

Post-settlement history of Icelandic forests

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SUMMARY

A short review is given on the history of Icelandic woodlands based on historic data from different periods, and the experience with vegetation in different regions of the country today and its relation to climate. It is evaluated which areas were probably woodless at the settlement, and the theory about the word "heiði" in place names set forth by Steindór Steindórsson is discussed. The frequent presence of names ending with "-heiði" almost down to the sea level in some extremely oceanic regions, is explained by these same regions being woodless heathland at the time when the names were formed. The old sagas indicate that the first settlers spent a lot of time clearing woodlands, and it is described how the wood was used for buildings, as fuel and to make charcoal. After the wood had been used up in densely populated areas, it had to be transported from more remote regions. At last the inhabitants had to tear up brushwood and dwarfshrubs to obtain sufficient heating material essential for surviving in Iceland. Free grazing everywhere prevented the natural regeneration of the woodlands.

Key words: birch woodlands, forest degeneration, anthropogenic effects.

YFIRLIT

Saga íslenskra skóga eftir landnám

Stutt yfirlit er gefið yfir sögu íslenskra skóga, stutt af sögulegum heimildum frá mismunandi tímum og reynslu af gróðri landsins eins og hann er í dag við mismunandi loftslag í hinum ýmsu landshlutum. Reynt er að varpa ljósi á hvernig skilja beri orð Ara fróða og hvar skóglaust hafi verið um landnám, með tilvitnun í sögulegar heimildir. Vísað er í hugmyndir Steindórs Steindórssonar um merkingu orðsins heiði til forna. Þær gefa vísbendingu um að skóglaus svæði hafi verið niður að sjávarmáli á útskögum þar sem úthafsvindar næða óheftir. Fornsögur gefa til kynna að landnámsmenn hafi verið miklu af tíma sínum til skógarhöggs. Gerð er grein fyrir hvernig viðurinn var notaður til bygginga, eldiviðar og viðarkolagerðar fram eftir öldum. Viðurinn gekk fyrst til þurrðar þar sem þéttbýlast var og mest umsvif en var síðar sóttur langar leiðir til fjarlægari staða. Að lokum neyddist fólk til að rífa upp hrís og lyng þegar ekki var annað að hafa til eldiviðar. Sú staðreynd að sauðfé lék lausum hala um allt landið til beitar kom í veg fyrir náttúrlega endurnýjun skógarins.

INTRODUCTION

It is my intention, to give you a short view of the history of the Icelandic woodlands from the settlement of the country in the ninth and tenth century, until now. Let us start with an attempt to illustrate the situation when the Norse settlers arrived to the country.

In a book that Ari the Learned (1068-1148) wrote to describe the settlement of the coun-

try, he tells that Iceland was covered with wood between the seashore and the mountains (Íslendingabók-Landnámabók, 1968). This statement has probably been more often cited than any other in the old sagas. It has been disputed by many earlier authors, but I think it is generally accepted in later times. We have now seen that wood of willows and

birches soon grows up by itself, if protected from intensive grazing, which otherwise prevents the natural succession.

As I see it, there is no reason to doubt that this statement of Ari the learned is correct, if we interpret it in a reasonable way. We must realize that this was a general statement of his, not meant to be understood in its strictest sense for every small area in Iceland.

The main species of the Icelandic woodlands were the same as today, with *Betula pubescens* Ehrh. and *Salix phylicifolia* L. dominating, intermixed with flowering trees of *Sorbus aucuparia* L. and shrubs of *Salix lanata* L., and probably at least locally with *Populus tremula* L. *Alnus* spp., which has been indicated in some periods of the interglacial flora, was already extinct at that time.

PRESENT WOODS IN ICELAND

Remnants of these woods are still found in the country. The upper limits of the woodland today are about 300–500 m above sea level. The altitudinal limits of the birch itself ranges from over 550 m in the most continental sites north of the large glaciers down to about 200 m or less in the extreme oceanic areas where strong winds are prevailing.

