

The Origin of Man, Tracing Neanderthal Man

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Who was Neanderthal Man?

- Characteristics

- Shorter than Homo sapiens, between 5 and 5.5 feet tall
- Had strong upper body and wide shoulders with bowed shoulder blades
- Wide barrel-shaped rib cage
- Shorter limbs and much more hair than Homo sapiens
- Low, flat elongated skull
- 1200-1900 cc skull, up to 46% larger than homo sapiens
- Shorter limbs, wider body and hair made Neanderthals better adapted for survival in cooler climates (ice age)



Who was Neanderthal Man?

- Locations

- Neanderthal man was found in Eastern and parts of Western Europe, and some areas of Western and Central Asia

- Time Period

- The first proto-Neanderthal traits appeared in Europe as early as 600,000–350,000 years ago
- Associated with the Chatelperronian industry

- Interactions

- Neanderthal man shared their habitat with modern homo-sapiens



Who was Neanderthal Man?

- **Speech?**

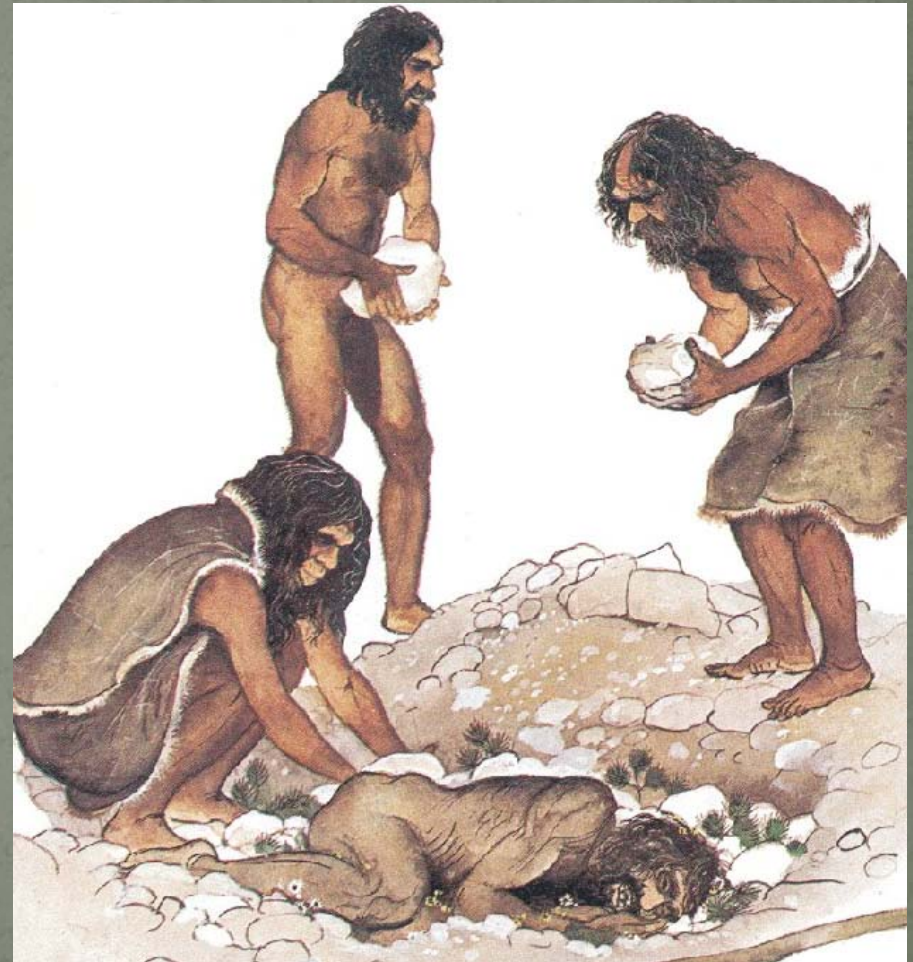
- Hyoid bone found virtually identical to humans
- Speech anatomically possible based on available evidence

