

# THE ECOLOGY OF PLEISTOCENE EUROPE AS REPRESENTED IN PALEOLITHIC CAVE PAINTINGS

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VGIFT 2022

Geosciences Information for Teachers Virtual Workshop

8:20 - 9:10 am

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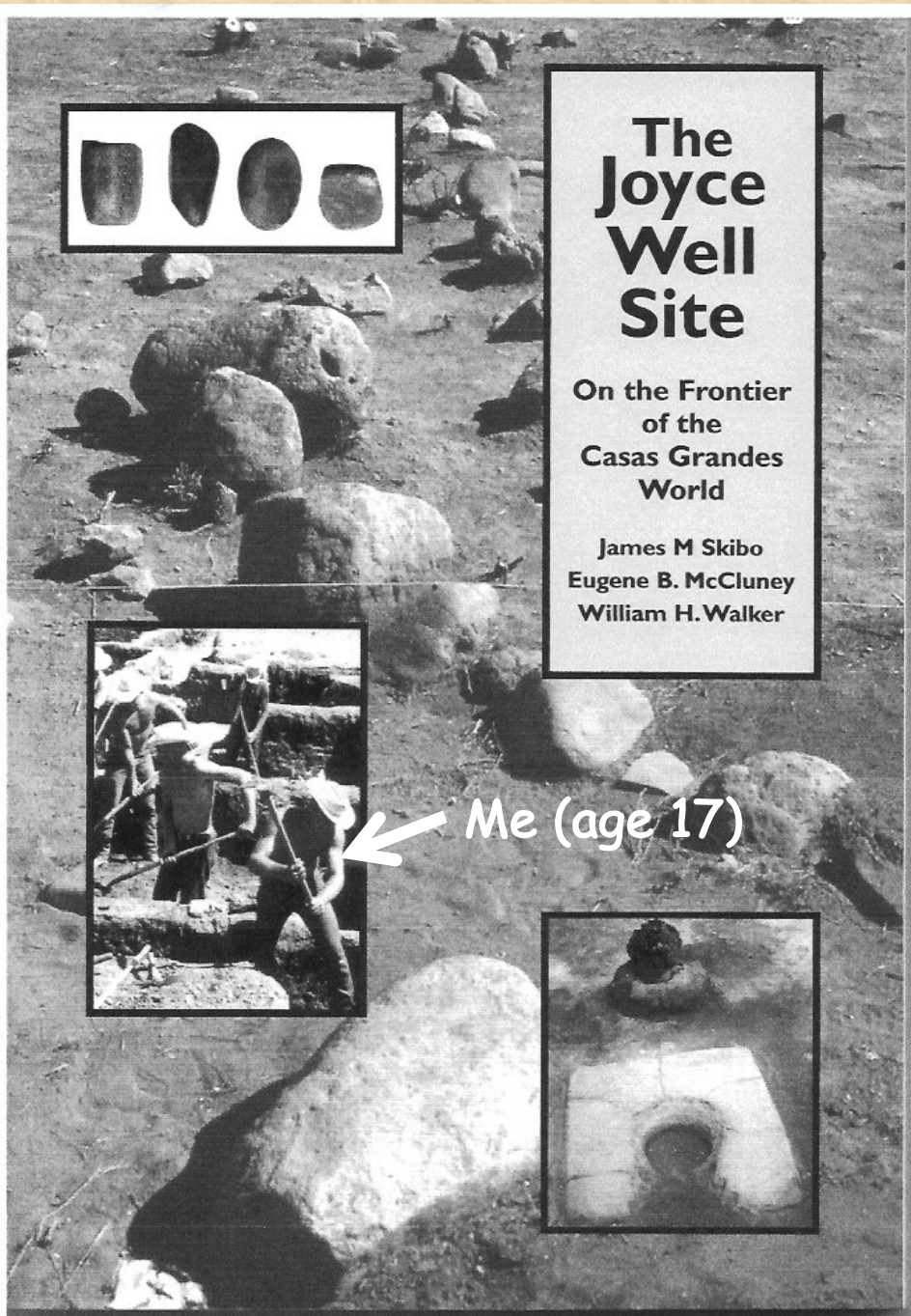
European Geosciences Union

GIFT – Geosciences Information For Teachers

The theme of this year's GIFT workshop, is ...

