

Archaeology in Iceland: Recent Developments

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ABSTRACT: The recent archaeological emphasis on the study of settlement patterns, landscape and palaeoenvironments has shaped and re-shaped our understanding of the Viking settlement of Iceland. This paper reviews the developments in Icelandic archaeology, examining both theoretical and practical advances. Particular attention is paid to new ideas in terms of settlement patterns and resource exploitation. Finally, some of the key studies of the ecological consequences of the Norse *landnám* are presented.

RÉSUMÉ: L'accent récent des recherches archéologiques sur l'étude des configurations spatiales des colonies, de la géographie des sites ainsi que des éléments paléo-environnementaux nous mène à réexaminer et réévaluer nos connaissances acquises sur la colonisation de l'Islande par les Vikings. Cet article passe en revue le développement de l'archéologie islandaise en examinant les progrès théoriques et pratiques en la matière. Une attention particulière est portée sur l'étude des configurations spatiales des colonies ainsi qu'une considération des questions d'exploitation des ressources. Finalement, l'article présente un aperçu des études principales qui traitent des conséquences écologiques du *landnám* islandais.

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Icelandic archaeology is a dramatically different field than it used to be. Through the years it has been subject to the same sorts of theoretical and practical trends seen throughout medieval archaeology. In the earliest years of work, Icelandic archaeologists used their excavations to illustrate the sagas, and as a means to fill in gaps in the story. It was exciting to look at the emerging settlements and try to match the colourful saga heroes with the farms they established and lived on. Later years saw a shift away from the cultural-historic mode, drawing more on the scientific methods of processual archaeology. Archaeological dating methods, including tephrochronology and radio carbon, were seen as a way to scientifically date historical events like the *landnám*, potentially confirming or disproving the veracity of historical sources. Issues of chronology have persisted, for example, with regard to the reliability of dating methods (Vilhjálmsson), and to a proposed, but contested, pre-*landnám* occupation of Iceland (Hermanns-Auðardóttir).

Up until very recently, archaeologists focused on the questions of “who settled where?” and “when did they arrive?” While the answers to the latter seem fairly certain in light of recent developments in dating techniques (Vésteinsson 1998 3), it may be impossible to answer the former with any conviction. The current direction in Icelandic archaeology has been a shift to new types of questions. Instead of focusing on the chronological development of a farm, or a typology of buildings and artefacts, archaeologists are turning their attention to the settlement processes, and their impact on society and the environment (Smith 319). Recent excavations have led to a number of significant changes in the way we understand the *landnám* period. This paper aims to critically review developments in the following three trends: (1) new theories regarding settlement patterns; (2) deeper insights into Norse resource exploitation and land-use; and (3) better understanding of the ecological consequences of Norse land and resource management strategies.

Settlement patterns

In the early days of saga studies and Icelandic archaeology the *Landnámabók* and the Icelandic sagas served as guides to sites. Using place names and topographical studies as aids to their work, archaeologists sought to match farmsteads with places and people mentioned in the sources. While this led to the discovery of many sites, recent survey work has shown that the historical sources only mention a small portion of the actual sites settled by the Norse. One example of an area ignored in the sagas is the Mývatn region (Mývatnssveit), in the northeast of Iceland, which appears to have been very densely settled.

It is generally accepted that the first settlers chose sites located along the coasts (Smith 320; Vésteinsson 2000 165; 1998 7); however a recent collaborative study, including Orri Vésteinsson, has suggested that some inland sites were also settled earlier than previously suspected (McGovern 2007 45). The written sources tell us that the Vikings settled where their high-seat pillars came ashore, establishing large claims and distributing land to their own followers.¹ Palynological studies cited by both Kevin Smith in 1994 and Vésteinsson in 1998 and 2000 have indicated that in the ninth century, lowland Iceland was covered with woodlands dominated by birch and considerable undergrowth (this has been recently questioned by Erlendsson et al.). Wetland regions along the coasts and rivers interrupted these expanses of forest. Dwarf birch and scrubby grasses characterised the highland area of Iceland, which likely would have been accessible only by means of the rivers. This meant that, on arrival, the coasts, estuaries and some of the river valleys would have provided practical locations for quick settlement. These wetland areas would have offered not only open space for house construction, but also winter fodder for the Norsemen's cattle (Vésteinsson 1998 7-8). An example of this might be the farm at Dalur, in South Iceland. Recent studies have suggested that the environment at the time the Norse arrived was dominated by wet meadows and grasslands, and would not have needed clearing (Mairs 370). The authors argue that the farm was successful, not only because there was no need to clear the land for farming, but also because the Norse exploited "a range of resources over a wide geographical area ... 'buffering' the environmental impacts" (Mairs 368).

