



Jonas Monié Nordin & Carl-Gösta Ojala

AN INDUSTRIAL REVOLUTION IN AN INDIGENOUS LANDSCAPE: THE COPPER EXTRACTION OF THE EARLY MODERN TORNE RIVER VALLEY IN ITS GLOBAL CONTEXT

Abstract

During a period of 40 years in the second half of the 17th century, a process of industrialization was initialized in the northern part of the Torne River valley, northern Sweden. The industrialization was the result of global demand for copper and brass, but its practice was a local and regional encounter between different groups of people with a manifold of identities, languages, economic, and social backgrounds. The modern industrial production units, some 100–150 kilometres north of the Arctic Circle, created spaces which functioned as contact zones for Indigenous Sámi and Finnish inhabitants, Swedish and Dutch workers. Local knowledge was pivotal for the establishment of the industries. The making of local spaces, closely connected with international networks of people, capital, and knowledge, affected the social and spatial everyday practices at the works and in the surrounding lands. This paper is based on field surveys conducted at five mining and metal works sites in the Torne River valley and a set of maps and drawings from 1660, depicting the structure of the mines and metal works in a Sámi-Finnish landscape. The results are discussed in a global historical archaeological context, connecting the metal extraction of Northern Scandinavia with global hunger for brass and copper.

Keywords: industrialization, Torne River valley, Sámi, Finnish, copper mining, modernity

Jonas Monié Nordin, Stockholm University, 106 91, Stockholm, Sweden: jonas.monie.nordin@ark.su.se; Carl-Gösta Ojala, Uppsala University, box 626, 751 26 Uppsala, Sweden: carl-gosta.ojala@arkeologi.uu.se.

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INTRODUCTION

In this article, we ask what forms early modern extractive industry took in the Torne River valley, and how this process was connected with the global economy, during the second half of the 17th century. We suggest that the industrial localities and the extractive landscape can be understood as a set of contact zones, as intersections of intellectual and material practices constructing identity and culture (Raj 2007: 225). Furthermore, we suggest that an early path

towards modernity was constructed as a collaborative yet contested industrial economy in the Torne River valley in the 17th century, in tandem with the global early industrial development in the Caribbean, India, and Western Europe. This early modernity process was created in collaboration between the different groups living in the Torne River valley and external groups, such as the Dutch and Swedish officials and workers.

The article is based on field surveys conducted at five early modern mining and metal works sites in the Torne River valley, carried out by the

authors in collaboration with Åsa Lindgren from the Norrbotten County Museum in the autumn of 2017 (see further details in Lindgren et al. 2020), as well as an analysis of a set of maps and drawings from 1660, depicting the structure of the mines and metal works in a Sámi-Finnish landscape.

In the early modern period, the Torne River valley was a multicultural and multiethnic area, with local Finnish-speaking and Sámi-speaking groups as well as other groups of people arriving in connection with the colonial and industrial movements (see e.g. Hederyd et al. 1991; Hederyd & Alamäki 1993; Nordin & Ojala 2017; Elenius 2019). As a border zone within the larger Sámi settlement area, it exemplifies the complexities of identities and cultural expressions during this period of great social and economic change and transformation. A combination of archaeological, geographical, and historical sources is needed in order to study this multitude of agents and to develop a deeper understanding of these historical processes.

The industrial development in the North had close connections with the colonial expansion led by the Danish, Russian, and the Swedish crowns, the Lutheran and Orthodox churches, and individual trade companies (cf. for instance Hansen & Olsen 2014: 232–37; Ylimaunu et al. 2014; Ojala 2017; 2018; Ojala & Nordin 2015; 2019). Thus, the wider colonial context in 17th-century Sápmi and Torne River valley needs to be considered in an analysis of the industrial development. The colonial processes including Christian mission and forced conversion, destruction of religious sites and ritual objects, confiscation and collecting of Sámi material culture, changes in languages and traditions, control of trade routes, and eventually loss of land and water rights and self-determination of the Sámi people of Northern Fennoscandia (cf. papers in Lindmark & Sundström 2016; Nordin & Ojala 2018; Ojala & Nordin 2019).

Today, the history and heritage of the Torne River valley is much contested, with discussions on the interpretation of historical and archaeological source material in ethnic terms and with interconnected conflicts over land, fishing, and hunting rights (Wallerström 2006; Hedman 2007; Ojala 2009; Elenius 2018; 2019). In recent years, there have been claims for Indigenous

status and Indigenous rights, on the same level as the recognized Indigenous Sámi population, within parts of the ethnopolitical movement of the Meänkieli-speaking Tornedalian population, and within the cross-boundary Kven ethnopolitical movement (see e.g. Wallerström 2006; Elenius 2018; Mella Stenudd 2020). The Meänkieli-speaking Tornedalian population in the Torne River valley has, in common with the Sámi populations, been subjected to colonization, assimilation, language oppression, discrimination, and racial biological investigations (see e.g. Persson 2018). However, the relations between Sámi and Finnish groups in the Torne River valley region in the early modern period have not been much explored in earlier research, and there is a need for more research on this theme.

INDUSTRIALISM AND MODERNITY FROM THE PERIPHERY – A CRITICAL APPROACH

The industrial revolution in Britain in the 18th century is perceived, and rightfully so, as one of the more decisive processes of change in the western and global world (cf. Toynbee 1884). Every aspect of the modern society has been affected in some way by the experience of industrialism. The grand narrative of industrialism is based on the idea of a conglomerate of factors creating the innovative climate in northern England, leading to the industrial breakthrough, generally labelled *The Industrial revolution*. Pivotal factors such as a wide set of agrarian reforms, the emergence of global markets, technical innovation, and accumulation of capital made industrialization possible.

There are, however, other factors that to a growing degree are acknowledged as decisive for the industrial breakthrough. Two factors of importance for the industrial development in Britain concern global entanglement. First, the influx of capital through the slave economy from the second half of the 17th century, but with a radical increase during the 18th century, enabling industrial development in Europe (e.g. Williams 1944; Inikori 2002). Second, the raw material from the Baltic trade that was essential for British and continental European industrial development: the high-quality iron, the copper,

and the copper alloys/brass (e.g. Evans & Rydén 2007; 2018).

Early modern pervasive economic and social processes, such as industrialization, the agrarian revolution, and colonialism are often understood from a national perspective. The global turn in history and historical archaeology, contrary to this, suggests that the level of entanglement between different parts of the global world were much more developed than suggested in earlier research, why such processes cannot be understood from a limited national perspective (cf. Orser 1996; Ogborn 2008; Andrén 2011; Nordin 2020).