- **Tools**

- Used tools much like those of Homo Sapiens
- Used tools for various purposes such hunting and fishing

- **Culture**

- Hunter-gatherer society much like Homo sapiens
- Even had a mastery of fire
- Practiced ritual burials and possibly defleshing



Time Periods/Industries

- Acheulian Tradition- the name given to an archaeological industry of stone tool manufacture associated with prehistoric hominins during the Lower Palaeolithic era across Africa and much of West Asia and Europe. Acheulean tools are typically found with *Homo erectus* remains.
- Archaeological Industry- the name given to a consistent range of assemblages connected with a single product, such as the Langdale axe industry. Where the assemblages contain evidence of a variety of items and behaviours, the more correct term is "archaeological culture".

Time Period Cont'd

- Aurignacian- the name of a culture of the Upper Palaeolithic located in Europe and southwest Asia. It dates to between 32,000 and 26,000 BC. The name originates from the type site of Aurignac in the Haute Garonne area of France. The Aurignacian culture is considered by some archaeologists to have co-existed with the Périgordian culture of tool making.
- Mousterian- name given by archaeologists to a style of predominantly flint tools (or industry) associated primarily with *Homo neanderthalensis* and dating to the Middle Paleolithic. Mousterian technology may have been evolutionarily significant because it may have partially replaced the function of the incisor teeth.
- Chatelperronian- the earliest industry of the Upper Palaeolithic in central and south western France, extending also into Northern Spain. It derives its name from the site of la Grotte des Fées, in Châtelperron, Allier, France.

What is Thermoluminescence

- Thermoluminescence dating- is the determination by means of measuring the accumulated radiation dose of the time elapsed since material containing crystalline minerals was either heated (lava, ceramics) or exposed to sunlight (sediments). As the material is heated during measurements, a weak light signal, the thermoluminescence, proportional to the radiation dose is produced.

Experiment One

- Excavation of a collapsed rock shelter near Saint-Césaire resulted in Mousterian, Châtelperronian, and Aurignacian lithic remains. These findings were divided into 17 different levels
 - Mousterian of Acheulian- Layers 16-13
 - Denticulate Mousterian- Layers 12-10
 - Châtelperronian- Layers 9-8
- Body remains in Saint-Césaire yielded a skull resembling that of a Neanderthal skull with modern human features, however, these remains did not contain enough collagen to attempt a carbon dating procedure
- These levels yielded 20 flints capable of being dated through the use of thermoluminescence



Findings of Experiment One



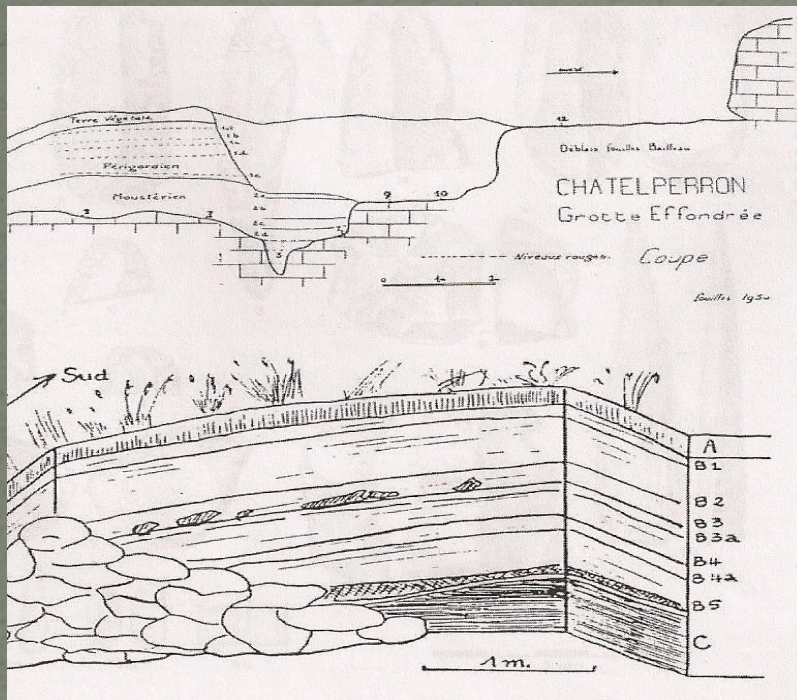
- Neanderthal remains found at Saint-Césaire suggest that Neanderthal could have lived alongside occupants of similar radiocarbon-dated Aurignacian sites, such as L'Abri Pataud (34,250±1,800 years BP) or Le Flageolet (33,800±1800 years BP). Both French sites were occupied by modern humans, placing the Saint-Césaire Neanderthal at the same time period as Homo sapiens.
- According to these findings the theory that Neanderthal's disappearance is a result of evolution into modern man is not a logical possibility