Recent geoarchaeological research in the south of Iceland has identified regions which were subject to periodic glacial outburst floods [jökulhlaups] (Smith and Dugmore). Smith and Dugmore suggest that floods ca. 700 CE created a mosaic landscape: those regions untouched by the flooding would have stable soils and lots of vegetation, while those that had been flooded would have thin soil layers and lighter plant growth (173). This would have resulted in fairly clear access routes from the coast into the interior and upper water-ways permitting settlement inland in the early part of the *landnám* period (Smith and Dugmore 173).

In northern Iceland, Mývatnssveit, mentioned above, has clear archaeological evidence of early *landnám* settlements, such as a farm at Sveigakot (Vésteinsson 2001), and an iron-smelting site and farm at Hrísheimar (Edvardsson 2003) (see also McGovern 2007 35). Although this region is considerably far inland, it is accessible from the coast by waterways. McGovern et al. argue that recent research in Iceland, primarily conducted under the "Landscape of Settlement Project"² has made it necessary to reconsider the traditional account of the settlement process (2007 30). While the evidence clearly indicates that some inland settlements date to the early *landnám* period, it would be useful to consider how and why the settlements were established.

One theory that has been much discussed is the so-called “Skallagrim effect,” based on a passage from *Egils saga* (ch. 29). This passage describes the settlement process undertaken by the chieftain Skallagrímur, in south-west Iceland. It is very detailed in terms of its discussion of the available resources and the ways by which Skallagrímur established his control over them. Of particular interest is his deployment of individuals to set up subsidiaries to the main farm. These include farms by the sea for the collection of marine resources (driftwood, fish, birds’ eggs, etc.), a salmon fishery upriver, a farm in the mountains for sheep, etc. While the actual size of Skallagrímur’s holdings, as described by the saga, is probably exaggerated, Vésteinsson argues that the basic “economic structure with a large central farm and numerous out-stations” is plausible (2002 103). This argument has been critiqued recently, on the grounds that it cannot explain the nature of the settlements in Mývatnssveit (McGovern 2007 35). The early farms of this region are not small out-stations, but rather “fully established farms with resident lineages” (McGovern et al. 2007 35). However, the plausibility of the “Skallagrim effect” should not be dismissed based on the evidence of a single region. Rather, more investigation must be carried out in order to see how the settlement process occurred elsewhere in Iceland. It is unlikely that there will have been any single process in place.

At first glance, these habitable areas must have seemed very suitable to a continuation of the Norse way of life (Vésteinsson 2000 165-67). This apparent similarity between Iceland and parts of Norway and Britain may have led to what is often described as a “false analogy” (see Dugmore 2006 340; Smith and Dugmore 174). On the surface, the landscape may have looked familiar, and thus the settlers would have attempted to use land and animal management strategies imported from home. However, because of the volcanic nature of the island, the biomass of Iceland is less stable than that of Norway and is prone to erosion (Dugmore 2006 341; McGovern 2007 29-30). It is possible that it quickly became apparent that some sites were not ideal and that these, such as Grelutóttir, in Arnarfjörður, were abandoned as land was cleared elsewhere (Vésteinsson 1998 11).

Vésteinsson (2000 167) suggested that by the 880s the “best land had already been claimed” thereby forcing settlers to settle on more marginal land. He bases this claim primarily on the evidence of an early settlement at Hofstaðir, near Lake Mývatn, but in a recent site report, Friðriksson, Vésteinsson and McGovern suggest that the initial settlement began after 950 CE (2004 193, see also McGovern et al. 2007 38). This effectively eliminates Vésteinsson’s main evidence for his original hypothesis, and thus until more examples come to light, we might still suppose that sites on marginal land were occupied in the later phases of the *landnám*. Alternatively, it may be possible that sites with marginal farmland may have been occupied early on, if some settlers had other priorities, such as control over route ways or access to a variety of other resources. Indeed, this is one suggestion put forward for the location of Hofstaðir (McGovern et al. 2007 24), albeit in a slightly

later context. Furthermore, the rich Framengjar meadow region, south of Mývatnssveit, could have supplied winter fodder for milk cows (Friðriksson et al. 197-98). Therefore, in spite of lacking access to varied resources like woodlands, farms in this region (like Grænavatn and Baldursheimur) may also represent inland settlements in the first phase of the *landnám*.