The so-called global turn in cultural history and recent development in post-colonial studies have scrutinized the Eurocentric traditional ideas of the industrial revolution and modernity as entities solely sprung from Western European circumstances. One goal has been to 'Provincialize Europe' (Chakrabarty 2012). Modernity as an episteme has strong Eurocentric connotations: The Renaissance, the nation state, and the industrial capitalist society are often perceived as European inventions and of European making. Modernity and industrial society are still to a large degree viewed as the fruits of European ingenuity and processes exclusively taking place in Europe (Mignolo 1995; Bhambra 2007; 2014). Industrialization and modernity as results of growing contacts between regions and continents, based on global entanglements, are seldom acknowledged. What generally is labelled 'Eurocentric' is in fact more often 'Anglo-' or 'Western-European-centric'. The grand historical narrative of modernity does not only shut out Africa and Asia, but also Eastern Europe, the Arctic, and many other regions.

It is here that early modern Sápmi (i.e. the land of the Sámi, roughly covering an area from Dalecarlia in the south to Finnmark in the north, and the Kola Peninsula in the north-east), and the Torne River Valley come into the picture. Sápmi is a part of the world often seen as a 'periphery' in relation to the major European processes of modernity – but, as will be discussed below, an area which triggered technological development, social movement and changes in the relations between Continental and Western Europe and the Far North. The Torne River valley and one of its main export commodities in the 17th

century, copper, can in this light be scrutinized as one of many arenas of modernity in the early modern global world.

The growth of the plantation economy in the Americas created a drastic growth in demand of metal tools, trade objects, and necessities for the shipping industry. In this global context, iron, brass, and copper from Scandinavia played an important role. Iron was needed for the making of tools, nails, and for the making of steel (Evans & Rydén 2007; 2018). Copper was needed for making of pans, vats, roofing, and sheathing of ships (Zahedieh 2013). Brass, an alloy consisting of copper, tin, and zinc, or more often during the early modern period, calamine, was essential for the making of cauldrons, kettles, candle sticks but also more ephemeral objects such as needles, hooks, and pins (Nordin & Ojala 2017; cf. Day 1984; Beaudry 2007). The copper and brass were essential for the manufacture of boiling furnaces for the whaling stations or the sugar plantations. The making of cooking vats for the distilling of whiskey or the brewing of ales were also founded on access to copper. In Indigenous communities in North America copper and brass were highly coveted, and among the Sámi objects of copper alloy were held in high esteem (cf. Immonen 2013). In this context, one can claim that the copper from Falun in central Sweden, Røros in central Norway, and Svappavaara in Torne River valley, functioned as one of the material bases for spurring globalization in the early modern world.

EARLY EXTRACTIVE INDUSTRY IN NORTHERN SWEDEN

In the early modern period, natural conditions for metal industry in sparsely populated Scandinavia were rather favourable. There was an abundance of water for hydropower, and forests for building materials and producing charcoal. Competition was at the same time rather limited. This industrial expansion brought about the innovation of a new form of industrial production, the metal works, the *bruk*, through the fusion of Dutch and Swedish conditions and considerations together with global market demand.

Historian Göran Rydén (2013) has pointed to the particularity of the *bruk*, but also how they were consanguine to the plantations of the New

World. The Swedish verb *bruka* means literally 'to cultivate' and 'to use'. It is related to the words 'to plant' and 'plantation'. The two forms of production are also related. A *bruk* is a single-purpose, concentrated production unit, just like the plantation, with the aim of extracting and refining natural resources, usually metals. The *bruk* is run by an intense concentration of labour force, living on the production site, often in an orderly form. At the Swedish 17th- and 18th-century *bruk* (in the following called 'works'), a certain kind of culture or habitus developed, inspired by reformed Christian ethics, Dutch aesthetics, and early capitalist modes of production (cf. Bedoire 2009).

Two of the more influential Dutch investors were Abraham and Jakob Momma, who moved to Sweden during the early 1640s. At first, they invested in import–export trade, encompassing wine, textiles, and luxury commodities for brass, copper, iron, hemp, and tar – mainly necessities for the shipping industry. The Mommas soon

started leasing and eventually bought several iron works in central Sweden. Here, they primarily produced pig-iron but also iron kettles, pans, stoves, and even statues (cf. Sondén 1911; Müller 1998). The copper trade proved more profitable on the global market and the brothers came to direct more of their resources to the brass and copper industry, taking over several of the De Geer family's works (cf. Day 1984: 35–6; Morton 1985). The Mommas not only invested in copper refinement in the south but soon became attracted by opportunities opening up in the far north.

In 1634, silver was discovered in Nasafjäll/Nasavärre in Pite lappmark and the Swedish Crown established its first industry in Sápmi. Several other, often small silver mines were opened in inland Sápmi, usually in the direct control of the Crown, such as Alkavare/Álggavárre, and Kedkevare/Gierggevárre in Lule Lappmark (cf. Awebro 1983; Nordin 2012, 2015; Ojala & Nordin 2015; see Fig. 1). Silver



Figure 1. Map of northern Sweden with some of the sites mentioned in the article. The borders are the present-day state boundaries. (Map: Carl-Gösta Ojala.)

was of key interest to the Crown whereas copper, also considered a precious metal, was more accessible for private investors.

In 1643, copper and magnetite iron ore were found at a place called Saivijokk (Junosuando) in Torne River valley, some 350 kilometres north of Bothnian town Torneå (present-day Tornio, see Fig. 2). The county governor Frans Crusebjörn persuaded a group of burghers in Torneå to form a company and start processing the find. He also provided privileges, such as exemption from taxes, to support the industry. It proved complicated, however, and the company was taken over by the German-born Torneå burgher Arendt Grape in 1646. After a year, a French type furnace was erected at the newly founded metal works in Junosuando/Junosuanto/Masugnsbyn (Norberg 1958: 7–14). Two years later, a metal works with a forge was founded by the Torne

River, at Geavņjis (SaN.), later Swedified into Kengis (Fi. Kōngänen).

Profit was not immediate, and Grape soon needed more capital. In 1653, he sold two thirds of the company to Abraham and Jacob Momma. A new company, with renewed royal privileges was founded (Norberg 1958: 17–8). Concurrently, copper was discovered in the Svappavaara Mountain, northwest of Junosuando, and from this time industrial expansion in the Torne River valley was rather swift. Svappavaara soon developed into the core mine of the consortium, with Kengis as the administrative centre. At Svappavaara, a mining village was founded on the mountain, and a furnace village some three kilometres down in the valley (cf. Kumm 1997).

