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Fishing Gear Used for River Lamprey *Lampetra fluviatilis* (L.) Catches

Documenting Rivers that Flow into the Baltic Sea

Part II, Finland, Latvia and Estonia

ABSTRACT The river lamprey (*Lampetra fluviatilis* (L.)) is an anadromous fish that has a growth phase in the sea, then migrates up rivers mainly during autumn for spawning next spring. It is during this spawning migration the lampreys are caught in rivers. Lamprey fishing has been documented in the Baltic Sea region at least since the fifteenth century, and some of the fishing gear used has remained largely unchanged for hundreds of years. In recent decades however, new material has replaced wood, although the design of the gear is still often the same as before. In this study lamprey rivers in Sweden, Finland, Latvia and Estonia were visited and the lamprey fishing gear was documented. There are differences in the use of fishing gear both within countries and among countries as regards gear type and the ways in which the fishermen use different fishing techniques to suit the conditions found in various rivers.

KEYWORDS river lamprey, *Lampetra fluviatilis* (L.), river lamprey fishing, fishing gear, Baltic Sea area

In Part I of this article (*Journal of Northern Studies*, volume 7, number 1), the lamprey fishing gear used in Sweden is described. This follow-up article is a continuation of descriptions of lamprey gear, but now the situation in Finland, Latvia and Estonia is treated. For references to Table 1, Fig. 1, and Fig. 2 in this article, and for background information, see Part I.

Finland

In Finland the river lampreys are traditionally fished for in the same type of rivers and habitats as in Sweden, that is, in rapids with stones and boulders. However fyke nets, which are common fishing gear today, are normally placed in calm water close to the mouth of a river. Nowadays most of the lampreys are caught in the rivers emptying into the Bothnian Bay (Aronsuu 2011*c*), that is, the northern part of the Gulf of Bothnia. The fishing in Finland is more efficient and economically important than in Sweden, but even there the catches of lampreys have decreased. In the early 1970s the numbers were about 2.7–3.0 million lampreys, corresponding to circa 130 tons (Tuunainen *et al*. 1980). Nowadays about 900,000 lampreys are caught annually (Aronsuu 2011*c*), that is, about 41 tons, and fishing is performed in at least 33 rivers (Lehtonen 2006). About 400 fishermen are involved; most of them catch lampreys for their own needs, or are semi-professional. Only a minority of them are professional, and lamprey is never the main target species (Aronsuu 2011*c*).

Fisheries in earlier times in Finland are described by Juvelius (1772), who wrote that lampreys were fished for with two types of gear, baskets and pots (in Swedish "Mjerdor eller så kallade kassar, och med tinor"), which were used in the River Nykarlebyälven/Lapuanjoki. The baskets were made of willow twigs or young shoots and put together with roots of Norway spruce. The funnel was made of the same material. In the narrow end of the basket where the twigs were put together, an access hole (Swedish *sprundhål*) was made where the lampreys were taken out, or an opening was left in the end of the basket, which was closed with a wooden tap. Around the opening of the basket the twigs were arranged as in a wreath, which made the basket more durable. The baskets were of different sizes to be able to fit among stones on the river bottom. They were either attached to a pole between two stones and pressed down to the bottom with stones, or attached to a "bridge." When attached to a bridge, the basket was equipped with a lifting-frame consisting of two poles with cross-pieces under and above the basket and one at the top of the poles, which keep them together. The basket is attached to the bridge with a strong string that is attached to the upper crosspiece of the lifting-frame.[7]

The pots made of boards were squared, wider in one end and narrower in the other end (making them pointed at that direction) and with small holes around. They were put together with spikes. Like the baskets, the pots were of different sizes. Such pots were also used for storing lampreys alive during the winter, when they were used as bait for burbot (*Lota lota*) fishing. The pots were also placed between stones in the river, with poles around. They were mostly used during the wintertime (Juvelius 1772). Quensel and Palmstruck (1806) described the lamprey fishing gear used in similar terms as Juvelius (1772) did.

In contrast to the situation in Sweden, baskets made of willow (e.g. Fig. 28) or juniper (e.g. Fig. 33) are still frequently used in Finland, while it seems that the gear of wooden boards are not used any longer (except for using them for storage in which lampreys could be kept alive for some time). Therefore they are not presented among the Finnish types of lamprey gear in this study. Experimental gear such as reconstructed milk cans, as described from the Swedish river Rickleån, is not used here. However, similar experiments with metallic cylinders are found in the River Tjöckån/Tiukanjoki (Fig. 1:25), and in both countries cylinders from washing machines are used for keeping lampreys alive for a while (e.g. Fig. 32; Fig. 33). In Torneälven/Tornionjoki a reconstructed milk can was noted as used for this purpose.

A basket of shoots or twigs of willow or juniper and their substitutes of other materials like plastic nets

These basket types can either be placed singly or together on the bottom of a rapid or attached to a weir (a *pata*). Sirelius (1906) describes that osier baskets equipped with a wreath around the mouth were used from the River Kemijoki in the north to the River Nykarlebyälven/Lapuanjoki in the Province of Ostrobothnia in the south. As mentioned, the basket gear (Fig. 2a) is still used in many of the northern Finnish lamprey rivers (although nowadays not always with the wreath) such as Simojoki, Kuivajoki, Kiiminkijoki, Siikajoki, Pyhäjoki, Kalajoki, Tjöckån/Tiukanjoki and Merikarvianjoki (number 15, 16, 18, 19, 20, 21, 25 and 26 in Fig. 1).

Back in 1978 willow baskets were frequently used also in the rivers Iijoki (Fig. 1:17; Fig. 29), Lestijoki (Fig. 1:22; Fig. 30) and Perhonjoki (Fig. 1:23), and bell-shaped baskets of juniper were still in use in the River Kokemäenjoki[8] (Fig. 1:27; Fig. 58; Fig. 59) (Sjöberg 1982). In all these rivers except the River Kokemäenjoki, the mouths of the baskets were squared and attached to lifting frames with cross-pieces above and below the basket, and with a third cross-piece that joined the pole-ends. The mouth of the basket at the River

Fig. 28. A basket type of gear, equipped with a mouth-wreath, with a wooden tap at the side which covers the exit in the top of the gear, where the lampreys are emptied. The gear is attached to a lifting frame. The River Simojoki, Northern Finland. 14 October 2010. Photo: Kjell Sjöberg.

Kokemäenjoki was round and attached to two poles without a connecting cross-piece below (Fig. 59). See also Storå (1978), who calls them shafts instead of a lifting frame. Lamprey fishing is still going on in the rivers Iijoki and Kokemäenjoki, but the use of fyke nets has now totally replaced the traditional fishing gear. In Lestijoki and Perhonjoki they still fish in the traditional way, but the material of the gear has changed from willow to lighter and more durable materials. This is clearly demonstrated in the River Lestijoki, where back in 1978 most of the gear used still was the willow basket type (Fig. 30), while in 2010 and 2011 none of that type were seen—at the same fishing site willow baskets were replaced by gear with plastic coated wire netting (Fig. 31; Fig. 32). In the River Perhonjoki the traditional gear has been replaced both with gear made of plastic netting and plastic coated wire netting (Aronsuu 2011*a*; Sjöberg 2011).

From Table 1 we can see that in many of the Finnish rivers the traditional basket type of gear constructed mainly of willow, but sometimes of juniper, has been replaced with more durable material. In Fig. 47 and Fig. 54

examples of river lamprey gear placed on *pator* are presented from the rivers Simojoki and Kalajoki. In the River Simojoki they are taken out of the water during the day for cleaning and drying, while in the River Kalajoki they are kept in the water during the day (even though the lampreys are catchable only during the night). The explanation is probably given by Valtonen (1980), who writes that the baskets made of willow shoots (*Salix* sp.) (and used in the River Simojoki) break down fairly quickly (in 3–5 years), while the baskets made of juniper (*Juniperus communis*), as in the River Kalajoki, can be used for many more years (Valtonen 1980).

However, baskets made of traditional material are still in use. In the River Simojoki (Fig. 1:15) the willow baskets look the same as they did back in 1978 (Fig. 28; Fig. 46; Fig. 47; Sjöberg 1982), and according to a picture from 1916 (Räsänen 1916: 50) either the gear or the weirs used seem to have changed. However, a few traps made of glass fibre instead of willow have been introduced (Fig. 35). In the River Kalajoki traditional baskets are also used (but here with juniper instead of willow) along with gear of plastic covered metal mesh in 2011 (Fig. 33).

How a willow basket is constructed is shown in detail from the River Nykarlebyälven/Lapuanjoki in Finland, where, however, the lamprey fishing has now ceased (Storå 1978; Storå 2008). The size of such a basket was 85

Fig. 29. Willow baskets from the River Iijoki back in 1978. Today, fyke nets of the type seen to the left have taken over. Photo: Kjell Sjöberg.

Fig. 30. Willow baskets attached to lifting frames in the River Lestijoki in 1978. On the other side of the river a lamprey trap of plastic-coated wire netting could be seen, which has outcompeted the willow baskets since then. They are about 130 centimetres long (Tuomi-Nikula 1986). Photo: Kjell Sjöberg.

Fig. 31. The same site in River Lestijoki as in Fig. 30, but in 2010. Willow baskets are not used any longer. They have been replaced with gear made of plastic-coated wire netting. Most are shown in fishing positions. 17 October 2010. Photo: Kjell Sjöberg.

Fig. 32. The traditional willow baskets in the River Lestijoki have been replaced with gear of different sizes made of metal mesh nets covered with plastic, but principally of the same shape as the old ones. Some traps are placed in fishing position along the edge of river, but because of temporary high water level most of them are left on the shore. To the right in the water a cylinder from a washing machine is seen, which is used as a corf (Swedish *fisksump*), that is. a temporary holding box for storing lampreys for some days. 29 September 2011. Photo: Kjell Sjöberg.

Fig. 33. In 2011, traditional basket gear made of juniper is still in use in the River Kalajoki, but nowadays probably more than 50 per cent of them have been replaced with gear made of plastic covered metal mesh[9] (but of traditional shape and still attached to lifting frames). Below the traps there is a cylinder from a washing machine. It is used to store lampreys alive. Such cylinders could be seen nowadays also in many other rivers, for example the River Torneälven/Tornionjoki, the River Simojoki and the River Lestijoki, where they are used for the same purpose. 1 October 2011. Photo: Kjell Sjöberg.

centimetres in length, the periphery in the middle of the basket was about 82 centimetres and the side of the squared opening was about 42 centimetres. As in Sweden the willow twigs or shoots were originally put together with thin roots of spruce or pine, but later on metal wires or some other more easily available and more manageable materials are used.

The shapes of the wooden baskets are to some extent different among rivers (see for example Fig. 28; Figs. 33–34), and the materials used for the traditional baskets are also different. In the northernmost rivers like Simojoki, Kuivajoki, and Kiiminkijoki, willow is still used, while in the Rivers Kalajoki, Merikarvianjoki and earlier also in Kokemäenjoki juniper is used. The way to empty the baskets also varies among different rivers. In Fig. 34 some examples are presented. The most common way is to empty it in the narrower end of the basket, like in the rivers Simojoki, Kuivajoki, Kiiminkijoki, and Kalajoki, where the baskets are closed by a wooden tap during fishing. In the River Tjöckån/Tiukanjoki not only the shape of the basket is different compared to rivers above, but also the opening, which is placed at the side of the basket (Fig. 34e). The flap over the opening is lacking in this picture, but is seen in a picture from the River Merikarvianjoki, where similar traditional gear is used (Fig. 34f).

Another type of a basket was used in the River Kokemäenjoki (Fig. 34g), a bell shaped basket. Here the opening was placed close to the opening of the basket, and no wooden lock was used (Figs. 34g–h; Fig. 59). Instead the opening was closed with grass/hay[10] during fishing activities (Sirelius 1906).

Although there still exists traditional wooden basket type gear in many of the Finnish rivers, it is evident that the wooden material is more and more being replaced by other, lighter and more durable materials. Even in the River Simojoki, where they still stick to the tradition with willow baskets and have decided that fyke nets should not be used, new material is employed, although so far on a small scale. In Fig. 35 for example, some traps of the same shape and material (glass fibre) as in the River Torneälven/Tornionjoki are used (Fig. 42). However, the glass-fibre traps used in the River Simojoki no doubt mimic the wooden lath gear in the River Torneälven/Tornionjoki, but at the River Kuivajoki further south, the glass fibre traps used there instead mimic the wooden basket of willow (Fig. 36). In this river the fishermen apparently test different materials on a larger scale. Fig. 37 demonstrates how gear of glass fibre and plastic mesh and traditional willow baskets are used simultaneously at different weirs. Sometimes there also appear combinations of materials, such as for example at the River Siikajoki, where the traditional willow baskets are repaired or improved with plastic mesh (Fig. 38).

There also exist more comprehensive changes both in materials and

Fig. 34. The lamprey traps are normally emptied through an opening in the end of the trap, which during the catching period is closed by a wooden plug. However, there is a variation among the rivers as regards this detail too. Here are some examples of the design from different Finnish rivers: a) Simojoki, b) Kuivajoki, c) Kiiminkijoki. The traps in these rivers are made of willow. d) Kalajoki. This trap is made of juniper. South of these rivers, there exists a basket type of trap which is emptied at the side, as at e) Tjöckån/Tiukanjoki, made of willow (according to the owner of the trap). The opening was closed with a wooden flap, which is lacking on this trap. The same type of gear, but of juniper, is still used also in f) the River Merikarvianjoki further south. g) and h) basket gear from the River Kokemäenjoki, also constructed by juniper branches. Such traps were in use at least up till 1978, but have now been abandoned in favour of fyke nets. Here the gear was emptied through an opening at the edge of the entrance to the gear. The opening was closed with hay or grass.[11] See also Fig. 59. Photos: Kjell Sjöberg.

models, such as in the River Kyrönjoki, where a cylindrical trap made of metallic mesh with plastic mesh at the top of the cylinder is used, but still equipped with a lifting frame and attached to a weir (Fig. 39; Fig. 55). Another example is from the River Tjöckån/Tiukanjoki, where metallic and metallic mesh cylinders without lifting frames are used (Fig. 40) along with traditional wooden traps (Fig. 34e).

Pots of wooden laths of spruce or pine

As already mentioned (see Part I) two types of gear were frequently used in the River Torneälven/Tornionjoki back in 1978; the basket gear made of willow, and the gear made of wooden laths (Fig. 2d; Fig. 19) (from the Swedish side of the river, see Sjöberg 1982 and Sjöberg 2011). In 2010 and 2011 not a single willow basket gear was seen, while the wooden lath gear was still abundant (Fig. 41). The wooden lath type was previously also used in the River Kemijoki (Aronsuu 2011*a*), situated about 20 kilometres south of the River Torneälven/Tornionjoki. However, similar to the development on the Swedish side of the river, this traditional gear type of the River Torneälven/Tornionjoki is being replaced with a trap similar in shape, but made of other materials, in this case glass fibre (Fig. 42). In 2011 the modified type constructed by glass fibre was also found in the River Simojoki, about 45 kilometres south of the River Tornionjoki (Fig. 35).

Fig. 35. A few pieces of gear made of glass fibre have been introduced among the traditional willow baskets at the River Simojoki. They are of the same type as those used at the River Torneälven/Tornionjoki (Fig. 42). 27 September 2011. Photo: Kjell Sjöberg.

Fig. 36. Lamprey traps constructed of glass fibre material. In contrast to the glass fibre traps in the River Torneälven/Tornionjoki, which mimic the wooden lath type of gear, these are clearly related to the willow basket type. Kuivajoki, 4 October 2012. Photo: Kjell Sjöberg.

Fig. 37. New material are tested and used for lamprey fishing. On the front weir, most of the gear are made of glass fibre, on the weir in the background to the right, traditional willow baskets are used, and to the left the gear are made of plastic-covered metal mesh. Kuivajoki, 4 October 2012. Photo: Kjell Sjöberg.

Fig. 38. In the River Siikajoki the traditional willow baskets are still used, but often supported or repaired with plastic mesh. 14 October 2010. Photo: Kjell Sjöberg.

Fig. 39. Lamprey trap of metalic and plastic mesh from the River Kyrönjoki, at Voitby. 29 October 2012. Photo: Kjell Sjöberg.

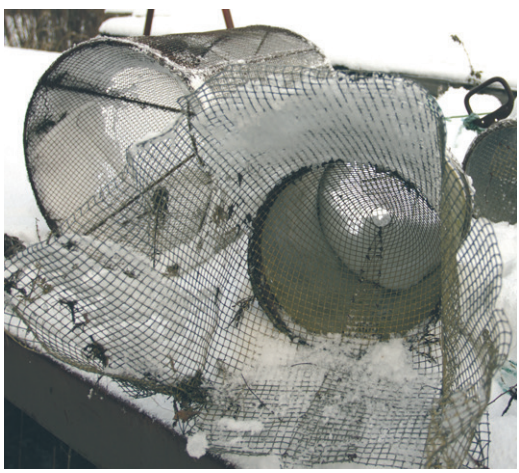

Fig. 40. Lamprey traps of metalic mesh and metal from the River Tjöckån/Tiukanjoki. 29 October 2012. Photo: Kjell Sjöberg.

Fig. 41. The traditional type of river lamprey fishing gear, constructed of wooden laths and attached to lifting-frames, is still in use in the River Torneälven/Tornionjoki. The Finnish side of the rapid Kukkolaforsen, 26 September 2011. Photo: Kjell Sjöberg.

Fig. 42. Lamprey gear of glass fibre at the Rapid Kukkolaforsen on the Finnish side of the River Torneälven/Tornionjoki. 26 September 2011. Photo: Kjell Sjöberg.

Fyke nets with wings

In Finland another type of lamprey fishing gear is also used, namely fyke nets (Fig. 2e). This kind of gear is a tightly woven long bag-shaped fishing net held open by hoops, and with wings which lead the lampreys into the gear (Fig. 43; Aronsuu 2011*a*; Sjöberg 2011). The collecting section is normally about 5–6 metres long and the wings are usually 25–35 metres long. They have five hoops and two funnels (Aronsuu 2011*a*). In contrast to baskets, stocks or wooden laths, which are placed in rapids or streaming waters, the fyke nets are placed in calmer water; they are normally placed in the sections between the river mouth and the first rapid (Aronsuu 2011*c*).

In Finland the first trials with fyke nets were performed in the River Kalajoki back in the 1940s. Then little changed until 1965, when the use of the fyke nets increased rapidly and by 1968, 52 fyke nets were used in the river. From Kalajoki the use of fyke nets spread to other rivers, first to the River Pyhäjoki, and in 1971 to the River Lestijoki, where during the autumn of 1974, 24 fyke nets were used (Tuomi-Nikula 1977; Tuomi-Nikula 1986; Tuikkala 1986). In 2010, 35 fyke nets were in use in Kalajoki and 78 per cent of the catch was caught by them (Aronsuu 2011*c*).

The use of weirs and lifting frames

In most of the Finnish lamprey rivers the fishing gear has been attached to weirs. Because of the introduction of the efficient fyke nets, the use of traditional gear and subsequently the use of weirs have decreased. It is clearly demonstrated in the Rivers Iijoki (Fig. 44) and Kokemäenjoki (Fig. 58), where back in 1978 the weirs were still in use, but at present they are totally exceeded by fyke nets. Compare also the situation in the River Kalajoki from 1978, where a view towards the church at Kalajoki shows a river with traditional gear and the situation in 2012 (Fig. 45), when many of the wooden gear and weirs have been replaced with fyke nets.

However, weirs still exist in many of the Finnish rivers, for example in the rivers Torneälven/Tornionjoki, Simojoki, Kuivajoki, Kiiminkijoki, Kalajoki, Perhonjoki and Kyrönjoki (Figs. 46–57). Their construction certainly depends upon the conditions like the river bed, the discharge rate, and the local economic importance of the lampreys. The local traditions are certainly also important. For example, the fishermen at the rivers Simojoki and Kiiminkijoki have decided to exclude fyke nets from lamprey fishing, because they want to keep the old traditional lamprey fishing, that is, with baskets attached to weirs, and also out of concern about overharvesting. Therefore, in the River Simojoki the weirs and most of the gear look the same now as in 1978 (Fig. 46; Fig. 47; Sjöberg 1982).

Fig. 43. A fyke net with wings in position in the River Lestijoki in Finland. 1 October 2011. Photo: Kjell Sjöberg.

Fig. 44. Traditional willow baskets at the River Iijoki back in 1978. Photo: Kjell Sjöberg.

Fig. 45a. The River Kalajoki back in 1978 showing many lamprey gear attached to weirs. Photo: Kjell Sjöberg.

Fig. 45b. The same view of the river, but in October 2012. Weirs are still used in the same area, but much of the lamprey fishing is now performed with fyke nets. Photo: Kjell Sjöberg.

The diversity of weir constructions is illustrated from the River Simojoki back in 1978 where at that time the weirs almost crossed the river completely (Fig. 46). Not all of them were in contact with the shore, and thus the word *strandpata* (a weir in contact with the shore, as described from the northern Swedish rivers), is not always relevant here. However, the construction is in principle the same as Ekman (1910) described as an *enryggig strandpata*, that is, with a row of trestles connected with stocks. Stones are placed on the weir to help withstand the pressure from the water. In Fig. 46

and 49, a fisherman is emptying the gear back in 1978. Many of the gear is still in fishing positions. The traps are normally emptied in the morning, dry during the day, and are put back into the water again in the evening.

Fig. 49 illustrate how gear could also be placed with just a few pieces together at small weirs, and even singly and not attached to a weir. In the foreground, two squared wooden construction can be seen at the shoreline and in the water. They are probably used as corfs where lampreys can be kept alive for some time (Swedish *fisksump*).

Fig. 46. Traditional lamprey baskets of willow attached to weirs. Many of the baskets to the left are still in fishing position, while those to the right have been taken up for drying during the day. The River Simojoki, Northern Finland 1978. Photo: Kjell Sjöberg.

Fig. 47. Traditional willow baskets equipped with lifting frames and attached to weirs are still used at the River Simojoki. 14 October 2010. Photo: Kjell Sjöberg.

Fig. 48. A *pata* at the River Kiiminkijoki where Timo Turunen is using fishing gear of traditional type constructed of willow, and with other fishing gear where the wooden material has been replaced with plastic-coated wire netting. 4 October 2012. Photo: Kjell Sjöberg.

The type of weir construction mentioned above is used today too (Fig. 47; Fig. 50). Similar weirs, *enryggiga strandpator*, could also be seen for example in the River Kuivajoki (Fig. 51; Fig. 52), as well as in the River Kiiminkijoki (Fig. 53).

As an example of diversity, also the weirs in the River Kalajoki are shown, in which the gear is attached to weirs constructed without trestles, but to poles driven into the substrate (Fig. 54).

The great variation in weir constructions in the rivers is further illustrated with a view of the River Kyrönjoki, where a weir with a more robust construction is needed in the rapid (Fig. 55).

There exist even larger and more complex weir constructions, for example in the large northern River Torneälven/Tornionjoki (Fig. 56), with an annual mean discharge of 315 m^3/sec. (Tockner *et al*. (eds.) 2009). Another complex type of construction is demonstrated in the River Kokemäenjoki (annual mean discharge of 230 m^3/sec., Kaipainen *et al*. 2007) where until about 1980 a big weir built for lamprey fishing was present at Nakkila (Fig. 58). To construct such a weir, a team of workers was needed. In the similar weir at the Ruskula village, a team of five workers did the job. The last time that weir was in use was about 1980. One reason was that it was difficult to find the right material, for example the long stocks needed to connect the different parts of the weir, but the main reason seems to be that in the end it was also difficult to hire people to do the construction work.[12]

In contrast to the situation in Sweden, in most Finnish rivers the fishing gear is attached to lifting frames, and in most rivers the gear has been at-

Fig. 49. Traditional willow baskets equipped with lifting frames and attached to weirs at the River Simojoki back in 1978. Note the boxes of wooden boards in the foreground, which probably were used for holding lampreys alive for a period of time. Photo: Kjell Sjöberg.

Fig. 50. There is a great variation in construction of the weirs. In the River Simojoki, the weir is constructed of two-legged trestles that are tied together with boards and poles, and with stones to help the construction to withstand the force of the water. 27 September 2011. Photo: Kjell Sjöberg.

Fig. 51. A weir of a single row of trestles with traps constructed of glass fibre material. Kuivajoki, 4 October 2012. Photo: Kjell Sjöberg.

Fig. 52. Another weir of a single row of trestles with traps mostly constructed of glass fibre material. Kuivajoki, 4 October 2012. Photo: Kjell Sjöberg.

Fig. 53. A more robust weir construction, like here at River Kiiminkijoki, makes it easier for the fishermen to handle the gear. 4 October 2012. Photo: Kjell Sjöberg.

Fig. 54. Basket gear from the River Kalajoki in Finland in 1978. These baskets are made of juniper, which is much more durable than willow, and that is probably the reason why they are left in the water during the day as well. This reduces the work of raising and lowering the traps, although it takes more time to clean the traps when they are emptied. They are about 70 centimetres long (Tuomi-Nikula 1986). Photo: Kjell Sjöberg.

tached to weirs of fairly advanced constructions. However, there are exceptions, for example in the River Lestijoki, where the gear is set out between stones or at prepared gates cleared of stones in front of the gear, and with support from just a pole or a wooden board (Fig. 30; Fig. 31). Similarly, for example in the big rivers with fast streaming sections of water, such as in the Kukkola rapid at the River Torneälven/Tornionjoki, it is also possible to find spots where single gear, or a few pieces together, could be placed only with support of a wooden board or pole, as in Fig. 57.