Citing examples such as Herjólfssdalur in the Westmann Islands, Hvítarholt in Árnesþing, and Reykjavík, Vésteinsson (1998 12-14; 2000 168) has noted that many of the early farmsteads had two or more longhouses that may have been in use simultaneously. Vésteinsson suggests that because the houses tend to be equal in size, they represent a co-operative effort between multiple families. However, other interpretations could be posited, such as use by extended family, retainers or slaves. It is interesting to note that his list includes several farms, like Bessastaðir, near Reykjavík, Granastaðir, in Eyjafjörður, and Goðatættur, in Papey, where one longhouse may have contained a byre while the other did not. This would either indicate that the two families using the site had different farming practices or that there was some variation in their social status. Rather than two equal families occupying such sites, it may be reasonable to suggest that the longhouse was home to the main Norse family, while the byre/house was for the slaves. Alternatively, because of the difficulties in producing absolute dates for the archaeological remains of this period, the possibility that these houses did not exist simultaneously, but rather in succession, must be acknowledged.

The Framengjar region has a number of smaller farms with limited access to other resources. Friðriksson et al. (198) postulate that at the time of the *landnám* the area was settled by a number of socially equal farmers. This could be interpreted as a larger scale version of the shared, possibly co-operative, settlements proposed by Vésteinsson, as no single site seems to have been in a position to control the distribution of the others. This pattern is also repeated in the early part of the *landnám* period in Mývatnssveit. As yet, however, there is no evidence, beyond the lack of domination, to indicate how these individual settlements interacted with each other.

Not all inland sites need to be later developments. Excavations at Hrísheimar, southeast of Mývatnssveit, have indicated that the site was occupied almost from the beginning of the *landnám*. The findings reported by Ragnar Edvardsson in 2003 suggest that in the first period of occupation at Hrísheimar the focus was not on farming, but on exploiting the bog iron resources and the extensive woodlands. The forest would have provided the fuel needed to produce charcoal for the smelting process. Only after the land had been cleared, would it be suitable for a farm. Excavations have revealed several smelting furnaces, suggesting that the amount of iron likely to be produced would have supplied a number of farms. A few scenarios could explain the early function of this site. Firstly, it could have been established by one of the pioneering families, to be managed by a retainer. Secondly, it may have been a communal site, used by a number of farmers in the

region. Finally, an entrepreneurial Norseman may have set up the iron-works instead of a farm, selling the iron to his neighbours in order to make a living. Once the land was cleared of trees, fuel was no longer easy to obtain and iron working was abandoned (Edvardsson 25).

Once the prime land was occupied, latecomers would be forced to look elsewhere. This would have led to the settlement of the coastal regions between the estuaries and more of the valleys inland. Access to the inland sites may have been controlled by the large farmsteads based at key points on the rivers, allowing the first settlers a certain amount of say in who settled upriver from them (Vésteinsson 2000 173-74). This could have been the case for Höfðagerði, Núpar, which was a large site located on the Laxa River. As mentioned above, the written sources suggest that the first settlers established large holdings and then set up their own followers at sites within these holdings. It is possible that the arrangement was not a formal one, but rather a case of indebting late arrivals to the pioneers by facilitating their land claims. The migration process can lead to the establishment of apex families—those whose earlier arrival places them in a position to help later migrants, thereby creating prestige for the primary settlers (Anthony 26). Furthermore, Vésteinsson argues that the Icelandic pioneers would have kept these secondary settlements small, so as to prevent rivals from arising nearby and make room for many loyal supporters (1998 21). The farm at Reykjahlíð, north of Mývatnssveit, appears to be an example of a powerful settler who parcelled out a “small number of planned settlements” (Friðriksson et al. 198).

