

Viking Age Ironworking: The Evidence from Old Norse Literature

Mark E. Hall

Introduction

Metallurgical studies have shown that the Northern European smiths of the Viking Age (ca. AD 790–1100) knew: how to 1) produce both iron and steel; 2) recognize iron and steel; 3) forge and heat treat steel and iron; and 4) forge weld iron and steel together (Kolchin in Thompson 1967; McDonnell 1987, 1989; Ottoway 1987; Thålin 1973; Thålin-Bergman 1979; Tomtlund and Genevois 1973; Tylecote and Gilmour 1986). While the metallurgical studies show how well the smiths understood what they were doing, they reveal little about the manufacturing techniques and social aspects of smithing. The purpose of this paper is to demonstrate the utility of Old Icelandic/Old Norse literature in reconstructing various social aspects of ironworking during the Viking Age.

The bulk of Old Norse literature was written down between the start of the thirteenth century AD and the end of the fourteenth century AD. (Gordon 1986:xliv–lxi). The earliest works were family sagas (*Íslendinga sögur*), biographies and histories of the kings of Norway (*Konunga sögur*), biographies of Icelandic bishops (*Byskupa sögur*), histories of Denmark, Iceland, Norway, and Sweden, and annals. *Riddara sögur*, or chivalric sagas, and *fornaldar sögur*, or mythical-heroic sagas, dominated Old Norse literature by the end of the fourteenth century (Kristjánsson 1988:22).

The *Fornaldar sögur* and the *riddara sögur* are seen by Kristjánsson (1988:22) and others as having no historic value. Since the other sagas genres are believed to have been written from oral tradition, their historical value is debated.

Even with these problems, the ethnohistoric value of Old Norse literature should not be ignored. Old Norse literature reflects the values and beliefs of at least a segment of medieval Scandinavian society, and records conditions and situations that would have been familiar to the author of the saga and the reader. In the case of ironworking, I am assuming that their accounts are viable descriptions of a thirteenth or fourteenth-century Scandinavian smithy. Furthermore, since the medieval Scandinavian iron industry was a direct descendant of the Viking Age iron industry, I feel the saga literature is a valid starting point for reconstructing manufacturing techniques and social aspects of the Viking Age iron industry.

Social Status

Ethnographic research on traditional societies has shown that: 1) the status of iron smelters and the smith can vary between societies, and 2) iron smiths are believed to have ties to the supernatural (Cline 1937:114, 117, 118, 131, 139; Eliade 1962:66, 67, 90, 91; Nicolaisen 1962; Robins 1953:26–28; van der Merwe and Avery 1988).

There are a few indirect references in Old Norse literature concerning the status of the smith. The *Landnámabók*, or *The Book of Settlements*, completed around AD 1307 (Kristjánsson 1988:124–127; Pállsson and Edwards 1972:4–8), contains the genealogies of several important land owning families of the thirteenth and fourteenth centuries AD. Smiths are in the genealogies of several families. Ljótólfr, who settled at Ljótólfr's Stead (O.N.: Ljótólfsstead), Steinrødr the Strong, Vémundr and Molda-Gnúpr, who both resided at Molda's Meadow (O.N.: Moldatún) are all smiths whose descendants were still landowners in the late thirteenth century (Benediktsson 1968:147, 257,328). Björn of Dalsmyni, nick-named "Red-Björn" was an iron smelter and is listed in the *Landnámabók* as one of the first settlers of the Northern Dales (O.N.:Nordurardalur) (Jóhannesson 1974:301). His descendants were still landowners in the Northern Dales in the thirteenth century.

The skaldic poet Egill Skalla-Grímsson was another famous Icelander who was descended from a smith. His life and adventures are chronicled in *Egils Saga Skalla-Grímsonar* (Nordal 1933). Egil's father, Skalla-Grímr, and his grandfather, Grímr, were both smiths (Nordal 1933:5,78,79). It should also be noted that Skalla-Grímr smelted his own iron (Nordal 1933:78).

While it is not clear how high in status this occupation was, it was not restricted to land owners only. A runestone in north Jutland suggests that even slaves could become smiths. The inscription on this stone records that it was commissioned by Toke the smith in honor of his former master Thorgisl Gudmundarson (Foote and Wilson 1980:77). Evidently, at one point in his life, Toke was a slave; whether he was a smith before he was a slave is uncertain though.