In most of the studied rivers, the openings of the gear are adjusted to a squared lifting frame with cross-section connections below and above the opening of the gear, and also with a cross-section connecting the end of the frame, as demonstrated for example in the River Simojoki (Fig. 47). The end of the frame could also be put together without a cross-section, such as in Fig. 44, from the Iijoki. A different shape of the lifting frame is demonstrated from the River Kokemäenjoki, where the opening of the gear is round, and two shafts are attached to the gear (Fig. 58; Fig. 59).

However, there are also rivers were the gear is not equipped with lifting frames and is not attached to a weir, for example the rivers Tjöckån/Tiukanjoki and Merikarvianjoki. Here the traditional traps are placed individually in the river and can be kept in place by poles and weighted down by stones to keep them in place.

Fig. 55. A weir in River Kyrönjoki with fishing gear formed as a cylinder with a metallic net and the front of plastic net. A wooden tap covers the opening in the trap where the lampreys are emptied. The River Kyrönjoki at Voitby, 29 October 2012. Photo: Kjell Sjöberg.

Fig. 56. In big rivers, like here in the River Torneälven/Tornionjoki, quite complex wooden constructions are made and the fishing gear is attached to them. The Finnish side of the River Torneälven/Tornionjoki, at the Rapid Kukkolaforsen, 26 September 2011. Photo: Kjell Sjöberg.

Fig. 57. In the big rivers too, it is possible to find stretches with calmer water flow where the gear could be attached to more simple *pata* constructions, where the gear is placed just a few together or one by one. The Finnish side of the River Torneälven/Tornionjoki, at the Rapid Kukkolaforsen, 26 September 2011. Photo: Kjell Sjöberg.

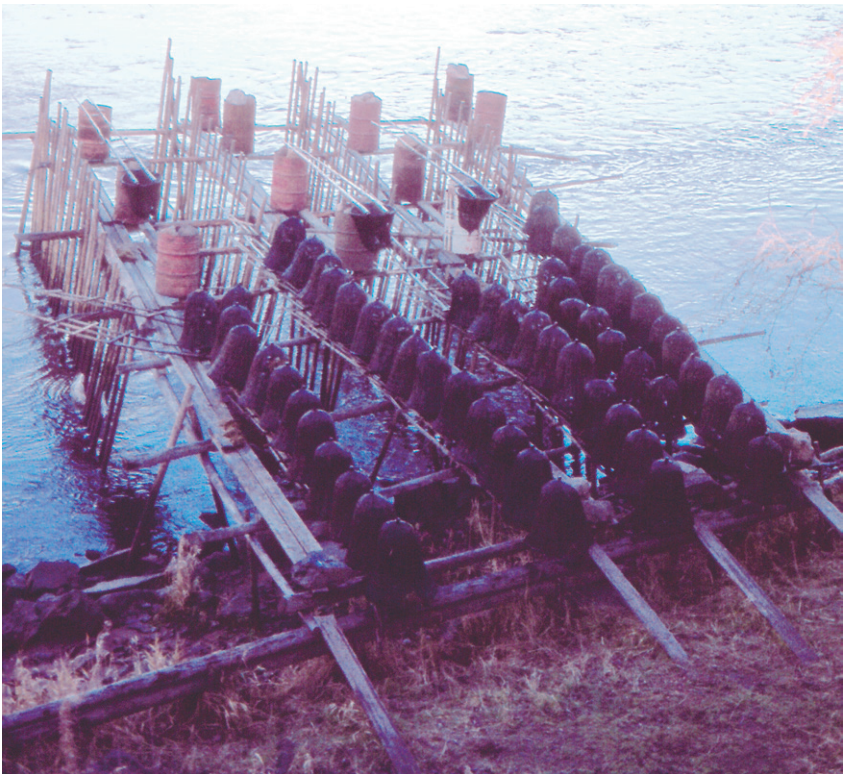

Fig. 58. A *pata* from Nikkala at River Kokemäenjoki back in 1978, with bell-shaped baskets similar to the type of gear used earlier in the rivers Salaca, Gauja and Gaudava in Latvia. Photo: Kjell Sjöberg.

Fig. 59. A basket trap from the Nakkila at the River Kokemäenjoki where this gear type was in use up to about 1980, but today has been replaced with fyke nets. This basket is very similar in shape to traps used earlier in the rivers Salaca, Gauja and Gaudava in Latvia (and attached to weirs). Here the opening of this bell-shaped gear is round, and not adjusted to a squared lifting frame as in many northern Finnish rivers. Note the opening at the edge of the entrance, where the lampreys are taken out (see also Fig. 58). Nakkila, 1978. Photo: Kjell Sjöberg.

Latvia

During the 2000s the mean catches of river lampreys in Latvia were 99 tons (Riekstiņš *et al*. (eds.) 2010), but in the period from 1960 to 1975, the overall catch even reached 400 tons (Birzaks & Abersons 2011). The river lamprey fishing is performed by enterprises on a commercial basis. No private fishing for lampreys is allowed. The number of professional lamprey fishermen is about 50–100.[13] Licences are issued by the Fishery Department of Latvia based on historical experiences gained from practising fishermen. The amount of fishing gear is also decided by the department. Then the responsibility for the fishing is delegated to the municipalities at the river, and fishermen can apply for a license to the municipality. A licence can then cover a period of for example 15 years. In 2011, 17 rivers were open for lamprey fishing. Licenses are issued for three types of lamprey fishing gear: traps with nets attached to lifting frames, fyke nets and tightly woven ordinary nets. Earlier basket types of traps were also used, as well as a combination of basket and net. Although not used today, they are described in this overview of Latvian lamprey traps types because the combined trap type is not described from Fennoscandian rivers.

Baskets of willow and their substitutes of other materials

In Latvia baskets made of willow were used in the River Daugava until about 1975, when a hydroelectric dam was built (Fig. 60; Fig. 61; Fig. 61, Fig. 77 and Fig. 80 in Cimermanis 1998). At Dole Island in the River Daugava at Riga willow baskets were attached to weirs placed at a depth of about 1.5 metres. Just below that site the depth increased to 4 metres, and with even deeper water further to the mouth. The opening of the basket was directed towards the mouth of the river. Closest to the shore a plaited construction was placed for the purpose of preventing lampreys from passing at shallow water[14] (Fig. 77 in Cimermanis 1998). A similar gear type was in use in the River Salaca in the eastern part of Latvia until approximately 50 years ago (Fig. 62; Fig. 63). In the River Gauja this gear type was also used (see Fig. 10 and Fig. 11 in Willer 1929). In all three rivers, the gear was attached to weirs (a *tača* in Latvian; lamprey weir is *nēģu tača*). At Dole Island in the River Daugava also baskets without lifting frames were used in older times (Fig. 61 in Cimermanis 1998).

A basket combined with a net

In 1992 gear constructed as a combination of a wooden basket of willow attached to a net was still in use in the River Salaca (Fig. 2g; Fig. 64). The gear was equipped with lifting frames and attached to a weir (Fig. 65; Fig. 66; see also Fig. 8 in Cimermanis 1998). Both the gear type and the weir are

unique in themselves, separately, and together represent something even more noteworthy, not being found in Sweden, Finland or Estonia. The reason is both that the gear is turned in the opposite direction compared to other gear attached to weirs, and the weirs are constructed in such a way that wooden barriers deliberately prevent the upstream migration of the lampreys. The wooden barrier also increases the water level on the upstream side of the barrier by blocking the water. There are, however, openings in the barrier where the water can pass. Below such openings the gear is placed. When a lamprey reaches the barrier, it swims sideways. When they reach the water flow from an opening in the barrier, they are flushed by the force of the water back into the gear with the mouth in upstream direction (Figs. 66–69). This trap type was in use in the River Salaca until about 12–15 years ago, when they were successively replaced by net traps only.[15]

Net gear attached to a lifting frame

The gear constructed as a combination of a basket and a net has been replaced with gear made of net only, that is, without the wooden basket, but still equipped with a lifting frame and attached to a weir (Fig. 2h; Fig. 70; Fig. 71), and otherwise used in the same way.

However, net traps with other designs are also used and they differed in size not only among rivers, but also between weirs in the River Salaca. In the first weir, the net gear used in 2010 and 2011 was the same as the gear used back in 1992 (Fig. 72). However, since then a much larger net trap has also been developed as a complement (Fig. 73). The reason why this larger gear has been developed is that the fishermen have noticed that during periods with relatively warm water in the river the upstream migrating lampreys are swimming closer to the surface compared to when the water is cold.[16] In combination with the net traps of ordinary size, lampreys could be caught at all water depths. However, to be able to empty the large traps, it is necessary to use a boat, and thus they cause more work. In total 148 traps of these types were allowed to be used in 3 rivers in 2011 (according to government rules on commercial fishing in inland waters).

A similar arrangement with barrier and the opening of the gear turned against the water flow, although in smaller scale and with net gear without lifting frames, is found in the River Venta at Kuldīga (Fig. 74).

In older times baskets were possibly used in the same way at rapids in the River Venta, like here at Kuldīga (Fig. 75). Baskets were placed under the falling water and fish trying to pass up against the water in the rapid were forced back by the water flow and into the basket gear with the mouth of the gear facing the water flow.[17] At Kuldīga seven fishermen were earlier allowed to catch salmon, vimba and river lamprey according to Cimermanis

Fig. 60. A demonstration weir with baskets made of willow shoots built at the Daugava Museum in Riga, Latvia, in 1992, showing how the baskets would look on the river bottom. The water flow would be from left to right. This type of weir and basket was in use in the River Daugava until about 1975, when a hydroelectric power plant dam was built. Photo: Kjell Sjöberg.

Fig. 61. Detail of the willow basket attached to the weir in Fig 60. The end of the basket is closed with a wooden plug. The Daugava Museum, 9 November 2011. Photo: Kjell Sjöberg.

Fig. 62. Bell shaped baskets of willow were earlier used in the River Salaca. The basket is closed with a wooden plug at the end. 15 November 2010. Photo: Kjell Sjöberg.

Fig. 63. A type of basket gear that was used in the River Salaca until about 50 years ago is shown here in the Museum of Salacgrīva. It has the same shape as the trap from the River Kokemäenjoki in Finland (Fig. 59). However, it is emptied at the end of the narrower end of the trap, not close to the entrance as in the River Kokemäenjoki. 8 November 2011. Photo: Kjell Sjöberg.

Fig. 64. Gear construced as a combination of baskets and mesh. The gear is emptied in the end of the trap, which during fishing position is closed with a wooden tap. Although the water flow was pressing against the wooden trap from inside, the tap was only very rarely flushed out of the gear, so there was no specific arrangement for keeping the tap in place.[18] The River Salaca 1992. Photo: Kjell Sjöberg.

(1998), and he has also described another old fishing method from River Venta, where bunches of twigs distributed across the river could attract migrating lampreys (Fig. 21 in Cimermanis 1998).

Fyke net without wings

Fyke nets are used in Latvia too, but in contrast to Finland the Latvian nets lack the wings that lead the lampreys into the gear (Fig. 2i). In Fig. 76 and Fig. 77 fyke nets from the River Gauja and the River Užava are demonstrated. They are often larger and with more hoops than the Finnish ones. However, in the River Daugava a shorter version with just three hoops is used. These fyke nets are set together at 8–11 metres depth. Eight to twelve nets are fixed along a 140–160 metres long rope with two large anchors at each end of the rope.[19] In total 430 net traps were allowed to be used by professional lamprey fishermen in 13 Latvian rivers in 2011 (according to government rules on commercial fishing in inland waters).

Small-mesh fish nets

Latvia also differs from both Sweden and Finland by using ordinary fish nets for lamprey fishing, apparently modified by using more tightly woven mesh (Fig. 2j). In total 31 such lamprey nets were allowed to be used by pro-

Fig. 65. In weir number 2 from the mouth of the River Salaca, baskets combined with mesh connected to lifting frames were still in use back in 1992. At the building in the background Arnis Rozenšteins is checking the weir. Photo: Kjell Sjöberg.

Fig. 66. Baskets made of willow combined with mesh, attached to lifting frames and placed in a row along a weir, but during daytime they are taken up for drying. The River Salaca in Eastern Latvia in 1992. Photo: Kjell Sjöberg.

Fig. 67. The same type of gear as in Fig. 66, but here in fishing position attached to the weir. The openings of the gear are towards the water flow. The River Salaca in Latvia, 1992. Photo: Kjell Sjöberg.

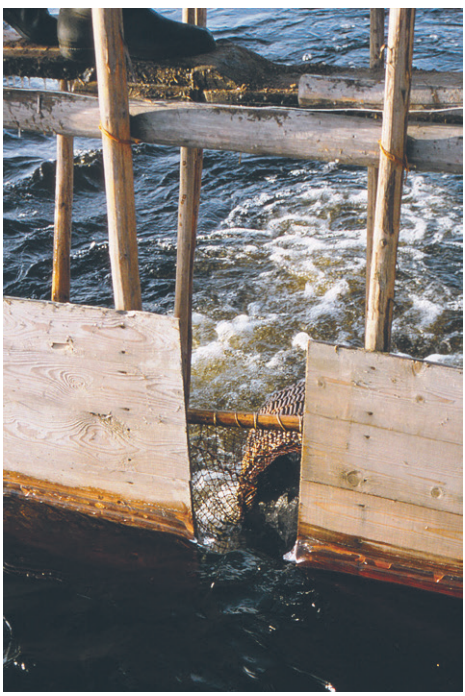

Fig. 68. A wooden barrier increases the water level against the weir. A gap in the barrier causes the water to stream into the gear and this catches the lampreys swimming upstream during their spawning migration in the river, and forces them into the gear. The River Salaca in Latvia,1992. Photo: Kjell Sjöberg.

Fig. 69. River lamprey fisherman Linde is emptying the gear attached to the second weir from the river mouth in the River Salaca in 1992. In contrast to most of the lifting frames in Finland, here they do not have a cross-piece connecting the two poles on top. The lampreys were collected and transported in a traditional box of wood back in 1992. Nowadays the box is made of aluminium. Photo: Kjell Sjöberg.

fessional lamprey fishermen in the rivers Daugava and Saka in 2011 (according to government rules on commercial fishing in inland waters).

The use of weirs and lifting frames

In the River Salaca in Eastern Latvia they still build three weirs for lamprey fishing each year, but previously there were 13.[20] A similar type of weir is also constructed in the smaller River Svêtupe (Fig. 82; Fig. 83). They cover the whole width of the river (e.g. Figs. 78–80; Fig. 82; Fig. 94), but the fishermen have to keep one third of the water free from traps. The foundations of the weir are two rows of poles of spruce driven into the bottom of the river with heavy sledges. The poles are connected to each other with horizontal poles, and crossbars connect the two lines of poles. On those crossbars gangways are placed (e.g. Fig. 73; Fig. 84). The gear can now be placed in two different ways, as described earlier, with the openings facing either downstream or upstream. In the first case the gear is placed on the upstream side of the weir (Figs. 72–73). In the second case wooden boards (Fig. 81) are attached to the weir which creates a barrier that increases the water level on the upstream side (Figs. 79–80; Figs. 82–83). There are a series of gaps in these boards, and the lamprey gear is placed on the downstream side of the barrier at these

Fig. 70. This trap type is used in the same way as the combined gear of basket and mesh used earlier (e.g. Fig. 64). The gear is emptied through the mouth by turning it upside down. This is possible because the funnel inside the gear is tied just to the base of the gear. Inside the gear it is held in place and stretched by the water flowing into it. 7 November 2011. Photo: Kjell Sjöberg.

Fig. 71. A close-up of the third weir in the River Salaca with sections of barriers. Note that this barrier has raised the water level at the upstream side to the left. 7 November 2011. Photo: Kjell Sjöberg.

Fig. 72. Maris Klêtnieks demonstrates the fishing gear used for river lampreys in the weir closest to the mouth of the River Salaca. This gear type in attached to the weir with the openings directed towards the mouth of the river. Inside the gear is a funnel that prevents the lampreys from escaping, but as the gear is directed with the end towards the direction of the water stream, the funnel is attached to the end of the gear with four strings that keep it in place. The gear is emptied from the end by loosening the string that keeps it closed. 15 November 2010. Photo: Kjell Sjöberg.

Fig. 73. A weir in the River Salaca, the first one, approximately 800 metres from the river mouth. In the first section the gear is set in fishing position, in the second section the gear is drying, and in the background a larger type of net trap is placed in fishing position. The larger gear is equipped with two funnels each. All the gear are placed with the openings towards the mouth of the river. 6 November 2011. Photo: Kjell Sjöberg.

gaps (Fig. 65; Fig. 68; Fig. 82). When a lamprey swimming upstream meets the wooden barrier, it tries to swim sideways. Then it meets the powerful water flow coming through this gap and is swept into the trap which has its

Fig. 74. Lamprey fishing in the River Venta at Kuldīga. At the shore a small-scale arrangement of a weir with openings is shown. The gear are placed with the openings facing the water flow. 16 November 2010. Photo: Kjell Sjöberg.

Fig. 75. At waterfalls like this in the River Venta at Kuldīga, baskets were earlier placed under the waterfall with the mouth of the gear facing the water flow, catching salmon and vimba that were pressed back into the gear by the strong water flow. Under such waterfalls, lamprey baskets could also be placed.[21] 16 November 2010. Photo: Kjell Sjöberg.

opening upstream (that is with its opening facing in the opposite direction from most other fishing methods which are designed to catch lampreys as they migrate upstream in the autumn).

Actually, depending on the water level situation in the river, the fishermen at the weir number 2 at the River Salaca can decide in which position they turn the gear. At low water levels and with slow flows (as can happen in the beginning of the season), the barrier is sometimes taken away, and traps are attached to the weir with the openings downstream. However, this requires much preparation work because the riverbed has to be smoothed out so the traps can be tightened to the bottom. The riverbed is overgrown with aquatic plants that have to be removed to be able to see smaller or bigger pits caused by the spring flood. Then small to medium sized stones are collected and wrapped into nylon nets, and those stone packages are placed in such pits. Otherwise there is a risk that the lampreys can pass under the traps. However, this work is seldom economically worthwhile, but is nevertheless done sometimes to avoid the risk of losing the opportunity for a good catch.[22] But normally the method with the barrier is a more efficient method at the weir number 2. The gear used when turned with the mouth in upstream direction (Fig. 70) has a funnel inside which is not attached to the end of the trap. It is kept in shape by the water flow running through the trap. For that reason the lampreys caught in the trap can be emptied by

Fig. 76. A fyke net without wings of the type used in the River Gauja (here shown on land at the town of Carnikava). About 100 pieces of this type of lamprey gear are used in the River Gauja. 9 November 2011. Photo: Kjell Sjöberg.

Fig. 77. Large fyke nets used for catches of river lamprey in the River Užava in Western Latvia. After emptying the nets in the morning, they are lifted during the day for drying. Normunds Lode is cleaning the nets. 17 November 2010. Photo: Kjell Sjöberg.

turning the trap upside down. The traps used when turned with the mouths towards the mouth of the river, that is, in downstream direction, are similar in construction to those at the weir number 1, but they are smaller in size, due to the depth and width of the river at the place. The funnel in such a trap is tied to the end of the trap with 4 strings to keep it in the right position. For that reason those traps have to be emptied through the end of the trap by loosening the string that keeps the trap end closed (Fig. 72).

At the weir number 1 (e.g. Fig. 95) just the method with the traps turned towards the mouth of the river is used (Fig. 73). The reasons are that the river is too wide there for making a barrier, the water flow is too weak for a successful result, and particularly one side of the river is very shallow, which makes it impossible to raise the water and increase the water flow.[23]

The fishing methods demonstrated at the weirs number 1 and 2 at short distance from each other at the River Salaca are good examples of how the lamprey fishermen adjust their methods to the morphological and ecological conditions in a river, as well as to the ecology of the river lamprey.

The work with constructions of the weirs starts in mid-May. The fishing season begins in mid-August and can last until 31 January, even when ice covers the river.

The fishing gear equipped with lifting frames and attached to weirs normally has cross-pieces below and above the gear, but not always at the end of the lifting frame (e.g. Fig. 69; Fig. 73). However, sometimes the two poles in the lifting frames are tied together at their ends.

Estonia

River lampreys migrate up almost all the Estonian rivers which empty into the Baltic Sea and according to Saat *et al.* (2003) about 40 of them are main spawning streams. In many of these fishing for river lampreys still occurs.[24]

There are about 200 active lamprey fishermen in the country, and they get licenses for fishing for two types of traps: cone traps (see Fig. 2k) (18,300 licenses for 2013), and lamprey fyke nets (81 licenses for 2013).[25] The state owns the fishing rights and the Ministry of Environment decides the number of licenses. The total yearly catches of lampreys have decreased over the last 60–70 years. During the period 1928–1938 the mean catch was 67 tons (Saat *et al.* 2003). At present the catches are about 50 tons per year, and 17 tons of these are caught in the River Narva (calculation based on about 15–17 lampreys per kilo in the River Narva).

Cone traps attached along a stick or a line

In Estonia cones of plastic or similar sheets (Fig. 2k) attached along a rope are used for lamprey fishing. The fishing method is described from the River Narva by Püttsepp and Järv (2010):

> The cones were earlier made of spruce bark, while cones of birch bark, thin pine planks and also of varnish-impregnated cardboard were used in the 1930ies. Sixty cones were tied to a "spine cord" (*seljanöör*), making up a cone line (*rait*).

Nowadays the same type of cones is used in the same manner, but they are mainly constructed of plastic material. In the small River Toolse (Fig. 1:35), Meelis Tambets demonstrated how the cones were attached to a pole with short ropes (Figs. 85–86) and the pole and cones were placed on the bottom of the river and kept in place by two poles driven into the river bottom.

In the River Narva (mean discharge 400 m^3/sec., Tockner *et al.* (eds.) 2009) along the Russian border, the biggest river in Estonia, the lamprey fisherman Heinard Kiik showed how his cone was used there (Figs. 87–91). Along a rope 50 cones were attached with strings at a distance of less than one metre apart. The rope was pushed down to the bottom of the river with anchors and weights of bricks. There is an anchor in one end (towards the middle of the river); on the bankside end ropes are fixed to another rope which is parallel to the river bank (anchored in both ends). The fishing season lasts from July till the end of February, and the season is closed between 1 March and 30 June for the whole of Estonia, in accordance with the Estonian fishing rules.[26] In the River Narva 15,000 lamprey cones are allowed (Püttsepp & Järv 2010). The same type of cone gear is also used in the River Pärnu (Fig. 92).

Fyke nets

Besides the cone traps, a kind of fyke net trap is also allowed for lamprey fishing in accordance with the Estonian fishing rules. They are officially

Fig. 78. The same weir as in Fig. 65, but from the other side, where the water is partially stopped by a wooden barrier with openings. The gear are placed on the other side of the weir. The River Salaca in 1992. Photo: Kjell Sjöberg.

Fig. 79. The same gear in the River Salaca as in Figs. 65 and 78, but in 2011, when the combined basket/mesh gear has been replaced with gear by mesh only. 7 November 2011. Photo: Kjell Sjöberg.

Fig. 80. The second and third weirs in the River Salaca are placed in sections of the river with faster water. Here the mesh gear has the openings facing the water flow, but catches upstream migrating lampreys. 7 November 2011. Photo: Kjell Sjöberg.

Fig. 81. Details of wooden sections of the type that built up the kind of barrier seen in Figs. 79 and 80. The River Salaca, 7 November 2011. Photo: Kjell Sjöberg.

Fig. 82. Weir in the River Svêtupe in Eastern Latvia in 2010 where the water stream is partially blocked by a wooden barrier that increases the water level. Gear is placed on this side of the weir with the mouth facing upstream. 16 November 2010. Photo: Kjell Sjöberg.

Fig. 83. The same weir as in Fig. 82, but in 2011 with lower water levels. The construction of the wooden barrier can be clearly seen, as well as the opening in the barrier where mesh gear with a lifting frame is placed on the other side of the barrier. 8 November 2011. Photo: Kjell Sjöberg.

Fig. 84. Detail of the weir in Fig. 83 showing the robust construction including cross-bracing needed to withstand the force of the water. 16 November 2010. Photo: Kjell Sjöberg.

called lamprey fyke nets (Estonian *silmumõrd*). By definition given in the fishing rules it is a trap with the height of the mouth up to 0.5 metres and with a width of the mouth up to 1 metre, and with no leading wings.[27]

Weirs and lifting frames

Püttsepp and Järv (2010) describe former fishing from two-legged weir trestles, where "wicker traps" were placed with their mouths directed towards the sea, between Narva Waterfall and the wooden bridge of Narva, where the current was particularly fast. Those traps were set in the afternoon and harvested at sunrise (Püttsepp & Järv 2010). However, a hydroelectric power plant dam has now destroyed the conditions for that type of fishing. No weir trestles are used for lamprey fishing in Estonia today.[28]

Discussion

As shown above, there is surprisingly great variation in the construction and use of river lamprey gear around the Baltic Sea. To some extent the variation is certainly dependent on the physical condition in the rivers, for example the size of the rivers, water velocity, and differences in bottom substrate. However, economic pressures and local traditions in different regions and in the different countries are clearly also involved, as are the fishing regulations issued by authorities. Otherwise there would not be such sharp differences in trapping methods when a border is crossed.

The physical conditions of many of the lamprey rivers emptying into the Baltic Sea area have been heavily influenced by the construction of hydroelectric power plant dams during the twentieth century. However, before that the rivers must have been largely unchanged. It is thus perhaps no surprise that the fishing gear used has evolved to be very well adjusted to local conditions.

