The Axed Man of Mosfell:

Skeletal Evidence of a Viking Age Homicide and the Icelandic Sagas

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Individual Profile

Site: Kirkjuhóll

Location: Hrísbrú farm, Mosfell Valley (Mosfellsdalur), western Iceland

Cultural Affiliation: Icelandic Viking

Date: AD 855-1015 based on calibrated radiocarbon dates tephrochronology

Feature: Trench CK-2001-3, (F2/2001)

Location of Grave: About 1 meter east of the eastern end (chancel) of the church at Hrísbrú

Grave Type: A single primary inhumation extended with the head to the west. The burial was resting on a stratum of organic material that appears to be decayed hay or animal dung.

Materials: Stones were found under the thoracic area and at the top of cranium. A poorly preserved lozenge-shaped object was found near the knee.

Completeness: Fair preservation, the cranium is well preserved. Many of the long bones have been affected by the acidic conditions at the site and are partially decalcified.

Age-at-Death and basis of estimate: 40-50 years based on tooth wear and fusion of cranial vault sutures

Sex and basis of determination: Male based on cranial and pelvic morphology

Conditions Observed: Massive cranial trauma with a gaping wound in the right parietal and a slice of bone removed from the occipital

Specialized Analysis: Accelerator Mass Spectrometry radiocarbon dating

Excavated: 2001, Mosfell Archaeological Project, directed by Drs. Jesse Byock and Phillip L. Walker

Current Disposition: National Museum of Iceland (Þjóðminjasafn)

When Christianity was adopted by law in Iceland (1000 A.D.) Grim of Mosfell was baptized and built a church there. . . . When a church was built at Mosfell, the one Grim built at Hrísbrú was demolished and a new graveyard was laid out. Under the altar some human bones were found, much bigger than ordinary human bones, and people are confident that these were Egil's because of stories told by old men. Egil's Saga, Chapter 86.

Introduction

The discovery of the skeletal remains of the person described in this chapter is one of many scientific results of the Mosfell Archaeological Project, an ongoing international research effort we began in 1995. The project's goal is to produce a comprehensive reconstruction of human adaptation and environmental change in Iceland's Mosfell Valley from Viking times until the present. To do this, we have used a multidisciplinary approach that integrates information from archaeology, physical anthropology, saga studies, and the environmental sciences (Byock, et al. 2005).

One facet of our work has been the use of archaeological evidence to test the historicity of the Icelandic sagas. These prose histories, which were first written down in the thirteenth and fourteenth centuries, purport to describe life several hundred years earlier during the Viking Age. Some historians view the period of saga oral transmission as a yawning gap across which very little historically accurate information is likely to have been transmitted (Jones 1968: 11). Others take the position that the proportion of fact to fiction varies from saga to saga, and the quantities of each can best be decided through the minute examination and comparison of individual texts (Ciklamini 1971: 100). A third view, which does not negate the second, is that the sagas provide information analogous to that collected by ethnographers; these stories are a vehicle of social memory combining social, historical, and literary functions. When carefully evaluated in conjunction with independent evidence sources, they can reveal much about cultural patterns, normative codes, and historical events (Byock 2001: 21).

In our research, we have extended and refined the latter approach by using archaeological excavations to "ground truth" saga passages, such as the one at the beginning of this chapter, that make specific statements about historical events that are supposed to have occurred in the Mosfell Valley. The most rewarding efforts along these lines have been our archaeological explorations at the Hrísbrú farm. According to Egil's saga, Hrísbrú is the place where the bones of the saga's protagonist, Egil Skallagrímsson, were temporarily laid to rest before removal to the cemetery of a new church built at Mosfell (Thorsson 2000: 183). In 2001, after several field seasons of fruitlessly testing areas at Hrísbrú that phosphate and remote sensing data suggested might contain ancient structures, we decided to take Icelandic oral tradition at face value. For many generations a small knoll behind the modern horse barn at Hrísbrú had been known by local farmers as *Kirkjuhóll* or "Church Knoll." Although our magnetometer and resistivity maps of the area did not suggest the presence of subterranean architectural features, we decided it was worth testing the site because of its place name. The *Kirkjuhóll* excavations revealed in rapid succession concentrations of burned animal bone and other domestic refuse from a settlement period (*landnám*) farm, graves with an east-west orientation indicating the presence of a Christian cemetery, and finally the foundations of buildings that our subsequent excavations have shown to be the Hrísbrú church mentioned in the sagas and