In the last years of the *landnám* period, the habitable areas of Iceland would have been filled. Any space with the potential to support a farm would have been claimed by those who came last or by the pioneers’ sons if land was not available on the family estate. These farms are characterised by being situated on marginal soils, with limited access to other resources. It is hard to say if the earlier settlers distributed this land, or if it was simply all that was left. Life on such farms was probably a daily struggle, and many may not have survived their first few winters. But this was probably true of the later phases of many of the early sites as well. As the mismanagement of the land in some places led to poor conditions on fragile soils, farms had to be moved or abandoned. For example, in his report on the three farms around Saltvík, Suður-Tingeyjarsýsla, Vésteinsson suggests that all of the sites were abandoned before 1300 (2004 32). The failure of such farms as a result of erosion is discussed below.

Resource exploitation and land use

As noted above, Iceland was forested in the *landnám* period. Once the Norse arrived, it did not take them long to denude the island. Archaeobotanical studies have suggested that the majority of the trees were destroyed within a few

centuries of occupation (Eysteinnsson and Blöndal 413). In southern Iceland, recent studies have identified a dramatic drop in birch pollen between the tephra layers of 871 CE and 920 CE (Vésteinsson 2000 167). The settlers exploited the woodlands for a number of reasons including building materials, grazing and fuel, as well as clearing the land to make room for farming. The demand for fuel was high, particularly in those regions that also contained bog iron. The trees around Hrísheimar appear to have been cleared before 1200 CE, at which point iron was no longer worked and the cleared land likely became available for agriculture (Edvardsson 26). Unfortunately for the Norse, without the cover of vegetation, erosion would have set in quickly and irrevocably, making farming difficult in such locations. The site of Háls, in Western Iceland, appears to have a similar past (Smith 335), which might indicate a pattern of bog and forest management. However, although the traditional studies have posited near universal deforestation, McGovern et al. (2007) challenge this assumption. Recent pollen analyses have produced evidence of woodland management at Hofstaðir, for example (Simpson et al. 2003 1415). Zooarchaeological studies at sites in Mývatnssveit have noted a decline in pigs and goats as early as the tenth century, indicating a possible animal management strategy in response to the need to protect existing woodlands (McGovern et al. 2007 40).

In addition to cutting wood for fuel, forested areas were burnt to allow the planting of crops or to improve conditions for grazing. Historical agricultural reconstruction is becoming possible through palynology and geoarchaeology. In most of Iceland the standard crop would have been hay to provide winter fodder for domesticated animals, particularly cattle. In southern Iceland, pollen analysis indicates the presence of cereal crops like flax and barley (Smith 329). The areas with the best forest would also have provided the richest soils for agriculture, and thus were likely to have been utilised quickly by the Norse (Eysteinnsson and Blöndal 412). Grazing was probably one of the most destructive of the Norse land management strategies, and the consequences of this will be examined below.

Wild fauna

Zooarchaeological studies in Iceland have provided a lot of interesting information about the settlers and how they adapted to their environment. The results challenge traditional assumptions about the reliance of the Norse on imported subsistence patterns and a lack of willingness to adapt to the local environment. In his article on Icelandic archaeofauna, Thomas Amorosi identified a “settlement period signature” that is distinct from that of later periods (281). This signature is characterised by a greater reliance on hunting, and higher numbers of cattle than in later periods. Studies at Hofstaðir and Sveigakot, near Mývatnssveit, have demonstrated that prior to the eleventh century the faunal remains include a large number of fish and wild birds in addition to domesticated

animals, while in later periods the presence of wild fauna drops dramatically (Tinsley 213). At sites throughout Mývatnssveit, a recent research project has recovered a variety of indigenous archaeofauna, including arctic fox (Iceland's only indigenous land mammal), seal, porpoise, whale, ptarmigan, migratory waterfowl, seabirds, and several species of fish (McGovern et al. 2006 192-93). The presence of sea resources inland is striking, suggesting internal trade or exchange mechanisms in place from a very early date (McGovern et al. 2007 44). There is also strong evidence to suggest that the marine-based fish (such as cod, saithe, haddock, ling) were processed elsewhere and then brought into Mývatnssveit. The bones of the head and upper spine are not generally present, which may be the result of the local fish-drying practices (McGovern et al. 2006 195).