To some extent the same type of gear is used today that is documented at least back to the fifteenth century (Nordberg 1977; Storå 1978). The gear used for the lamprey fishing in the River Umeälven in the middle of the sixteenth century was called wooden logs (Swedish *nättingstockar*). Back in 1732 Linnæus (Linnæus 2003 [1732]) noted two types of lamprey traps when he visited Kalix in Northern Sweden, a basket made of willow shoots, and a tree trunk, hollowed out and put together again. The fact that these types of gear were still in use in northern Swedish rivers until recent decades demonstrates how well they were adjusted to the situation in those rivers. In the River Gideälven, for example, the tree trunk traps were used till the middle of the last century and the willow basket type was used till the end of the last century in Sweden and is still used in many of the Finnish rivers

Fig. 85. Meelis Tambets is collecing cone gear for harvesting river lampreys in the River Toolse in Estonia. The cones are tied along a stick and placed on the bottom of the river in a section with gravelly/stony bottom. 7 November 2012. Photo: Kjell Sjöberg.

Fig. 86. The traps are emptied at the small end of the cone, which during fishing is closed by a plug. 7 November 2012. Photo: Kjell Sjöberg.

(Table 1). It is reasonable to assume that the present-day logs constructed of wooden boards, still used in the rivers Öreälven, Rickleån and Åbyälven in Sweden, are a substitute for the hollowed out stocks. They are used in the same way as the original hollowed out stocks.

In Northern Sweden and Finland the traditional fishing sites for lampreys are in rapids or sections with fairly fast-flowing waters and the fishing gear was developed to work in rivers with different water regimes (cf. Storå 1978; Tuomio-Nikula 1986). In the mid-sized rivers like Rickleån and Öreälven for example (mean annual discharge 16 and 35 m^3/sec., respectively; *Norrländsk uppslagsbok* 1996), the rapids are covered with stones and boulders on the bottom. Figs. 10 and 93 demonstrate how the traditional gear is placed between stones in rapids where the water level is so low that the fishermen can reach most of the rapid by wading out in the stream with waders. Gear of different sizes can be placed one by one (parallel if possible) among the stones, which are also used to lead the lampreys into the trap by filling the gaps between the traps and stones with for example spruce or alder twigs to prevent them from passing through these gaps. Part of the bottom could also be cleared of stones or arranged so that the lampreys were led towards

Fig. 87. Heinard Kiik demonstrated his lamprey fishing method in the River Narva and also the grill for lampreys in the oven behind him. Alder is used as firewood. 7 November 2012. Photo: Kjell Sjöberg.

Fig. 88. Cone-shaped gear of plastic on the River Narva in Eastern Estonia, belonging to lamprey fisherman Heinard Kiik. 7 November 2012. Photo: Kjell Sjöberg.

Fig. 89. Cone gear at the River Narva, Estonia. About 50 cones are attached less than one metre apart from each other along a rope. 7 November 2012. Photo: Kjell Sjöberg.

Fig. 90. The cones are attached to the rope, and they are emptied in the end of the cone, which during catching time is closed by a wooden plug. The cones are approximately 30 centimetres in diameter at the mouth and mostly about 60 centimetres long. 7 November 2012. Photo: Kjell Sjöberg.

Fig. 91. Fisherman Heinard Kiik emptying his plastic cone lamprey gear in the River Narva, the biggest river in Estonia, and the most important river for lamprey fishing in the country. The boat moves to the left, and after emptying each cone into a bag, it is allowed to fall back into the river on the right side of the boat. The flow of water is towards the camera. The rope and gear are weighted down to the bottom of the river with bricks. The gear is emptied during daytime. 7 November 2012. Photo: Kjell Sjöberg.

Fig. 92. River lamprey gear of plastic material is also used in the River Pärnu in Western Estonia. 6 November 2011. Photo: Kjell Sjöberg.

the traps when swimming upstream during migrating. In Finland this is described in detail by Storå (1978; 2008) from the former lamprey fishing in the River Nykarlebyälven/Lapuanjoki, and it can clearly be seen even today at the River Lestijoki (Figs. 30–31).

Naturally, the size of the river ought to be a factor in the development of fishing gear. However, for example in the big rivers Torneälven/Tornionjoki, Umeälven and Dalälven in Sweden (mean discharges of 315, 431 and 397 m^3/sec. respectively; Tockner *et al*. (eds.) 2009), the same methods were used as in smaller rivers, that is, the lampreys were caught in the rapids. This is still done in the River Torneälven/Tornionjoki, where until recently the traditional fishing gear of willow was used, that is, the same as for example in the River Lestijoki in central Ostrobothnia with a mean discharge of 11.5 m^3/sec. (Valtonen & Niemi 1979). This was possible because in the bigger rivers, the gear was attached to weirs of different constructions, which

made it possible for the fishermen to reach further out in the river from the shore than would otherwise have been possible. Also, the river lamprey is a fairly weak swimmer and probably avoids the part of the rapids with the strongest water flow. Thus, to some extent the same type of gear could be used independent of the river size.

However, when comparing Figs. 30–31 and Fig. 93 from Northern Finland and Sweden with Fig. 91 from the River Narva in Estonia and Fig. 94 from the River Salaca in Latvia, it is obvious that the fishing gear also has to be adjusted to the physical conditions of the river in the region in a more structural way. In the River Salaca in Latvia (Fig. 94) the mean discharge is 33 m^3/sec. (Birzaks 2011), and the mean depth 0.7–2.7 metres, with stony and stony-sandy as the main bottom habitat types (Grinberga & Spriņģe 2008). The River Narva in Estonia is generally 300–400 metres wide, with a mean average discharge of approximately 400 m^3/sec. The average depth of the river is four to six metres. Under such conditions it is not possible for lamprey fishermen to see the bottom and thus it is difficult to get individual traps to fit well to the bottom structure in the same way as in the northern rivers. The solution has been the cone gear in Estonia and the gear attached to weirs in Latvia, which are used also in stretches in the river with slow moving water. The gear attached to the weirs is also adjusted to the situation, with nets equipped with lifting frames. There are also weirs where the openings of the traps could be turned either in the upstream or downstream direction depending on the water velocity.

In a way, the fyke nets have nowadays to some extent neutralized the differences between the Fennoscandian and Baltic river structures as fishing sites, because the fyke nets are placed close to the river mouths and normally downstream of rapids.

An example of how water velocity influences the fishing methods is presented by Püttsepp and Järv (2010) from the River Narva with an average flow velocity of one metre per second, but increasing up to three metres per second at rapids and decreasing to 0.5 metres per second in the lower courses. They wrote: "Between Narva Waterfall and the wooden bridge of Narva, where the current was particularly fast, lamprey was fished with weirs (fish fences: *sakools*) and with wicker and cord traps. From the wooden bridge to the sea, lamprey fishers used 'pipes' or traps made of thin pine boards and birch bark."

Strong traditions of lamprey fishing in rivers for hundreds of years have certainly influenced present-day activities. Even if the economic importance of the lamprey might have decreased, the long fishing traditions along many rivers are still strong. This is seen in different ways. For example in the town of Carnikava at the River Gauja in Latvia, the river lamprey is a part

Fig. 93. A typical fishing site for river lampreys in the northern Swedish rivers with rapids with stones and boulders on the bottom. Here the fishermen can select sites for individual fishing gear between the stones and press them down to the bottom with stones on top. Arne Öberg and Jan-Erik Johansson are emptying their lamprey traps in the Rapid Långedsforsen in the River Öreälven, Sweden (Fig. 1:6). 26 September 2012. Photo: Kjell Sjöberg.

Fig. 94. A difference between Sweden and Finland vs. Latvia is how the gears are placed and constructed. In the River Salaca in Latvia with fairly calm water and a relatively low water level, weirs are used which cover the whole width of the river, and not necessarily near a rapid as is common in Sweden and Finland. 7 November 2011. Photo: Kjell Sjöberg.

of the symbol of the town, and in the town of Salacgrīva at the River Salaca there is a lamprey festival each year. Furthermore, the weirs still in use in the River Salaca attract many visitors. Tourist tours are organized to the weirs where people from different countries learn about the lamprey fishing. In Estonia, at the mouth of the River Narva, the Narva-Jõesilm Lamprey Festival is celebrated in the end of September. In the River Simojoki in Northern Finland annual lamprey festivals are also organized and there, as well as in the River Kuivajoki, the local fishermen have decided to stick to the traditional fishing methods and exclude the more efficient fyke nets.

If a type of gear has been developed and used in a river for a long time and functions well in relation to the demand of lampreys on the market, there might be limited interest in developing or accepting new methods. This may also lead to limited exchange of information, and subsequently a decline in experience. For example, not all lamprey fishermen in Sweden are aware of the similar lamprey fishing across the Bothnian Bay in Finland, and vice versa. Even when an exchange of information exists, a lack of experience on one side could be a reason why a new method is not accepted there. In fact, individual fishermen in the rivers Öreälven and Rickleån have tried to use the Finnish fyke nets, but without good results, probably because they have placed them in different habitats in the river than the Finnish fisherman would do. However, this does not mean lack of possibilities for exchange of information. For example, lampreys from the northern Swedish rivers are sent to southern rivers for processing, and thus make it possible to exchange information. Actually, the present use of cylinders from old washing machines for storing lampreys for a while can now be seen in some rivers, for example Torneälven/Tornionjoki (Fig. 24), Kuivajoki, Kalajoki (Fig. 33) and Lestijoki (Fig. 32), which might be an example of useful innovation which is accepted by the fishermen, although the different gear and methods remain intact.

Of course fishing regulations also influence the choice and development of fishing gear. For example, in both Estonia and Latvia the state authorities decide the number of licenses issued for lamprey fishing and also the type of gear allowed, as well as which rivers are open for lamprey fishing.

Even if the reasons for differences described above often seem clear, there also exist differences within the same region and also between countries with similar conditions, which are more difficult to explain. The difference between Sweden and Finland as regards use of fyke nets could again serve as an example. Why are the efficient fyke nets used in Finland but not in Sweden? One reason might be that lamprey fishing is more important in Finland than in Sweden. It is noticeable not only in the catches, but also in the interest from the authorities. For example, there still exist statistics

of the river lamprey fishing in Finland, but these are no longer collected in Sweden. There are attempts to improve the fish ways (fish ladders) in the hydroelectric power dams in Finland so that they suit the migrating lampreys (not only salmon). In Finland, lampreys are caught at dams and transported and released upstream of the dams: 100,000 adult lampreys per year in the River Kemijoki; 60,000 in the River Iijoki; 50,000 in the River Oulujoki; 10,000 in the River Perhonjoiki and 5,000 in the River Kokemäenjoki (Aronsuu 2011*b*). These activities are regulated by water courts. Also lamprey larvae are produced and released in Finnish rivers as a method for management of lamprey stock, for example 2 million larvae in the River Iijoki and 15 million larvae in the River Perhonjoki (Aronsuu 2011*b*) as ordered by the authorities. Spawning and breeding habitats are restored in some rivers, for example in the rivers Perhonjoki and Kalajoki (Aronsuu 2011*a*; Aronsuu & Tuohino 2011). No such activities to improve lamprey populations are done in Sweden, except release of adult lampreys, which is done voluntarily on a small scale in the rivers Dalälven and Ljusnan, where lampreys are transported around the dams (cf. Sjöberg 2011).

In the following sections some of the differences among and within the countries as regards gear types and the methods to use them in rivers with different conditions are discussed, as well of changes in the materials used.

Differences within and among countries in the use of gear types, materials, methods, and wooden barriers

Sweden compared to Finland

As mentioned above, in 1772 Juvelius described the trap types used in the River Nykarlebyälven (the lower part of the River Lappo å/Lapuanjoki) in Finnish Ostrobothnia, osier baskets and pots. The baskets were conical in form and constructed by osier material and small roots of spruce, that is, the same type of baskets that are still in use in the Ostrobothnian rivers, although sometimes with other materials. The pots he describes are (in my translation from Swedish) squared and narrowed towards one end and with small holes around the box. They were made of boards that were nailed together. The same description could also be used to describe the wooden logs still in use in for example the rivers Öreälven and Rickleån in Sweden. However, this wooden log is not in use in Finland today (nor in Estonia and Latvia). Thus, here we have two important differences in the recent use of lamprey gear in Sweden and Finland:

(1) Although the wooden log (Fig. 2c) once was used in both Finland and Sweden, today it is still in use in Sweden but not in Finland;

(2) The willow type of basket (Fig. 2a) has until recent decades been used in several of the northern Sweden rivers. In 1978 they were still in use for example in the rivers Rickleån and Torneälven/Tornionjoki, but in 2010, 2011 and 2012 no baskets were found used in the rivers studied in Sweden, but the basket type of gear, equipped with a lifting frame and often attached to weirs, is still frequently used for lamprey fishing in many of the Finnish rivers (Table 1).

The traditional gear is not normally equipped with lifting frames in Sweden, except those gear that are attached to weirs. The baskets and board logs were placed individually among stones in the river. In the River Dalälven, with an annual mean discharge of 379 m^3/sec. (Tockner *et al*. (eds.) 2009) the wooden pieces of lath gear used earlier (Fig. 2d) were also placed individually or a few together, attached via poles, although some kinds of weirs were used a long time ago (for details, see Ehn 1970). Thus, the size of the rivers may not be the reason for some differences among regions in the use of weirs. Furthermore, from the River Torneälven/Tornionjoki it is obvious that there could be a differentiation in use of weirs within the same section of a rapid. In the Rapid Kukkolaforsen for example, complex weir structures are used in the white water sections of the rapid, while along the shore in calm water simple weirs are used, and the gear with lifting frames could also be placed in the river with support of just a pole (e.g. Fig. 57).

There are, however, also in Finland, rivers where the gear of wooden materials, baskets of willow or juniper without lifting frames is still in use, for example the rivers Tjöckån/Tiukanjoki and Merikarvianjoki.

The distribution of weirs in connection to lamprey fishing in Sweden is interesting. They are still used in the big rivers Torneälven/Tornionjoki (mean discharge 315 m^3/sec., Tockner *et al*. (eds.) 2009) and Kalixälven (mean discharge 290 m^3/sec., but could be as high as 3,000, *Norrländsk uppslagsbok* 1994), where lamprey fishing gear equipped with wooden frames is attached to them, but not in the large rivers further south, such as in the River Umeälven (Fig. 1:8) (mean discharge 431 m^3/ sec., Tockner *et al*. (eds.) 2009) where the important lamprey fishing was going on until the beginning of the1960s when a power plant dam had been constructed. Not even in the large river Piteälven (Fig. 1:12) and in the once so important lamprey rivers Ljusnan (Fig. 1:2) and Ljungan (Fig. 1:4) was the use of weirs mentioned in the literature. In those rivers, and even in other, smaller Swedish rivers in this study south of the River Torneälven/Tornionjoki and the River Kalixälven, the lamprey traps are set out individually between stones, boulders and other obstacles on the bottom of streaming waters (e.g. Fig. 9, Fig. 93 and Sjöberg 1982).

In Finland weirs have been used in all the bigger rivers, for example in

the River Torneälven/Tornionjoki and the River Kokemäenjoki, and earlier in the rivers Kemijoki and Oulujoki as well, where, however, hydroelectric dams close to the river mouths now have changed the situation (these latter rivers are not included in this study).

It is also interesting to compare the use of weirs in smaller rivers in Finland and Sweden. On the Finnish side of the Gulf of Bothnia, weirs are found in many rivers from the River Torneälven/Tornionjoki to at least the River Kokemäenjoki (14b to 27 in Table 1), for example in the rivers Kalajoki, with a mean annual discharge of 35 m3/sec. (Eklund *et al*. 1984), Lestijoki, with a discharge of 11.5 m^3/sec. (Valtonen & Niemi 1978; Edén *et al*. 1999), and Perhonjoki, with a mean discharge of 17–21.5 m^3/sec. (Eklund *et al*. 1984; Ojutkangas *et al*. 1995). Those rivers may be compared to the Swedish River Rickleån, with a discharge of 16 m^3/sec., and with the River Öreälven with 35 m^3 sec. (*Norrländsk uppslagsbok* 1996) where they do not use weirs.

Ekman (1910) suggests an explanation: The use of weirs for lamprey fishing in Sweden is the result of influence from Finland. They are widely distributed in Finland and further east. In Sweden the Finnish influence reaches to the border region in the north, and weirs of the same type as used for whitefish catching were introduced to the rivers Torneälven/Tornionjoki and Kalixälven. According to Ekman (1910), the tradition with weirs of the kind had reached those rivers from the east, but not further south in Sweden—apparently this is still the situation today.

The difference in the use of fyke nets mentioned above is another surprising difference between Sweden and Finland. Back in the 1940s the lamprey fishermen in the River Kalajoki in Finland (Fig. 1:21) began to use fyke nets with wings for fishing lampreys on a small scale, but in the 1960s the numbers increased and spread to other rivers (Tuomi-Nikula 1986). Nowadays they are used in most lamprey rivers in Finland, with a few exceptions. However, in Sweden such fyke nets are not used at all for lamprey fishing, which is remarkable because the fyke nets are regarded as more efficient than the traditional trap types (Tuomi-Nikula 1986) and because many of the rivers on both sides of the Gulf of Bothnia are similar in size, bottom structure and water discharge. Again, the rivers Rickleån and Öreälven could be used as examples. As in the other Swedish lamprey rivers no fyke nets are used, while fyke nets are used in the Finnish River Perhonjoki, where the discharge was 17–21.5 m^3/sec. (Eklund *et al*. 1984; Ojutkangas *et al*. 1995), in Kalajoki with 35m^3/sec. (Eklund *et al*. 1984), and in the River Lestijoki with 11.5 m^3/sec. (Valtonen & Niemi 1978; Edén *et al*. 1999) (see Fig. 1 for locations of the rivers).

Sweden and Finland compared to Latvia and Estonia

It is quite obvious that the differences between rivers in Northern Sweden and Finland, compared to the situation in the Latvian and Estonian rivers have created adaptations as regards constructions of gear. For example, it is difficult to see how basket traps without lifting frames or logs of wooden boards could have been utilized efficiently in big and broad rivers such as the River Narva and the River Pärnu in Estonia, or in the rivers Salaca, Gauja and Daugava in Latvia, if they had been used in the same way as in for example the River Rickleån in Sweden. In this river, with a mean annual discharge of 16 m^3/sec. (*Norrländsk uppslagsbok* 1996), they can be placed individually among stones on the bottom. The water levels are so low that fishermen can wade out in the rapids, the water is so clear that they can see the bottom and individually adjust the gear to an efficient fishing position.

In the Estonian and Latvian rivers, which are referred to as Baltic and Eastern Continental Rivers by Tockner *et al*. (eds.) (2009), other methods have been developed. In the River Narva, with an annual water discharge of 400 m^3/sec. at the mouth, mostly 200–300 metres wide and four to six metres deep (Püttsepp & Järv 2010), the fishermen use a method where the gear could be placed out without wading into the water and without being able to see and fit individual gear to an exact position on the bottom. By using many funnel-shaped traps attached to a rope, and emptying them during the day, it is possible to catch lampreys in such habitats too.

However, why should the night active lampreys swim into small plastic traps distributed out from the riverbank when swimming upstream against the water in a broad, deep river? And why are the traps not emptied at the same time of the day as in Sweden and Finland, where normally baskets and logs placed in rapids are emptied in the morning. That was also the case at the time when baskets attached to weirs were used between Narva Waterfall and the wooden bridge of Narva. Those traps were set in the afternoon and harvested on the following day at sunrise (Püttsepp & Järv 2010). In the rapids of Sweden and Finland the migrating lampreys are sometimes led into the baskets and logs by constructions of stones (e.g. Fig. 30), and the fishermen try to prevent the fish from passing the trap by tightening around it with spruce twigs or other materials. This is not the case when the cone traps are placed in the deep and broad River Narva.

A hypothesis could be that the fishing method is adapted both to the diel (24 hours) rhythm of the lampreys and the river morphology. The lampreys are sensitive to daylight (e.g. Wikgren 1954; Claridge *et al*. 1973; and Sjöberg 1977). Already Juvelius (1772) made a comment about this. He noticed that the lamprey fishermen at River Nykarlebyälven/Lapuanjoki in Northern Finland had tried to fish for lampreys during the day, but without

success (Juvelius 1772). Actually, the lampreys are so sensitive to light in general that it is a common knowledge among lamprey fishermen both in Sweden, Finland and Latvia that the catches are smaller even when there is moonlight (e.g. Storå 1978). After migration during the night the lampreys seek shelter from the light in suitable places on the bottom, under a stone, etcetera, to attach to with their sucking discs. In a river like the River Narva they do not have access to large stones and boulders as in the northern rivers, but find the plastic funnel-shaped traps distributed on the bottom of the river, and inside the dark cones they can attach to the plastic and find shelter from the light.

The method of placing the fish gear in this way is not used in Sweden, Finland or Latvia. However, it is still a cone-formed gear of the same construction in principle as other lamprey traps, but the way to adapt it to the diel activity of the river lampreys seems to be unique within the Baltic Sea area. Instead of catching actively upstream migrating fish during the night as in Sweden, Finland and Latvia, with this method they catch the fish when they seek shelter during the light part of the day. However, it ought to be stressed that this is a hypothesis that is not proven, to my knowledge, but it should be easy to test the hypothesis.

Then the question arises why the same catching philosophy is not used in Northern Sweden, where they use the wooden board logs. The answer is certainly that in the rapids where the wooden logs are used, the lampreys can easily find shelter and attach to stones and rocks almost everywhere in such habitats, and thus few of them would have a reason to enter the logs during daytime.

Lamprey fishing in Latvia and Estonia is nowadays different from the fishing in Sweden and Finland at least in seven ways:

(1) The common wooden traps in Sweden and Finland, the wooden gear of boards or laths and the willow basket type are not in use in Latvia today;
(2) The basket type of trap attached to a lifting frame and attached to a weir, which is still common in Finland and to some extent in Sweden, is no longer used in Latvia;
(3) In Latvia large fyke nets without wings are used, and in addition
(4) different types of net traps equipped with wooden frames and attached to weirs are used, but not in Sweden or Finland;
(5) Ordinary fish nets with small mesh openings are also used to some extent in Latvia in contrast to Sweden and Finland. Furthermore,
(6) the weirs used in Latvia are different compared to those in Sweden and Finland.
(7) The use of cone traps.

First, single traps placed on the bottom of rivers and weighted down with stones (still used in Sweden) and the willow basket type (still used in Finland) are thus not used in Latvia or Estonia nowadays (Table 1). The reason could be that the bottom structure in the Latvian rivers is different. Large stones covering the bottom of the rapids or streaming sections of the rivers (typical of Swedish and Finnish rivers), does not seem to exist in Latvia to the same extent. A second explanation could be that the efficient fyke nets have taken over (as in some Finnish rivers, for example the River Kokemäenjoki).

Second, a basket type, similar to the basket gear earlier used in the Finnish River Kokemäenjoki (Järvi 1932; Soikkeli 1959; Hurme 1966) has been in use at least in the rivers Gaudava and Gauja. Pictures from 1929 of this trap type are shown by Willer from the River Kokemäenjoki in Finland and from the River Gauja in Latvia (Figs. 4, 10 and 11 in Willer 1929). They were used in the River Salaca up till about 50 years ago (Figs. 62–63) and were still in use in the River Kokemäenjoki back in 1978 (Sjöberg 1982; Fig. 58; Fig. 59). However, such gear, or basket gear in general, are no longer used in Latvia and Estonia (Table 1).

Third, fyke nets are not used in Sweden, but frequently used in Finland and Latvia (Table 1). However, at least some fyke nets used in Latvia are bigger than those in Finland (cf. Fig. 43 and Fig. 77) and the Latvian fyke nets are without leading wings. A possible explanation could be that the lamprey fishing in Finland and Latvia is of more economic importance. There still exist professional or semi-professional lamprey fishermen both in Finland and Latvia, but not in Sweden. This might have forced a development towards more efficient and less labour demanding fishing gear in Finland and Latvia (cf. Storå 1986; Tuomi-Nikula 1986).

Fourth, the type of gear constructed as a combination of basket and net and attached to a frame, which was used in the River Salaca until about 12–15 years ago, has not been documented in Swedish or Finnish rivers. Neither has its present-day replacement, that is, gear made of net only but still attached to a frame and placed at a weir been used in Sweden or Finland.

Fifth, ordinary fish nets, but tightly woven, are apparently used to some extent in Latvia. Such lamprey fishing gear is not used in Sweden, Finland or Estonia.

Sixth, the types of weir are different. In Sweden and Finland they are normally shorter and are placed in a rapid or section with streaming water. In Latvia they can cover most of a river. However, by law at least a third of the river should be free from traps to allow some fish to escape and reproduce. The model of weir with a barrier that increases the water level in the upstream direction of the weir has not been used in Sweden or Finland.

Consequently, the possibility to turn the entrance of the gear in either the upstream or downstream direction is not possible with the weirs or barriers in Sweden and Finland. A weir must be very robust to be able to increase the water level in a flowing river and it may only be in Latvia where the lamprey is so highly valued that the investment of time and energy to build and maintain such a structure is justified, and where the geomorphology of rivers makes such constructions easier.

Thus, a *pata* (weir, trestles) in Sweden and Finland is situated in a rapid or in a section with fairly fast moving water and has no barrier to increase the water level. The gear are always placed with the entrance pointing downstream to meet the upstream-swimming lampreys (e.g. Fig. 50).

In their review of fish catching methods of the world, Gabriel *et al*. (eds.) (2005) describe a very similar idea of catching upstream-migrating lampreys (*Geotria australis*) from New Zealand as has been in practise in Latvia—that is, a gear with a combination of a basket and a net, which is attached to a weir in the downstream position, but with the mouth of the gear directed towards the water stream of the river (cf. Figs. 66–68). When the upstream swimming lampreys meet the barrier of the weir, they swim sideways, and when they meet the water flowing thought narrow openings in the barrier, they are washed back into the openings of the trap.

