

Eyvind Bagle

Nature's Factory: A case study of Norwegian natural ice exports in the era of industrialization, 1840-1920





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of Norwegian natural ice
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industrialization, 1840-1920**

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Culture Studies

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Dedication

For "Mutter'n", Lill Wittussen (1942–2020).

Preface

I want to start by thanking the manager and prime mover of the *Last Ice Age research project*, Per G. Norseng, whose vision and persistence made the project a reality. While it has provided my fellow researchers and me with above-average knowledge of the natural ice industry, Per still is the magister on the subject. My employer, Stiftelsen Norsk Folkemuseum, granted me leave and ample working conditions, and special thanks are due to the Norwegian Maritime Museum's director Tove Wefald Pedersen for supporting my application. Thanks also to all my good colleagues at the museum for all help and support!

To my fellow researchers in the Last Ice Age project—Knut Nygaard, Effie Dorovitsa, Benjamin Jennings, and Inger Johanne Lyngø—I extend thanks for good discussions along the way. My affiliation has been with the University of Southeastern Norway (USN), Program for cultural studies. Jeanne Schoenwandt coordinates the program and, among many other things, arranged my midterm and end seminars, both indispensable. The program is interdisciplinary, and it has been exciting to learn about perspectives and methods quite far from the document-oriented one of historians. The Cultural heritage in use research group (KAB), headed by Steffen Fagernes Johannessen, is a place for inspiring presentations and discussions. When it comes to the actual collection of material for this study, I have been given invaluable assistance at the Berg-Kragerø museum, Telemark museum, The State archive at Kongsberg, The National archives, and the National library in Oslo. Furthermore, I thank those kind people who took their time to talk to me, in some case letting me peruse their private collections of material on the ice industry. Special thanks to those who agreed to be interviewed, see the full listing in the appendix.

My supervisor, Ellen Schrumpf, has pushed me and kept me on track, and always responded promptly and meticulously on chapter drafts. I thank her for making sense of my scattered ideas, and for challenging me to work them into a coherent form. Thanks to my co-supervisor Ingo Heidbrink for his work, in particular good sessions and fieldtrips during his stay in Oslo the strange summer of 2020. The ensuing pages are far from a

work of perfection, but they would have been much farther from the mark without the input of my supervising team. The responsibility for the end product is, of course, solely mine.

Finally, thanks are due to my family. My father, Rolf Bagle, put me in contact with local experts at Nærsnes who pointed me in the direction of valuable source material. Marius, Sindre, Erlend and Solveig are all young adults now, and cause minimum distractions, which I suppose is deserving of gratitude in its own right. If I had an emoji here, I would probably use it wrongly as per usual. Thank you Liv, love of my life, for your patience and support.

Abstract

From roughly the middle of the 19th century until the First World War, Norway was a major exporter of natural ice to several European destinations, in particular to Great Britain. Regular-sized blocks of ice were cut from ponds and lakes, stored in icehouses, and shipped across the rough North Sea, on journeys that usually kept most of the product intact. Although the exports of natural ice for decades affected the lives of thousands on the southeastern coasts of the country, it has received little attention in Norwegian historiography.

This thesis has been researched and written to produce new knowledge on why and how the natural ice trade came to be a regular economic activity in southeastern Norwegian coastal communities, in the time between 1840 and 1920. The approach is to regard this development as a case of industrialization. This means acknowledging industrialization as a broad social transformation, containing many more technological developments than just the “key technologies” usually shortlisted for attention. The method has been to subject the actions of four ice entrepreneurs and their ice companies to closer examination.

Keywords: coastal culture, natural ice industry, maritime history, entrepreneurial strategies, telecommunication.

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Abbreviations for archives and sources

BKM = Berg-Kragerø museum (Telemark museum, Kragerø). Archives and photos.

RA = Riksarkivet (National archives of Norway, Oslo).

SAKO = Statsarkivet Kongsberg (State archives, Kongsberg).

KBC = Knut Baarsrud Collections, Nærsnes (private).

OCN = Ole Christian Nord's archive, Stockholm (private).

NSM = Norwegian Maritime Museum, Oslo. Photos.

Measurements and currency

Ship volume measurements and “tons”

Register ton (RT) is a volume measurement used in 19th-century shipping. In Norwegian terms, 1 RT corresponds to 2.83 cubic meters. This was the measurement used to estimate the volume of ice exports in Norwegian trade statistics, and up to its cessation in 1947 the time series for ice exports were rendered in RT.

The *commercelæst* (CL), a ship volume measurement, was the predecessor to the RT. When the CL was phased out over the course of the 1860s and 1870s, 1 CL was set to correspond to 2.1 RT, see *Historisk Statistikk 1948* p. 209.

In public discourse, ice was usually referred to in volumes, more rarely in value. Contracts between buyers and sellers stipulated price per weight measure. Since much of the ice trade went to Great Britain and Ireland, the “ton” usually referred to in ice

contracts is the long ton, at 1,016 kg (i.e., 1.6% more than a metric ton). The ice was weighed upon arrival, either at the ship's deck or quayside.

Speciedaler and kroner

The *speciedaler* was Norwegian currency until 1875. One *speciedaler* was 5 *ort*, each equivalent to 24 *shillings*. Upon replacement by the *kroner* in 1875 (there were 100 *øre* in a *kroner*), the exchange was four *kroner* to each *speciedaler*. In this thesis, abbreviations will not be used for Norwegian currency, while the British pound sterling will generally be represented by the £.

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1 Introduction and research problems

1.1 Past uses of ice

From roughly the middle of the 19th century until the First World War, Norway was a major exporter of natural ice to several European destinations, in particular to Great Britain. Regular-sized blocks of ice were cut from ponds and lakes, stored in icehouses, and shipped across the rough North Sea, on journeys that usually kept most of the product intact.¹ The sheer volumes were staggering. In 1898, around one and a half million metric tons of ice was harvested, stored, and shipped in this fashion. Although the exports of natural ice for decades affected the lives of thousands on the southeastern coasts of the country, it has received little attention in Norwegian historiography.

Before turning to the review of that historiography, an outline of the functions of ice in contemporary 19th century societies might be useful. The ice found human usage in a number of ways, mostly connected to nutrition.² Blocks of ice cooled the carts pulled around London and other UK city streets by Italian-speaking ice cream vendors, known in the English-speaking world as “hokey pokey men”. Crates of crushed ice cooled the catches of British and European trawlers going out from North Sea shores, increasing their operative range at sea from the 1870s and 1880s onwards. In German brewery cellars, fans wafted frosty breezes over kegs with fermenting lager beer. For dairies, restaurants, ocean liners, and the households that could afford them, physical blocks of ice were a crucial conserving agent well into the age of mechanical and electric means of refrigeration.

¹ The overall volume of the Norway ice trade from 1844 to 1947 is provided in table 9.5.1.

² Kinross (1991), Freeman (2018), Rees (2018).

Cooling drinks via mixtures of snow and ice (and salt) is noted to have occurred in European antiquity and other civilizations.³ During the 19th century, however, a distinct “ice culture” emerged.⁴ Systems and procedures were developed for processing freshwater ice blocks, storing them for longer or shorter periods depending on market prospects, and, significantly, for transporting them by horse and ship over great distances with remarkably modest loss rates from melting. Crucial elements of this variety of ice culture were forged by New England ice merchants, among whom the Boston “Ice King” Fredric Tudor (1783–1864) occupies center stage in many accounts.⁵ The traffic of “crystal blocks of Yankee coldness” extended by 1856 to “England, the Caribbean and South America, the Persian Gulf and India, southeastern Asia, Hong Kong, Manila, and Australia”.⁶ The foundation of this business was to provide, at great expense as well as potential profits, coolness to people of European descent, facing uncomfortable heat in their colonies and trading posts.⁷ The norms and tools of the business thus had a somewhat specified geographical origin, but it grew to include many local variations. Profits made on ice drove new perceptions of the natural world to the fore.

Even in Norway, where ice was wished away in the spring, the mindset changed if, in the words of an 1825 Norwegian commentator, it “transforms into bread”.⁸ Although the business entailed risks, it was exploring a resource imagined to be in endless, replenishable supply. At times—for instance, in 1890 in the Norwegian coastal town of

³ Anderson (1953, pp. 4-13); E. David (2012); Rees (2013).

⁴ *Chamber's Journal*, February 13, 1864, p. 99.

⁵ And is given a lively, although hagiographic, biography by Weightman (2003).

⁶ Dickason (1991).

⁷ Dickason (1991).

⁸ Pastor Niels Hertzberg in *Morgenbladet* October 4, 1825. The transformed conception of ice is poetically captured in Isaksen (1975). Cf. also Schweigaard (1840, p. 26), on Norwegian inland and highland districts' practice of spreading ashes on snowcovered fields to hasten melting.

Kragerø—the idea surfaced that the district “could supply the whole world”.⁹ Although hyperbolic, the statement testifies to the ice actually being “produced” in specific environs.

The ice business was largely driven by temperature and the opportunity to profit off of climate zone differences. In Norway, as in the United States and elsewhere it existed, the natural ice business was regional, yet decentralized.¹⁰ In Norway, just about all the ice exports was harvested and shipped from the southeastern region of the country. More specifically, the ice industry was distributed along a littoral belt. Some winters this encompassed areas as far south as Mandal and Arendal, but usually, the production went on from around Risør and then further east and northwards into the Oslofjord.¹¹ The majority of the actual production sites were located outside cities.¹² Of the 141,000 RT of Norwegian ice exports in 1876, only 5,265 were physically shipped from within city limits.¹³ Its rural affiliations may cast ice harvesting in a rosy glow of a pastoral, small-unit industry: a contrast to the steel, smoke, and chemicals of the industrial revolution. This ambiguity is provisionally captured in the title of this thesis, “Nature’s factory”.¹⁴ But the ice business was as capitalist an enterprise as any other. In some years, demand drove the markets to a frenzy, and commentators deplored the collective “panic”

⁹ *Vestmar*, October 9, 1890.

¹⁰ The US ice industry is theme in chapter four.

¹¹ Tore Ourén (1991). The geographical distribution of the industry will be expounded on below.

¹² Rees (2018, pp. loc 208-120) on the US ice business and the role of capitalism in “organizing distribution networks that have made the commodities that we depend on in our everyday lives available to everyone”.

¹³ *Odelstingsproposition* No. 3, 1882, p. 3. This is a matter of administrative history, however, as the scores of rural loading places were in legal terms within the custom precincts of city harbors.

¹⁴ A phrase lifted from *Cold Storage and Produce Review*, Vol. 13 No. 152 (Nov. 1910), p. 309, via Robert David (1995). It was meant to underscore that the days of natural ice being imported from Norway would soon be over. More on this in chapter two, section 2.4.

displayed by speculators.¹⁵ A few people successfully claimed ownership over the natural resource. Significantly more were extracting, transporting, and stacking it, mostly by the power of their own bodies. The work was hard, cold, and wet. The “ice culture” alluded to above was primarily regarded as the production, harvesting, and distribution of consumable ice for profit.



Figure 1.1. In this postcard from around 1910, the ice workers represent winter in Norway. The Leif Arne Ulland collection, see appendix.

This thesis sets out to examine and provide new insights into this ice culture, through case study analysis of four Norwegian ice firms. They are those of Heinrich Biørn., Johan Martin Dahll and Thomas Møller Wiborg and Nicolay Wiborg in Kragerø, and the ice company of Thorvald Baarsrud at Nærsnes in the Oslofjord. My work explores their operations in the timeframe roughly between 1850 and 1920, a large timespan that

¹⁵ *Norges Sjøfartstidende*, January 3, 1899.

contained the most active years of the ice trade. As will be evident, there is a stress on the actions and motivations on the part of the owners of the ice enterprises.¹⁶ One important backdrop is the fact that the ice trade was volatile, even in the decades when hundreds of thousands of tons were exported each year. Geographically, the concentration is on two of the coastal communities within the southeastern region of the country that supplied European markets with natural ice, and they are *Kragerø* and *Røyken*. The specific research questions, method and design of the undertaking will be returned to in more detail. There will be a geographical outline of the ice industry in Norway. First, we turn to a survey of how the ice trade has been thematized in Norwegian historical research so far. I consider this a first step of a framework for the study.

1.2 The natural ice trade in Norwegian historiography

I maintained above that the natural ice trade has received little attention in Norwegian historiography. This subchapter will clarify and nuance that statement. While written in English with a view to international readership, this is a work by a Norwegian historian, using Norwegian source material to answer questions about a phenomenon that primarily concerned past Norwegian society. Thus, my aim is to present new findings, and hopefully be able to relate those findings to traits of 19th and early 20th century Norwegian history. Within that sphere there is emphasis on developments in the coastal regions of the southeastern part of the country. With that comes questions of interaction across the seas and national borders, questions to which the ice trade is a case in point. A first step, which will be the matter of concern here, is to survey Norwegian historiography for treatment or specific viewpoints on the ice trade.

It is relevant start by noting that this PhD project is part of an international research program called *the Last Ice Age*. It is about the history of the Norwegian natural ice

¹⁶ Inspiration from Johnsen (1998, pp. 19-27).

exports, and is funded by the Norwegian research council.¹⁷ From an obviously Norwegian viewpoint the project description states that the ice industry has been “addressed by many local historians, focusing on ice plants and ice exporters”, while the “significance of these local businesses in wider geographical, economic, technological and cultural contexts is far less researched”.¹⁸ Divided into four strands of research activity, ranging from production, to logistics, food supplies and impact on societal tastes, the individual research projects have maintained a large degree of independence.¹⁹ My frameworks and research questions have been shaped by the overall project, specifically its ambition to link the production of ice to various sets of contingencies, such as “the role of climate and environmental factors in shaping human economic, social and cultural activity, as well as on technological developments, manpower and property relations involved in the production process”.²⁰ Within those parameters, choices have been made and the thesis is a stand-alone product. In the context of this section, it is relevant to note that the Norwegian National Library was commissioned to work out a literature list at the outset of the Last Ice Age project.²¹ The literature list has been a vital resource to my work, but the historiography addressed over the following pages is not an exhaustive treatment of the list per se.

The clarification and nuancing promised above may be summed up as follows: The natural ice trade from Norway is just briefly mentioned in a few works of general and economic history on 19th and 20th century, possibly absenting it from the mainstream of historical consciousness. To the extent that there is a “historiography” of the natural ice

¹⁷ For participants, aims and results so far of the *The Last Ice Age* project, see <https://bit.ly/3fze83A> (Retrieved October 1, 2022).

¹⁸ Cf. <https://bit.ly/3fze83A> (Retrieved October 1, 2022).

¹⁹ Cf. <https://bit.ly/3fze83A> (Retrieved October 1, 2022).

²⁰ Cf. <https://bit.ly/3fze83A> (Retrieved October 1, 2022).

²¹ [https://lokalhistoriewiki.no/wiki/Bibliografi:Isdriften - Den siste istid](https://lokalhistoriewiki.no/wiki/Bibliografi:Isdriften_-_Den_siste_istid) (Retrieved May 20, 2021).

trades, it consists of specialist studies accumulated over years. Principally, in a Norwegian context, valuable contributions have come as chapters in local historiography, as indicated in the project description cited above, but also to some degree as academic papers. I will address these subsets of history writing in turn.

Works of general history, i.e., multi-volume publications portraying the political, social, cultural, and economic development of the nation through the ages, are here taken to represent mainstream historical literature. Four works have been examined: The 1930s *Det norske folks liv og historie*, 1970s *Cappelens Norgeshistorie*, 1990s *Aschehougs Norgeshistorie*, and finally the 2011 *Norvegr*.²² The first two have no mention of the ice industry at all and may be quickly dispersed with. Skipping to the most recent work, the *Norvegr* volume on the 1840-1914 timespan, the chapter on economic development devotes considerable attention to the fisheries and shipping industries.²³ The closest thing here is reference to the salmon, mackerel and herring packed in ice for the foreign markets.²⁴ Although this alludes to a central function of the ice, it does not concern the exports of natural ice as such.

The ice trade does receive some attention, however, in the 1990s *Aschehougs Norgeshistorie*. In the 1840-1870 volume, historian Anne-Lise Seip lists natural ice as one of the key outbound cargoes of the expanding Norwegian merchant navy, although no further mention of the phenomenon is provided.²⁵ The next volume covering 1870-1905, by Gro Hagemann, reproduces a scene of 1880s Oslo ice harvesting by the painter

²² Keilhau (1931), Keilhau (1935), Try (1979), Fuglum (1978), Seip (1997), Hagemann (1997), Nielsen (2011).

²³ Nielsen (2011, pp. 72-131).

²⁴ Nielsen (2011, pp. 87-88). That use of ice, which in many cases may have been the same sources as the ice for overseas exports, was not covered in the exports statistics directly. On the preservation of herring using ice, cf. also Fuglum (1978, p. 267).

²⁵ Seip (1997, p. 119)

Frits Thaulow (1847-1906). It also sports a graph of the export volumes in register tons.²⁶ A caption to the illustrations lays out the essentials; where the ice was produced, from where it was shipped and what made it come to an end: “the electric refrigerator”. Within the context of the volume chapter, the ice trade is apparently element of the “modern breakthrough”. Exactly what kind of element, though, is less clear as the ice does not figure in the body text as such. One might wonder about several aspects, such as: Was the country’s ice trade an exception to the reported stagnation of the traditional exports sectors after 1870, i.e., that of lumber, fish, and shipping services? Or should it rather be reckoned as a part of the domestic industrial sector? Industry, catering chiefly to domestic demand, did in the view of this text become the prime mover for economic development in the 1870 to 1905 timespan.²⁷

A tendency of short allusions to the ice exports also holds true for a sample of standard texts on the country’s economic history, including a recently published maritime history.²⁸ In his overview of Norwegian economic development between 1815-1970, economic historian Fritz Hodne makes a note of Scottish fish merchants coming to Norway for ice for their salmon trade in the 1820s.²⁹ This is mainly in the context of the new opportunities for fresh fish exports from Norway from the 1860s onwards, although Hodne notes that the exports of ice from Norway to England later rose to be “considerable”. In a later economic history textbook, by Hodne and economic historian Ole H. Grytten, the natural ice export is expounded on. Grouped in an “other exports” category along with hides, oats, iron, pyrite, copper, and copper ore, it was one of the

²⁶ Hagemann (1997, p. 142). The exports volume graph builds on the time series referenced in appendix table 9.5.1.

²⁷ Hagemann (1997, pp. 142-143).

²⁸ Hodne (1981), Hodne (2000), Sandvik (2018) and Tenold (2020). Tenold’s book is an overview of Norwegian shipping in the 20th century, with reflections on late 19th century developments. The book mentions the ice trade in a footnote (p. 57) as a voluminous bulk cargo, i.e., as an example of low specialization in late 19th/early 20th century Norwegian shipping.

²⁹ Hodne (1981, p. 117). See also this thesis section 4.2.

goods of a “relatively minor significance” in comparison to the staple products of lumber, fish, and shipping services.³⁰ While of lesser importance than those dominant goods, the “other exports” were in these authors’ view also vital to engendering self-sustaining economic growth in Norway.³¹

Hodne places great emphasis on the role of the exports sector in fostering economic growth in Norway both in the 19th and 20th centuries. Other Norwegian economic historians, while acknowledging the social effects of the expansion in traditional trades in lumber, fish, and shipping in the 1840s-1870s time span, have underscored complementary, although various, domestic markets and supply side developments.³² A recent economic history textbook of the 1840-1940 period, Sandvik (2018), includes a discussion of the stagnation in the Norwegian economy from 1875 to 1905. Diminishing quantities and returns in the traditional trades impeded overall growth, due to the dominance of foreign trade in the 19th century Norwegian economy. However, Sandvik notes that generally lower prices, capacity for reorientation and innovation, improved capital goods in agriculture and industry, as well as rising salaries and increased work opportunities for women, were among factors making Norway a “considerably richer country” in 1905 than in 1875.³³ In addition to this, performance in a number of niche export trades served to compensate for the lackluster performance of the old staples. Sandvik singles out canned sardines, shipping of tropical fruits, tourism, and exports of ice.³⁴ Here, the natural ice exports are depicted as one of several components in the diversification of Norway’s foreign trade.

³⁰ Hodne (2000, pp. 114-115, 279).