The involvement of the Momma brothers entailed at least four main supplements to the

Figure 2. Hans Lybecker's map of the Torne River valley (right) and the Kalix River (left), from 1643. The town of Torneå is located at the mouth of the Torne River. The symbols of Iron and Copper mark the location of the Junosuando ore finds. (Photo courtesy of Riksarkivet, Stockholm.)



industry: 1. swift and direct access to the global market through the brothers' trade networks; 2. access to knowledge and technology through the brothers' collective experience in brass and copper making (they came from an old copper-making family, cf. Day 1984); 3. access to skilled labourers through tapping into the Dutch wave of migration to Scandinavia; and 4. contacts with the power circles in Stockholm and the Board of mines (Sw. Bergskollegium).

Through their networks and contacts with the Board of mines, the Momma brothers recruited a surveyor to map the industries in the Torne River valley. Olof Simonsson Nauc ler (1626–1706) was *markscheider* (surveyor) in Falu copper mine and was appointed head surveyor of the Board of mines. These maps are among the oldest and most detailed in early modern Sweden but also global industrial history; Nauc ler was one of the leading surveyors of his time (Lindroth 1955: 677). His Lapland journey resulted in five maps, one covering the Lule River valley and its rapids, used by Carl Linnaeus on his Lapland Journey 1732 and now in the original of Linnaeus' *Iter Lapponicum*. He also made one map each over Kengis works, Masugnsbyn works, Svappavaara mines and Svappavaara works. The latest additions to the Torne industrial complex, Lepp koski/Pahtavaara, Kalix (located south-east of Torne River valley) and Raggisvaara were not surveyed by Nauc ler (for details on the Kalix works and Raggisvaara mines, see Awebro 1986; 2004; Lindgren et al. 2020).

Conflicts between Grape and the Momma brothers on the one hand, and the burghers of Tornio town on the other, over the rights to trade with the local S mi and Finnish population in the river valley was an ongoing conflict with heavy economic and social impact (cf. Symonds et al. 2015). The conflict was strengthened when the Kengis consortium obtained royal privilege to trade, hold markets, and to mint tokens, that soon were widely spread in the river valley. The Swedish kingdom was, despite the economic, administrative, and political expansion, in constant shortage of cash and the Kengis tokens swiftly became regionally accepted as coins (Norberg 1958: 26–7; cf. Hy tyniemi 1978).

The Momma industry group's power grew through the metal production, and the important

trade in S mi products. Metal extraction was the *raison d' tre* for the Mommas investments in Torne River valley, but trade with S mi products contributed to their business. The severe climate during the 17th century and the 'Little ice age' meant a drastic growing demand for pelts and fur products, such as boots, gloves, caps, and jackets, goods that were provided by S mi producers and exported to continental Europe (cf. Degroot 2018; Nordin 2018). The power of the company and its owners was expressed in, among other activities, the erection of a manor in Kengis – sometimes called the northernmost manor in the world – and a representative office building in Hell l , just outside of Tornio town. To this can be added all the ships owned and leased by the brothers and constructed at their own shipyards and works scattered along the central Swedish east coast, and their palatial homes in Norrk ping and Stockholm. Arendt Grape himself owned a farm in-between Kengis and Torne  town at Nautapuoti on an island in the Torne River (Norberg 1958: 10).

The Momma brothers expanded the industrial conglomerate in the Torne River valley during the 1650s and 1660s (Awebro 1993; Nordin & Ojala 2017). Maps and written record give testimony to a substantial expansion during this period. The well-preserved physical remains at most of the sites also give a good picture of the size and form of the investments. Concurrently the brothers' business expanded in Sweden with more brass works, along with the pursuing of other business opportunities. Along with many other traders and entrepreneurs they formed a class of 'nouveau riche' (cf. Bedoire 2009: 188–91). When ennobled in 1669, the Momma brothers took the fitting name Reenstierna, meaning star of the Reindeer – the reindeer being a key factor for their economic success and an important trade goods in the form of all the boots, gloves, and hides made of reindeer skin and traded by the brothers. In fact, the investments in S pmi played an important role for the brothers' brand making and as a symbol (Nordin & Ojala 2017).

In the early 1670s, the brothers' expanding business consortium was challenged. The third Dutch – English Naval war, 1672–74, and the war between Denmark and Sweden 1676–79 proved fatal for their business. The death of the

brothers in 1678 respective 1690 meant the end of the Momma family as influential industrialists in Sweden (cf. Nordin & Ojala 2017). Minor efforts to continue the metal production in the Kengis consortium were attempted in the late 17th century and again in the 18th century, with the opening of for example the Sjangeli mines in the mountains south-west of Lake Torneträsk/Duortnosjávri, but never with any substantial success. It would take until the turn of the 20th century and the founding of the Kiruna mines, that metal production in the Torne River valley would supersede that of the Momma-Reenstierna brothers, and now it was iron instead of copper that created the profit. A local saying in the Torne River valley goes: *Se oli Mommaan aikaista* (Fi.), meaning “It was at the time of the Mommas”, alluding to events that took place a long time ago and in a time of prosperity.

METAL WORKS AS CONTACT ZONES

Although the ore in Junosuando was the first deposit to be discovered, the fertile and strategic land surrounding the rapids of Kengis soon became the centre of the works complex along the river valley, stretching from Torneträsk in the northwest to Torneå in the southeast. The reason to choose Kengis for the processing of the iron and copper from Junosuando Masugnsby and later Svappavara and other mining sites, lies in the powerful Kengis rapids with a vertical drop of about four meters. At flood, in spring and summer, the river bursts with enormous energy and is several meters higher than during wintertime. Such a power source was almost impossible to control in the 17th century (see for instance the rapids at Kamajökk/Gámajökk in Kvikkjökk/Huhtán that caused several accidents in the 1670s; Abrahamsson 2009: 176). On the other hand, the Torne River could provide an abundance of power. The course of the Torne River is recurrently interrupted by rapids but still provides an excellent means of transportation, by boat during the summer or by sleigh on the ice during the winter. Another reason for choosing to settle in Kengis was that the river, as a communication system, connected vast areas of inland northern Sápmi with the Baltic coast.

The Kengis rapids are situated near the intersection between Muonio and Torne Rivers,

a location of high communicative significance since prehistoric times, which is indicated by the remains of prehistoric dwelling sites, stray finds of stone tools etc. To the north, following the Muonio River, and the Kōnkämä River, was Enontekis/Markkina, the central market place for Torne Lappmark since at least the early 17th century, and further to the north was Rounala church, a central node in the religious geography since the Middle Ages, and further away the Arctic Ocean (Wallerström 2017; Drury et al. 2018: 1561–63; Ojala & Nordin 2019; see Fig. 1).