a large adjacent Viking Age longhouse suitable for habitation by important chieftains such as Egil Skallagrímsson (the son of Bald Grim) and Grim Svertingsson, a prominent chieftain who was Egil's son-in-law and Iceland's law-speaker (AD 1002-1004).

At the end of our third *Kirkjuhóll* trench, we uncovered the skeleton of the person we have come to know as the "Axed Man" (Figs. 1 and 2). The skeleton of this middle-aged man and its archaeological context speak eloquently about the circumstances of his life, death, and burial. Through our efforts to reconstruct his life, we have learned much about the living conditions and social world of Viking Age Icelanders.

Childhood

Although we know less about the Axed Man's childhood than we do about his adulthood, his remains are far from mute concerning the events of his early life. One strategy we have followed to learn more about the childhood lives of the people buried in the *Kirkjuhóll* cemetery is to use the elemental composition of their teeth to make inferences about the food they ate and the water they drank as children. This research exploits the truth in the adage "you are what you eat." For example, the concentrations of isotopes in the collagen of your bones echo the concentrations in the protein sources ingested during the last years of your life. For the enamel of your teeth, it would be more precise to say, "you are what you ate." Enamel is composed of the chemicals you ingested during the childhood period of dental development that become locked into the metabolically inactive crystalline structure of your teeth.

We have been exploiting isotopic sources of information to learn more, not only about what the Viking Age inhabitants of Hrísbrú ate and drank as children and adults, but also to test theories about where they were born. The ratio of two strontium isotopes ($^{87}Sr/^{86}Sr$) in rocks, soil, and drinking water varies geographically in northern Europe. These differences are especially large between the ancient geological formations of Norway, the place many Viking settlers of Iceland are believed to have been from, and Iceland's much younger volcanic rocks.

Although the Axed Man's teeth have not been tested, isotopic studies of the teeth of other people buried in the *Kirkjuhóll* cemetery suggest that they all grew up in Iceland, not in Scandinavia or the British Isles. Based upon our work so far, it appears that most, if not all, of the people in the Hrísbrú cemetery were native Icelanders removed by a generation or two from the first wave of Viking settlers who, according to the sagas and archaeological evidence, began colonizing the island late in ninth century (~ AD 870).

The conclusion that the Axed Man was born in Iceland is consistent with a radiocarbon date on collagen extracted from one of his bones. This sample produced a radiocarbon age of 1360 ± 40 RYBP and a $^{13}C/^{12}C$ ratio of -17.4$^{o}/_{oo}$. The carbon isotope ratio ($^{13}C/^{12}C$) resulting from this test suggests that, in the decade or so before his death, he obtained about 25-30% percent of the protein in his diet from marine sources. Since the carbon in marine foods is often considerably older than the carbon in terrestrial food sources (Kennett, et al. 1997), a special correction procedure was used to estimate the age of the sample in conventional calendar years. The resulting age estimates for the year the Axed Man died range between AD 890 and 990, with the most likely date (curve intercept) being AD 960. Given our estimated age at death for the Axed Man of about 45 years, these tests give a 97 percent probability that he was born sometime between AD

805 and 970. Other archaeological evidence strongly suggests that he was born near the end of this range.