*"How the planet shapes history - geosciences, human society and civilizations."*

*"The workshop will explore key aspects of the influence of geological and climatic processes on the human society and civilizations throughout human history."*



## Disclaimer

I've done a little archeology.

But I'm *not* a card-carrying

... Archeologist

... Paleontologist

... Art historian

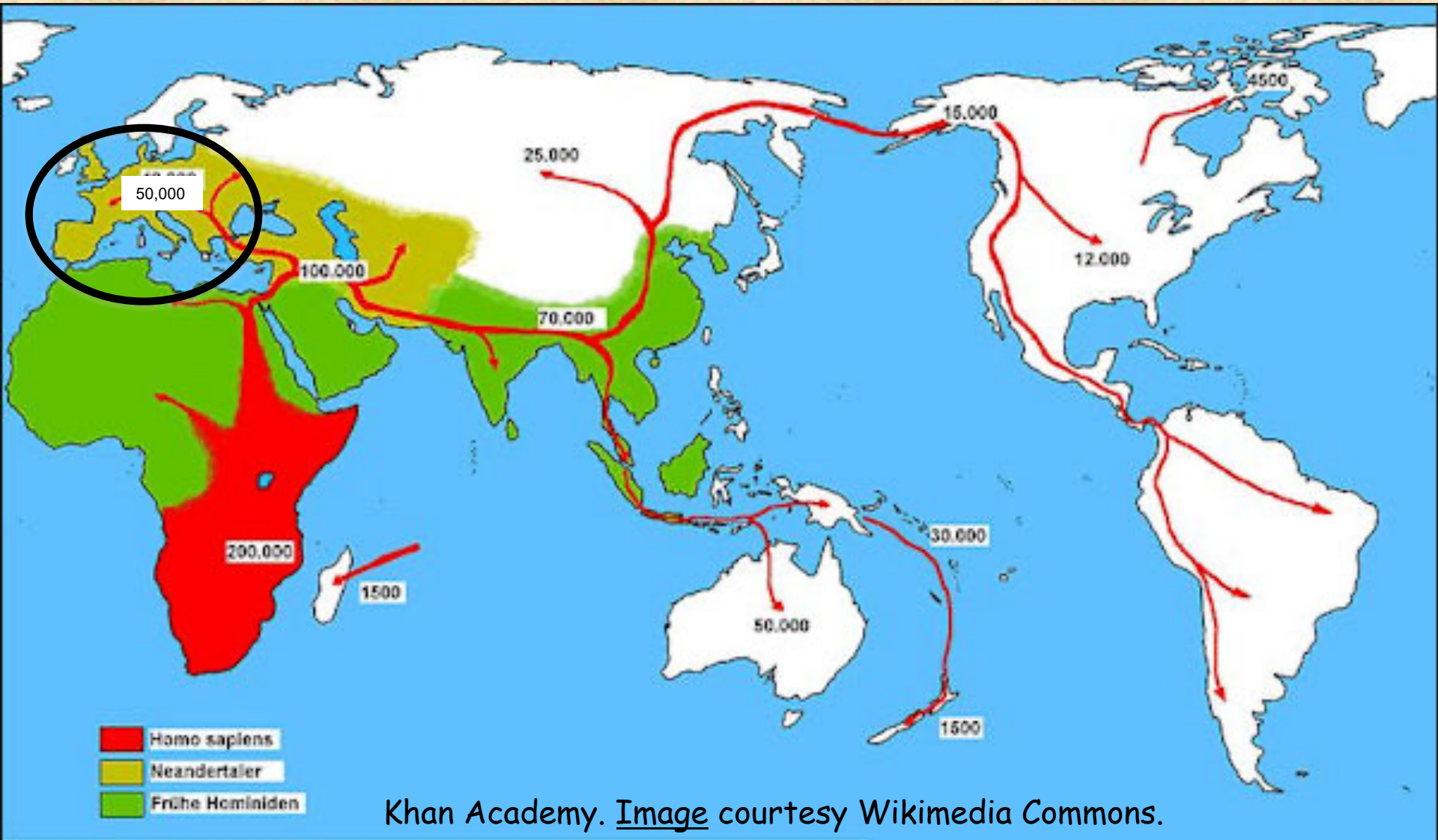
... Geologist

I'm an ecologist with interest in how other people living in other places and other times express their perception of the world around them - *including the people who created Paleolithic cave art in Western Europe.*