³¹ Hodne (2000, p. 115). The performance of the exports industries and their impact on 1830-1865 growth patterns is greatly detailed by Brautaset (2002).

³² F. Sejersted (1993, pp. 47-48).

³³ Sandvik (2018, p. 141).

³⁴ Sandvik (2018, p. 141).

In conclusion, we may ask whether the above allusions to the natural ice exports from Norway confirm the impression of a largely invisible historic industry. My reply to that question is affirmative, despite the fact that both Hodne and Sandvik attach significance to the natural ice exports. Observant readers of this literature might pick up the few references to natural ice exports, but practically nothing is revealed on what kind of business this was, who ran it, what markets it served aside the fisheries, or how it linked to the maritime sectors of the economy. It may be objected here that the same goes for the other niche trades mentioned by all these authors; format and frameworks do not allow for more detail. And, of course, the absence of such detail is a good thing for the researcher setting out to bring such knowledge to the table. This benefit must, however, be offset against the lack of an existing, overarching research debate to place the effort in relation to. The latter entails need for a contextualization, and I will return to this in chapter 2. Before that, it is crucial also to look at the local histories and specialist studies on the ice exports referenced above.³⁵

1.3 Ice in other contexts

Despite the low profile of the ice trades noted above, the ice is not totally absent in all literature, especially not if the net is widened to include local historiography and a sprinkling of academic papers. Thus, a review of historiography must include findings and viewpoints from this literature, even though these have not made their mark on mainstream, secondary historical literature.

It must be noted that much a similar questioning of practically the same material has been conducted previously, by historian Per G. Norseng. Norseng's work may in several respect be regarded as a preparatory study for the Last Ice Age project.³⁶ It seems

³⁵ And in the project outline of the Last Ice Age project, cf. above.

³⁶ Norseng (2014), and Norseng (2019).

relevant to start with Norseng's interpretation of other authors' approach to the subject matter.

Norseng's primary attack point is to review the ice trades as element of Norwegian maritime history. He holds that the few allusions that have surfaced about ice in more recent works on economic and maritime history, still builds on depictions offered by early 20th century writing, especially that of Norwegian maritime historian Jacob Worm-Müller (1884–1963).³⁷ According to Norseng, the ice trade has received little attention in Norwegian maritime history after Worm-Müller's oeuvre. This is troubling as Worm-Müller cites no sources to back his narrative.³⁸ More significantly, Norseng finds the subsequent absence perplexing, in light of the considerable attention given to the transition from sail to steam, and Worm-Müller's hypothesis that ice trades played an opaque part in this transition, if only mentioned in negative relief. The ice trade sustained business opportunities for the largely secondhand fleet of Norwegian sailing ships all the way from the turbulent 1870s until the 1910s. The capacity of the ice trade to alleviate the ruptures caused by low demand for other cargoes, in particular timber and plank freight, is a point also made in Ellen Schruppf's 2006 history of Porsgrunn.³⁹ In light of other evidence, Norseng questions the attending suggestion that the ice trade impeded the modernization of the Norwegian fleet. For instance, there was likely more frequent use of small to medium-size steamships than accounted for by Worm-Müller. Calling for more research, Norseng claims that the agency of the ice trade in the otherwise much-debated transition from sail to steam in the Norwegian merchant fleet remains unclear.

³⁷ Bugge and Worm-Müller (1935, pp. 636-705). The chapter by Jacob S. Worm-Müller covers the period from circa 1850 until the First World War, where ice is a sub-chapter sharing space with special trades in fish, fruit, and coffee.

³⁸ Norseng (2014). Similar characterizations of Worm-Müller's work, see P. Holm (1991, p. 25).

³⁹ Schruppf (2006, p. 146).

Norseng also reviews a number of chapters on ice trade in local or regional history works, both monographs and articles surfacing in yearbooks and anthologies. In the books on districts that were involved in the ice trade, there are typically chapters on the workings, comings, and goings of the ice business. For both Kragerø and Røyken, the main districts in this study, there are old and new “ice chapters”.⁴⁰ The same holds for other central districts in the trade, like Porsgrunn, Asker, and Nesodden.⁴¹ As will be evident in the footnotes in the following chapters, local histories have been an important set of secondary literature to my work.

While acknowledging the many contributions offered by local histories, Norseng's general critique is that they primarily focus on the actual ice production in the communities in question, and usually fail to appreciate the symbiosis with the maritime aspect, or indeed the overseas markets, of the trade. Added to this, Norseng finds no substantial attempts to analyze the ice trades in more overarching terms. The contribution by Weihe (2012) is too fragmented, albeit with a commendable ambition to connect the “frozen water trade” to its cultural contexts.⁴² Norseng also favorably mentions botanist and economic geographer Tore Ourén (1918-1995) for his work on the ice trades, but he relates little of Ourén's research results.

Ourén published three succinct articles on the ice trades from Norway between 1981 and 1991, and obviously spent time researching customs ledgers and historic temperature data in particular. The empirical legwork led him to propose causal links between temperatures, climate zones and export volumes.⁴³ Ourén did not attempt to place the subject of ice exports within any particular debates in the economic or social

⁴⁰ Steffens (1916), Killingstad (1928), Martinsen (2004), A. Pedersen et al. (2016).

⁴¹ Ellen Schrumpf (2006), C. H. Holm et al. (1995), C. H. Holm (1996), Thue (1984). Vesseltun (1994) is a master's thesis in ethnography that discusses the role of ice workers in the early labor organization and settlement of a coastal community in Asker.

⁴² Weihe (2012).

⁴³ Tore Ourén (1981), Tore Ourén (1990), Tore Ourén (1991). For an overview, see Lundberg (1996).

history of Norway. Still, his work was meticulous and produced insights into structural matters that have been overlooked by just about anyone writing on the ice trades.⁴⁴ I find it relevant to revisit some of Ourén's findings about the ice trades from Norway.

We will return to some of his findings in the next section but note for now that a significant development documented by Ourén is the gradual shift from "spring" to "summer" shipments. The latter came to encompass a long sailing season, often from May through October, even later sometimes. These shipments required that the ice be kept intact in the interim, in icehouses designed for the purpose. The upside of this was having ice for sale when the summer heat set in further south, or as Ourén states, "when prices were more favourable".⁴⁵ Ourén traces this shift using evidence from customs records of outbound shipping. With some lacunae for the 1860s and 1880s, he is able to outline that by the 1850s, 20 to 30% of Norwegian ice was "summer" ice. In the years from 1890 to 1910, the figure every year hovered between 60 and 80%, and nowhere below 50%.

This was a fundamental shift. In essence, Ourén gives a coarse numerical expression of a basic transformation, that of the ice trade changed from into a *cultivating activity*.⁴⁶ In years of low percentages of summer shipments, more was exported directly from the source. When the capacity to keep ice stored increased, more could be withheld to increase profits, and the export season became longer. In Ourén's analysis, the construction of icehouses is also crucial. He provides only a very rough sketch of the diffusion of icehouses starting in 1852, the reported year of the first icehouse built in

⁴⁴ An exception is the master's thesis by Blain (2006).

⁴⁵ Tore Ourén (1991, p. 25).

⁴⁶ This terminology follows Norseng (2014), who speaks in the Norwegian of a transition from «høstingsbruk». This is essentially «foraging», only that it did not happen within a framework of a hunter-gatherer society.

the town of Drøbak. In “subsequent years a large number of ice-houses were set up along the coast in East Norway”.⁴⁷

While Ourén thus gives structural insights, albeit very brief in nature and prose, about the rise and high points of the Norwegian ice trades, British economic historian Robert David offers views on the demise of the ice trade between Norway and Britain, which after all, was the primary market area.⁴⁸ David opposes the view that the First World War singularly caused the end of North Sea ice traffic. He points to the fact that exports of ice from Norway to Britain had inexorably diminished after the pinnacle years of 1898 and 1899. By 1913, the volume had shrunk to less than half that of the halcyon years; a fact David attributes primarily to the competition from “artificial ice”. Although the impact of mechanized ice production played out differently in the fisheries, domestic and urban markets, the overall trend was apparently evident. German submarine warfare tactics affected the trade in two ways. First, it severely restricted the range of ice-consuming British trawlers in the North Sea, and then it drove general freight rates beyond viability for a price-sensitive commodity like ice. Thus, although the circumstances and historical sequences were different, the effect was analogous to what had happened in the Indo-American ice trade already in the 1870s.⁴⁹ The beneficial maritime transport conditions vanished, changing the relative cost of alternative “artificial ice”.

David's is a structural reading of the “Anglo-Norwegian” ice trades. The trade diminished due to the impact of two main factors: competition from alternative refrigeration technologies, and unfavorable maritime transportation conditions caused by total, maritime warfare by the belligerents of WWI. David also casts light on the debates on the hygienic qualities of natural ice, which became an issue in the UK from the 1890s

⁴⁷ Tore Ourén (1991, p. 25).

⁴⁸ Robert David (1995).

⁴⁹ Dickason (1991).

onwards. Purveyors of manufactured ice managed to create substantial insecurity about natural ice in this regard, which was no small matter, on the background of recurring urban epidemics and the growing knowledge of the effects of waterborne pathogens.

In a later work, David provides further detail of the distribution of the ice imports into northern British ports between 1840 and 1914, concluding that although London was by far the port taking the largest share of ice over time

the greater importance of the ice trade lay in its ability to transform the fishing industry at northern ports. The symbiotic relationship between the use of cutters in the trawling industry and the sudden availability of ice, cheaply and consistently, made available fresh fish to an extent that have never been possible before, and consequently changed people's diet across the region.⁵⁰

The linkages are thus evident between Norwegian natural ice, the British pelagic trawler industry and the fish-and-chips shops mushrooming in Britain in late 19th and early 20th century. David admits that although it "is clear that the use of ice in the provinces differed from that in London", more research on the ice industry would be needed to "ensure that its importance is recognized".⁵¹

In conclusion, David's call to action is a rare expression that the ice industry, not just the natural ice industry but all history of refrigeration and cooling in the 19th century, holds the promise of more insights into British economic history. Norseng is a counterpoint from the other side of the North Sea, although more delimited to the natural ice industry as a particular feature of the Norwegian economy. The works surveyed in this subchapter come from many positions, and they have not instigated substantial historical debates. That being said, the works of local historians, to which we will return in more detail in later chapters of this thesis, as well as scholars Ourén and David in particular, offer insights on which to build further studies.

⁵⁰ Robert David (2000).

⁵¹ Robert David (2000).

1.4 Outline of the Norwegian natural ice exports

The previous subchapter has touched on several structural features of the Norwegian natural ice exports, as the researchers surveyed have each shed partial light on basic patterns of the trade. This subchapter will combine the insights given by these scholars with material from the Norwegian historical trade statistics, to provide an outline of the historic Norwegian ice trade, in terms of volumes, prices and geographical concentrations.

The rise and fall of the Norwegian ice exports is well known in outline. Several authors point out that it had modest beginnings, a rising phase picking up in the 1850s and some peak years in the 1880s-1890s time period, before abruptly declining during the years of the First World War. Some make a point of the ice trade going on for upwards of a century, others characterize it as a “short-lived adventure”.⁵² This has to do with points of comparison; held up against the relatively longer histories of Norwegian lumber, metals or fish exports the latter viewpoint is perfectly valid even when the time series in table 9.5.1. is considered, which lists annual totals of more than one hundred years of ice exporting.⁵³ The statistical recording of ice exports started in 1835. This was for the majority of years done by the register ton, a ship volume unit corresponding to 2,83 cubic meters.⁵⁴ The first 12 years the recordings are spasmodic but starting with the year 1847 there is a continuous time series until 1947. It is known that there were instances ahead of as well as after those years. The earliest shipments known were in 1822, and the very last took place as late as in the mid-1960s, with schooners picking up ice for the fisheries on the west coast of Sweden.⁵⁵ By then, the volumes had since 1914 been miniscule compared with the heydays of the 1880s to 1910 period.

⁵² Blain (2006, pp. 4, 43)

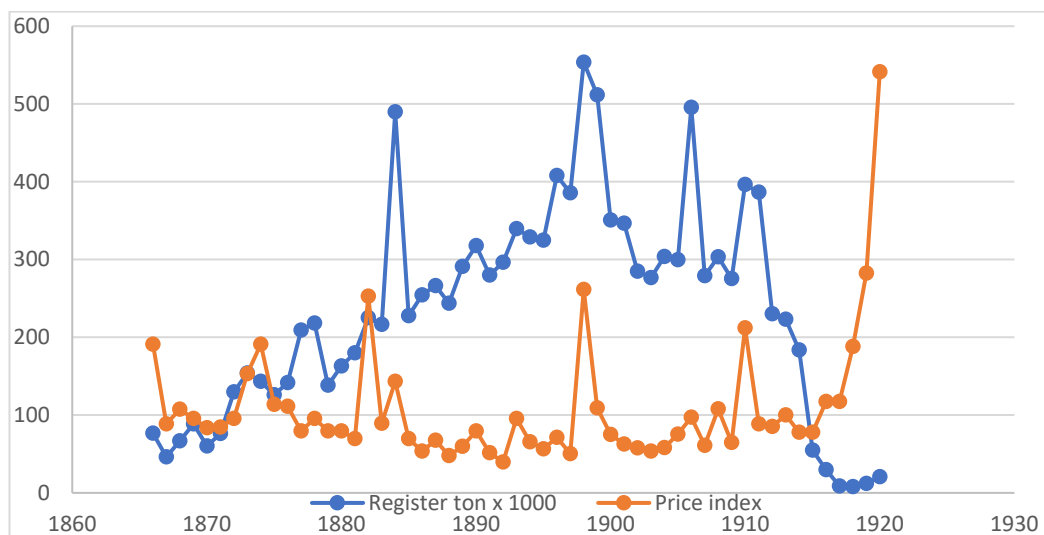
⁵³ Appendix, table 9.5.1.

⁵⁴ More about this in chapter four.

⁵⁵ Cf. on Baarsrud's last shipments in chapter six.

The rise and fall of the ice exports is discernable in Figure 1.2., which uses the same scale to depict volumes in thousands of register tons and a price index 1866-1920 for natural ice, compiled by economic historian Jan Tore Klovland. The outstanding top years of 1884, 1898-1899, 1906 and 1910-1911 almost conceal a general trend of rising volumes up until 1900, followed by gradual decline until 1914, when the bottom completely fell out of the market. There is correspondence between high price years and the volumes registered for exports, although more for some years than others. 1873 was apparently such a year, the second of all where the volumes exceeded 100 000 register tons of ice. The next high point 1884 was also a bull season for ice, although the prices paid on average had evidently been higher in 1882.

Figure 1.2. Volumes and price index for the Norwegian ice exports 1866-1920



Sources: See tables 9.5.1. and 9.5.2. in the appendix. In Klovland's price index (orange), 1913 = 100. Volumes (blue) in thousands of register tons.

The year 1898 marks the all-time high point of the Norwegian ice trade, in which good prices offered were matched by capacity to produce and expedite no less than about 1,4

million metric tons of ice.⁵⁶ The capacity and expectations for good prices were evidently matched in 1899, but that year the prices were only 42 % of the previous year. However, 1899 was still a decent ice year, a long shot from the plummeting prices of 1892. The exorbitant levels of the two years following the First World War reflect among other things most likely a shortage of tonnage, but they also testify to the disproportionate impact of small numbers. However, even a shrinking market still offered opportunities, and the price signals may explain why a few exporters stayed in the business for years.

Which factors are known to have influenced the outline presented above? That will be the question for the remainder of this subchapter. There are two main issues to contend with, and they are interconnected. The first is the level of volatility apparent in the ice trade, the second concerns the interplay of geography and climatic variables as explanation for the observable patterns. As element in the latter there is also the question of the geographical distribution of the Norwegian ice exporting business, and in both these regards the work of Tore Ourén is the obvious starting point for discussion.

Before that, however, some words on the volatility of the ice trade. The price index referenced is by economic historian Jan Tore Klovland and appears within the context of a study on historical commodity prices in Norway.⁵⁷ The natural ice price index is merely one of many exported and imported commodities, thus Klovland's own succinct interpretation is of interest:

The frozen water trade was of importance in Norway, particularly from the last quarter of the nineteenth century until WWI, although it met with growing competition from artificially produced plant ice. [T]he price of ice was characterized by sporadic, but quite volatile, price fluctuations. These were largely caused by anomalous weather conditions. Following an unusual mild

⁵⁶ Given that 1 liter of water = 1 kilogram, the formula is 553 647 register tons * 2,83 m³ * 0,9 (to reflect 10 % expansion of frozen water).

⁵⁷ Klovland (2013). The overall objective of Klovland's study is to investigate the purchasing power parity, which concerns the relationship between a country's currency and a selection of commodity goods. The index, which covers the years 1866 to 1920, is printed in the appendix to this thesis and used for reference in chapters six and seven.

winter in Europe in 1882, prices rose to unprecedented heights in 1882, being more than three times the normal level. Similar short-lived price spikes occurred in 1898 and 1910.⁵⁸

Klovland's attribution of the "sporadic" and "quite volatile" fluctuations is attributed mainly to climatic variation, although the emerging competition from "plant ice" is also factored in. The years singled out match the ones noted by Tore Ourén (1991), who also includes the years 1869, 1884 and 1906. For the majority of years, though, the prices were within the range of 50 to 100 % of the base year value.⁵⁹ The spectacular years may give the impression of a highly volatile trade, for most years prices appear to have been recognizable from one year to the next.⁶⁰

There is an obvious (although not measured) correlation between the prices and top years. Ourén has also offered some explanations for observable patterns in this regard.⁶¹ Spikes in demand were largely caused by climatological variation affecting the receiving markets. Table 9.5.3. in the appendix ("Countries importing Norwegian natural ice, 1873, 1884, 1910") picks out three very good ice years to illustrate some points in this regard, based Norwegian trade statistics. The year 1873 is fairly representative in that Britain and Ireland are the unrivalled main takers of ice, in this case about 80 % went there (124 522 out of a total of 154 138 register tons). Thus, it is the British demand that offers the main explanation for the more or less gradual increase until about 1900, and the subsequent decline of the Norwegian ice exports after that.

However, it is not the British market that explains the big increases of the top years listed above. The other two main markets were in France and Germany. The French markets were comparatively modest and fluctuated to a certain degree, they even showed signs

⁵⁸ Klovland (2013, p. 56).

⁵⁹ Excluding 1918-1920, the average of the index for 52 years is 95,7.

⁶⁰ For expressions of this in a local history context, see e.g. Martinsen (2004, pp. 77-78)

⁶¹ Ourén uses Greenwich and Berlin temperature data for the periods 1865 to 1915 and 1855 to 1915, respectively, as base for differences between British and German market situations.

of picking up a little as British demand abated after 1900. It was the dearth of ice on the German markets that caused the high points in 1884, 1898, 1906 and 1910. This is exemplified for the years 1884 and 1910 in table 9.5.3., in which the share of German consumption is well above the usual. In 1873 it was under seven percent, in 1884 it was 31 and in 1910 38 percent.⁶² The demand from Germany, and in the case of 1884 also Denmark, Belgium, Netherlands and France, came on top of the British. This mechanism produced the all-time high years.

Ourén sees a clear correspondence between climate and profits on this count. Having established that these were “mild winters with only modest home production of ice” in Germany, Ourén labels the German-induced peaks as a “new demand” for ice that sometimes, above all in 1898, “stimulated the price, and the ice trade could also afford the transport costs by supplementary ice production further inland, with cooler winters”.⁶³ Ourén cites the same, direct correlation with temperature as the reason for the much rarer exports of Norwegian ice to New York City and a few other US Eastern Seaboard harbors in 1880 and 1890. The winter of 1898, which was also mild in southeastern Norway, stands out as exceptional in Ourén’s account. In other years the winters in the coastal regions of southeastern Norway supplied ample conditions for ice exporting.