Thus, although the Axed Man could have traveled to Iceland with the initial wave of immigrants, he probably was a child or grandchild of one of these early settlers. He most likely lived and died during the pagan period before Iceland officially converted to Christianity in AD 1000 by a decision at the Althing (Iceland's annual national assembly). *The Book of Settlements* (*Landnámabók*) speaks of Thord Skeggi, a settler or *landnámsmaðr*, as the first to colonize the area around Hrísbrú in the year 900 (Benediktsson 1968; Byock, et al. 2005), and it is conceivable that the Axed Man was a descendant or kinsman of Thord. In the decades before and after the year 1000 when Mosfell was the home of the chieftain or *goði* Grim Svertingsson (Thorsson 2000: 729), the sagas tell us that the elderly Egil Skallagrímsson also lived there and died at Grim's farm (c. 990). The Axed Man is thus very likely to have had personal encounters with both of these historically important figures.

The Axed Man's teeth bear the stigmata of childhood sicknesses (Fig. 3). If illnesses occur that disrupt development during the period of permanent tooth crown formation (around the time of birth to ~15 years), transverse grooves (hypoplastic lesions) reflecting that growth disruption are left that permanently scar the teeth. Because tooth crowns develop in a regular sequence, the height of these hypoplastic lesions on the crown can be used to determine when during a person's childhood the disrupted development occurred (Martin, et al. 2008). Several hypoplastic lesions are visible in the teeth of the Axed Man: in the upper jaw, the right canine tooth has two lines that reflect a health problem between the ages of 4 and 5 and the second between the ages of 5 and 6. In the lower jaw, both canines have lines from growth disruption between the ages of 4 and 5. The right canine has additional lesions reflecting health problems between the ages of 3 and 4 and between 5 and 6 (Fig. 2). Based on this, it seems clear that the Axed Man's childhood was a stressful period punctuated by a series of severe illnesses.

That his childhood conditions were not optimal is also suggested by our estimates of his adult height. These stature estimates are based upon equations that allow a person's height to be estimated from long bone lengths (Trotter and Gleser 1958). The average height estimates based upon these equations suggest that the Axed Man was about 5 foot 6 inches (~170 cm) tall. This places him among the shorter men whose remains we have recovered from the Hrísbrú cemetery, a fact that may be explained by the association between disrupted childhood growth (suggested by his teeth) and reduced adult height (Silventoinen 2003).

Adulthood

Our confidence that this person is a man and not a woman is based on evidence from the pelvis and the skull, two of the most highly sexually dimorphic areas of the human skeleton. One feature, the greater sciatic notch of the hip bone, has a masculine shape that is found in less than 5% of women of European ancestry (Walker 2005). The skull has an array of hyper-masculine features that, using sex prediction equations developed for people of European ancestry (Walker 2008), yield a 99.99% probability that the Axed Man is a male.

As an adult, the Axed Man experienced a life of strenuous physical activity. Signs of degenerative joint disease can be seen throughout his skeleton. Osteoarthritis is present

at the base of his left thumb. This is possibly an indication of handedness, habitual work-related activities, or perhaps an injury that traumatized this joint. There are arthritic changes in the elbow joints of both arms and, in the lower back, the second and third lumbar vertebrae exhibit arthritic lipping. The bones of the shoulder girdle bear signs of heavy lifting (Fig. 4). The right and left clavicles display lesions associated with trauma to the costoclavicular ligament during activities in which a person's shoulders are bent forward while the arms are used to move heavy loads. Ethnographic and ethnohistorical accounts of occupational activities causing this type of injury include ploughing, stone house building, hunting, and ship maintenance (Capasso, et al. 1999: 52). These degenerative changes of the Axed Man's skeleton suggest a life of heavy labor and are consistent with saga descriptions of Viking Age Icelandic farming and seafaring activities.

Death

The Axed Man died in middle age. We know this because the sutures between the bones of his cranial vault had begun to fuse. An estimated age at death of 38 years derived from these sutural data is consistent with age-related changes in his pubic bones (45-49 years old using the Todd scoring system, 35-45 years old using the Suchey-Brooks system) and the auricular surface of his sacroiliac joint (40-49 years old using the Meindl and Lovejoy system). Based on all of these aging criteria, our best guess is that he was about 45 years old when he died.