Seventh, one fishing method dominates in Estonia, cones mainly made of plastic material attached along a rope and placed on the bottom of the river. This method stands out from all methods described earlier, because it is not used either in the neighbouring country Latvia, or in Sweden and Finland. Furthermore, this method is unique compared to those used in the other countries because it apparently utilizes the 24-hour-activity and behaviour of the lampreys in a different way. They indeed still catch upstream migrating lampreys with the cone traps, but they do not catch them during their active nocturnal migration, as all other described catching methods in the study area do. These cones evidently catch lamprey during daytime, when the night-active lampreys seek shelter on the bottom of the rivers during the light period—shelter which these cones provide.

Latvia compared to Estonia

When dealing with the rivers in Estonia and Latvia, for example the River Narva in Estonia and the rivers Salaca and Gaudava in Latvia, the differences between the counties are obvious. Although baskets attached to weirs have been used earlier, today there are just two methods in use in each of the countries. Just one of the gear types used nowadays is the same in the northern countries, and that is the fyke nets, which are used both in Finland, Estonia and Latvia, although with different sizes and shapes. Other-

wise the use of weirs is also different. However, more surprisingly, the net traps attached to weirs in Latvia are not used in Estonia, and the cone traps in Estonia are not used in Latvia (Table 1).

A possible explanation of the differences could be that the lamprey fishing is regulated by the state authorities. Both the amount of gear and the type of gear are regulated by issuing licences and the state and local authorities also decide in what rivers and where in the rivers the gear is allowed to be used. Such systems, developed differently in the two countries, might act as a conservative force, perhaps limiting changes and innovation. In Sweden and Finland the landowners along the rivers have the fishing rights, and the fishing is often organized within the framework of a fish conservation association.

Differences within countries

There are considerable differences not only among Sweden, Finland, Latvia and Estonia in the use of fishing gear, but also within countries. In Sweden, for example, the differences between the southern and northern lamprey rivers are evident. The pot of wooden laths was the traditional type of fishing gear in the rivers Dalälven, Ljusnan and Ljungan, that is, among the southern lamprey fishing rivers, and as well in the River Torneälven/Tornionjoki along the border between Sweden and Finland, but not in the rivers between (Table 1). Today, the gear type made of wooden laths is no longer used in the southern rivers, or just on a small scale, as in the River Ljungan, but it is still common in the River Torneälven/Tornionjoki. In his survey of Finno-Ugric fishing implements, Sirelius (1906) mentioned this model from the rivers Torneälven/Tornionjoki, Onega, Neva and Luga, but he also mentions analogous forms in the rivers Ljusnan and Dalälven.

Among the rivers studied in Finland, the wooden lath type of gear was found just in the northernmost River Torneälven/Tornionjoki (Table 1), where it is still common, but has earlier been used in the River Kemijoki, about 45 kilometres further south (Aronsuu 2011*c*). However, as on the Swedish side of the River Torneälven/Tornionjoki, this traditional gear has to some extent been replaced with a trap of similar form but made of glass fibre material (Fig. 22; Fig. 42).

Up till recently, baskets made of willow (*Salix* spp.) or by rattan have been in use in some Swedish rivers (to my knowledge, juniper has not been used in Swedish baskets, in contrast to Finland). Like the wooden board log, these items of fishing gear are normally put into the rapids one by one between stones, and are held down on the bottom of the river by placing stones on the top of the basket or log, as was the case in the River Umeälven. There both types were used in the same fishing site, the latter one mostly in

the end of the season, when ice began to appear in the water. The wooden board log is still used in the rivers Rickleån and Öreälven (e.g. Fig. 9; Fig. 12), that is, in the central rivers, compared to River Dalälven in the south and the River Torneälven/Tornionjoki in the north (Table 1). Baskets attached to wooden frames were in use in the River Kalixälven, and in the River Torneälven/Tornionjoki (Fig. 4) until about 15 years ago. Among the Swedish rivers studied, those two northern rivers were the only ones where the lamprey gear was attached to any kind of weir. In this respect, the situation is much the same as was described by Ekman in 1910.

In contrast to the situation in Sweden, the basket type of gear is still in use in some of the Finnish rivers, for example in the rivers Simojoki, Kuivajoki, Kiiminkijoki, Kalajoki, Tjöckån/Tiukanjoki and Merikarvianjoki. In the three northern rivers, willow twigs or shoots are used as material, while in two of the southern rivers juniper is used. There are also regional differences as regards the use of lifting frames and weirs. Among the studied Finnish rivers, lifting frames are used in all rivers from the River Torneälven/Tornionjoki in the north to the River Kyrönjoki (Fig. 1:14–24), and further south two shafts were used to lift gear in the River Kokemäenjoki (Figs. 58–59). But there are also rivers where lifting frames are not used. In the river Tjöckån/Tiukanjoki and the River Merikarvianjoki, gear without a lifting frame is still used to some extent and is placed on the bottom of the river and kept in place by stones on top.

Changes in material

Compared to a few decades ago, the most obvious change among the lamprey gear seems to be that more durable material is used, but that the fishing gear form is relatively unchanged. For example, today plastic nets, plastic coated wire netting or perforated sheet metal are used, instead of willow, or wooden boards (Fig. 14; Fig. 21; Fig. 23; Figs. 31–32; Figs. 39–40). Today there is also gear on the market constructed of fibre glass, which is perforated to let water flow through the gear (Fig. 36; Fig. 42). It is interesting to note that even when such a different material as the glass fibre is introduced, the shape of the new gear follows the traditional types—again an example of how well the trap type is adapted to the situation and tradition in a particular river. For example, there is no doubt that the glass fibre trap in the River Torneälven/Tornionjoki (Fig. 42) reflects the wooden lath type previously used in that river. Furthermore, compare the glass fibre trap in the River Kuivajoki (Fig. 36), which clearly is based on the willow basket type of trap.

The example from the River Rickleån in Sweden is typical of the situation in many rivers. Compared to the situation in 1978 for Sweden and Finland, and with Latvia in 1992, in almost all the rivers studied in 2010 and

2011, there have been changes in either the gear type used or in the material (Table 1). For example, in Sweden the basket of willow or rattan, which still was in use back in 1978, has largely disappeared and been replaced with plastic or metal mesh materials. In contrast, in Finland baskets of willow or juniper still exist in for example the rivers Simojoki and Kalajoki. In the River Simojoki the gear and the weirs it is attached to are very much the same now as back in 1978 (Fig. 46; Fig. 47; Fig 49), and also the same as in a picture from 1916 (Räsänen 1916).

The reasons for changes in materials are quite obvious as new and more sustainable materials are available nowadays, compared to birch bark, willow or juniper twigs or shoots (and spruce or pine roots as connective material). Plastic nets, metal mesh covered with plastic, glass fibre, metallic sheets with holes for water flowing by, etcetera, make the gear easier to handle and also more sustainable. For example, gear of glass fibre does not have to be dried during the day, as the willow baskets, and does not have to be replaced after a few years.

Concluding Remarks

In conclusion, there are remarkable differences in the use of lamprey fishing gear and methods for using it, as well as the use of weirs or barriers within countries as well as among countries in the Baltic Sea area. For example, it is remarkable that such a method as cone traps is used in the large Estonian rivers like Narva and Pärnu but is not used in the neighbouring country of Latvia in rivers of about the same size (the Daugava, Gauja and Salaca). Even more noteworthy, it is astonishing that such an efficient fishing gear as the fyke net is not used in Sweden for lamprey fishing, while these same nets have nearly totally replaced the traditional wooden lamprey fishing gear in some Finnish rivers. Some of the differences could be explained by specific morphological characters of the rivers in the northern and southern part of the Baltic Sea area, but also the economic importance of the lamprey fishing, local traditions and fishing regulations certainly influence lamprey fishing methods and gear.

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NOTES

[7] For further descriptions and details about lamprey fishing in the River Nykarlebyälven/Lapuanjoki and about Juvelius, see Storå (1978 and 2008).

[8] Personal communication 2012 with Olavi Penttilä, who has fished for lampreys with this type of traps at Ruskula village in the River Kokemäenjoki (cf. Sirelius 1906: 170).

[9] K. Aronsuu 2011, Centre for Economic Development, Transport and the Environment in

Northern Ostrobothnia, Finland. Personal communication 2011.

[10] See note 8.

[11] See note 8.

[12] See note 8.

[13] N. Riekstiņš and J. Birzaks, Fishery Department, Ministry of Agriculture. Personal communication 2011.

[14] According to Valdis Skulte, whose father worked with lamprey fishing in the River Daugava. Personal communication via Gundega and Hakon Kampe-Persson 2013. See also Fig. 77 in Cimermanis (1998).

[15] According to fisherman Aleksandrs Rozenšteins, who works at weir number one, close to the mouth of the River Salaca at Salacgrīva. Personal communication 2010.

[16] See note 15.

[17] According to an anonymous referee of this manuscript in Latvia.

[18] According to Visvaldis Šrenks, fisherman at the River Salaca. Personal communication 2013.

[19] See note 17.

[20] See note 15.

[21] See note 17.

[22] See note 18.

[23] See note 18.

[24] Ichthyologist Meelis Tambets. Personal communication 2012.

[25] See note 24.

[26] See note 24.

[27] See note 24.

[28] See note 24.

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WAYNE EDWARDS

Temporary Internal Migration

Inferences from Survey Data

ABSTRACT It is well established in the literature that an important reason why people move from place to place is to seek employment. One way to balance non-job considerations against the need for a wage income is to move to another place temporarily for a job opportunity. By making a temporary move, an individual can maintain his or her residence in a community, thereby retaining place level amenities, family relationships, traditional activities, and so on. Temporary migration for market work might be an especially attractive solution for people who have strong community ties but few job opportunities. This paper concentrates on the case of internal temporary migration for job market reasons in Alaska. Some U.S. Census data are useful for analysis of migration, but those data are not collected frequently enough to address temporary migration questions well. Using a set of pre-existing non-Census surveys, this paper examines temporary migrants in north and northwest Alaska. For the investigated area, approximately 8 per cent to 16 per cent of the population are engaged in temporary migration for market work. Substantial seasonal differences in temporary migration rates are uncovered, as are gender differences.

KEYWORDS migration, temporary migration, commuting, job search, job market, Alaska

Introduction

Why do people leave one community and move to another community? Researchers across a wide spectrum of disciplines have investigated this question extensively. The migration of individuals and families is caused by an enormous variety of reasons from the desire to be near other family members that live elsewhere to the search for work to the desire for amenities that are not available in a given place. Migration is sometimes temporary rather than permanent. The duration of the relocation is sometimes so short that some researchers do not consider the move to be migration at all. Because the question of why people move, where they move to, and how long they stay is complex, researchers often focus on a narrow geographical region in order to better understand the processes involved.

The present paper concentrates on the case of internal temporary migration in Northern and North-western Alaska. "Internal temporary migration" refers to individuals who leave their community in order to do work elsewhere and then return to their community. While there is not an extensive literature on this type of migration in Alaska, some evidence has been offered by researchers to support the general conclusion that people in other places move for improved job opportunities (Huskey, Berman & Hill 2004). While Alaska, and the Circumpolar North in general, have many unique characteristics compared to the rest of the world (Huskey 1990; Huskey 1992; Huskey 1994; Usher, DuHaime & Searles 2003), people moving for jobs is one thing the Far North has in common with the South. It is well established in the literature that a common reason why people move from place to place is to seek employment (Borjas 1994; Lucas 1997).

Sometimes commuting is confused with temporary migration. The difference between the two is the duration of the stay. In an urban or suburban setting, commuting occurs daily. In the case of oil industry workers in Alaska, some individuals work a schedule of one to several weeks in a remote location and then return to their home in another place. Is this commuting or temporary migration? There is no universally agreed upon length of time that changes commuting into temporary migration. In empirical analysis, the specific timeframe that separates the two will depend on the extent to which the available data can separate the groups.

Some U.S. Census data are useful for analysis of migration, but these data are not collected frequently enough to address temporary migration questions well. Specialized surveys investigating specific questions have been conducted by a number of different institutions and they contain much useful information. In the present paper use is made of a set of pre-existing non-Census surveys that contain information about temporary migration

in Northern and North-western Alaska. The investigation of the temporary migration issue is a part of a larger research program funded by the National Science Foundation and the surveys used were determined by the larger research design. The main findings indicate that approximately 8 per cent to 16 per cent of the population in the examined areas are engaged in temporary migration for market work. Substantial seasonal differences in temporary migration rates are uncovered, as are significant gender differences.

The paper is organized as follows. The next section reviews the literature on temporary migration. Then section three discusses the research questions and the survey instruments. In section four, data from the surveys are analyzed, and in the final section concluding remarks are made and suggestions for further research are offered.

Brief Literature Review

Most of the research on temporary migration in Alaska concerns the Trans-Alaska pipeline project (Carrington 1996; Coates 1993). For that large infrastructure project, a severe labor shortage occurred in the state and large numbers of workers came to Alaska for the job opportunities. When the pipeline was completed, many of those migrants left the state (Carrington 1996). For the purpose of the present paper, the type of temporary migration examined is internal temporary migration. Specifically, only residents of Alaska who move to a location outside their community but inside Alaska are included in the analysis. Little economic research has been done on temporary migration for job opportunities in Alaska as it is defined for the purpose of this paper. The notable exception is Huskey, Berman, and Hill (2004), who examined return migration of Alaska natives from urban settings to rural settings. Using Census data, the authors found significant gender differences among return migrants, with women being more dependent on market employment in rural places than men.

Like Huskey, Berman and Hill (2004), Nilsson (2003) found a gender effect in Sweden's return migrants in that women's migration decisions were more affected by having a family than were men's. Dustmann (1994) found a gender effect using German data in that the migration behavior of women differed depending on whether their intentions were permanent or temporary migration. Significant gender effects are a common finding in many studies of migration (Lucas 1997).

Movement for non-market activities such as subsistence has been investigated extensively (Nelson 1973; Alonso & Rust 1976). Research in the Canadian North has uncovered the similar result that people there often move in order to engage in subsistence harvesting (Marshall 1993; Kuo & Lu

1975; Wonders & Brown 1984). Canadian internal temporary migration has received essentially the same scant treatment as internal temporary migration in Alaska. Return migration studies have been conducted elsewhere (see, for one example, Mesnard 2004), usually in small studies when data were available. The lack of data (or the poor quality of available data) has long been an obstacle to migration research (Edwards & Huskey 2008).

Most of the work on temporary migration has been done at the international level (e.g., cross-border migration in Europe for work, recalcitrant temporary migration from Mexico to the United States, temporary migration from India and Pakistan to the Middle East, etcetera). Notable exceptions are found in work on internal temporary migration in Asia. Rahman (2001: 125) states the general issue succinctly: "International migration occurs when excess demand for labor in one country is coupled with excess supply of labor in another." If the workers who migrate stay in the new country and assimilate, they are permanent migrants. If not, they are temporary migrants, or "guest workers." Guisinger (1984) uses a cost-benefit analysis to assess the impact on Pakistan of large temporary migration flows out of the country toward the Middle East. After measuring and discussing direct and indirect costs of the flows, Guisinger concludes that the net present value to Pakistan from emigration of unskilled labor is strongly positive. Unskilled laborers travel abroad for a few years and earn more money than they could have in Pakistan. The remittances to Pakistan of the expatriates exceed the loss of production in Pakistan. Guisinger mentions internal temporary migration in passing but does not analyze it.

Karayalcin (1994) finds that temporary migration is theoretically equivalent to international lending and borrowing, and reports an expectation for global welfare improvements. No data are analyzed in Karayalcin's paper. Dustmann (1999; 2000) develops a model of human capital investment, suggesting that necessary human capital investment for migration depends on the expected length of time a migrant stays in the host country. Borjas (1984) also reports that significant earnings differences exist between assimilated and non-assimilated migrants. Commenting on Dustmann (2000), Storesletten (2000) points out that return migrants (temporary migrants) are not representative of the typical aggregated cohort in that their decision to acquire human capital in the host country depends on its value (return) in the host country, given the expected temporary nature of the return migrant's tenure. Macro-level analysis of migrant success is then underestimated if the return migrants are not taken into account. Similar arguments are made by Faini (1996), which appear to be robust.

Without question, remittances are the central subject of a large number of migration research articles (for recent examples see Adams 2006; McKen-

zie & Sasin 2007; Page & Plaza 2006). There is enormous diversity in the aspect of remittances examined, ranging from development issues in sending and receiving countries to the simple volume of flows. In virtually all cases, the migration itself occurred in an effort to find a better job environment.

Turning to internal temporary migration, much of the literature stems from studies in China or India. Ma (1999) examines internal migration as a cycle in China where workers begin in a rural setting, migrate to an urban setting, then return to their rural home. Ma finds a significant positive development impact of this migratory cycle in that the returning migrants bring both human capital and physical capital with them when they return to the rural environment. As in Hugo (1982), Ma claims that temporary migration to urban areas is used strategically by rural families to reduce the risk of unemployment. Overall costs are reduced by sending only certain, usually young, members of the family into the urban area. The return probability for the migrant, given his or her rural family ties, is high. The magnitude of the return flow is large in China. Ma reports that nearly four million migrants returned to rural areas in the early 1990s.

H. Yang (2000) compares temporary and permanent migrant flows in China, with an eye toward the question of whether government reform programs for development have changed migration patterns. The reported result is that temporary migration has increased dramatically since the 1980s, but permanent migration patterns are about the same (that is, the policy did not work). H. Yang's work supports the findings in Ma's study. Li and Zahniser (2002) estimate the determinants of temporary rural-to-urban migration in China using 1995 data from the Chinese Household Income Project. Using probit models of the migration decision, the authors find that the most educated and the least educated rural workers are *least* likely to migrate. The effect of education is stronger for men than for women, at the margin, and an increase in farm income reduces the migration probability.

The Chinese "peasant" experience has been investigated by Blecher (1983). The author finds that complex contract labor arrangements serve to restrict the movement of peasants except in special circumstances, like severe labor shortages in industrial areas. More recently, Knight and Song (2003) find that restrictions are not as severe on the movement of people as they were in the past and that returns to non-farm work exceed returns to farm work, explaining a large part of the reason for internal temporary movements. X. Yang (2000) discovers that temporary migrants to cities in the Hubei province view themselves as transient, making them more likely to move again. Further, the author finds that the decision process for an individual who is single differs substantially from an individual who is married, the former being much more likely to migrate.

Like X. Yang's (2000) finding that family status influences the migration decision, Rogaly (2003) finds family influences on migration activity in Eastern India. Rogaly states that some people who wish to stay where they are send a member of the family to another location as a seasonal migrant to work in order to support the home. The particular individual in the family who moves temporarily to work often changes over time. Suchitra and Rajasekhar (2006) find that the temporary and changing nature of jobs some workers (unorganized workers) in Karnataka engage in makes their employment insecure and therefore makes them vulnerable to spells of unemployment.

Normative assertions about migration exist in the literature, mostly outside of the economics discipline. For example, Howard (2006) discusses how welfare policies like "national basic income approaches" might be magnets for migration and therefore might lead to border restrictions in international cases. In the case of internal migration, local services might have a similar "magnetic" effect if they are only available in urban centers (Edwards 2007; Edwards & Natarajan 2007).

Taken together, the work on temporary migration shows that the phenomenon is widespread, present virtually everywhere in the world. In different places, the situations of individuals differ but in general the over-riding reason for temporary migration presented in the economics literature is labor market work.

Research Questions and Survey Instruments

In north and northwest Alaska, people live in three regional centers with fairly large populations (Barrow, Nome, and Kotzebue) and many smaller villages. Transportation between places is difficult and expensive due the general absence of roads, and jobs are difficult to find even in the two major resource production centers of the Red Dog mine and the Prudhoe Bay petroleum complex (Howe & Huskey 2007). As noted by Howe and Huskey (2007), the economy in the Far North is three-pronged: the market, public transfers, and subsistence. With little market work available, public transfers and subsistence activity necessarily take a larger role.

Almost all economic analysis of temporary migration completed so far indicates that temporary movements are job related. In Alaska, in addition to a seasonal job market environment in rural areas, temporary movements are also related to production activities (subsistence), which can be viewed as a non-market labor activity (Tomlinson 2005). Educational attainment has been shown to be a primary factor of temporary movements of people in Alaska, the U.S. in general, and in other countries (notably China), as education is an indicator of potential labor market success. Therefore,

labor theory is a good way to think about temporary migration. As far as economic models go, then, utility maximization (Edwards 2007) or household production models (Huskey, Berman & Hill 2004) fit quite well. Many other models might also be relevant, especially human capital models such as Roy's model of positive and negative selection. The focus of the present paper is the descriptive analysis offered by existing survey data, and so the particular theoretical model employed could easily vary from one research question to the next.

In general, explaining migration activity econometrically is a matter of choosing variables that are relevant to expected labor market success or economic need as independent variables for a discrete temporary migration dependent variable. Good candidates for independent variables are measures of income, education, and proxies for these (family demographic data, for instance). Because the surveys used for analysis typically have small sample sizes, econometric analysis is necessarily limited. Instead of modeling an econometric specification for every survey, the data are summarized and presented as stylized information of migration experiences. Where the sample size and variability warrants, multivariate analysis is conducted.

At the University of Alaska Anchorage (UAA), many researchers are engaged in a collaborative project investigating migration (Berman *et al*. 2006). A number of basic research questions regarding migration have emerged from this collaborative endeavor, including the following. (1.) How important are subsistence opportunities and community quality of life in the migration decision? (2.) How do the patterns of migration differ between places and over time? (3.) How does public policy influence migration decisions? While all three of these questions can be related to temporary migration, the first question is especially relevant in the case of Natives moving for subsistence harvest. The focus of the present paper, namely the movement of people seeking temporary employment, aligns best with the second question.

Temporary migration research questions identified by researchers engaged in the migration project at UAA include the following.

(1.) C*hanges in available jobs*. There is a large literature demonstrating that people move toward job opportunities (Marshall 1993; Kuo & Lu 1975; Wonders & Brown 1984). As jobs become more scarce, people will migrate toward places where they believe jobs exist, such as urban areas. Some people might move toward job opportunities only temporarily.

(2.) C*hanges in educational attainment*. The level of education might affect the decision to migrate insofar as the educational level is an indicator of the probability of success in the labor market (Stabler 1989). Kuo and Lu (1975) found that higher levels of vocational and technical training increase

the probability of moving. Huskey, Berman and Hill (2004) found an education effect among return migrants in Alaska.

(3.) *Differences in subsistence opportunities*. Nelson (1973) notes that Alaska Natives traditionally move if subsistence opportunities where they live diminish. Substantial changes in the North's economy and society have led to an evolution of activity, particularly due to urbanization (Alonso & Rust 1976). The diminished opportunity of urban dwellers to participate in the subsistence harvest might affect the decision to live in an urban environment. Location-specific human capital might also encourage return migration of people who had previously left rural areas for urban environments (Tunali 1996).

(4.) *Traditional orientation (language)*. Familiarity of surroundings, family, and social institutions might be incentives to remain in rural areas, or to return to them (Wonders & Brown 1984). Marshall (1993) finds evidence that social and familial factors exert a large influence on individuals' decisions to migrate.

In the case of the present paper, only the first temporary migration research question is addressed directly. The second question might have an effect as well in that seasonal market work might be a necessary result of an individual putting a higher priority on subsistence activity than market work. The data analyzed, however, cannot sort this effect out, if it exists.

Migration rates in Alaska are quite high and therefore the subject of migration in Alaska is a potentially rich ground for investigation (Edwards 2007; Edwards & Natarajan 2009). Using Census data, Howe (2007) finds that gross migration of Alaska Natives in the Far North accelerated in 2000 compared to 1990. Migration was not evenly distributed across the Far North during this time period. Nome saw above average out-migration while Barrow and Kotzebue remained essentially the same. There is "sizable" movement between villages, but the Census data do not reveal whether the movement was due to job seeking or other factors. The gender difference revealed is consistent with other research in the Circumpolar North: women are more likely to out-migrate than are men. The largest proportion of movers, both in and out, consists of the young (working age) population.

Because Census data do not indicate the reason for migration, the present study examines non-Census surveys. The surveys employed in this study are described briefly below, and the survey items of interest to the questions stated above concerning temporary migration are specified. See Fig. 1 for the coverage area of the surveys.

Social Transitions in the North (STN). These data were collected in four communities of Alaska's Northwest Arctic borough (Deering, Buckland, Kivalina, and Kotzebue) by the Institute for Social and Economic Research

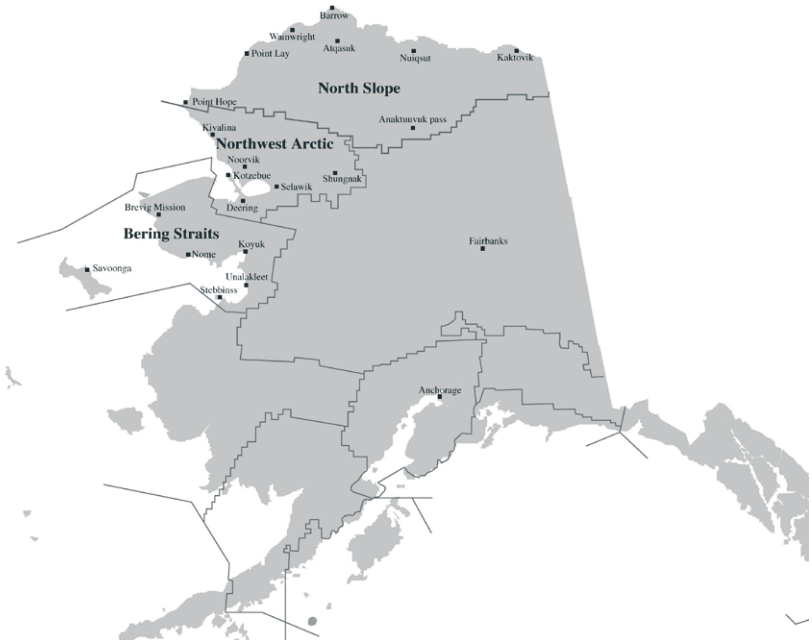

Fig. 1. Map of survey area (from Martin 2007).