Following the Torne River, one comes to Jukkasjärvi/Čohkkiras, a central place in the North Sámi area and the central marketplace since the early 17th century. Here, the historic Sámi villages of Siggevaara and Tingevaara had their church and marketplace (Wallerström 2017). Further along the river is Lake Torneträsk, one of the largest lakes in Sápmi. From the western shore of Torneträsk it is but a short distance over the mountains to the Atlantic Ocean. Torne River, with its tributaries, thus connect the historic fishing communities of the Norwegian coast with the agricultural communities of the Gulf of Bothnia. The river system has a long history of connecting different groups of people with various identities, languages, and traditions. The river system furthermore enabled the flow of the copper – from the mines to the works, and further to the south, to the brass works of central Sweden and out into the Baltic and Atlantic worlds.

The location of the Kengis *bruk* had additional advantages. At the rapids, the fishing was, and still is, extremely good and the meadows along the river allow for some limited agriculture. Kengis and all the industrial sites belonging to the consortium (except for the Kalix works) are located well above the Arctic Circle. Agriculture at Kengis never played a substantial role, but the early construction of a pleasure garden played both a functional and a symbolic role in providing herbs and some vegetables, and connecting it to the architectural ideal of Western Europe and the outline of metal works in southern Sweden.

An inventory from Kengis 1653 suggests that the works was running at a rather limited scale, but from 1660, two depictions provide an extraordinary image of the works. The first is



Figure 3. Olof Naclér's map over Kengis 1660. *Kommerskollegii gruvkartor*, Riksarkivet. (Photo courtesy of Riksarkivet, Stockholm.)

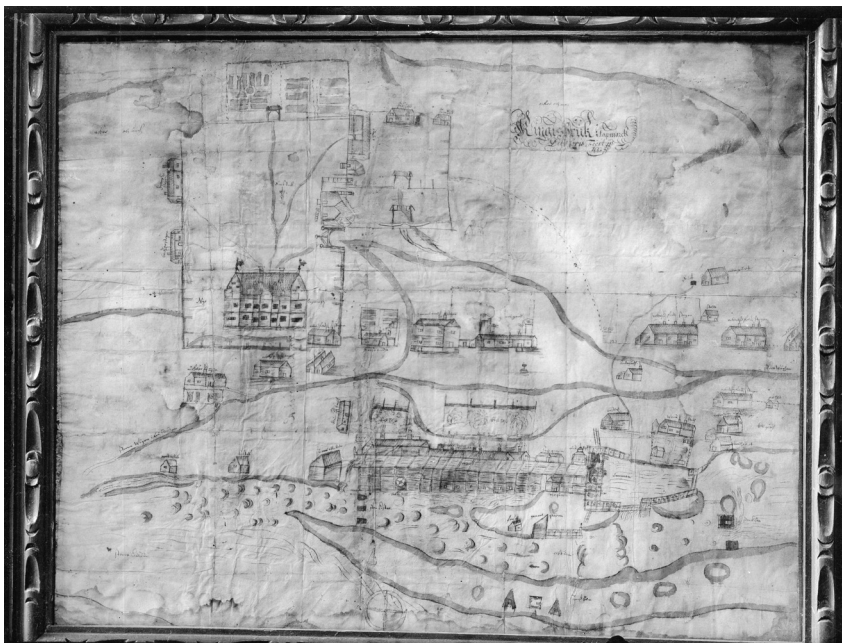


Figure 4. Drawing of the Kengis works by the scribe Dennis Joris, 1660. Note the forge in the centre, the manor and pleasure garden to the upper left, and the Sámi settlement in the lower front. (Photo courtesy of *Jernkontoret bruksbildskatalog*, Stockholm.)

the surveyor Olof Nauclér's *Kiengis bärgzbruck uthi öfre Tornöö geometrice aftagit i Novembris månadt år 1660* (see Fig. 3, Eng., approx.: 'Kengis works in öfre Tornöö geometrically depicted in November 1660'; inventory published in *Svappavaara* 350). In the centre of the plan is the water dam (P), the penstock (w) and the forge (v). Just a little bit to the south is the manor (a) and its enclosure (A). The mighty Torne River runs from the west to the east, and Kengis works is located at a broader part with five small islets in the river. Looking more closely at the plan, a well-developed industry is visible.

Along the penstock, east of the dam is (s) *stegerhus* (a kitchen), a saw mill (t), a forge (v), divided into three sections, then a copper refining furnace (*gårmakeri*), stamp mill (*bookhus*), for the copper ore, and lastly in this more than 25-meter-long house, a copper forge, for the making of copper plates. Just south of the forge are two large coal sheds (o) and to the north are two flour mills (q) and a prison (r). Scattered around the forge are the workers dwellings (m), their outbuildings (b) and chimneyless cabins, *pörten* (n). The southern side of the road has a somewhat different character. It is, as mentioned above, dominated by the manor house (a) and a courtyard surrounded by servant's quarters (d), brewery (c), outbuildings and stables.

The second depiction, stemming from the same year but from another hand, that of the works scribe Dennis Joris, is a drawing showing Kengis from a different angle (see Fig. 4, cf. Nordin & Ojala 2017: 14–6; Nordin 2020: 133–4). The drawing presents a unique complement to the map. The projection on the drawing makes it possible to discern what the buildings looked like. For instance, the new manor (a) that in the map is presented as a large building with two porches, is a three-storey renaissance manor, with two chimneys, weather vanes, a large amount of led stained glass windows with shutters and a brick roof.

The workers dwellings are depicted with chimneys, and the two workers houses (m) to the west, distinctly show that in each there lived three to four families, according to the number of front doors. The *pörten* are also depicted as dwellings (they have small windows), but without chimneys. Another rather surprising detail on the drawing are the features related to the

pleasure garden. The manor's garden is fenced and gated and is divided into geometrical parterres. In the middle of the courtyard, between the manor and the garden is a sundial (labelled *Tids sten*, 'time stone'). Just north of the overseers' old dwelling (i) there is a similar feature, but without explanatory text (cf. also Nurmi 2019).