Further to the south, Amorosi's research demonstrated that settlers of Tjarnargata, in Reykjavík, and Herjólfssdalur took advantage of local marine resources such as fish, bird and even walrus. The walrus remains are particularly important as they include samples from young walruses, which indicate the presence of a breeding-colony. The Norse hunted these colonies out very early in Iceland's history and the bones of the young are the only evidence of their existence (Amorosi 280; Amorosi et al. 502, Batey 355-56).

Not all Norse encounters with local wildlife resulted in the annihilation of the species however. Returning to the research in Mývatnssveit, an impressive amount of new evidence for the consumption of eggs has been identified and evaluated (McGovern et al. 2006 193-94). Although eggshells tend to be very difficult to recover in the archaeological record, many of the middens at sites in Mývatnssveit have produced large quantities of eggshells. It has been possible to identify the bird species for much of the material, and the record seems to indicate that the eggs most commonly came from waterfowl, closely followed by ptarmigan. While most of the waterfowl would have come from Lake Mývatn, some were identified as sea birds (McGovern et al. 2006 194). As the Norse evidently exploited the birds' eggs without overly hunting the birds themselves, and as this pattern has continued throughout the history of the region, it has been put forward as evidence for good resource management by the settlers (see McGovern et al. 2007 41-42).

Domesticated fauna

Amorosi et al. (501) identify a "*landnám* package" of domesticated animals, which included cattle, caprines (goats/sheep), pigs and horses. The value of cattle in the early years is not only illustrated by the faunal record, but also in the presence of large byres on early sites like Herjólfssdalur and Hvítarholt (Vésteinsson 1998 7). In later periods, pigs became rare and sheep replaced cattle as the preferred domesticate. This is generally assumed to be because the changing landscape was less suitable for meeting the dietary needs of both pigs and cattle.

However, McGovern et al. have recently proposed that the reduction of pigs and goats may be a deliberate response in some regions to early land degradation—an attempt to reduce erosion caused by grazing (2007 45). Of course, it may also be true that as the landscape degraded, animals which required intensive grazing may have become impractical to keep. The change in animal management practices may thus reflect economical decisions on the part of the settlers in addition to, or as opposed to, environmental ones. Because cereal production was so limited in Iceland, animal husbandry must have been one of the main elements of subsistence for the Norse at the time of the *landnám*.

The arrival of the Norse, and their livestock, introduced a variety of new insects to Iceland. These insects probably came to the island in a variety of ways: piggy-backing on animals or people, in fodder shipments, and dunnage (Sadler 199-211). The insect remains are often well preserved in the Icelandic archaeological record, and so provide data for interpretation. For example, sheep ked and lice could indicate the presence of sheep on a site where bone preservation is poor (Buckland et al. 1991 265). The presence of these insects in large quantities on the floor of a building at Reykholt suggests that the area was used for the processing of wool, as the insects would not have dropped off the sheep naturally (Buckland et al. 1993 517). There is also evidence at Reykholt for at least one episode of delousing humans, an activity that was carried out near the main hearth (Buckland et al. 1993 516). Archaeoentomology has also increased understanding of building structures, as different insects will naturally occupy different building materials. For example, shipworm, found in building timbers, indicates the use of driftwood (Buckland et al. 1993 516).

Through the study of insect fauna archaeologists have also begun to understand the Norse living conditions. According to Eva Panagiotakopulu,³ life in the Icelandic long house was squalid, with refuse simply discarded on the floors. There is even evidence of human faeces inside the houses, which Panagiotakopulu claims is not uncommon throughout the Norse world. It is almost as if this evidence brings scholars full circle, back to the stereotypical images of the dank, smelly Dark-Age houses of earlier scholarship—images that have been questioned in more recent times (Jones 53; Powlesland 105-08; Rahtz 70-76).

Ecological consequences

It has been estimated that seventy-three per cent of Iceland suffers from soil erosion (Arnalds et al. 2001, cited in Simpson et al. 2004 471). While some of the processes leading to erosion began in the period immediately preceding the *landnám*, the consequences of Norse land management are ultimately at fault (Simpson et al. 2004 472; Smith 337). The Norse “*landnám* package” described by Amorosi (1997 499) was a recipe for disaster in Iceland. Cattle and goats stripped

bark and leaves from trees. Pigs tore up roots and low-lying vegetation. Horses, cattle and goats ate not only existing plants, but also any new growth, preventing the regeneration of the forests. As the forests were cleared, the land became available for agriculture, and new farms might then be established.

