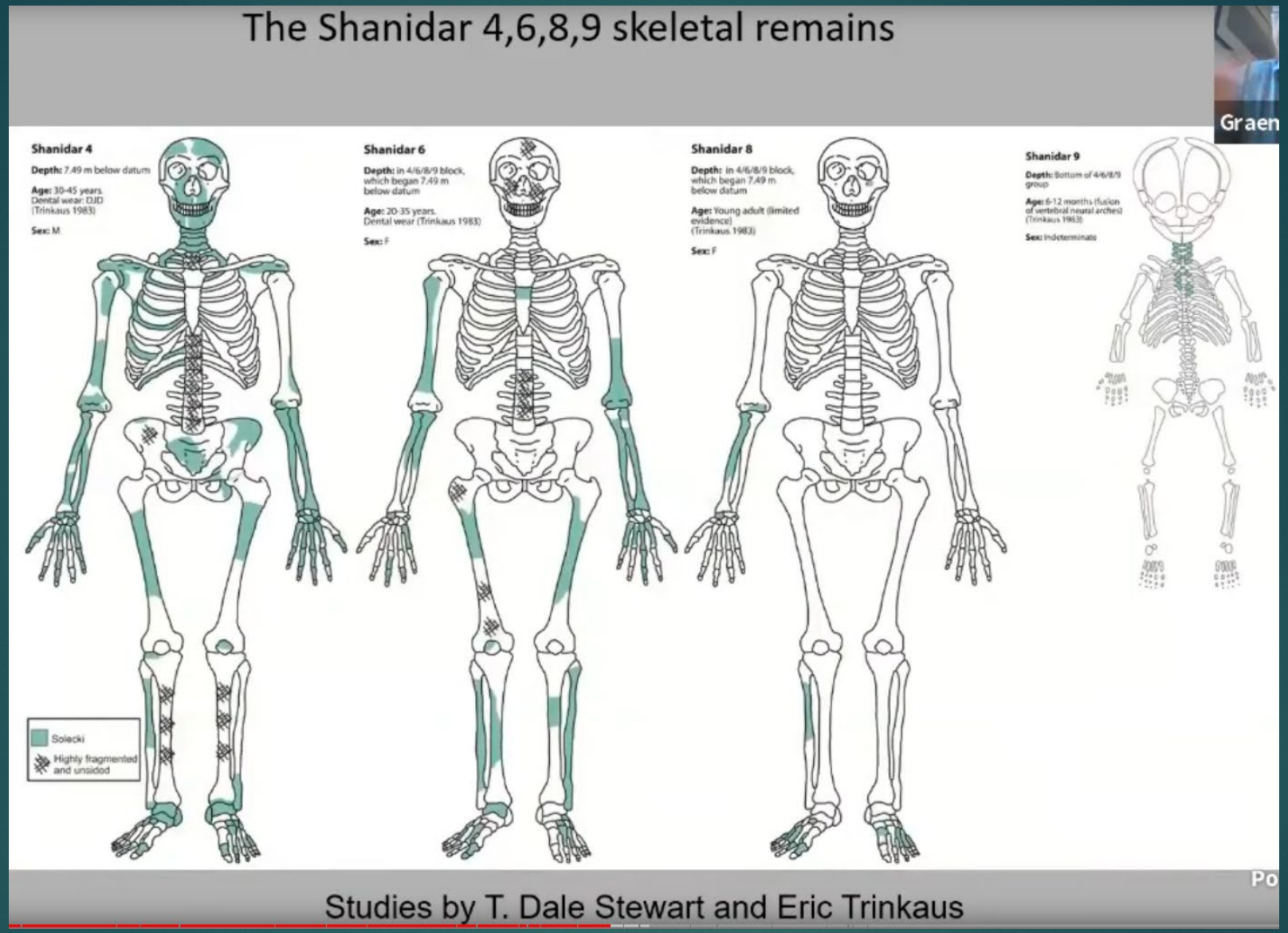
Visits at times of interstadial conditions

Baradostian hearths

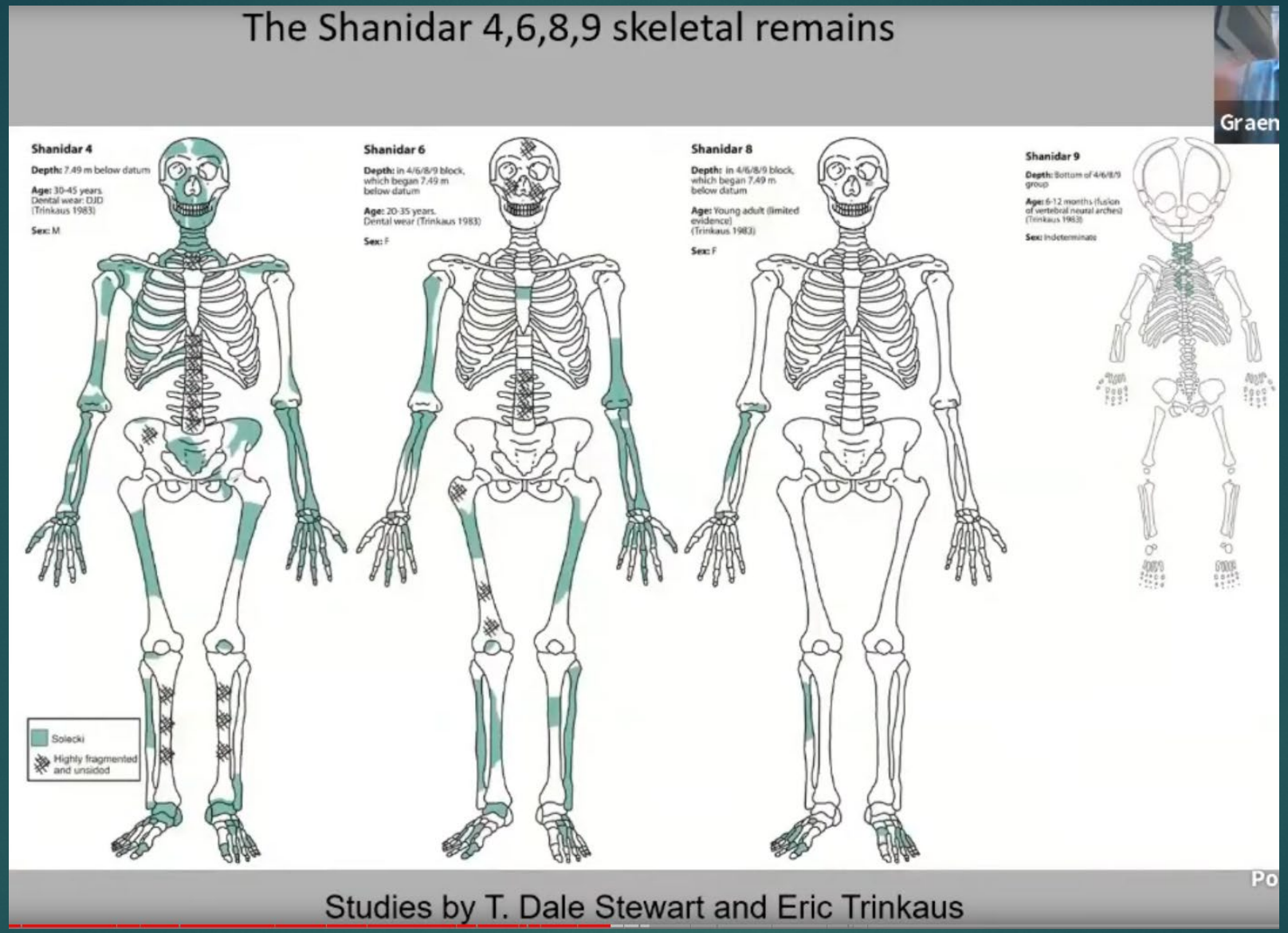
Upper layers: No MH bones but single use hearths during warm period; UP stone tools



Failed attempt to encapsulate fossils in a plaster box and remove Shanidar 4 to Bagdad on top of a taxi!



Remains in plaster box sorted by Trinkaus: bones that did not fit 4 became 6, 8, and infant; but new find renders this assessment problematic

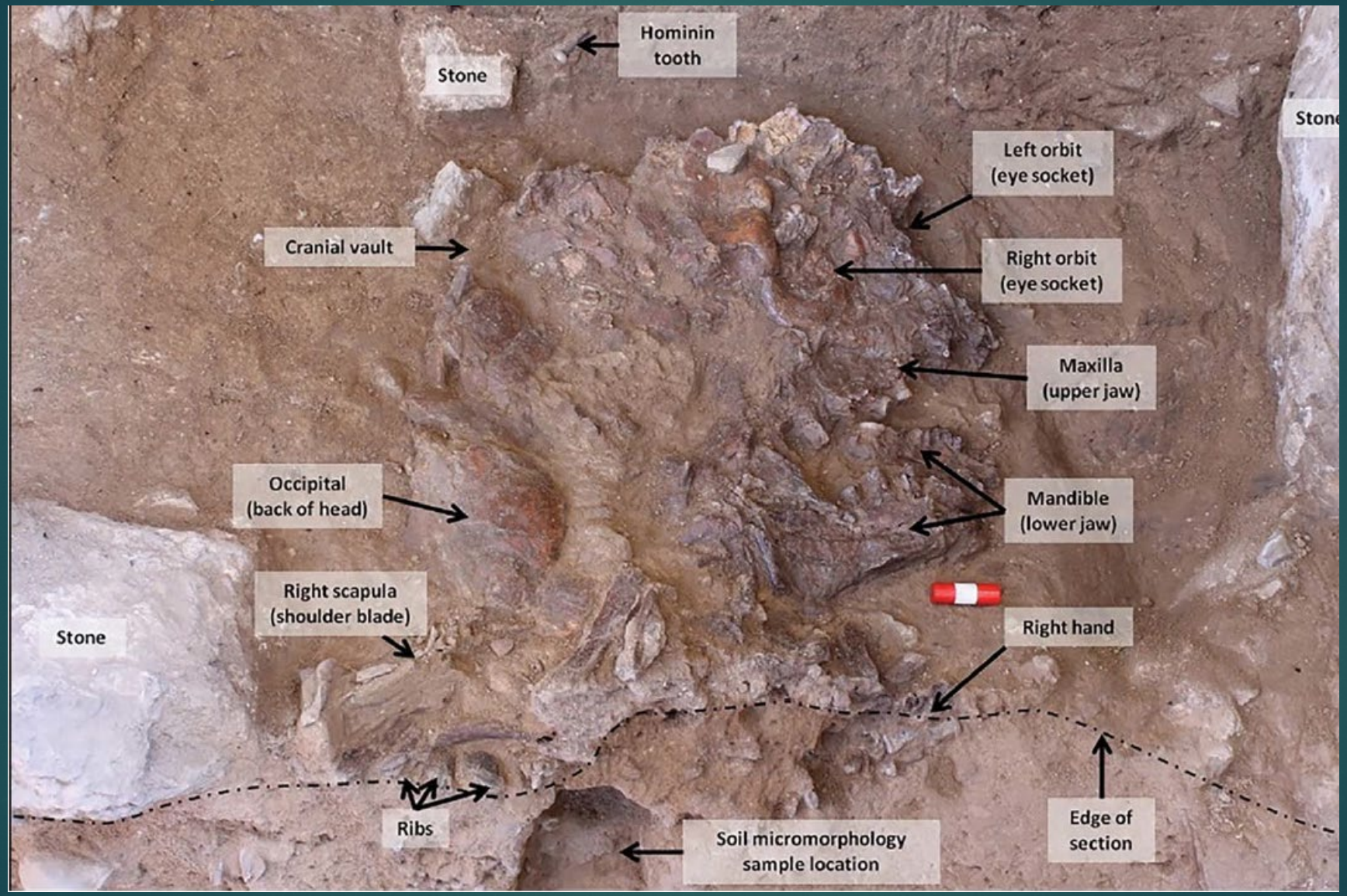


Remains in plaster box sorted by Trinkaus: bones that did not fit 4 became 6, 8, and infant; but new find renders this assessment problematic

New Neandertal Shanidar Z skeleton discovered

New Shanidar Z was found directly adjacent to Shanidar 4

What a newly discovered N fossil looks like: A flat pizza.



Cranium flattened like a pizza

Emma Pomeroy, et al. 2020

New Neanderthal remains associated with the ‘flower burial’ at Shanidar Cave

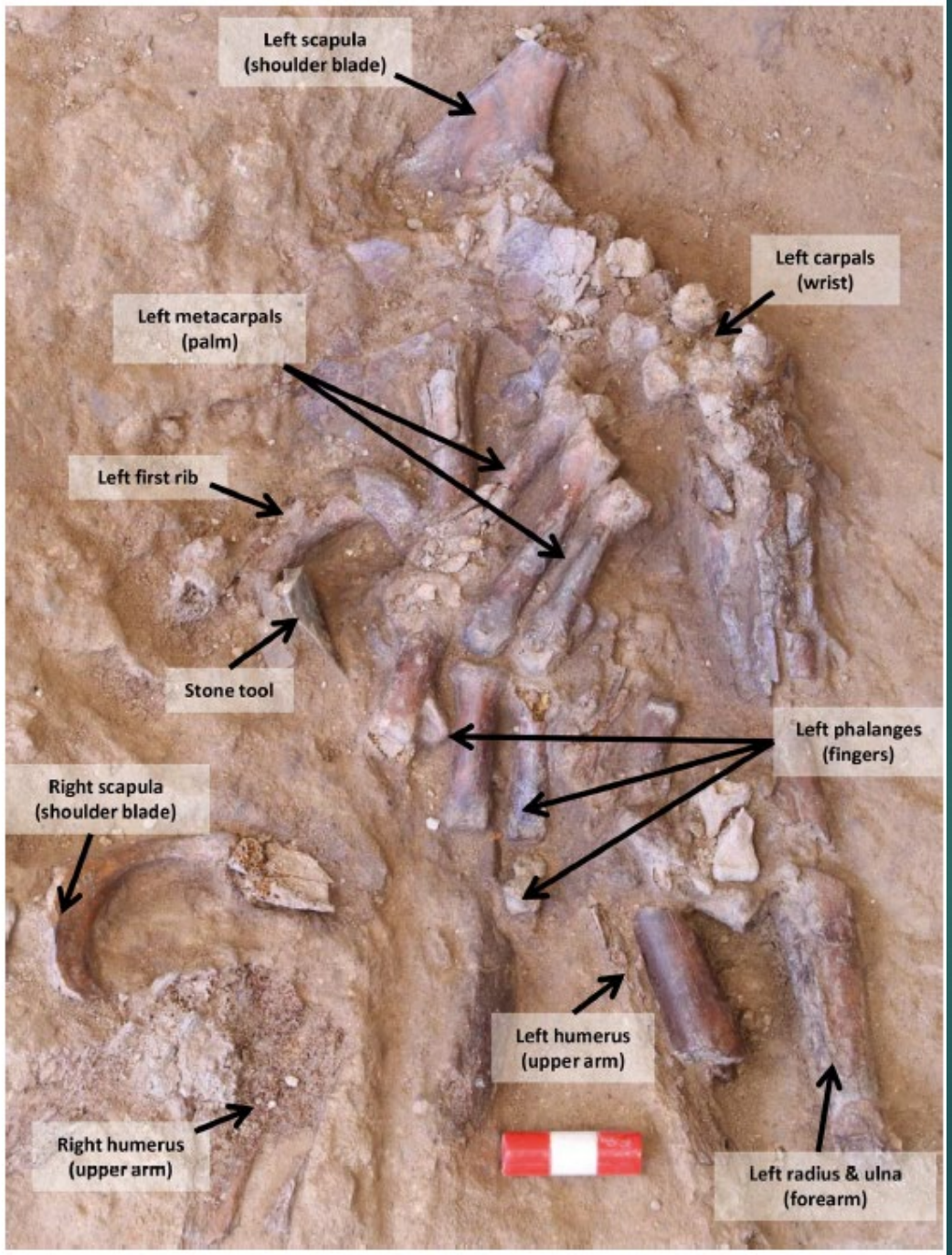
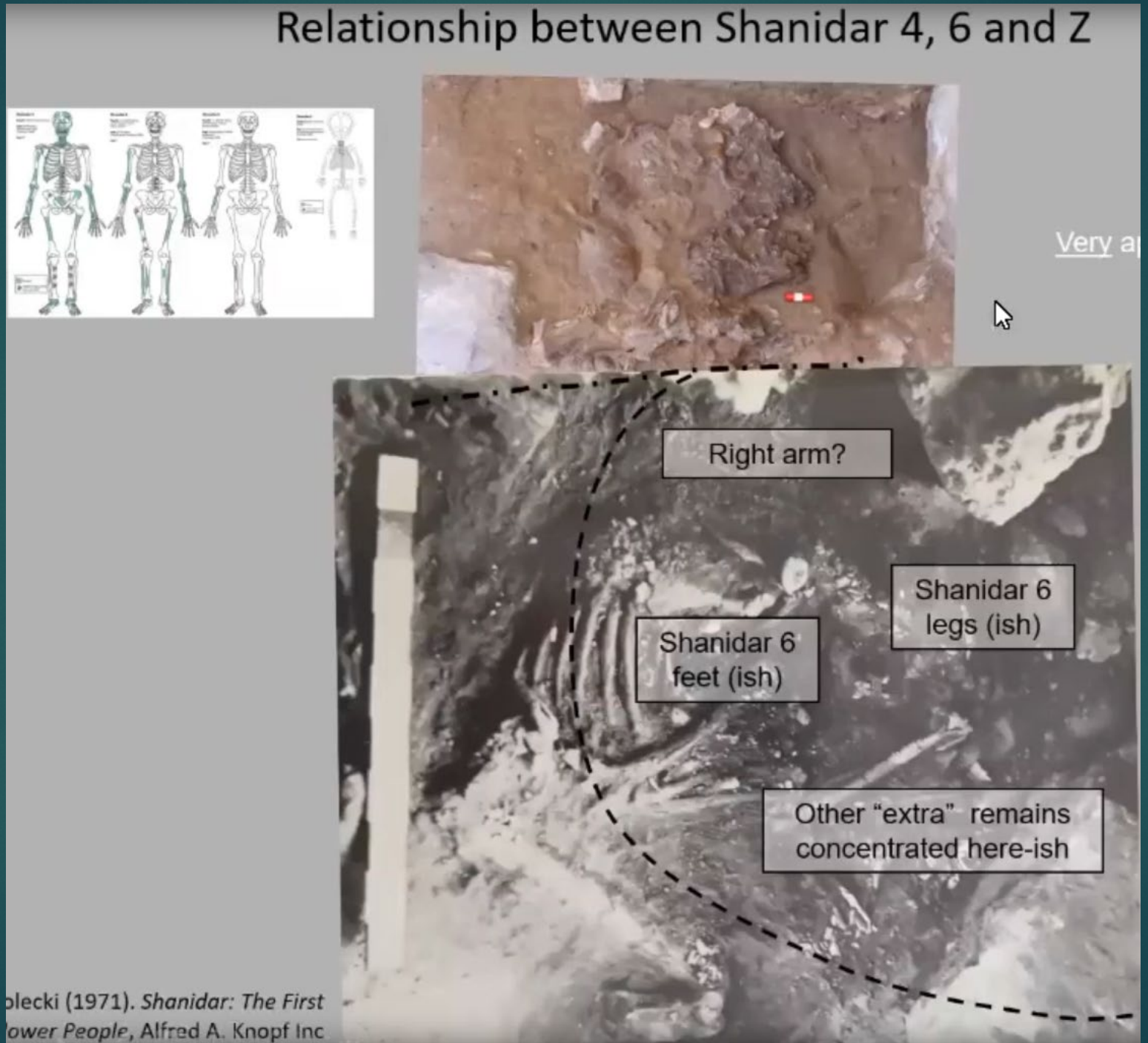