In some places it is still possible to see the treeline in the mountainsides, even though the woodland has been destroyed in the lowland. It is seen as a zone of birch shrubs growing horizontally along the ground. I believe that the birch limit at the time of settlement was at least not lower than today, but possibly a little higher. We might expect decline of the birch limits in the cold period 1500–1900. The present warmer climate has not yet been able to raise the birch limit again, partly because of the short time, and also because of the constant sheep grazing.

In fact there is also an oceanic limit for the woods along the coast. Melrakkaslétta in northeast of Iceland, the north coast of Hornstrandir, and the southernmost points of Reykjanes Peninsula, have probably been

woodless at the settlement, except in depressions or slopes sheltered from the oceanic winds.

In regions with extreme oceanic climate and heavy coastal storms, the birch forms only low shrubs, 1–2 m. Towards the inland in more continental sites, the birch reaches the height of 10–12 m. Shrubs of *Salix phylicifolia* dominate in wetter habitats, but are intermixed with the birch in other habitats. *Salix phylicifolia* forms under favourable conditions in the more continental climate round cushions 5–6 m high and 10–12 m broad. At extreme oceanic sites they are only 1 m high and 3–4 m in diameter. *Salix lanata* forms under favourable conditions shrubs that may become up to 2–2.5 m tall.

THE WOODS AT THE SETTLEMENT

Let us now come back to the situation at the time of settlement. I mentioned earlier that we should not understand the words of Ari the learned literally in its strict sense. Where did we then not have woodlands?

We have already seen, that regions above 500–550 m did not have birch wood, but only creeping willows such as *Salix arctica* Pall., *S. lanata* and *S. phylicifolia*. Some areas between 300–500 m did not have birch wood either, especially in coastal regions.

Besides the altitudinal limit towards the mountains, we had also an oceanic limit towards the extreme oceanic, stormy coasts. Exposed areas such as the western coast of Reykjanes Peninsula, the north coast of Hornstrandir, and the north coast of Melrakkaslétta did not have any birch woods even down to the sea level, except in very sheltered habitats or hillsides turning away from the coast.

Steep scree slopes with loose material frequently moving downhill, like in Hafnarfjall in southwest Iceland or in Lónsöræfi in southeast Iceland must have been woodless. Fens and other very wet areas have also been woodless, but bordered with *Salix phylicifolia* on higher spots rising a little above the water level.

Flooded areas along large glacier rivers were in many cases also without wood. We must however keep in mind, that such disturbed areas caused by flooding or land slides are very rapidly colonized again, if seeds from the surrounding woods are carried there.

Some volcanic areas and recent lava fields were also without woods, although lava fields generally become colonized rather rapidly and form birch woods within 100–200 years. In oceanic areas, however, thick carpets of *Rhacomitrium lanuginosum* (Hedw.) Brid. can slow down the succession on lava fields for a long time.

HEIDI IN GEOGRAPHICAL NAMES

At last I would like to look at the role of place names, especially those ending with the Icelandic word “heiði” (heath). These names can give some information on the vegetation. The old Icelandic botanist, Steindór Steindórsson, wrote one of his last articles on this subject (1990). Steindór Steindórsson pointed out, that the meaning of the word “heiði” was different at the time of settlement from what it is now. Now it usually means a rather flat, smooth hill or mountain, usually about 400–600 m high. Often it is used mainly for the part of hills where a road or path crosses over it (equivalent to the word “Pass” in English). In old days the word is supposed to have had similar meaning as in our neighbouring Scandinavian languages, i.e. a stretch of land with low vegetation or dwarf shrubs instead of woods, or, in other words, woodless dwarfshrub heath.

As an example we can follow the pass Öxnadalshéiði on the way from Skagafjörður to Eyjafjörður, north Iceland. No woods are seen on this way today. The route leads up through the valley Norðurárdalur which at the time of settlement was grown with woods on both sides, and into a narrow side valley. There we have a place called Skógarhlíð (woody slope) on the left side at the elevation of 350–450 m. This was the last wood on the side of Skagafjörður. Further east we have

the rather short pass still called Öxnadalshéiði at 460 m. According to the theory of Steindór Steindórsson, this was the only woodless part of the route, and that is the reason for the name Öxnadalshéiði. After passing the heath, the steep road leads down into the woods of Bakkasel in Öxnadalur Valley.