As we have discussed earlier (Nordin & Ojala 2017; Ojala & Nordin 2019; Nordin 2020: 110–42), there is another important constituent in the drawing, namely the two *goahti* (Sámi huts) depicted on the islet (Ängsholmen) in the foreground. From the written record it is well known that Kengis works had a large number of Sámi employees (see e.g. pay rolls from Svappavaara and Kengis 1660–1, printed in Lindmark 1963: 72–9; cf. also Ljung 1937; Kuoksu 2003). A closer look at Joris' drawing and the two *goahti* reveals a third feature, right between the two dwellings. It is a quadrangle wooden construction with emphasized delineations. It is impossible to conclude with certainty what it is supposed to depict. Here, we raise the possibility of interpreting it as relating to contemporary Sámi wooden ritual platforms, known from Lule lappmark, and other parts of Sápmi (cf. Bergman et al. 2008). The location of a ritual platform at the site would seem to be surprising, located closely to the settlements of the metal works and in light of the missionary processes and the hostility towards traditional Sámi religion and tradition from the officials of the Swedish state and church.

The depicted Sámi settlement on Ängsholmen, which we have not been able to locate during our fieldwork, can be understood as a precursor of the works settlement that was still inhabited by the time of the drawing. The place name, Kengis/Geavv̄njis, the traces of older habitation by the river (as registered in the *Kulturmiljöregistret*, managed by the National Heritage Board in Sweden), and the location of the site by the rapids, indicates that it has been in constant use and inhabited by both Finnish and Sámi groups during the late medieval and early modern period.

Ingela Bergman et al. (2008), have identified the existence and use of ritual platforms and sacred wooden objects, *várro muorra*, in mid-17th century in the Sámi ritual landscape from the mining maps of the Nasafjäll mine from the 1640s. Moreover, they have identified that the

Figure 5. *Ionsva masugn och järngrufvor i Tornöo Lapmarck geometrice aftagen uthi Novembris månadt åhr 1660. Junosuando furnace and iron mines in the Torne Lappmark, depicted in November 1660. The mines in the lower right and the works settlement in the upper right. (Photo courtesy of Riksarkivet, Kommerskollegii bruks- och gruvkartor, Stockholm.)*



use of the platforms continued despite Christian missionary activities and religious persecution against the Sámi around the mid-17th century, only to disappear by the end of the century (for an overview of the missionary process in Sápmi, see Rydving 2020). We wish to emphasize that the interpretation of the quadrangle feature on the drawing is tentative, but, at the same time, not unimaginable in a landscape inhabited, shaped and used by Sámi groups since hundreds of years, which still, at the time of the industrial breakthrough, was an Indigenous landscape of the Sámi and Finnish local populations. What is visible from the map and the drawing of Kengis is a space shared between Dutch and Germans industrialist (the manor), Dutch and Swedish workers (the cabins), Finnish workers (the *pörten*), Sámi inhabitants (the *goahti*). Looking more closely at the other works of the consortium, it is also possible to identify other features connected to the Sámi use and habitation of the landscape.

THE PRODUCTIVE AND SOCIAL LANDSCAPE OF THE KENGIS CONSORTIUM

On the first map showing the location of the Junosuando findings, made by Hans Lybecker in 1643 (see Fig. 2), the symbol for copper is placed next to the symbol for iron. The amount of copper mined in Junosuando seems, however, to have been limited. The ore was found by a farmer, Lars Larsson or Lasun Lassi in Finnish, from Junosuando village by the Torne River – hence the name Junosuando Masugnsbyn (*masugn*, means furnace), soon shortened to Masugnsbyn (Fi. Masuni)¹ The finding was made in a ravine by a small river with the name Saivijokk. The landscape is characterised by great forests and is rather flat except for the dramatic ravine along the river.

The name Saivijokk is probably related to the Sámi concept of *Sáiva*, *Sáivu* (SaN.), *Sáivva* (SaL.), indicating sacred places, often in relation to lakes and particularly lakes with good fishing, although there are different meanings in different Sámi regions (Manker 1957: 19–20; Pulkkinen 2005; Äikäs 2015: 44). *Sáiva* can also be connected to sacred mountains and the world of the dead (Bäckman 1975: 13–7). It should be noted that many toponyms in the Torne River valley area have Sámi origins (as Kengis), although many have been transformed over time into Finnish or Swedish (Vahtola 1991; Swedell 2001; cf. also Edlund et al. 2016). Saivijokk was soon changed into the Finnish Rautajoki, meaning ‘Iron stream’, and the Saivi-name disappeared on most later maps.

Sámi sacred places can be traced through their names, such as *Sáiva*, local traditions, and/or their conspicuous form and shape in the landscape (cf. Manker 1957; Mebius 1968; Bäckman 1975; Äikäs 2015; Westman Kuhmunen 2016). The Saivijokk at Masugnsbyn runs in a steep and conspicuous ravine, the most dramatic landscape feature in the area. The studies on Sámi

Figure 6. Masugnsbyn, deserted works site. The building in the centre left is the works scribes' dwellings, the *Gruvstugan*. The two terraces with rows of houses can be discerned in the centre and the foreground of the picture. (Photo: Jonas Monié Nordin, 2016.)



religious practice and its traces in the landscape are so few and limited that it cannot be taken for granted that this ravine had a ritual or religious role among the Sámi in the region, and there are no recorded material traces of sacrificial practices. The river's and the ravine's role in a sacred Sámi landscape must thus be considered hypothetical.

At Masugnsbyn, a mining village and a furnace was soon established. Raw copper and iron were processed here and transported by reindeer sleighs down to Torne River and Kengis for further refinement. The map from 1660 shows a quite developed society (see Fig. 5). The productive space of the map shows two dams, the upper dam, to the northwest is connected to the copper furnace, the roast and a saw mill, the lower part, close to the iron mines holds a furnace, a flour mill, a shed, and a workers dwelling. In between is a bridge and an open coal shed, to the right of the river. At the far left is a mine called *Magnetz grufwan*: the magnetite mine.

The dwelling area is situated on top of a set of ridges. At a first glance the settlements seem rather scattered but through survey in the field it has been possible to locate the remains of this 17th-century works. The row of houses, labelled A on the map, and erected north–south has been possible to identify. One of these buildings still exists today and is quite unaltered. In 1660, this house had two apartments with hallways and housed the works scribe (see Fig. 6). At the

angle of this building is a row of workers apartments with an outbuilding (*b*) and a *pörte* (*d*) in between. To the north are two rows of outbuildings with a couple of worker's dwellings and a *kotta* (*goahti*, Sámi dwelling), visible as shallow depressions on top of the ridge.