Figure 6. The upper body and left arm remains that lay beneath the skull; north is to the left of the image; scale is 30mm (photograph by G. Barker).

Shanidar 4 & 6 Skeletal assessment may have some of Shanidar Z's lower skeleton

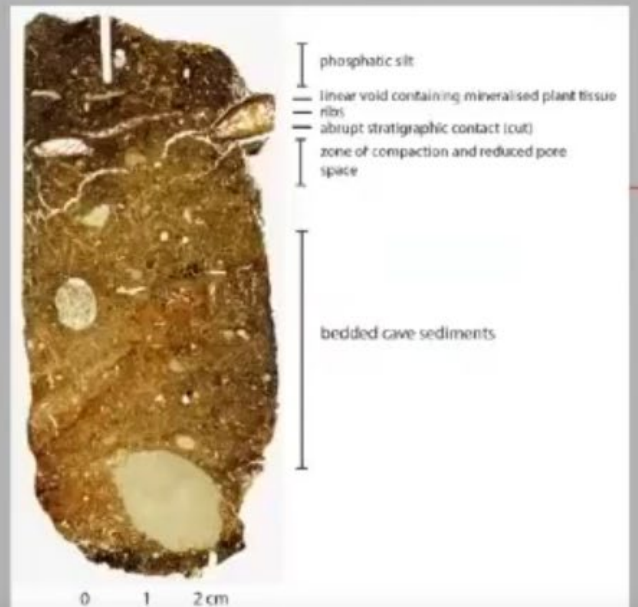


Burial site appears to have been “shoveled” to create it.

Shanidar Z a burial?

Occupation evidence runs up to it

In waterlain channel, but non-fluvial sediments within and under body



Clear non-natural ‘cut’ on one side of scoop

Stones placed on top of Shanidar Z

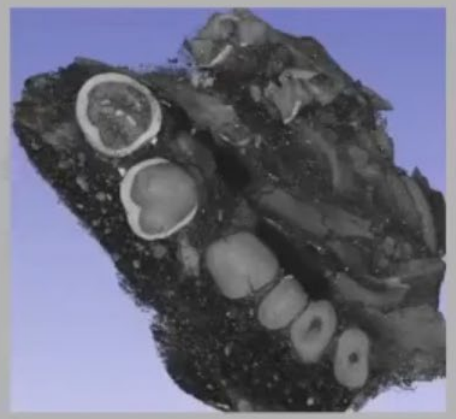
A 'persistent place' in the Neanderthal landscape?

"L'Hortus, La Quina, La Ferrassie, Krapina, Shanidar “imply the transmission of mortuary tradition...centred around a fixed point in the landscape that could be used, if not exclusively, to hide, process and bury the dead... To the groups at La Ferrassie and Shanidar...the dead had not quite departed.

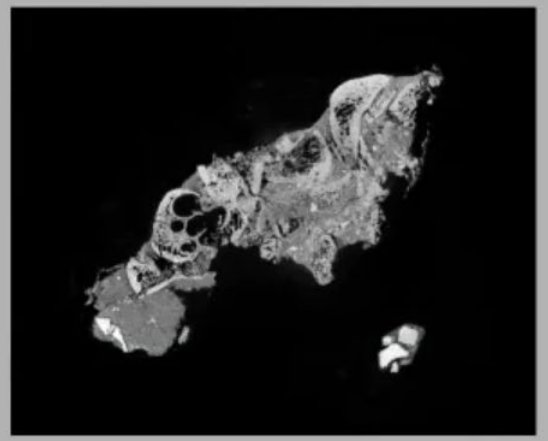
Paul Pettitt: *The Palaeolithic Origins of Human Burial*

Shanidar Z: diet? health? genetics?

3D rendering of micro-CT scan



Dental wear



Cross-section showing petrous bone

eDNA was discovered higher up that is being evaluated by Eske Willerslev

Shanidar cave is a national monument for the people of Kurdistan, who use it and visit it

Deliberate burials

- The older rockfall theory appears discredited.

- The new Neanderthal Z remains from Shanidar Cave provide strong evidence for the deliberate burial of this individual.

- They also offer an unparalleled opportunity to reassess the relationships between the individuals represented by the Shanidar 4, 6, 8 and 9 remains, and to consider whether this unique assemblage represents evidence of simultaneous (or near simultaneous) burial activity or of Neanderthals returning to the same place over time to deposit their dead.

“Flower burial”?

- April is time of massive yellow wildflowers outside the cave.
- Flower pollen found with S4 as well as all below.
- There are animal burrows in with the N layers
- Theories: include flowers laid on body, plants covered bodies, flowers brought in on feet of tourists today as well as Solecki’s team, and original Ns, as well as gerbils introducing the pollen.
- Original 1960s analysis of Arlette Leroi-Gourhan considered all of these options and concluded it was a “flower burial“
- Current excavation leader Graeme Barker believes flowers were part of the burials; but…

The Flowers of Shanidar, Iraq

Shanidar et ses fleurs (Shanidar and its flowers)? Reflections on the palynology of the Neanderthal 'Flower Burial' hypothesis

- The Shanidar Cave 'Flower Burial' hypothesis proposed by Arlette Leroi-Gourhan and developed by Ralph Solecki, along with other findings from his 1951–1960 excavations of Shanidar Cave, in Iraqi Kurdistan, had a transformative impact on ensuing debates about the abilities and humanness of Neanderthals

- The 'Flower Burial' hypothesis arose from palynological (pollen) research. Six 'soil' samples were taken by Solecki in the sediment layers immediately below and adjacent to the Shanidar 4 Neanderthal and sent to Arlette Leroi-Gourhan, the leading cave palynologist of the day.
- Along with the clumps of pollen were fragments of woody tissue of Juniper pine

Reevaluating Neanderthal Flower Burial Theory: New Study Raises Questions

- The idea of Neanderthals practicing flower burials gained prominence with the discovery of Shanidar Cave in Iraq, where clusters of pollen were interpreted as evidence of intentional floral deposits. These findings sparked debates about whether Neanderthals engaged in ritualistic behaviors and had a level of symbolic understanding previously unattributed to them.

- Through his excavations in Shanidar Cave in the 1950s and 1960s, Ralph Solecki put forward the "Flower Burial" hypothesis.

- According to this hypothesis, the Neanderthal known as Shanidar 4 was placed on a bed of flowers, possibly for medical reasons, as a mark of affection, or as a sign of respect.

Debates

- This hypothesis had a transformative impact on the understanding of Neanderthals, challenging their previous characterizations as entirely brutish and suggesting they were capable of empathy and care.

- Later study suggested emplacement of the pollen by jirds – small rodents known to bring flowers into their burrows – whose skeletal remains are known from the Shanidar Cave sediments in small numbers

- The new study discounts the possibility that Solecki and his colleagues introduced the pollen. Instead, they conclude that the pollen is likely to be approximately contemporary with the Neanderthal with which it is associated.

- However, the current study has cast doubt on the flower burial theory

Chris O. Hunt, et al., 2023

Ritual burials?

- The study utilized advanced pollen analysis techniques and three-dimensional imaging to reevaluate the floral remains from Shanidar Cave. The team questioned the assumption that the pollen clusters were purposefully placed and instead suggested alternative explanations.

- It seems likely that at least some of the pollen clumps were emplaced by nesting solitary bees, though other mechanisms may also have been involved

- The team proposed that environmental factors, such as shifting sediment and water flow, could have naturally concentrated the pollen in certain areas of the cave.

- Team lays out the case for the pollen found in the grave sites being of non-human placement, likely by bees.

Bees did it

- Soil samples from on top of and underneath the burial were originally studied in 1975 by two palynologists — pollen experts — who determined they came from five known and two unidentified taxa. They suggested that all of these plants were available to be picked at the same time, likely between late May and early June.
- New study largely agree with the earlier identification of the plant species, but they discovered that the plants actually grow at slightly different times of the year, calling into question the previous interpretation that Neanderthals gathered flowers to bestow on the dead.
- They noticed a potential alternative explanation for the pollen: ancient mud-lined bee burrows close to Shanidar 4. These ground-nesting bees could have drilled into the dirt and deposited collected pollen as they moved through the burrows.

Bees

- The mixed clumps of pollen aren't indicative of entire flowers being laid down. Instead, they suggest that it is far more likely that "pollen was collected and deposited in clumps by bees."
- Hunt and his team think the pollen is likely ancient, perhaps even closely contemporaneous with the Neanderthal burial. But neither the pollen nor the bees can be directly dated.
- The analysis concludes that the presence of taxonomically mixed clumps is inconsistent with the clumps of pollen from the deposition of whole flowers. It is far more likely that the taxonomically mixed pollen was collected and deposited by bees.

Bees common today

- The burrows of solitary bees can be found in less-trampled areas of the cave floor today. Individual bees can collect multiple floral pollen species as they forage, and their burrows are common to the cave, making them an ideal suspect for the pollen clumps.
- Under modern conditions, the flowers represented in the Shanidar 4 pollen cannot all be collected simultaneously in any season, ruling out the excavation team and flowers being gathered immediately at the time of death. Bees could easily have deposited the pollen throughout a growing season.
- The possibility of other mechanisms, such as small mammals or Neanderthal activities, according to the researchers, cannot be completely ruled out.

Wood fragments

- Wood fragments and pollen were also found within the body cavity of the nearby Shanidar Z (latest N skeletal discovery). It seems likely that these had filtered into the rib-cage from above.

- While microscopic wood fragments can be fairly common in sediments of caves frequented by early people, the coincidence of wood fragments and pollen of immature plants might point to branches and other vegetation being placed over the bodies

Wood branches over the bodies?

- Unexplained wood fragments (juniper tree wood) were found within the grave dirt of Shanidar Z, a more recently discovered Neanderthal skeleton that significantly overlaps with the Shanidar 4 site, suggests there is still more funerary mystery left in the cave.

- The tight cluster of burials at Shanidar remains incredibly significant to our understanding of Neanderthals and noted that "woody tissue" samples collected from the site may hold the key to learning more about their burial rituals.

N Bodies of Shanidar

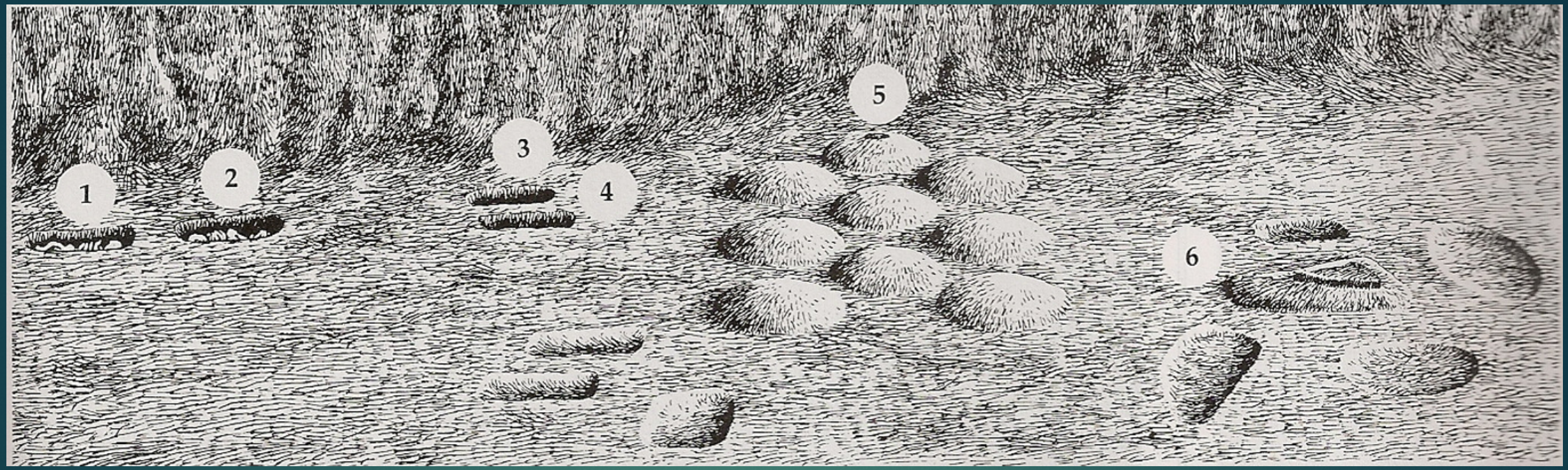
- The cluster of Neanderthal bodies associated with Shanidar 4 is certainly associated with N mortuary behavior – the placement of bodies.
- Shanidar 4 and Shanidar Z were certainly carefully placed, and it is possible that the fragmentary skeletal material found below them was from another placed individual. This is consistent with members of their group(s) feeling empathy.
- Several bodies in the Shanidar 4 cluster were placed episodically, close to what would have been a major landmark on the cave floor - a very large boulder over 2 m high when the bodies were deposited.
- The episodic, repeated deposition of Neanderthal bodies within a very confined space, as evidenced by the Shanidar 4 group, seems to be worthy of further consideration and debate