Smiths are also linked to the supernatural in the Old Norse heroic and saga literature. In Snorri's *Edda*, the gods and dwarves are smiths (Jónsson 1980:25, 149–151). Regin, the smith in the *Sǫmundar Edda* and the *Völsunga saga*, is a dwarf. Völundr/Velent, the tragic hero of the *Völundarkviða* and *Þjóreks Saga Af Bern*, is either an elf (Kristjánsson 1988) or human with magical powers (Mutz 1986).

While the above examples are from *fornaldar sögur*, the "historic" saga literature also contains two notable cases of a human smith being linked to the supernatural. First, in the *Landnámabók* Steinrødr the Strong battles and slays a witch who could transform herself into a monster (Benediktsson 1968:257). The second case is Thorgrímr, the villainous smith of *Gísla Saga Súrssonar*. He is described as follows:

Maðr hét þorgrímr ok var kallaðr nef. Hann bjó á Nefsstoð um fyrir innan Haukadalsá. Hann var fullr af gærningum ok fjkyngi ok var seið skratti, sem mestr mátti verða. Honum bjóða eir þorgrímr ok þorkell til sín, ví at eir

hofðu ar ok boðinni. Þorgrímr var hagr á járn, ok er þess við getit, at þeir ganga till smiðju, báðir þorgrímr arnir ok þorkell, ok sið an byrga their smiðjuna. (from Thórolfson and Jónsson 1943:37)

Translation:

There was a man named Thorgrímr and was nick-named “Nose”. He lived at Nose’s Stead within Hawk Dale. He was full of deeds and black sorcery and was a wizard, the greatest that one could become. They, Thorgrímr and Thorkell, made an offer to him, and because of this they were invited inside. Thorgrímr “Nose” was skillful with iron, and it was mentioned that they should go to the smithy, both Thorgrímrs and Thorkell, and afterwards they shut themselves in the smithy.

Gender

While female warriors can be found in Snorri’s *Edda*, there were no references found to women having any involvement with metalworking in any of the sagas surveyed by the author. If *Egils Saga Skalla-Griimsonar* and *Þiðreks Saga Af Bern* are any examples, charcoal production was done by the smith or his male workers (Jónsson 1961; Nordal 1933:78).

The tradition of excluding women from metalworking is recorded in Snorri’s *Edda* and the *Völuspá* of the *SÆmundar Edda*. The passage from Snorri’s *Edda* is as follows:

þar næst gerðu þeir lögðu aflaðí, ok þar til gerðu þeir hamar ok tóng ok steðja ok aðan af öll tól önnur. ok því næst smiðuðu their málm ok stein ok tré ok svá gnógliga þann málm, er gull heitir, at öll búsgögn ok öll reiðigögn höfðu þeir af gulli, ok er sú öld kölluð gullaldr, aðr en spilltist af tilkvámu kvinnanna. þær kómu ór Jötunheimum. (From Jónsson 1980:25).

Translation:

Then next they built a house, in which they put the hearth of a forge, and they made there a hammer and tongs and anvil and from them all other tools. And therefore, next they worked metal and stone and wood and so plentiful was the metal, which is called gold, that all household utensils and all furniture were made from gold, and that age is called a Golden Age, until destroyed from the consequences of women. The women came from Jötunheim.

Manufacturing Techniques

In *Þiðreks Saga Af Bern* is a fairly detailed description of the forging of the sword Mímungr by Velent. The passage is dealt with here in order to illustrate the manufacturing techniques the smith could have used when making an item for a “customer.” The passage:

Ok er þessi stund er liðin, þá spyr konungr, hví Velent vill ekki smiða, sem hann hefir veðjat.

Hann segir svá: “þegar mun ek smiða, er yðr synist ok þér leggið rað til.”

“Mér synist svá,” segir konungr, “sem þér liggi mikit við, ok þú átt at skipta við hagan mann ok illan í sér. Far nú ok smiða ok freista þín.”

Velent gengr nú til smiðju ok sezt til smiðar ok gerir eitt sverð sjau daga. Ok inn sjaunda dag þá kom konungr sjálfr til hans ok hefir Velent nú algert eitt sverð, þat er aldriki þóttist konungr hafa sét vænna né bitrigrá. Nú gengr Velent ok konungr með honum til ár einnar. þá tekr Velent einn þófa þvers fótár þjukkan ok kastar í ána ok lætr reka fyrir straumi ok setr sverð seggina í ána ok hvefir móti strauminum ok rekr þófann at sverðinu, tekr egginn í sundr þófann.