The Norse used a seasonal system of infields and outfields for grazing their livestock. During the winter, while the cattle were in the byre, the sheep occupied the infields and consequently ate any available vegetation in the area. In the summer, these same infields were used to grow hay for winter fodder for cattle. This cycle was repeated annually, and a recent study of historical grazing practices (Simpson et al. 2004) has concluded that where winter grazing was left unchecked, soil erosion was dramatic. At the site of Sveigakot the soil conditions were very fragile and over-grazing led to the permanent degradation of the soil and the abandonment of the farm (Simpson et al. 2004 499). While it is entirely possible that the volcanic soils of Iceland predisposed the island to erosion, the traditional assumption is that the scale of that erosion is the direct result of Norse agricultural and grazing practices. It is another black mark against the Vikings. Once again, however, the traditional views are being challenged by recent research.

It is clear that in much of Iceland, the land management strategies imported by the settlers were not sustainable. Left unchecked, they led to land degradation on a large scale. However, they were not always left unchecked. As has been highlighted above, some of the farms in Mývatnssveit show evidence of adjusting grazing and woodland management strategies in an effort to reduce deforestation and erosion (see McGovern et al. 2007 45–46). In fact, although erosion quickly became a problem at some farms in the region, others did not experience severe levels until the eighteenth century (McGovern et al. 2007 39). The farms at Mörk and Þórsmörk, in southern Iceland suggest that the adaptation of land management strategies could actually preserve landscapes and woodlands, in spite of unstable soil conditions, even to the present day (Mairs et al. 371).

McGovern et al. (2007) argue that the real problem lies in the changing climatic conditions. Research shows that the biomass at the farms of Sveigakot and Hofstaðir would have been sufficient to support the households and related livestock using them, and thus land degradation was not inevitable (Thomson and Simpson 22). If they experienced one bad season, the settlements were not threatened. However, the climate was fluctuating, and it seems likely that the region was subject to a string of bad seasons. It has been suggested that even if the seasons were only mildly poor, it would have been enough to push some farms over the edge (McGovern et al. 2007 44). Because Hofstaðir was larger and had access to a wider variety of resources than Sveigakot, it may have been easier for the farmers there to adjust their land management practices, thereby making the farm sustainable over the long term (Thomson and Simpson 23–24). It should also be remembered that the farm at Hofstaðir was established approximately 80 years after the farm at Sveigakot. The household may have come from elsewhere

in Iceland and had the benefit of generations of experience with Icelandic land and climate conditions.

The proposal that land degradation may have been caused the failure to remove livestock from the upland pastures quickly enough at the onset of winter was proposed by Simpson et al. (2001) as a possible explanation for erosion in Eyjafjallahreppur, south Iceland. They suggest that poor seasons could have led farmers to either bring their livestock to communal upland pastures too early or remove them too late in the summer, resulting in over-grazing (Simpson et al. 2001 187). The region's climate was apparently mild enough in the *landnám* period for over-wintering in the uplands to be possible, and the timing of the livestock grazing only became an issue in the medieval period (Simpson et al. 2001 186). However, in Northern Iceland, climatic conditions may have been more severe at earlier dates, making the timing of the removal of livestock from upland grazing crucial to the prevention of land degradation as suggested by McGovern et al. (2007).

By contrast, in other parts of the south of Iceland, land degradation may have been an inevitable consequence of Norse settlement for some regions. As has been mentioned above, some areas of Iceland, such as the Markarfljót valley, were subject to periodic glacial outburst floods [*jökulhaups*]. According to research by Smith and Dugmore these *jökulhaups* have a major impact on the landscape, producing areas with thin soil cover over unstable tephra-rich sand (2006 173). The resulting landscape would have looked deceptively familiar to the Norse settlers, but would have also been much more fragile than they would have initially realised. Smith and Dugmore posit that it would have required only a minor break in the soil cover to begin erosion. Such breaks could have been caused by both animal grazing and human traffic through the regions. Once erosion began, it likely could not have been halted, even through changes in land management practices, because there was no way for the soils to be replenished (Smith and Dugmore 173). Although the human impact may have been the trigger for the land degradation, the Norse were not in a position to be aware of the risks.