Shanidar Ns use of space

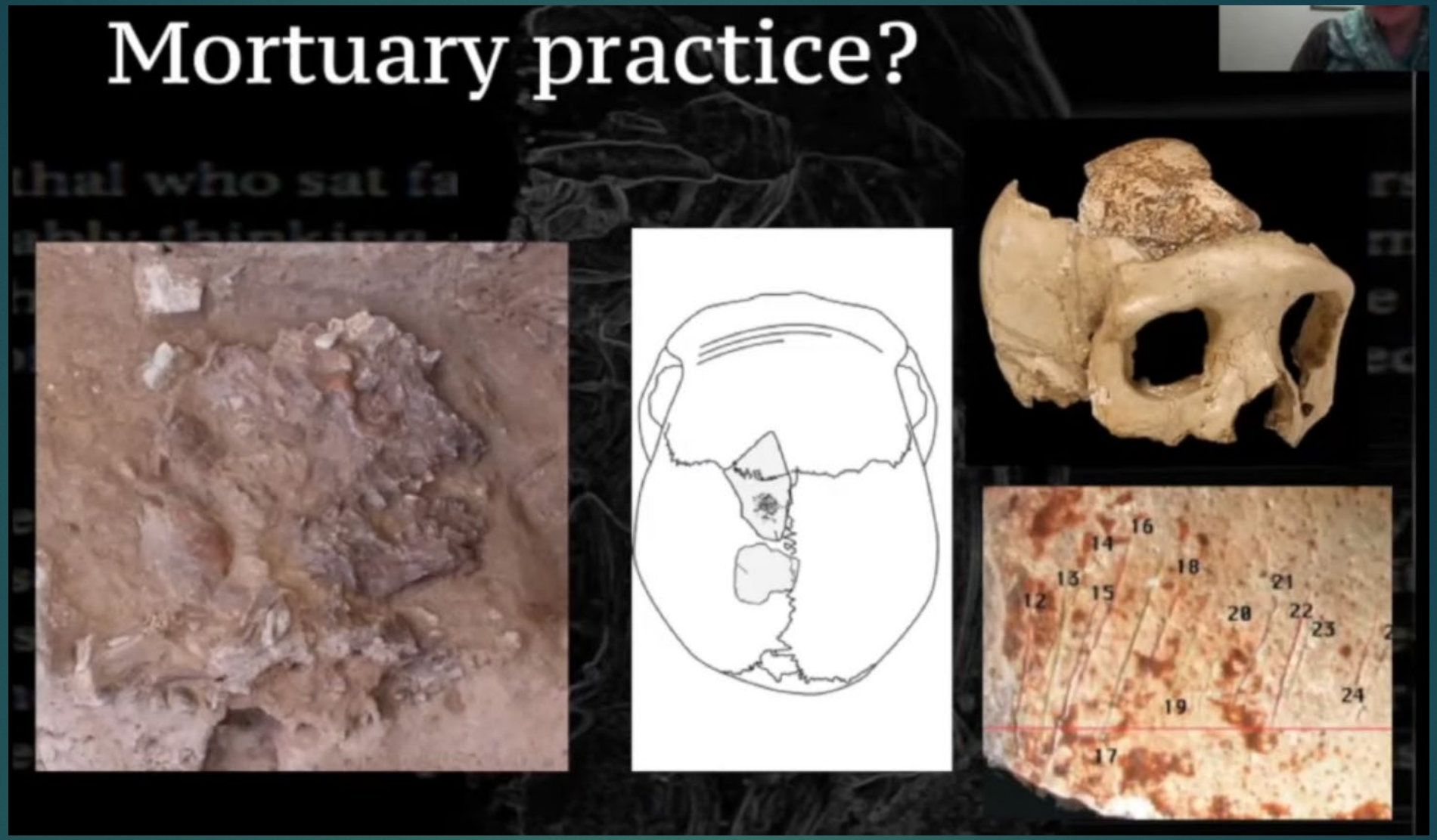
- It seems very likely that the re-use of the same distinctive location can be associated with the Neanderthals using Shanidar Cave having topographic memory. Conceivably, this is evidence that the Shanidar Neanderthals inhabited ‘storied landscape”, as do modern humans

- The debates about the ‘Flower Burial’ have in many respects many respects obscured its most significant aspect: that it was part of a tight cluster of what evidence suggests were emplaced bodies that is practically unique in the Neanderthal realm. The potential implications of this behavior for Neanderthals’ sense of space and place are probably the most intriguing aspect of the Shanidar Cave Neanderthals, rather than whether an individual was buried with flowers.

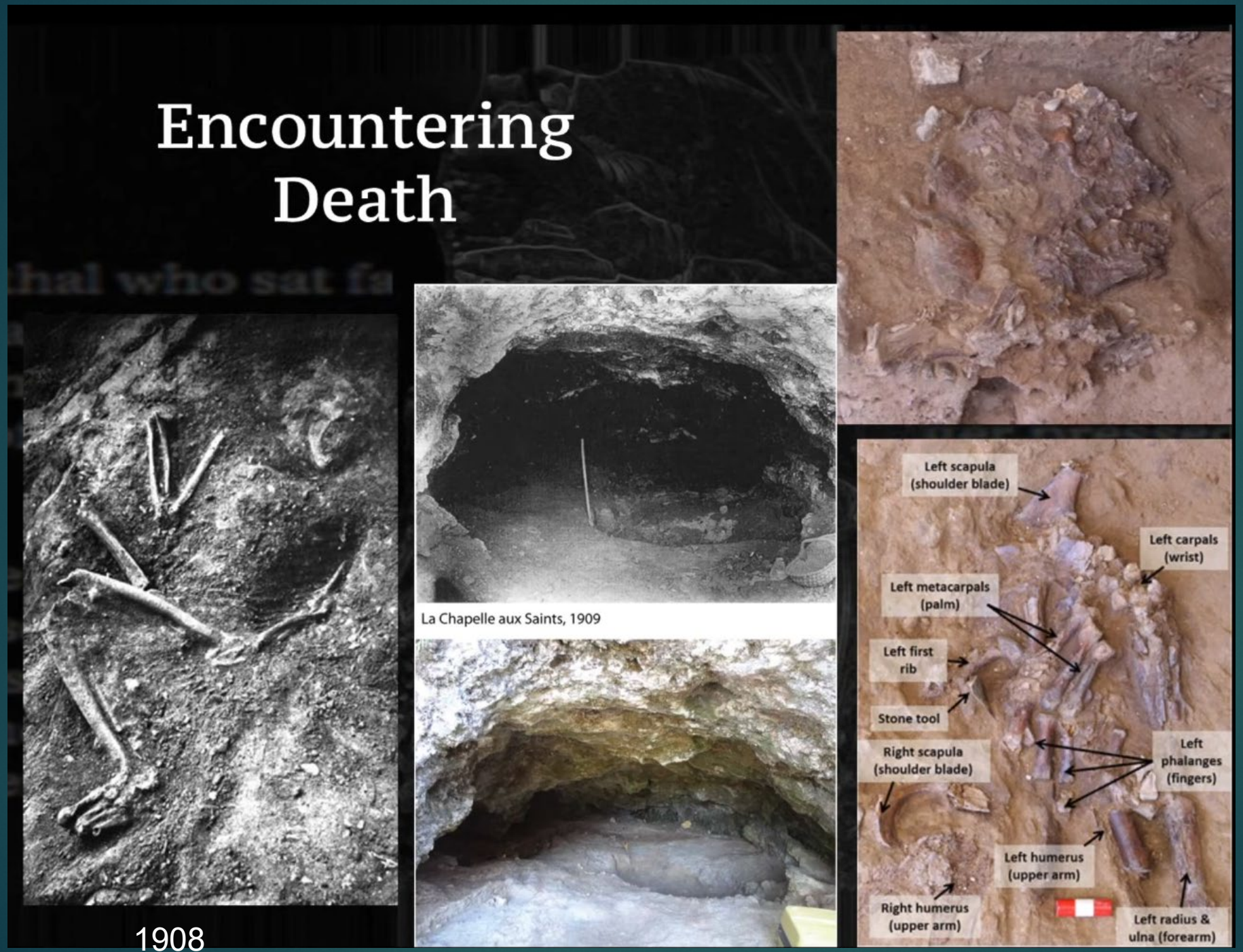
La Ferrassie Burials, 70 Ka: 2 adults & 4 children



The care that Neandertals sometimes lavished on their dead seems clear at La Ferrassie, in France. There, archaeologists discovered what may be a 70,000-year-old family cemetery, containing the skeletons of two adults and several children. The drawing here shows a site about 85 feet (26 meters) long. The presumed parents were buried head to head (at locations 7 and 2 in the drawing); two skeletons (3 and 4), possibly of their children, each about five years old, were neatly interred near their father's feet. The significance of the nine small mounds is not clear, but one contained the bones of a newborn infant and three flint tools (5). The triangular stone (6) covered the grave of another child.



N interest in taking bodies apart; more cut marks on Ns than on animals; Shanidar Z = full body; Center – French skull bone used as retoucher- only example in hominin record; Krapina – 30 tiny cuts; engraving on skull



Re-excavation of La Chapelle

Shanidar Z, Iraq
Intentional burial

N Mortuary Practices (Heavily based on Rebecca Wragg Sykes)

- Whole skeletons are extraordinarily uncommon, and virtually unknown for big creatures. The only exceptions are bears that died while hibernating, or animals lost deep in cave systems or down pitfalls.

- Diving deep into the evidence for claimed Neanderthal burials shows just how complicated things are. Many were excavated decades ago, and are increasingly being held up to critical reanalysis.

- Perhaps the most famous cold case - controversial for more than a century- began in spring 1908. The emerging remains of Le Moustier 1 was from the outset viewed as a burial.

Burials: La Chapelle-aux- Saints

- Nearby was Old Man near La Chapelle-aux- Saints. The most complete skeleton yet found, its excavators claimed it was a grave. The bones were rapidly exhumed and sent to Boule's lab in Paris, then all the dirt was shoveled back into the cave. There it stayed for 100 years, until a new project began to re-examine just how the Old Man came to be there.

- This was a remarkably intact body. The skeleton came from the base of a 'pit', shown in one illustration resting on small stones. It was no loose bony jumble, and missing parts are almost all mirrored on the other side, so the whole skeleton was apparently originally there.

La Chapelle-aux-Saints

- When meticulously re-excavated, twenty-first century researchers confirmed the pit had existed, was deeply sunken and curiously one edge was cut by a fissure containing vertical containing deer bones.

- In all, there's no natural explanation that can account for every feature of the Old Man at La Chapelle-aux-Saints. Today remains one of the best-supported cases for Neanderthal burial.

- But with others interpretations have only grown murkier. The site of Regourdou, ended up as perhaps the most grandiose of claimed Neanderthal burials.

Lamalunga Cave: burial or he fell in a hole

- Perhaps one of the most intriguing Neanderthal CSI cases was only found in 1993.
- Date 170 to 130 ka, an incredibly complete body lay right at the end of a narrow tunnel in Lamalunga Cave near Altamura, southern Italy.
- Cemented in place in the 'Apse of the Man' and almost inaccessible behind stalagmites

N postmortem body manipulation

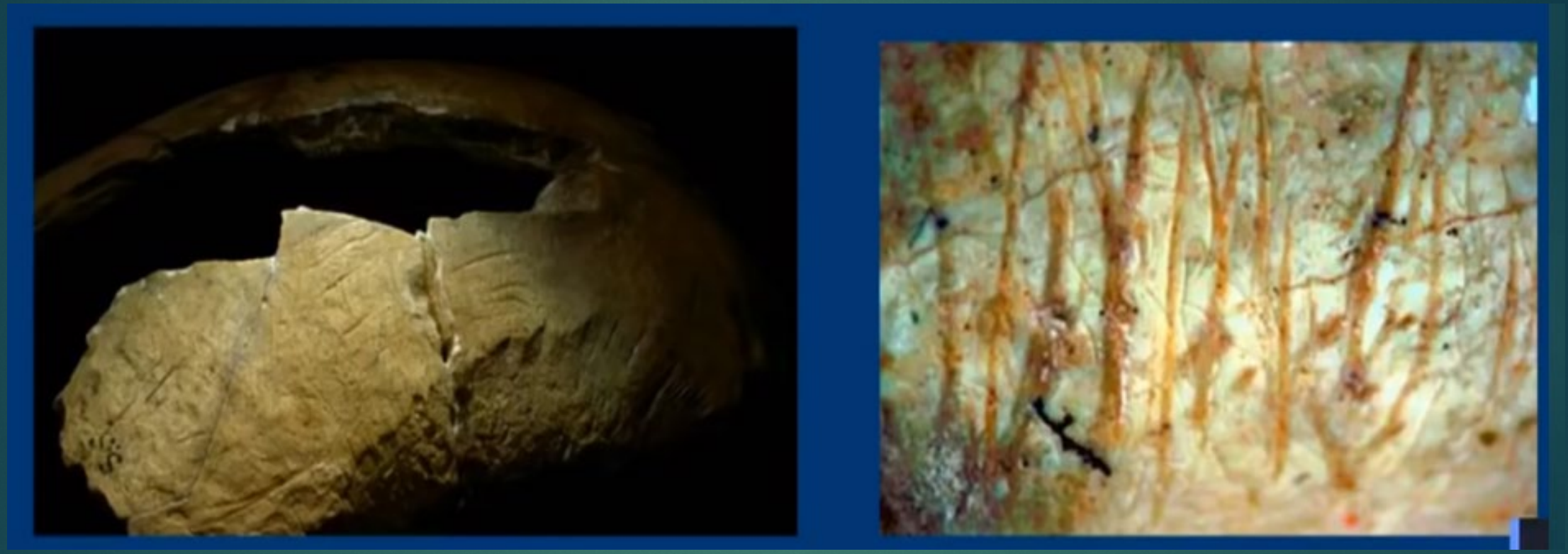
- We can't be sure that Neanderthal remains at open-air locales were intentionally manipulated, but recent research has found that other things than burials were happening with bodies in caves and rockshelters.

- More and more cases of unquestionably butchered Neanderthal bones are being identified, even including some of the original Feldhofer remains.

Postmortems

- In general, Neanderthals were covering the full range of what they did with animals: skinning, dismembering, jointing, defleshing their own.
- Sometimes also comprehensively snapping and smashing bones. Some among the hundreds of bones at Krapina.
- All parts of the skeleton across multiple individuals there had been processed, with skinning and defleshing - even of skulls

Evidence for complex behavior in the Krapina Neandertals



Cannibalism at Krapina: Gorjanović-Kramberger's noted cut marks in 1899; hypothesized cannibalism in 1906

Taking bodies apart, fragmenting them

Belgium:
femurs
used
as tools

Skull piece
used as
retoucher;
Unique
usage, no
other
example

N body processing

- Not all Neandertal sites with human remains preserve evidence of burial, and some hint at different and darker ways of dealing with the dead. Neandertal bones from several sites bear cutmarks and other evidence of postmortem processing.

- Demonstrate the processing of Neandertal bones at Moula-Guercy (France), El Sidrón (Spain), and Troisiéme Caverne of Goyet (Belgium). It is not clear whether this treatment of the dead among Neandertals should count as symbolic behavior or subsistence activity.

- T. White (1992, 2001) views these processed remains as the leftovers from cannibal feasts driven by hunger.

Cannibalism

- The Le Moustier teenager was butchered. His skull was skinned and defleshed, tongue removed, jaw cut off, sliced and possibly battered, and the meat from one femur was also removed. Interestingly, however, his body hadn't been left scattered, and the skull and lower jaw were actually next to each other.

- Though separated by many tens of millennia, Krapina and Le Moustier are later Neanderthal sites. It's during this period, after about 130 ka, that body processing seems to be, if not common, then no longer rare. In many contexts there's little difference in how hominin and faunal remains were treated, with similar focus on marrow-rich body parts.

- Perhaps surprisingly, however, direct proof Neanderthals were actually eating the processed bodies is scarce. Tooth marks aren't common on animal bones, so those on hominin remains are especially noteworthy. At least one leg shaft from Krapina has shallow, paired grooves looking exactly as if someone had gnawed it like a corncob.

N bone treatment

- At Vindija, taphonomic evidence strongly suggests that Neandertal bones were treated and processed in much the same way as the remains of other animals at the site,

- The Belgian site of Goyet yields Neandertal bones that were used as stone tool retouchers.

- At Krapina, the Neandertal fossils seem to have been processed much like the non-human remains there.

Bone treatment

- On the other hand, M. Russell (1987a, 1987b) argued that the processing evident on the Krapina folk shows evidence of secondary burial – that is, the reburial of human skeletons, which often involves bone-cleaning that can leave cutmarks.

- The most famous supposed case of ritual cannibalism in Neandertals, the Guattari (Monte Circeo) 1 skull, has been plausibly reinterpreted as the result of hyena activity

Burial stats

- Early MP – no burials; never find graves
- MP burials: 2/3rd male; many infant, children; almost no adolescents
- By Neolithic: 2/3rd female, buried in houses
- Grave goods only in middle UP

Some Cannibalism

- N teeth evidence of periods of severe starvation were not uncommon
- Neanderthals occasionally practiced cannibalism — at the site of Moula-Guercy, France, a number of Neanderthal remains were found with butchery marks indicating defleshing and marrow extraction
- The similarity between the butchery marks on the Neanderthal bones and those on deer suggests the Neanderthals were consuming their dead for food

Cannibalism

- In general, however, tooth marks are extremely rare. This is particularly noticeable when compared with cannibalism among H. sapiens from various periods in time. In Britain, 1 MH example had 65% of bones with teeth gnawing.

- Burning of hominin remains is also very rare among Neanderthals.

- Krapina also has burning, however, and given the abundant evidence of body processing and eating, it's a fair suggestion that some of the dead here were cooked.

Cannibalism vs body manipulation

- If we assume at least some cannibalism was happening, the question then is, why?

- At Krapina, although whole bodies were obviously present, the most nutritionally rich bones don't appear to have been selected for processing.

- Something similar was happening at El Sidrón: they were also probably cannibalized. The bones had been very intensively processed, with traces of dismembering, slicing and hammering.

Krapina and El Sidrón: youngsters

- Yet despite some bodies being taken apart, it doesn't look exactly like typical animal butchery and isn't systematic or targeted to the richest parts.

- The bones had no carnivore damage or weathering, and some parts from the chest, arms, hands and feet were still connected.