þá mælti konungr: “þetta er gott sverð,”—ok þetta vill hann sjálfr bera.

þá mælti Velent: “þetta er ekki mjok gott sverð, ok miklu skal þat betra vera, áðr en eg lettá.” Konungr gengr til hallar sinnar, ok er hann kátr.

Velent ferr nú til smiðju ok tekr eina þél ok þélar þetta sverð allt í sundr í svarf eitt. Nú tekr hann svarfit ok blandar við mjöl, ok þá tekr hann mjölit ok gefr fuglum at eta. þá tekr hann sáur fuglanna ok lætr koma í afl ok fellir, ok vellr nú ór járinu allt þat, er deigt var í. Ok þar af gerir hann eitt sverð, ok er þetta minna en it fyrra.

Nú er albúit er sverð it, þá kemr konungr til Velents, ok þegar er hann sér sverðit, þá vill hann sjálfr braut hafa, ok aldriki kveðr hann betra grip fást né finnast en þat sverð.

þá mælti Velent: “Herra, þetta er gott sverð, ok enn skal þat betra vera.”

Ganga þeir nú til árinna. Kastar Velent þófa fyrir sverðit, tveggja feta jukkan, ok tekr etta sverð sundr ófan sem it fyrra, ok konungr segir, at eigi mun fá gert betra sverð, thó at við leiti. Velent segir, at hann skal gera hat hálfu betra. Konungi líkar thetta vel ok gengr heim til hallar sinnar ok er glaðr.

Velent ferr til smiðju sinnar ok thelar thetta sverð allt í sundr ok ferr á sömu lund með sem fyrr hafði hann farit. Ok á er lið nar eru þrjár vikur, þá hefir Velent gert eitt sverð, skyggt ok merkt gulli, ok hjaltat fagrt.

Nú kemt konungr til Velents ok sér sverðit, ok þykkist hann aldriki hafa sét betra sverð né bitrigrá en þetta er skaplíga mikit sverð, en hin váru meiri en lagi gegndi, er fyrr haf hann gert. Nu ganga þeir til árinna, ok hefir Velent í hendi sér einn þófa þriggja feta þjukkan ok svá langan ok kastar í ána, ok essu sverði heldr hann kyrru í ánni, ok rekr þófan at sverð segginni, ok tekr sundr þófann jafnslétt sem sjálfan strauminn.

þá mælti Niðungur konungur: “þó at leiti um alla veröld, þá mun eigi finnast jafngott sverð sem þetta er, ok þetta skal ek hafa hvert sinni, er ek skal berjast við mína óvini.

Velent svaraði: ”Þessa sverðs ann ek engum manni at njóta nema yör, herra, ef nokkurr fengr er í. En skal búa fyrst at fetlum ok umgerð allri ok fá yör siðan sverðit.”

Konungur vill, at svá sé, ok gengr heim til hallar sinnar ok er kátr. Velent ferr í smiðju sína ok sezt til smiðar ok gerir annat sverð svá líkt hinu, at engi maðr kennir hvárt fyrir annat. Velent snyr inu góða sverði undir smið belgi sína ok mælti svá: “Ligg þú þar, Mímungur. Hverr veit, nema þín þurfi enn, áðr en lúki?” (From Jónsson 1961:97–99).

Translation:

And when this length of time passed, then asked the king, why Velent had not forged, as he had staked in the wager.

He said: “I shall forge at once, when you think it is time to forge and you counsel me on what to forge.”

“It seems to me,” said the king, “That you have greatness, and you have a suit with a man who has been wronged. Go now and try to craft something.”

Velent went to the smithy and began smithing and made one sword in seven days. And in seven days, the king came to him and Velent had now finished the sword, that one which the king thought he had never seen a better one or sharper one. Now Velent and the king went to a river. Then Velent took a piece of felt and cast it in the river and let it drift with the stream and set the sword edge into the river and turned it against the stream flow and the felt was driven towards the sword, and the edge cut the felt.

Then the king said: “This is a good sword,”—he would carry it.

Then said Velent: “This is not a good sword, and it shall be better, before I will stop.” The king went to his hall, and he was cheerful.

Velent went now to the smithy and took a file and filed the sword into a pile of dust. Now he took the filing dust and mixed it with meal, and then took tame fowl and starved them for three days, and then he took the meal and gave it to the fowl to eat. Then he took the fowl’s dung and came to the hearth of the forge and smelted it, and iron came out of all that, and it was soft. And from it he made a sword, and this one reminded him of the first.

