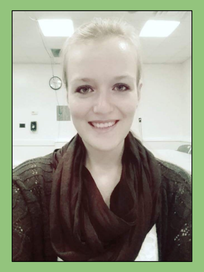

Neanderthals: The First Spear Throwers?

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Abstract

Before 1995, Neanderthals were believed by many to be mentally and physically incapable of throwing a spear as a long-range weapon. However, the discovery of the Schöningen spears in 1995, sparked a debate over Neanderthal capabilities and whether there was enough evidence to say these spears were indeed thrown. Some say these spears were too heavy and long to be thrown and were therefore thrust. However, this project documents examples found in the literature accessed through eHRAF, electronic Human Relations Area Files, and other databases that show usage of unwieldy throwing spears found in modern societies. This presence of similar spears can serve as evidence for the possible usage of the Schöningen spears as projectile weapons. Additionally, a team of Anthropology and Physics professors and students was formed to conduct experiments with Schöningen spear replicas to test the flight capabilities of the Schöningen spears. After considering many methods of propulsion, the team settled on a hybrid spear-dart propelled by an atlatl. This method produced penetration, but was not sufficient to cause fatal harm to the simulated prey. However, the literature indicates that Neanderthals were likely able to throw at higher speeds and the full spears would have had higher masses and have been created with a harder wood than was achieved in this experiment. Given these conditions, with a more accurate speed, mass, and material, penetration is still possible.

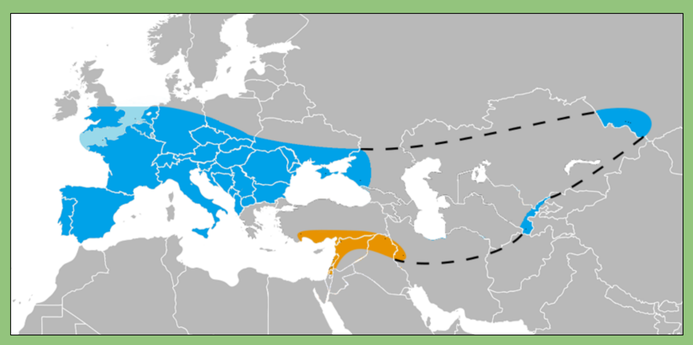

Fig. 1 Range of *Homo sapiens neanderthalensis*

Introduction

Homo sapiens neanderthalensis is a subspecies of the genus homo that inhabited the European continent from approximately 400-25 kya. Despite being humanity's closest relative and existing for thousands, they are consistently viewed as beings incapable of basic survival skills.

Discovered in 1995 among stone tools and animal bones, five wooden spears were found at Schöningen dating from 400- 300 kya and were made from spruce or pine trees. The spears are pointed at both ends and range from 1.82-2.50 meters in length. These spears are weighted in the first third of the object, which is typical of throwing spears and resembles modern javelins. These spears were found among horse remains numbering to at least 19 individuals, which suggests an organized hunt of a herd.

There is much debate on whether these were throwing or thrusting spears. A study examining the high trauma rates in Neanderthals by Berger and Trinkaus (1995) suggested that the only modern sample with similar trauma rates were rodeo riders. From this, they inferred that Neanderthals must have hunted prey in close-quarters battles. This image stuck, despite the fact that it was only one of the suggestions offered by Berger and Trinkaus. Following on this idea, some cite lack of difference in arm anatomy that would indicate habitual throwing (Churchill and Rhodes, 2009). However, there is no experimental research that tests the speeds necessary to penetrate the hide similar to that of the horse heard found at Schoeningen.

Fig. 2 Comparison of Complete Spears found at Schoeningen (Schoch 2015)

Research on Ethnographic Data

A significant portion of the ethnographic research was conducted with the use of the electronic Human Relations Area Files (eHRAF). With this database, I was able to query ethnographic data on over 1,000 different cultures collected by anthropologists from the early 20th century to the present. With additional research, I was able to create a comparative database of spear descriptions for comparison with the Schöningen spears. Below is a sub-section of the most significant examples:

Area- Society	Throw or Thrust	Material Used	Description	Prey	Source
York Peninsula, Australia	N/A	wood	"crude"	N/A	Davidson 1934
Central Australia	N/A	wood	"King Spear" wide spatulate heads, acicular or slightly flattened heads; ceremonial function?	N/A	Davidson 1934
Central and northwestern Australia (Wiluna, York, Ashburton)	N/A	wood	"well-made"	N/A	Davidson 1934
Ecuador-Waorani	N/A	Bactris Gasipaes; extremely hard wood	N/A	pecarries, monkeys, birds, humans	Davis & Yost 1983B
Equador-Waorani	Geonoma	wood	hunting and war spears; used exclusively before metal tools were availabe to cut Bactris Gasipaes	pecarries, monkeys, birds, humans	Davis & Yost 1983B
Zulu	Thrust (Thrown Occasionally)	wood	24-25mm in diameter	N/A	Gramly 1984
North-central Kenya- Borana and Galla	Thrust (Thrown Occasionally)	wood	1in or 25mm in diameter	"elephant spear"	Gramly 1984
Azande	thrown, thrust	wood	Heavy spear used in buffalo hunting	hare, buffalo, elephant, leopard, lion	Larken 1930
Ifugao Province	thrown, thrust	wood	1.5 meters, diameter of boys arm and thinner	N/A	Maher 1975
Tasmania	thrown	Melaleuca sp	3-4m long, 3-23mm diameter; fire-hardening?; weirdly held; 40-70yrd range	human; could pierce leather	Noetling 1911
Northern Columbia- Nukak	N/A	Melaleuca sp	2.5m long, 2cm diameter	pecarries; occasional fishing	Smith 2015
Roman	thrown	wood	2-2.3m long, 2-4kg, 15m range	human	Villa and Soriano 2010

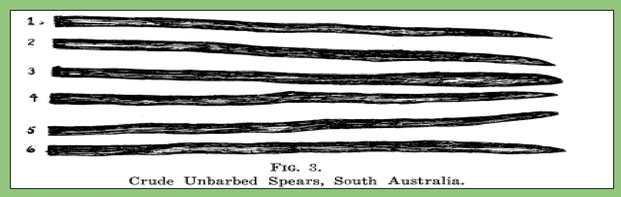

FIG. 3.
Crude Unbarbed Spears, South Australia.

Fig. 3 (Davidson 1934)

Experiment Info

One of the goals for this project was to design a contraption that could propel a replica spear at high speeds so that we could test the flight capabilites of these spears. The desired speed was set at 30 meters per second since this is the speed of a olympic javelin thower. While not all Neanderthals would have had olympic speeds, given the facts that this skill would have increased their livelihood and that they were indeed much stronger than the average olympic javelin thrower, the speed of 30 meters per second is a reasonable goal.

The replica spears were created using sycamore, a similar wood in terms of hardness on the Janka scale to spruce and pine. However, the wood used for the Schoeningen spears was from a slow-growing climate which would have increased the hardness of the wood. These replica spears were thrown at a target from approximately 15 feet away constructed by a cowhide covering ballistics gel.

Fig. 4 Ballista from experiment 1

Fig. 5 Results from the ballista experiment

Experiment #1

Based on previous experiments and resources available, the first method of propulsion attempted was firing the spear from a ballista constructed with wood and solid steel rods and plates.

However, after a few uses, we bent the solid steel rods and plates. Even though we were creating such a high amount of pressure, we were not able to exceed 21 meters per second.

Experiment #2

Upon further consideration of resources and time, we attempted to reach desired speeds through the use of an atlatl and hybrid spear-dart. This spear-dart utilized 30 cm of sycamore for the tip and was attached to the length of a dart. While this decreased the total mass of the object, we believed it more likely to achieve the desired speed.

Fig. 6 Hybrid Spear-Dart

Fig. 7 Target made from cow hide

Fig. 8 Placement of experiment #2

Fig. 9 Penetration of the hide

Results

We achieved significant but non-lethal penetration of 2.5 inches using this method at an impact speed of approximately 22.6 meters per second from a distance of approximately 15 ft. The other throws caused the spear points to bend indicating that the fast growing, softer sycamore growing along the Kokosing is not a good proxy for slow growing spruce in glacial Europe.

Conclusions

Kenyon College professors and students could not survive by hunting with throwing spears, but that does not mean that Neanderthals were incapable of doing so. Even though this spear-dart had a considerably lower mass, the wood was softer than the actual Schoeningen spears, and the fact that the average anatomically modern human is much weaker and unskilled than the average Neanderthal, we were still able to achieve penetration. With these results in mind, it is not unreasonable to say that with more accurate materials, skills, and speed we could achieve significant results that when paired with modern ethnographic data could support the presence of spear throwing in Neanderthal hunting techniques.

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