- Moreover, at El Sidrón, the representation of elements is strange: facial bones are mostly missing, but there's a hyoid and toes are oddly numerous. However, there is one pattern across the El Sidrón bodies: it's the youngsters who have the most cut marks, which is hard to explain if this was solely about nutrition.

Cannibalism

- For any species living in small groups at low population densities, regularly eating each other is a highway to extinction. And compared to animals of roughly equal size, hominin bodies are surprisingly poor in terms of nutrients.

- Could it be starvation? Some cannibalism cases have been linked to glacial conditions. For example, dismembered and filleted remains of two adults, two teenagers and two different children come from Level 25 at Combe Grenal, probably dating around 70 to 65 ka and full of cold-associated reindeer.

- Les Pradelles is most certainly a Quina reindeer-hunting camp, but new evidence shows it wasn't dramatically colder than Wales or Scotland today. And it's important because among the butchered animals, there are also remains of at least nine processed Neanderthals.

Cannibalism

- They include adults and children, and were treated in a nearly identical way to the reindeer, with defleshing and bone ends smashed off, presumably for marrow.

- This assemblage has been claimed as another case of nutritional cannibalism, but this doesn't stack up. Not only was it not extremely cold, but the immense amounts of butchered reindeer surely imply that, at least seasonally, food wasn't an issue.

- At the opposite end of the climate spectrum, interglacial body-processing sites have also been argued to result from starving Neanderthals unused to hunting forest creatures.

Moula-Guercy: classic N cannibalism site

- Intriguingly however, there is another cannibalism site that may be contemporary with Krapina.

- Level 15 at Moula-Guercy, a cave in south-east France, has very similar dates and at least some of the fauna such as porcupine might be connected to aridity. At least half the remains from six Neanderthals - an older man, an adult woman, two teenagers and two children -were butchered.

- The Moula-Guercy processing is quite intensive, with skinned skulls, removed tongues, dismembered joints and limbs, defleshed legs and systematically smashed bones.

Famines?

- There are arguments against climate-driven interglacial famines and cannibalism. Sites like Neumark- Nord make it clear Neanderthals had adapted to forest hunting, taking out fallow deer with precision spear strikes, and even leaving good meat and marrow behind.

- Huge elephants were being targeted too; even if the Lehringen carcass and spear site is scavenging rather than a kill locale, these Eemian Neanderthals clearly had access to a lot of food. Smaller prey were certainly also available, including tortoise or beaver.

Violence?

- Rather than being connected to particular climates, might cannibalism simply imply that Neanderthals ruthlessly chomped down on weaker individuals?

- Children and elders would be most at risk, but they don't outnumber butchered teenagers and adults.

- Plus one man at Moula-Guercy is among the largest known Neanderthals, and surely would have been risky to attack.

Violence

- Antagonism towards strangers is another explanation.
- Goyet in particular has been proposed as an example of aggression-motivated cannibalism.
- The butchered parts are lower legs, skulls and thighs, which does match economic selection for meat/marrow. Abundant cut marks on more than a third of the remains record dismembering, defleshing and even less common gutting gashes on the pelvis and ribs.
- In addition, there were huge amounts of bone cracking - the only complete bone is a fingertip - and probable crushing of the long bone ends, all of which points to consumption.

Violence?

- However, the theory that these were 'foreigners' who were attacked and eaten relies on interpreting the isotopes as reflecting nonlocal individuals, rather than Neanderthals who simply had a very large territory, fitting lithic transfer data.

- Other places confirm that those being eaten were from the local area. Anatomical quirks on the bodies from Krapina and El Sidrón suggest the dead were from closely related, probably local populations.

- If groups were competing for the same land then conflict could erupt, but the generally wide age range of processed bodies would imply either mass slaughter or ambush killings over a long period of time.

Why?

- Furthermore, butchered bodies don't have higher rates of violent deaths, and we'd need to assume Neanderthals tended to be aggressively territorial. The collaboration and food sharing at the heart of their societies argues against this.

- In fact, cannibalism and butchery may well have had primal motivations, but not necessarily rooted in ravenousness or belligerence.

- This demonstrates two things crucially important in understanding Neanderthal cannibalism and body processing.
  - First, there is no need to invoke aggression as a default.
  - Second, after consumption, the dismantled scraps aren't transformed into waste, but still treated as representative of, or connected to, the deceased

Cannibalism as grief

- Cannibalism is very probably a powerful means by which individuals and groups process the impact not only of killings carried out on emotional impulses, but other deaths too. In other words, it's about grieving.

- Such an interpretation is just as likely in Neanderthals.

- Suddenly it's not difficult to envision how skills in carefully taking apart hunted carcasses might be transposed into a grieving process that involved butchery and cannibalism as acts of intimacy, not violation.

Retouchers

- As researchers have increasingly scrutinized faunal bone collections for worked objects including retouchers, examples made from Neanderthal remains have been discovered.

- At both Krapina and Les Pradelles, fragments of thigh bone were used, while at Goyet four retouchers were made on shards from the thigh and lower leg.

- Moreover, there the Neanderthals appear to have specifically chosen hominin bones, in spite of their lesser suitability than other species and skeletal elements.

Krapina retoucher made of N skull bone

- Neanderthals, with their exceptional knowledge and appreciation of anatomy across species, would absolutely have known what they were handling.

- The choice at Krapina to use this object was not accidental or casual. Its shape and thickness are well outside other retouchers at La Quina or elsewhere, and furthermore it's the only known skull retoucher from any species, anywhere.

- This object was selected despite its unsuitability, and while there are other unusual retouchers in the same layer (a reindeer jaw and horse tooth), the skull represents the only Neanderthal bone from this level.

Krapina skull with sequential parallel engravings

- A Krapina skull bears a series of 35 mostly parallel tiny cut marks running from slightly above the brow ridge over the forehead towards the rear of the skull. Just 5 mm (0.2 in.) long, they don't fit any butchery pattern, are totally unique at that site and have no parallels in any other hominin skulls, whatever the species.

- Yet they do recall something. They represent the longest series of sequential markings made by Neanderthals, even more than on the hyaena bone at Les Pradelles or the raven at Zaskalnaya.

Unique Krapina engraved skull

- Their placement on a hominin bone, and moreover a skull - the most symbolically resonant part of the body - is extraordinary.

- What it most closely mirrors is behavior of *H. sapiens* people who lived more than 100,000 years later at Gough's Cave. There, in addition to the body processing and cannibalism, bone modification was also going on.

La Quina: Use of skull bone as stone tool retoucher

Krapina, Croatia:

Bones with significant, not butchery related, cutmarks

Skull with 30 parallel lines engraved on it

Creation of markings

Skeletal variation

- One of the most remarkable burial patterns is the apparent paucity of female skeletons. This isn't due to difficulty in identifying sex in fossils.
- Age also shows some patterning, with the very young and elders more often found as individual skeletons than processed and recycled bones. Krapina for example is full of butchered adults, but there are no infants.
- On the other hand, children seem associated with the potential multiple-body deposits.
- And speaking of the Near East, while there are plenty of skeletons, so far there are no known cases of body processing.

Burials

- The Le Moustier teenager was butchered, but the baby there was not.
- Then there is the fact that plenty of locales with rich N archaeology have no Neanderthal remains at all.
- Hugely conspicuous is Abric Romani: occupied for tens of millennia and excavated to high standards, yet none of the hundreds of thousands of bones are hominin.
- Other Iberian sites that Neanderthals seem to have used in similar ways do have hominin remains: a child's tooth and skull fragment were found in 2016 at Teixoneres, and Cova Negra contains bones from at least seven individuals: two adults, one older child, and four little ones.

Breadth of N Mortuary Practices

- In essence, it's now very hard to maintain that Neanderthal bones all accumulated by random processes, or in the case of butchery, that it was just about filling hungry stomachs.

- Once the breadth of mortuary practices is understood, the borders between what they and early H. sapiens did with the dead begin to look fuzzy.

Burials

- There remain divergences.
- No intact Neanderthal skeletons come from open-air sites; though they're also rare among *H. sapiens* until after 30 ka, from then on spectacular burials exist. Double or multiple burials become more common
- Spectacular grave goods found only in H. sapiens graves.
- For comparison, Africa has only 2 burial sites older than 70 Ka.

Mortuary traditions

- There's only one conclusion to draw from all this.
- If mortuary traditions extend beyond our own species, and even back to our last common ancestor with Neanderthals, then so too does a key definition of humanity.
- No formalized spiritual framework was needed; Neanderthal 'funerals' probably ranged from ardent and anarchic to methodical and precise.
- R. Wragg Sykes: “They too were motivated not only by fear, but also by love.”

Neandertal Transitional Industries

The timing and spatiotemporal patterning of Neanderthal disappearance

- Tom Higham, 2014: Applied improved accelerator mass spectrometry ^{14}C techniques to construct robust chronologies from 40 key Mousterian and Neanderthal archaeological sites, ranging from Russia to Spain.

- The Mousterian ended by 41,030–39,260 years ago across Europe. We also demonstrate that succeeding 'transitional' archaeological industries, one of which has been linked with Neanderthals (Châtelperronian), end at a similar time.

- Our data indicate that the disappearance of Neanderthals occurred at different times in different regions. There was a significant overlap between AMH and Ns of 2,600–5,400 years.

T. Higham, et al., 2014

The great debate

- During the Middle to Upper Palaeolithic transition suggests that there was ample time for the transmission of cultural and symbolic behaviors, as well as possible genetic exchanges, between the two groups.

- Stratigraphic layers containing N's distinctive Mousterian stone tool complexes also disappeared between 45 and 40 ka.

- What tools come afterwards has caused probably the most vexed of all N debates.

Disappearance of Neandertals

- Across Europe and Western Asia: post 40 Ka, there's many more MH shaped bone, antler and ivory objects.

- By 40 Ka, Neanderthals obviously knew how to make blades and bladelets, but these were never their main focus, and similarly, formed bone artefacts are very rare.

- Within any site's stratigraphic layers, Middle Palaeolithic assemblages are always below intermediate ones, which are then followed by classically Upper Palaeolithic stratigraphic layers after 40 Ka.

Transitional industries: imply dates of last Ns

- Earliest MHs in Eastern Europe arrived by 45 Ka; S Europe at 41 Ka; Western Europe 41 Ka; Ns disappear by 40 Ka
- Transitional period between Ns and incoming MHs: 40-45 Ka
- Continued debate about origins of tool traditions, esp. tools that presage the UP, i.e. jewelry, blades
- Claim that Ns had no carved bones, pendants

Châtelperronian: N or MH?

- One of the first intermediate transitional cultures to be recognized was the Châtelperronian, from France and northern Iberia. It was assumed that Neanderthals were too intellectually inferior to produce the blades or bone artefacts they contained.

- In 1979 Neanderthal bones emerged from what looked like a Châtelperronian layer. Known as Saint-Césaire that skeleton wasn't alone. Further north in France at the Grotte du Renne, Arcy-sur-Cure, bones and teeth spread through a series of Châtelperronian layers were also claimed to be Neanderthal.

- These revelations presented a paradox for leading theories that saw the Châtelperronian as something that was only made by *H. sapiens*, who had replaced Neanderthals because they were "culturally more advanced"

Transitional industries: imply dates of last Ns

- French Châtelperronian = carved bones, pierced teeth, ivory
- These layers are quite thin, cover short period of time
- Sites that have N layers don't have best archeological contexts (in original position, or erosion or stratigraphic disturbances up or down);
  - no refitting evidence (if broken flake pieces are in different layer, tells you that movement has occurred);
  - sites were N fossils are mixed with UP material are all disputed;
  - Wragg Sykes does not believe Ns made CP artifacts
- Neronian industry at Mandrin France: nanopoints at 54 Ka by MHs?

Grotte du Renne, Levels VIII-X, Châtelperronian

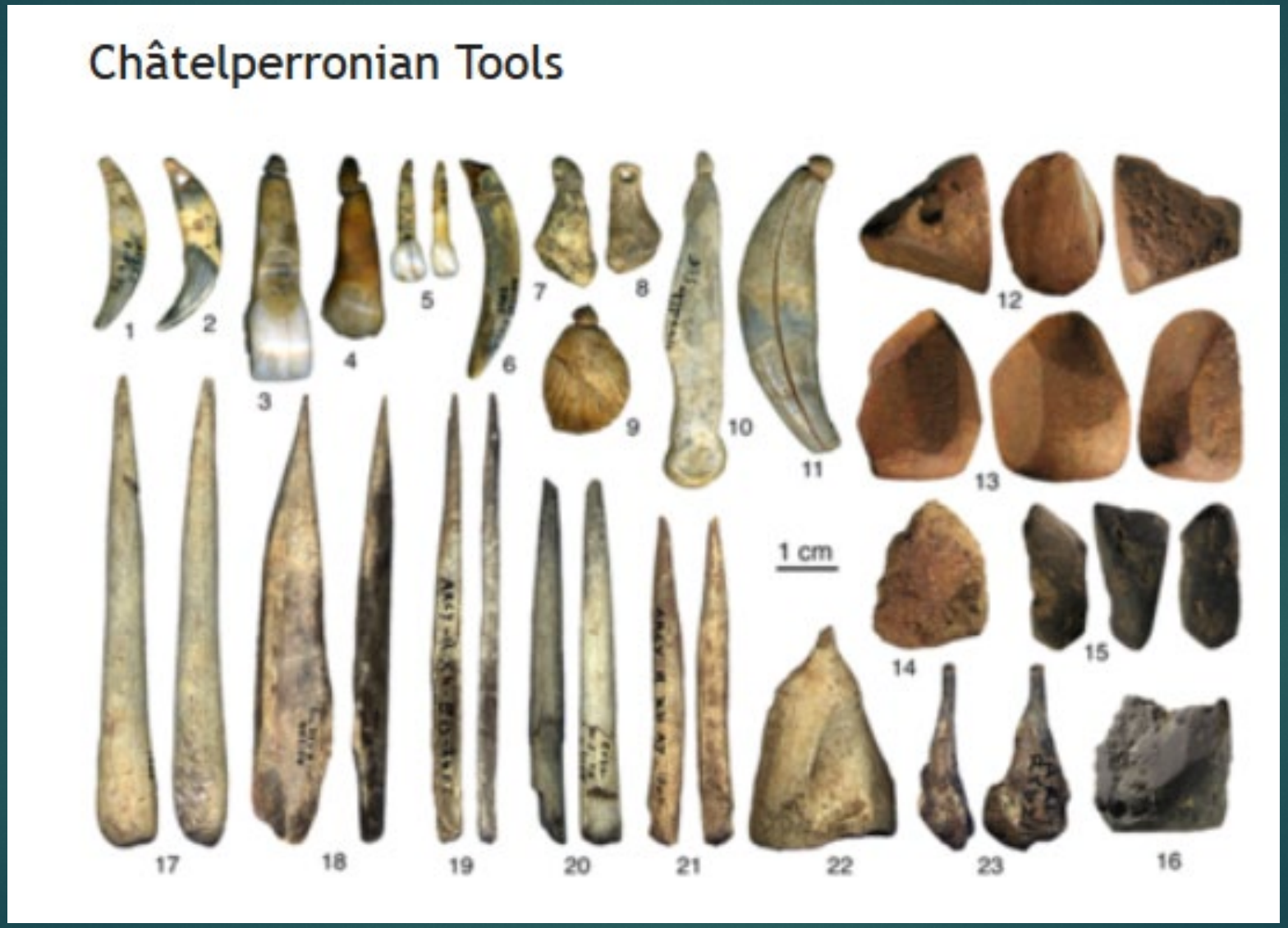
'Smoothers' made of ribs and ivory n= 14


IX
Châtelperronian
X
1 cm
White-tailed eagle.
Pygargue à queue blanche
Haliaeetus albicilla