# What are we going to discuss today?

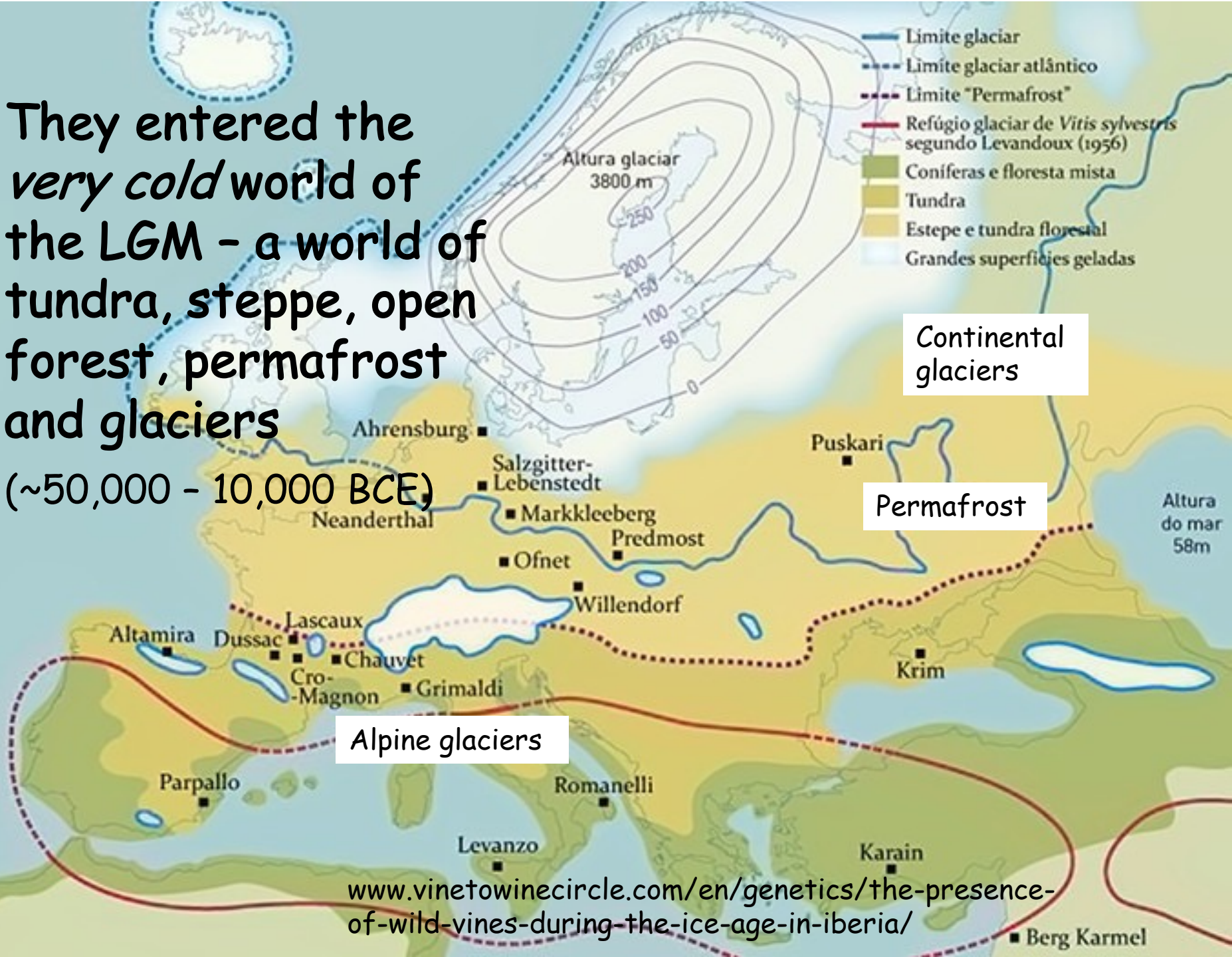
- The arrival of *Homo sapiens* in Europe
- The environment of Western Europe at the time of their arrival.
- The artistic capabilities of these early Europeans, and the subjects they portrayed in their cave paintings.
- Finally, a series of questions about *what can we learn about these people by examining their artwork?*