This point brings us finally to consider the geographical distribution of the ice industry within Norway. The core regions of Norwegian natural ice exports were the coastal areas stretching from about the southeastern port of Risør, then north and eastwards along the Telemark (until 1919: Bratsberg) county coast, with the hotspots being Kragerø, Brevik, and Porsgrunn, all including surrounding districts. The outermost areas of the Oslofjord, both the western and eastern shores, were relatively minor players, but the inner area from about the town of Drøbak northwards sported scores of producers,

⁶² Appendix, table 9.5.3. (Page 263)

⁶³ Tore Ourén (1991)

lakes, and icehouses. Table 9.5.4. lists 27 customs districts with registered ice exports in the relative bonanza years of 1873, 1884, 1898 and 1910. Only a third of the ports had exports all those years, six only one year out of four. The table illustrates the concentrations alluded to above; the combined districts of Kristiania (Oslo) and Drøbak are major players in all years. No less than 44 % of the ice is thus likely to have been cleared from the northern reaches of the Oslofjord in the all-time high season of 1898. Other ports display variations, some with clearly waning levels after 1884 like Larvik and Risør, while the port of Kragerø stayed on fairly regular shares of 18, 16, 15 and 21 per cent of the national total during the four years observed.

The geographical area thus identified for ice broadly coincided with places of exporting the timber and lumber from inland regions of the country. Boards and timbers were a significant staple since the 16th century, and also of a major importance to the growth patterns of the 1840-1875 time period, cf. above. The majority of the wood products exports was shipped out from the coastal region from “Lindesnes to the Swedish border”.⁶⁴ The exports sector was commercially and legally centralized in the port towns. The activities represented by a.o. shipbuilding, recruitment of labor on land and at sea, and the loading and unloading on the scores of district wharfs served to integrate the rural districts along the coast deeply into the exports economy. Thus, the region stipulated above corresponded roughly to the 1860s government statistical concept of *Søfartsbygder*, translated into the French as *Districts, où prédomine la navigation*. In 1865, these “Maritime districts” were registered with a population of 135 810 out of a national total of about 1,7 million people.⁶⁵

⁶⁴ Sandvik (2018, p. 80).

⁶⁵ NOS C No. 1, *Tabeller vedkommende Folkemængdens Bevægelse i Aarene 1856-1865*, p. XI-XII. The statistics attempts to divide the land districts into six types of socio-economic regions according to their presumed dominant activities: Alpine, Agricultural, Forestry, Industrial, Navigational (Maritime) and Fishery. Between 1855-65, the biggest increase was in the Industrial districts (2,7 %), with the maritime districts second at 1,4 % increase. While population increase was 1,3 % in the same period, the urban population was estimated to grow by 2, 7 %, cf. p. XIII. The difficulty of precision due to the combinations

However, the ice and lumber districts were not identical, most of the area contemporary Norwegians refer to as *Sørlandet* only intermittently functioned as ice exporting ports. When they did, volumes were small, as demonstrated for Kristiansand, Mandal and Farsund.⁶⁶ Again, it is the research by Tore Ourén (1991) that locates the border areas for the ice production, which depended in his words on three natural conditions: “climate (cold winters), topography (many lakes close to the sea) and nearness to the markets”. With regards to the traditional wood products exporting regions of the country, the southern limit for wielding all three conditions usually ran between Risør and Mandal. In “far-south Mandal, the mean winter temperature was 0.7 °C and ice cutting for export was mainly restricted to the years with winter temperatures far below the normal”.⁶⁷

The above demarcation may provide much of the explanation for the distribution of ice production in Norway, but the picture is not that simple. As indicated in section 1.2, fresh herring, mackerel, and salmon became a significant export items from the 1860s onwards. Ice was used extensively in these exports. Mackerel was caught off the south and southwestern shores. The salmon business expanded from the Trøndelag region.⁶⁸ Trondheim merchant Marentius T. Thams (1836-1907) established a regular trade in fresh salmon to Britain in the early 1870s. By the early 1900s, the company reportedly handled half the salmon being exported from Norway, and this operation did among other things include a “system of ice-houses along the coast from Aalesund in the south right to the Russian frontier in the north”.⁶⁹ The number of Thams’ icehouses surpassed

of occupations by a majority of the laboring population is indicated several places, e.g. p. XI. Publication available at https://www.ssb.no/a/histstat/nos/nos_i_c1_1856-65.pdf (Retrieved November 2, 2022).

⁶⁶ Appendix, table 9.5.4.

⁶⁷ Tore Ourén (1991). Ourén was also concerned with the more sporadic and short-lived ice exporting ventures based on the glacier ice from Folgefonna in the west of Norway, see also Tore Ourén (1990).

⁶⁸ Hagemann (1997, p. 25)

⁶⁹ Sundt (1907, p. 377)

that of even the biggest ice exporters in the southeast of Norway. There were seasons in which the volume of ice for fresh fish exports probably rivalled the natural ice exports proper, both in value and volume. In the all-time top year for natural ice exports, 1898, a total of about 960 metric tons of salmon and mackerel were exported fresh, the corresponding number for herring was close to 30 000 tons. The total value of fresh fish exports was reported at above 3,5 million kroner, compared with the natural ice at 4,7 million kroner.⁷⁰ The main point about this observation here is that more ice went out of Norway than was reported to the customs as natural ice.

To sum up, this subsection has aimed to demonstrate that work has been done to explain the rise and fall of the Norwegian ice exports, even though these insights have not been subject to debate. The rising and ebbing volumes of the ice trade can be accounted for: Levels increased over decades in the second half of the 19th century, before culminating in the 1898-season and then gradually decreasing until World War One, when it more or less vaporized. The afterwar ice exports were never reestablished at levels anything like in the premium years, which is clearly within the period from the 1880s to 1910. Important developments took place before those years, however. Furthermore, it is a fact that the leading markets on opposing shores of the North Sea are generally known. In the long run the British markets dominated attention, but a few years witnessed huge demand also from European, primarily German, takers of natural ice.

The price fluctuations between 1866-1920 have been mapped by Klovland (2013), which held against the actual volumes shipped display that market signals were communicated effectively in the natural ice trade. With some slight alterations over the years, and certainly shifts in the relative weight of ice exporting communities, there coast from about the town of Risør eastwards to the southernmost point of the Swedish-Norwegian border, including the Oslofjord, formed the core area for ice exporting. The subsection

⁷⁰ All figures from NOS III 316 *Tabeller vedkommende Norges Handel i Aaret 1898*, table 3. Available at https://www.ssb.no/a/histstat/nos/nos_iii_316.pdf (Retrieved Nov 13, 2022).

has examined Ourén's explanation for this geographical pattern, where the correspondence between winter temperatures, topography and "nearness to markets" takes center stage.

1.5 Research questions

Thus, despite the sparse attention given to the Norwegian ice trade in standard works of economic, social, or general history, some features of the trade have been discussed in somewhat obscure research. This is largely thanks to Ourén, who has been extensively referenced. Ourén's articles provide little historical detail, practically no historic actors are mentioned. In Ourén's guise, there is some automatism to the history of Norwegian natural ice exports. It is almost as long as temperatures, topography and short sailing routes all lined up, ice workers would gather on the lakes, icehouses would be erected, and ships loaded as if by phantoms.

This is admittedly a querulous interpretation of Ourén's work. Still, the absence of actors, human intention, or the way the ice trade was contingent on contemporary political, social, and technological factors raises questions. On the other hand, local historiography has a lot of detail on districts and do indeed identify actors, but I largely follow Norseng in the view that these works are restricted by their local basis. They do in some cases hint to the overseas markets and conditions of the trade but have obviously not had the time nor space to delve deeper into such aspects.

The blind spot left by the Ourén's structural and macro studies on the one side, and the more restricted approaches by local and regional historians on the other, provide the ground for suggesting the research questions for this thesis. With inspiration from historian Kristine Bruland's study of the Norwegian textile industry in the mid-19th century, my focus shifts from *prerequisites*, in my case largely identified by Ourén, to "the process by which it actually occurred".⁷¹ Overseas markets, topography and the

⁷¹ Bruland (1989, p. 13). More on Bruland's perspectives on industrialization and technology in chapter two.

variation of temperature zones may have provided the opportunity, the question is then how that opportunity was seized, and by whom.⁷² Concentrating on the actions of a selection of historical individuals, my study sets out to produce new knowledge on why and how the ice trade for decades came to be a regular activity in southeastern Norwegian coastal communities. I break this problem area down into the following questions for research:

1. What were the crucial drivers behind the transformation from sporadic to regular exportation of natural ice from Norway? As clarified above, the timing and some elements of this shift of the ice exports into a “cultivating” activity have largely been identified, but no one has attempted to critically examine activities of the crucial actors involved in the events. There is already recognition that overseas international ice business emanated from the United States and New England, so how were the tools and essential knowledges of the trade brought into use in Norway?
2. The ice trade was throughout marked by volatility. All the same, merchants and shipowners got involved in exporting ice, and from about the 1860s, also members of the farming class. How did the ice business feature in the mix of economic activities of these different social groups? How can different modes of operation be accounted for?
3. Within the story of human means of preserving food over time and distance, the chapter of the overseas natural ice exports is a short one. Even within that relatively short time span it is unlikely that the business remained unchanged from start to finish. How was the natural ice industry impacted by the

⁷² F. Sejersted (1993, p. 48). The question is paraphrasing the quote from Bruland.

competition from “artificial ice”, or from other sources of social or technological changes of the last three decades of the 1800s?

While my projects builds on the view that the historical Norwegian ice industry is under-researched, it is not the argument that it happened in isolation from broader developments, whether social, technological, or economic. We are faced with an activity that for decades impacted communities along a portion of the Norwegian coast, which at the same time certainly was not immune to change in other respects. The time frames in which the ice exports grew, peaked, and decreased were marked by fundamental social transitions, in Norway as in the industrializing world at large. There was the gradual shift to self-sustaining economic growth caused by industrialization, new systems of communications emerged, and there were unprecedented growth rates and relocation (urbanization, emigration) of the population. If this thesis is to succeed in bridging the gap between what is above termed “obscure” research and the mainstream of Norwegian historiography, a closer look is necessary into how historians have interpreted relevant developments and their timing. This will need some detailing and will be the primary objective in chapter two.

While the above addresses the “why” of my undertaking, chapter three looks at the “how”; the method and the sources consulted to answer the questions posed here. To foreshadow briefly, the thesis will be a collection of case studies of three ice exporting (family) firms and entrepreneurs, two of them from the port of Kragerø and one from the community of Nærsnes on the Oslofjord. While the cases from Kragerø are picked from merchants and shipowners on the top rungs of the regional and national social scales, the Nærsnes case of Baarsrud represents that of a farmer making it big in ice. The social differentiation was not merely a question of identity or mentality but manifest in different rights and entitlements in law and tradition. The case-studies have been chosen on their capacity to cast light over the research questions, as well as on the surviving source material from the businesses. The source material situation is not unproblematic, as there is little direct sources kept from the ice businesses, and even among the cases selected the volume of direct, remnant sources from their activities

vary a great deal. Thus, the material might have been utilized another way and given a different research design. The choices made in this regards will be accounted for in chapter three.

1.6 Thesis outline

The thesis is organized into eight chapters, including this introduction.

The second chapter examines Norwegian historians' views of, and discussion of the social and economic development of the country during the 19th century. The aim of the chapter is to highlight industrialization, the function of the exports sector in the Norwegian economy, and to look at how these transformations have been taken to have affected the coastal region that was home to the ice exports. While all historical ages exhibit dynamic qualities, the pace of industrialization and technological change accelerated in the second half of the 19th century. This is also a key backdrop for this work.

The third chapter concerns the contrastive methodological elements used in the study and presents and discusses the project's empirical base—the source material of the thesis. The case studies have not been picked randomly; they are connected to notions of significance as well as to the accessibility to source material. The chapter discusses the historical method, and the line between remnant sources and post-action narratives.

The fourth chapter investigates ice as a commodity in the early 19th century. It aims to look into the historical uses of ice, what we know about the first ice shipments from Norway, and also a section on US ice in Britain and Europe. The chapter contains empirical findings on the first shipments of ice from Kragerø, one of which went all the way to Algiers. The time frame for this chapter is circa 1835 to 1850, but some of the earliest shipments in the 1820s are also surveyed.

Chapter five is on Norway's "ice culture", or the transformation from harvesting to cultivation modes of working with ice. Commencing with the late 1840s and tracking developments until the 1870s, this chapter sets out to cover these processes for with a stress on the Kragerø district. Johan Martin Dahll and the Dahll family ice business are central to the discussion of events.

The sixth chapter focuses on Thorvald Baarsrud's ice company (Nærsnes, Røyken). The thrust of the chapter is an exploration of the significance of the ice business to a successful entrepreneur from a farming background. At the center of the investigation is how Baarsrud viewed the uncertainties and risks of the trade. Baarsrud gave candid opinions, not meant for the eyes of strangers or "competitors", on how to stay afloat in the volatile ice business.

Chapter seven is also a case study, this time of the combined ice and shipping business of Thomas Møller Wiborg and his son Nicolay Wiborg, in the Kragerø district; here, the emphasis is on developments between the 1890s and the First World War. At one point, the Wiborg ice business was Norway's largest. In contrast to the Baarsruds, the Wiborgs only left fragments of original material for posterity. Among those fragments, a collection of telegraph codebooks arguably supply the most interesting pieces of information. The chapter is constructed around an analysis of these documents.

Chapter eight consists of the conclusion, which details the overall answer to this thesis's research questions.

2 Background: Exports, social transformations, and technology

2.1 Introduction

Chapter one has argued that the natural ice exports of the 19th and early 20th centuries have received little attention in Norwegian historiography. The subject has not figured in any substantial historical discussions. Nonetheless, this was for decades a significant economic activity of many of the *maritime districts* (*Søfartsbygder*) and ports along the southeastern coast of the country. On that basis, my project intends to investigate how the opportunities of the ice business were actually seized, with the aim to discuss the Norwegian ice exports within a broader context. The subject of this chapter is to examine that context, with attention centered on the period from the 1840s to the First World War. The ice industry has not received much attention, but historians have extensively discussed the economic, technological, and social developments of those decades.

2.2 Exports and economic development

The time of the natural ice exports coincide with periods of fundamental economic changes, whether viewed in global, European, or Norwegian contexts. Norway, a small and peripheral economy, underwent “significant” economic growth between 1800 and the early 1900s.⁷³ The demographics is one expression of this. From 1820 to 1920 the total population of the country grew from about 960 000 to about 2,6 million, a formidable growth rate in a European context.⁷⁴ The young age groups composed larger shares of the population. Despite a sizeable overseas emigration in the latter half of the

⁷³ Sandvik (2018, p. 240).

⁷⁴ Population figures from <https://www.ssb.no/befolkning/faktaside/befolkningen> (Retrieved November 4, 2022).

19th century, net population increased practically without interruption into the 20th century.⁷⁵

The reasons behind the demographic changes have been discussed, also the lift-off stage starting after the end of the Napoleonic Wars in 1815. Increased agricultural productivity and caloric yields loom large. This came about due to numerous improvements of tool culture and introduction of new crops and legumes, among these the introduction of the potato is emblematic.⁷⁶ The focus on agricultural improvements is connected to the fact that the overwhelming majority of Norwegians, from mountain valleys to the skerries on the country's long coasts, were involved in agriculture. Many farming communities resorted to outfield foraging and ingenious means for sustenance. Men, and some women, had recourse to other means of subsistence in the fisheries, the forests, mining works, at sea, or domestic service, but the "economic pluralism" of individuals did not eliminate agriculture as dominant activity for the central economic unit of the time: the family household.⁷⁷ The demographics of the 1800-1840s timeframe constituted, in the words of historian Francis Sejersted, a "veritable pressure for societal change".⁷⁸ Abundant and cheap labor was among the chief pressurizing forces.

⁷⁵ Cf. <https://www.ssb.no/befolkning/faktaside/befolkningen> (Retrieved November 4, 2022) for infographics. In 1880 total population was 1,9 and in 1920 2,6 million. Today (2022) it stands at 5,4 million. The net growth rate of the 1865-1920 period was less than the previous decades, mainly due to overseas emigration. According to Hagemann (1997, p. 18), Norway's population might have been 3 million instead of 2,4 million in 1910 if not for this fact.

⁷⁶ Hodne (2000, pp. 121-122), (Sandvik, 2018, pp. 14-20)

⁷⁷ The term «economic pluralism» is borrowed from P. Holm (1991, p. 298). On family or household as primary economic unit, gradually losing out to institutions, companies and firms over the course of the 19th century, cf. Sandvik (2018, p. 241).

⁷⁸ F. Sejersted (1993, p. 57). My translation.

Norwegian historians are in agreement of a new kind of self-sustaining growth starting in 1840s.⁷⁹ From then on and ever since, although performance has varied, the economy has advanced at rates surpassing net population growth.⁸⁰ Through the second half of the 19th century, economic development served to increase general welfare, although still in incremental steps, particularly if contrasted with the progress of the period after 1950.⁸¹ The foundations, structure and social impact of the growth has been subject to historical debate, reflecting differing theoretical positions on economic development. Broadly, the outlooks have fallen into two camps. On the one hand are those who regard it chiefly as a response to or “reflex of” foreign demand, in other words, a position that views foreign trade as chief causation for growth, and by extension, economic and social modernization. On the other, there are those who place more emphasis on endogenous development traits.

The economic historian Fritz Hodne is credited with establishing a school of “export-led growth” within Norwegian economic history.⁸² While this tradition far from disregards the significance of domestic institutions or the function of local entrepreneurial activity to economic development, it has been criticized by historian Francis Sejersted for implicitly assuming that the proclivity to exploit opportunities are always present.⁸³ Sejersted’s theory of 19th century Norwegian economic development seeks to synthesize a range of positions that accentuate domestic institutional, social, and

⁷⁹ See Hodne (2000, pp. 92-94), F. Sejersted (1993, p. 47), Sandvik (2018, p. 100) For an outline of the dynamic qualities of 1500-1850 economic development, including a tenfold population increase, see Dyrvik et al. (1979, pp. 237-251).

⁸⁰ Hodne (2000, p. 15), who cites estimations that GDP (Gross domestic product) per capita increased by a factor of 2,2 between 1830-1900.

⁸¹ Sandvik (2018, p. 98).

⁸² See e.g. Brautaset (2002, pp. 1-5), Lange (1991, pp. 387-390).

⁸³ F. Sejersted (1993, p. 48). Sejersted connects his critique to variation in methodology between economics and historical sciences.

technological development.⁸⁴ Sejersted holds that Norwegian economic growth experienced a shift in the latter half of the 1800s, whereby the internal dynamics of the Norwegian economy was largely responsible for the qualitative changes effectuating further growth.

Between Hodne and Sejersted, there are numerous issues of divergence and agreement, and economic historians have after these discussions of the 1970s and 1980s taken nuanced positions. The discussion in Sandvik (2018, pp. 100-101) is a recent example. Sandvik points to the unquestionable growth of the exports of timber and planks, fish, and shipping services between 1840 and 1875, which succeeded a period of decline especially for the lumber exports after 1815. Sandvik highlights the role played by technological change in the emerging industrial sector, the fisheries and agriculture. He points to state facilitation of economic growth, that is, the securing of stable currency and finances, repeal of mercantilist economic privileges and the introduction of new infrastructure projects. In all, “internal and external factors reinforced each other and created a faster economic growth than ever before in the history of the country”.⁸⁵ Sandvik cites as prime example the huge expansion of the maritime sector “from Lindesnes to Tjøme”, where increased market access must have been accompanied by “local culture and competence” to perform so well.⁸⁶

The anatomy of the rapid economic growth period between 1840-1875, and how it changed in the decades after the global depression of the late 1870s are an essential backdrop for the research project of this thesis. In the following paragraphs, some numbers will demonstrate that shipping services did indeed perform well – for some decades. We will also explore some further nuances in historians' views on the shifting economic environment of the latter 19th century. The view is that the export-led growth

⁸⁴ The theory was originally formulated in the 1970s, my reading is the final version in F. Sejersted (1993, pp. 47-105).

⁸⁵ Sandvik (2018, p. 101). My translation.

⁸⁶ Sandvik (2018, p. 101). My translation.

was based on lumber and fish products, as well as shipping services. Economic historian Camilla Brautaset has studied the growth period 1830-1865 in depth, and the study confirms that by 1865 the three mentioned traditional staples made up about 90 % of export value. The “remaining exports consisted mainly of ice, manufactured goods and minerals”.⁸⁷ The study is one among very few to acknowledge a significance of ice in the boom period of Norwegian exports. That is because it belonged to the “residual” of the exports sectors, which according to Brautaset’s calculations grew no less than six-fold in the same period.⁸⁸ The significance of the “residual” grounds a general view that the exports sectors acted as the “motor” of the Norwegian economy in the period.⁸⁹ This function was only possible through expansion also of maritime transport.