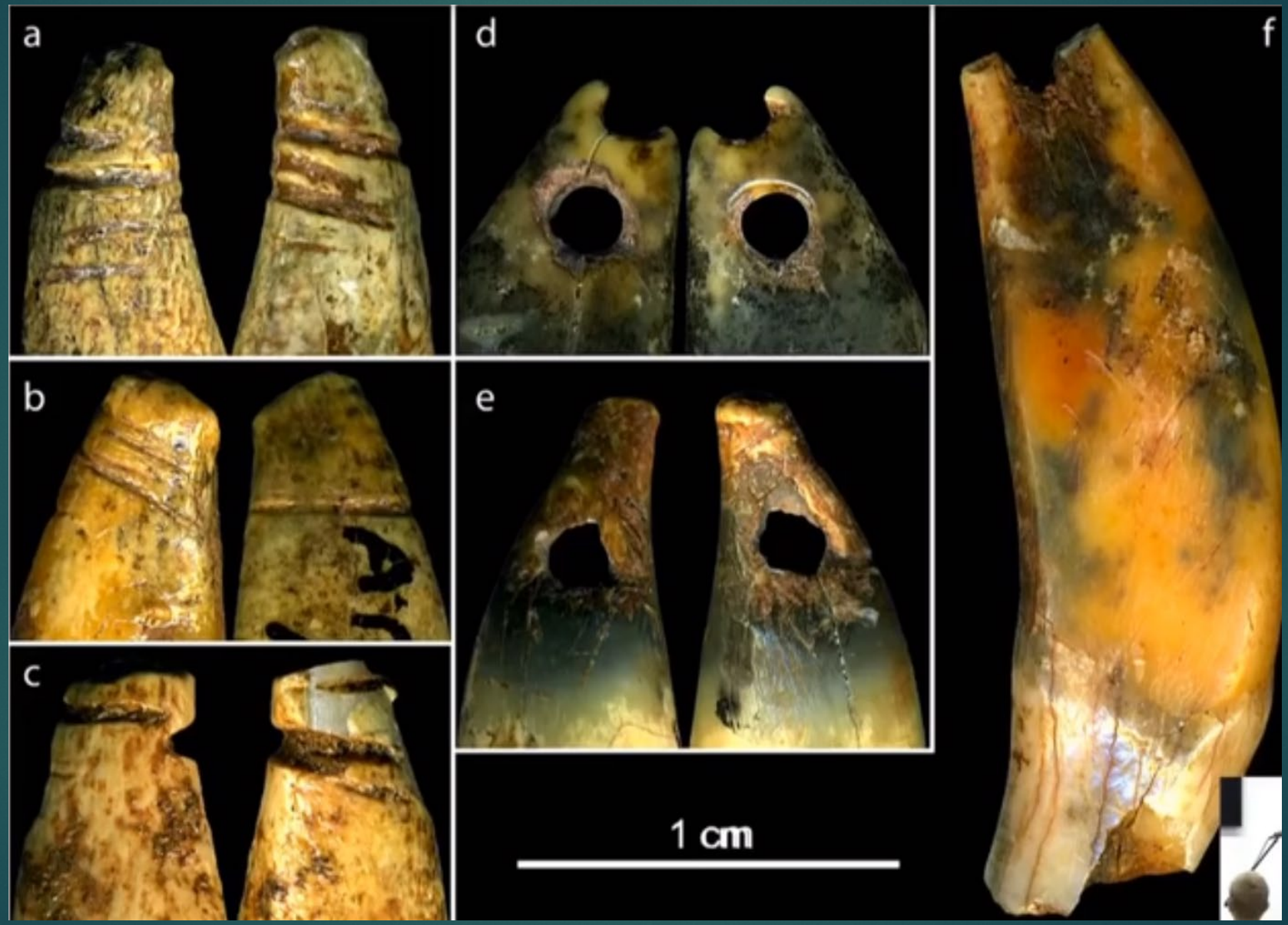

1 cm


a
b
c
d

Châtelperronian Tools made by Neandertals?, 45 to 40 Ka




Hyena canine
1
2
3
4
5
6
7
8
9
10
1 cm
VIII
VIII
Vanhaeren, d'Errico et al in press


a
b
c
d
e
f
1 cm


1 cm


a
b
c
d

Châtelperronian industry 42 kya

The final Neanderthals in France (33,000–30,000 years ago) began to make ornaments from animal bone and teeth, such as this necklace from Arcy sur Cure.

Photograph © Claudio Vazquez

Châtelperronian Tool debate x 20 years

- There has been a 20-year debate as to whether the last Neandertals or AMHs created the tools & jewelry at Grotte du Renne at Arcy-sur-Cure, France. Based on long assumption that Ns were incapable of producing UP tools.

- Solely at this site the Châtelperronian is stratigraphically associated with Neandertals.

- Hypotheses explaining this association range from "acculturation" by AMHs, to independent development of such artifacts by Neandertals, to stratigraphic movement of pendants and bone artifacts from the overlying Aurignacian into the Châtelperronian layers, or to movement of the hominin specimens from the underlying Mousterian into the Châtelperronian layers.

- 2016 study using proteinomic analysis and mtDNA concluded that hominins in same CP layer are Ns.

2016: Châtelperronian tools & jewelry were definitely Neandertal

Châtelperronian Neanderthal bone artefacts from the Grotte du Renne (Arcy-sur-Cure, France)

Paleoproteomic evidence identifies Neandertals associated with the Châtelperronian at the Grotte du Renne

Frido Welker, et al., 2016

2016: Neandertals made their own jewelry at 42 K, new protein method confirms

- Châtelperronian layers: The “necklaces” are tiny: beads of animal teeth, shells, and ivory no more than a centimeter long. Found in the Grotte du Renne cave at Arcy-sur-Cure in central France, they accompanied delicate bone tools and were found in the same layers as fossils from Neandertals.
- Others argued that Neandertals were incapable of the kind of **symbolic expression** reflected in the jewelry and insisted that modern humans must have been the creators.
- Study uses a new method that relies on ancient proteins (asparagine collagen specific to N) to identify and directly date Neandertal bone fragments from Grotte du Renne (single, immature, breastfed N) and finds that the connection between the archaic humans and the artifacts is real.

Other Transitional technologies: taphonomic problems

- 5 other transitional groups: There's the Szeletian in Hungary, Bohunician in the Czech Republic, Uluzzian in Italy, Bachokirian in Bulgaria and the cobbled-together Lincombian–Ranisian–Jerzmanowician identified in Britain, Belgium and Eastern Europe.

- The million-dollar question is who made them.

- But skeletal remains are vanishingly rare before this, and frustratingly, many key sites were either excavated over 40 years ago, or have obvious signs of disturbance or mixing between layers.

- With greater understanding of taphonomy, the potential for freeze–thaw shifting of sediments within has become obvious, and so untangling what these cultures really mean requires archaeological contexts of exceptional integrity, and a battery of high-resolution analytical methods.

100 Châtelperronian sites, 44-41 Ka

- Two competing explanations emerged.
- 1 - Perhaps the Châtelperronian was actually an independent Neanderthal invention, converging on Upper Palaeolithic-like features by chance.
- 2 - Or alternatively, it was made by Neanderthals but resulting from some kind of cultural hybridization. Possibilities ranged from full contact, to Neanderthals spying on Upper Palaeolithic groups or picking through their trash and then figuring out how to copy them. Today things have grown more complicated.

- Nearly 100 Châtelperronian sites are now known, from the Paris basin down to northern Iberia, dating somewhere between 44 and 41 ka. In France it rapidly follows the youngest Middle Palaeolithic layers, but south of the Pyrenees there seems to be a gap of around 2,500 years before it appears. It was definitely over fast everywhere, lasting perhaps 1 millennium in any site.

Newer excavations of Châtelperronian layers do not support idea that Ns made them

- Most crucially, excavations of new sites without taphonomic problems have revealed a rather different cultural picture.

- Middle Palaeolithic flakes and tools are only present in Châtelperronian assemblages from old excavations or places where there are signs of disturbance. This means that the apparent 'transitional' character in the technology is far less supported.

- Detailed studies of these 'clean' Châtelperronian layers show it was a true laminar UP world. Blades were retouched on one side opposite a sharp edge to make Châtelperronian points, and the makers were highly selective: blades not up to scratch in size terms were rejected.

Châtelperronian was not N

- Open-air Châtelperronian sites show the same thing. Canaules II, near Bergerac, has a clear separation from underlying Middle Palaeolithic archaeology. It was a mass-production workshop, containing thousands of near-pristine artefacts from a very thin layer.

- Even more significant, Châtelperronian laminar technology doesn't match the way Neanderthals made blades or bladelets, and more closely resembles Proto-Aurignacian approaches.

- But in total contrast to Neanderthals, Châtelperronians had no systematic interest in flake production.

Saint-Césaire and Arcy-sur-Cure: older sites

- Today Saint-Césaire and Arcy-sur-Cure remain the only Châtelperronian sites with Neanderthal associations.

- Despite new protein identifications, both locales are very problematic. The Grotte du Renne was excavated over 30 years ago with good practice for the time, but lacked precise location recording and sediment studies. Only have the layer and grid square recorded.

Grotte du Renne

- Most were towards the bottom of the Châtelperronian layer but others came from higher up, which was taken to mean Neanderthals were present through its entire duration. However, as well as Middle Palaeolithic artefacts occurring well up into the Châtelperronian, there are also Châtelperron knives and bone awls in the underlying Middle Palaeolithic layer.

- This is strongly suggestive of disturbance or movements between the two deposits.

Saint-Césaire and Arcy-sur-Cure: older sites

- So far, refitting of lithics has been limited, but it identified that fragments were also moving several tens of centimeters between the different Châtelperronian layers.

- Put together, the Grotte du Renne contains worrying evidence that things were being displaced both within and across the crucial layers.

- The most recent research used ZooMS analysis to identify more Neanderthal remains, including a breastfeeding baby girl, and they date to around 42 ka.

Saint-Césaire and Arcy-sur-Cure

- But given the other evidence for objects moving, it's not entirely out of the question that the Neanderthal bones were jumbled upwards from an original Middle Palaeolithic context.

- Geo-thermal processes from freezing sediment can also move things over 5 ft vertically, and there's plenty of evidence that the Châtelperronian occurred during an exceptionally cold period.

- What's really needed to be secure in interpreting Grotte du Renne is a complete refitting analysis.

Saint-Césaire Neanderthal

- The Saint-Césaire Neanderthal, in contrast, seemed a more solid case. When first found, it was removed as a block of sediment 1.1 yd across to be excavated in the lab. Full details on the position and condition of the skeleton have, however, never been published, although direct dating produced results around 42 to 40.6 ka; potentially an underestimate due to low collagen.

- But Saint-Césaire has also recently been subject to critical reanalysis, raising more red flags over whether the Neanderthal here was genuinely in an intact Châtelperronian layer. The highly crushed bones themselves indicate complex taphonomy and erosion, but meticulous research on the artefacts published in 2018 also suggests things aren't as simple as they once seemed.

Saint-Césaire Neanderthal: CP was MP

- While only about 15 per cent of the 40,000 lithics excavated in the 1970s were recorded in 3D, it was possible to digitally reconstruct the stratigraphic boundaries and reassign other artefacts to their correct layer.

- The results showed that almost all the lithics from the Châtelperronian layer weren't related to blade production at all, but were Levallois and Discoid.

- While much of the layer was jumbled and pointed to mixing, all the lithics from within the skeleton's sediment block were technologically Middle Palaeolithic.

Saint-Césaire CP was not N

- A gigantic refitting programmed found that just 4 per cent of the lithic fragments could be reunited, compared to Canaules II, which is nine times higher. This already suggested that the layers weren't intact, which was confirmed by spatial refit data that revealed objects had moved several meters along the cliff and down the slope.

- Adding in the fact that everything in the supposed Châtelperronian layer was far more battered, it looks as if some kind of massive sediment flow had come off the cliffs and mixed things up.

- The researchers proposed a new explanation for Saint-Césaire: there had been a Châtelperronian layer, but it was thin and right on top of a rich Middle Palaeolithic layer. Geological disturbance later thoroughly mixed the two.

Neither Grotte du Renne nor Saint-Césaire are entirely secure contexts connecting Neanderthals to the Châtelperronian

- It seems that neither Grotte du Renne nor Saint-Césaire are entirely secure contexts connecting Neanderthals to the Châtelperronian.

- This means that, at present, we don't know who made it.

- And it also means that in France and northern Spain, the culture of the last identifiable Neanderthals was very much in the mold of what they'd been doing for tens of millennia = Discoid and Levallois assemblages.

But did MHs learn from Ns

- And while in a number of places Ns were showing interest in pigment, fossil shells, markings and some shaped bone tools like lissoirs, the Châtelperronian at Grotte du Renne and elsewhere unarguably contains artefacts that go beyond this.

- Still, vague hints at possible cultural contacts exist, but with ideas moving in the opposite direction: perhaps it was MH Châtelperronians who picked up an interest in large raptors from Neanderthals, shown by the butchered eagle toe at Cova Foradada in northern Spain. And perhaps they learned from Neanderthals how to make lissoirs, then decorated them with their own V-shaped engravings.

MH had integrated hunting system

- Secure evidence for genuinely hybrid cultures associated with Neanderthals is very thin indeed.
- It's not that they weren't savvy enough to make Uluzzian lunates or Châtelperron points, but the real difference is conceptual.
- Those objects were systematically made to exacting standards and methodically retouched because they were part of an integrated system of hunting using composite, mechanically assisted weapons: light spears, dart tips or even arrows.
- This is quite unlike what we see in Neanderthals, where hafted weapons were thrusting or javelin-like throwing spears.

UP culture was richer

- In contrast, the Uluzzian and Châtelperronian – covering a couple of millennia at most and many times fewer sites – contain more shaped bone tools than the entire Middle Palaeolithic.

- Even more striking is the frequency and variety of aesthetic and symbolic objects in intermediate cultures compared to the Middle Palaeolithic.

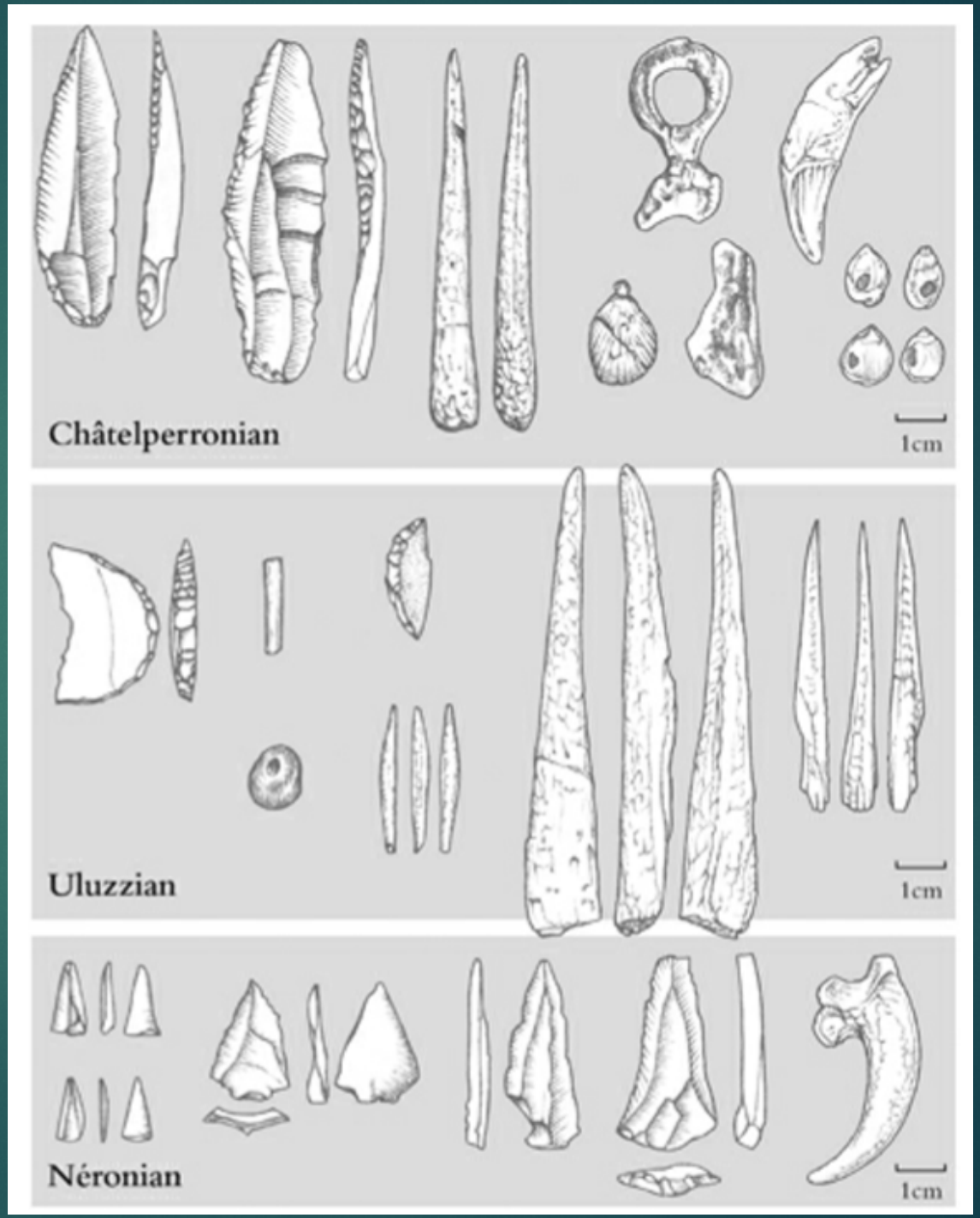
- They’re still much rarer than in later Upper Palaeolithic cultures, but nothing like the pierced teeth, bones and stones, decorated tools or carved objects are known to have been made by Neanderthals.

2023 L. Slimak Mandrin study: bows and arrows were first used in Europe by *Homo sapiens* when they arrived there at ~54 Ka

At Mandrin, France, level E: According to experiments, ancient stone points found in Mandrin E level were so little that they could only be used as arrowheads when shot from bows

Metz, L., Lewis, J. E., & Slimak, L. (2023). Bow-and-arrow, technology of the first modern humans in Europe 54,000 years ago at Mandrin, France. *Science Advances*, *9*(8),

Objects from the Néronian in south-east France, and two ‘intermediate’ cultures after the Middle Palaeolithic: Châtelperronian and Uluzzian.