# Modern humans arrived in Europe ~50,000 BCE



They entered the *very cold* world of the LGM - a world of tundra, steppe, open forest, permafrost and glaciers

(~50,000 - 10,000 BCE)



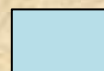
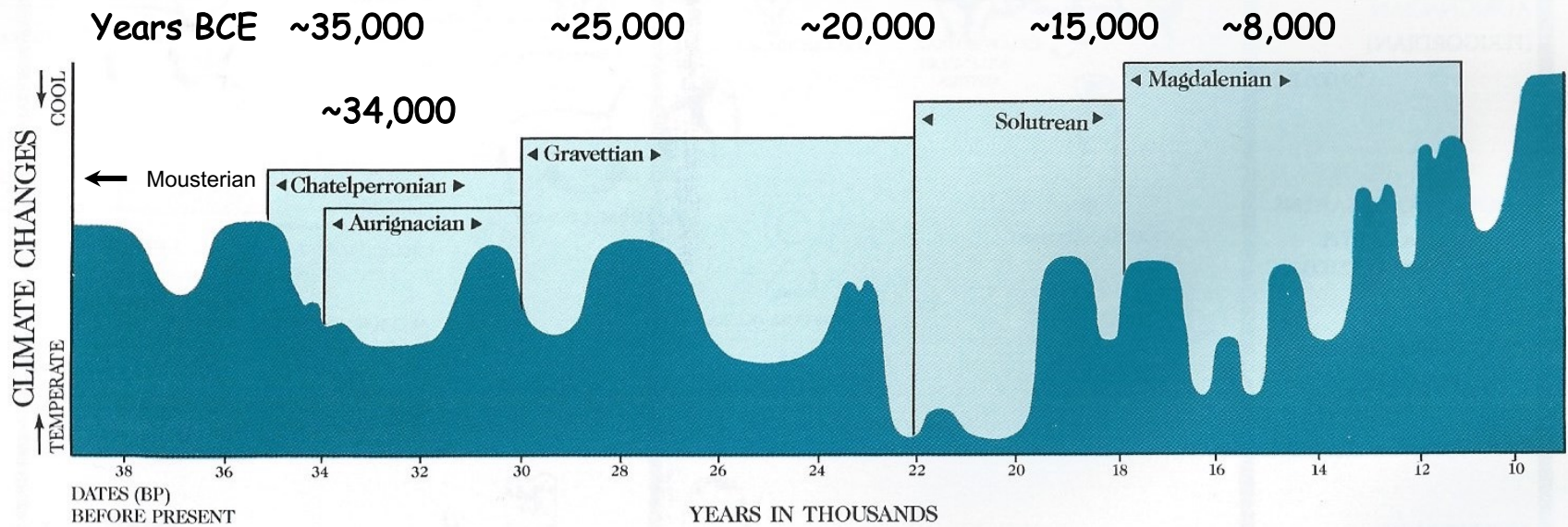
Continental glaciers