(ISER) at the University of Alaska Anchorage in 1993 (n=171), 1994 (n=124), and 1995 (n=94) (Martin 2006; Martin 2007). One series of questions (C15) asks specifically whether the respondent worked away from the community during the previous year. Another question (C15C) asks: "During how many months [indicate which ones] did you work two weeks or more away from home?" This latter question makes it convenient to define temporary migration as being more than two weeks away from the community for the purpose of market work. The two-week rule establishes a distinct difference between temporary migration (two weeks or more away) and commuting (less than two weeks away).

Survey of Living Conditions in the Arctic (SLiCA), conducted by ISER in 2002. Twenty communities in the Bering Straits Census Area, Northwest Arctic borough, and North Slope borough provided 662 respondents (Martin 2007). The question (B6), "Why did you live somewhere else?", helps sort out the reasons why respondents moved, as does the question (B7), "Why did you move back?" A question about temporary migration for market work (B9a) has a slightly different time dimension for temporary migration than the STN survey (one month instead of two weeks), but informs a similar question. One question (C21) asks whether the respondent, if the respondent could choose, would rather work a "wage job," "harvesting, herd-

ing or processing your own food," or "both." This question has a possible interpretation of temporary employment, but does not necessarily indicate temporary migration.

Buckland Census (BC). The census of all 74 households in Buckland, Alaska, was conducted in 2003 by ISER, the Alaska Department of Fish and Game, and the National Park Service (Martin 2006; Martin 2007). This survey includes a question concerning the respondent's work schedule where one of the coded responses is that the work schedule is "irregular/as required." The response "irregular/as required" can have a temporary migration interpretation if the work location and residence location are sufficiently far apart. Data on both the respondents' residence locations and work locations were collected as part of the survey.

Much of the information gathered using these instruments remains unexplored. Of the three surveys, only the SLiCA data have been extensively analyzed. Recently, Martin (2007) has generated a set of five "stylized facts" from these surveys as follows (see Martin 2007 for a full description and discussion of these findings): (1.) Push and pull factors drive gender differences in Iñupiat migration; (2.) Many men who return [to a rural place] do as well or better than people who never left; (3.) Return migration benefits [rural] communities; (4.) Out-migration without a return flow is detrimental to communities; and (5.) A key influence on Iñupiat migration is the sending of subsistence food from rural to urban areas.

None of these five stylized facts mentioned by Martin deals with temporary migration for market work. The present paper is then a continued secondary data analysis of non-Census information collected during earlier research projects. Use is made of these data sources in an endeavor to address different questions than other researchers. Attention is focused on responses to survey questions that inform temporary migration decisions.

Findings

One important note on the collected data is that women appear to be over-sampled in all three surveys. According to data circulated by the State of Alaska, men outnumber women in all three areas surveyed in north and west Alaska (State of Alaska 2007). However, in all three surveys more of the respondents are women than men. While this fact does not necessarily indicate a bias in the data, caution should nevertheless be observed when interpreting the apparent gender effects.

Social transitions of the North (STN)

The STN survey examines temporary migration for market work directly. The relevant questions in the survey ask whether the respondent worked

away from the community in the previous year. For the purpose of this paper, individuals who maintain residence in one place while moving to another for two weeks or more in order to work are considered temporary migrants. As shown in Table 1, between 11.70 and 16.37 percent of the respondents overall fit the description of temporary migrants for reasons of market work.

In general, the percent of those surveyed who migrate temporarily for work declined between 1993 and 1995. There are also clear gender effects. In 1993, women migrated temporarily at a higher rate than men, and in 1994 and 1995 the opposite was true. For men, the rate of migration spikes dramatically in 1994, while for women the rate declines steadily. Table 2 displays the pattern of temporary migration for each month, disaggregated by gender. The rate of migration clearly depends upon the month, or season. Interestingly, the spike for men witnessed at the annualized level in Table 1

Table 1. Temporary migrants for work, Northwest Arctic Borough

	Percent Who Worked Away from Community Last Year		
	1993	1994	1995
Men	12.05	18.52	12.82
Women	20.45	14.29	10.91
Total	16.37	16.13	11.70

is largely due to increased activity toward the end of the year. In fact, migration rates for men are actually lower in 1994 compared to 1993 and 1995 for many months in the first half of the year. Similarly, for women the steady decline in the rate observed at the annual level is not as smooth when fluctuations are observed every month.

Survey of living conditions in the Arctic (SLiCA)

The SLiCA survey also takes on temporary migration directly. One question asks whether the respondent has worked away from the community for more than one month. People who report being away for work for more than one month satisfy the two-week criteria for temporary migration, under the assumption that they maintain residence in the community where they were surveyed. Table 3 shows the results from the relevant SLiCA question for 2002.

Overall, 8.01 percent of the respondents report being away from the community to work on a temporary basis in 2002. This rate is considerably

Table 2. Temporary migrants for work, Northwest Arctic Borough, by month

	Percent Who Were Away More Than Two Weeks			
		1993	1994	1995
January	Men	3.61	0.00	5.13
	Women	2.27	2.86	0.00
February	Men	2.41	0.00	5.13
	Women	3.41	2.86	0.00
March	Men	2.41	0.00	7.69
	Women	2.27	2.86	0.00
April	Men	2.41	0.00	7.69
	Women	1.14	1.43	3.64
May	Men	4.82	1.85	7.69
	Women	2.27	2.86	0.00
June	Men	6.02	5.56	5.13
	Women	5.68	4.29	0.00
July	Men	8.43	5.56	5.13
	Women	4.55	2.86	1.82
August	Men	6.02	5.56	5.13
	Women	6.82	5.71	0.00
September	Men	6.02	5.56	5.13
	Women	5.68	2.86	1.82
October	Men	6.02	9.26	7.69
	Women	2.27	4.29	3.64
November	Men	6.02	1.11	2.56
	Women	2.27	5.71	3.64
December	Men	4.82	5.56	2.56
	Women	2.27	4.29	1.82

lower than what is reported in the STN survey for 1993–1995. Men migrated temporarily at a higher rate than women, according to the SLiCA results, as did the STN respondents in both 1994 and 1995. Unlike the STN survey, the SLiCA survey asked respondents to report other reasons for being away from the community. As shown in Table 3, work is the fourth most common reason for being away overall after vacation, family, and the catch-all "other" category. The rate of migration for market work was about the same as for subsistence activities of "Hunting, fishing, trapping, or gathering," and was substantially higher than leaving the community temporarily for education.

Table 3. Away from community more than one month, SLiCA Region, 2002

Percent Away More Than One Month, by Reason and Sex			
	Men	Women	Total
Work	10.60	6.07	8.01
Education	7.07	6.07	6.50
Illness	3.53	5.54	4.68
To go to a camp or cabin	7.42	6.60	6.95
Vacation	14.13	13.98	14.05
Family	10.60	13.98	12.54
Hunting, fishing, trapping, or gathering	9.19	6.86	7.85
Other	7.77	8.71	8.31

The SLiCA data set is large enough and contains enough relevant questions to potentially provide reliable parameter estimates of factors that contribute to temporary migration. The natural statistical method for analysis in this context is the probit model, because it generates estimates of how characteristics of the respondent change the probability of leaving the community temporarily for market work. In addition to the probit estimation, three other estimations were made for comparison: linear regression (linear probability model), logit, and tobit. All models were estimated using STATA statistical software employing standard designs that correct for heteroskedasticity. The dependent variable is the response to the question (B9a) of whether the respondent was away for work more than one month.

In Table 4, the results of regression analyses are reported. The four different methods employed all yielded roughly the same results. Because the variables that are statistically significant are the same in every estimation and the marginal effects are very similar, only the probit results will be discussed. As above, the dependent variable is whether the respondent was away from home for work for more than one month. Independent variables are: age, sex (male=1), whether subsistence hunting or fishing was engaged in by the respondent (yes=1), whether the respondent had a full time job (yes=1), whether the respondent considered moving away from the community (yes=1), education level, general health (self-reported), household income from wages, and the respondent's general satisfaction with life. The statistically significant variables are sex, having a full time job, and household income from wages. Consistent with the figures in Table 3, the probit results indicate that men are more likely to be away for work than are women. Having a full time job is also a positive predictor of working away from the community and may indicate that full time jobs are scarce in many locations, leading to residents choosing to migrate temporarily for work. While

the coefficient of the household income from wages variable is statistically significant, it is small in magnitude and negative in value. The negative coefficient means that as household income from wages increases, the probability that the respondent works away from his or her village declines. One interpretation of this outcome is that local jobs, while scarce, pay relatively better than jobs respondents migrate to acquire.

The multivariate results are robust. The general agreement of the four estimation techniques, and the statistical significance of the F-tests for all four, suggest confidence in the values of the statistically significant parameter estimates. The pseudo R^2 value 0.159 in the probit model indicates approximately that sixteen percent of the variation in the dependent variable is explained by the independent variables. Many of the explanatory variable coefficients are not statistically significant, a common result when using cross sectional survey data. It is surprising that age and education do not seem to play a big part in the decision to take a job away from one's home village. A possible explanation of this is that respondents do not vary sufficiently in these characteristics to determine the influence that age and education have on the migration decision.

Buckland Census (BC)

The BC survey does not ask explicit questions about temporary migration for market work. It does, however, ask questions about work schedule, and the location of the respondents' residence and place of work. Combining these questions, respondents who worked an irregular/as required schedule at a job in a location different from their place of residence would be temporary migrants for market work as long as the location of the residence and the place of work were sufficiently distant from each other to require temporary relocation. In examining the BC data no evidence of temporary migration was uncovered. Specifically, no respondent reported working an irregular/as required schedule in a location sufficiently far away from her/his residence to require temporary relocation. The rate of temporary migration in the BC survey, then, is the lowest of all the surveys: zero.

Conclusions

A reasonable assumption about migration is that people move from one place to another only if they expect to be better off in the new place. Otherwise, the decision to move would be perverse. What makes a person "better off" depends on the individual. Migration has been studied by many researchers who have uncovered a wide variety of reasons for migration including family considerations, traditional cultural activities, and job opportunities.

Table 4. Regression results for SLiCA data, dependent variable: Away for work

Variable	Linear regression	Probit [marginal effect]	Logit [marginal effect]	Tobit
Age	-0.001 (0.002)	-0.005 [-0.002] (0.007)	-0.007 [-0.001] (0.013)	-0.002 (0.002)
Male	0.130* (0.061)	0.445* [0.129] (0.212)	0.799* [0.128] (0.368)	0.168* (0.079)
Subsistence hunting or fishing	0.071 (0.062)	0.224 [0.063] (0.218)	0.469 [0.072] (0.395)	0.096 (0.078)
Full time job	0.210* (0.061)	0.859* [0.216] (0.272)	1.642* [0.222] (0.567)	0.268* (0.077)
Considered moving away	-0.036 (0.070)	-0.067 [-0.019] (0.237)	-0.227 [-0.035] (0.421)	-0.054 (0.088)
Education	-0.027 (0.040)	-0.117 [-0.033] (0.134)	-0.188 [-0.029] (0.237)	-0.035 (0.050)
Health	-0.002 (0.031)	-0.019 [-0.005] (0.103)	-0.021 [-0.003] (0.182)	-0.002 (0.038)
Household income from wages (000)	-0.002* (0.000)	-0.005* [-0.001] (-0.002)	-0.009* [-0.001] (0.004)	-0.002* (0.001)
Satisfaction with life	-0.001 (0.037)	-0.008 [-0.002] (0.124)	-0.006 [-0.001] (0.208)	-0.003 (0.045)
Constant	0.843* (0.206)	1.173* (0.733)	1.801* (1.312)	0.818* (0.260)
F-statistic	3.91*	2.78*	2.54*	3.34*
Adjusted R2	0.166			
Pseudo R2		0.159	0.163	
Number of observations	198	198	198	198

*Statistically significant at 0.05 or less; standard error in parentheses.

One way to balance non-job considerations against the need for wage income is to move to another place temporarily for a job opportunity. By making a temporary move, an individual can maintain his or her residence in a community, thereby retaining place level amenities, family relationships, traditional activities, and so on. Temporary migration for market work might be an especially attractive solution for people who have strong community ties but few job opportunities.

Census data, while containing a wealth of information, do not reveal much about temporary migration. Some surveys conducted in recent years in Alaska's far north and west regions ask specific questions about temporary migration. Information from these surveys helps fill in the spaces left by the Census data with respect to temporary migration.

Overall, temporary migration rates vary from about eight percent to sixteen percent. Comparing these results with other work on migration in the same Alaska communities (as in Howe & Huskey 2007), the type of temporary migration described here accounts for as much as twenty-five percent of total migration in some cases. Men, in general, migrate temporarily for work at a higher rate than do women. Substantial fluctuation of the temporary migration rate occurs on a month-to-month basis, and the rates of temporary migration are different in different communities and in different years. In the case of the Buckland survey, the respondents reported that no temporary migration occurred at all during the survey period.

While this analysis reveals some information about temporary migration in Alaska, more work is clearly needed. The best approach is to design a survey specifically to address questions of temporary migration. Useful survey questions would be ones that separate the decision to migrate temporarily from long distance commuting. Questions that address directly whether temporary migration is a solution to the desire to maintain residence in a particular place in the face of limited local employment opportunities would be especially helpful. Data collected from such a hypothetical survey could reveal more of the dynamic decision processes temporary migrants engage in when contemplating non-permanent relocations for the purpose of market work.

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Northern Lights Chase Tours
Experiences from Northern Norway

ABSTRACT This study is focused on the development of northern lights chase tourism, a particular type of northern lights tourism consisting in guided tours that have the goal to find good views of the northern lights.

The theoretical approach is based on the understanding of the northern lights experience as a visual experience, and on the recognition of the tourism practitioners as the driving force to new product development. The empirical case concerns the recent development of northern lights chase tourism in the Tromsø area, in Northern Norway.

The aim of this study is to investigate the tourism practitioners' understanding of the northern lights chase tourism, with a particular focus on the development of such a form of tourism as a source of positive memorable experiences. The research questions are: How is the northern lights chase tourism experience described by the tourism practitioners involved in its development? What are the recognized potentials, critical factors and challenges in terms of memorability?

On the basis of the empirical results, this study indicates actions directed at fully exploiting the identified potentials, and meeting the relative challenges, and considers critically the adopted theoretical approach proposing directions for future research.

KEYWORDS northern lights, guided tours, designing tourism experiences, Tromsø, Norway

Introduction

Although the northern lights have been objects of study as a natural phenomenon and a potential and powerful national icon since the eighteenth century, it is only recently that their tourist appeal has been recognized (Fara 1996; Friedman 2010). To the researcher's knowledge, there are few scientific contributions concerning northern lights tourism.

This study is focused on the development of northern lights chase tourism, a particular type of northern lights tourism consisting in guided tours that have the goal to find good views of the northern lights. Because of this focus, this study's underlying understanding of the tourism experience is connected with the tourism experience as an essentially visual experience (Urry 2002).

According to the classification advanced by Hjalager (2010) of the different categories of tourism innovation, northern lights chase tourism can be viewed as a case of product innovation that is directly observable by the tourists. The empirical case investigated in this study concerns the recent development of northern lights chase tourism in the Tromsø area, in Northern Norway. Still following the classification by Hjalager (2010), the investigated case can be regarded as a case of the development of a product that is new to the specific destination.

This study is influenced by the practice-based perspective on strategy (Corradi *et al*. 2010), and the related recognition of the practitioners as those who elaborate new products in response to external trends and on the basis of their creativity, values and competence (Hjalager 2010). The aim of this study is to investigate the tourism practitioners' understanding of the northern lights chase tourism, with a particular focus on the development of such a form of tourism as a source of positive memorable experiences. The research questions are: How is the northern lights chase tourism experience described by the tourism practitioners involved in its development? What are the recognized potentials, critical factors and challenges in terms of memorability?

On the basis of the empirical results, this study aims to indicate actions directed at fully exploiting the identified potentials, and meeting the relative challenges. On the basis of the empirical case, this study aims also to consider critically the adopted theoretical approach, and indicate relevant complementary and/or alternative theoretical approaches that might be used in the future study of such an under-investigated form of tourism.

In the next section this study's theoretical background is presented. The third section describes the research method applied to investigate the empirical case of northern lights chase tourism in the Tromsø area. The re-

sults are then presented and discussed in the fourth section. The last section presents the conclusions, outlining the main findings and indicating some directions for further research.

Theoretical Background

This section presents the study's underlying understanding of the northern lights chase experience as a visual experience, and its perspective based on the central role recognized to the tourism practitioners. In addition, the elements that are identified in the tourism literature as being particularly relevant in relation to the creation of positive memorable tourism experiences are presented as the basis of the discussion of the empirical case. The section concludes summarizing the main ideas behind this study.

Northern Lights Chase Tours as Visual Experiences

This study has its underlying understanding of tourism in its conceptualization as a visual form of consumption (Urry 2002). During their holidays tourists search those images that are associated to the destination they are visiting, often trying to re-create a set of photographic images of what they have seen in tourist guides, brochures and documentaries (Jenkins 2003; Moir 2010).

Such an understanding of the tourism experience that privileges the visual aspect seems to be particularly suitable for the study of northern lights tourism. Northern lights chase tours in particular can have a significant relevance in the Arctic tourism experience, because they assist the tourists in their search for the image of what can be qualified as the icon of the Arctic.

On the other hand, it can be noted that this focus on the visual aspect of the tourism experience has been subject to criticism by several scholars. Some scholars have argued that such a view excludes the tourists' intellectual activities, bodily performances and their substantial interrelation (Perkins & Thorns 2001; Obrador Pons 2003; Rakić & Chambers 2012).

Another type of criticism concerns its neglect of the social dimension of the tourism experience. This aspect can be seen in relation to the recently new approach to the tourism experience as a co-created experience where the tourists have a central active role, also in their interactions with the other people with whom they come in contact in a sort of tourism experience network (Binkhorst & Dekker 2009).

The Perspective of the Northern Lights Chase Tourism Practitioners

As mentioned in the introduction, this study is influenced by the practice-based perspective on strategy, sometimes referred to as strategy-as-practice. Such a perspective has its basis in the acknowledgment of the situated aspect of knowledge and the view of practice as reflective doing (Chia 2004; Corradi *et al*. 2010).

According to such a perspective, the core of a strategy consists essentially in the actual activities of the practitioners and in their knowledge at work (Jarzabkowski & Spee 2009; Corradi *et al*. 2010). The practitioners are viewed as those who "do the work of making, shaping and executing strategies" (Whittington 2006: 620).

Following such a view, it can be said that the tourism practitioners are the ones who make, shape and execute the strategies involved in tourism development. Such an approach directs the focus at the practice itself. This aspect is evident in some studies concerning tourism experiences in natural environments, with the guides viewed as "reflective doers" (Rantala 2010; Rantala *et al*. 2011).

In terms of tourism product innovation, the position of the strategy-as-practice perspective can be related to the recognition of the practitioners as the actors, who develop innovative products, individually, as entrepreneurs, and/or in groups, as part of local networks (Hjalager 2010).

Such considerations can be related to the case of the tourism practitioners operating in northern lights chase tourism. Adopting the strategy-as-practice perspective to the study of the development of the northern lights chase tourism implies then an understanding of such a development as the result of the practitioners' activities based on their creativity, values and competence, stimulated, acquired and renewed through their experience, and on their working alone, as entrepreneurs, or in groups, as members of formal and informal local networks. According to this view, it is their doing that is the prime motor of the development of northern lights chase tourism as a new form of tourism. As a consequence, the practitioners' experiences and reflections are viewed as being among the main driving forces of the development of northern lights chase tours as an innovative tourism product, and, therefore, their investigation is considered particularly relevant and is chosen as the focus of this study.

Northern Lights Chase Tours as Potential Memorable Tourism Experiences

Due to a lack of studies about northern lights tourism, concepts and find-

ings from studies about other forms of tourism, especially nature-based tourism, are adopted to identify the potentials of the northern lights chase experience. The following sections present such concepts and findings as relevant factors in relation to the memorability of the tourism experience. These factors will then be used in the discussion of the empirical case.

The tourism experience

The recognition of different types of tourists and tourism experiences (Cohen 1979) can be a starting point for the identification of the central aspects of the tourism experience.

Tourism experiences can be perceived as pure recreational activities, while in other cases they can satisfy the tourists' desire of experiencing something different and/or something particularly meaningful. In the latter case, the literature adopts the concept of *existential authenticity*. It has been noted that the modern tourist tends to view nature as being capable of offering experiences comparable to escapes from the bounds of the normal every-day life of the mundane society (MacCannell 1973; Fredrickson & Anderson 1999; Wang 1999; Reynolds & Braithwaite 2001; Curtin 2005; Reisinger & Steiner 2006). An example of this is offered by a study about wildlife tourism that compares nature-based experiences to the North American Indian rituals of "vision quests," travels undertaken by people at a critical moment of their lives and characterized by dream-visions interpreted as a sort of guardian spirits (Almagor 1985).

Also in the case in which the tourism experience is perceived as a recreational experience, it still has the potentials for being a particularly profound experience. Two concepts adopted in the wildlife tourism literature can be relevant in this regard: the concept of *intensity*, the excitement generated by the experience, and the concept of *uniqueness*, the sense of experiencing something special and unusual (Reynolds & Braithwaite 2001). A concept from the tourism literature that is related to the concept of *uniqueness* and to the mentioned aspect of escaping everyday life is the concept of *contrast*, the extraordinary aspect of the experience (Tarssanen & Kylanen 2007).

Other aspects indicated in the literature as relevant for positive tourism experiences are: *story* and *interaction* (Tarssanen & Kylanen 2007). The term *story* indicates the thematisation of the experience. This includes all the types of narratives that can be used by the tourism actors in their interactions with the tourists, especially before and during the tourism experience (Mossberg 2008; Bryon 2012).

The element of *interaction* refers to the relation between the tourist and the guides, and can be relevant in regard to the mentioned aspects of *story* and also to the concept of *individuality*, the tourist's perception of the ex-

perience as being tailor-made and the consequent sense of privilege (Tarssanen & Kylanen 2007). The role of the guides has been the object of study in nature-based tourism, especially in relation to the required skills and training needs and their responsibility in challenging situations (Ballantyne & Hughes 2001; Markwell 2001; Haig & McIntyre 2002; Beedie 2003; Reisinger & Steiner 2006; Rantala *et al*. 2011). The studies by Holloway (1981) and Cohen (1985) identify different roles the guides are expected to play. A guide can play the role of a *pathfinder*, a person who leads the way in an unfamiliar environment, the role of a *mentor*, a person who directs the tourists into their travel understood here as a sort of spiritual pilgrimage, and also the sub-roles of *information-giver*, *entertainer*, and *disciplinarian*. More recently, the role of the guides has also been studied in terms of their performative competence involving their interpretations through verbal and bodily communication and their ability to create intense moments through narratives and creative affordances (Jonasson & Scherle 2012)

The concept of *interaction* can also be referred to the interaction among the tourists. In this context, some findings about wildlife tourism show that the minimization of *the size of the tourist group* can have positive effects (Schanzel & McIntosh 2000; Smith *et al*. 2011).

The concept of *interaction* can have a further application with regard to the possible positive effects of the *interaction with the objects/subjects of interest*. This factor has been studied in wildlife tourism and related to the interactions of the tourists with the animals (Schanzel & McIntosh 2000; Smith *et al*. 2011).

Designing memorable experiences

Tourism design can be seen as a process of constant shaping of an event within a distinct span of time and in a clearly circumscribed place (Ek *et al*. 2008). According to such a view, the tourism actors, during their practice, assist the tourists in their experiencing a particular event and they do so designing the experience, from the pre-visit to the post-visit phase.

The creation of memorable experiences is an important aspect of tourism (Pizam 2010) and the literature has identified some elements that can be taken into consideration when designing experiences in order to create favourable conditions for memorability.

In the pre-visit phase, the tourists' *expectations* are considered particularly important in regard to the memorability of the tourism experiences. It has been suggested that it is important to establish expectations that are realistic and achievable (Tung & Ritchie 2011).

During the experience, the *delivery of pleasant surprises* is suggested as one of the design principles for memorable experiences (Tung & Ritchie 2011).

Another process that is considered to be relevant in terms of memorability is *recollection*, remembering the experience in the post-experience phase (Tung & Ritchie 2011). In this context, photographs and souvenirs play an important role, encouraging the memory of the experience and representing tangible evidence of it (Gordon 1986; Markwell 1997; Tung & Ritchie 2011; Wilkins 2011). The tourists' photographs are considered to be an essential part of the so-called "circle of representation," the process through which marketers and tourists develop the image of a tourist destination (Jenkins 2003).

Another element that is considered to be relevant for the memorability of the experience in the post-visit phase is *encouraging repeated visits* (Tung & Ritchie 2011).

This Study's Position

The research questions that are posed in this study are based on the concepts exposed above and here summarized.

As an underestimated form of tourism and a relatively new product, northern lights chase tours can be studied focusing on the elements that, according to the literature, contribute to the memorability of a tourism experience and the possibilities to influence such elements while designing the tours. At the same time, due to the novelty of the case, the exploitation of such possibilities are thought to be heavily influenced by the practitioners' conceptualization of the northern lights experience and by their experience as tourism providers and managers. As a consequence, this study adopts the practitioners' perspective and the research questions are developed and investigated as described in the following section dedicated to the method.