In forensic work, a distinction is made between the manner of death (i.e. natural, accidental, suicide, homicide, or undetermined) and the cause of death, which refers to the specific conditions leading to death such as hanging, sharp-force trauma, blunt-force trauma, asphyxiation, and so on. The cause of the Axed Man's death is clear: his braincase shows two gaping wounds, each produced by the blade of a heavy weapon (Fig. 5). Both of these wounds would have severed major endocranial blood vessels. The massive brain damage and blood loss resulting from them would have rendered him almost immediately unconscious as his blood pressure plummeted. Within a minute or so, this exsanguination would have resulted in irreversible shock followed by death.

One of these injuries is a deep cut in the right side of his braincase that extends from the frontal bone to the back of the skull. The weapon that produced it would have severed many major cerebral vessels and penetrated deeply into his brain. The second injury removed a large round slice of bone from the back of the head. In doing so, the weapon would have cut through the transverse sinus, a large blood vessel that drains venous blood from the head.

The Axed Man's death would have been a ghastly sight. If the blow to the back of the skull occurred first, large quantities of venous blood would immediately have gushed from the back of his head. If the blow to the top of his head occurred first, a spray of arterial blood under high pressure would most likely have showered upon his assailant and anyone else who was standing nearby.

The distinctive marks that bladed weapons leave in bone can be used for identification purposes (Spitz and Fisher 1993:252-310; Walker 2001; Walker and Long 1977). We gave the "Axed Man" his name because the gaping defect in the right side of his head exhibits all of the diagnostic features of an axe wound. Especially important is the abrupt termination of the injury at one end. This feature and the straight, clean-cut

edge of the wound are both characteristics of the injuries produced by the heavy blades of sharp, short-bladed, chopping weapons such as Viking battleaxes (Figs. 5 and 6).

The weapon used to slice the piece of bone from the back of the Axed Man's head is less certain. Instead of embedding in the skull, the weapon producing this wound sliced through it. Although both of these injuries are likely to have been made by two blows in rapid succession from the same axe, it is conceivable that the wound in the back of his head was produced by a slashing blow from the sword of a second assailant. Arguing for this is the width of the injury (90 mm or more), which implies a weapon with an even wider cutting edge. Viking Age axes were of all kinds, but the common axe used for everyday tasks often had blades narrower than this. An interesting feature of this wound is the striated surface it produced while passing through the bone (Fig. 5). This reflects irregularities in the edge of the blade that produced it: a blade that evidently had been damaged through heavy use.

That the Axed Man is aptly named is reinforced by the prominent role axes play in saga accounts of interpersonal violence. War axes were highly prized and given poetic names such as "witch of the helmet," "wolf of the wound," "fiend of the shield," "wound-biter," and so on (Du Chaillu 1890: 89; Thorsson 2000: 61). When used in fights, the opponent's head was typically targeted. For instance, when Egil was seven years old, he is said to have driven an axe through the head of a playmate because of an earlier humiliation after losing a game. Elsewhere in *Egil's Saga*, an incident is described in which an axe is embedded up to its shaft in the helmeted head of a Viking warrior. In attempting to retrieve his weapon from his victim's head, the assailant retracted the axe with such force that his victim's body was swung into the air and over the side of the ship they were fighting on (Thorsson 2000: 45).

Given the consistent cross-cultural finding that men are much more likely to be both the perpetrators and victims of homicidal violence than women (Walker 2001), it is probable that the Axed Man's killer was another man. However, murders committed by axe-wielding Viking women are occasionally mentioned in sagas. For instance, Freydis, the infamous daughter of Eirik the Red, reportedly ordered the killing of several of her fellow Greenland explorers and is also known for personally taking an axe to five women who the men on her expedition refused to kill (Thorsson 2000: 650).

The unequivocal evidence of violence provided by the Axed Man's remains is consistent, at least in a general way, with a description in *The Saga of Gunnlaug Serpent-Tongue* (*Gunnlaugs saga ormstungu*) of a killing at Mosfell around the year AD 1020 (Thorsson 2000: 593):

"People say that during the autumn, Illugi rode off from Gilsbakki with about thirty men, and arrived at Mosfell early in the morning. Onund and his sons rushed into the church, but Illugi captured two of Onund's kinsmen. One of them was named Bjorn and the other Thorgrim. Illugi had Bjorn killed and Thorgrim's foot cut off. After that, Illugi rode home, and Onund sought no reprisals for this act."