The Néronian

- There's a last, even more mysterious culture that's worth discussing, from south-east France.
- It's some 10,000 years older than the Châtelperronian, and potentially of Neanderthal authorship.
- The Mandrin Cave: contains is the richest and best-studied example of the Néronian.
- It's not just unusual because of its technology, but also because it's sandwiched between typical Neanderthal-associated assemblages. Preceding it is a Quina level, and afterwards come another five Middle Palaeolithic layers, dating to about 47 ka. There is only 1 MH tooth associated with this layer.

The Mandrin Néronian

- The Mandrin Néronian – under 8 in. thick and around 60 yd2 – has produced 60,000 objects, plus probably millions of tiny pieces of knapping debris.

- Technologically it looks completely unlike anything else during this time period in Western Europe, combining blades, bladelets and Levallois-like points.

- And the richness of the assemblage is extraordinary: there are some 1,300 points, which astonishingly is more than all European Middle Palaeolithic sites combined. While they vary in shape, they were systematically made apparently in three sizes, some left unaltered, others retouched steeply.

The Mandrin Néronian: nano-points

- A third are less than 1.2 in long and therefore microlithic, but others are so diminutive – 0.3 to 0.6 in. long and 0.08 in. thick – researchers called them nano-points.

- Use-wear analysis confirms even the tiniest were damaged by high-speed impacts, but because weapon shafts must be smaller than the stone tip, they're too small to be used with spears; something like darts thrown with an atlatl, or for the nano-points, arrowheads.

- At Mandrin Cave, about 75 per cent of all artefacts relate to laminar production and points. Similarly, Neanderthals did make very tiny flakes, including using Levallois methods, and bladelets in many contexts, but it's typically a response to the stone resources available.

Mandrin

- But in Europe after Mandrin Cave, there are no comparable small lithic points designed for propulsion weapons for more than 10,000 years.

- Comprehensive dating shows that the Néronian layer was deposited probably 50 to 52 ka, and the soot chronology points to not more than several decades, even just a few years, between it and the preceding Quina layer.

- Nothing remotely like it exists for thousands of years and hundreds of kilometers. It resembles some so-called Initial Upper Palaeolithic (IUP) cultures in the Near East and the borders of Europe. They date around 45 to 50 ka, older than the European intermediate cultures, and the Bohunician of the Czech Republic is especially relevant.

But what of eagle talons at Mandrin

- In theory there could have been older ‘cryptic’ dispersals of early H. sapiens into Western Europe; alternatively, an ancient hybrid population is another possibility.

- But after all this, there is a glimmer of a cultural connection to Neanderthals. The Madrin Cave Néronian produced one of the largest butchered golden eagle talons from anywhere in Europe. Focusing on raptor claws is not an Upper Palaeolithic trend at all.

Mandrin Cave

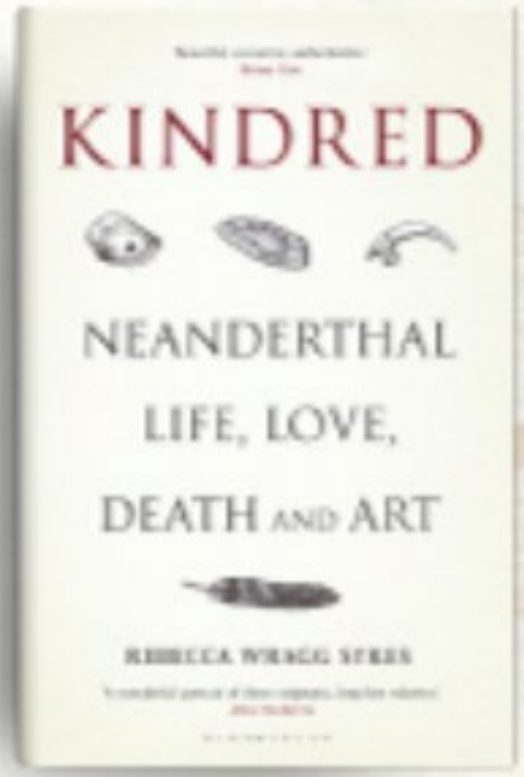
- Scenarios about the Néronian itself will remain speculative until DNA is extracted, potentially from the sediments.

- But even if it turns out that Neanderthals weren't responsible, it's still extremely interesting because of what it implies about their population dynamics.

- The Mandrin Cave soot chronology shows an extremely rapid shift from a preceding Quina-based tradition to the Néronian: no more than a human lifetime, or even faster. Then the Néronian itself looks very brief: a thin layer corroborated by only 18 or so occupations within the soot archive. After it ends, the cave was abandoned for many generations, perhaps millennia.
- When fires burned once more in Mandrin Cave, they were sat around by people – presumably Neanderthals – making basically Middle Palaeolithic artefacts again.

KINDRED

NEANDERTHAL LIFE, LOVE, DEATH AND ART



Dr. Rebecca M. Wragg Sykes

An email to Rebecca Wragg Sykes: Re: Your opinion about Châtelperronian material not being Neanderthal

On Sat, 25 Mar 2023, CHARLES VELLA wrote:

Rebecca

Kindred is a fantastic book. My only concern is your apparent opinion that the Châtelperronian material is not Neanderthal. I would like your analysis of the use of proteomics in this study which appears to conclude that Neanderthals did create the material at this site: Welker, F. Pääbo, & Hublin, J. , et al., 2016. Palaeoproteomic evidence identifies archaic hominins associated with the Châtelperronian at the Grotte du Renne.

Many thanks.

Charlie

Charles J Vella, PhD

Rebecca Wragg Sykes<rebeccawraggsykes@gmail.com> Aug. 21, 2023
To CHARLES VELLA

Dear Charlie,

Thank you for your email and kind words about my book, and apologies for the delay in my response.
I think I do go into a lot of detail in the book about my concerns with the Grotte du Renne, which is simply that lithic refitting has demonstrated some movement of objects within the CP layer, and therefore until there is a full investigation into the stratigraphic integrity of this site, the presence of fossils or DNA in the CP layer must be suspect as there may have been movement between layers.

Dr Rebecca M. Wragg Sykes

A new paper was recently published which reports such a fossil, but I think the most important point they make in their conclusion is this:

"Furthermore, additional analyses must be conducted to discuss the archaeological integrity of the Châtelperronian sequence of the GDR such as what has been done at Saint-Césaire. Indeed, it incites to undertake taphonomic and spatial studies of the GDR remains since it is now the only site delivering human remains in Châtelperronian layers for which these kind of studies have not been carried out. "

https://www.nature.com/articles/s41598-023-39767-2

Dr Rebecca M. Wragg Sykes

In addition, the supposed mixed technological character of the CP lithic industry itself has been shown not to exist at sites where there is no possibility of stratigraphic mixing, instead it looks very much like it is embedded in a blade-focused, Upper Palaeolithic technological world.

I would also suggest this paper which for me places the CP in a framework which makes sense:
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0277444

Best wishes
Rebecca

Dr Rebecca M. Wragg Sykes
Hon. Fellow, School of Archaeology, Classics and Egyptology
University of Liverpool; rebeccawraggsykes.com

Last Ns

- The latest-dated Neandertals in Europe are not restricted to southwestern Europe, but are actually rather widely spread in Europe

- Neandertals and their associated Mousterian and Châtelperronian tool "traditions" disappeared between 41 Kya and 39 Kya in Europe.

- In Iberia, Neandertals seem to have disappeared earlier, around 45 Kya. Although there are more recent "Neandertal" dates from the Iberian Peninsula, they are derived from archaeological levels containing Mousterian artifacts but no human fossils.

- But even if this inference is sound, the Iberian radiocarbon dates are still probably underestimates.

MH and N overlap time in Europe

- Late Mousterian/Châtelperronian and early Upper Paleolithic (including Uluzzian) AMH dates indicates an overlap on the order of 2.6 to 5.4 Ky between Neandertals and early modern humans in Europe (Higham et al. 2014).

- N dates in Levant are back to 265 Ka, and later to 70 to 45 Ka.

- In Siberia at 50 Ka.

N and MH overlap

- By 2014 Tom Higham had around 200 new dates from forty sites that he had worked on over the previous decade to help refine the date of Neanderthal extinction. The final model suggested that between 39 and 41 Ka, the Neanderthals disappeared.
- Oase: MH dated to between 39 to 41 Ka.
- Earliest European Homo sapiens were not the Aurignacians, whom we date after 42 Ka.
- In some regions, Neanderthals seem to be present later, around 40,000 years ago, while in others they had seemingly disappeared up to 5,000 years earlier.

N and MH overlap

- There is direct evidence of overlap and interaction at Oase, of course, but amongst late Neanderthals we have found no evidence yet for the introgression of modern human DNA into Ns, only of N into MHs.
- It seems clear that the idea of a modern human invasion of Europe, resulting in a rapid disappearance of Neanderthals, is simply not supported.
- For over ten millennia prior to their final disappearance 39,000 years ago Neanderthals were our neighbors, and perhaps our friends, maybe occasionally our lovers and sometimes our enemies.
- The model of Neanderthals rapidly disappearing as our own species swept into Europe, superior cognitively and technologically, can simply be eliminated.

Neandertal Denouement

Did Neandertals go extinct?

- Yes – and no.
- The genetic data demonstrate conclusively that Neandertals made small but important contributions to modern Eurasian gene pools.
- There also been a very small amount of Neandertal gene flow into African populations during the past 20,000 years, amounting to ~0.03% of most Africans' genomes. Neandertal genes are still with us.
- However, Neandertal morphology disappears around 40 Kya.

If Neandertals were so well-adapted to life in Pleistocene Europe, why did they disappear?

- Some have attributed their disappearance to climate change. But population modeling suggests that rapidly changing climate alone would not have resulted in global Neandertal extinction unless competition with early moderns was part of the picture.

- Recent reassessments of Neandertal cognition and technology have undermined the long-standing belief that Neandertals differed qualitatively from early moderns in cognitive capacities.

- There were population size differences in the two groups, and demography may be one of the key to the Neandertal “demise.”

Neandertal Denouement

- When? Consolidating data from numerous sites points to 39-40 ka, as the point beyond which no reliable evidence for Neanderthal morphology exists.

- Where? Moreover, aside from generic Levallois technology, most intriguingly, someone between 47 and 42 ka at Jinsitai Cave in China was making Mousterian artefacts extremely similar to N assemblages from Chagyrskaya and other Neanderthal sites some 1,550 mi. west in the Altai. It's not entirely unreasonable to imagine that the last breaths to fill Neanderthal lungs were inhaled somewhere in the vastness of Central or East Asia.

- The MH Oase jaw is among the few fossil representatives anywhere for late N-MH interbreeding. However, since it took place up to six generations before his birth, how it manifested physically will be diluted.

MHs at 45 K were going extinct too

- A further irony is that long-standing claims that early H. sapiens possessed some intrinsic superiority have been disproved.
- The Oase man's people went extinct in Europe. Even more striking is the MH Siberian 'Ust-Ishim man. His line also went extinct.
- This means that many of the first H. sapiens populations are as extinct than the Neanderthals; not a great sign of evolutionary dominance.
- Our present evidence of interbreeding may be somewhat like the early history of exoplanet discoveries, where such objects were assumed to be rare, yet several decades on it appears there are more planets in our galaxy than stars. Today we know Eurasia was always a melting pot, home to hundreds, perhaps thousands of hybrid children.

Both Ns and MHs experienced extinctions ~40 Ka

- At 39-40 Ka, both Ns and early MHs in Europe died out.
- H. sapiens populations in Europe before 37,000 years ago did not contribute to the modern European gene pool.
- There is no evidence of the earliest modern humans in Europe contributing to the genetic composition of present-day Europeans.
- Only from ~37,000 years ago do all the European individuals analyzed share ancestry with present-day Europeans

End of Ns

- There wasn't wholesale merging of populations, or of cultures. No Neanderthals across their whole range during the crucial period between 80 and 40 ka have any genetic hints of hybridizing N DNA, and not all early H. sapiens individuals show it either: neither the mtDNA from Bacho Kiro, nor a Proto-Aurignacian tooth at Fumane almost the same age as Oase.

- But the genetic patterns in living people tell us assimilation to some degree did happen. Though Neanderthals remained physically distinct even in their last visible skeletal remains, the scale and repetition of interbreeding, plus the range of retained genes in us, means they were – and are – human.

Demise

- Biologically speaking, individuals who can mate and create viable offspring are the same species.

- It seems to me that the replacement of Neanderthals probably occurred at different rates and in different places over thousands of years.

- Hingham wonders about the possibility that Neanderthals were assimilated into modern human groups through time.

Demise

- Demise: Ns were not alone and surprised by MH groups; MH had been around from 200-100 Ka; there was contact, & interbreeding but there are no descendants from these earlier contacts;

- Breeding populations – N more isolated, small groups; perhaps more MH social connectivity

- We need to see Ns on own terms; not only from their demise; their achievements; other kind of human with whom we interacted.

Multiple N demise theories

- Genetic issues: The effect of population genetics; very low genetic viability, low population sizes.

- Loss of ecosystem mammals;

- Competition with Modern Humans

- Villa & Roebroeks, “Neandertal Demise: An Archaeological Analysis of the Modern Human Superiority Complex.” , but also see a counter argument: Neandertal demise appears to have resulted from a complex and protracted process.

Villa & Roebroeks -- Demise theories

- Climate changes: rapid changes after MIS5 (125 to 45 Ka); while Neandertals were well experienced with cold, big game ecosystem, losses reduced food sources
- Repeated population crashes with decreased genetic diversity
- Low Neandertal population density
- Possible male hybrid sterility,
- Contraction in geographic distribution
- Interbreeding within their small community sizes; males in small groups were often related; consequent interbreeding
- Followed by genetic swamping and assimilation by modern human immigrants.

Extinction Theoretical Models: causes of N demise at 39-40 Ka

- Neanderthals disappeared from the fossil record about 39 Ka and were eventually replaced in Europe by anatomically modern forms.

- 8 Models of possible causation of N demise: from least likely to most likely
- 1 - Early MH alliance with wolves resulting in domination of the food chain: But modern dog DNA = only at 16 Ka; long past N extinction time
- 2 - Volcanic eruptions: Mt. Toba or Campanian Ignimbrite volcanic eruption
- 3 - Genocide: Intergroup violence: Ns were killed off by MHs: localized quarrels for food or territory, a la Europeans vs Native Americans

Possible Causes of Extinction Theories

- 4 - Spread of MH pathogens/disease to Ns: we got N immune genes; what did they get? In similar scenario, 90% of Native Americans were exterminated;
  - Wild theory: the Neandertals were pushed into extinction by prion diseases (which include kuru and mad cow disease) that they contracted by feeding on the brains of their own dead (Chiarelli 2004).

- 5- Resource Competition: Out competed by AMHs -localized quarrels for food or territory = violence from AMHs; competitive replacement (MH aggression); competitive exclusion (two species competing for the same limited resource cannot coexist)

Possible Causes of Extinction Theories

- 6 - Climactic stress: Habitat degradation and fragmentation occurred in the Neanderthal territory in the 10 Ka before the arrival of modern humans; Large game dying out; effected population sizes

- Some of the more intriguing uncertainties that remain include what caused the splitting, dispersing and perhaps even replacements visible in the Neanderthal meta-population from MIS 5 (120 Ka).

- Climatic impact is a possibility, with the rapid temperature rise towards the hothouse'n'hippos Eemian peak, followed by a world in flux, experiencing massive temperature jumps of 11 to 16°C (50-60° F). The population changes are mirrored in the archaeology too, with a proliferation of techno-complexes and regional traditions between 125 and 45 ka.

Finlayson: Climate was chief factor in N demise

- Finlayson, 2004:
  - MH Gravettian culture starts c 37 Ka, with flint blades & bone points; more dense population, with more sites in an area; long term settlements & food storage; river fishing; hunted seasonal migrating animals; MHs better at pursuit long distance hunting?
  - Ns were in rivers and forest edges using ambush hunting of more sedentary animals; as steppes expanded, Ns contracted along with their preferred habitat; Iberian Peninsula as final refuge

C. Finlayson 2004

N demise: climate

- Wragg Sykes: Ns disliked full-on glacials, but was the climate during the last few millennia up to 40 Ka worse than what they'd weathered before?

- While true tundra species do become more common at the end of the Middle Palaeolithic, they only really dominate after the last Neanderthals were gone. Perhaps if it wasn't intense cold, maybe the wider impact of MIS 3 (59 Ka) is what made it different.

N demise: severe climate fluctuations

- While hunter-gatherers can successfully adapt to extremes, instability can be catastrophic.

- After coping with the heat of the Eemian, Neanderthals rode out a series of ups and downs in climate during the later MIS 5, which may even have been a time of expansions and cultural diversity.

- But after the subsequent MIS 4 glaciation thawed, the climate got jittery. From 55 ka, MIS 3 degenerated into a jagged, fitful frenzy of stadial–interstadial cycles, sometimes plunging from not too bad to truly bitter within a lifetime.