In 1865 shipping services was 41 percent of export revenues, almost as much as fish and timber combined.⁹⁰ The number of ships in the Norwegian merchant fleet rose from 2000 in 1830 to about 7000 in 1850, the tonnage increased more than sevenfold. While ship size increased, average crews decreased, but still the number of seamen has been estimated to rise from about 13 000 to 49 000 in the same interval.⁹¹ The Norwegian merchant fleet, measured in gross tonnage, was the third largest in the world in the mid-1870s. Most of this fleet was different makes of wooden sailing ships, either built at yards in the coastal regions, or purchased second-hand from abroad.

Although the growth of the merchant fleet was gradual from the 1830s and the upturn of the following decade, it was the repeal of the British Navigation Acts in 1849 that ushered in the “next period, 1850-1879, (...) the most brilliant in the history of

⁸⁷ Brautaset (2002, p. iii)

⁸⁸ Brautaset (2002, p. 195)

⁸⁹ Brautaset (2002, p. v)

⁹⁰ Seip (1997, p. 121)

⁹¹ Seip (1997, p. 119).

Norwegian shipping”, as statistician Anders Nicolai Kiær (1838-1919) held in 1893.⁹² Now Norwegian ships carried goods not only from Norwegian and Swedish ports to British ports, but between Great Britain and any foreign port. Norwegian tonnage extensively supplied British and French troops during the Crimean war 1853-56, a precursor of later war-induced booms for Norwegian shipping. By 1860, Norwegian ships were engaged more in foreign (tramp) trades than to and from Norway proper. Much was based on transporting lumber from the Baltics and Sweden, which represented a geographic expansion of traditional trades. It is a general view that well into the latter half of the 19th century, sailing ships had an advantage over steam ships in some long-range trades, especially ones where time was not critical.⁹³ In reality, the time factor may have been subject to variations, though, as Kiær emphasizes the expansion in shipping to have meant new cargoes. Kiær terms that in the “the Norwegian carrying trade”, the shipping to and from the home country, the “principal articles were first and foremost, lumber and then cereals, petroleum, coal, cotton and wool, sugar and coffee, ice, etc”.⁹⁴ Kiær thus connects the carrying of ice to the overall expansion of the shipping sector in its “most brilliant period”. He also indicates that shipping brought about a more multifaceted foreign exchange of goods. From his vantage point in 1893, it nonetheless appears that Kiær regards this timeframe to have been characterized by a low degree of specialization. The brunt of advance was borne by quantitative rather than qualitative growth, mainly transporting larger bulk volumes with roughly the same kind of ships, equipment, and knowledge.

Kiær's views on shipping may be transposed to the other dominant exports sectors. For the 1840s to 1870s period, Francis Sejersted holds that it was predominantly one of quantitative growth patterns, as “qualitatively new ways of organization only gained

⁹² Anders N. Kiær (1893, p. 346).

⁹³ For instance as conveyed in Hagemann (1997, p. 27), chiefly because steamers had to carry fuel (coal) in addition to cargo.

⁹⁴ Anders N. Kiær (1893, p. 351).

limited entry into the truly expansive sectors of the economy”, i.e., fish, lumber, and shipping.⁹⁵ Labor force expansion, resulting from both larger sets of young people seeking employment labor migrations, also from neighboring Sweden, were also element in this quantitative growth.

In Sejersted's schema, the economic expansion of the mid-century was subsequently replaced by modernization and industrialization. These processes gained momentum in the 1880s, after the global economic recession of the 1870s, which among other things hit traditional Norwegian exports hard. The crisis-induced growth led to new waves of industrialization and the creation of mutually reinforcing mechanisms. Engineering workshops produced machinery and capital goods for other industries. By the late 1800s, there was national production of steam locomotives for the railways, and urban shipyards were contributing to a piecemeal transformation of the merchant fleet from wood and sails to iron and steam. Other central developments included a mechanized textile industry catering primarily to markets in Norway and Sweden, and a transformation of the forestry industries primarily demonstrated by the establishment of a mechanical wood pulping industry, which provided a cheaper alternative for European newsprint production. After 1900, large-scale exploitation of Norwegian hydropower for electrochemical industries represents a new paradigm of industrial development, but also these developments relied on the self-sustaining mechanisms and modernizing ideology emerging in the late 19th century. According to Sejersted, the capital goods sector was cornerstone in the processes whereby Norway escaped becoming a “periphery”, that is, a region predominantly delivering raw materials to more developed nations.

The Norwegian economy went through fundamental changes in the 19th century. While there are different schools of interpretation, general agreement appears on the main features of successive stages. The period of peace after 1815 witnessed agricultural

⁹⁵ F. Sejersted (1993, p. 82). My translation.

improvements and unprecedented acceleration of population growth. The next phase, between 1840 and the 1870s, was dominated by further quantitative expansion in agriculture, fishing, and forestry, the latter two feeding the traditional exports sectors. The augmented labor force also went into building and manning more Norwegian (sailing) ships, employed in routes opened by relaxation of foreign trade restrictions. This phase of quantitative growth in traditional sectors centered on British trade and transport demands. Consequently, the global economic recession starting in Britain in 1873 had dire effects in many Norwegian towns and communities. It was instrumental to the relative downturn of growth rates in the subsequent decades. Some “maritime districts” and port towns, such as Stavanger, Arendal, and Kragerø, suffered great setbacks. The specter of crisis in the old trades of lumber, and failure in regional fisheries based on the nomadic species of herring, compounded with population pressure in the agricultural districts, all served to accelerate overseas emigration to the US as well internal demographic movements. Population movement from rural to urban areas, and from inland to coastal regions of Norway continued with force.

Thus, the period starting in the 1870s signifies crisis, but historians following Sejersted point to this as crucial decades of industrialization and modernization.⁹⁶ Regardless of position on Hodne’s theory of export-led growth, cf. above, most historians would recognize as constant and significant the influence of foreign trade on the Norwegian economy. The tectonic slides in the structures underpinning that trade were so impactful that a relative stagnation was observable, no matter the impetus towards modern industry observed in the decades after 1880. Norwegian stagnation was observable in relation to neighboring Sweden, which both in scale and scope is estimated to have emerged the more modern industrial economy by the early 20th century.⁹⁷ One example among many is the Swedish pioneering of chemical cellulose

⁹⁶ Exemplified by the title «Modern Breakthrough» as title for the 1870-1905 volume by Hagemann (1997).

⁹⁷ Hagemann (1997, p. 17).

wood pulping, in contrast to technologically cruder method of mechanical wood pulping which dominated in Norway.⁹⁸

However, in economics everything is relative, and Sandvik (2018) points, as indicated in 1.2. above, to the decades after 1870s as home to considerable qualitative progress and increased scope in foreign trade. Norwegian whaling was moving through its first legs of industrialization, as was the fish canning business. In this view, the tourist industry and the exportation of natural ice were also attested to adaptive response. The reduction in general prices following 1870s recession was obviously not welcome for investors in shipping and exports businesses, but they served to increase real wages and purchasing power for broad sections of society.⁹⁹

2.3 Coastal transformations

From the above, it is rather obvious that in 19th century Norway, the shifting fortunes of export trades carried significant social impact. The economic and social spheres of existence were intimately linked, in the countryside as well as in the emerging towns. For instance, when rural residents moved to the cities for work, traditional household sizes were reduced, and the age of marriage was lowered.¹⁰⁰ Historians and cultural historians (ethnologists) have discussed the nature, speed, and depth of such transformations as they apply to the *coastal regions*. The 1980s Scandinavian *Kattegat-Skagerrak* research project is still a touchstone for these debates, specifically as they pertain to the southern Norwegian coasts.¹⁰¹ Since the ice trade was for all practical purposes based on extraction of resources in the immediate vicinity of the sea, as has

⁹⁸ F. Sejersted (1993, p. 103).

⁹⁹ Sandvik (2018, p. 141).

¹⁰⁰ Hagemann (1997, p. 18).

¹⁰¹ The doctoral thesis by Poul Holm, P. Holm (1991), may be regarded as the project's final report, cf. Bråstad (1992).

been explained above in section 1.4., it is of interest to discuss views on break or continuity of social formations in these economic zones of the country.¹⁰²

Discussions on coastal history pay attention to social and cultural formations, and how they were influenced by fluctuations in the regional resource base mix.¹⁰³ A well-known example is the migratory species of herring, caught in drift nets, which was key to successive booms and busts around Scandinavian coastal regions during in the 19th century.¹⁰⁴ Coastal communities on the Kattegat and Skagerrak seas, and the ice exporting communities may broadly be held to belong to this group, had since the 1500s been impacted by overseas business cycles, as well as warfare among the great powers of Europe.¹⁰⁵ Up to the time when those communities were enmeshed in “Atlantic trade”, i.e., the second half of the 19th century, this went on within a “North Sea – Baltic” system of trade.¹⁰⁶

Coastal zones, and their cultural, social, and economic peculiarities, can hardly be viewed in isolation from the regions or countries to which they belong. Thus, it is a point of departure that in the 19th century, the population of Norway was broadly culturally homogenous. However, the country was sparsely populated, and geography and social distinctions caused contrasts.¹⁰⁷ A major distinction was between town and countryside, which regards to economic entitlement and culture was so great that the Norwegian historian Hans Try coined the phrase “two cultures – one state” to frame 19th century

¹⁰² Chapter four will also show that the first wave of extraction of ice in Kragerø was literally taking place at sea, as seawater ice was source for the first shipments.

¹⁰³ For discussions of the Norwegian concept of “coastal culture”, cf. Hundstad (2014) and Fulsås (2011). Bråstad (1992) employs an approach that is followed in this discussion; he delimits “coastal culture” to pertain to “cultural traits among people in a social environment to which the ocean is of direct economic significance” (my translation).

¹⁰⁴ P. Holm (1991, pp. 133-135).

¹⁰⁵ P. Holm (1991, pp. 119-145)

¹⁰⁶ P. Holm (1991, pp. 20-21)

¹⁰⁷ Main points in this paragraph from Hagemann (1997, pp. 12-29) and Myhre (2022, pp. 113-145).

social reality.¹⁰⁸ Since Norway for practical purposes had no nobility, the upper classes consisted of the public officials (*embetsmenn*) and the urban privileged merchants, who together composed the Norwegian version of a bourgeoisie.¹⁰⁹ In the countryside and especially in the southeastern regions of thick soil, owners of the larger farms belonged to the economic, if not cultural, elite of their communities. Cultural outlooks and economic situation set the different elite groups apart, but the truly huge socio-economic gap was between them and the overwhelming majority of the population. The latter were designated as common people (*almuen*). This included day-laborers and the large group of crofters (*husmenn*), who predominantly paid for their rent by their labor. Many smallholders, even though they might own land, were also common people. Still, they were proprietors in a legal sense, and as such the male heads of the family (and female if they were widows) had certain obligations and rights. Over the course of the 19th century, their right to vote in parliamentary elections proved politically significant.

Farmers were also entrepreneurs, running their own businesses. In coastal areas in the west and north of the country this usually involved some combination of farming and fishing. Coastal farms were typically small, even by Norwegian standards. In the south, specifically along the coast of the *Agder* counties (*Nedenes* in 19th century), the “economic pluralism” broadly meant families combining agriculture and maritime activities. It was typical for men to go out at sea at young age; other work included piloting and shipbuilding. A typical trait of the coastal “economic pluralism” was that women would be in charge of the crops and animals.¹¹⁰ This trait was also visible further north and east, that is, the Telemark coast and the Oslofjord region, in which combinations of forestry and agriculture were relatively significant. It has to be said that the above are generalizations; between one village or municipality and the next, a variety of binary occupations or means of subsistence could exist in combinations. Over

¹⁰⁸ Myhre (2022, p. 119)

¹⁰⁹ Myhre (2022, p. 125).

¹¹⁰ Bråstad (1992).

the course of the 19th century, farmers were involved as owners in ships, that were managed as partnership ventures (*partsrederi*). From the 1860s, many also came to be involved in the production of natural ice.

As the rights to conduct trade and business outside towns were extended in the 1840s and beyond, the range increased for entrepreneurial action also in the farming community. The cultural and economic changes of agrarian communities have been subject to a long-running discussion called *Hamskiftedebatten*. Originally kicked off in the 1940s, it widened through contributions from economic and social historians in the 1960s and 1970s.¹¹¹ The extent and consequences of stronger integration into monetary and market economic organization are key issues. From an initial emphasis on labor-intensive and land-extensive agricultural districts, studies have also been conducted on areas of more marginal agrarian existence. From the end of the 1870s, times were tough on many communities, and large sections of the rural proletariat “escaped the countryside” to seek employment in industry, or they migrated. After 1880 the emigration to the USA became a mass phenomenon.¹¹² Thus, in terms of social developments, the migratory movements of the latter half of the 1800s stand out. The economic downturn of the 1870s amplified trends that had emerged in previous decades: From countryside to towns and cities, from the inland towards the coastal areas, especially in the south and southeast; the new generations of the population boom were on the move for a livelihood.¹¹³ There was also immigration, notably Swedes coming into the east and southern towns and countryside.

The overseas emigration from Europe to the USA is a powerful manifestation of Scandinavian communities' closer integration into an Atlantic economy. It is impossible to limit this strictly to a question of coastal communities; in Norway emigrants hailed

¹¹¹ For an overview, cf. Nordby (1991, pp. 30-45).

¹¹² Hagemann (1997, pp. 76-83)

¹¹³ Seip (1997, p. 82)

from both the coast and the inland. With regards to social reality on the coasts encircling the Kattegat and Skagerrak seas, historian Poul Holm has discussed to what extent the changes of the 19th century entailed basic restructuring. The discussion has some analogies to the questions being raised in the *Hamskiftedebatten*. Holm's point of entry are the long-standing trading networks around these bodies of water, as well as further afield in the North Sea. The timber-trade connection with the Netherlands dated back to the early 1500s.¹¹⁴ Holm holds that for such coastal communities there was no absolute dichotomy between (traditional) barter and (modernized) market socio-economic organization.¹¹⁵ Coastal populations lived under fluid conditions of "economic pluralism", whereby portions of livelihoods and consumption had at least since medieval times been integrated in monetary exchange. Sources of income and consumption depended on fluctuating cycles. Thus, shore dwellers had to base their existence on their own production of food, shelter, and clothing.¹¹⁶ The less developed the market integration was, the more people would be given to self-sufficiency. Also in this framework, the period of the mid-19th century represents a qualitative shift. The integration into an "Atlantic" economy accelerated, and larger shares of the population were involved in market exchange. Eventually, these forces eroded the basis for the trades and ways of life connected to the Baltic and North Sea overseas network.

Historian Kjell Bråstad has addressed how the 19th century expansions and recessions of shipping and exports interacted with social and cultural reality.¹¹⁷ In principle, his analysis encompasses the entire Norwegian Skagerrak coast, thus also including

¹¹⁴ For a review of the cultural impact of this connection, see Løyland (2012).

¹¹⁵ P. Holm (1991, pp. 15-16). In his view, market conditions has impacted production life since the Bronze Age, so the question is not when this development started (e.g., at some point in the 1800s or earlier), but how they affected the mix of economic activities.

¹¹⁶ P. Holm (1991, p. 16).

¹¹⁷ Bråstad (1992).

communities which came to be involved in the ice trade.¹¹⁸ Relative to other regions in Norway and Scandinavia, this coastal area was less involved in the fisheries. Since the beginning of the 17th century, shipping and other maritime occupations had been key to securing incomes, but the majority relied on marginal plots of land to carry out some form of farming. The wages paid at sea or in the shipyards rarely sufficed to sustain families. As noted above, the way of life entailed a division of labor between the sexes. It also did so among the age groups; it was the young men who went to sea. Bråstad underlines that these were not static categories. The Skagerrak coast communities displayed capacity for flexibility and adaptive responses. Opportunities were seized, but often with a kind of risk management approach. The basic means of life were to be covered by the home production, the small plot of land and a few chicken, goats, or a cow.

There were fortunes made at sea and in maritime adventures. In coastal regions the lines of social divisions rather ran between skippers and sailors, than between farmers and smallholders. Historian Bråstad claims there is a link between this social distinction, which he classifies as larger in coastal areas than in their hinterland, and the maritime communities' proclivity to assume risks, or "take chances".¹¹⁹ While this way of life fostered individualism, there was also "unbreakable community". The latter manifested itself in forms of solidarity when families were struck by accidents at sea. Shipwrecks often meant that crews from one family or village were lost. Misfortune came in different shapes in the coastal versus agrarian regions. On the coast, there were many widows.

Another feature that set the coastal regions apart was the number of foreigners settling down, some for a short time, others for generations. Before 1814, most were Danes, but

¹¹⁸ Cf. section 1.4., and also the quote in Sandvik (2018, p. 101) about the dynamics of the «Lindesnes to Tjøme» coast. In actual fact, however, Bråstad's analysis is empirically and culturally centered on the sailing vessel hubs along the Agder counties. I do not think this fact makes his observations less interesting.

¹¹⁹ Bråstad (1992).

there were also towns heavily influenced by the Dutch (Son, Lillesand). People came as laborers, servants, and crew, some also as merchants, traders, or craftsmen with families. The influx of foreigners was linked to the urbanization of the coastal regions. Many of these foreign-born families became part of the social elite in the port towns on the coast, primarily as merchants and traders.

The changes bracketed under the term urbanization are wide and many, and Norwegian society underwent profound transformation in this respect during the 19th century. Historian Jan Eivind Myhre's overview of the process provides several points of interest.¹²⁰ The number of chartered cities grew, and the number of people in them generally increased. In 1815 there were 35 towns or settlements with urban privileges ("kjøpsteder" and "ladesteder") in Norway, by 1870 there were 70. The estimations are that in 1801 8,8 per cent of the population lived in urban areas, in 1855 and 1910 the corresponding figures are 13,3 and in 37 percent.¹²¹ The new towns of the early to mid-19th century emerged because of the expansion in the exports of fish and lumber.¹²² Examples of such towns in the coastal region being discussed here are Tvedestrand, Lillesand, Mandal, and Flekkefjord. Established towns like Arendal and Kristiansand expanded, as did the Telemark coastal cities of Skien, and significantly for this thesis; Kragerø.¹²³ It is a feature of Norwegian urbanization of the mid-19th century period that it was the coastal areas in the south and southeast that witnessed the thrust of the developments, and the maritime business and the lumber exports are singled out as main causation of this pattern.¹²⁴ Two other main drivers are identified for the growth of cities and towns, also as the 19th century wore on. The first is industrialization, which

¹²⁰ Myhre (2022, pp. 113-119).

¹²¹ Myhre (2022, p. 116).

¹²² Myhre (2022, p. 117).

¹²³ Myhre (2014, pp. 109-112). For more detail on Kragerø, see chapter 3, section 3.3..

¹²⁴ Myhre (2022, pp. 117-119), Myhre (2014, pp. 107-130).

covers a wide range of establishment of processing plants close to urban markets and transport hubs. The second is the function of towns and cities as commercial and administrative centers for their surrounding country.

The function of regional center meant that schools, hospitals, newspapers, and associations were there. The level of how a big area the city or town served in these manifold social, economic, and cultural aspects of life, entailed that a hierarchy emerged. At the top ranked the capital Christiania (Oslo), taking over for Bergen as largest city during the first half of the century. Then there were a collection of regional center cities like Bergen, Trondheim, and “possibly Stavanger and Kristiansand”.¹²⁵ These were places of significance to counties or regions; Bergen and Trondheim both functioned as such for the entire north of Norway until Tromsø expanded. Beneath that layer were the rest; towns and ports functioning as local centers for one municipality, or a collection of municipalities or villages. The town of Kragerø, which will be in focus in several chapters in this thesis, was (arguably still is) in this category. As the town of Kragerø grew, agricultural practices and the production of food in the surrounding communities were modernized.¹²⁶ This nature of the connection between urbanization and agricultural development is one issues for debate in the above-mentioned *Hamskiftedebatten*. According to historian Ellen Schrumpf, in Telemark it made the coastal agrarian communities stand out as “progressive” (*framskrittbygder*) compared with the more inland locations.¹²⁷

During the 19th century, the southern and southeastern coastal regions of Norway underwent changes that went to the base of their social and economic foundations. The cities on the coast dominated the wave of urbanization well into the latter part of the 1800s. Historians have pointed to the close interlinkages between expansion of the

¹²⁵ Myhre (2022, p. 118).