Permafrost

Alpine glaciers

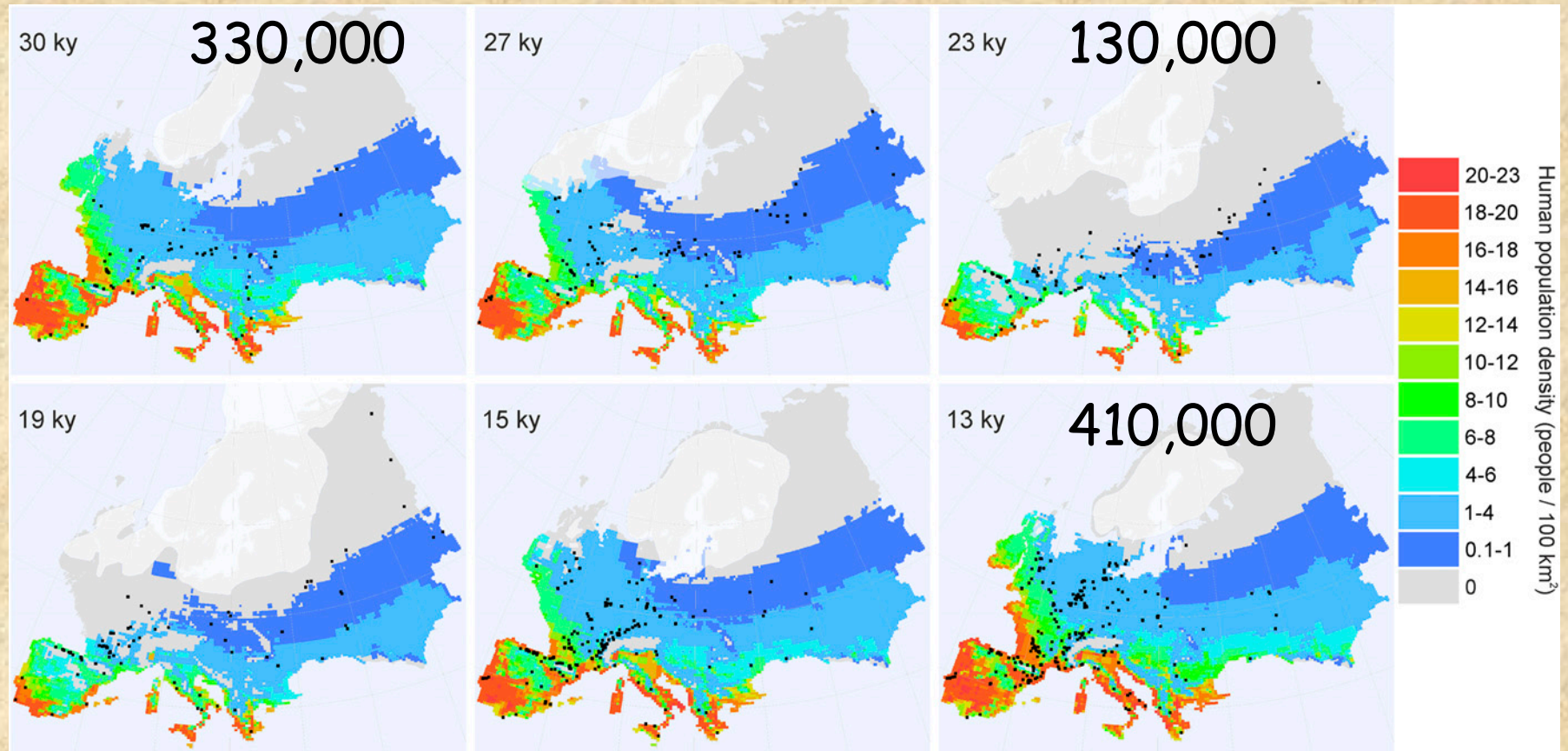
[www.vinetowinecircle.com/en/genetics/the-presence-of-wild-vines-during-the-ice-age-in-iberia/](http://www.vinetowinecircle.com/en/genetics/the-presence-of-wild-vines-during-the-ice-age-in-iberia/)

Humans encountered a cold but highly variable climate in Europe ... colder at some times than at others. Human cultural expression varied through time as well.



Periods in which glaciers advanced (White 1986)

# Human population range and density in Europe was highly variable during the LGM



Simulated population range and density. Tallavaara et al. (2015). PNAS.



# Humans encountered a fauna of breathtaking diversity of animals - *a veritable Arctic Serengeti*



Mauricio Antón - from Caitlin Sedwick (2008). "What Killed the Woolly Mammoth?". PLoS Biology 6 (4): e99. DOI:10.1371

# Pleistocene Megafauna of Europe

- Horse
- Wild ass
- Bison
- Alpine ibex
- Aurochs (Cow)
- Red deer (Stag)
- Reindeer
- Woolly mammoth
- Woolly rhinoceros
- Giant deer ("Irish elk")
- Fallow deer
- Musk-ox
- Pyrenean chamois
- Saiga antelope
- Wild boar
- Cave bear
- Cave lion
- Cave hyena
- Scimitar-toothed cat
- Leopard
- Fox
- Wolf
- Weasel
- Hare
- Seal
- Snake
- Owl
- Great auk
- Fish

~30 mammal species and a few birds and fish are represented in Paleolithic art

# These early Europeans entered into this new world bringing with them ...

- A complex brain
- Unsurpassed cognitive ability
- Complex spoken language
- Control of fire
- Efficient new lithic technologies
- Needle-sewn clothing
- The ability to organize complex social activities
- An understanding of the benefits of division of labor
  
- They also brought with them the ability to create what we call "*art*" ... they knew how to draw, paint, engrave, sculpt and carve.
  