Climate

- That doesn't mean Neanderthals lived in permanent crisis.
- But consistent uncertainty would have amped up risks, and this is visible in their core prey species: horse and mammoth were being forced to rapidly alter their diet, and were probably behaving in new ways that impacted traditional hunting tactics.
- Yet climate chaos can't be the full story.

Climate not whole story

- Recent research tracking what happened to hyaenas during that crucial period came to a surprising conclusion.

- They were even more affected than Neanderthals by the huge decline in prey during the MIS 4 glaciation, but recovered from the crash in the temporary warmish conditions afterwards as steppe-tundra and even open forest loaded with herbivores developed.

- Neanderthals mirror this, expanding as things warmed up again, even recolonizing Britain, and revealing a burst of technological diversity.

- But this golden age didn't last,

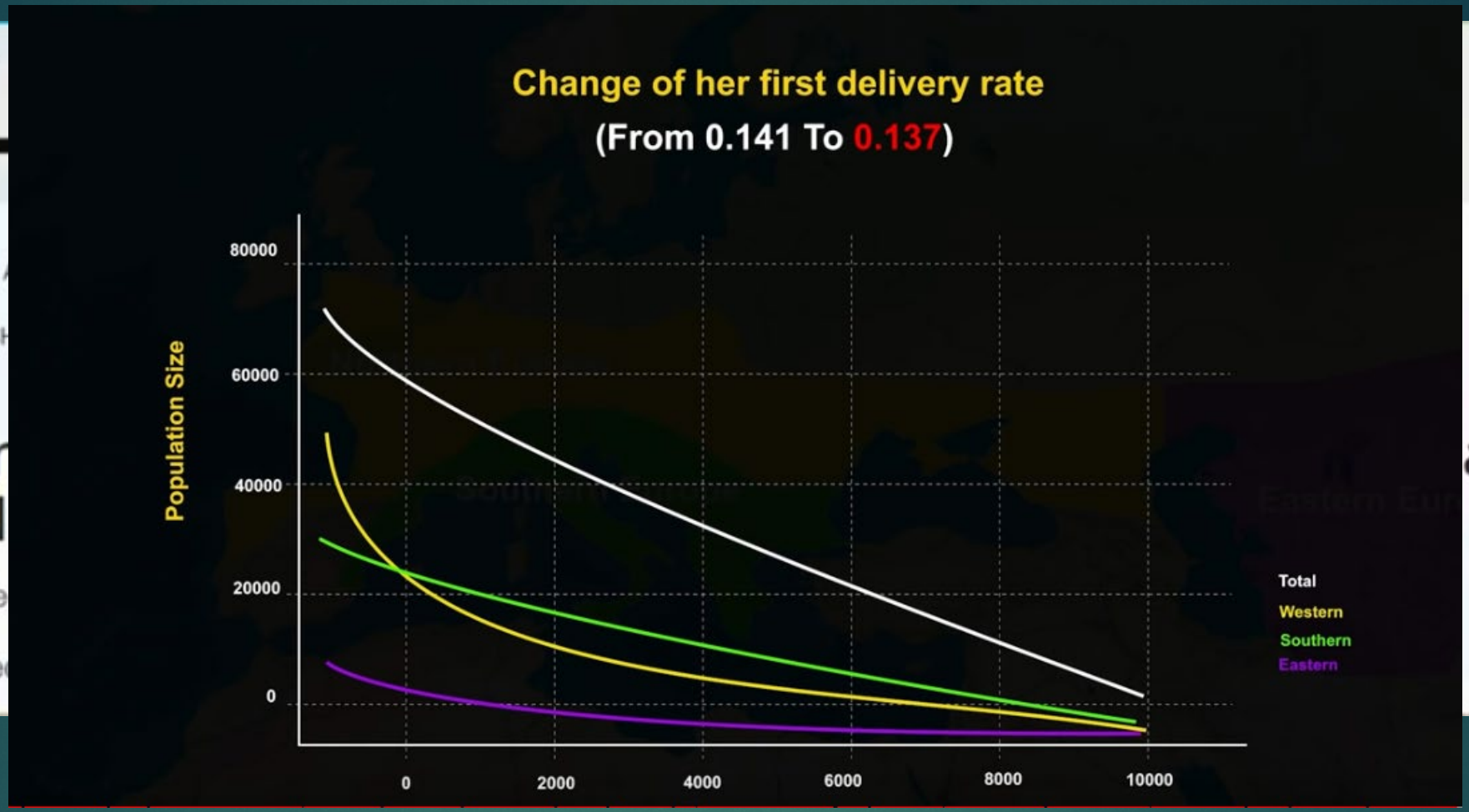
Climate

- The genetic evidence of a possible bottleneck and the archaeological settlement record both suggest that population fragmentation and possibly even local extinctions occurred in northern Europe in MIS4 (74 Ka) due to the increasingly uninhabitable glacial landscapes

- When climate ameliorated at the start of MIS3, previously abandoned regions become re-populated including Britain which had not seen any Neanderthal occupation since the end of MIS6, a period of more than 100,000 years

Climate

- However, following an initial warm stable phase lasting several thousand years, MIS3 (60-28 Ka) degenerated into highly fluctuating climatic excursions, with significantly cold stadials that may have forced populations to periodically leave affected regions, separated by relatively mild interstadials.



Population of 5000 is lowest that can survive; female birth rate as crucial variable for N demise; if rate is .130, disappear in 4 K years

7 - Population Dynamics/Genetics: Ns did it all by themselves

- Ns did it to themselves: their population was too small: too much family interbreeding with a decline in genetic diversity; reduced fertility
- Population size matters for the survival of a species
- Charles Darwin observed that large population size is an important hedge against extinction in the presence of predators or other natural enemies
- Chris Stringer: "They may have disappeared in different regions for different reasons, but the background cause is clear. They didn't have the numbers."

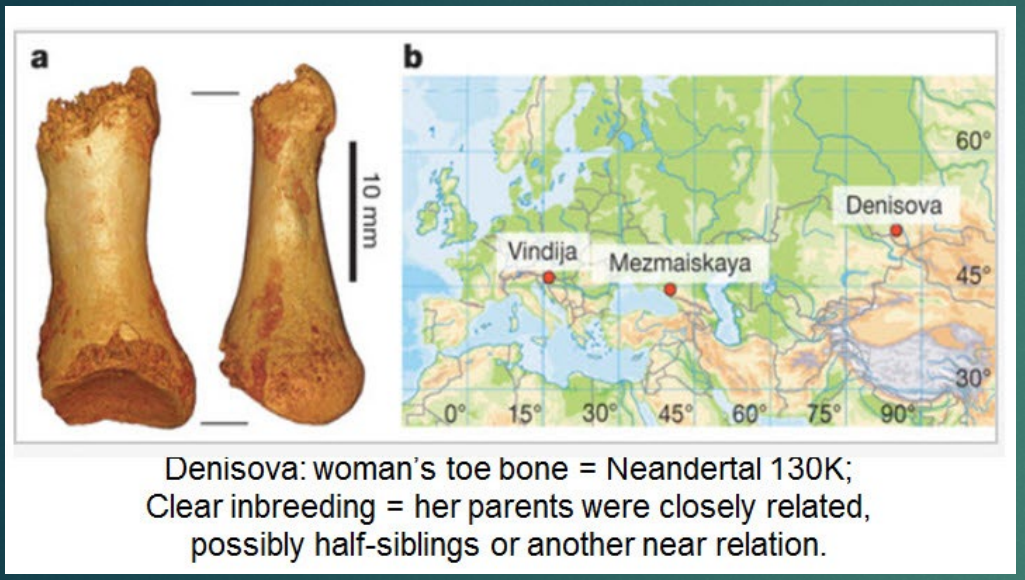
Historical pattern of N demographics

- Clear phases of presence and absence of Neandertals in the Late Pleistocene, very probably the result of a process repeated phases of colonization, regional extinction, and recolonization, during earlier glacial–interglacial cycles.

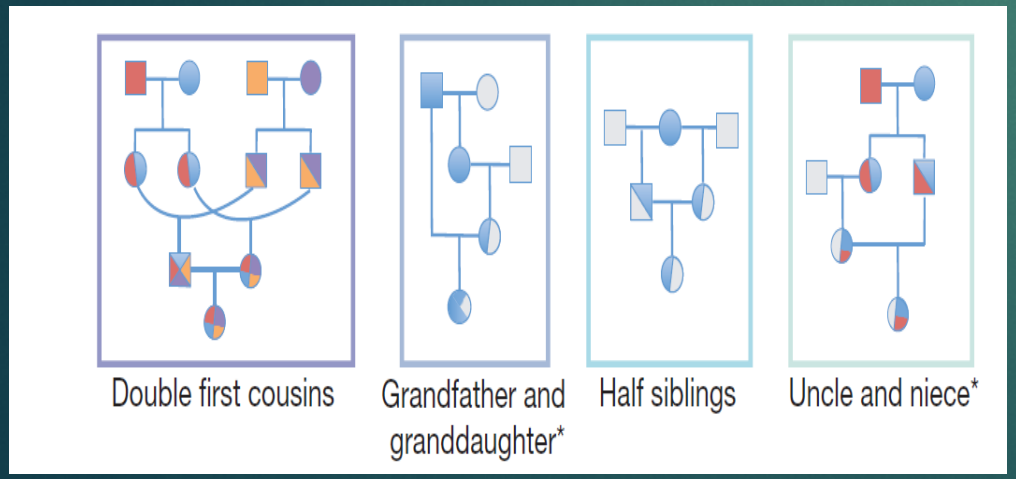
- This process must have been an important factor in the demography of these populations, including their limited genetic variation

- Genetic studies show that (late) Neandertal populations had small effective population sizes and were inbred

2014: Reason for Neandertal Demise:
Low population number with interbreeding



Denisova: woman's toe bone = Neandertal 130K;
Clear inbreeding = her parents were closely related,
possibly half-siblings or another near relation.



Denisova Neandertal woman toe bones:
Chromosome 21:
M & F genetically related (19 Mb base pairs with no difference)

- Half siblings
- Grandfather-granddaughter
- Aunt-nephew
- Double first cousins

Pruefer et al., , Nature, 2014

At 49,000 years ago, the Neandertal family group from El Sidrôn, Spain, with genetic and skeletal evidence of inbreeding, could be representative of the beginning of the demographic collapse of this hominin phenotype.

Steven Churchill, 2014: Thin on the Ground

- Thin on the Ground: Ns appear to have lived at relatively low population densities throughout their existence. This would have impeded technological advancement.

- Larger population size correlates with tech innovation; lower size impedes innovation

- Why did Ns live at such low population size, why were they so “thin on the ground.” Energetic and ecological factors likely kept Ns at low population density throughout their existence.

Neanderthals were “thin on the ground”

- Population size:
  - Lived in groups of 15-30
  - Estimates of only 1 person per 40 sq. miles
  - Total population in Eurasia = 5,000 to 70,000 (JP Bocquet-Appel - 2013); Hawks: less than 100 K
  - Genetic studies show that (late) Neandertal populations had small effective population sizes.
  - Subjected to bottlenecks due to fluctuating climatic changes, which produced little genetic diversity
  - Eventual significant familial interbreeding

Thin on the ground?

- ~80% of all known Neandertal individuals appear to have died as young adults.
- This implies a population density of 0.03 persons per square kilometer; about three times smaller than MH estimates.
- Estimated that the early MH populations were an order of magnitude larger that the Neandertal population.
- Genetics = extremely low levels of genetic diversity, strongly suggesting small population sizes.
- Neandertal populations had lower fertility rates than those of Upper Paleolithic modern humans.

Neandertal populations were small.

- Genetic drift and inbreeding, which are greater in smaller populations, may have played a major role in this process.

- There are several reasons to think that Neandertal populations were small. Because a much greater portion of their energy budget was expended in maintenance, far less remained for growth and reproduction; and their possibly accelerated rate of growth, in addition to their robust body build, would have left even less energy for reproduction.

- Given all this, it is not surprising that Neandertal population density was low. Neandertals have been described as “rare on the landscape” or “thin on the ground”.

Population Dynamics

- Researchers' simulations suggest that small population sizes and familial inbreeding made Neanderthal populations vulnerable to chance fluctuations in population size.

- Inbreeding, small population sizes, decline in genetic diversity and a pinch of misfortune could have been sufficient to wipe out our hominin cousins around 40,000 years ago.

- MHs were not needed for the Neanderthals to go extinct.

- C. Stringer: "There was nothing inevitable about modern human success," "It was luck."

8 – Genetic assimilation

- Interbreeding & Hybridization with MHs
- Genetically absorbed into *Homo sapiens* without significant genetic contributions to modern populations
- Continuity? Evolved into MHs: Genetically absorbed
- Interbred with anatomically modern *H. sapiens.*
- Evidence of MH-N hybrids, i.e Oase

"Extinction by Hybridization"

- Genetic swamping is a well-known extinction cause among plant and animal species.
- A smallish group of native, localized trout, for example, may lose their genetic identity after a large influx of a different species with which the native fish are able to breed.
- When local populations are specialized, and for some reason there is a change in their interaction with adjacent populations, and that interaction level goes up, they tend to go extinct—especially if one population is much smaller than the other. In conservation biology this is called extinction by hybridization.
- Over generations of genetic mixing, the Neanderthal genome would have dissolved, absorbed into the *Homo sapiens* population, which was much larger.

Genetic Assimilation/Hybridization

- Fred Smith: First to propose theory of N extinction by hybridization or genetic assimilation

- What if our species -- arriving in waves from Africa -- overwhelmed Neanderthals, and perhaps Denisovans, with affection rather than aggression?

- "Part of the story of these groups is that they may simply have been absorbed by modern populations," said Svante Pääbo. "The modern humans were more numerous, and the other species might have been incorporated."

- Nielsen et al. (2017) raise the possibility that Neanderthal extinction is due to interbreeding and absorption into Homo sapiens groups, rather than an inability to out compete them or to adapt to climate change.

Fred Smith, et al., 2005

Genetic Assimilation/Hybridization

- As MHs entered Europe ~ 40 Ka, only those Neanderthals that rejected MH contact would be able to sustain a distinct gene pool.
- Most modern hunter/gatherers positively engage new people, because their wealth is measured in social relations, encouraging interbreeding or 'marrying out'.
- Over time, the two populations would blend and the group with the fewest members, would have the least impact on descendant genetic makeup.
- Since modern humans had babies earlier and more often, Neanderthal populations were eventually subsumed into the modern population.

Assimilation

- Yet the interbreeding with archaic humans seemed limited—from 1% to 6% of some living people's genomes.

- Low levels of interbreeding suggest that either archaic people mated with moderns only rarely—or their hybrid offspring had low fitness and so produced few viable offspring.

- David Reich notes that at least 90% of our genomes are inherited from African ancestors who replaced the archaic people on other continents but hybridized with them around the margins.

- And that scenario most closely backs the assimilation models proposed by Smith and Brauer.

N denouement = complex process

- Villa & Roebroeks, 2014: Neandertal demise appears to have resulted from a complex and protracted process including multiple factors such as:
  - repeated population crashes with decreased genetic diversity
  - low Neandertal population density,
  - interbreeding with some cultural contact
  - possible male hybrid sterility,
  - contraction in geographic distribution
  - followed by genetic swamping and assimilation by modern human immigrants.

Villa & Roebroeks, 2014

N Denouement

- No significant data supports the supposed technological, social and cognitive inferiority of Neandertals compared to their AMH contemporaries.

- Single-factor explanations for the disappearance of the Neandertals are not warranted any more, and that their demise was clearly more complex than many archaeology-based scenarios of “cognitive inferiority” seem to suggest.

N Denouement

- The Neandertal archaeological record was not different enough to explain their denouement in terms of inferiority in archaeologically visible domains.

- Thus, if Neandertals were not technologically and cognitively "disadvantaged", how can we explain that they did not survive?

- In 2010 a draft sequence of the Neandertal nuclear DNA provided clear evidence of interbreeding between Neandertals and modern humans. A revised estimate based on a high-coverage sequence of a Neandertal from the Altai Mountains now suggests 1.5–2.1%

N Denouement

- Gene flow from Neandertals to modern humans occurred, and most likely happened at the time when Neandertals and modern humans encountered each other in Europe and the Middle East around 45,000 years ago.

- Instead, current genetic data suggest that complex processes of interbreeding and assimilation may have been responsible for the disappearance of the specific Neandertal morphology from the fossil record.

- In sum, interbreeding and assimilation (a model first proposed by Fred Smith) are now supported by genetic data

Vanishings

- Wragg Sykes: However we conceptualize it, the vanishing of Neanderthals has loomed golem-like over virtually every aspect of how we've researched, portrayed and dreamed of them. Narratives of their failure – and our success – have dominated. There is no obvious or simple answer for why we are here and not them.

- First: bodies. There's relatively little evidence for specific physical features that gave us dramatic advantages. They both ate mammoth, thereby culling another theory for potential inferiority. In certain environments a big game habit was probably the best strategy, but elsewhere and else-when Neanderthals were perfectly capable of hunting small game and collecting plants when it suited them.