This account leads us to focus on Icelandic feuding, one of the most likely social circumstances leading to the Axed Man's death. The Axed Man may have been killed because of some relatively minor interpersonal dispute such as the one that enraged the young Egil enough to kill his playmate. Among the settlers of Iceland, such killings rarely went unavenged: the sagas suggest that family feuds were rampant and frequently led to cycles of retaliatory killing that lasted for generations (Byock 1982; Byock 1988;

Byock 2001). The Axed Man's death may thus have been part of a larger cycle of violence.

Another, less likely possibility is that the Axed Man was killed as an outlaw. In Viking Age Iceland, outlaws were sentenced to banishment abroad or to the unpopulated areas of Iceland. Although not imprisoned or subject to judicial execution, outlaws were extremely vulnerable because they could be killed with impunity by anyone (Byock 2001). As we shall see, the prominent location of the Axed Man's burial just outside the eastern end of the chancel at the Hrísbrú church argues against the idea that he was a social outcast (Fig. 2).

Burial

The location of the Axed Man's burial in the Hrísbrú church cemetery is full of symbolic significance (Fig. 2). Pagan Viking-Age burials typically include grave goods and sometimes also sacrificed animals intended for use by the deceased in the afterlife (Williams 1920: 411-429). Early Christians, in contrast, tended to shun grave goods, presumably in part because of their pagan connotations. The Axed Man and all of the other primary inhumations in the Hrísbrú cemetery are oriented with the feet to the east, a symbolic reference to the direction of paradise and the rising sun on judgment day (Gordon 1971: 215). Another aspect of Christian burial practices is the exclusion of pagans, suicides, and other social outcasts from the consecrated ground of Christian cemeteries (Herbermann, et al. 1914). The east-west orientation of the Axed Man's burial and its location in a symbolically significant location near the church's chancel indicate that he was considered a Christian and a person of some social standing in his community. It is doubtful that an outlaw would have received such respectful treatment.

There are some puzzling aspects to the Axed Man's burial. Although we initially thought he was buried inside a wooden casket (Byock, et al. 2002), this now seems unlikely. All of the subsequent burials we have excavated at the Hrísbrú cemetery with clear evidence of casket wood also contained traces of iron nails and clinch bolts. These iron fasteners were often arranged linearly, reflecting their use to hold together a casket or the planks from a ship, which sometimes were included in graves. No such fasteners were found with the Axed Man. We initially believed that the traces of organic material under the Axed Man's skeleton were decomposed wood. Our subsequent excavations have shown that this layer is instead a living surface of livestock dung and remnants of hay deposited before the burial and associated with an adjacent longhouse. Thus, instead of interment in a grave dug into the ground, the Axed Man may have been buried on or near the surface of the ground with earth piled on top of him. This was a common Viking practice and sometimes involved use of a small rowboat as a coffin (Williams 1920: 415).

Outside the context of the cemetery, rocks are present elsewhere on the living surface the Axed Man's body rested upon. This may explain two flat stones we found during excavation of the Axed Man's burial. One, measuring 5 x 20 x 17 cm, was under his chest and the other, measuring 4 x 18 x 8 cm, was resting against the top of his skull. Near to his left knee, we also found a very fragile 4-cm-long, dark-brown, lozenge-shaped object. This object, whose use we were unable to determine, may possibly have been made of leather or some other organic material.

We found a Viking-Age iron ring pin of the West Norse variety (showing Celtic influence) in the soil just above and west of the Axed Man's skull (Byock, et al. 2003).

Such pins were used to fasten the cloaks of men over the right shoulder, so their sword arm was free. Perhaps the dead man's clothes were placed in the mound, and the pin may have been part of that grave offering.