- What followed was a remarkable flowering of both *mobile* art (e.g., effigies designed to be carried from place to place) and *parietal* art (art placed on a rock surface or cave wall).



These early modern Europeans occupied a mountainous landscape of karst geology, with abundant water, rockshelters and deep caves - *much like the Shenandoah Valley of Virginia.*

### Entrance to Les Combarelles

Les Eyzies de Tayac, Dordogne, France  
(Ethan Doyle White, Creative Commons)

The valley of Les Combarelles  
(Sémhur, Wikipedia Commons)





Mouth of the  
Grotte de Niaux.  
@ A. H. Marquis.

Abri Castanet Rockshelter,  
France. @Père Igor/  
Wikimedia Commons



## These Ice Age artists devised a host of now familiar drawing and painting techniques:

Outline

Contour line

Cross-contour line

Parallel hatching

Cross hatching

Cameo and intaglio marking

Modeling

Foreshortening

Use of plane and void perspective

Carving in relief

Carving in the round

Champlevé carving

Smudging

Shading

Overlapping

Stenciling

Use of friezes

So, what subjects did these Ice Age artists choose to represent in their art?

Plants?

Clouds?

One another?

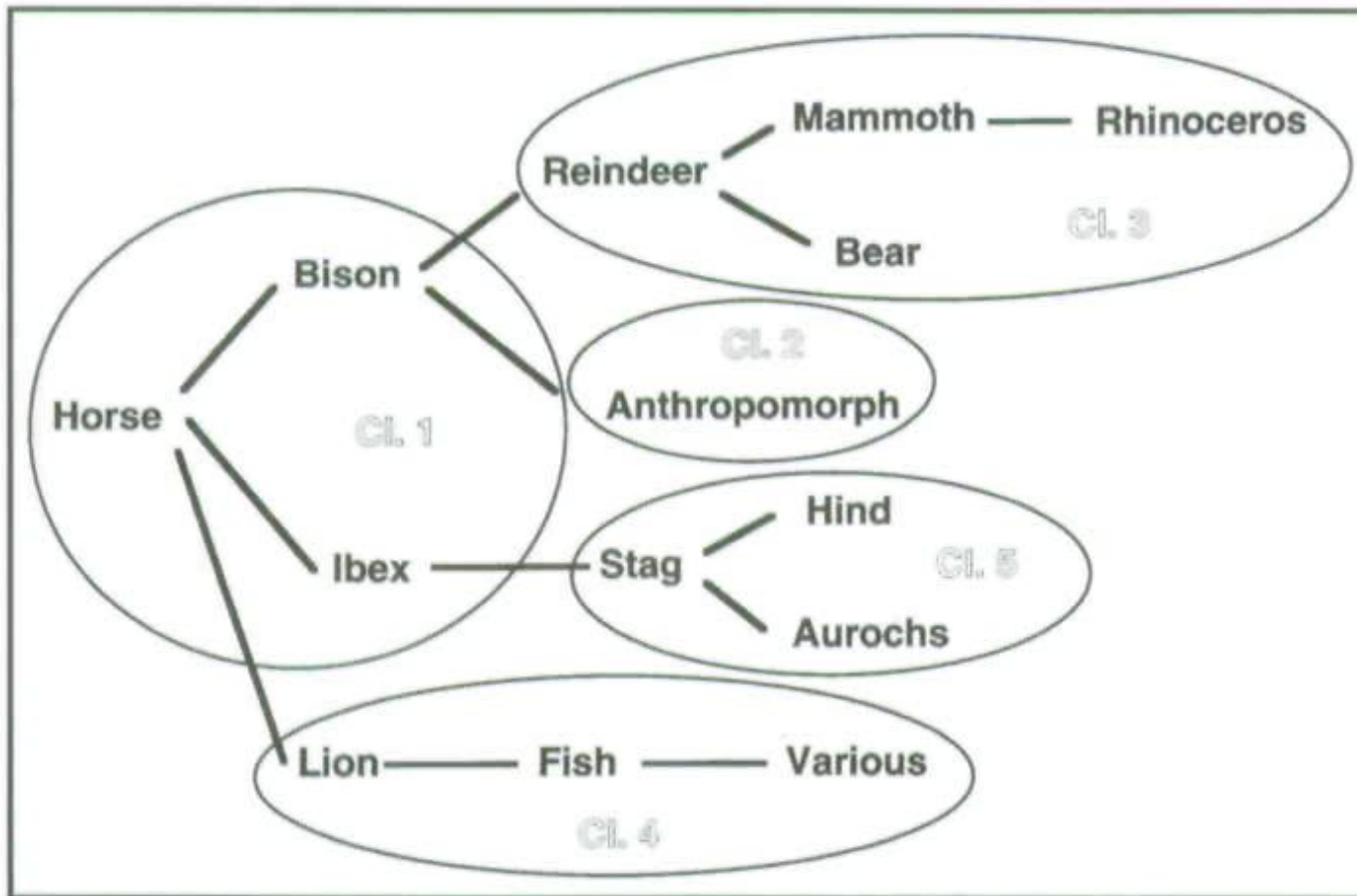
Landscapes?