Now when the sword was finished, then came king to Velent, and when he saw the sword, then he wanted to have it for himself, and declared never had another sword a better grip nor find he a better sword than that one.

Then said Velent: “Lord, this is a good sword, and it shall be better.”

They now went to the river. Velent cast a felt before the sword, two paces thick, and that sword cut the felt as before, and the king said, that he shall have made the best sword, and with the best appearance. Velent said, that he shall make it twice as good. The king liked this well and went home to his hall and was glad.

Velent went home to his smithy and filed his sword asunder and went in the same manner as he had before. An then when three weeks had elapsed, then had Velent made a sword, polished and marked with gold, and a beautiful hilt.

Now came the king to Velent and he saw the sword, and seemed to him never had he seen a better sword nor one as sharp as this one, and this was in a provoking manner a great sword, and was greater in every respect than the other ones which he had made. Now they went to the river, and Velent had in his hand one felt three paces thick and as long and cast it in the river, and he held the sword quietly in the river, and the felt was driven on to the sword's edge, and the felt was taken asunder immediately.

Then said Niðungr the king: "Nevertheless if I sought the whole world, then I would not find an iron sword as good as this one, and I shall have this sword at this time, and I shall carry it against my enemy."

Velent answered: "I shall not let a man use this one sword, for it will take part of your name, lord. And I shall first prepare the sheath and all the straps and then give you your sword."

The king wanted that, which thus was, and went home to his hall and was cheerful. Velent went to his smithy and set to smithing and made another sword like that one, so that no man could perceive between one another. Velent put the good sword under his smithy bellows and said: "Lay you there, Mfmungr. Who knows, you may be needed still, before the case is over?"

Archaeometallurgists have been trying for years to figure out what is going on in the forging of Mfmungr (Tylecote 1986:192,193). It has been suggested that nitrogen or phosphorus, coming from the animal dung, could have been alloyed with the iron during smelting. Experimental evidence shows that this does not happen (Tylecote 1986:193).

Instead of looking for a rational explanation for this, one should consider the idea that this was a technique or process that the smith, Velent in this case, felt was necessary to make a proper sword. Practices and rituals that have no functional effect on the final product have been noted among traditional ironworkers of Malawi (van der Merwe and Avery 1988).

Another feature of this passage is the testing of the smith's final product. This idea occurs elsewhere in Old Norse literature. In the *Hávámál* from the *Sæmundar Edda*, the reader is to "praise the day" when a sword is proven. Sigurðr, in the *Völsungasaga*, tests the sword Gramr by splitting an avil and a piece of felt.

The idea of testing the final product suggests that the iron smiths were manufacturing products of dubious quality. Metallographic examination of axes, knives, and swords from Anglo-Saxon and Viking sites in Europe shows that the majority of them had cutting edges of harden steel, but 10% to 25% of them were made of iron or low-carbon steel (Hall 1992; McDonnell 1989; Tylecote and Gilmour 1986).

The cutting of a piece of felt was an indication of how sharp the sword was and of the quality of the steel. The sharper the sword, the higher the carbon content of the steel in the cutting edge, and thus the more felt it could cut. Striking a sword against an anvil would be a rough measure of its toughness.

The time it takes to make a sword in this passage seems fairly realistic. Anstee and Biek (1961) have shown that it could take fifty hours of heating and forging to produce a pattern-welded sword. They felt a more elaborately patterned sword would have taken longer to make.

Conclusions

Evidence from the *Landnámabók* and *Egils Saga Skalla-Grimsonar* shows that both iron smelting and smithing were considered respectable occupations for the land owning families of medieval Iceland. Yet, on the basis of runic evidence, it is indicated that slaves could also become smiths.

Old Norse literature indicates that women are excluded from metalworking, but why this is not explained. If the *Edda* is any indication, women are seen as ruining the product of the smith.

Finally, as demonstrated with the passage from *Þiðreks Saga Af Bern*, Old Norse sagas can be used to reconstruct the techniques and rituals of the iron smith.

This is not intended to be a comprehensive review of references to smithing in Old Norse literature; but, instead this paper is intended to demonstrate its utility in reconstructing the smithing industry of the Viking Age. All of the above examples are things we may suspect as occurring in the smithing industry, but we have no way of proving them with either archaeological or metallurgical evidence.

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