Anthropology (last of the neanderthals)

ASSIGN BUSTER

(Teacher) The Last of the Neanderthals According to the article, what was the geographic range of Neanderthals? According to the article, what was their maximum population size at any given time? How do think they figured this out?

According to Stephen Hall, the extent of the land occupied by Neanderthals during their time was as far as far as " south along the Mediterranean from the Strait of Gibraltar to Greece and Iraq, north to Russia, as far west as Britain, and almost to Mongolia in the east" (Hall). This area is mainly Western Europe. However, the results of the findings of the Leipzig Group of Svante Paabo, head of the genetics laboratory at Max Planck Institute in Leipzig, revealed that this range extended " some 1, 200 miles east of their European stronghold" (Hall) in the area of Uzbekistan and southern Siberia. Therefore the original geographic range of the Neanderthals extended to northeastern Europe.

The Neanderthals are believed to have had a total number that " never exceeded 15, 000." (Hall)

They most probably have gotten this information on geographic range and population through fossils excavated in specific areas that qualified as a part of the past geographic area for Neanderthals, or perhaps any new site. Mitrochondrial DNA must have been extracted from the fossils and if the results match the ones previously found from Neanderthals, then such a case is documented. In order to determine the population estimate, the size of the geographic area as well as the possible number of inhabitants or communities might be taken into consideration.

2. What does the genetic evidence reveal about the relationship between modern humans and Neanderthals? Discuss the significance of this evidence

(use at least two examples)? Do you think modern humans and Neanderthals interbreed? Why or why not?

The Neanderthals and humans were said to have had some connection around the time that the modern humans began their existence and there was a question whether they interbred.

Geneticist Svante Paabo disagreed that there was interbreeding between Neanderthals and humans. Using a 40, 000-year-old arm bone from the original Neanderthal man, Paabo and his colleagues found " a tiny 378-letter snippet of mitochondrial DNA (a kind of short genetic appendix to the main text in each cell" (Hall), which revealed DNA that was totally different from those found in humans. Moreover, the fact that " it was too rare to leave a trace of Neanderthal mitochondrial DNA in the cells of living people" (Hall) further strengthens Paabo's claims.

Another significant genetic evidence concerning Neanderthals was the discovery of the Neanderthal pigmentation gene MC1R in October 2007. This indicated that " at least some Neanderthals would have had red hair, pale skin, and, possibly, freckles" (Hall).

On the possibility of interbreeding, I rather agree with the views of Svante Paabo that it might have been impossible. Otherwise, there would have been hybrids of humans and Neanderthals which might look distinct from its human and Neanderthal ancestors. However, the human species now are more or less similar morphologically. Another thing is that if they had interbred, then the Neanderthals would not have become extinct, or at least would have expanded in terms of geographical area.

3. Why is prehistoric cannibalism good for modern-day molecular biology? What is the significance of the MC1R and FOXP2 genes?

The reason prehistoric cannibalism is very good for modern-day molecular biology is that “ Scraping flesh from a bone also removes the DNA of microorganisms that might otherwise contaminate the sample” (Hall). This means that if hypothetically a human cannibalized on a Neanderthal, the flesh eaten by the human would remove the DNA of some bacteria that would otherwise contaminate the Neanderthal bone sample.

As for the MC1R gene discovered from a Neanderthal fossil, it indicated that “ at least some Neanderthals would have had red hair, pale skin, and, possibly, freckles” (Hall). The fact that this MC1R gene is “ unlike that of red-haired people today” (Hall) means that “ Neanderthals and modern humans developed the [hair color] trait independently” (Hall).

As for the FOXP2 gene which “ contributes to speech and language ability, acting not only in the brain but also on the nerves that control facial muscles” (Hall), it implies the possibility that “ Neanderthals were capable of sophisticated language abilities or a more primitive form of vocal communication (singing, for example)” (Hall), although this remains unclear. However, because of the MC1R and the FOXP2 genes, one knows that Neanderthals possessed red hair and were equipped with a voice box.

4. What is the significance of the studies that utilized a synchrotron? What did learn from these studies and how does this help archaeologists to better understand Neanderthal behavior?

The studies that utilized a synchrotron revealed findings concerned with the life history of Neanderthals, especially on the question of whether they reached maturity at an earlier age than humans and in order to find out, the studies had to use Neanderthal teeth. The subjection of the teeth to the synchrotron taught scientists that:

“ When teeth are imaged at high resolution, they reveal a complex, three-dimensional hatch of daily and longer periodic growth lines, like tree rings, along with stress lines that encode key moments in an individuals life history [and that] teeth preserve a continuous, permanent record of growth, from before birth until they finish growing at the end of adolescence,” (Hall)

One particular result of study that used the synchrotron revealed that, as shown through data from the teeth, a 160, 000-year-old human child from Morocco “ showed the modern human life history pattern” (Hall), while a 100, 000-year-old young Neanderthal from Belgium had a tooth that revealed that “ the child was eight years old when it died and appeared to be on track to reach puberty several years sooner than the average for modern humans” (Hall). The possibility of an early puberty stage among Neanderthals would indicate a big difference in terms of “ Neanderthal social organization, mating strategy, and parenting behavior [and] cognitive abilities” (Hall) when compared with modern humans. This study would be useful in anthropology.

5. What is “ cultural buffering”? Discuss an example of cultural buffering used by Neanderthals and modern humans.

Cultural buffering is defined as the having “ something in a groups behavior —a technology, a form of social organization, a cultural tradition—that hedges its bets in the high-stakes game of natural selection” (Hall). Simply speaking, it is like having a contingency fund left in your house so that if ever you get robbed outside and all your money are taken, you still have something to spend when you get home. As for the Neanderthals, Hall somehow implies in his article that their cultural buffer was somehow not enough for them to survive. One of the Neanderthals’ cultural buffers was to

rely mainly on “ big and medium-size mammals like horses, deer, bison, and wild cattle” (Hall) for sustenance, and the fact that “ Neanderthal women and children to join in the hunt” (Hall) in order to retain body heat. However, such cultural buffers were rather dangerous to the life of the individual Neanderthal as well as to the Neanderthal community as a whole. Hall says that “ A Neanderthal woman would have been powerful and resilient. But without such cultural buffering [of having a fixed staple food], she and her young would have been at a disadvantage” (Hall).

Humans, on the other hand, may have survived for the cultural buffers they once had were extremely favorable not only to the growth of the individual but also to the survival of the community as a whole. For their cultural buffer, ancient humans divided labor, a diversified diet, sophisticated toolmaking, and many more. Hall points out that the cultural buffers of humans encouraged the growth of large populations which fostered longevity. Longevity further led to innovation. This is something that the Neanderthals may have failed to develop because of their impractical cultural buffers.

Works Cited

Hall, Stephen. “ Last of the Neanderthals.” Features. Oct 2008. National Geographic. 6 May 2010.