Method

The investigated empirical case concerns the northern lights chase tourism in the Tromsø area, in Northern Norway. Although northern lights tourism has been present in such an area for a relatively long time, it is just recently that it has begun to be on the agenda of the regional and national Destination Management Organizations (DMOs). The Tromsø case was selected because northern lights chase tours have been recently discussed in several forums among the local tourism actors. This is assumed to have stimulated reflections and considerations on its conceptualization as a tourism experience, its potentials and the critical factors pertaining to its development.

Secondary data was collected through the consultation of the local newspapers, marketing material about Tromsø, and statistical material elaborated by the Confederation of Norwegian Enterprise (NHO).

Primary data was collected in the period February–April 2012. Two

Table 1. Information about the interviews

Type of respondents	Specification of the role	Number of respondents
Providers	manager and guide	1
	manager, driver and guide	5
	guide	1
	driver	1
DMOs	manager	2

semi-structured interviews were conducted: one with a manager of Visit Tromsø (VT), the tourist destination management organization of Tromsø, and the other with a manager of Northern Norway Hospitality (NordNorsk Reiseliv, NNR), the tourist destination management organization for Northern Norway. One informal interview with a bus driver was conducted during an observation. The rest of the interviews were conducted with the managers and the guides of the firms offering northern lights chase tours. Table 1 shows the information concerning the type and the number of respondents.

Three observations were performed. Two were conducted while participating in two northern lights chase tours: one with one of the most experienced northern lights chase tours providers, and the other one with the biggest local tourism actor offering such tours. The third observation was performed while participating in a meeting entitled "Northern Lights Guide Course" organized by Profitable Winter Experiences (Lønsomme Vinteropplevelse, LV), a regional project network for the development of winter tourism.

Except for the mentioned informal interview, data from the interviews was based on interview guides, recorded on a dictaphone and transcribed. The data from the observations was registered in the form of notes just after the observations in the case of the northern lights chase tours, and during the observation in the case of the "Northern Lights Guide Course."

The primary data of this study is about 6 of the 10 providers identified in the Tromsø area (see below). Three have between 12 and 5 years of experience of northern lights chase tours, and the others have started more recently.

Results and Discussion

This section starts by presenting those results that can assist the reader in contextualizing the phenomenon subject to the study, the development of northern lights chase tourism. The section continues relating the results to

the research questions and discussing them on the basis of the ideas presented in the theoretical background.

The Context

Northern lights tourism in Tromsø

Tromsø is a Norwegian city counting approximately 68,000 inhabitants and located above the Arctic Circle. Its location in relation to the so-called northern lights belt, an area shaped as an oval strip around the North Pole, is favourable for viewing the northern lights.

The northern lights have been used by the tourism actors operating in Tromsø for a long time, but only recently have more efforts been directed towards its exploitation to market Tromsø as an attractive and unique winter destination. Such efforts have taken place together with an increased international attention that Tromsø has received since 2008. As reported by all the respondents during the interviews, two episodes were decisive. The first one is the NASA's statement in regard to the particularly active northern lights season in the years 2011–2013. Such a statement was followed by the publications on the Internet of a picture and a film about the northern lights in Northern Norway. The second episode concerns a documentary by the BBC: *In the Land of the Northern Lights*. Such a documentary was filmed in 2007 and broadcast on British television for the first time in 2008.

The NASA's statement and the BBC documentary have directed much attention to Northern Norway as a tourist destination and, possibly as a consequence of this, the area has been internationally qualified by the international press as among the best places to view the northern lights. In such a context, Tromsø was reported as being the most easily reachable city that can be used as a base camp for northern lights tours.

An increase in the number of the Tromsø hotel stays and the relative revenues was observed in the winter season 2011/2012 and, according to the interviewees and to the information reported by the local newspaper, such an increase may be related to northern lights tourism.

Northern lights chase tours

The northern lights chase tours offered in the Tromsø area differ according to the means of transport, the inclusion of additional services, the duration and the price.

Most of the companies use buses, and two companies use boats. All the tours include some form of refreshments: warm drinks, snacks and light meals. Some tours include warm clothes that can be used by the tourists during the trip. Two companies offer a digital picture taken during their

tours, and, during some tours of one of these companies, a professional photographer takes portraits of the tourists with the northern lights in the background and sells them through his private firm. In the case of two companies, tourists are given some gadgets, a badge and a glowing band with the firms' logotypes respectively. The duration of the tours varies from four and a half hours to eight hours, for a maximum of 300 kilometres. The price varies from 700 to 1,325 NOK, with some variations according to the season.

The providers of northern lights chase tours and the destination management operators

According to the secondary and primary data, and adopting the definition of northern lights chase tours in accordance with several of the comments made by the respondents (see below), the number of the northern lights chase tours providers is ten.

Five providers are one-person firms. In these cases the owner-manager also acts as the driver and the guide. Two providers employ helpers during the busiest period. The interviews revealed that these actors consider it difficult to find good employees, especially when the company's profile is characterized by and built around the person of the owner. This is for example the case of a company whose owner-manager is very active on the Internet, both on Facebook and on TripAdvisor.

One company, consisting of one person, provides tours and is also an incoming tour-operator.

Three companies are run by couples. Two of them conduct the chase tours by boat and they employ several people to perform all the needed tasks. Such companies have a large capacity, around 40 persons.

One provider is a company with three regional managers, of whom one works exclusively with northern lights chase tours during the winter, together with 12 trained guides and several professional drivers. This company can serve large groups of tourists. On one occasion it arranged a tour for 685 participants. With groups of approximately 50 people, this company usually uses three employees, one driver and two guides. In addition, two or three people are employed during the sale of the tickets and the boarding. According to this provider, the possibility to rely on such a broad spectrum of employees guarantees good service as it allows each employee to concentrate on one specific task. During the interview, it was said that the idea to offer chase tours was initiated by one of the managers, who had the personal experience of having difficulties in showing the northern lights to some private guests. With cloudy weather in town and all the chase tours by the small providers fully booked, he realized that tourists have very little chance

to view the northern lights. He concluded thinking that a large company could have been able to offer such tours every evening to a varying number of tourists, satisfying then a need that the present structure of the supply did not satisfy.

The other tours are conducted with minibuses, with a capacity that varies from 7 to 12 persons.

In regard to the relation between the providers, the data shows that the three most experienced providers tend to have a particular open dialogue. A fourth provider seems also to be integrated within such a group. Three of these actors share a sales office in town, and, during an observation, it was noted that two of them were in contact by phone in order to help each other to find good weather conditions. During the interviews such behaviour was indicated by several providers as happening relatively often, within this group of four and also with other providers.

When asked about their relation with VT, three providers reported the episode of a conflict at the beginning of the northern lights season concerning the use of the car parks along the road that is used during the tours. The providers reported how this conflict was positively solved thanks to the open communication among the providers and also the intermediation of VT.

In regard to the relations with the regional tourism organization NNR, almost all the providers described their relation with NNR as positive, although not so close as with VT. The latter aspect is in accordance with the role of NNR, which, as pointed out by the manager during the interview, works mainly through the local tourism organizations.

Secondary data showed that a two-day seminar was arranged by LV in March and, although there was a section dedicated to the northern lights experience, none of the Tromsø northern lights chase tours providers participated. Interviews showed that the providers thought that the invitation came too late and that the seminar was arranged in the busiest period of the year, in the middle of the northern lights season. A provider seemed to be particularly frustrated when reporting his/her feeling of being excluded. At the second seminar arranged in May, the "Northern Lights Guide Course," two of the northern lights chase tour providers were already operating and one who was planning to start in the season 2012/2013 participated.

The Experience

What is a northern lights chase tour?

Although there is a relatively homogenous understanding of what a northern lights chase tour is, there is no full agreement on the classification of the tourism products that can be related to the view of the northern lights. The

interviews revealed that not all the providers agree about the classification of the local products presented by VT based on the identification of two types of tourist products: northern lights chase tours and northern lights experiences. Several northern lights chase tours providers commented on the fact that some tours are described as chase tours, while, in their opinion, they do not have the characteristics that a chase tour has to have in order to be qualified as such.

Still in regard to the understanding of northern lights chase tourism as a distinct form of tourism, the data suggests that the most experienced providers are particularly concerned about this aspect. This can be illustrated by the following comment by one of these providers:

> We can't oversell the northern lights! Lately, everything has something to do with the northern lights and the northern lights chase! Just as an example: northern lights chase tour using a kick-sled ... this can't be qualified as a chase! Such differences should be made clear to the tourists.

During two interviews the researcher had the impression that the experienced providers feel a form of ownership in relation to the typology of chase tours. This feeling seemed not to be related to any desire to be the only providers offering such tours or any fear of newcomers, but to the concern for the way the northern lights are exploited in the broader tourism context.

The data from the interviews show also a concern by the tourism actors about some unofficial and rather improvised tours arranged by the local taxi drivers. This is a source of worry for the tourism actors, who point out the risk of low quality tourism experiences that might affect the companies operating within northern lights tourism and also the image of Tromsø as a tourist destination.

Existential or recreational experience?

Secondary data shows that there is a broad understanding about the potentials of the northern lights experience and the relative individual differences. Several local newspaper articles report the tourists' perspective on northern lights after participating in chase tours. An article dedicated to the northern lights chase tours arranged by one of the interviewed providers reports the guide's words: "Someone cheers, others cry, others are completely silent."

Several providers reported of having being in contact with tourists that viewed the experience as pure recreation and also with tourists who attached to it a much deeper meaning. During an interview, a provider commented on such differences. He/she reported the case of a couple who told

him/her that the choice to participate in a northern lights chase tour had a special meaning for them, because the wife had recently been diagnosed with cancer and that was probably their last holiday together. The possible deep meaning the tourist might attach to the tour is viewed as something private by the tourism providers and out of their control.

All the interviewed guides turned out to reflect on the role they have in such tours and made comments that can be related to the role of the northern lights chase guide as a combination of pathfinder, information-giver, disciplinarian and entertainer. The tasks they reported to be important for being a good guide were the ones concerning the information the tourists receive about the phenomenon and the local area, including the invitation to come back during the summer, the care and attention in order to keep the tourists safe, in relation to the street traffic, and comfortable, in relation to the low temperatures, and the ability to create a nice and relaxed "holiday atmosphere."

Using the terms introduced in the previous section, the empirical data shows that, in their relation with the tourists, the guides tend to stress the aspects of contrast, uniqueness and intensity. An aspect that was observed during the tours in which the researcher participated, was that when the northern lights were visible, the guides had a very explicit reaction showing wonder and also surprise. While these reactions seemed to be sincere, it could be suggested that they were somehow exaggerated, in an attempt to influence the tourists in a positive way.

Relevant aspects during the visit

Among the aspects reported by the providers as important for offering a good tourism experience, the size of the group was mentioned by all the small actors.

The interviewed providers that offer tours for small groups consider the limited size of the group a better condition for a good northern lights experience. One provider was particularly clear in this respect. The informant reported the following episode:

> Once I was with my group of tourists, driving out from town looking for good conditions to view the northern lights ... and suddenly I see two big busses parked and all the people out with their glowing vests on. I didn't stop. I drove on to find a quieter and not crowded place. I don't like this kind of tourism, it's not what I regard as quality tourism.

The same person added that he/she prefers to work in small-scale tourism but, at the same time, recognizes that it would be impossible to serve all the

tourists coming to Tromsø to view the northern lights without facilities and activities for mass-tourism.

The manager of one of the companies with large capacity commented on the aspect of experiencing the northern lights in large groups as follows:

> Many people think that the northern lights experience must be something to be experienced when you are on your own ... but to be completely alone in the Arctic wilderness ... how it this possible? For most of the tourists it's not realistic. But joining a tour, also with many other tourists, it can also be amazing! I'd compare it to being at a stadium, during a football match; you have hundreds of people around you ... and your team scores ... isn't that fantastic? A strong emotion, no matter how many people you have around, is still strong! With northern lights it can also be the same.

The aspect of the importance of the limited size of the groups and the relative effects, dealt with in the literature, is not confirmed by the data from the observations. During the tours the researcher participated in, the way the tourists behaved and reacted to the view of the northern lights was similar. During the drive the tourists seemed to be in a waiting mood, silent, looking through the windows and listening to the information the guides were giving. When the busses stopped, they went out and most of them reacted with surprise and wonder. Some of the tourists were visibly enthusiastic, commenting aloud and pointing at the sky. A comment that was reported by four respondents and that well describes the tourists' reactions was about tourists acting like children, meaning with this the cheerful reaction of surprise in seeing something new. Some of the tourists who seemed to travel on their own had a less explicit reaction. It was observed that after a while they tended to approach someone, the guide or another tourist, and comment about the northern lights. Such behaviour was particularly evident in one case when a light meal was served around a campfire.

The latter element, the tourist's desire to share the experience with someone else and, more in general, the interaction between the participants, can be interpreted as an indication of the importance of the social dimension of the experience. Such an aspect was ignored by almost all the providers during the interviews. Only one provider commented in this regard, saying that for him/her it is important to create an atmosphere that facilitates the conversation among the tourists, and ideally, the beginning of friendships across borders. Another provider commented in regard to the interaction among the tourists, but limiting his/her comment to the difficult cases when few tourists with a negative attitude can influence the rest of the group.

In terms of interaction between the guides and the tourists, no significant differences between the observed small-group tour and the large-group

tour were observed. It was noted that the tourists received as much attention by the two guides during the tour in a large group, as the tourists by the guide/driver during the tour with a small group. This can be explained by the fact that during the small-group tour the guide-driver tended to be very busy with several tasks.

In many cases the tourists are interested in taking pictures of the northern lights and, although to a different degree, all the tours include some kind of assistance by the guides in order to set their camera. The guides' skills in photography were identified as particularly relevant by the participants in the "Northern Lights Guide Course" arranged by LV. As mentioned before, in one case, an additional service of photographic portraits is available during the tours. During the observation of one of these tours, an informal interview with the bus driver, who had been working with the company during many tours with several different guides, revealed that the tours where the photographic portraits are taken are particularly appreciated. In regard to this, the manager of the specific company commented:

> When the guides take these portraits it's like they bring the northern lights down from the sky, making them accessible to us ...suddenly the tourists are in touch with something extraordinary, that is usually out there ... in space ... it's powerful!

In addition, the manager expressed his/her interest in using the pictures taken during the tours on the company's Facebook page, as an effective way to create positive word-of-mouth communication. In regard to the role of the pictures within the tours, the photographer agrees with such a view, although he/she is more focused on the significance that the pictures can have in the post-experience phase for the individual tourist, as a kind of support to reflect and re-elaborate his/her memories.

The pre- and post-experience phases

All the respondents commented on the importance of the expectations tourists have before arriving in Tromsø. In particular, the respondents expressed concern about the not controllable sources of information. Such a concern was evident during the discussion at the seminar arranged by LV. The data from the observation shows that there is a general misunderstanding of the information by the international press about the cycles of the northern lights. The tourism actors said that the recent focus on the phenomenon has contributed to presenting only the next two years as favourable for viewing the northern lights. This is not entirely true as, due to its location in relation to the northern lights belt, Tromsø is only slightly

influenced by the peaks of the period 2011–2013.

The providers stressed the responsibility the DMOs have in shaping the tourists' expectations. The use of the northern lights in the marketing of Tromsø and Northern Norway is viewed as positive by most of the providers. Such an activity is viewed as contributing to attracting tourists that might be interested in participating in northern light chase tours. At the course arranged by LV it was pointed out that such promotional activities should also contribute to spreading correct information and form realistic expectations. The more experienced providers commented that, although viewing the organizations' task in this sense as important, their businesses are not directly influenced by it, as they have already been active in northern lights tourism for a while and have their own communication channels to reach potential tourists.

The contact with the tourists in the pre-experience phase was described by a provider as an important part of his/her job that is relatively easily conducted through the Internet, especially email and Facebook. In regard to this aspect, two providers had a different opinion, commenting on their inability to spend time on being active on the Internet.

The data shows that the post-experience phase is relatively neglected by several providers. Only three of the contacted providers use photographs and souvenirs. On the other hand, all the providers reported that they stimulate tourists to come back to Tromsø in the summer, telling them about what the area and their company can offer them.

Challenges

During the interviews, the tourism actors were asked about the challenges facing northern lights tourism and northern lights chase tourism in particular. Some factors were mentioned by all the respondents: the weather, the safety and the contact and interaction between the guides and the tourists. The challenge in regard to the weather concerns the necessity of clear skies in order to view the northern lights. All the providers said that they check the local weather broadcast, some also during the tour through mobile phones, but that they rely mostly on their own knowledge about the local areas and on tips by colleagues.

Safety is understood in relation to difficult driving conditions in case of bad weather. In this regard all the providers said that in some cases the tours might be cancelled for safety reasons. The providers who use the busses commented also about the risks pertaining to the only available option to park close to the main road. VT indicated the need to have more and broader parking facilities. The municipality was described as having the responsibility for preparing such car parks already when the first snow comes

in autumn.

The element of the contact with the tourists was mentioned mainly in connection with the role of the guide. According to three of the interviewed providers such a relation has to be nurtured already in the booking phase. These providers mentioned their contact on the Internet before the tourists' arrival as being essential for giving accurate information about the tour, especially in regard to the low temperatures that the tourists might experience. For all the providers the contact during the tour can be summarized with the idea of being good hosts. A provider said that he/she always gives 100 per cent of himself/herself during the tours, and another provider commented similarly saying that:

> Your performance as a guide makes the difference. You have to perform: if there is any chance to view the northern lights also at the end of the tour, you have to be out there longer ... so they can see them! And you have to smile of course, and be nice no matter what ... after all they are here to have a good time!

Another challenge that is related to the role of the guide and that was mentioned during the interviews and discussed during the course arranged by LV has to do with knowledge. Relevant knowledge is considered to be competence in terms of scientific understanding of the northern lights as a natural phenomenon and also the capacity to explain it and also tell the related myths and stories. Other relevant knowledge is considered to be generic tourist information about the local area. The training of the guides is viewed as essential, especially in those cases where the northern lights are not visible. All the interviewed guides were asked about their experience in such situations. The answers were relatively homogenous, referring to the habit of warning the tourists from the very beginning about such an eventuality, and the attempt to focus on other aspects of the tours, such as the beauty of the landscape and the culture-historical presentation of the local area.

Conclusions

The empirical data shows that the tourism practitioners involved in the development of the northern lights chase tourism describe the relative tourism experience as a complex and memorable experience. Many of the elements identified in the tourism literature as relevant for positive memorable experiences are broadly recognized by the tourism actors.

At the same time, it can be noted that some elements, although recognized, are not fully exploited. In particular, the possible existential aspect of such tours and their social dimension are elements that could be better

exploited and are therefore identified as critical factors for the future development of northern lights chase tourism.

On the practical level, it seems correct to say that the inclusion of the identified critical factors in the design of the tourism experience could gain from a more market- and tourist-based approach to tourism product development. A segmentation of the tourist market could be particularly important as the starting point for developing northern lights chase tours as recreational activities and/or existential experiences. As the results show, the tourism actors recognize the existence of different types of tourists, but at present such recognition is basically intuitive. Research is necessary to gain a better understanding of the different types of tourists so that distinct and relevant market segments can be identified. Considering the challenges implicit in the investigation of the identified critical factors, in particular the potentials in terms of existential experience, it can be suggested that the research could be performed applying both unobtrusive methods, such as observations, and introspective methods, such as analyses of the tourists' spontaneous annotations in diaries, as done for example in Volo (2009). It can be added that it seems unrealistic to think that the individual small actors have the resources to plan, perform and evaluate such research, so that in this context the local DMOs can be considered to play a decisive role, possibly in collaboration with academia.

In regard to the social dimension of the tourism experience and the related issue of the group size, it seems correct to say that, as commented above on the aspect of the northern lights chase tours as a recreational and/or existential experience, a better understanding of the different segments is necessary.

The empirical data shows also that the practitioners identify in the information concerning the northern lights to which the tourists are exposed before their visit as a particularly challenging aspect of such a form of tourism. They think that such information can be inaccurate and can influence the tourists' expectations and, consequently, the memorability of the experience. Such a possible negative influence can be met through the training of the involved actors that are in contact with tourists and a focused communication campaign by the DMOs.

Still in regard to the critical factors for northern lights chase tourism development that emerged from the data, it seems correct to say that a clearer differentiation by the DMOs of the chase tours from other tourism products that include the view of the northern light is needed, together with a broader attention by the practitioners to the pre- and post-experience phases. The latter could be done for example through a more strategic use of the different Internet-based communication channels, which at pres-

ent is done by only a few providers.

In addition to the mentioned practical implications, the above considerations can be significant in relation to the theoretical approach that can be adopted in future studies about the northern lights tourism. The findings of the investigated case suggest that focusing on the visual aspect of such a tourism experience might be limiting. The underlying understanding of the northern lights chase tourism experience as an essentially visual experience could be integrated with concepts and perspectives from other approaches. An example is the mentioned co-creation approach that might contribute to the inclusion of the social dimension of the experience. Such an approach could also contribute to giving to the tourists a more active role in the tourism experience. The latter element could be particularly relevant when related to the tourists' creative activity of taking pictures of the northern lights.

The aspect of the active role played by the tourists can be also related to the role of subjectivity in the tourism experience. This implies a shift of focus from the objects of observation to the subjective negotiations of meaning as the determinants of the tourism experience. Such a shift is one of the main dimensions along the post-modern understanding of the tourism experience (Uriely 2005), and can be related to the mentioned critical factor of the potential existential aspect of the northern lights experience. In this context some insights could be gained through the inclusion of contributions from the study of ephemeral phenomena and seasonality in landscape research (Brassley 1998; Palang *et al*. 2005). The inclusion of contributions from such a field of study seems also to be in accord with some of the comments reported by all the tours providers concerning the contrasting views of the Arctic natural landscape.

Still on a theoretical level, the empirical results show how the development of the northern lights chase tourism as a new form of tourism depends on and requires initiatives and actions by the individual practitioners as well as by the local DMOs. Such an aspect indicates the complementary role of the two theoretical schools of entrepreneurship and innovation systems identified in Hjalager (2010) as being usually adopted in the study of tourism innovation.

On the basis of the empirical data and in addition to the elements mentioned above, the following issues are identified as potentially relevant for the development of northern lights chase tours, and northern lights tourism in general, and are suggested as objects for further research: The role of photography, from the pre- to the post-experience phase; The challenges in regard to the broad spectrum of competence required for northern light guides, from scientific dissemination to storytelling.

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Reviews/Comptes rendus/Besprechungen

Cato Christensen, *Religion som samisk identitetsmarkør. Fire studier av film*, diss., Tromsø: University of Tromsø 2013, ISBN 9788282440998, v + 174 pp.

In his doctoral dissertation *Religion som samisk identitetsmarkør. Fire studier av film* ['Religion as a Sami identity marker. Four studies of film'] the scholar of religion Cato Christensen discusses the relationship among cinema, religion and Sami identity. The main focus is on two films directed by the Sami filmmaker Nils Gaup, *Ofelaš/Veiviseren* ['The pathfinder'] (1987) and *Kautokeino-opprøret* ['The Kautokeino rebellion'] (2008). Christensen's main argument is that these two films reflect, and at the same time contribute to, the ongoing revitalization of Sami ethnic identity. More specifically he claims that these films promote *religion* as an identity marker for Saminess, and that religion, then, functions as an important resource in the revitalization process. The kind of religion the author has in mind is what he calls "indigenous spirituality," a religiosity which he sees as informed by both the pre-Christian Sami religion and "late modern indigenous peoples' discourses." These discourses are, in the author's view, founded upon primitivist conceptions from the Western history of ideas and colonialism. According to Christensen this "indigenous spirituality" is a significant part of indigenous peoples' cultural and political revival worldwide. With his choice of cinema as the object of study, Christensen wishes to widen the empirical scope of the study of religions to include also popular cultural expressions.

Religion som samisk identitetsmarkør is a compilation thesis and the "four studies" of the title are represented by four previously published articles, three in Norwegian and one in English. In addition there is an extensive introduction of 96 pages. I guess it takes some courage to choose a topic like Christensen's, since it means critical scrutiny of the works of a celebrated representative of a historically discriminated minority group struggling for recognition and political rights. Christensen is aware of the hazards involved, but argues that, from an academic perspective his analyses are not particularly radical or controversial, even if they might be provocative from the perspective of those under study (p. 75). This leads him over to a discussion of ethics for researchers. In this context he warns against giving in to political correctness or what the Canadian anthropologist Ronald Niezen has termed "the politics of shame," that is, that awareness of historical injustices guides the politics—and research—of today in a compensating direction. This must not, however, be done at the expense of commonly accepted norms for scientific work. In a rhetorically elegant discussion Christensen argues that it is rather an ethical responsibility for scholars not to refrain from critically scrutinizing romantic conceptions of indigenous peoples. Such critical studies do not necessarily stand in opposition to supporting these peoples' struggle for political and cultural rights and recognition. On the contrary, Christensen maintains, critically investigating such notions among indigenous peoples is a way of taking these peoples seriously. I find in this reasoning the author's main motive for the study.

Christensen makes a few interesting points in his thesis. In the article "Re-

ligion i *Veiviseren*. En analyse av samisk religiøs revitalisering" ['Religion in *The Pathfinder*. An analysis of Sami religious revitalization'] he shows how the depiction of Sami pre-Christian religion in Gaup's film *The Pathfinder* is an adapted version suited for today's audience. Drawing from the American folklorist Thomas A. DuBois' (2000) analysis of the same movie, Christensen concludes that the plot is relatively true to the oral folklore on which it is based, apart from one ingredient—religion, which is largely absent in the documented versions of the legend. Furthermore, the Sami religion in the film is far from the demonized version of the pre-Christian religion that we know from the written sources by Lutheran clergymen of the seventeenth and eighteenth centuries. Christensen makes a point of the fact that Gaup has placed the plot in an undefined pre-Christian era. By doing so the filmmaker does not confront present-day Christian (and he particularly mentions followers of the conservative revivalist movement Læstadianism) or secular Sami with questions of "true faith," and thus audiences are able to identify and sympathize with the Sami in the film regardless of their own religious belonging. This has also been pointed out earlier by DuBois.