In a similar way, the name Vaðlahéiði was used for the long, 600 m high, mountain range on the east side of Eyjafjörður. The ridge was rather flat and overgrown with dwarfshrub heath, reaching well above the woods of Eyjafjörður and Fnjóskadalur on both sides.

This theory explains the rather unexpected situation we have today, where we find “heiði” in a few places only few metres above sea level. According to the present language this seems very strange because “heiði” generally is at least a 300–500 m high mountain pass. At the time of settlement, this simply reflected that the land was woodless almost down to sea level. If we look at the map, and check where we have these low “heiði”, we find them in areas where we can expect an oceanic rather than an altitudinal tree line.

On the western part of the Reykjanes Peninsula there is Miðnesheiði about 20–30 m above sea level, and further east Vogahéiði, Strandarheiði and Vatnsleysuheiði about 40–60 m. On Melrakkaslétta in the northeast we have Skinnalónshéiði and Hestheiði about 20–25 m, Raufarhafnarheiði 30–50 m, and Sléttuheiði 60–80 m.

We have now got an idea of the woods in Iceland at the time of settlement of the country. Let us now turn to the fate of these birch woods. If we search carefully through the literature, through manuscripts and other data from the past, it is possible to collect many pieces of information and trace the history of the birch woods for different areas in Iceland. Many authors have collected such information, but most of them are of course written in Icelandic.

The woods are often mentioned in the old Icelandic Sagas, not just the statement of

Ari the learned, that the country was covered with woods from the mountains down to the beach. In general the information on woods in the sagas are rather convincing. They indicate large woods with tall trees in more continental sites like in Eyjafjörður and Fljótsdalshérað, where we expect favourable climate for woods. They also indicate low brushwood and thickets in more oceanic sites, where we can hardly expect tall trees for climatic reasons. There are some indications, that the western part of Húnavatnssýsla in north Iceland from Hrútafjörður east to Víðidalur was grown mainly with woodland of willows rather than birch, and that real birch woods were first found in Vatnsdalur and eastwards. This is probably because the mountains provide some shelter against the oceanic storms which severely affect the conditions in the flat heathlands of Western Húnavatnssýsla. Still today there are large gaps in the distribution maps of birch in this area, but the willow vegetation regenerates quickly if fences are erected to protect the land from grazing.

In *Heiðarvíga Saga* it is told that the Hvítársíða District in west Iceland was covered with woodlands. It tells about six men that were sitting on the hill above the forest, in order to see around the District. The mountainside above Hvítársíða is about 300–350 m, which indicates that the tree line was rather low there. This is to be expected, both from the landscape and also because the whole western part of the country has a very oceanic climate. In that area we find *Hrafnkelsstaðaheiði*, which is 300–400 m, also indicating woodless heathland.

THE FATE OF THE WOODS

At the beginning, the settlers had to cut or burn woods to provide space for farming. They also cut wood to use as support for buildings. Later on they also cut wood for use as fuel, and to make charcoal. Many accounts describe such activity in the Icelandic Sagas. Wood-cutting is mentioned so often,

that it seems clear that the farmers and their workers spent a considerable time on this activity. In *Víga-Glúms Saga* it is told that horses were used to pull the bundles of wood from Mjaðmárdalur down to Munkaþverá, north Iceland. In *Laxdæla Saga* it is told that Ólafur had the farm built from wood cut in the neighbourhood, but he also used some driftwood from the shore. His farm was big and impressive.

Sometimes when making charcoal, the fire escaped by accident, and the woods were burned down in large areas.

The Icelandic Sagas are written mainly in the 13th century, but they contain accounts on events happening long before, mostly in the 10th and 11th century. It is commonly indicated in the accounts, that the woods are not so extensive at the time of writing, as they were before. It appears therefore that a large part of the woods in densely populated areas had already been cut down in the 13th century.