The row of dwellings is located on the lowest of three natural terraces, near the upper dam, the row of outbuildings located on the natural terrace in the middle, and the third row of houses were dug into or put on top of the highest ridge. The main building formed a demarcation towards the western side (Lindgren et al. 2020: 23–4). Surprisingly, most of the buildings existing 1660 were possible to locate and identify during the fieldwork. The natural terraces had, at places been improved with rows of stone, ordering space with a *bruksgata*, a main street flanking the industry and the dam, and an administrative building overlooking the works, forming a pendant vis-à-vis the furnace, and the mines could also be identified. The hierarchical outline is strengthened by what seems to be an ethnic or linguistic division, identical to what was depicted in Kengis, but in Masugnsbyn also visible in the field, with the Swedish/Dutch/French-speaking, in the cabins, the Finnish-speaking people living in the *pörten*, and a Sámi family in the *kotta*. These ethnical and linguistic division of space was a recurrent pattern in 17th-century Sápmi, visible at the church and marketplaces (see e.g. Ojala & Nordin 2019; Nordin

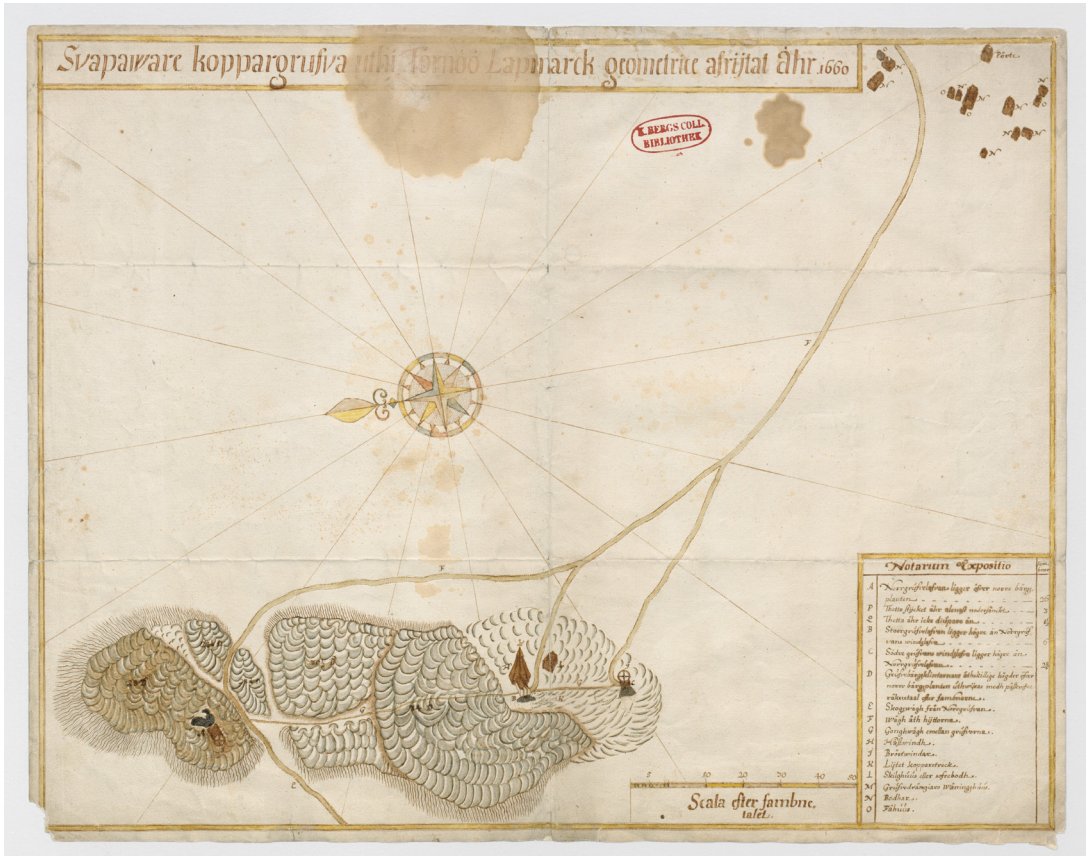


Figure 7. Svappavaare koppargrufva uthi Tornöo Lapmarck geometrice afritjat åhr 1660. Svappavaara copper mines in Torne Lappmark, depicted in 1660. The miners' village in the upper right. (Photo courtesy of Riksarkivet, Kommerskollegii gruvkartor, Stockholm.)

2020: 230–8). A parallel with the *goahti* can be found at the concurrent Kvikkjokk silver works (Nordin 2020: 123).

Masugnsbyn was shut down in the late 1670s, this short period of activity explains the high degree of preservation. Some mining activities were, however, ongoing during the remaining part of the century, but concentrated to the mines. Maps from 1736 and 1906 suggest that most of the early structures of the works were not in use, suggesting that a substantial part of the building features identified by us are remains from the first industrial phase (Lindgren et al. 2020, app. 6.2–6.3).

Svappavaara settlements

This high degree of preservation is also found at the contemporary settlement by the Svappavaara

mine, some 150 kilometres northwest of Kengis. A Sámi man, Olof Tålck (the last name denotes his function or profession as interpreter), had found copper ore on the mountain Svappavaara, which he reported to Abraham Momma. The place name derives from a North Sámi word, with unclear meaning and was soon re-named Veaikevárri (SaN.) and Vaskivuori (Fi.), meaning the copper mountain. As in Masugnsbyn, the landscape is quite flat and dominated by large forests, marshland, and rivers. The dominating landscape feature is the Svappavaara Mountain. This conspicuous peak seems to have been a sacred mountain in Sámi traditions, a *Passevare* according to a tradition recorded in 1729 when the clergyman Henric Forbus travelled the region (Manker 1957: 139).

After the discovery of the copper ore the development was swift. Mines were opened and



Figure 8. Svappaware Kopperhüttors ...uthi Tornöö Lapmarck Geome...tagen åhr 1660. Svappavaara copper works in Torne Lappmark, depicted in 1660. (Photo courtesy of Riksarkivet, Kommerskollegi gruvkartor, Stockholm.)

a miner's village founded nearby, and another settlement in the valley to the north where a furnace was erected along a stream. Soon the whole landscape was transformed. Not only was most of the trees cut down, but the rivers were dammed, bridged, and summer and winter roads were laid out connecting the mines and the furnace with the Torne River, some 20 km to the north. The mines and the furnace were surveyed and mapped by Naclér in the autumn of 1660 (see Fig. 7).

Each mine is depicted with its elevator (*spel*) and the *Stoorgrufvan* (B), has an octagonal wheelhouse (*hästvind*) with a weathervane on top erected adjacent to the mine shaft. The latter was driven by a horse, whereas there was number of female employees running both elevators, according to the pay rolls from the 1660s and 1670s (pay rolls printed in Lindmark 1963).