¹²⁶ Ellen Schrumpf (2014 p. 40).

¹²⁷ Ellen Schrumpf (2014 pp. 36-43).

export trades and the towns, which had ramifications on agricultural practices, and the way of life in general. Among those who have studied the history of particular coastal areas, there are different views on the usefulness of the concept of coastal culture. A middle ground has been struck by some, and historian Kjell Bråstad's underlining of the interplay between *resources* and *adaptability* in those communities that largely depended on the oceans for their living, provides a guiding light for the following chapters.

2.4 Two coastal communities: Kragerø and Røyken

The case studies of this thesis have been selected from two coastal districts in Norway, Kragerø and Røyken. In many ways, their development during the 19th century are manifestations of the overall patterns of coastal transformations indicated above. However, there were some nuances.¹²⁸ The outward oriented lumber and shipping port Kragerø had age-old trading networks, and its activities, booms and recessions impacted the surrounding farming and seafaring rural community (Sannidal). In opposition to this we have the overwhelmingly agrarian Røyken community, which conducted most of its trade with the neighboring boroughs and parishes. However, on closer inspection the coastal areas of this parish display long traditions for maritime knowledge, and most likely much of that adaptability and seizing of opportunities that historian Kjell Bråstad reckons as a key feature of 19th century Norwegian Kattegat-Skagerrak coastal culture.

In the Kragerø district, the economic and cultural interconnections between town and country were manifest in several ways. During the 1700s a varied occupational structure emerged as people were employed directly or indirectly into the maritime economy.

¹²⁸ This subsection is based on local historiography, primarily for Kragerø A. Pedersen et al. (2016), Robbestad (1945), E. Pedersen (1933), Steffens (1916), Midgaard and Tande (1953), and Røyken/Nærnes Killingstad (1928) and Martinsen (2004).

Less people were exclusively engaged in agriculture than national average. In this respect, Sannidal resembled other coastal communities of the sailing ship era. Fishing was resorted to, a little for sale and most for subsistence. Shipbuilding was on the rise from the 1780s onwards, with vessels of increasing tonnage on the blocks in coves around the districts. Goods or services rendered by the locals were sometimes paid in partial stakes in the ships. Although the merchants set the terms for economic interactions, trade and barter also meant that urban provisions and cultural impulses transferred into the countryside. From the general stores in town, farmers brought home foreign building materials (slates and glass windows) and spices, coffee, and sugar.

In and around Kragerø, the urban merchants controlled much of the resource base, and had developed proto-industrial settlements, catering to exports, that became important also in the early and later stages of the ice industry. In Røyken, ownership to resources was largely controlled by the local farmers. The form of agriculture conducted there adhered more closely to the Eastern norm of extensive cultivation, which implied widespread use of horse-drawn farming implements and other forms of capital investment. Both were coastal communities, but in terms of combination of farming and other occupations, the Kragerø district population (not merchants or public servants) was closer to the norm in "fishing and coastal" Norway – with relatively smaller average plots of land and much more reliance on a differentiated occupational structure to make ends meet. The domestic shipping sector developing in Kragerø was growing strongly, by all indications a function of foreign demand. Røyken had a shipping sector too, but many of these smaller craft escape the statistics as they were most likely used in the short-range traffic. However, from the 1840s, Røyken shipbuilders also offered larger ships to town merchants or other customers.

2.5 “Nature’s Factory?” Industrialization and technology

All historians reviewed in this chapter agree that industrialization was a fundamental force of economic and social change in 19th century Norway. Indeed, historian Jan Eivind Myhre writes that the entire economic development of the country after 1840 is often referred to simply as industrialization.¹²⁹ It is also uncontroversial to hold that industrialization was impacted by factors originating outside the country. However, there has been various readings of the stages and details of the process. For instance, researchers on the wood pulping industries have debated the relative weight of (foreign) demand for paper raw materials and (Norwegian) supply of processed wood fibers, as the industry developed in the 1880s and 1890s.¹³⁰ As can be suspected, this discussion relates to the question of “export-led” growth, cf. above.

This section examines concepts of industrialization, with a particular view to how they might illuminate the undertaking of this thesis, which is titled *Nature’s Factory*. The title is lifted from a 1910 census of the British “artificial ice industry”, which reportedly employed upwards of 1000 workers and produced 62 per cent of the total ice sold in Britain in 1909. The conclusion was that “it must be obvious that factory-made ice is ousting ice from **nature’s factory** (i.e., Norwegian ice)”.¹³¹ It shines through that the observed development is beneficial, as the (British) demand for cold energy may now be decoupled from the caprices of nature.¹³² This reminds us that the ice and refrigeration industries, whether natural or in “factories”, were (still are) about gaining control over the natural world for human ends. Generally, this point applies to any industry one might subject to closer scrutiny. Studies in the history of refrigeration have since the 1990s pointed to its Janus-faced character of providing huge benefits for

¹²⁹ Myhre (2022, p. 202).

¹³⁰ Lange (1991, pp. 390-391).

¹³¹ *Cold Storage and Produce Review*, Vol. 13 No 152, November 1910, p. 309. The reference is picked up via (Robert David, 1995).

¹³² On this point, see Woods (2017).

nutrition and human welfare, while synthesized chemical cooling agents quickly transpired to have dire climatic consequences.¹³³

How does “Nature’s factory” relate to 19th century industrialization? The quote indicates that it is the ice produced in steam-powered plants that represent the industrial product, in other words, the “factory-made ice”. The ice from Norway is ostensibly nature’s own creation, and while the writers certainly knew otherwise, they suggest a procedure nearly untouched by human hand. The question of where the ice industry stands in relation to 19th century industrial development has largely gone uncommented in the Norwegian historiography. One exception, a thorough discussion, appears in an MA dissertation by ethnologist Ida Vesseltun.¹³⁴ Her analysis highlights the local ice industry of Asker as a vehicle for mobilization of working class consciousness. Vesseltun’s work could provide an inroad, but the following paragraphs are inspired by more recently published, overarching perspectives.

The first point is that that “Nature’s Factory” was very much about human control and coordination. Suggesting that the ice flowed effortlessly from nature’s bounty would be mistaken. The 19th century ice industry was complex. It depended on methods and technologies to keep blocks of ice intact for a desired period of time, across distances and climatological zones. The ice was only a commodity when it functioned as a cooling medium for specified purposes. It is the melting of ice that activates the transfer of cold onto the surroundings, thus melting was ideally kept at bay during storage and transports. The whole point was to keep the ice as intact as possible for specific time. In practice, as we will see examples of later, this posed numerous challenges. Viewed from prosperity, an intriguing aspect of the 19th-century overseas ice business is the complexity of the logistics of this highly perishable product. After all, it was founded on

¹³³ See e.g. Hård (1994, p. 236).

¹³⁴ Vesseltun (1994, pp. 130-132).

systems predominantly powered by muscle and wind power. US historian Jonathan Rees addresses this for the American context:

[i]n many ways, the cold chains of the late nineteenth century and early twentieth centuries were an even more complicated achievement than the cold chains of today because the earlier version utilized so many different technologies [...] keeping ice from melting prematurely required coordination between a vast network of people and enterprises.¹³⁵

Still, this reference to complexity, technology and human control is possibly not enough to convince skeptics that we are faced with a historical phenomenon that can be labelled industrialization.

It is quite common in works of history or economic history to associate industrialization with the concept of an *industrial revolution*.¹³⁶ Specifically, this is perceived as a rapid succession of changes in the productive organization of the British economy between 1760 to 1830. The changes are taken to have been based on three basically British technologies: textile machinery (especially spinning and weaving of cotton), steam power, and factories. Other countries then industrialized by following the British example. In a critical review of this concept of industrialization, found to still permeate international and Norwegian history writing, historian Kristine Bruland presents an alternative view.¹³⁷

Bruland's point is not that the political, social, economic, or environmental consequences of European industrialization were less intense than generally held. Industrialization was an "economic transformation of unique historical significance".¹³⁸

¹³⁵ Rees (2018, p. loc 217).

¹³⁶ See, e.g. F. Sejersted (1993, p. 47): «During the 19th century there was an industrial revolution in Norway» (my translation).

¹³⁷ Bruland (2022). Her critique of works by historians Terje Tvedt and Tore Linné Eriksen, see (p. 50). Bruland's other work on European industrialization include a.o. Bruland (1989) and Bruland (1991).

¹³⁸ Bruland (2022, p. 17). My translation (for this and all quotes from the book).

It is still ongoing, with current world consumption of energy, minerals, and biomass at record and unsustainable levels.¹³⁹ According to Bruland, however, the historical roots of this situation go further back in time than 1760 and applies to a much wider field of economic activity than the traditional “key technologies” of steam, textiles, and factory organization.¹⁴⁰ There is also the question of how the supposed timing of the industrial revolution squares with historical evidence. For instance, in 1841, more than 10 years after the supposed end of the industrial revolution, just 40 % of workers in the British textile industries were employed in factories.¹⁴¹

While capitalism and industry first became dominant in the British economy, Bruland underlines that this was a process that went on in many other countries, although elsewhere more restricted in pace and scope. In her analysis, the industrialization process depended on technological innovations dating back to the 1400s and beyond, and these innovations were the outcome of broad social and political transformations. The primary causation behind industrialization is the shift towards a capitalist social system. The transformation began in the 1400s and unfolded over decades and centuries, “first in agriculture, then in manufacture, and finally in industry”.¹⁴² Three aspects of the capitalist system were crucial to the development of industry. Technological competition forced producers to innovate. Capitalist control, often brutal, of the workplace made it possible for them to introduce new methods and products. Finally, a capital goods sector emerged that supplied tools and machines to other industries.

¹³⁹ Bruland (2022, pp. 32-33).

¹⁴⁰ Which are the emblematic ones in a British context, but also a lot of variations among historians, cf. Bruland (2022, pp. 47-49)

¹⁴¹ Bruland (2022, p. 59).

¹⁴² Bruland (2022, p. 212).

In this analysis, technology assumes a primary significance. Drawing on numerous studies of the British economy, Bruland discusses innovations in several areas including agriculture, food production, cooling and preservation of food, the glass industries, and copper.¹⁴³ The crucial insight is that technological innovation manifested itself, “often intensely”, in all areas of economic activity.¹⁴⁴ Technological innovation also happened in industries with high levels of manual labor. There is no equal sign between mechanization and innovation, which is a kind of process that in some cases have taken decades and even centuries and involved many people around the world. Innovation is incremental and cumulative in nature. Overall, this conceptualization of technology is one in which social dimensions assume just as much significance as the hardware of tools and machines. A technology, writes Bruland, is “best understood as a combination of knowledges (understanding how to use the technology and the production it is part of), skills, management, and artefacts (tools and machines) that together make it possible to create functional products”.¹⁴⁵

This is one out of several expressions of the inherently social and cultural dimensions in the concept of technology. Over the last four decades, there have in Norway been several studies in the history of industrialization that underscore the social dynamics of technological change.¹⁴⁶ For instance, there has been some debate on the nature of international transfer of technology, which most agree is not just about the acquisition of machinery, but also the physical movement of embodied skills and knowledges of workers and foremen. Bruland has herself underlined this as crucial to the 1800s

¹⁴³ The study of refrigeration partly draws on a contribution to the Last Ice Age project, Nygaard (2022).

¹⁴⁴ Bruland (2022, pp. 86-108).

¹⁴⁵ Bruland (2022, p. 29).

¹⁴⁶ F. e. Sejersted (1982) may be considered a kind of starting point for this tradition in Norwegian historiography. See also Andersen and Stang (1984, pp. 9-13). On Sejersted and the history of technology, cf. Espeli (1990, pp. 749-753).

mechanization of Norwegian and European textile industry.¹⁴⁷ Other historians have emphasized the skills of domestic workers and looked at the mechanisms whereby local milieus mastered complex engineering, allowing them to produce steam engines, locomotives, and steel ships.¹⁴⁸ Workers' adaptive responses to the factory system have also been subject to historical research. The classic study by historian Knut Kjeldstadli underscores them as a means of forging a "urban, unified and organized" labor class.¹⁴⁹

2.6 Conclusion

More and newer studies of industrialization and technology might have been referenced in the above section. Hopefully, they are sufficient to make a general point about how to approach "Nature's Factory" as a case of industrialization, and why the following chapters place emphasis on the diffusion of knowledge and tools - technology - also in regard to a mainly manually operated, coastal and rural industry. The general point is that Norwegian historiography tends to concentrate on 19th century industrialization as something that happened in cities and factories, using "key technologies" to produce textiles, steam engines and other more or less iconic products associated with an industrial revolution. There is nothing wrong with that, but there are still questions to be asked about 19th century Norwegian industrialization.

Economic historians agree that the exports sector of shipping, lumber and fish was crucial to the growth of the Norwegian economy after 1840. Camilla Brautaset has identified a "residual" of other commodities – including ice – that grew sixfold in just three decades.¹⁵⁰ It is unlikely that these developments were exempt from forms of

¹⁴⁷ Bruland (1989).

¹⁴⁸ Andersen and Stang (1984), Andersen (1989, pp. 437-439) for a view on cultural values and technology as embodied in skills and craftsmanship. Also Sandvik (1994, pp. 229-244).

¹⁴⁹ Kjeldstadli (1989, pp. 385-390). This study, and Kjeldstadli's contribution to Andersen and Stang (1984), are examples of interconnections between the scholarly fields of the history of labor, and the history of technology.

¹⁵⁰ Brautaset (2002, p. 195), cf. above, section 2.2.

continuous innovation or capitalist control of the workplace, even if they might have taken place outside city factory fences. One such place is the coastal region discussed in this chapter, where people depended less on the fisheries and more on shipping and resource adaptability. Acknowledging industrialization as a very broad development containing many new technologies will open new areas for historical investigation, according to Kristine Bruland.¹⁵¹ The ambition is that a study of ice production in “Nature’s Factory” can contribute valuable insight in this respect.

¹⁵¹ Bruland (2022, p. 108).

3 Method and sources

3.1 Introduction

The overall purpose of this thesis is to produce new knowledge on why and how the ice trade for decades came to be a regular activity in southeastern Norwegian coastal communities. It has been indicated that this question will be answered by focusing on a “selection” of historical actors. More precisely, the empirical chapters of the thesis are built as successive case studies of four different ice companies. Three were from the town and surrounding regions of Kragerø, one was based in the coastal community of Nærsnes on the Oslofjord. Nærsnes is part of a former municipality called Røyken, which explains the recurring appearance of that name in this thesis.¹⁵² This chapter, then, elaborates on the case-study approach.

The second main element of this chapter is to present and discuss the source material that informs the research questions of the thesis. The framework is one of fairly standard elements of source criticism, a core precept of the historical method. Issues to be addressed include the variation in volume of the remnant sources corresponding to the actors under study. It will be apparent that the choices of case studies are informed by the desire to contrast merchant and farmer operations in the ice business, but they are also informed by the access to historical source material.¹⁵³

3.2 The choice of case studies

From the survey in chapter one, it will be apparent that the Norwegian ice exports did involve a great number of persons. Wiborg's ice company, which is detailed in chapter seven, employed around 400 workers in good years. On the other end, a farm might

¹⁵² Røyken ceased to exist as independent municipality in January 2020.

¹⁵³ A previous version of this chapter contained a paragraph on the impact of the Covid pandemic on my research situation.

employ just a handful of persons, harvesting and transporting ice from one or two ponds, delivering it to the nearest shipper. The ice business was likely never the only line of business for anyone taking part of it.¹⁵⁴ This goes for town merchants, farmers and laborers and everyone else involved in the production of ice, and just as probably it also applied to the agents, brokers or other persons acting as “speculants” in ice.

Thus, in theory, there are scores of case studies to choose from. As there is only so much time available, choices have had to be made. On the background of their significance and probability to answer the research questions, as well as availability and accessibility of source material, four (family) ice companies have been selected. It will over the course of the thesis be apparent that they were not one-man shows, but for the sake of simplicity they are introduced by reference to their main owners: Heinrich Biørn jr. (1794-1860), Johan Martin Dahll (1830-1877), Thorvald Baarsrud (1837-1910) and the Wiborg company of Kragerø, operated first by Thomas Møller Wiborg (1835-1918) and then his son Nicolay Wiborg (1867-1946).

Henrich Biørn Jr. was a shipowner, timber merchant, and grocer. He was listed with Kragerø's highest taxable wealth at the time of his death. Biørn was owner of, among other things, the sawmilling industrial site at Helle, which was partly developed into an ice works by his son. As far as we know, Biørn was the first Kragerø merchant to attempt export of ice, in 1835.¹⁵⁵ It has been possible to reconstruct a voyage with ice on one of Biørn's ships in 1839, that went all the way to Algeria (chapter four).

Johan Martin Dahll hailed from Kragerø. He was a merchant, shipowner, mining-industry mogul (nickel and apatite), and ice merchant. He is noted to have been first to organize American-style freshwater harvests of ice in the Kragerø districts, and to erect icehouses for “summer shipments” and damming fields to make ice ponds. He was manager of his

¹⁵⁴ I have not come across anyone in Norway, either sales agents, brokers, shippers or producers who are reported to have had natural ice as an exclusive line of business. This conclusion is based on surveys of local historiography, which is crucial to mapping the significant actors in each region.

¹⁵⁵ Biography of Biørn in Hopstock (1975, pp. 171-219).

widowed mother Maren Rendtler Dahll's (1794–1875) estate at Frydensborg. The estate included a pond (of which only remnants exist today) that formed the basis of the first freshwater ice business in Kragerø. Johan Dahll's business also included his younger brother J. Georg Dahll (1832-1875), and sometimes also elder brother Tellef Dahll (1825–1893), who was a geologist and responsible for several surveys of the Norwegian mineral resources.

Thorvald Baarsrud was from the coastal community of Nærsnes in Røyken. He was a ship captain, farmer, and ice exporter. After several years at sea, he came back to take over the family farm (Nordre Klemmetsrud) and two more farms. In a community where there were several farmers engaged in ice harvesting, Baarsrud became the dominant ice exporter using the various resources on his farms. Baarsrud's ice company has left an extensive archival material and is object of study in chapter six.

Thomas Møller Wiborg was from Kragerø. He was a shipowner and merchant. Wiborg was trained in France from the age of 15, went into business at age 19 with his older brother Simon Wiborg upon the passing of their father. Became leading ice merchant of the Kragerø area from the 1870s, and in the mid-1880s Wiborg commissioned steam vessels fitted for ice exports. He went bankrupt in 1893, after which his son Nicolay Wiborg took over the production sites, infrastructure and even most of the company's ships. He is often referred to as the largest ice merchant in the Kragerø district in the 1890s and beyond. He served as mayor of Kragerø and was listed with the town's highest tax valuation in 1916 and 1917. Wiborg exited the ice business in 1917 and moved to Christiania. He later made a few attempts at shipping in the 1920s, which were quickly abandoned.

Within the different comparative frameworks in social theory and history, this thesis's approach is closest to a *contrast-oriented study*.¹⁵⁶ By that is implied a case-study orientation whereby the attention is on the cases themselves, and the contrasts

¹⁵⁶ This paragraph informed by Kjeldstadli (1992, pp. 253-261) and Skocpol and Somers (1980).

between and among them. That comparative logic stands in contrast to others that predominantly employ a greater number of cases to “test” comprehensive theories, or other macro-oriented studies that aim to validate or invalidate macro causal hypotheses. There are no watertight compartments between different comparative approaches, and each come with their strengths and weaknesses. The contrast approach offers two main advantages: It offers the possibility to provide the reader with “holistic, rich descriptions and full, chronological case accounts” and it can “dramatically” reveal “limits to the applicability of received general theories”. On the other hand, it “can also be theoretically very misleading. For virtually any themes can be brought to bear upon the case materials without being put to any explicit test and without being openly identified as a proto theory”.¹⁵⁷ This objection might be read as coming from a positivistic point of view, holding as a norm a deductive procedure involving the formulation and “testing” of hypotheses. To the extent that it addresses a need for conceptual candor in any research, the statement is valid here in a general sense.