The use of woodland went on throughout the middle ages. The people had to rely on wood for many purposes. We have historic records that show how the woods in many regions were first used up around the larger farms and churches. Later on these same farms obtained the right to use wood in neighbouring areas, and still later they had to transport it from other regions. Through these records it is possible to trace how the woods declined step by step in different areas until the last century. Many authors have collected such information on a regional basis.

The Eyjafjörður and Hörgárdalur regions in the north of Iceland were covered with extensive birch woods in the first centuries after the settlement. Around 1400 the woods had declined to such an extent that wood had to be transported from other regions. The district was densely populated, resulting in early depletion of woods around the larger farms, churches and cloisters. In Hörgárdalur, as an example, the woods were first used up on the western side of the valley. In the 15th

century all farms on the western side had obtained the right to use some woodlands on the eastern side. In the beginning of the 18th century, there were still some remnants of these woods left in Hörgárdalur.

One of the larger forests in Eyjafjörður, Möðruvallaskógur, and one of the few left at that time, was severely damaged in an ice storm in the winter 1607. The inhabitants tried to make the best use of these broken woods, which had been destroyed anyway. In 1752 trunks from this wood could still be seen in the buildings of Möðruvellir. Long before this happened, the woods of Eyjafjörður had declined to such a degree that wood had to be transported from other regions such as the western side of Fnjóskadalur.

In the relatively cold climate of the 17th and 18th century firewood, as well as peat and dung, was almost essential for survival in Iceland. After the birch woods were used up, people had to chop or tear up brushwoods from coastal areas, or from the tree line, and even shrubs of *Betula nana* were torn up and used for heating.

EFFECTS OF GRAZING

To my knowledge, no measures were taken to reforest cut-down woodlands. Actually it should not have been necessary, because wherever birches and willows are cut, new woodlands would have regenerated naturally within few decades, unless the land is used in another way like for hayfields, agriculture or grazing. The birch very quickly seeds itself into bare areas if seed-producing trees are in the neighbourhood. The willows are renewed even faster from shoots surviving in the ground. Unfortunately the Icelanders in the past made the decision to allow uncontrolled sheep grazing all over the country, instead of limiting the grazing to certain areas at a time, in order to maintain the vegetation.

Therefore the woodland could not renew itself in a normal way after being cut down.

Grazing also affected the mountainsides above the treeline. Willows were browsed by the sheep, and grassy slopes replaced the shrubby vegetations. Willows and other dwarf shrubs are very important for maintaining the soil in steep mountainsides. The vegetation change effected by grazing therefore caused the soil to slide down the slopes, and produce open scars that were open to wind erosion.

There is no doubt, that the activity of man is the primary cause for the declining woods and the resulting erosion in Iceland. Other factors often mentioned, such as cold climate and volcanic eruptions were only of secondary importance. They would never have caused this dramatic change without the activity of man.

REFERENCES

- Porgilsson**, Ari, 1067–1148. Íslendingabók; Landnámabók. In: *Íslensk fornrit 1*. Hið íslenska fornritafélag, Reykjavík, 1968.
- Ólafsson**, Eggert & Bjarni **Pálsson**, 1726–1768. *Ferðabók Eggerts Ólafssonar og Bjarna Pálssonar um ferðir þeirra á Íslandi árin 1752–1757*. 2. edn. Örn og Örlygur, Reykjavík, 1975.
- Skuggsjá, 1969. *Heiðarvíga Saga*. In: *Icelandic Sagas, Vol. II*.
- Skuggsjá, 1969. *Laxdæla Saga*. In: *Icelandic Sagas, Vol. III*.
- Skuggsjá, 1971. *Víga-Glúms Saga*. In: *Icelandic Sagas, Vol. VI*.
- Steindórsson**, Steindór, 1951. Skógar í Eyjafirði. Drög til sögu þeirra. *Ársrit Skógræktarfélags Íslands* 1950: 49–81.
- Steindórsson**, Steindór, 1990. *Heiði. Gróðurlendi – landslag – fjallvegir*. *Ársrit Skógræktarfélags Íslands* 1990: 19–24.

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