Conclusions

The skeletons of the Axed Man and the other people buried at Hrísbrú are providing important new evidence concerning the health status and living conditions of Iceland's earliest inhabitants (Walker, et al. 2004). Skeletal lesions associated with a life of heavy labor, like those of Axed Man, are common among these early Icelandic settlers. Unfavorable conditions for growth and development are also suggested by the comparatively short stature of these people in comparison to contemporaneous populations elsewhere in Northern Europe. Hypoplastic lesions in the teeth of several individuals show that, among these people, childhood growth disruption like that suffered by the Axed Man was not a unique phenomenon. Skeletal evidence of tuberculosis is present in several of the Hrísbrú burials (Walker, et al. 2004). Given epidemiological characteristics of this contagious disease, it seems likely that most, if not all of the people living at Hrísbrú were infected with the tuberculosis bacillus. These bioarchaeological findings imply that some of Iceland's earliest inhabitants experienced poor living conditions soon after they colonized the island and contrast with the picture the sagas paint of early Icelandic life. Sickness and ill heath are seldom mentioned in the sagas and, even then, it often seems to be a rhetorical device used to signal the impending death of an elderly person. Perhaps, as our bioarchaeological findings suggest, health problems were so common that they were viewed as a condition of life that was unworthy of note. Further research is clearly needed to resolve these and other health related issues (Byock 1993; Byock 1994; Byock 1995).

The sagas are full of accounts of violence, killing, fighting, and feuds. When we began our archaeological research in Iceland more than a decade ago, we started with the working hypothesis that the rampant violence described in the sagas referred to rare events that storytellers focused upon for dramatic purposes. The discovery of the Axed Man's skeleton at the beginning of our Hrísbrú excavations made it clear that extremely violent interpersonal encounters did occur in Viking Age Iceland. While none of the twenty or so burials we have subsequently excavated at Hrísbrú show signs of violent death, many of these skeletons are so poorly preserved that the presence of lethal injuries would be difficult or impossible to detect. Although the presence of someone who clearly was a homicide victim in such a small sample is suggestive, more archaeological work will be necessary before we can say with any certainty how common violent deaths like that of the Axed Man's were in Viking Age Iceland.

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Figure 1: Photograph of the Axed Man, Feature 2, Trench CK-2001-3,