The ecological changes following the settlement of Iceland were severe. That the blame for this should fall primarily on the Norse settlers is, however, possibly unjust. Evidence suggests that land degradation had already begun prior to the *landnám*, and was caused by a combination of on-going factors including climate change, volcanic activity, and flooding, rather than simply over-grazing (Dugmore et al. 2005 30). The human factor is only one of many. Furthermore, it seems that in some parts of Iceland, like Mývatnssveit, erosion came hard on the heels of the late medieval era, and not during the Norse period (Dugmore et al. 2005 30; McGovern et al. 2007 45).

Conclusion

A new picture of the *landnám* is emerging, one that is focused on how the Norse settled Iceland and how they lived once there. Settlement patterns cannot be explained by simple models, but rather through a series of possibilities. Most of the first settlers chose wetland environments for their farms. For some, these locations worked and they stayed, while others moved on. In many cases, the farmers appear to have settled together, working co-operatively. In others they seem to have brought a large number of dependants, who may have eventually relocated outside the main farmstead. Later arrivals made do with what they found or received from others, gradually filling up the landscape.

In much of Iceland forests were cleared as quickly as possible, either for fuel, agriculture, building, or grazing, depending on the location and the needs of the farmers. Other natural resources, like iron, were used as long as it was economical to do so. Local fauna was exploited to greater or lesser extents throughout the country. In some cases, like that of the walrus, they were destroyed completely, while in others, such as the Mývatn migratory birds and their eggs, sustainable practices were developed. Over time, the habitable parts of Iceland were farmed and grazed so intensely, that the island is still reeling from the consequences. However, it is not possible to lay the blame for this solely at the feet of the Norse. Evidence suggests that the concepts of adaptation, moderation and conservation were not unknown to the settlers. Rather, the situation may have been inevitable to a certain extent. Furthermore, it was an on-going dilemma and the Icelanders of the following centuries must also accept responsibility for the care of the landscape.

Icelandic archaeology is in a period of rapid development as new sites are worked on, old sites are re-examined, and new techniques and theories are explored. This rapid development has led to the creation of a journal dedicated exclusively to Icelandic archaeology—*Archaeologia Íslandica*—established in 1998, which has now published five issues.⁴ Outside of archaeology, recent studies in genetics and isotopic analysis are also adding to our knowledge of the *landnám*. Several studies have suggested that while the vast majority of the male immigrants to Iceland were of Scandinavian descent, more British women accompanied them than Norse (Helgason et al. 2000; Price and Gestsdóttir; Williams). The rise of archaeology-based sciences, including archaeobotany, zooarchaeology and archaeoentomology, has enabled scholars to move beyond plans and typologies and into the nitty-gritty of Norse life. It should be said, however, that material culture studies have neither stagnated nor been neglected in Iceland, although they have fallen outside of the scope of this review. For example, a recent article by U. Loumand in 2006 has re-examined the role of the horse in Icelandic burial practices, and A. Friðriksson in 2004 has begun work to analyse the relationship

between burial sites and topography. M. Hayeur Smith in 2004 has taken new theoretical approaches to the relationship between adornment and social structures, while C. Callow in 2006 addresses the issues of childhood and infanticide. They present clear reminders that the Icelandic Viking Age landscape was occupied and shaped by people. From a settlement at the edge of the world to a country on the cutting edge of archaeological research, Iceland has come a long way.

NOTES

1. For example, Ingolf Ornsson, having previously visited Iceland, established himself as its first settler, by building a home at Reykjavík where his high seat pillars had come ashore. He then proceeds to advise subsequent settlers with regard to their own foundations (*Landnámabók* ch. 6-11). Bjorn Ketilson establishes himself in a similar manner, as does his sister Unn the Deep-minded (*Laxdæla saga* ch. 3, 6).
2. The "Landscapes of Settlement in NE Iceland" project is an interdisciplinary and international research project studying the Mývatnssveit region. It is sponsored by the North Atlantic Biocultural Organization (NABO) and has been running since 1996.
3. "Flies and Death in Norse Greenland," seminar at Glasgow University, 9 February, 2005.
4. The scope of the journal is not limited to Viking Age archaeology, but rather spans the period from the *landnám* to the modern day.

ABBREVIATIONS

NABO: North Atlantic Biocultural Organization

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