No, they chose to paint pictures of the animals that shared their Ice Age landscape.

3,300 figurative images depicted in 416 polythematic panels in 84 caves and rockshelters in France and Spain (G. Sauvet and A. Włodarczyk (2008). *Rock Art Research* 25:165-172)

motif	symbol	number of figures	figures (%)	number of themes	themes (%)
1. Horse	Ho	946	28.7	457	26.4
2. Bison	Bn	730	22.1	307	17.7
3. Ibex	Ib	312	9.5	201	11.6
4. Mammoth	Ma	257	7.8	135	7.8
5. Aurochs	Ox	200	6.1	125	7.2
6. Hind	Hd	239	7.3	122	7.0
7. Stag	St	192	5.8	119	6.9
8. Anthropomorph	An	114	3.4	75	4.3
9. Reindeer	Re	123	3.7	64	3.7
10. Bear	Ur	47	1.4	36	2.1
11. Lion	Li	41	1.2	31	1.8
12. Fish	Fi	33	1.0	15	0.9
13. Rhinoceros	Rh	18	0.5	13	0.8
14. Various, Rare	Va	43	1.3	31	1.8
Total		3295	100	1731	100





*Figure 4. Minimum-cost Spanning Tree (results of the Kruskal algorithm) and classes.*

# Primary Paleolithic cave locations in Eurasia



Source: Peter Bull

# The world's attention was drawn to cave art here - Lascaux Cave 1940



**Hall of Bulls, Lascaux Cave  
(Dordogne, France, October 1940)**

<https://www.independent.co.uk/independentpremium/long-reads/lascaux-cave-paintings-discovery-anniversary-b421481.html>

A video player showing a virtual tour of Lascaux Cave. The background is a close-up of the cave wall covered in ancient paintings of animals, including horses and deer. Overlaid on the video is a large yellow text box with the following message: "This slide provides a link to a spectacular virtual tour of Lascaux Cave. We cannot take time for this tour today, but I highly encourage you to take it yourself when you have 15 minutes." The video player interface includes a play button, a progress bar showing 02:46, and various control icons on the right side.

This slide provides a link to a spectacular virtual tour of Lascaux Cave. We cannot take time for this tour today, but I highly encourage you to take it yourself when you have 15 minutes.

## Lascaux Cave Paintings - Virtual Tour <https://vimeo.com/40849516>

6 years ago



Vimeo Videos

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### More from Personal Tech

Autoplay next video



The Cyborg Artist...

Great Big Story

# Let's delve into some specific questions about the cave art and artists

Were both sexes involved in cave painting?

How skilled were the artists?

Did the cave painters accurately portray what they observed around them?

Did the cave artists tell stories and portray events from life?

*Why* did they paint on cave walls?

# Were both sexes involved in cave painting?

## Snow (2013)

- Hand impressions on cave walls ("hand negatives")
- Males - ring finger *longer* than index
- Females - ring finger *shorter* than index

Developed an algorithm for analyzing hand architecture.

Analyzed 32 hand stencils from 8 European caves.

75% were classified as **Adult Female** hands - clearly females were involved in the creation of cave art

**How skilled were the cave painters  
as artists?**

e.g., could they portray feeling, motion  
and perspective?