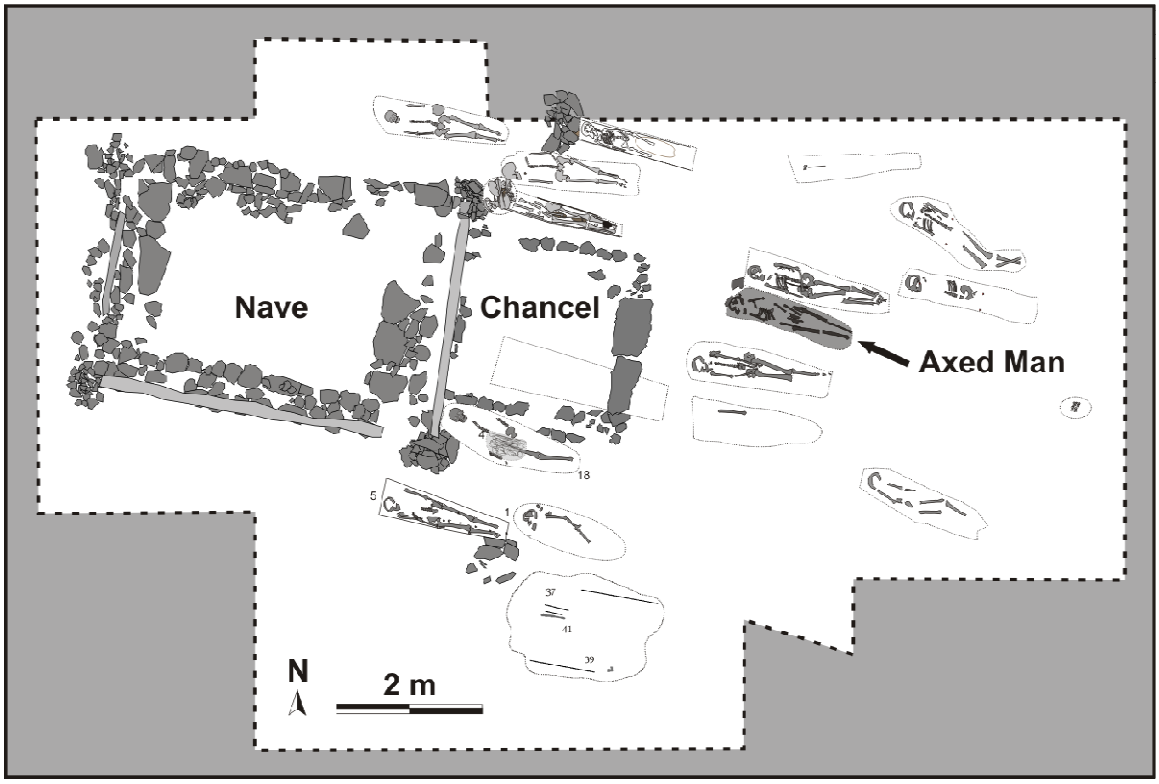

Figure 2: Map of the Kirkjuhóll cemetery at Hrísbrú showing the location of the Axed Man's grave.

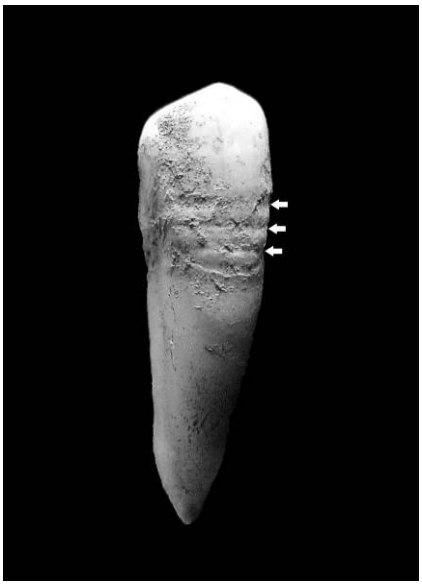

Figure 3: The lower right canine tooth of the Axed Man with arrows pointing to three hypoplastic lesions reflecting a series of childhood growth disruptions.

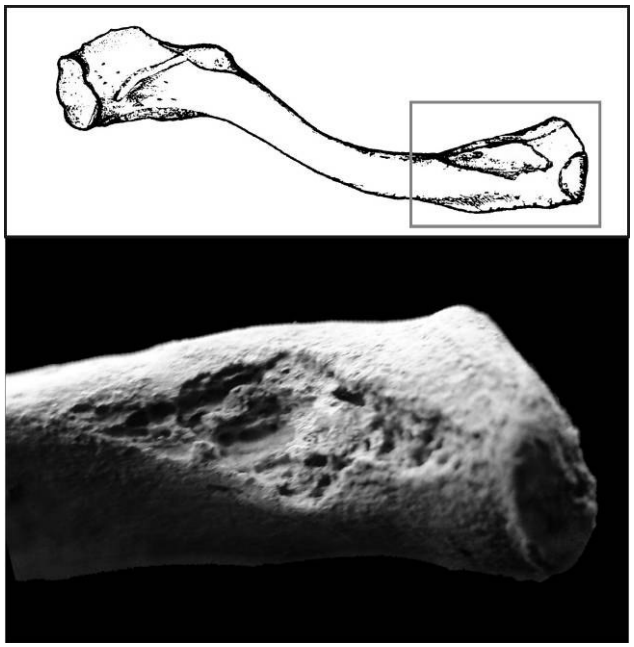

Figure 4: Inferior view of the sternal end of the Axed Man's left clavicle showing irregular bone in the area of the costal tuberosity produced by heavy lifting. The boxed area in the top drawing of a clavicle delimits the area seen in the photo below.