This thesis singles out for attention individual cases against the thematic backdrop of the Norwegian ice trade. The entities compared and contrasted are each approached at an idiographic level. Here, different qualities, events, and tendencies are singled out for attention within a 70-year-plus time frame. The actual method has not turned out to be one in which identical questions have been addressed to each of the cases. There is a contrastive logic applied.

3.3 The source material of this thesis

The purpose of this subchapter is to present which and what kind of sources this study uses, as well as to discuss how these sources have been consulted or used to answer the research questions of the thesis. Three main groups of *remnant* sources have been

¹⁵⁷ All quotes from Skocpol and Somers (1980, p. 193).

consulted: Private archives originating in the business activities of the actors themselves, contemporary press reports and finally, various government sources including the statistics worked out by departments and Statistics Norway.¹⁵⁸ By remnant sources are meant the kind of documents and traces that have originated close in time and place with the events they are meant to explicate. The opposite of this category of sources are *narrative* sources, which will be given a separate discussion in the subchapter below. There have been decades of debate on the assumedly unproblematic separation between remnant and narrative sources.¹⁵⁹

The research questions and method of this thesis emphasize analysis of the actions of ice exporters. The sources for such analyses may of course be found in a variety of places, including press and public records, but records and documents from the hands of the people studied are especially prized. There are few catalogued and publicly accessible archives from the business of Norwegian ice exporters.¹⁶⁰ At the outset of my research in 2018, the most promising avenues for research were some private archives in the Telemark Museum/Berg-Kragerø Museum (henceforth BKM) collections. Furthermore, there is a private archive after the dominating ice company in the Nærnes region, after Thorvald Baarsrud (1837-1910).

The BKM's archive covers fragments of correspondence and account material from leading ice exporters in the Kragerø district, above all the Biørn, Dahll, and Wiborg family businesses.¹⁶¹ That being said, the volume of material pertaining to the ice trade is

¹⁵⁸ See listing in the appendix, 9.1. – 9.4. Much of the national and regional government sources as well as practically all press sources are listed under 9.4. «Online material», as they have largely been located and read online.

¹⁵⁹ Kjeldstadli (1992, pp. 161-173), Hatlen (2020, pp. 47-52).

¹⁶⁰ May be somewhat corroborated by inserting the searches “iseksport” or “iseksportør” in the www.arkivportalen.no, each returning only one hit (as per November 1, 2022). However, there may be documents pertaining to the ice business, as it was commonly carried out in combination with other activities.

¹⁶¹ Source material from the Berg-Kragerø collections are abbreviated as BKM/and litra/number according to museum catalogue as per 2020/2021.

limited. Outgoing correspondence books from Henrich Biørn (Helle/Kragerø) and Johan Georg Dahll (London) have been examined for details on shipments of ice in the 1840s and 1850s. Account material from Johan Martin Dahll from the 1860s has shed light on the number of icehouses in operation and what kinds of costs and activities were recorded, among others it has given grounds for an estimation of communication practices and the function of the electric telegraph in the 1850s and 1860s ice exports. This goes some way to provide material for discussing the transformation of the Norwegian ice business in the 1850s and 1860s, i.e., the shift from “spring” to “summer” shipments. Unfortunately, though, the Dahll archive in the BKM turned out to not contain documents or details on the manifest transfer of US ice harvesting and storing technology to the Kragerø district in the early 1850s. The lacunae in this respect made searches in historic press sources serve to fill in some of the blanks.¹⁶² Admittedly, those reports are generally quite brief, and certainly do not provide much on the deliberations made by the actor in question. Despite all these shortages, however, the case of Dahll is the closest I got to a significant early actor in the Norwegian ice exports.

However, Dahll was not the first one. Starting a decade and a half before Dahll, the ice exports of Henrich Biørn jr. (1794-1860) is even less substantiated, both with regards to material from Biørn's own hand and press reports. In that case, snippets of customs records and governmental sources, primarily foreign service shipping lists, have served to document a few unknown facts about very earliest shipments of ice from Kragerø (see chapter four).

The BKM also houses some material on the later time periods of the ice trade. That material has been used in chapter seven, which deals with the ice business of Thomas and Nicolai Wiborg. The Wiborg section of the archive includes a collection of telegraph codebooks from 1880, 1896, and 1903. These books hold the promise to unlock some of the practices, risk reduction strategies and business routines of a large integrated ice

¹⁶² Executed online, see subchapter 3.6. below.

and shipping business like that of Thomas Wiborg and his son Nicolay Wiborg. Essentially, the books cover some 2,800 phrases for everything from ice sales and qualities, wind, and weather to issues with unloading, crew, and economic settlement. I have not come across historians using these kinds of telecommunications sources in their research. While there are a great number of issues they do not address, they grant access to routine behavior, and give occasion to ponder how overseas relations were formed, and how risk and uncertainty were weighed. My work with the telegraph codebooks sharpened my attention to the electric telegraph as a factor in explaining why and how the Norwegian ice industry worked, perhaps even how it *could* work. In terms of fact–theory feedback, this is perhaps my most salient case of empirical material shaping a communicative perspective on the ice trade, which aligns with the knowledge aspects discussed above: specifically, the gathering of intelligence and news, and the impact of new communication technology.

Another source consulted with regards to the Wiborg ice enterprise is a collection of diaries by Kristian Thommessen Blankenberg (1887–1957). He was lumber laborer, and ice worker, with several seasons in the ice industry (*issjau*). Blankenberg kept a diary, which I have used mainly to say something about the speed of operations (filling the icehouses and ships) in the Wiborg ice business.

Ultimately, the BKM material is fragmented. Why this is so is not easy to say. At least in one of the cases (the Wiborg material), the bequest was made from descendants of the actors.¹⁶³ No documentation exists with which to ascertain whether active selection of material has taken place, nor can it be ruled out. On balance, it seems apt to say that the overall nature of the material allows occasional immediate access and closeness to events, but it also requires much in the way of contextualizing and critical reading of adjoining narrative sources. Methodologically, the resources afforded by online

¹⁶³ The description of BKM/Bb 112 (Wiborg) states that the contents were a gift from Cecilie Wiborg Bonafede (1929–2012), Oslo.

historical newspapers and journals at the NB have been invaluable concerning efforts at discussing these sources.

With regards to the Baarsrud archive, formally the SAKO P-1359 (as it will be referred to in the footnotes in chapter six), the situation is quite the opposite. It is available for researchers at the State Archives in Kongsberg.¹⁶⁴ At the outset of my project, this was by all tokens the only archive hailing from a Norwegian ice business to be catalogued and stored in a government archive institution.¹⁶⁵ This happened in 2014, before which the archive was kept at the family firm's headquarters in Nærsnes.¹⁶⁶ Thorvald Baarsrud's ice company came to be the predominant ice business of the Røyken municipality. It is a prime example of a Norwegian ice business founded on the basis of farm property and entitlements. The archive contains a series of outgoing correspondence starting in the mid-1870s, which will be commented below. Furthermore, there are protocols of board minutes, account material, collections of bills of lading, and ice contracts. It also has material from a neighboring ice plant that was managed and co-owned by Thorvald Baarsrud from the late 1890s. The volume of information and coherent context offered by this one archive makes it a valuable resource for the case study approach.¹⁶⁷ The asymmetry of perceived information volume in the private archives of the BKM on the one hand, and the Baarsrud archives on the other, entailed some demanding considerations.

¹⁶⁴ Full online catalogue (Retrieved August 17, 2021): <https://www.arkivportalen.no/entity/no-a1450-04000000284381>. AS Søndre Nærsnes was the name of the family business from 1926, when it was reorganized. Whenever the AS prefix appears in the text, it refers to the company. Without it, the reference is to the farm Søndre Nærsnes. This is detailed in chapter six.

¹⁶⁵ In June 2022, an archive from shipowning family firm in Risør, J.W. Prebensen, was made available, which among other things pertain to ice exporting, cf. https://www.arkivportalen.no/contributor/no-AAKS_arkiv000000028349?ins=AAKS (Retrieved November 2, 2022).

¹⁶⁶ Interview Dag Erichsrud, November 27, 2019.

¹⁶⁷ It has been complemented with a collection of ice contracts and scattered correspondence in the private possession of Knut Baarsrud (referred to as Knut Baarsrud Collection, KBC).

I spent about half a year regularly going to the State Archive at Kongsberg to read, scan and collect material from the Baarsrud archives, but I could easily have spent more time on this archive alone. The volume made for some consequential choices with regard to the design of my research project. I could have opted to concentrate the case-study approach on this one firm. With the time available for my project, this would most likely have resulted in losing the contrastive ambition of the project as it stands now and omit discussion of Wiborg's ice business (chapter seven). Furthermore, it would also imply less concentration on the early (1840s-1860s) stages of the industry (chapter 4 and 5), as the Baarsrud archive picks up in the late 1870s. On the other hand, a single-case focus on Baarsrud might have provided a more nuanced and textured rendition of the high points of the ice business, and the way it impacted the community in which the business operated.

By the above, I specifically refer to my decision to *not* read the *Copibog* series of outgoing correspondence from Baarsrud, beyond roughly the year 1885.¹⁶⁸ The number of letters was simply too large (rough estimate is > 1000 per year), and the decision was made on cost/benefit approach about what was gained and lost by the move. Almost certainly, it made my project lose access to even more day-to-day insights about business alliances and methods. Closer reading might also have served to substantiate better how the business over time got integrated into regional social and political life.

Instead, the choice was made to concentrate on trying to systematize the collection of ice contracts in the archive, which was partly concealed in the E-series of "diverse correspondence", and this exercise made it feasible to say something about the shifting overseas contacts of this one firm. This part of the archive also included incoming letters from agents and business contacts. A rudimentary overview of the business annual business accounts was also made possible from the Status book which Baarsrud kept himself. This has made it possible to hold this one company's performance up against

¹⁶⁸ Cf. Appendix, 9.1.

the general fluctuations as have been outlined in subchapter 1.4. A most valuable part of the Baarsrud archive is Thorvald Baarsrud's own reflections of the business, which are at irregular taken down in the Status book between 1882-1902.¹⁶⁹

Hopefully, I have explained some of the most significant dilemmas encountered about the selection of material. Through that, I hope to have indicated that the research and writing of this thesis do not ascribe to "naïve empiricism". This is a critical review of the idea that worthwhile research rests on a bedrock of pure data or uninterpreted facts.¹⁷⁰ In the following, indeed in the entire enterprise, I try to navigate a course which accords legitimacy to the tools of the historical method, using the traditional concepts associated with the source criticism method. At the same time, it is impossible to hold that research is a straightforward collection of "pure facts". I have tried to maintain an awareness about who is speaking and what interests they may have in doing so, and this is all the more important as the actors mainly discussed in this thesis were very powerful individuals in their time.

3.4 Narratives and memories

The example of Baarsrud's annual statements in the SAKO P-1359 archive gives one example of how the line between remnant and narrative sources is not as clear-cut in actual collections of historical sources as it might initially seem.¹⁷¹ Again, this does not preclude categorization, and the potential for distortion is, as a general rule, greater when it comes to the range of sources considered as narrative. In a narrative source, "the information has passed through a subjective medium, and hence is always exposed to risks of distortion".¹⁷² The actual reasons for distortions include deliberate actions,

¹⁶⁹ SAKO P-1359/R/Rb/L0003, see chapter six, especially 6.9.

¹⁷⁰ Alvesson and Sköldberg (2018, p. 3).

¹⁷¹ Cf. also "rule of thumb" in Kjeldstadli (1992, p. 172).

¹⁷² Alvesson and Sköldberg (2018, p. 137).

such as willfully withholding or misrepresenting information, but also the accumulative, more inadvertent, effects of accounts passing through many people over time.

Memories and statements from actors have been braided into works of local history. One example that I have consulted is Andreas Killingstad's history of Røyken from 1928.¹⁷³ The chapter on the ice industry in that book is clearly informed by oral sources close at hand to the author. The book was written while there still was some ice industry in the district, and Killingstad is open about having obtained evidence from people active in the trade. None are identified, however. Nonetheless, the uncertain origin of Killingstad's information does not discredit everything he writes about the business—some points of which have been quite valuable to other local historians, as well as to this research.¹⁷⁴

While the following is not meant to imply that local historiography are narrative sources *per se*, the discussion above provides a good place to insert a general comment. Local histories have been very important to this undertaking, and the references in the following chapters will make that clear. Even though they have been generally criticized in the context of ice exports history, cf. chapter one, they have been very an unmissable tool in locating actors and evaluating the choice of actors and cases. The degree of methodical rigor varies. A substantial portion of those consulted are written by professional historians.¹⁷⁵

Due to the asymmetry in the source material between Røyken and Kragerø addressed above, I have consulted a greater proportion of narrative sources in the Kragerø case. The Biørn, Dahll, and Wiborg families have published family chronicles, in which the

¹⁷³ Killingstad (1928, pp. 158-162).

¹⁷⁴ Evidently, Martinsen (2004) partly builds on Killingstad in his writings on the Røyken ice industry. In my research, Killingstad's identification and explanation of a productivity increase has been of particular interest.

¹⁷⁵ Valuable contributions in this regard in (C. H. Holm et al., 1995), C. H. Holm (1996), Thue (1984), and Ellen Schrumpf (2006).

families' editorial hand is evident.¹⁷⁶ When analyzing that information, one must be aware of the processes shaping memories, both at individual and collective levels.¹⁷⁷ Some are analogous to those often encountered in narrative sources: The phenomenon of *narrative contagion*, when elements of one story get mixed into another, is one example.¹⁷⁸

These are not flawless sources, but they contain information that has been crucial to this research. Furthermore, the stories and portrayals of some Kragerø's prominent men and their families are not without counterpoint. Cantor and schoolteacher Fredrik Hougen (1820–1911) came to Kragerø in 1844 to begin a career that was to last for more than 50 years. Hougen was a school reformer, and he made his mark on the town's public life as a progressive force.¹⁷⁹ Towards the end of his life, he related his recollections to his son: These manuscripts were published in five volumes during the 1930s, totaling more than 800 pages.¹⁸⁰ Hougen's memoirs continue to figure as a source in local historiography.¹⁸¹ They have also been consulted here, mainly as alternative sources on actors such as Johan Dahll and the Wiborgs.

It must be highlighted that the above passages concern the memories of and about the powerful actors in the story. A substantial group of actors are largely invisible: namely, the ice workers and their families. That is not to say that no measures have been taken to get a grasp on their situation, the skills they possessed, and how the work was organized. In the case of Kragerø is local historian Mads Olsen's (1980) article on ice

¹⁷⁶ Fleischer (1925), Dahll (1959), Hopstock (1975). For the Drøbak ice merchant Søren Angell Parr, there are recollections from a relative in Egeberg (1957).

¹⁷⁷ Kaldal (2016, pp. 60-66), Kjeldstadli (1992, p. 188).

¹⁷⁸ Alvesson and Sköldberg (2018, p. 144).

¹⁷⁹ *Kragerø Blad Vestmar (KV)*, January 12, 2019, chronicle by Jimmy Åsen.

¹⁸⁰ Hougen (1936).

¹⁸¹ A. Pedersen et al. (2016, pp. 90, 92, passim)

work, based on interviews with ice workers and providing a taxonomy of the different tasks involved.¹⁸² Another one is a private initiative in the 1970s by then student, now physician and pharmacist, Øyvind Melien (b. 1958). Melien visited rest homes in the municipality of Asker and conducted interviews with several older ice workers, some born in the 1880s and 1890s.¹⁸³ Their stories describe the physical demands of ice work, the dangerous situations facing the ice workers, and how even short bouts of ice work could provide important income for struggling families.

The rough nature of the ice works, and the economic contribution from labor, are addressed in general terms. Nonetheless, this thesis does not involve much original research on the ice workers' situations.¹⁸⁴ This is due to its emphasis on the entrepreneurs and owners in the industry. Instances of labor unrest, strikes, and possibly squalid living conditions are outlined in chapter seven, but quite roughly.

3.5 Public records, in archives and online

This research project has a bias for private archives and material emanating directly from the actors. Still, a number of official archives have been consulted. The public records I have consulted hail from both state and municipal levels. The institutions, even when they have the same name as their present-day counterpart, were very different entities in 19th-century, semi-independent Norway.

This also goes for parliament, Stortinget, which has been conferred for information on tax policies in the 1840s phase of ice exports.¹⁸⁵ The bureaucracies producing the sources were miniscule, compared with today. The statistics compiled by these

¹⁸² M. Olsen (1981).

¹⁸³ Interview, June 25, 2021, Øyvind Melien. Summaries of six of the interviews he conducted are published in Melien (1990).

¹⁸⁴ Vesseltun (1994) is the most comprehensive treatment in this regard.

¹⁸⁵ See chapter four, 4.5.

bureaucratic structures come with their own problems.¹⁸⁶ Thus, footnoted references to units like the Customs Offices, Ministry of Finance, or Statistics Norway conceal worlds of difference. When working with the primary sources, a basic challenge is the fact that most were handwritten in the Gothic style. Reading that handwriting is an acquired skill.¹⁸⁷

A substantial amount of information for this thesis has been collected from online sites. Using online material in historical research is nothing new in 2022. Nonetheless, immersion into the truly massive potential of online historical content requires “search engine literacy”.¹⁸⁸ Access to online material at one’s fingertips grants substantial information power, but also potential pitfalls. I will first provide a brief description of the kinds of online material I have used, before discussing some of the snares.

A first point is that nearly all the online material I have consulted is published on official or institutional platforms.¹⁸⁹ While this fact alone is not an antidote to all conceivable sources of misinformation, it validates information quality, since principles for digitization have been accounted for.¹⁹⁰ The most important sites and institutions I have consulted are the National Library (NB), Statistics Norway (SSB), and the digital resources of the National Archives of Norway (Digitalarkivet). These will be discussed in reverse order.

¹⁸⁶ Which are dealt with in the context of their actual usage in this thesis. Lie and Roll-Hansen (2001) history of Statistics Norway (Statistisk Sentralbyrå) gives a general foundation for critical approaches in this regard.

¹⁸⁷ The authoritative guide for Norwegian material is Johannessen (2007).

¹⁸⁸ Burke (2016, p. 55).

¹⁸⁹ The institutional platforms include museum collections, such as digitalmuseum.no and kulturnav.no.

¹⁹⁰ Hatlen (2020, pp. 54-55).

Concerning Digitalarkivet, I have made enquiries in two respects.¹⁹¹ I have consulted census material to find information on specific individuals¹⁹² identified from other sources, rather than to conduct systematic surveys to detect structural developments.¹⁹³ The other main category of sources from Digitalarkivet are public registries, containing deeds and information on property ownership. These have been used in particular to expound on the early phases of the Baarsrud ice business. The material returned examples of 1850s and 1860s contracts between ice merchants and farmers in the Røyken/Hurum district, which have been used to discuss social aspects as well as flows of knowledge in the early ice industry.

SSB has made available online series of historical statistics, going back to 1828.¹⁹⁴ The fact that ice exports were included in the historical statistics is afforded some attention in chapter four, where the thrust is on using the statistics on ice exports to provide information about the early transformations of the ice industry (i.e., the phase from 1835 to about 1860). There is a time series of the volume of Norwegian ice exports running from 1844 up to 1947, which is reprinted in the appendix.¹⁹⁵ While there are certainly sources of error in this material, the volume of observations provide

¹⁹¹ Accessible at <https://www.digitalarkivet.no/> (Retrieved August 18, 2021).

¹⁹² The Norwegian personal history search engine *histreg.no* has been used; it came onstream during the course of my work. It is a collaboration between several universities and institutions, drawing on data from a variety of sources including censuses and newspapers. See <https://histreg.no/index.php/omhbr> (Retrieved April 5, 2022).

¹⁹³ The exception is a study of the Frydensborg estate (Johan Dahll) between 1845 and 1865, cf. chapter five.

¹⁹⁴ Accessible at <https://www.ssb.no/a/histstat/publikasjoner/> (Retrieved August 18, 2021).