Mining activities has commenced several times at Svappavara in connection with global economic conjuncture, after its' closure in the 1680s. In 1965, the mine opened again, closed in the early 1980s, only to re-open in the early 2010s. The last decades' mining has meant that the whole northern part of the mountain (A), the peak, the sacred Sámi site, is now gone. The other parts, including the village, remain surprisingly intact.

Our field survey could in detail confirm the features of the mining village (Lindgren et al. 2020; cf. also Wennstedt Edvinger 2014). The four scattered dwellings labelled *M*, and their outbuildings and cowsheds, *N* and *O*, could be identified, but it was also evident that the settlement had expanded between 1660 and the late 1670s – early 1680s, when the regular mining was shut down. At least three more dwellings



Figure 9. The Muonapuoti garner dated to the late 1650s. Now in the Svappavaara folklore museum. (Photo: Jonas Monié Nordin, 2017.)

were identified, along with remains of outbuildings cellars, remains of roads, and heaps of stone (clearance cairns), during the field work (Lindgren et al. 2020: 19–23). On the map, the village looks quite scattered and improvised, but like in the case of Masugnsbyn works, field survey could show a quite regulated space, consisting of a row of houses with the gables facing an open area sloping to the south east. The old road was possible to identify and to follow for more than a kilometre in the slow-growing sub-arctic forest (Lindgren et al. 2020: 23).

In the valley to the east, along the small river Kotijoki (Fi. ‘Home stream’) is the village of Svappavaara, founded adjacent to the furnace c. 1655. Naucmér’s map over the village, shows two dams, and two large, 20 x 5 metres long, furnaces (see Fig. 8). Next to the two furnaces are the foundation of roast houses where the copper ore was roasted before smelting. Remains of the lower, the new furnace, its dam, and a flour mill, could be identified (on the northern side of the road), whereas the remains of the old furnace were not identified (Lindgren et al. 2020: 15, 19).

The continuous settlement in the village had changed several features quite substantially. Roads had been adapted to modern traffic; new houses were erected on top of the old ones. Adjacent to the remains of the lower furnace several features shaped as house foundations could be identified, probably being the remains

of the dwellings a, b, and c, just southeast of the roast house. Only one *pörte* is depicted, which is considerably less than at the other sites. In an inventory from 1679, which corresponds quite well with the map, a *kåta* (*goahiti*) is listed among the buildings at the works, but its location could not be determined (*Svappavaara* 350: 26). The map of 1660 reveals a substantial amount of improvement. The stream had been straightened and channelled, which we found traces of during the survey, but it had in later times gone back to its earlier shape.

Again, a topographical analysis could reveal a lot. The road leading from the north, vaguely depicted on the map, conjuncts with the road coming from the east and the Torne River, just below a quite steep hill below the secluded farm in the centre of the map. What, at first sight looks like scattered groups of houses, in fact makes up two main streets. Right in the centre is the works scribe’s house, home of the most powerful person at the works.

Today a small local folklore museum is located on top of the hill in the centre of the old village. Three old outbuildings have been brought there from other locations in and around the village. The *Muonapuoti*-building (see Fig. 9), has a log in the timber frame-construction that was felled between the years 1657 and 1660, according to dendrochronological dating (*Svappavaara* 350: 20). The name, *Muonapuoti* (Fi), means

Figure 10.
Remains of
roast ovens at
Leppäkoski
works. (Photo:
Jonas Monié
Nordin, 2017.)



garner, and its size, and shape corresponds well with the garners (*bodar*, b) on the map.

From Svappavaara mining village and works, quite a substantial amount of pay rolls, and other documents survive from the 1660s and 1670s. From 1661, 54 workers with 23 wives are listed, two of Dutch descent, five Finnish, and five Sámi. In other lists, there are names of other Dutch/French workers and civil servants, as well as Finns, and Sámi. Only fifteen of the 54 workers are listed (including the ones with clear French names) as not primarily Swedish-speaking. However, several of the others are listed as coming from farms with Finnish or Sámi names.

Both the Sámi and the Finns had their names Swedified making them hard to identify, when not addressed as 'lapp' or 'finne'. Most of the Sámi worked with transportation and did not live at the works. The main part of the 1045 tons of raw copper produced in Svappavaara between 1657 and 1674 was transported, at least part of the way, by reindeer sledges, arranged by Sámi (cf. Hoppe 1945). In an inventory for the mines and the village of Svappavaara in 1660, 122 reindeer, and 150 *geres* (Sámi sledges) are listed. An additional 200 sledges are also listed (inventory printed in *Svappavaara 350*: 16). The number of reindeer and Sámi sledges demonstrate close economic and social ties not only with

the Finnish but also the Sámi population. This picture of 'lived cosmopolitanism' (Thompson 2013: 10; see also Kuusela et al. 2016), is also confirmed by several continental travellers visiting Torne River valley and Svappavaara, in the second half of the 17th century. Johan Ferdinand Körningh, Francesco Negri, and Jean François Regnard, travelled here in between 1659 and 1680, and writes about the Dutch workers, the Sámi, and the Finns at the works (Nordin 2020: 100–42).

Leppäkoski and Pahtavaara

The finding of the ore by Sámi surveyors is known from Svappavaara and the founding of the works sites took place on localities previously inhabited by Sámi, shown through the archaeological and spatial sources, such as in the case of Kengis, Masugnsbyn, and Svappavaara. A similar pattern can be identified at other sites such as Sjangeli, and Leppäkoski. The mines of Pahtavaara, and the Leppäkoski furnace, are found c. 10 kilometres north of Jukkasjärvi/Čohkkiras church and marketplace, on a mountain ridge in the forested areas between the Torne and Vittangi Rivers. There is no evidence of any later industrial activity at the sites, even though there are traces of probing from the late 19th and early 20th centuries (Tegengren 1924). Industrial

activities started in Leppäkoski in 1668 with a workforce from Svappavaara under the direction of Hans Bergsman. Bergsman, meaning miner or metal worker, a rather distinguished title, had originally come from Säter in Dalecarlia, the central copper production district in Sweden (Schefferus 1956 [1673]: 393; *Svappavaara* 375: 20).