The article "Reclaiming the past. On the history-making significance of the Sámi film *The Kautokeino Rebellion*," originally published in *Acta Borealia* in 2012, offers a good analysis of Gaup's film on the events taking place in and around Kautokeino, in Northern Norway, in the middle of the 1800s. A Christian revivalist movement among a group of reindeer herders—under pressure from, among other things, changing living conditions, alcohol abuse, the insensitiveness and ignorance of Norwegian authorities (including the Norwegian Church), and inspired by the preaching of the Swedish Lutheran clergyman Lars Levi Læstadius—culminated in a violent showdown in which several people were assaulted and killed (see Zorgdrager 1989 or 1997 for the most meticulous study of these events). Some 30 Sami were prosecuted and sentenced for the insurrection, and two eventually faced capital punishment. As a consequence and in the aftermath of the rebellion Norwegianization of the Sami increased and the incident has been a trauma and a stigma for the descendants of those involved in the revivalist movement (Gaup himself is a descendant of one of the leading figures in the movement). In the article Christensen structures his analysis of the film, its wider contemporary context and reception with the help of German literary scholar Astrid Erll's theory of how film is able to successfully create "cultural memories" and "collective imaginations" of the past without necessarily keeping to "historical accuracy." He plausibly explains how the film managed in "retelling, reimagining, reconstructing and reclaiming the past" and thereby giving the story, at least potentially, an ethno-political significance for the Sami. Many of his points about *The Kautokeino Rebellion* go for the *The Pathfinder* as well.

In the article "'Overtroen er stor blant Viddenes folk.' Om religion og koloniale relasjoner i samisk filmhistorie" ['"Superstition abound among the people of the Fjelds." On religion and colonial relations in Sami film-history'] Christensen accounts for the portrayal of the Sami in Norwegian cinema from the 1910s until the present, and more specifically he analyses the depiction of Sami religiosity (in its widest sense) in these films. He concludes that in the oldest films religious belonging played the role of demarcating ethnic boundaries between Sami and Norwegians, and that the religion of the Sami was demonized. Later on, and for most of the twentieth century, religion was all but absent in the "Sami films," at least as

a marker of ethnic differences. With Gaup's two movies came what Christensen calls a "religious turn," in which the religious theme is once again present as a marker for Saminess, but now with an affirmative attitude towards Sami religiosity. This conclusion seems quite plausible at first glance. But since Christensen, in a footnote, mentions no less than ten other films, produced during the same period as *The Pathfinder* and *The Kautokeino Rebellion*, and since he does not mention anything about the religious theme in these movies, one cannot help but wondering whether they perhaps display the same lack of interest in religion as most films in previous decades. In that case, Gaup's movies are perhaps exceptions from still prevalent attitudes, and not a general "trend." Even if Gaup's films have reached, and been appreciated by, an incomparably larger audience than the others, Christensen should have clarified this in order to make his conclusion plausible.

In general the texts in the thesis are well-written and it is easy to follow the author's reasoning. However, despite rather extensive discussions in the introduction, Christensen's treatment of the concepts of "religion" and "spirituality," as well as the relation between those two, is somewhat confusing. Since these concepts, together with his assumption about "indigenous spirituality," are fundamental for his analyses this lack of clarity is not an insignificant flaw. One obvious drawback of a compilation thesis such as this, with all the articles and the introduction focusing on the same theme, is also that repetitions of facts, arguments and conclusions abound. In short, the things said and claimed could have been presented on considerably fewer pages, and that would have given Christensen both the time and the space for widening his empirical source base as well as making deeper and more thorough analyses of his material.

Regarding the empirical base Christensen has chosen not to consult or interview Nils Gaup for his research. He justifies this with a desire to have a high degree of transparency by using what he calls "naturally occurring texts," that is, the films, and with not wishing to give the views of the filmmaker priority in the interpretations of them. Still he accounts at times for what Gaup has had to say about the films in interviews made and presented by Kari Synnøve Morset in her doctoral thesis (2009). Obviously, then, he finds it fit to consult the director on some points. I believe that Christensen would have benefitted from consulting Gaup more. That would have given him more and better material to make more balanced analyses and draw more reliable conclusions. To rely on interviews with an author does not necessarily imply giving priority to the author's interpretations, only making the interpretations of the researcher more well-informed.

In the article "Religion i Kautokeino-opprøret. En analyse av samisk urfolksspiritualitet" ['Religion in the Kautokeino Rebellion. An analysis of Sami indigenous spirituality'], which Christensen has written together with his supervisor Siv Ellen Kraft, the authors claim that Gaup's film is not in accord with historical events. They mention the essential research made on the revivalist movement of the mid-1800s around Kautokeino, but they do not account for what is known about the movement and the rebellion from this research nor from any primary sources available. Thus, they present no evidence for their claims about the movie's inaccuracy. For example, they contend that Gaup has played down the extent of the violence performed by the revivalists, and that he has reversed the burden of guilt and detached the movement from the underlying circumstances (article 2, p. 24). But which underlying circumstances Christensen and Kraft find wanting

they do not tell. This is quite surprising since watching the film it seems as if Gaup is focusing on nothing but what might be called underlying circumstances: the wide-spread alcohol abuse and the economic and social unrest this caused among the reindeer-herders; the stress imposed on the reindeer herding community when several of the Sami were imprisoned; the insensitiveness and lack of empathy among representatives of the Norwegian Church and state; the influences on the revivalists from the Swedish priest Læstadius; the clash between Sami and Norwegian norms for male and female authority; the secondary status of the Sami in relation to the church and Norwegian authorities and society in general. I am not saying that Gaup's version is historically correct in every respect—and as an artist, hardly would Gaup. But Christensen's and Kraft's contention that he detaches the events from its background remains an empty proposition when they do not inform us which decisive causes they find lacking.

Christensen and Kraft also contend that when the main character in the film—one of the revivalists—claims that "God does not live in buildings of tree and stone, he lives in humans," this does more reflect present-day "indigenous spirituality" than the views held by the revivalists in Finnmark in the nineteenth century (article 2, p. 23). However, the authors should have argued for this point in view of the historical sources that tell us that several of the revivalists in Kautokeino claimed that they had the Holy Spirit inside them and some even calling themselves Son of God or Jesus Christ. Is it perhaps possible that Gaup alludes to such statements? Further, it is not unlikely that the revivalists were inspired by St. Paul's words that God "does not live in temples made by human hands" (Acts 17:24) and that "your [the righteous'] body is a temple of the Holy Spirit who is in you, whom you have from God" (1 Corinthians 6:19). Such ideas seem a bit far from the "indigenous spirituality" that Christensen and Kraft has in mind.

A similar kind of sweeping proposition is made in Christensen's and Kraft's conclusion that Gaup depicts what they call "reindeer holism" and they claim that this breathes of modern "indigenous spirituality." One cannot help but wondering how Gaup could have depicted it otherwise when he aims at describing the conditions for Sami reindeer herders in Finnmark during the nineteenth century. Were not the reindeer herding Sami entirely dependent on the reindeer and the well-being of the herds? Did not the care for the reindeer permeate the culture and everyday life of reindeer herders at that time?

The two authors also show indiscretion in their propositions that it is unlikely that the women to such a degree dominated the religious movement in Kautokeino, as Gaup makes us believe (article 2, p. 23). By a quick look at the research and source material on the movement one finds that several women were actually among the leading figures in the movement, and women were a majority among those prosecuted for the violent insurrection (see e.g. Zorgdrager 1997). What scale Christensen and Kraft has used when comparing the degree of female dominance in the actual events with Gaup's version of them they do not specify.

To my mind Christensen (together with Kraft) over-interprets some of the features in Gaup's movies, that is to say that his assumptions about the role of "indigenous spirituality" in the films guides his interpretations more than the material allows. For example, the two authors interpret the character Ellen Skum, in *The Kautokeino Rebellion*, as "a mixture of the Virgin Mary and Mother Earth, with unbounded capacity for Christian as well as indigenous spiritual ideals and values."

That Skum is the heroine in the film is indisputable, and hence she embodies ideals and values that Gaup brings to the fore. But it is very difficult to find any obvious references to the Virgin Mary or Mother Earth, and since Christensen and Kraft do not articulate more exactly what these references are, my imagination falls short. Therefore, to me, the proposition seems empirically unfounded. Another example—found throughout the dissertation—is the claims that Gaup depicts the religiosity or "indigenous spirituality" of the Sami as "unchangeable and inherent" or an "essence" in Sami culture and identity. Any evidence or example of how the filmmaker portrays this as unchangeable and inherent is not presented, and therefore the concepts appear to be merely slogans in vogue—or are they meant to be denigrating epithets, perhaps? Why could not Gaup's intention have been to describe Sami religiosity in *The Pathfinder* and *The Kautokeino Rebellion* respectively as part of the particular historical epochs and cultures in which the films are enacted, that is as *contingent* instead of *essential* phenomena? If the plot in *The Pathfinder* is placed in an undefined ancient time in order not to offend Christians or religious sceptics—as Christensen concludes—then how could the aim at the same time be to depict the religious features as unchangeable and essential characteristics of the Sami? Furthermore, the religiosities depicted in *The Pathfinder* and *The Kautokeino Rebellion* are immensely different from each other, and I have difficulties finding any similarities between them. In the latter movie we also see Sami that are part of the revivalist movement, and some that are not part of it, or even against it. Are there any reasons to believe that Gaup wants to portray the latter group as less Sami? An interview with Gaup would surely have given Christensen the opportunity to gather more data, in order to make his own interpretations more reliable.

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Sumarliði R. Ísleifsson & Daniel Chartier (eds.), *Iceland and Images of the North* (Collection Droit au pôle), Québec: Presses de l´Université du Québec 2011, ISBN 9782760530874, xi + 611 pp.

A book about Iceland and images, published in 2011 and dealing with both historical images and their contemporary extensions, will inevitably be read in light of developments over the last few years. Even if the underlying research goes back some time before 2008, one could justifiably expect some reference to the events of that year and the following ones. The much-commented collapse of the Icelandic banking system was, among many other things, also an image crash. For a few years preceding it, the idea that Iceland was transforming itself into an international financial centre had become the "mythomotor" of Icelandic neoliberalism. This lunatic nonsense (there is no other word for it) was accepted by a majority of the population; the exact statistics are a matter of debate, but the general picture is beyond doubt. It changed abruptly in October 2008; the consequences are still unfolding, and the long-term outcome unpredictable. How much the Icelanders have learnt from the experience is highly debatable (one of the more worrying recent signs is the triumphant re-election, four years after the crash, of a president who before 2008 toured the world with the good tidings that Iceland had pioneered a superior system of financial management, based on the Viking heritage). In any case, the self-image that went up in smoke has not been replaced by a more coherent one. If we shift the focus to Iceland seen from elsewhere, the aftermath of the crash is no less bewildering. Myths about Iceland having nationalized the banks, resisted the demand to pay for the excesses of its financiers, and set itself a new constitution have enjoyed astonishing currency. By the time this review is published, at least some of these misconceptions will have been laid to rest.

Finally, the reference to images of the North has a particular bearing on the present situation. The boom years saw a semi-official attempt to disconnect Iceland from the Nordic world, supposedly left behind, and rebrand it as a country emulating the United States. As everybody knows, this *imitatio Americae* came to a deservedly absurd end; but the return to Nordic values, proclaimed by the centre-left coalition that took office in 2009, has not proved easy to achieve. A Scandinavian political scientist—whose name I have forgotten—once argued that it was a mistake to think of Iceland as just another Nordic country; its political culture was, as he saw it, so peculiar that places like Sicily or Albania might be more comparable. The aftermath of the crash—including the parliamentary election at the end of April 2013—suggests that this idea should not be rejected out of hand.

Reviews telling authors what kind of book they should have written are generally not well received. But here we are dealing with an extreme case. If ever there was a country afflicted with an image crisis, it is post-crash Iceland, and writing on images in that context cannot but incur certain obligations. Read with this in mind, *Iceland and Images of the North* is rather disappointing. Only two contributions, by Katla Kjartansdóttir and Kristinn Schram, deal directly with the imagery and image marketing of the boom years. Katla Kjartansdóttir

describes the Viking heritage boom that accompanied the banking spree and infected the whole community, from restaurants in search of customers to a head of state in pursuit of world fame. Her portrayal of the "Viking wave" is very effective (and for those of us who would prefer a book more attuned to recent history, this is the most relevant chapter), but the analysis overstresses construction and calculation, thus neglecting the genuine obsession that clearly went beyond all image-building strategies. This is a recurrent problem with work in the tradition of cultural studies, and the objection applies even more to Kristinn Schram's paper on banking and *Borealism*. The latter term is explicitly coined in analogy with Said's O*rientalism*, and suffers from the same defects as other constructs of the same kind. If the original is useless (as it is in my opinion, for reasons too complex to be explained in a review of a book by other authors), imitations will not do better. But the description of the bankers' *þorrablót* is a memorable contribution to the ethnography of Icelandic venture capitalism on the loose. This approach is especially pertinent today, when a determined attempt to refashion memories of the boom years is going on. However, the emphasis on "building identity on irony" downplays the authentic *hubris* that drove the bankers and the see-what-we-can-get-away-with message they were addressing to each other and their domestic constituency.

An explicit reference to the image crash ("a reputation in ruins," p. 376) is also to be found in the paper by Hallfríður Þórarinsdóttir, on the use of English in Iceland (pp. 373–404). The author considers the question of English as *lingua franca* and its impact on the Icelandic language community in light of the situation after 2008. The notorious proposal to introduce English at the headquarters of Icelandic banks, made in 2007 by a prominent banker, should be seen as a part of the fantasy world which the banks created among themselves, but the reactions to it reflected the weight they had acquired in the Icelandic national imaginary. One commentator could even write that the bank crash had removed the greatest threat to the Icelandic language. This overheated controversy can, as the author shows, serve as a starting-point for analyses of a more complex background. The irresistible rise of English in the role of *lingua franca* poses specific problems for each non-English culture. In the Icelandic case, the situation is defined by two main features. On the one hand, the exceptional importance of language for Icelandic national identity, together with the very small size of the language community, made the problem particularly sensitive; on the other hand, the growth of international connections, the rapidly increasing number of immigrants (many of whom knew no Icelandic and only basic English) and the wave of venture capitalism going global added up to a formidable linguistic challenge. The author develops a lucid analysis of this constellation. But I am less convinced by the proposal to explain it in terms of a straightforward power conflict (with reference to Bourdieu). Neither the gatekeepers nor the globalizers are easily identifiable with groups wielding power. It seems more appropriate to speak of a cultural-political complex eroded by multiple forces.

It is not the purpose of this review to survey every contribution at the same length. But two more chapters in the section on contemporary images should at least be mentioned in passing. Heiða Jóhannsdóttir's paper on the Gorbachev-Reagan summit (pp. 435–460) describes an extreme example of media construction "in only a tangential relationship with reality" (p. 446); it raises—

implicitly—the question whether this over-the-top spectacle did not count for something in the scenario that began to unfold after 1990. Edward Huijbens's paper on nation-branding (pp. 553–582), the last in the volume, does mention the much-ridiculed nation-branding initiative of the Icelandic government (launched in 2007), but this highly revealing episode would deserve more extensive treatment; much of the chapter is devoted to a rather de-contextualized discussion of branding. And Huijbens would probably win a contest for the least comprehensible sentence in the book:

> With space talking back, as stated in the opening quote to this section, what I argue is that being part and parcel to the excess of communication and encounters, a vitalist future-oriented spatial politics makes brand management untenable in terms of destination. (p. 574)

It may be objected that the historical section of the book (the first part is subtitled "Historical Images") should not be judged unilaterally in terms of its relevance to recent and contemporary events. There is no denying the informative value of some contributions to this group of papers. Julia Zernack traces the development of German approaches to Old Norse-Icelandic culture, and the role of this connection in the constitution of German national consciousness; there was, as she shows, a long history behind the well-known National Socialist appropriation of Nordic themes. Clarence E. Glad presents a very interesting account of the Greco-Roman—and particularly the Greek—heritage as an ideological resource for nineteenth- and early twentieth-century Icelandic nationalists. This seems to be an important part of the genealogy of nationalism in Iceland. Marion Lerner writes about images of the Icelandic interior as sublime nature and as a culturally interpreted North; this is also a topic that has been given less than its due. But precisely here we find a connection to more recent Icelandic history that the author has not taken into account. Lerner quotes from a German collection on the sublime "between liminal experience and megalomania," but the latter aspect does not enter into her argument. Megalomaniac trends are certainly not rare in modern nationalism, but some cases are more pronounced than others, and if we were to attempt a comparative study (which has, to the best of my knowledge, not been done so far), there is little doubt that the Icelandic experience from the 1990s would stand out as a particularly grotesque example. The sources are multiple, but all the aspects mentioned above are of some importance. The image of pioneers confronting an ultimate wilderness was conducive to a particular kind of self-titanization. On another level, the undeniably hubristic notion of a "Nordic Hellas" could—within a more restricted circle—give rise to disproportionate expectations. And the influence of German variations on Nordic themes reinforced other romanticizing trends. Some other problems of the historical section should at last be mentioned in passing. There is, on the whole (not to the same degree in all cases), an over-reliance on constructivist approaches and a tendency to use them in the spirit of Said and his followers. The problems caused by this bias are perhaps most evident in Sumarliði Ísleifsson's paper on medieval and early modern images of Iceland and Greenland, based (as he explicitly says) on the research traditions of imagology and postcolonial studies. Discussing medieval European ideas about Iceland, as represented most notably by Adam of Bremen

and Saxo Grammaticus, he first attributes to these writers the creation of an image that was practically the opposite of the way of life of civilized Europe; then he argues that they also engage in an idealization of the primitive, and that their picture of Iceland resembles monastic communities on the continent; "Saxo in particular seems to be rather describing the learned society of the monastery" (p. 44). If it is taken for granted that constructions of the other involve both distancing from and assimilation to the self, it will be easy to fit pretty well everything into the space between the two poles. But it might be more fruitful to move out of the closed constructivist-cum-postcolonial universe and try to grasp the relationship between experience and interpretation. High medieval Iceland was a distinctly anomalous offshoot of Western Christendom; cultural transfers from the mainland outpaced institutional ones to a degree unknown elsewhere, and this gave the Icelandic version of the twelfth and thirteenth century renaissance its peculiar characteristics. The accounts written on the mainland were trying to make sense of this atypical constellation.

I should admit that neither the connections to recent events nor the complaints about their absence are quite as easy to substantiate in the historical section as in the contemporary one. The former does include self-contained pieces of considerable value. Sverrir Jakobsson's paper on the emergence of the North as an identifiable region (pp. 25–40) traces the development of this notion in Old Norse medieval texts. This variety of regionalizing discourse has some specific characteristics. It is to a very high degree developed at the extreme western rim of the geographical space in question. It shifts between a bipolar and a quadripolar frame of reference; the former scheme works with a generalized opposition of North and South, the latter with more concrete demarcations from neighbours on the western, southern and eastern side. Finally, the regionalization of the North involved a strong emphasis on its distinctive historical past. All these points are relevant to the comparative study of regionalizing discourses, now actively pursued by conceptual historians. Another instructive piece is Gylfi Gunnarsson's paper on "Old Norse poetry and new beginnings in late eighteenth and early nineteenth century literature." Here the European sources and connections of the Icelandic literary revival are analysed in a novel way. Against assumptions about an unbroken continuity of Icelandic literature, the renewal of contact with the Old Norse heritage is shown to have been dependent on prior European reception of these sources, and on pre- or proto-romantic dissent from classicism.

In short, this book contains a wealth of information on diverse and sometimes disparate subjects, but readers coming to it with some prior interest in current Icelandic affairs are likely to conclude that something is missing.

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Emilia Aldrin, *Namnval som social handling. Val av förnamn och samtal om förnamn bland föräldrar i Göteborg 2007–2009* (Namn och samhälle 24), Uppsala: Uppsala universitet 2011, ISSN 14041790; ISBN 9789150621952, 297 pp.

On the back-cover of this book the author writes (here in English translation): "Choosing a name for a child implies not only to give it a simple label but also to express emotional, aesthetic, ideological and social attitudes." This is evidently the case. The aim of the study is to find out how parents in Gothenburg in the early twenty-first century use the first names of their children as a part of an identity creating process: what identities are created, how are they created, whose identity is it about? The thesis adheres to the socio-onomastic tradition, and a brief account of this area is given in chapter 2, focused on the research on first names and choices of first names. The sociolinguistic points of departure are dealt with more exhaustively in chapter 3, in which perspectives on identity theory and conversation analysis are also discussed. It is pointed out that identity is a process that takes place at different levels. Several materials were collected for the study, both through an inquiry with 621 answers about names and choices of names and through interviews with 18 mothers and 5 fathers. The analysis of the collected material is made in chapters 5–12. The parents express attitudes to different social positions such as traditional–modern, ordinary–original, Swedish orientation–international orientation–foreign orientation. This is accounted for in a sketch (p. 68). In very great detail Aldrin then accounts for her observations, and the accounts of the talks with parents are not least interesting, since their voices can really be heard. It is valuable that the author consistently relates her results to other relevant onomastic studies. The results are too numerous to be accounted for here, but some examples will nevertheless be mentioned. It is thus interesting to read about the aesthetic position in the choices of names (pp. 129 ff.), that is, what names are cool, tough, soft etcetera and why? It is also very interesting to be informed about the specific life style related positions (pp. 170 ff.) in connection with choices of first names, that is such cases where the parents express an interest in music, film, history, literature etcetera. Some choices of names are related to religion. But in the material there are also examples of obvious dissociation from life styles in the choices of names. Some informants emphasize that the choice of name may also be a way of trying to avoid that the child will be exposed to bullying and mobbing. As shown above, the parents often combine in their choices of names a number of different positions in the course of the naming process. Parents and children respectively, as subjects of positioning through choices of names, are focused on. The author says, "choosing a name implies [...] positioning both oneself and the child, but not being able to control which positions the child and the surroundings conceive" (p. 234). When reading the results of the study one is struck by the fact that in several cases there is a discrepancy between the parents' positioning through their choice of name and the reasoning about names that the parents then conduct. Among other things this is paid attention to in the summarizing chapter. It is also pointed out in it that the social variation that is made visible in the the-

sis is rather "an indicator that people identify themselves with and want to create different types of communities where different types of social values and attributes are given importance" (p. 248). The thesis is well implemented, but regarding at any rate a couple of points one would have liked to see more detailed reasoning. One would for example have seen some more comments on the fact that in the interview study *no* fathers from the low status areas in Gothenburg participate—one is curious to know what these can tell about their choices of names and their positioning. Furthermore, the question is only touched in passing of how generalizable the results really are in a Swedish perspective—it is after all the conditions in a big city that are investigated here. Even if the thesis thus does not provide all the answers, it offers the reader essentially stimulating reading.

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Olof Almenningen, Marit Hovdenak & Dagfinn Worren (eds.), *Språk og samfunn—heime og ute. Festskrift til Lars S. Vikør 65 år*, Oslo: Novus Forlag 2011, ISBN 9788270996322, VIII + 432 pp.

Lars Sigurdsson Vikør is a well-known Norwegian linguist who has been active in various ways at Norsk språkråd ['the Norwegian Language Council'] and *Norsk Ordbok* ['Norwegian Dictionary'] but has also participated in encyclopaedias, has been a successful translator and has been scientifically, politically and culturally engaged in South East Asian issues, among others for East Timor. For this and some other things the Festschrift editors provide a picture in the introduction, but naturally it is also elucidated in the selection of articles collected here. Interestingly enough, Vikør has now (2011) attached current comments to the articles, sometimes concerning their history of origin, at other times regarding the discussion that the articles gave rise to. As a result the reader gets a strong impression of being incorporated in an ongoing discussion. A little more than thirty articles are included in the anthology, but only some of them are mentioned here.

An introductory section deals with New Norwegian. Are there one or two languages in Norway is a question asked in one article, and the answer is given in a section with the heading "Forsøk på ein konklusjon" ['Attempt at a conclusion'] (pp. 18 f.), which depicts different scenarios. One article "Nynorsk for folket?" ['New Norwegian for the people?'] was published in 1980 and then attracted great attention. Among other things Vikør writes about the mentality among some of the New Norwegian intelligentsia. A number of articles deal more generally with the Norwegian language situation, language history and language planning. The articles on the language situation in an international perspective and on language planning in the European context are of essential importance. The concept of *standardtalemål* ['standard spoken language'] is discussed in one contribution, and in another the reader is told that Arne Garborg's view of language has had a great influence, even if the present view of language work differs from his. A number of articles naturally deal with *Norsk Ordbok*. A well formulated defence of dictionary projects of this type is made in "Norsk Ordbok og det norske språksamfunnet" ['The Norwegian Dictionary and the Norwegian language community']

from 2000: is the work needed, why does it take such a long time to produce it and what does one get for the invested money? Diachronic aspects of *Norsk Riksmålsordbok* and *Norsk Ordbok* are discussed—the author discusses "implisitt diakrone" ['implicitly diachronic'] dictionaries besides "eksplisitt diakrone" ['explicitly diachronic'] ones (p. 138)—as well as the selection of words and *Norsk Ordbok* as a "cultural dictionary." One article describes different kinds of purism from an international perspective. Nordic perspectives are also found in some articles, for example one that was included in an anthology about Language and Nationalism in Europe. The heading of the article is "Northern Europe. Languages as prime markers of ethnic and national identity." The question of *Scandinavia* versus *Norden* in English contexts is also dealt with. An article in English on language contacts and minorities in Europe focuses on three concrete examples: Finland, Friesland and Schleswig. The last sections in the anthology deal with problems related to Indonesia, Malaysia and East Timor. Among some other things there is an article on spelling reforms in Indonesia and Malaysia and another one on cross-cultural translation. One is certainly given some useful perspectives on one's own linguistic and cultural conditions when regarding language planning and language policy from completely different points of departure, as is the case here. The reading of the articles of the book is highly rewarding.