¹⁹⁵ Table 9.5.1.

confidence in relation to trends.¹⁹⁶ Other material that I have consulted include statistics on telegraph communications.¹⁹⁷

As the emphasis on actors is instrumental to my work, a great deal of information for this thesis has been obtained through feeding key words and names into the NB databases.¹⁹⁸ This constitutes a rapid means to obtain relevant newspaper articles, and access to texts written in temporal proximity to the events. The earliest sources on the Norwegian ice trade are in fact newspaper articles from the early 1820s. As will be revealed throughout this thesis, the press regularly commented on ice industry prospects and protagonists. Newspapers also reprinted records of court hearings—indeed, of several court cases of which I found no trace in legal sources. A cautionary note here is that newspaper articles of the 19th-century press were not free of political slant when writing about ice trade and ice work. I have therefore tried throughout to approach the information in the articles critically: that is, to gauge the information presented against the knowledge accumulated from other sources.

Several hours of research have been spent in front of the computer screen, trying to separate the wheat from the chaff after having produced, for instance, 1,165 hits on “Nicolay Wiborg”. Naturally, techniques for narrowing down the hits have been a must. At one end, the immediacy of the process is an intuitive progression from long hours of sifting through non-indexed, microfilmed newspapers, one roll at a time.¹⁹⁹ On the other end is the sheer amount of hits and information. As pointed out by Norwegian historian Jan Frode Hatlén, a danger of online material is to get lost in the information maze.²⁰⁰ It

¹⁹⁶ For a refutation of the idea that historical statistics are passive reflections on the society they address, see Lie and Roll-Hansen (2001, pp. 9-10).

¹⁹⁷ Cf. chapter five, section 5.5.

¹⁹⁸ <https://www.nb.no/search>. (Retrieved August 18, 2021).

¹⁹⁹ Which I also spent two weeks doing, as no issues of the *Kragerø Adresse* newspaper (roughly 1840s–1850s) had been scanned by the summer of 2020.

²⁰⁰ Hatlen (2020, p. 54).

can be more than a little overwhelming to face the number of hits generated by a query: For example, “ice dam” (“isdam”) returned more than 3,000 newspaper and journal hits for the period between 1850 and 2020, reduced to about 400 if restricted to 1850 to 1900. All things considered, however, the access to so much information from my desktop has been highly beneficial—even with the ever-present possibility that better, or more rewarding, sources were scrapped for the ones on which I concentrated.

3.6 Conclusion

This chapter has explored and discussed principal and practical questions on the historical method. It details how, in this thesis, historical subjects are compared or contrasted, each at an idiographic level. Different events and tendencies are singled out for attention within a 70-year-plus time frame. The chapter also explains why my method is not one in which identical questions are addressed to each of the cases. Instead, a contrastive logic is applied, while the work as such cannot strictly be categorized as comparative.

Secondly, the chapter discusses the empirical material that forms the basis of the thesis. The framework involves fairly standard elements of source criticism in historical method. Issues addressed include the variation in the volume of remnant sources linked to the actors under study. The twin focus on the districts of Kragerø and Røyken have been accounted for, also with a view towards the different status of the source material encountered in this research. In the Kragerø case, the material in question is comprised of rather scattered and incomplete sources from a variety of actors. In the case of Røyken, the resource is a catalogued, comprehensive archive of the activities of Thorvald Baarsrud and his family's ice business. The nature of the source material may easily facilitate even more detailed scrutiny of the latter historical entity; however, such an approach would have considerably reduced the contrastive ambition of this work.

4 “A factual exchange of goods?” The first ice shipments, 1822–1850

4.1 Introduction

The first phase of transformation addressed in this thesis concerns the early phase of the ice exports. This and the following chapter map the drivers that were crucial in the transformation from sporadic to regular exportation of natural ice from Norway. A shift of the Norwegian ice exports into a regular, annual activity from about 1850 has been identified in the research of Tore Ourén. However, there have been no real attempts to examine the activities of the crucial actors involved in this process, let alone to systematically survey this as a case of innovation or technological development. There is recognition that overseas international ice business was an innovation that originated in the United States. How were the tools, knowledges and technology of the trade brought into use in Norway?

Events and developments over a 30-year period are covered, including a specific journey transporting ice from Kragerø to Algiers. The Kragerø initiatives will be viewed against the backdrop of the very first ice export from Norway in 1822. This chapter explores different technological knowledge about ice and cold energy in this period. For a while, the Norwegian exports—whose volumes were modest by the standards of the later 19th century—were sourced from both glaciers and seawater. There was awareness about the New England freshwater ice trade in Norway, but how much of an example or template it was for the Norwegian trade before 1850 remains a point for discussion.

Was there political encouragement of the ice trade, possibly feeding into the strategies of merchants and ice traders? In 1835, ice came to figure as an item in the foreign trade statistics, and that does indicate expectations. I have consulted parliamentary debates on tariffs of the early 1840s to try and discern what kind of merchandise ice was considered to be. The title of this chapter contains a quote from an 1842 tariff

agreement. For Norwegian legislators, ice formed a double entity in the expansion of the country's maritime business—the country's "most natural employer and source of income".²⁰¹ It could be ballast for sailing ships, but it could also be a commodity for sale.

4.2 The *Spring* and the *Albion* in Norway, 1822

The year 1822 marks the first recorded instances of ships coming to Norway to collect ice. In many sources, this is pinned to one individual: William Leftwich, the "Fleet Street fishmonger" who was "credited with the introduction of Norway ice into England as an article of consumption".²⁰² Leftwich chartered a vessel in Yarmouth, the *Spring*, for the purpose. A newspaper article in Norway reports of "trade speculation in Norwegian ice", detailing that Mr. Leftwich made a profit of £5,000 in London on just one journey, collecting in excess of 350 metric tons of ice from somewhere north of Trondheim.²⁰³ Successful ice expeditions to Norway and Greenland enabled the construction of a 1500-ton capacity ice well in the Cumberland Market of London.²⁰⁴ In his last will, registered in 1843, Leftwich is presented as an "ice dealer", a documented instance of this kind of market specialization in the city by that time.²⁰⁵

However, Leftwich's was not the only expedition to Norway to procure ice that year. Coming on the heels of wartime deprivations and at a time when the traditional timber commerce between the Britain and Norway was at a low ebb, the promise of ice exports was put in writing in an 1825 *Morgenbladet* article by pastor Niels Hertzberg (1759–

²⁰¹ "Søefarten, Norges naturligste Syssel og Erhvervskilde", Stortingsforhandlinger 1839, 1. del, S. 13.5., p. 272.

²⁰² *Chamber's Journal*, February 13, 1864, p. 99.

²⁰³ *Morgenbladet*, August 11, 1822 ("Handelsspeculation med Norsk Iis").

²⁰⁴ Buxbaum (2014 p. 39).

²⁰⁵ Information from Leftwich's will presented in a London court in December 1843, cf. the National Archives: PROB 11/1990/77.

1841) of the Hardanger region.²⁰⁶ Hertzberg facilitated one or two shipments of ice from the Folgefonna glacier. In his article, he expresses hope for a future venture in ice, while stressing the need for a good road to transport the ice from the mountains to the shore. That road came much later, in the 1860s; “Isvegen” is a tourist attraction today, but it never succeeded in making Folgefonna glacier ice a substantial repository for ice or fish exports.²⁰⁷ Hertzberg is a rare case in Norway of the science and ice trade intersecting in one person.²⁰⁸ He figures as a pioneer in the history of Norwegian meteorology, conducting long observation series and proposing a theory of storm prediction, in 1824.²⁰⁹ Although little came of the ice business he proposed, Hertzberg’s writing is the closest source on the matter and he provides a few descriptions of the kind of glacier ice collection that was attempted.

Hertzberg relates an arduous process whereby the “blue steel ice” was collected by local farmers and peasants—which is to say, the ones who could be persuaded to venture onto the glacier.²¹⁰ The ice was taken out in chunks, though Hertzberg does not detail the tools or methods of the mining itself. It was then rowed over a glacial lake and carried down a talus: in all, several kilometers from the glacier to the ship hull. Each man carried on his back 3 to 4 *våger*, a unit corresponding to 18.5 kilograms. According to Hertzberg, workers were paid 18 shillings per *våg* loaded on board the ship. Nothing is related about the number of workers, nor how many turns each took. Regarding the

²⁰⁶ *Morgenbladet*, October 4, 1825.

²⁰⁷ On Isvegen, cf. <https://folgefonna.info/besoksmal-rundt-folgefonna/turistvegen-over-folgefonna/> (Retrieved July 9, 2021). On the 1860s road construction and a view that ice exports were only spasmodic, cf. Lea (1914, p. 59).

²⁰⁸ The other one considered in this thesis: the Dahll brothers in Kragerø, cf. next chapter.

²⁰⁹ Nilsen (2016, p. 29).

²¹⁰ Hertzberg alludes to workers “mumbling” that ice should not be taken from the glacier. He provides no further clues regarding the sentiment, and the passage is too brief to judge whether this constitutes an instance of taboo or prohibition by tradition. A note on the use of the terms “peasants” and “peasantry” in this thesis: It follows the dictionary definition of “a member of a European class of persons tilling the soil as small landowners or as laborers”, see <https://www.merriam-webster.com/dictionary/peasant> (Retrieved May 15, 2022).

latter, however, more than 50 shillings for a day's work would likely have been a decent wage.

Hertzberg identifies the ship transporting the ice as the schooner *Albion*, originating from a place he calls *Warwich*, but which was more likely Berwick-upon-Tweed. The *Albion* apparently loaded 5,000 våger (i.e., more than 92 metric tons). It could have loaded another 2000 våger, were it not for disputes arising between the ice harvesters and local farmers who protested at their grass being dented by all the traffic. Despite this resistance and the absence of suitable roads, Hertzberg relates that a few more shipments took place in the 1824 season. On one occasion, the minister himself acted as a kind of middleman for the Bergen brokers and British shippers, entrusted with recruiting labor. The end recipient is merely identified as a "baker from London". By the 1820s, confectioners in several UK cities are reported as having begun building "large, functional ice stores".²¹¹ Perhaps the "London baker" to whom Hertzberg refers was John Bridgeman of Marelybone, who from 1805 "supplied orange, lemon, apricot and raspberry ices, along with meringues and ratafias".²¹² The use of the ice for purveying up-market taste sensations seems certain.

Hertzberg informs his readers that the ice collected by the *Albion* in 1822 was intended for keeping salmon fresh during transport to the London markets. This implies that the ship was chartered by principals connected to the fresh salmon trade of Berwick-upon-Tweed. By the early 1820s, using ice to conserve salmon sent from the Tweed and Scottish rivers to high-end customers in the metropolis was a regular occurrence. Apparently, the business started in the 1760s with salmon "preserved by boiling, salting, smoking or curing".²¹³ The conversion to packing and dispatching the salmon on ice, in

²¹¹ Buxbaum (2014 p. 39).

²¹² Buxbaum (2014 p. 39).

²¹³ Beamon and Roaf (1990, p. 133).

wooden boxes, took place in the late 1780s.²¹⁴ The literature does not connect the shift to any development in transport mode. Other sources indicate that the ice-cooled salmon was still marketable after three weeks in transport.²¹⁵

The ice was “fetching a good price”.²¹⁶ Several “commercial icehouses” were built in Berwick and other locations to support the industry, originally stocked with “natural ice, and in the 19th century, depending on the mildness of the winter, with local or imported ice”.²¹⁷ The “natural ice” referred to in this context is the ice collected in the surrounding areas, from ponds and rivers. For the year 1799, this is reported to have amounted to 7,600 cartloads of ice being brought in.²¹⁸ The literature does not relay the distribution over time of “natural”, “imported”, or “mechanical ice”. The commercial icehouses continued activity until roughly 1960.²¹⁹

The Berwick-upon-Tweed salmon business was part of a commercial endeavor that also included rivers in Scotland’s mainland and on its islands (e.g., the Isle of Skye). The use of Norwegian ice to preserve the product must have been costly and indicates a trade in a luxury commodity. Reportedly, the mild winter of 1821/22 sparked initiatives to cross the North Sea to procure the necessary coldness, both in the case of the northern salmon traders and the London fishmonger-cum-ice dealer William Leftwich.²²⁰ The exact volumes of his and other English and Scottish merchants’ ice purchases from Norway is unclear. Later accounts highlight it as quite limited, whereas an 1847

²¹⁴ Beamon and Roaf (1990, p. 133), Buxbaum (2014 pp. 37-40).

²¹⁵ “Midler mod Forraadnelse”, in *Nyt Magazin for Kunstnere og Haandverkere*, Nos. 37-39, 1837.

²¹⁶ Buxbaum (2014 p. 37).

²¹⁷ Beamon and Roaf (1990, p. 134).

²¹⁸ Buxbaum (2014 p. 37).

²¹⁹ Beamon and Roaf (1990, p. 134).

²²⁰ From the monthly mean temperatures of central England relayed in Beamon and Roaf (1990, pp. 142-147), December 1821 through March 1822 were above the temperatures of the preceding years, but more so in relation to 1819/1820 than the following season.

newspaper source relates that English traders “not infrequently” (*ikke sjældent*) arrived in “western” Norway to fetch ice.²²¹ At the time, the term “western Norway” encompassed more than today; the operational area for ice trade had likely expanded southeast of the Folgefonna glacier by then.

Significantly, the fresh salmon business contributed to a state of affairs such that by “mid-nineteenth century Scotland’s once plentiful salmon had grown rare and costly, in part because faster transportation led to new markets”.²²² The depletion of these fish stocks pushed the boundaries of fresh fish commerce around the mid-1800s, when British fishmongers were linchpins in the southern and southwestern fishing ports of Norway. In the early stages of fresh salmon exports from Norway in the 1860s, Britain dominated. This was also the case for mackerel, which outweighed salmon as a fresh fish commodity both in volume and value well beyond the 1870s.²²³

Pastor Hertzberg’s attempts to disseminate information on the earliest ice shipments from Norway illustrate certain aspects of knowledges. In his *Morgenbladet* article, the general point was to inform “patriotically inclined citizens”—most certainly an appeal to town merchants—about the pecuniary opportunities arising with this new commodity.²²⁴ The thrust here was thus on the “knowing that” dimension. On the other hand, this was also enlightenment, detailing how the ice was actually collected, how much was paid to the workers on the glaciers for their considerable efforts, and other technicalities of the trade. While it is fully possible to draw an analytical line between the two kinds of knowledges, in the practical life of the actors, they were intermeshed.

²²¹ *Kragerø Adresse*, November 18, 1847, article heading “At bevare fersk Lax og anden Fisk i længere Tid”.

²²² Freidberg (2009, p. 240).

²²³ Solhaug (1976b, pp. 556-557).

²²⁴ *Morgenbladet*, October 4, 1825: “Patriotisksindede Medborgere”.

4.3 Tracking the first ice shipments from Kragerø

The next stage in Norway's ice exports came in the mid-1830s when a handful of merchants in southeastern ports sent off ships. This stage differs from the collection of glacier ice described by pastor Hertzberg in a few ways. Firstly, Norwegian merchants were entering the trade. Secondly, the methods by which the ice trade was conducted were changing. There are also signs that the collection of ice for overseas shipment was given a measure of government support. These elements will be examined and discussed over the next sections of this chapter.

The first official registration of ice shipments from Norwegian ports occurred in 1835, when Fredrikshald (Halden), Drammen, Tønsberg, Langesund, Risør, and Kragerø reported a total of 624 CL of ice being shipped out.²²⁵ Of this total, 344 went to Britain and Ireland, and 280 to France. As for Kragerø, responsible for about a sixth of the total, the volume reported may be only one shipment on the newly launched *Commerce*, a ship owned by local merchant Henrich Biørn Jr. (1794–1860).

The Kragerø community remembered that Biørn's ships were the first to carry ice out of the district; though somewhat divergent concerning destinations or the ships employed, accounts generally agree on this having taken place in 1835.²²⁶ Henrich Biørn was a prominent member of the Kragerø merchant class, having taken over the family estate in 1827. Among the several properties was the proto-industrial community of Helle Brug, with its grain mills and sawmills and about 50 resident worker families. Despite his direct ownership in mills and lumber exports, it is held that shipping services became a

²²⁵ NOS: *Norges Handel og Skibsfart I Aaret 1835*. Table 1: "Tabel over udførte norske Varer og Produkter fra samtlige Toldsteder i Norge i Aaret 1835". Available at https://www.ssb.no/a/histstat/nos/st_03r_1835.pdf (Retrieved September 3., 2021).

²²⁶ Bugge and Worm-Müller (1935, p. 688) and M. Olsen (1981) both specify 1835 as the first year, while one of Worm-Müller's sources, Captain Stian Jørgensen, wrote an account in 1926 in which Biørn's brig ship, the *Ursus Minor*, was the first to do this "in the 1840s" (*i 40 aarene*), cf NMM\A-1197/D/L0003/05, "Kragerø Skibsflåde, Skibsbyggeri og Rederier fra 1812 til 1914".

priority for Biørn, and also a factor contributing to his relative success.²²⁷ He is also noted as the first Kragerø shipowner to send a ship south of the equator: the *Æolous*, which sailed to Rio de Janeiro in 1839.²²⁸ The ship was also used in the French ice trade. On March 14, 1846, it was cleared out of Kragerø with a cargo of ice.²²⁹

In the case of the *Commerce*, captained by Johannes Larsen Jr., its maiden voyage was with a consignment of ice: The destination was Le Havre, in France.²³⁰ Writing to his insurance broker in Copenhagen, Biørn states that the *Commerce* departed on March 20. He wanted the ship insured for 18,000 *daler*. Whether in Norwegian or Danish currency, the amount likely exceeded that which local insurers would underwrite.²³¹ It seems that his broker required reassuring, as Biørn justifies the high sum due to the ship being “new”, adding that he has “no fear” for the ship on account of the nature of its cargo. The journey from Kragerø to Le Havre took seven days. No further entry is made concerning the sale of its cargo. However, it was not a one-off, so there must have been a rationale for the shipment, even if the sale sum may have been low.²³² The *Commerce* then took on freight from Le Havre to Oostende, making more trips in the North Sea and Baltic before returning to Kragerø at the end of the shipping season. It is not unthinkable that the ice cargo was a way of sending off a ship with the lowest possible tariffs—at least on the Norwegian (and French) side—and that the real purpose of the journey was to engage in third-party transports abroad. Trade with France, despite forbidding fees and tariffs, has been singled out as the most important factor in the Kragerø shipping

²²⁷ A. Pedersen et al. (2016, p. 32).

²²⁸ Hopstock (1975, p. 191).

²²⁹ *Kragerø Adresse*, March 26, 1846.

²³⁰ Information on this journey from BKM/Ba 68, Copiebog Henrich Biørn.

²³¹ Local ship insurers in Kragerø set a maximum at 3,000 *speciedaler* per ship in 1858, cf. advertisement in *Kragerø Adresse* March 11, 1858.

²³² A bill of exchange for 1,340 francs may have had something to do with the cargo, although this is unclear from the context of the correspondence.

expansion between 1820 and 1840.²³³ The *Commerce* was one of four ships registered by the Swedish-Norwegian trade consul to have arrived in Le Havre with ice in 1835; another vessel was from Kragerø, one was from Fredrikshald (Halden), and one was from Sandefjord.²³⁴

In the following years, the *Commerce* was outbound with ice on at least two more occasions. In 1836, it is registered as arriving at Sentobal in Portugal in ballast and departing February 7 with salt—as were scores of other ships from Norway from that location.²³⁵ The ship was likely engaged in tramp trades for the remainder of the year, as well as in 1837 and 1838. In January 1839, an interesting journey commenced. The customs book notes that the *Commerce* and Captain Larsen were bound for Lisbon with a cargo of ice.²³⁶ At some point in the voyage, however, the point of destination changed. On February 12, the *Commerce* called on the port of Algiers. The Swedish-Norwegian consul noted that it was loaded with ice (*Is*), and that the value of the cargo was 12,000 Francs.²³⁷ Five Norwegian ships arrived in Algiers that year, between January and July. Most had cargoes of wood and whetstones that exceeded the value of the *Commerce's* ice: In all, the trade was set at about 65,000 Francs. The *Commerce* departed Algiers on March 21 Odessa in the Black Sea with wool (*balles laine*) and making several journeys before reappearing in Kragerø in the spring of 1840. The ship's sojourn in its hometown was short-lived. On March 26, the *Commerce* headed for

²³³ Robbestad (1945, p. 31). French tariffs on timber, the primary staple shipped from Kragerø and most southern and eastern ports, were in the region of 50 to 60%.