The Pahtavaara copper mine is situated on a small hillside sloping to the northwest. To the south, on top of a ridge overlooking the mine are the remains of a small mining settlement, consisting of a cluster of seven building-remains consisting of two dwellings, a probable stable, a smithy, a cellar, a hexagonal building of unknown function. The two dwelling houses were quite substantial, 11 x 7 metres, respectively 10 x 10 metres. One was situated on top of the ridge and had a foundation for a substantial staircase, facing the old pathway, and an attached foundation that we interpreted as the foundations of a porch. Inside is a cellar and the remains of two chimneys. The shape of the building was that of a double house (Sw. *parstuga*), a significant building form introduced during the 17th century, for example in the Silbojokk/Silbbajähkå silver works (cf. Nordin 2012). Due to its dominant position, its size and other features, it is reasonable to assume that this was the *gruvstuga*, office. Due to the cold and dry climate, parts of the wall timber are preserved, and several corner knots are still visible (Lindgren et al. 2020: 12–5).

The contemporary Leppäkoski copper works, a couple of kilometres to the northeast, by the Vittangi River, is featured by the substantial slag heaps, and a two-meter-high charcoal storage heap. The dam, the foundation for the furnace, and the roast oven are all very well preserved (see Fig. 10). The main road within the industrial complex is also well preserved, connecting the furnace and the other features at the site. On a small ridge overlooking the industry are some remains of buildings, furnished with hearths. Here are also several remains of charcoal kilns. Along the river are remains of quays in the calm waters just below the furnace, but also of canals and features for the water wheel were found. Also, the course of the river had been modified. Below the works, the stream was cleansed from boulders to reduce the rapids.

The remains of the settlement were identified by the local historian Albin Lindmark in the 1960s and in the 1970s the county museum made some preservation activities, including a limited archaeological excavation to date the otherwise unknown industrial site (Nordin 2019). Finds of red earthen ware and some fragments of clay pipes, from one of the cabins by the Pahtavaara mine, supported the dating to mid – late 17th century (Wallerström n.d., finds in Norrbotten County Museum). There were finds of animal bones from reindeer, underlining the Sámi-Finnish connection (Drury et al. 2018: app. 2). Little is known about the Leppäkoski industry, but the recent field survey suggests that it shares several traits with the other works sites discussed here, such as the urge to express power and hierarchy. The location and the shape, and the form of the main building at Pahtavaara strongly suggest a will to enforce a hierarchical world view based on class and power – features that in miniature reflects the situation in Kengis, but also at other works, industrial sites and plantations of the early modern world. A second trait shared by Leppäkoski works and the other sites discussed in this paper, is that the mineral deposits were discovered through local knowledge and in the day-to-day business were supported by the local Sámi communities, for instance through transportation services and trade in food products.

Part of the reason for this might derive from the role of copper itself. Within the Sámi societies copper was coveted for the manufacture of ritual objects such as pendants, rivets, and other objects attached to, for instance, the sacred drums, of which the oldest known examples still surviving are from the 17th century (*Goavddis*, SaN, *Goabdes*, SaL; see Manker 1938; Immonen 2013; Hedlund 2017). The sharing of knowledge, from the part of the local Sámi and Finnish people, about the copper ore with the Kengis consortium indicate local and individual agency in the interest of obtaining the coveted metal and its alloys. The demand for, and the lure of, copper and brass were shared features that connected the Sámi with the global merchants, the Native Americans, and the West African business entrepôts making Torne River valley a local hub in the emerging global modern world.

LOCAL WORKS AND GLOBAL CONNECTIONS

This extensive review of the Torne industrial consortium of the second half of the 17th century has served three objectives: first, to show the structure of the industrial sites and the unique level of preservation; second, to demonstrate the similarities of outline, style, and architecture within the industrial complex – showing that an overarching architectural program or idea was implemented, and that the industrial complex of 17th-century Torne River valley was not solely adapted to a West European aesthetic framework, but also active in the shaping of that very style; and third, to emphasize the multicultural character of the early modern industrialization, and the many traces of local adaptation through the role of local and Indigenous participation, and collaboration, including Sámi and Finnish knowledge, agency, and traditions.

Most of the copper veins were found by Sámi people and several of the sites seem to have been related to a sacred Sámi geography. At least two of the sites have indications of being sacred sites and at a third, Kengis, there is a tentative indication of ongoing Sámi ritual praxis around 1660. Other finds were made by Finnish farmers and most of the work force in the mines and at the works consisted of Finns. At this point, we can conclude that the early mining took place in a shared Sámi and Finnish landscape, and that industrialization was in fact fully dependent on Sámi and Finnish knowledge and agency. The pay rolls from Svappavaara show a clearly multi-ethnic environment with the Dutch/French, southern Swedish, Finnish, and Sámi workers.

The close relation between the different groups led to a transfer of ideas and cultural traits. This process is difficult to follow in detail, but sacred sites, such as a holy mountain, possibly a sacred river, and all other Sámi features around Masugnsbyn, Kengis, and Svappavaara, suggest the parallel existence of a plethora of traditions and identities during the early years of the industrial expansion. To this can be added the importance of trading with Sámi goods to the European continental market, where the Momma-Reenstierna brothers played a key role.

Assessing all these sources, supports our understanding of the metal works and mining

sites as contact zones, where people from different ethnic, linguistic, and social backgrounds met and affected each other. In a context of state and industrial colonialism, these localities became active nodes where identities were shaped, knowledge, and experiences were shared, and power relations played out. Moreover, these localities became contact zones between cultural and religious traditions, and served as sites of introduction of new perspectives on land, nature, magic and modernity.

The constructing of contact zones was also based on modern traits connected with a drive to shape and change social, and extractive space. The works founded in Torne River valley in the second half of the 17th century were all built on the principles of separation of people according to class and ethnic identity, and accumulation of capital. The latter is visible in the recurrent examples of modern traits in the layout of space, such as the implementation of time devices in the making of a capitalist space and the idea that time is money – or as in the words of Benjamin Franklin: “money makes money as part of God’s plan” – creating a fundament for the modern society (Weber 1920 [2020]). What we can observe at the copper works of the Torne River valley is not a local isolated path to modernity, but the blend of local, Indigenous, regional, and global traits in the making of the modern world. The Industrial revolution of England in the second half of the 18th century had, it might be argued, one of its predecessors in the dramatic changes in the production of metals in Scandinavia, including parts of Sápmi and the Torne River valley.

Global hunger for brass and copper was a decisive motor in this development and so was the industrial and technical knowledge and skill of the Dutch workers and investors. Another pillar propelling the first wave of industrial development – or the very beginning of the industrial revolution – was made possible by the Indigenous knowledge of the Sámi and the Finnish inhabitants of the Torne River valley.

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NOTES

¹ See also the Kvikkjokk/Huhtán silver works, erected in 1660 in Lule lappmark which was commonly known as the furnace or Huhtán, i.e. furnace in Lule Sámi.

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