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Ole-Jørgen Johannessen & Tom Schmidt (eds.), *Etymologiens plass i navneforskningen. Rapport fra NORNAs 39. symposium i Halden 11.–13. mai 2010* (NORNA-rapporter 87), Uppsala: NORNA-förlaget 2011, ISSN 03466728; ISBN 9789172760868, 213 pp.

In May 2010 a number of onomatologists convened in Halden in order to listen to some twenty contributions at a symposium on the status of etymology in onomastics. Fifteen of the contributions have been collected in this volume. A survey rich in perspectives of the area is made by Thorsten Andersson, who not least can build on many of the studies he has presented over the years. Lennart Elmevik can also base his substantial study on several works of his own—not least from recent years with analyses of puzzling names in Uppland such as *Vappa*, *Vavd* and *Tierp*—and he discusses the intricate question of what assumptions one can dare to make when working etymologically with toponyms of obscure origin. Bent Jørgensen elucidates etymological onomastics on the basis of Danish material, and also discusses some fundamental questions concerning the potentials and limitations of etymology. Harald Bjorvand's contribution starts with a more general discussion, whereupon the discussion goes on to a treatment of the qualifying elements in the Norwegian *Varteig*, an Old Norse **wara-taigōR*, where Bjorvand finds that a hydronymic original meaning 'the quiet(er) water' is probable. The onomastic element *var-* is however also discussed in Svante Strandberg's article—a contribution that was apparently produced during the Halden symposium after Strandberg had heard Bjorvand's talk. Strandberg shows that several of the

names in question may be connected with gravelly and sandy soil. This is no doubt true. Klaus Johan Myrvoll shows that the evidence of skald prosody may be useful in the etymologisation of Norwegian place-names. Vidar Haslum states in his contribution (here in English translation), "if we are to be able to interpret names satisfactorily, we need ideas about the name-giver's language competence; ideas about what patterns were decisive for the name-giver's conception of how to create names correctly" (p. 129). To trace such a lost language competence may, however, in some respects be difficult; one may for example ask what potential was long ago available for expressing emotivity? Concrete etymologisations of names are accounted for by Andrew Jennings (*Shetland*), Staffan Fridell (*Tjust*), Birgit Falck-Kjällquist (*Härnäs*, *Kåvran*) and Margit Harsson (*Idd*), while Nicolai Peitersen elucidates the use of words for 'cheese' and 'butter' in English place-names. Inge Særheim's article about the oldest place-names in Southwest Norway, especially in Rogaland, is of a survey nature. Line Sandst deals with place-names as stylistic figures. This latter theme can probably be developed. An article by Peder Gammeltoft about digitalisation of printed place-name editions concludes the volume.

The symposium report contains a number of interesting perspectives on the theme "the status of etymology in onomastics," such as the importance of recorded appellatives (also remote ones) in the derivation, the importance of the factual analysis in connection with the interpretation process etcetera. After reading the fifteen contributions one can more clearly see the perspectives that in any case unite most of them. The volume would perhaps have benefited from an editorial introduction where these perspectives had been clarified. But even without this introduction the symposium reports offer a great deal of interest. This is not least guaranteed by the numerous experienced authors.

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Annette Lassen, *Odin på kristent pergament. En teksthistorisk studie*, København: Museum Tusculanums Forlag 2011, ISBN 9788763526166, 447 pp.

This is the revised version of Annette Lassen's doctoral thesis, which was duly discussed at the University of Copenhagen in February 2006. Reflexes of the discussion that was conducted at the public defence are also included in the text. In some minor works Lassen has earlier on elucidated the figure of Woden (e.g. in *Arkiv för nordisk filologi* 121, 2006, pp. 121–138). One can note that the research has not reached agreement concerning the picture of the god Woden, the reason being that both the object in itself and the source material are too many-sided. The thesis of the book is

> that in an inclusion of all examples where Woden is involved in the Old Norse (i.e. Icelandic-Norwegian) text corpus and in Saxo Grammaticus' *Gesta Danorum*, it may be possible to find a way of explaining the god's complexity without at the same time reducing it (p. 17).

In the second chapter of the book a picture is given of the view of research of Woden from the sixteenth century onwards: the author accounts for the earliest translation and editions, some of the eighteenth century monographs on Woden, where there are sometimes

euhemeristic interpretations—where the idea is thus that the myth reflects real events—up to the Woden of comparativists and folklorists and the research on Woden in the last century. (Rather as a curiosity Lassen mentions here Thor Heyerdahl's euhemeristic interpretation of Woden as an immigrant to the Nordic area from the east.) The research paradigms of the different periods are made obvious through this survey, and Lassen argues generally for the value of going *ad fontes*. A very short chapter deals with the concept of 'myth' in Old Norse contexts—it is however notable that the concept of 'myth' as such is only dealt with in a note (p. 87). The picture of Woden in Latin and Old Norse translations is discussed, and it is evident that this says more about the Christian environment in Scandinavia than about Woden's mythological role. It is obvious that the interpretative models of the Church have an important explanatory value for the understanding of the material, for which reason there is a chapter entitled "Kirkens forklaringer af hedenskab" ('The Church's explanations of heathenism') (pp. 110–118).

The book then examines in great detail its broadly composed text corpus, which results in a large number of observations. It may for example be noted that the Icelandic sagas, when taking place on Iceland, mention Woden only in the skald stanzas. Maybe Woden did not play any role on Iceland, where by the way neither place-names nor personal names formed with O*den* seem to exist—even if it cannot be completely ruled out that Woden may be represented under one of his alternative names. On the other hand the Sturlunga saga shows that Woden in the High Middle Ages could be used as an image of mendacity and other characteristics that could be associated with the Devil. In view of where the action takes place in the tales of chivalry, Woden is very seldom mentioned in them. Woden plays a far greater role in the sagas of kings, it is not a genuinely pre-Christian character but one "that existed through the Church's interpretation and appears in this way as a Christianized Woden, who sometimes is the Devil himself" (p. 151). He is even more frequent in the fornalder sagas, since these are about pre-Christian Scandinavia and at the same time make supernatural phenomena take part in the action.

In the skald poems Woden appears in paraphrases for poetry and war—the kennings are listed in a special section. Saxo uses different strategies in the description of Woden: he is described in euhemeristic way as a false god and as a human being versed in witchcraft, but he is also the Danes' special protective god. In the Ynglinga saga he is described as Sweden's first ruler. That narrative is consistently euhemeristic, with Woden both as an immigrant chief but also as a magician.

Snorre's Edda is rooted in Christian learning but does not seem to be particularly polemic, and consequently Woden is not described in it as demonised. Subordinate to the euhemeristic Woden is the divine Woden. In Grímnismál he is a warlord. On the contrary the picture of Woden as a skald god is not inspired by Christian ideas. The Edda poems contain a large Woden material and are the subject of treatment in an extensive chapter. Woden is the highest god, and the individual poems contain different pictures of Woden: the moral adviser, the cunning, the mendacious and the unmanly god.

In summary one may state that in some of the texts located in Scandinavia before the introduction of Christianity Woden is incorporated

in what might be called a "paganised" interpretation (*interpretatio pagana*), but the examples of a Christian interpretation of Woden are nevertheless completely dominant in the Old Norse texts and in Saxo. In the medieval texts that Lassen deals with Woden is described in accordance with the texts' genre requirements and way of expression: "Any attempt at understanding Woden must thus take its point of departure in the text" (p. 392), she consequently points out.

Lassen's very readable thesis has through its organisation a clear focus, as a result of which a number of different aspects concerning Woden are naturally enough completely left out. In this way the picture of "Woden on Christian parchment" is on the other hand described in detail. Full descriptions are made of the analysed text sources, which gives the readers themselves greater possibilities to judge the assessments that are made. This too is definitely a strength.

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Katharina Leibring, Staffan Nyström & Mats Wahlberg (eds.), *Uppländska namnstudier. Valda namnspalter ur Upsala Nya Tidning 1982–2002. Utgivna av Ortnamnssällskapet i Uppsala*, Uppsala: Ortnamnssällskapet i Uppsala 2011, ISBN 9789163397462, 213 pp.

In the twenty-year period 1982–2002 no fewer than 54 onomatologists contributed 403 articles under the vignette "Namnspalten" in the *Upsala Nya Tidning* (UNT). In *Uppländska namnstudier* the editors have collected about one fourth of these into a highly readable volume. How the selection was made is not made quite clear in the introduction, but it is at least clear that parish names for example have been left out, since they are dealt with in *Svenskt ortnamnslexikon* (SOL, 2003). It is, however, obvious that the brief description in SOL does not in any way replace the broader description provided by the articles in the UNT. These are often articles on a little more than one page. Some articles are however longer, such as the one on the *-tuna* names (pp. 30 ff.) or on the element *nor* in Uppland place-names (pp. 47 ff.)—in the original publication these consisted of several successive contributions to "Namnspalten." Otherwise derivations of individual names dominate, such as *Ambricka*, *Benala*, *Fullerö*, *Gråmunkehöga*, *Hallkved*, *Kolje*, *Nyvla*, *Nåsta* och *Ycklinge.* These names are thoroughly dealt with and as a reader—whether one is an expert or a member of the general public with an interest in place-names—one gets an insight into how the professional toponymists work and what problems they grapple with. The article on *Nyvla*—stemming from a medieval *Nyvili*, from **Nyvälli*, 'the new grazing-ground' or suchlike—elucidates how a final element that was possible to restore in appellative contexts (there is also an appellative *nyvälle* 'regrowth on a grazing-ground after the hay-making') was very early obscured in the toponymic compound. In some cases an ongoing research discussion is more clearly presented, as in Lars Hellberg's article (pp. 139 f.) on place-names formed with an old **faxe*, corresponding to Old West Nordic *faxi* '(horse) mane.' This element seems to have been possible to use about heights likened to a horse's withers. Hellberg includes in the discussion also the village name *Fasma* and the castle name *Faxaholm* respectively, which both Lennart Moberg and Ann-Christin Mattisson have earlier on connected

to **faxe* but interpreted in other ways. Some younger names are also dealt with, such as O*maket* about grounds said to lie apart, *Djävulsbitarna* about some particularly waterlogged small plots that were hence difficult to drive on, and names based on similarity such as *Byxan* and *Mösskärmen*. A name such as *Stövelrisefte* about a field in the parish of Alunda is said to be formed on the dialectal *stövelriseft*, 'the upper leather of a boot,' where the factual basis seems, however, to be unclear. A couple of articles deal with the names *Ryssland* and *Roslagen* (pp. 171 f., p. 183). Personal names are of course also dealt with, among others the personal names on rune stones, old Uppland peasant names such as *Björn*, *Kalv* and *Vädur*, old burgher names in Uppsala and names of miners in Dannemora. It is praiseworthy that the editorial committee has collected these articles, which have also been provided with a foreword by Ortnamnssällskapet's chairman Lennart Elmevik.

The only thing one may wonder about is why "Namnspalten" was discontinued in the UNT ten years ago. We know that there is great interest in toponymy and there are good reasons for resuming the series. The reading of the articles in this omnibus book whets the appetite.

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Inger Lindell (ed.), *En medeltida ordspråkssamling på fornsvenska* (Acta Academiae Regiae Gustavi Adolphi 114), Uppsala 2011: Kungl. Gustav Adolfs Akademien för svensk folkkultur ISSN 00650897; ISBN 9789185352883, 133 pp.

In the library of Uppsala University the medieval manuscript *Cod. Ups. Palmskiöld 405* is kept. It contains more than a thousand proverbs that are rendered in parallel in Old Swedish and Latin. Some of the proverbs are well-known to moderns Swedes, such as "ma*n*ge bækkia ok sma gøra stora aa" ['many small brooks make up a big river'], but some of them are felt to be very unfamiliar, such as "ondh q*u*inna ær diæwlsins dura naghil" ['an evil woman is the Devil's door nail']; *dura naghil* 'nail by means of which a door is opened or shut'. In the nineteenth century the volume was published twice, first by Henrik Reuterdahl (1840), and then by Axel Kock and Carl af Petersens (1889–94); the latter edition is extremely valuable with its comments on individual proverbs and its word explanations and indexes. With neophilological points of departure the text in the present edition is presented as close to the manuscript as possible for the purpose of trying to understand how the text was conceived by the medieval readers. The editor of the edition is Inger Lindell, who has solid experiences of such editorial work. The model for the volume is without doubt Peder Låle's proverb collection in Old Danish and Latin—the latter probably had a pedagogical purpose and was used as a teaching aid in the teaching of Latin. Proverb collections of this type are interesting, since they give us insights into the customs of older periods and tell us about people's everyday life and mentality, something that the editor give a brief description of in the introduction. She deals among other things with the proverbs that are about men and women—as we have already seen, some of the proverbs in the collection give expression to the contempt of women of the period–, upbringing of children and other things.

Lindell further deals with the

manuscript and its history and language. She makes a fairly thorough analysis of the sentence structure, word inflection, stylistic features of different kinds and vocabulary. Among interesting words found in Lindell's comments may be mentioned *hærpa*, 'ingrained dirt,' *rapan*, 'haste,' and *døna*, 'smell, feel the smell of.' The editorial principles are accounted for in a clear way and are followed by the careful edition (pp. 51–133). It is a good thing that this collection of proverbs has once more been made available. The work was done within the framework of a post-doctoral research project funded by the academy that is now also responsible for the edition.

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Maj Reinhammar under medverkan av Lennart Elmevik, Staffan Fridell, Mats Thelander & Henrik Williams (eds.), *Studier i svenska språkets historia 11. Förhandlingar från Elfte sammankomsten för svenska språkets historia i Uppsala 23–24 april 2010* (Acta Academiae Regiae Gustavi Adolphi 118), Uppsala: Kungl. Gustav Adolfs Akademien för svensk folkkultur 2010, ISBN 00650897; ISBN 9789185352876, 260 pp.

According to the foreword the arrangers of this meeting wanted through the choice of the four keynote speakers to show the affinity between Swedish and the other Nordic languages. Hans-Olav Enger deals with a classical problem in the history of the language, the disappearance of cases. Among other things he focuses on the question of whether the morphological processes in question should be seen in relation to phonological changes or whether the processes are the result of language contacts, and concludes that the causes seem to be complex. The importance of the dialectal evidence is emphasized in several places in Enger's contribution. In her contribution Cecilia Falk deals with the Old Swedish infinitive phrases and discusses the possibilities of reconstructing from preserved written language material an inner grammar in older periods. Frans Gregersen discusses the very interesting question of the scope of the so-called *uniformity hypothesis*—"that knowledge of processes that operated in the past can be inferred by observing ongoing processes in the present." Camilla Wide deals with nouns with the definite article and demonstrative pronouns and shows how an analysis of diachronic and synchronic variation can be made within a framework of construction grammar.

After the four keynote lectures there follow seventeen contributions dealing with widely different parts of the area of the history of the Swedish language. Lennart Elmevik shows convincingly that the diphthongisation of an originally long e^2 to (*ia*) (*ie*) does n o t require any assumption of a Birka-Swedish/Hedeby-Nordic language stratum. A classical research problem—the chain shift of the long back vowels in Swedish—is elucidated by Stig Eliasson, who discusses a number of phonological problems and presents interesting perspectives on internal and external explanatory factors. More general reflections concerning external factors as causes of language change are presented in Lars-Erik Johansson's article. A couple of contributions are philological: Maria Arvidsson's on the compilation manuscript and Nils Dverstorp's on research problems connected with transcription of text in the Middle Ages. Peder Månsson's language

is dealt with by Bo-A. Wendt, who shows among other things that this language user "at the eleventh hour of Old Swedish" appears exceptionally consistent in the choices he makes at different language levels. With variation grammar methods the sequence of subordinate clauses in Old Swedish and Early Modern Swedish is discussed by David Håkansson. The word *ther*, which introduces relative clauses, and its functions in older Swedish is dealt with by Martina Zachiu. What might be called "too narrative" (Swedish "alltför narrativa") sentences beginning with *nu* ['now'] in the Swedish law of 1734 (for example "Nu faller fiende oförtänckt in i landet, och kan ej Konungens befalning afbidas; tå må väl manskap til motvärn upbodas") is discussed in an informative way by Rickard Melkersson, who shows that this is probably not a relic in the legal language but "a well established and exact technical expression" (p. 187). The law of 1734 is also the point of departure for Lena Rogström in her investigation of the vocabulary in the law and in contemporary dictionaries. Pirjo Söderholm deals with terms for 'flickor' ['girls'] and 'kvinnor' ['women'] in situations-wanted advertisements in the newspapers *Huvudstadsbladet* and the *Dagens Nyheter* from 1864 onwards. Collectivising genitives are discussed by Lars-Olof Delsing and Gunlög Josefsson in a joint article that among other things deals with South-West Swedish *a*-genitives (*Erika bil*, 'Erik's car'). The infinitive verb phrase in the Swedish dialects is analysed with an extensive empirical material by Kristina Hagren, and *Ekenssnacket* ['the Stockholm vernacular'] by Jenny Öqvist. Gustav Bockgård elucidates with good examples dialect interviews from the perspective of conversation analysis. Henrik Williams' article discusses disciplinary history and goes through the contributions in the ten meetings that have so far been dedicated to the history of the Swedish language, and he states that there have been rather few philological contributions. The "Nordic philology" from the seventeenth and eighteenth centuries—rather forgotten in the research, probably not least because the contributions were written in Latin—is dealt with by Lars Wollin in his contribution.

The conference volume shows that the research on the history of the Swedish language has many important problems on its agenda.

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Daniel Riches, *Protestant Cosmopolitanism and Diplomatic Culture. Brandenburg-Swedish Relations in the Seventeenth Century* (The Northern World 59), Leiden & Boston: Brill 2013, ISBN 9789004240797, 332 pp.

In his book *Protestant Cosmopolitanism and Diplomatic Culture. Brandenburg-Swedish Relations in the Seventeenth Century* Daniel Riches studies the "personal interactions carried out via mobile and transnational networks" by actors who were "informed by their educational backgrounds, intellectual and cultural interests, religious convictions, and webs of personal connections." This includes people such as tradesmen, theologians, army officers, royal physicians and many others. Diplomacy was conducted not only by diplomats in the word's most narrow meaning. Riches claims that the relations between Sweden and Brandenburg cannot be understood "as the collision of states' interests and the institutional appara-

tus constructed to carry them forward" and therefore focuses on individual agency. Riches examines what he calls this northern European "diplomatic class" and the diplomatic culture shared by its members. He describes them as "based in a cosmopolitan (yet decidedly Protestant) worldview that transcended the narrow boundaries of state, dynasty and confession."

By using the term *Protestant cosmopolitan* Riches manages to show that there was not necessarily a conflict between being in service of a state or dynasty, and yet at the same time work towards Protestant cooperation. In fact, the shared convictions of northern European Protestant diplomats helped develop a particular diplomatic culture.

The basis for the study is certainly important and Riches gives ample proof of how transnational movements over the Baltic—made possible because of the common Protestantism—contributed to the building of personal networks. Brandenburg immigrants to Sweden before and during the Thirty Years' war kept in touch with networks in Germany, adding contacts in Sweden with these. Riches discusses what he feels is a neglected part in the study of early modern diplomacy, namely the importance of friendship. While religion bound people together it also made bonds of friendship possible across state borders. He makes a point of how the weakness of institutions made friendship ties important. Another side of the weakness of the institutions is that private interests of men such as the Swedish diplomat Johan Adler-Salvius sometimes over-shadowed that of the governments: individual agents acted on behalf of a state but sometimes against the state government´s wishes.

The study highlights the importance of religion both to explain the developing of a common northern European diplomatic culture, and also as a key factor for understanding why Sweden and Brandenburg drifted apart at the end of the seventeenth century. Towards the second half of the seventeenth century Calvinism became more influential among the elite in Brandenburg. The Lutheran orthodoxy in Sweden and an increasingly loud Swedish anti-Calvinist propaganda helped divide the two states and break up the common diplomatic culture. Riches also argues that the development of a central administration contributed to making individual agency and networking less influential. The two developments put an end to the influence of informal networks based on regionally specific and confessionally circumscribed modes of conduct. Of the two explanations Riches is more convincing in proving the importance of religion for this outcome. Having said that, Daniel Riches book on Brandenburg-Swedish relations in the seventeenth century is an important and thought-provoking contribution to the new diplomatic history of Europe.

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Helge Sandøy & Ernst Håkon Jahr (eds.), *Norsk språkhistorie i eldre nynorsk tid (1525–1814). Minneskrift for Kjartan Ottosson*, Oslo: Novus Forlag 2011, ISBN 9788270996551, 193 pp

The period in the history of the Norwegian language that is focused on in this volume is often called *tidleg nynorsk tid*, *tidleg moderne tid* or *tidleg ny tid* ['early New Norwegian period, early modern period or early new period']. The primary sources consist of

some sixteenth century diplomas—the majority originating from before 1550—and later on in the period there are some word lists and short texts. Sources of this type require critical evaluation before they can be used as sources in the description of the history of language. A seminar on this period in the history of the Norwegian language was planned by Kjartan Ottosson, but when the seminar was to be held he had died. The volume is now dedicated posthumously to him, and in the beginning of the book there are some commemorative words written by Arne Torp—together with some of the obituaries dedicated to Kjartan Ottosson—, and at the end of the book his bibliography is listed.

Ten contributions deal with the main theme of the seminar. In his article Ivar Berg describes the written and spoken language in Norway around 1500, and he does not think that the Danish-Norwegian written language that was used in the early sixteenth century "can tell us everything there is to know about spoken Norwegian language" (p. 29). Agnete Nesse deals in an interesting way with text sources that might be referred to the everyday use of written language (cookery books, letters, diaries), where some of the synchronic variation can be found. What word collections can tell us about spoken language is illustrated by Martin Skjekkeland. Ole-Jørgen Johannessen deals with the borrowed personal names in the sixteenth and seventeenth centuries, and states that these expand at the expense of the Nordic names. Jan Ragnar Hagland tries to form a conception of "medvitet om eit eige norsk språk på 1700-talet" ['the awareness of a specific Norwegian language in the eighteenth century'], to use the words of the heading. Endre Mørck deals with the often rather neglected syntax. It is obvious that the syntactic structure in the early New Norwegian period has a great deal in common with Modern Norwegian, in contrast to Old Norse and Middle Norwegian, but since there are also features that differ in the syntax between early New Norwegian and Modern Norwegian, the early New Norwegian period stands out as a language stage of its own.

There is also a battery of articles on individual Norwegian language areas in the volume, where sources and extensive empirical material are accounted for. Erik Simensen thus writes about the old Austland dialect, Inge Særheim about the Sørvestland dialect, Helge Sandøy about the Nordvestland dialect and Arnold Dalen about Trønder dialects. These essays illustrate the empirical material that is available for the study of Norwegian spoken language in the early New Norwegian period, at the same time as the authors communicate some source critical reflections worth considering, most of all perhaps Helge Sandøy.

The book illustrates extremely well a part of the problems that exist in the description of this period's history of the Norwegian language and at the same time it shows that there are after all empirical foundations for a description of the history of language of the period's Norwegian language.

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Manuscripts should be double-spaced with wide margins, all pages numbered consecutively. The manuscript should be submitted electronically to the editor-in-chief in the format of a major word processing program for Windows or Macintosh, RTF or plain text format, via e-mail to the address lars-erik.edlund@nord.umu.se. Illustrations should be submitted as separate files, either via e-mail or on CD (see further below under *4.1 Illustrations and Maps*).

The manuscript should be accompanied by a separate sheet with a brief note on the contributor (50 words), institutional address, e-mail address, telephone and fax numbers and an abstract of no more than 200 words plus 10 or fewer keywords.

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Articles may be divided into sections if necessary. Each section should be numbered, using Arabic numerals with up to three decimals: 3.2.1. , 3.2.2 etc. or provided with section headings.

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Use indentation instead of a skipped line to mark the beginning of a new paragraph.

Notes should be numbered consecutively through the text and collected at the end of the article as endnotes.

3. References

Book

Paasi, A. (1996). *Territories, Boundaries and Consciousness. The Changing Geographies of the Finnish-Russian Border*, Chichester: John Wiley & Sons.

Edited book

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Unpublished dissertation

Smith, J. (1998). "Social Work Education in Scotland," diss., University of Glasgow.

References to several works by the same author, published the same year, should be numbered 2007*a*, 2007*b*, 2007*c* etc.:
Simmons, I. G. & Innes, J. B. (1996*a*). "An Episode of Prehistoric Canopy Manipulation at North Gill, North Yorkshire, England," *Journal of Archaeological Science*, 23, pp. 337–341.

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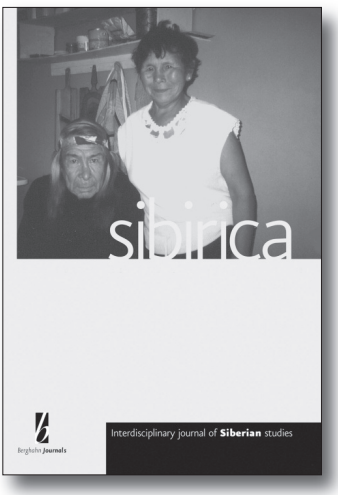

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