Experiment Two

- In 1997 mitochondrial DNA of a Neanderthal was found and sequenced. The analysis shows it is outside of that of modern humans but shares a common ancestor with humans around 500,000 years ago. When compared to modern human it is seen that Neanderthals donated little or no mitochondrial DNA. This evidence provides a very strong argument to debunk the myth that we are descendent of Neanderthals.



Experiment Three



- Excavation of the cave of the Grotte des Fées at Châtelperron contained a sequence of at least eight archeological levels, extending over a total depth of at least 2.5 m and containing at least five clearly defined levels of Châtelperronian occupation (levels B1-B5). These were underlain by at least 1.5 m of late Mousterian deposits (layers C1-C3), containing a typical Mousterian of Acheulian tradition industry
- Found within these Châtelperronian levels were Aurignacian tool forms (level B4) clearly sandwiched between Châtelperronian activity (levels B5 and B1-3).

Experiment Three Cont'd

- In support of stratification techniques radiocarbon dating was performed. These radiocarbon dating tests show, the Aurignacian tool forms were in fact older than the Châtelperronian artifacts found in levels B1-3 and younger than those found in level B5
- These two test techniques proved that Neanderthals and modern humans coexisted in the same environment and possibly even interacted with each other

Experiment Four



- In a 1993 study, scientists used mass spectroscopy to date Neanderthal and early hominid remains from three burial sites in the Levant, Tabun, Qafzeh, and Skhul
- The mass spectroscopy research indicated that the homo sapiens of the Qafzeh cave may be older than the Kebara Neanderthal and these same homo sapiens may have lived at the same time as the Neanderthals whose remains were found at level C of the Tabun site.

Experiment Four Results

- The results of this study helped to show the potential for mass spectrometric U-series dating of small samples since the results of these dates correspond to the early uptake ESR estimated ages. Also this study provided evidence for more ancient chronologies of these three sites. And finally this study helped provide more reason to belief that homo sapiens and Neanderthals probably lived at the same time rather than homo sapiens being the descendants of Neanderthals

Conclusion

- In conclusion, the experiments conducted using thermoluminescence dating, analysis of Neanderthal DNA base pairs, radiocarbon dating, and mass spectrometric U-series dating all resulted in the dating of various Neanderthal remains. However, the experiments did not provide conclusive evidence as to whether or not Homo sapiens and Neanderthal man did in fact interact. While the dates retrieved from the various methods suggest that Neanderthal man and Homo sapiens did coexist, there is no conclusive evidence that both societies interacted with each other. What the experiments did conclude was the possibility of Neanderthal and Homo sapiens coexisted, since dating of the two remains coincide within the same time period. With advances in dating methods, we can only hope that new archeological sites will surface containing remains of both Neanderthal man and Homo sapiens that provide conclusive evidence between the interaction of the two beings.

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Thank You

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PHYS 10262

Physics Methods in Art & Archaeology

Michael Wiescher