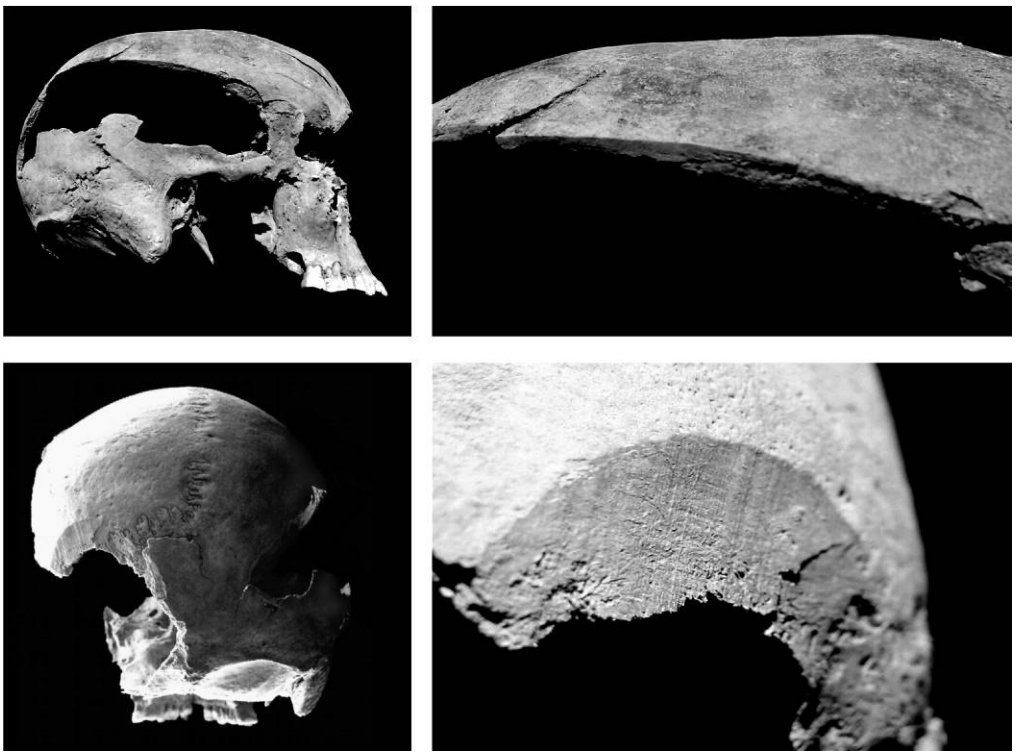

Figure 5: The Axed Man's cranium showing parietal (top) and occipital (bottom) injuries made by a bladed weapon such as an axe.

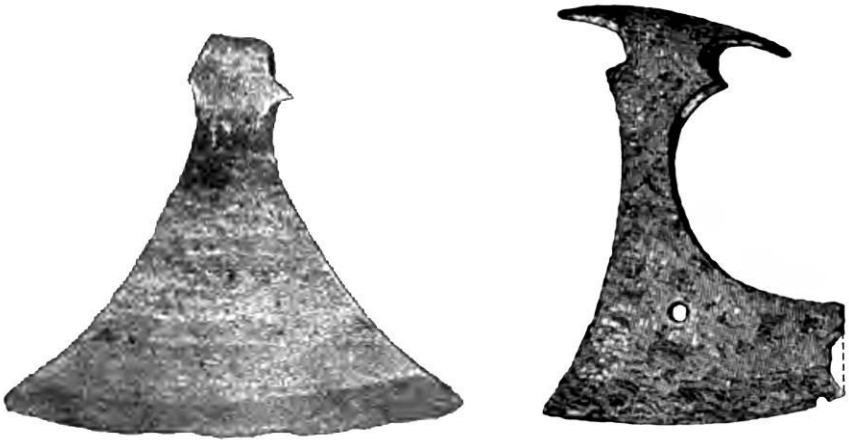

Figure 6: Examples of axes of the type likely responsible for the Axed Man's cranial injuries. (Left) Ax found with two other axes, a horse bit, and a bell in a Norwegian tumulus (Right) Iron axe, Hemse, Götland. Drawings after Du Chaillu (1890).