Pech Merle Cave, France  
Gravettian - 25,000 BCE

Heinrich Wendel

© The Wendel Collection, Neanderthal Museum





The image shows a section of a rock wall with a natural crack. A rock painting of a reindeer is visible, with a small human-like figure riding on its back. The reindeer is depicted in profile, facing right. The human figure is positioned on the reindeer's back, appearing to hold onto it. The painting is rendered in earthy tones, likely ochre or red earth. The rock surface is textured and shows signs of weathering and mineral deposits.

*The drinking reindeer*  
Les Combarelles  
Magdalenian - ~12,000 BCE

<http://www.visual-arts-cork.com/prehistoric/les-combarelles-cave.htm>



*Red Bison Bull*  
Altamira Cave, Spain  
15,000 BCE

Photo by Rameessos. Licensed under public domain via Wikimedia Commons.



***Charging Bull***  
**Chauvet Cave, France**  
**Aurignacian – 32,000 BCE**

**©Marc Azema, J. Clottes. Chauvet Cave scientific team**



*Crossed Bison Panel*  
Lascaux Cave, France  
17,000 BCE

*Swimming "stags" (Red deer?)*  
Lascaux Cave, France  
17,000 BCE



©N. Aujoulat/Centre National de la  
Préhistoire/Ministère de la Culture

A large black bull (Aurochs) painted on a cave wall. The bull is depicted in profile, facing left, with its body rendered in dark black pigment. It has a thick, shaggy coat and a white patch on its belly. The background is a textured, brownish-yellow rock surface. The painting is set against a natural rock formation that includes some faint, lighter-colored markings.

*Great Black Bull (Aurochs)*  
Lascaux Cave, France  
17,000 BCE

©MCC/National Center for Prehistory

This 5-m image is painted on the ceiling, 4 m above the floor

Did the cave painters accurately portray what they observed around them?

e.g., Did they represent locomotion realistically?



*Frieze of Small Horses*  
Lascaux Cave, France  
17,000 BCE  
(N. Auloulat)

Photograph N. Aujoulat (2003) © MCC-CNP



**Eadweard Muybridge (1886)** - Photographic study of quadruped walking

- Discovered the LH-LF-RH-RF "foot-fall formula"

**Horvath et al. (2012)** - Analysis of foot-fall patterns of horses in 3 groups of art:

- Modern pre-Muybridgean
- Modern post-Muybridgean
- Pre-historic

Examined 1,000 quadruped walking depictions to determine the correctness of horse gait portrayal

Horvath et al. (2012) observed that ...

<u>Artists</u>	<u>Percent correct</u>
Pre-Muybridgean	~17%
<i>Even da Vinci sometimes got it wrong</i>	
Post-Muybridgean	~42%
<i>Some modern artists learned from Muybridge</i>	
Modern taxidermists	~49%
Paleolithic painters	~54%

**Did the cave artists tell stories and portray events from life?**

i.e., Did they express narrative or simply paint images?



*The Shaft Scene*  
*"Dead Man and Wounded Bison"*  
Lascaux Cave, France  
17,000 BCE

Photo J. Vertut

*Frieze of Lions*  
Chauvet Cave  
37,000 BCE



# The "why?" of cave art: *why did these ancient people create these images?*

All art conveys a message of some sort...

- Serves as a signature, warning, prohibition or welcome
- Conveys a story, myth, vision or perhaps a metaphor, either sacred or profane
- Affirms individual or collective presence
- Communicates with one or more divine beings, to establish a bond with the spirit world

Several explanations have been offered

Art for art's sake - individual expression

Totemism ("animal worship") - expression of kinship

Sympathetic magic - the world as they *want* it

- Hunting magic - plea for hunting success

- Fertility magic - plea for abundant prey

- Destructive magic - plea for fewer predators

Shamanism - communication with the "spirit world"

In fact, any or all of these interpretations may be correct at certain times in certain places ...

*but none makes sense as a universal explanation.*



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Thank you for your interest and patience.

And thank you to the EGU GIFT Education Committee for providing me this opportunity to share my interest in a time before history began.

# Some recent news!



**"Cow-like" figure**  
**Lubang Jeriji Saléh cave**  
**Borneo**  
**c. 40,000 BCE**  
Auburt et al. (2018)