Vanishings

- Both Neanderthals and hyenas came under pressure from declines in prey as MIS 3 got colder. The carnivores hung on with their tenacious jaws along with cave bears in south-western Europe until about 31 ka, but in contrast, Neanderthals, who had previously outcompeted them, never made it past 40 ka.

- At least some Neanderthal groups included elders, whose wisdom and experience probably acted as sources of disaster mitigation. But if the situation deteriorated beyond common memory, fleeing might have been the only option for survival. If the southern lands were already filled with other Neanderthals, then those from the north, used to relying more on big game, might have had no refuge.

Vanishings

- And there was an added factor no previous generations had encountered in large numbers: H. sapiens.

- Hominin populations overall likely grew during early MIS 3. The genetics tells us that Neanderthals were definitely encountering H. sapiens around this time, with interbreeding happening in multiple phases.

- Even if relations were largely friendly, competition for resources would still have been at its most intense in our collective history, just as the climate instability really kicked off around 45 ka.

Endings

- It’s impossible not to wonder if a terrible contagion might have been added into the mix, jumping from us to them. Obviously invisible on skeletons or in genomes, nonetheless what seemed like a fringe concern over the past decades no longer appears so unlikely. Though some Neanderthal lineages were less genetically isolated than others, overall the wider population had been slowly withering for hundreds of thousands of years.

- For all their cleverness, flexibility and resilience, the archaeology does suggest they had weaker and smaller social networks made up of small groups that ony rarely came together in large gatherings

Endings

- Climate meltdown, plus a much more crowded continent, could have provided the stage for our persistence and the passing of the Neanderthals.

- A perfect storm of different stresses may have together been overwhelming. Crucially, populations and species can vanish through factors that have nothing to do with cleverness, but that simply come down to time and babies.

- The fact that hybrids existed, lived, loved and raised their own children is the most persuasive argument for our closeness at every level. Not only did we find each other attractive, but some level of cultural communication must have been involved.

Neanderthals

- Fundamentally, the long obsession over the Neanderthals' fate reflects our deep dread of annihilation. Extinction is frightening.

- In the face of obliteration, we desire comforting parables where we are always the Ones Who Lived. What's more, we want to feel special: most of the stories we've told about Neanderthals have been narcissistic reassurances that we 'won' because we're outstanding, destined to survive.

- Yet the Neanderthals were never some sort of highway service station en route to Real People. They were state-of-the-art humans, just of a different sort.

Why so long?

- We now know that early H. sapiens populations were dispersing from Africa into Eurasia far earlier than once believed (at least by 200,000 years ago), and that interbreeding was happening periodically right up until just before they disappeared around 40,000 years ago.

- Put together, this means the notion that H. sapiens populations arrived only very late and, like an invading army, entirely replaced Neanderthals, cannot be the case.

- Instead, something much more complicated was happening, including the extinction of almost every early H. sapiens population.

- Despite this, H. sapiens still tend to be framed as inherently superior. Yet we might well ask, ‘why did it take so long for us to replace the Neanderthals?’

N demise

- It's hard to square these narratives of repeated contact and reproduction with the archaeological record of the Neanderthals' sudden demise.

- But 40,000 years ago, Neanderthals' distinctive skeletal and material remains disappear.

- Given the chronological resolution that's possible so far back, this is tantamount to an almost simultaneous vanishing across their entire geographical range. Yet the genetics shows that they were not extinguished, but rather engulfed in a human flood. *H sapiens* weren't their executioners so much as their assimilators.

N denouement

- Genetic drift operating in small Neandertal populations may explain the absence of both Neandertal mtDNA and Y chromosomes in modern gene pools.

- As a result of these differences, Neandertal populations were almost certainly swamped both demographically and genetically by the greater size of early modern-human populations.

- A 2% demographic advantage to early moderns compared with Neandertals would have led to the latter's extinction in 30 generations, or about 700–800 years

N denouement

- Some authors have accordingly proposed that the cultural “explosion” of the Upper Paleolithic was a function of the greater population density of early modern humans.

- Invoking demography rather than genetics to explain that “explosion” would account for the wide variation in rates and times of cultural innovation and loss among Paleolithic modern-human groups.

- It would also account for the relatively impoverished and static material culture of the Neandertals, as a predictable result of their sparse distribution in the harsh environments of Pleistocene northern Eurasia.

N denouement

- New diseases or other negative factors affecting Neandertal health may have played a significant role in their disappearance as well.

- The devastating initial impact of European diseases on Native American populations is well documented. Even in areas that Europeans had not directly reached, indigenous populations were decimated by diseases that traveled in advance of the European immigrants.

- These diseases killed Native Americans so quickly that they left no evidence of their impact on skeletal remains. Diseases introduced by modern-human invaders could have been similarly catastrophic for Neandertals, particularly if their population sizes were already small.

Extinction vs Assimilation

- The Neanderthal disappearance is viewed by some as a true extinction.

- Others however, contend that Neanderthals did not become extinct, but instead were assimilated into the modern human gene pool.

Are Neandertals and modern humans separate species?

- Maybe. The key issue here is how a species is to be defined in the fossil record.
- Many paleoanthropologists have argued that Neandertal morphology is so distinctively different from modern humans that they must be recognized as separate species.
- If Neandertal-modern human hybrids were infertile, then they would certainly constitute different biospecies. However, the genetic data rule this out. The reproductive barrier between Neandertals and early modern humans was permeable. If we adopt a strict biological-species definition, then the two were not separate species.
- But how much interbreeding is necessary to demonstrate that two demes should be considered the same species? There is as yet no compelling answer to that question.

Mixed morphology

- One key bit of evidence for interbreeding between Neandertals and early modern people is the existence of fossils with mixed morphology.
- Some of these are early modern humans with Neandertal features. A significant number of late Neandertals – from both Western Europe (Saint-Césaire, Hortus, La Cotte de St. Brelade) and Central Europe (Vindija, Šipka) – evince cranial, dental, or postcranial morphology that deviates from typical or "classic" Neandertals in the direction of modern humans.
- Nevertheless, if intermixture occurred even sporadically all the way from central Europe to the Near East, there must have been a very extensive hybrid zone between Neandertal and early modern populations. Such a broad hybrid zone would cast doubt on whether the morphs involved really should be thought of as separate species

Late changes in Ns

- The "progressive" traits seen in some late Neandertal populations – larger and rounder braincases, more vertical foreheads, more vertical mandibular symphyses with incipient chins, narrower nasal apertures, shorter and smaller faces, reduced supraorbital tori with mid-orbital thinning, and evidence of Upper Paleolithic behavioral capacities – would then be interpreted as the products of evolutionary convergence with modern humans.

- We cannot avoid recognizing these late Neandertals as the same sort of creatures as ourselves: upright, talking apes with a capacity for technological innovation and symbolic behavior.

Rebecca Wragg Sykes

- However, it's now clear that Neanderthals weren't any *less* 'evolved' than us. Nor is there much decisive evidence that they were fundamentally less social or less inclined to mingle with those outside their tribe.

- They simply travelled on their own path, running roughly in parallel to ours, albeit with different twists and turns in the trail. They were not parochial cul-de-sac Europeans, but instead lived across immensely varied lands well into Asia – even towards the shores of the Pacific, if some Chinese stone tools are any indicator.

- They were capable hunters and knowledgeable gatherers; artisan crafters across a range of materials. Weathering multiple glacial cycles, they survived extreme climate change as rapid and severe as the worst predictions for the coming centuries.

Rebecca Wragg Sykes conclusion

- While Neanderthals had lived through many periods of extreme climate change, the conditions around 55,000 years ago became extraordinarily unstable. If *Homo sapiens* had even marginal advantages in coping with this instability – perhaps more effective weaponry (allowing us to obtain more food), or extended social networks – then over time this would have built up.

- In millennial scales, a few extra human babies surviving per year could eventually snowball into a total population replacement, especially if Neanderthals' genes were being diluted by breeding with us. Their fate wasn't a dramatic annihilation, but a slow, irreversible assimilation.

No chasm

- There is no cognitive chasm between us, just as there was no reproductive barrier. The genetics shows that they were not extinguished, but rather engulfed in a human flood. *H sapiens* weren't their executioners so much as their assimilators. Both H. sapiens and H. neanderthalensis were nature's experiments in humanity.

Ludovic Slimak: Ns and MHs were different

- Ludovic Slimak = New book on Ns : points to the way prehistoric Homo Sapiens and Neanderthal crafts are vastly different. “We might not know much about Neanderthals,” he goes on, “but through what they created, we can see something incredible. When you take Homo Sapiens tools made of flint, spanning tens of thousands of years, in different parts of the world, they’re always the same. Standardized. It can’t be cultural.”
- There was likely little contact between these different settlements. “There’s something innate within the behavior of Homo Sapiens – within our behavior – to act and think in a certain way. It’s in our nature.” Neanderthal crafts, though, don’t share this pattern of MH standardization. “Look carefully at Neanderthal tools and weapons. They’re all unique. Study thousands and you’ll find each is completely different. I saw there was a deep divergence in the way Homo Sapiens and Neanderthals each understand the world.”

Justice for Neanderthals! What the debate about our long-dead cousins reveals about us by Nikhil Krishnan

- The comforting idea that there was no extinction, only a sort of "dilution", is tantamount to a failure to see that Neanderthals were a genuinely "other" kind of humanity, neither better nor worse, and certainly not "soulless". "That humanity", L. Slimak writes with a brutal brevity, "is extinct, totally extinct."
- Researchers anxious to emphasize how much Neanderthals were like us may well be motivated by the same worthy aspirations of those who thought they could fight racism by denying the existence of any real difference between human groups. But that, Slimak proposes, is itself racist. "Racism is the refusal of difference … Racism is those old images of Plains Indians trussed up in three-piece suits: just like us." He sees this as a denial of radical difference, or "alterity" – a term popular in French philosophy and the social scientific theory inspired by it.
- The old knuckle-dragging conceptions of Neanderthals certainly don't do justice to what the evidence tells us. But they at least did the Neanderthals the courtesy of allowing them to be different from us. The challenge, Slimak argues, is not to dignify the Neanderthal by making them, effectively, identical to us, a sort of "ersatz sapiens". The challenge is to let them have their dignity while remaining themselves, a different kind of human, a different kind of humanity.

Justice for Neanderthals!

- The unavoidable talk of “humanity” in these debates forces us to confront a more fundamental philosophical question of what exactly we take the “human” to mean in the first place. Agustín Fuentes, an American primatologist, writes that the deep moral lesson of our new research on the Neanderthals is that we now need to “reconceptualize *the human* to recognise our contemporary diversity, complexity, and distinction as part of a narrative of hundreds of thousands of years of life, love, death, and art”. The contemporary champions of the Neanderthals do indeed seem to take the task before us to be one of recognition, of acknowledgment. But Slimak worries that the language of “recognition” conceals what is really going on: projection. And projection, even from the most honorably egalitarian of motives, is still a distortion and a failure to respect the dignity of difference.
- There appear to be perils in both directions, perils that the analogy with racism brings out. These debates echo conversations that have haunted us since Columbus arrived in the New World in 1492. But it is an essential part of our conversations about colonialism that enough of the colonized – and enough of their ways of life – have survived for them, or their descendants, to give their own answers to these questions about similarity and difference. Importantly, not every person in a colonized nation has given the same answer to these questions. Maybe we shouldn’t even assume it has a single correct answer.

Justice for Neanderthals!

- The Neanderthals can no longer speak. As we put our insistent questions to their bones, their genes and their hearths, we can never be sure that the voice that answers isn't just ours, echoing back to us from an ancient cave. But perhaps the mistake lies in thinking that the question "Are they like us or different?" presents a real choice. Perhaps the correct answer to that question is, quite simply, "Yes". Maybe the best way to accord them their dignity is to treat them as we treat each other in at least one respect: by allowing them to be puzzling.
- In puzzling over them, we reveal something of ourselves. Why might some of us care so much about creatures so long extinct? No doubt part of the answer is that questions about the Neanderthals serve as proxies for questions about ourselves. The old fiction writer's choice between a picture of the Neanderthals as thugs and one of them as prototypical flower children no doubt reflects anxieties about human nature that have haunted the last few centuries of our history: are we built for war or peace?

Neandertals and the Game of Thrones

- J. Arsuaga: “What I have been telling people is that it was like Game of Thrones. There were a few spread-out populations, some related, some not, emigrating or going extinct over time. And winter was always coming.“

- S. Pääbo: now recommends against imagining separate species of human evolution altogether: not an Us and a Them, but one enormous “metapopulation” composed of shifting clusters of humans that periodically coincided in time and space and, when they happened to bump into one another, occasionally had sex.

Not Us and Them

- Finlayson: “Each valley could have told a different story. In one, they may have hit each other over the head. In another, they may have made love. In another, they ignored each other.”

- Jon Mooallem: “a superlong elevator ride with strangers.”

- Can we say that Ns were less than fully human?

Excellent recent article

- Justice for Neanderthals! What the debate about our long-dead cousins reveals about us
- by Nikhil Krishnan, 19 Sep 2023, Guardian
- https://www.theguardian.com/science/2023/sep/19/justice-for-neanderthals-what-the-debate-about-our-long-dead-cousins-reveals-about-us

Neandertal in fiction: Novels

J. H. Rosny-Aine – *La Guerre du feu*, 1911

J. Darnton - *Neanderthal: Their Time Has Come*

H.G. Wells – The Grisly Folk

Edison Marshall - *Dian of the Lost Land*

Philip K Dick – *The Simulacra*

Michael Crichton – *Eaters of the Dead*

Isaac Asimov - *Ugly Little Boy*

Robert Silverberg – *Child of Time*

Clifford Simak – *The Goblin Reservation*

William Golding - *The Inheritors*

William Shatner - Quest for Tomorrow

Jean M. Auel – *The Clan of the Cave Bear*

Robert J. Sawyer – *Neanderthal Parallax* trilogy: *hominins, Humans, Hybrids*

Jasper Fforde - *Thursday Next* series

Bjorn Kurten – *Dance of the Tiger*

Pat Jordan - Neanderthal

Michael Stewart – *Birthright*

Paul Levinson – *The Silk Code*

Stephen Baxter – *Evolution*

Harry Turtledove – *Down in the Bottomlands*

Terrence Hawkins - *American Neolithic*

Claire Cameron - *The Last Neanderthal*

Neandertal Films

- *Quest for Fire*, 1981
- *Ice Man*, 1984
- *The Clan of the Cave Bear*, 1986
- *13th Warrior,* 1999
- *Neanderthal*, 2001
- *Walking with Cavemen*, 2003
- *Clash of the Cavemen*, 2008
- The Croods, 2013

Documentaries about Ns

- Neanderthals Human Extinction BBC Documentary, 2008
  - https://www.youtube.com/watch?v=dWKCdChaLn0
- Neanderthal Apocalypse, 2015:
  - https://www.youtube.com/watch?v=ex4bc0RYNIE
- Decoding Neanderthals, Nova, 2013
- Are we the last neandertals? John Hawks
  - https://www.youtube.com/watch?v=0uRCVyJ7-0c

Neandertal Tourism

- Visitor centers and museums:
  - La Chapelle-aux-Saints
  - Le Moustier, France & Tursac Prhisto Parc & La Roque Saint-Christophe
  - Atapuerca, Spain
  - Krapina, Croatia
  - Neander Valley, Germany
  - Neanderthal Museum in Mettmann, Germany
  - Zagros Mountains, Iran
  - Dordogne region of France: Les Eyzies has National Museum of Prehistory
  - AMNH in NY – Hall of Human Origins
  - Smithsonian NMNH in DC – Hall of Human Origins (John Gurche reconstructions)

Neandertal Bibliography

- *The Naked Neanderthal* - Ludovic Slimak, 2024
- *Kindred* - Rebecca Wragg Sykes, 2020
- *The Smart Neanderthal* - C. Finlayson, 2019
- *The Invaders: How Humans and Their Dogs Drove Neanderthals to Extinction* – Pat Shipman, 2017
- *Neanderthals Rediscovered* - D. Papagianni & M. Morse, 2015
- *Neanderthal Man - In Search of Lost Genomes* – P. Svante, 2014
- *Thin on the Ground: Neandertal Biology, Archeology and Ecology* - Steven E. Churchill, 2014
- *How to Think Like A Neanderthal* – T. Wynn & F. Coolidge, 2012
- Katerina Harvati, *Neanderthals*, Evo Edu Outreach, 2010
- *The Humans Who Went Extinct* - C. Finlayson, 2009

Neandertal Bibliography

The Neanderthals - Friedemann Schrenk, Stephanie Müller, Christine Hemm, 2009

Neanderthals and Modern Humans – C. Finlayson, 2004

Neanderthal's Necklace – Juan Luis Arsuaga, 2004

The Last Neanderthal – I. Tattersall, 1999

Neandertals & Modern Humans in Western Asia – (Eds) T. Akazawa, K. Aoki, & O. Bar-Yosef, 1998

The Neandertal Enigma – James Shreeve, 1996

In Search of the Neanderthals - C. Stringer & C. Gamble, 1993

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The End

Thanks for Listening