²³⁴ RA/S-1094/D/Da/L0001, "Förteckning på de Norrska Fartyg hwilka ankommit til og afgått ifrån Havre de Grace År 1835".

²³⁵ RA/S-1094/D/Da/L0003.

²³⁶ SAKO A-1037 Kragerø Tollsted/G/Gb/Gbb/L0001 ("Utgående tollbok 1840").

²³⁷ RA/S-1094/D/Da/L0005, "Förteckning på de Norrska Fartyg hwilka ankommit til Algier eller derifrån gått under de 6 första Månader af År 1839".

“northern France” with an unspecified amount and value of ice, as well as 200 speciedaler worth of “one-foot Norwegian boards”.²³⁸

The *Commerce*'s Algiers journey is noteworthy for several reasons. Firstly, it testifies to an ability to keep a marketable portion of the ice solid, even when traveling through the Mediterranean Sea. This was likely achieved via insulation and caulking all hatches, possibly with wood that may have also been intended for sale: The “one-foot Norwegian

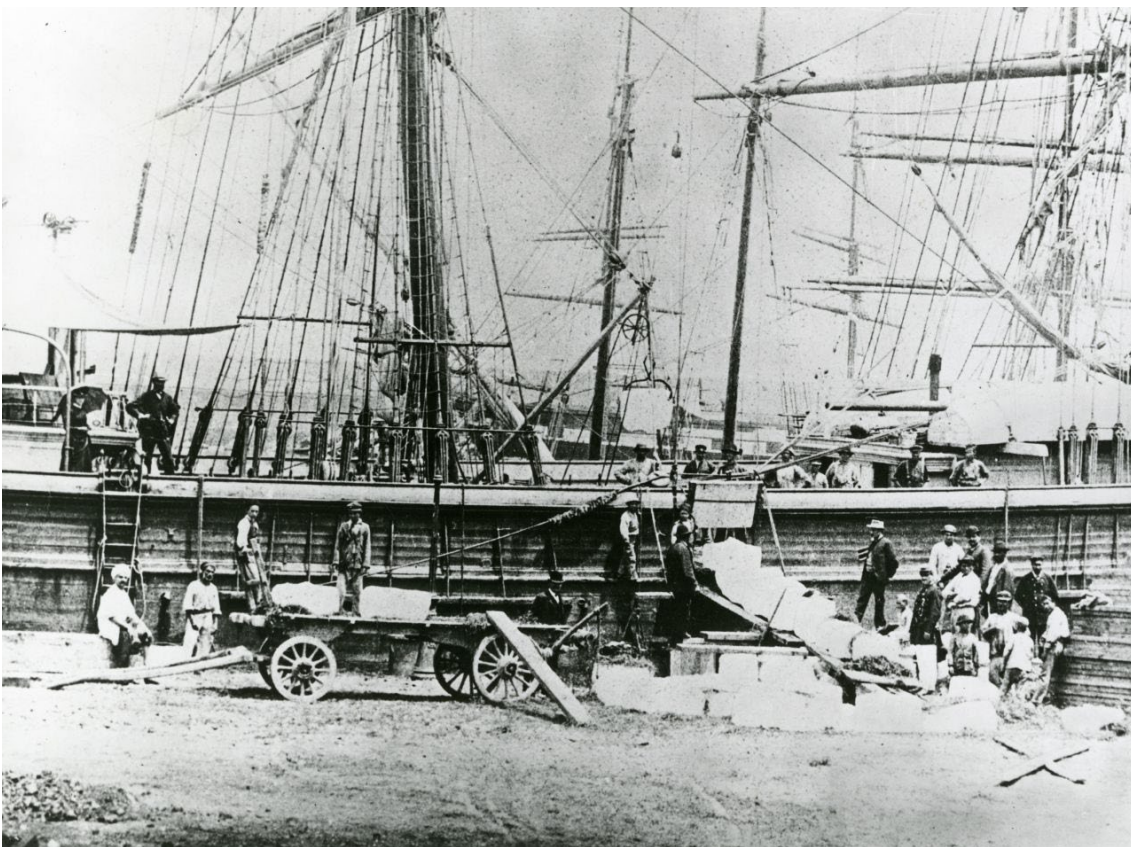


Figure 4.1. The journey of Henrich Biørn's *Commerce* in 1839 was decades later followed by other Kragerø vessels taking ice to Algeria. This is the *Tenax Propositi* (built 1868) unloading ice in Algiers, probably 1880s. Unknown photographer, NSM.3000-033.

²³⁸ SAKO A-1037 Kragerø Tollsted/G/Gb/Gbb/L0001, Utgående tollbok 1840.

boards" on the 1840 journey may hint at this. Second, it documents that Norwegian and Kragerø merchants appreciated that there was some demand for ice among French colonizers. However, these distant markets did not fully emerge until the 1880s. This has recently been brought to light in a master's thesis in history by Solfrid K. Surland. She concludes that Norwegian ice became an agent in the colonizing of Algeria, as it "was helping the colonists to cope with the hostile summer heat and [...] brought a taste of their homeland to the colony".²³⁹ There is a comparable function here to New England ice in colonial India in the previous decades, where Europeans and Britons struggled to mitigate the heat stress.

Henrich Biørn and the few Kragerø and Norwegian ice traders seem to have made their ice forays within the framework of consignment sales (*markensladninger*). That is, shipments were made without a contracted purchaser at the port of call; it was thus typically the captain's task to strike as good a deal as possible for his principal's products, upon arrival.²⁴⁰ This was primarily a system for marketing non-perishable products, especially timber, but was evidently extended to ice cargoes.

4.4 Seawater ice

Norway's ice product was initially harvested directly from seawater ice, most likely in close proximity to the ships laid up for winter. Both Kragerø and other Norwegian merchants collected seawater ice, at least until the 1850s. The natural world produces three kinds of ice from water—glacier ice, lake ice, and seawater ice: among these, the "most basic difference is that sea ice forms from salty ocean water, whereas icebergs,

²³⁹ Surland (2021 p. 89).

²⁴⁰ Consignments were particularly used by Kragerø shipowners and merchants in the expansion between the 1830s and 1860s, but also later in the century. Specific reference to ice in this regard is found in E. Pedersen (1933, p. 15), who terms it a purely speculative mode of business that ended "in time" (*ren spekulasjonsfart på lykke og fromme og tok også etterhånden slutt*). Note also that Pedersen provides a mechanism for the development of the Kragerø commercial fleet, in which ice played a role: "Denne økning av handelsflåten hadde ikke sin årsak i øket behov for skib i hjemmefarten. Det var langt fra at byens egen handel kunde beskjefte alle disse fartøier, og de søkte derfor ut i den utenrikske skibsfart «til dels på fjerne farvann" (p.16).

glaciers, and lake ice form from freshwater or snow”.²⁴¹ The varying qualities of the three kinds of ice had ramifications for market conditions. The seawater ice used by Biørn and others was not “made from freshwater”, nor was it frozen “as a smooth layer”; rather, it had likely developed “various forms and shapes because of the constant turbulence of the ocean water”.²⁴² The ice was an inferior-grade product, on account of both the larger melting surfaces created by that “constant turbulence” and the salt content of the water.

Little is related on the methods and tools used in this first stage of ice harvests from Kragerø or other southeastern ports. Since the ice was likely fetched close to the ships, there may have been overlaps with techniques of manual ice-breaking (*isvekking*).²⁴³ In the mid-19th century, the archipelago basin of the Kragerø region regularly froze, as did the Christianiafjord from Drøbak northwards. Organized manual icebreaking came with the expansion of shipping volume, a mode of freeing icebound ships that was largely superseded by steam-powered icebreakers decades later.²⁴⁴ A description of 1850s icebreaking portrays a strenuous and risky procedure.²⁴⁵ Men were sent out on the ice to saw or chop loose a piece of ice corresponding to the width and length of the largest of the vessels to be freed. Others then walked onto the loosened sheet to weigh it down, while the first team used hooks to push it underneath the ice cover to create leeway.²⁴⁶

²⁴¹ See <https://nsidc.org/cryosphere/seaice/index.html> (Retrieved November 27, 2020).

²⁴² at <https://nsidc.org/cryosphere/seaice/index.html> (Retrieved November 27, 2020).

²⁴³ Rogan (1998, pp. 291-310), who also suggests that the impulses went the other way, from ice harvests to icebreaking.

²⁴⁴ Rogan (1998, pp. 291-311). In the Oslo (Christiania) fjord, public funding of (manual) icebreaking started in 1848, as piecemeal work for pilots. Most ships were frozen in from November/December until March/April. It was only in 1878 that the icebreaker *Mjøllner* and others secured all-year shipping for Christiania, cf. O. Olsen, Bryhn, Reisegg, Johansen, and Tvedt (2010, p. 278).

²⁴⁵ Christensen (1920, pp. 23-24).

²⁴⁶ Christensen (1920, p. 24).

In terms of property rights, seawater ice was part of the commons. This early phase thus somewhat corresponds to initial New England ice harvesting, which was “attended with no other charge than the labor of cutting and transporting the article; for the pond belonged to no man, any more than the air which hung above it”.²⁴⁷ That is, merchants like Henrich Biørn only had to pay for a very limited number of work tasks to get seawater ice on board and prepared for overseas destinations. Its low cost and abundance must have contributed to the calculations, when contemplating cargoes bound for highly uncertain markets.

Although no one really owned the seawater ice being harvested, breaking the ice cover in coastal areas was inimical to age-old functions of winter infrastructure. Solid ice supplied shorter, straighter routes on horse or foot than most of the cumbersome road network. Various thicknesses served as a rule of thumb for carrying capacity: The equivalent of 5 centimeters carried a man, 10 a horse, and 15 a canon.²⁴⁸ The latter hints at the proclivity of Scandinavian war campaigns occurring in the frozen months (e.g., those of Swedish King Charles XII during the Nordic War). The peacetime usages of ice roads raise the question as to whether the novel practice of breaking ice, either for ship passage or ice harvesting, caused conflicts that influenced developments.

In the Kragerø district, the failing ice cover was noted as having effects. A stretch of mild weeks in the beginning of 1846 “paralyzed” communication and business on the island of Berøy, and it was hoped that the ice would soon become safe for driving on (*kjørbar*), not only walking.²⁴⁹ Such occurrences were ascribed to natural variation and fall outside the question posed above, but they illustrate the significance of ice roads. Some years later, in 1862, an anonymous open letter addressed to the “Messieurs Shipowners of

²⁴⁷ Cummings (1949 p. 17). This situation changed somewhat with the institutionalization of cutting and harvesting rights, but nonetheless factors in Cumming’s account as an incentive for harvesting, transporting, and storage innovations.

²⁴⁸ Rogan (1998, p. 238).

²⁴⁹ *Kragerø Adresse*, February 15, 1846.

Kragerø" (*Dhrr. Skibsrhedere af Kragerø og Omegn*) claims that frequent rounds of icebreaking around the ships in the Kalstadkilen fjord posed a threat to public safety and the "common people" (*almuen*).²⁵⁰ According to the letter's author, the problem was not the icebreaking itself, but the lack of signs marking that the ice was unsafe.²⁵¹



Figure 4.2. 1900 (circa) postcard depicting manual ice breaking (*isvekking*) on the Tønsbergfjord. Note the ice concurrently being used for transport. John Fredriksons kunstforlag, Christiania. NSM 3004-099.

²⁵⁰ *Kragerø Adresse*, March 5, 1862. The letter, printed on the front page, is interesting in a local context. The degree of opposition towards the local shipowners and merchants prompted a person with the same initials to announce in the following issue that he was not the writer of the piece, cf. *Kragerø Adresse*, March 8, 1862.

²⁵¹ The argument was that even though the icebreaking entailed a number of inconveniences and troubles, especially for the "common people", stopping it would amount to "obstructing someone from carrying out their industry" (*ikke er Meningen at hindre Nogen i sin Næringsvei*).

The author holds the shipowners—a very powerful tier of Kragerø society—responsible for this omission. The upkeep of ice roads, and potentially lifesaving information on unsafe ice, was never settled as a public responsibility in Norway.²⁵² However, this letter infers no substantial resistance to the icebreaking practices, at least not of a force that explains the somewhat limited scope of the seawater ice trade.

It is challenging to state with confidence how long the practice of shipping cargoes of seawater ice continued. Little attention is given to the matter in Norwegian literature, beyond summary descriptions of the fjord and freshet ice being of “poor quality”, and that it was quickly superseded by lake ice.²⁵³ The trade statistics provide no guidance, as they do not discriminate between different qualities of ice. At least through the 1850s, in times of strong foreign demand, seawater ice was brought from Norway to overseas markets. A source from the spring boom of 1851 alludes to a semantic differentiation. Seawater ice was termed “rough ice”, as opposed to the coveted “block ice” from freshwater.²⁵⁴ There is indication of price differences, as well. “Rough ice” apparently fetched 14 shillings per ton in a season where freshwater ice sold at £1 to 1.5 (i.e., 50 to 75% of the higher grade product).²⁵⁵ In 1859, when exports reached a new peak of more than 30,000 register tons, ice traders from the Drammensfjord did “good business” in England with a shipload of brackish seawater ice. A year later, “such ice would likely not be marketable”.²⁵⁶

The trade in seawater ice is a little understood subchapter of the Norwegian ice trade. While undoubtedly an inferior-grade product, it is documented that there were profitable markets for the commodity well into the 1850s. The confirmed sales of a load

²⁵² Rogan (1998, p. 238).

²⁵³ For example, M. Olsen (1981).

²⁵⁴ *Christiania-Posten*, February 2, 1851.

²⁵⁵ *Christiania-Posten*, February 2, 1851.

²⁵⁶ *Morgenbladet*, March 15, 1860. (“iaar vil sandynligvis saadan Is være usælgelig”).

of such ice in Algiers in 1839 indicates that the shipping business entrepreneurs had mastered techniques to reduce melting. As such, the knowledge aspect of the trade must be underscored.

4.5 Tariffs and statistics

This section rests on the fact that the Norwegian state started recording outbound ice as a separate commodity in 1835. The actual volumes recorded remained quite low over the next fifteen years, at least in comparison with the numbers from the 1870s and beyond. Nonetheless, the listing of ice along with several hundred goods exported from Norway suggests expectations. In a way, the commodity of ice had become part of Norwegian political economy. It is not really possible to ascribe this to a particular decision, made by a specific person. The following paragraphs attempt to put the statistical monitoring in context, by posing two questions: What kind of entity might ice have been in the early phases, and was its connection to economic development?

A few markers can be found in the contemporary political debates on customs tariffs, of which the sessions between 1836 and 1842 have been scrutinized.²⁵⁷ The expectation was that the recently added product of ice would be commented upon in some fashion, in debates where the relationship between trade, exports, and economic development frequently surfaced. The Norwegian economy was greatly primed on exports: More than 75% of the state expenditure was financed by duties.²⁵⁸ It was argued that substantial tariff adjustments might amount to “changing our entire system of taxation”.²⁵⁹ There was a balance to be struck between financing the modernizing aspirations of the state and “burdening” the exports of lumber, fishery products, and shipping. The 1839 commission on the customs tariffs declared adherence to the “principle” that “a

²⁵⁷ This section is based on customs commissions and tariff discussions in Stortinget (parliament) in the period between 1836 and 1842.

²⁵⁸ Between 1837 and 1892, there were only indirect taxes in Norway, Brautaset (2002, p. ii).

²⁵⁹ Stortingsforhandling 1842, 1. del, S. 30.7., p. 333.

country's natural export articles to the smallest degree be hampered by taxes".²⁶⁰ Despite that principle and the express desire to grant "all possible relief" to the maritime industry— "Norway's most natural employer and source of income" (*Søefarten, Norges naturligste Sysse og Erhvervskilde*)—liberalization through customs policies was a gradual process. Nonetheless, the 1840s tariff commissions and the 1845 Customs Act were a watershed in several respects.²⁶¹

Concessions on less-significant commodities were easier to pass than ones on high-volume trades, primarily lumber and fish.²⁶² The 1842 parliamentary sessions on duties notes approximately 30 exempted commodities, and that further reductions on "less important goods" would hardly have financial impact.²⁶³ Occasionally, exemptions were promoted as favorable to domestic production. When the 1836 Storting proposed tax-free exports of rags (for paper production), it was because the practice of collecting them, usually done by women, provided "some members of the working classes employment and profit".²⁶⁴ The 1845 Customs Commission expressed a deeper view on the relationships between tariffs and industrial development.²⁶⁵ This can be summarized as encouraging all enterprises adaptable to existing social and economic structures and the (scarce) raw materials available in the country. The sentiments expressed were a defense of handicraft industries and have been interpreted as a

²⁶⁰ Stortingsforhandling 1839, 1. de, S. 13.5., p. 272: "Comiiteen tilfulde erkjender Riktigheden af det Princip, at et Lands naturlige Udførselsartikler saa lidet som muligt bør betynges ved Afgift til Statscassen, saameget mere som Producenternes og Handelsstandens Interesser her utvivlsomt forene sig og falde aldeles sammen".

²⁶¹ Lund (1977, pp. 41-47), Keilhau (1931, pp. 136-138).

²⁶² Camilla Brautaset has demonstrated that "other goods" increased in value more than sixfold between 1835 and 1865 (cf. Brautaset (2002, p. 195): namely, other goods than staples like fish and lumber became increasingly important.

²⁶³ Stortingsforhandling 1842, 1. del, S. 30.7., p. 351.

²⁶⁴ Stortingsforhandling 1836, 1. Del, S. 10.5., p. 128: "[H]vorpaa disse Ting gjøres meest nyttige og hvorved tillige endeel Mennesker af Arbeidsclassen erholder Beskjæftigelse og Fortjeneste".

²⁶⁵ Lund (1977, p. 44).

caution against UK-style industrialization.²⁶⁶ This corresponds to historian Francis Sejersted's thesis about the technological conservatism in 1840s modernization, and the quest to avoid changes leading to social upheaval.²⁶⁷

Direct tariffs on the exportation of ice were unlikely. Nothing suggests that ice was incongruous to existing practices and structures, and it certainly represented a domestic natural resource. The question is whether it was considered a commodity at all. A liberalization in the 1842 tariff revisions resulted in the elimination of ballast fees. This was part of a scheme to simplify and reduce shipping fees, and eliminate as far as possible ambiguities about whether a particular shipment represented a "factual exchange of goods" (*en virkelig foretaget Varetransport til eller fra Landet*).²⁶⁸ The parliamentary committee suggested that, with regards to the shipping fees, any part of the ship occupied by ice or stone/granite boulder on the way out, and hay or straw on the way back, were not to be reckoned as "part of the loaded tonnage of the ship" ("Det Rum i Skibet, der ved Udførsel optages af Iis eller Graasten, og ved Indførsel af Hø eller Halm, regnes ikke for Skibsafgifternes Vedkommende til den lastede Deel af Dræktigheden").²⁶⁹ The proposition was passed, marking ice as a kind of ballast. Ice was not listed among about 20 commodities that were now totally exempt from export duties; it did not appear on the bill of exports goods at all.²⁷⁰

²⁶⁶ Lund (1977, p. 44).

²⁶⁷ F. Sejersted (1993, p. 74), cf. also chapter two, section 2.4.

²⁶⁸ Stortingsforhandlinger 1842, 1. del, S. 30.7., p. 432.

²⁶⁹ Stortingsforhandlinger 1842, 1. del, S. 30.7., p. 431.

²⁷⁰ Stortingsforhandlinger 1842, 1. del, S. 30.7., pp.499-500. Among the goods were amber, vinegar, mutton, gold, human and animal "hair", gold, honey, hops, leather, linen, mead, quills, hides, and tin. However, as there had been no registered exports of these commodities in 1835, 1838, or 1839, the reduction in revenue was zero.

The indication is that the government was not certain whether loading ice on outbound ships from Norway would result in a “factual exchange of goods”.²⁷¹ Perhaps the ice was regarded as primarily for ballasting, in addition to or as a substitute for rocks. In that case, some Norwegian shipments would be parallel to 1820s ice shipments from Boston, another “land of thin soil” where ballasting has been identified as a driver of the ice industry.²⁷² In any case, Norwegian shipowners and traders from 1842 onwards were not to be “hampered” (*betyngt*) by ship fees on ice, whether it was a cargo or a sort of ballast, or both in combination. The legislation on ice was clearly a policy to bolster the shipping sector, and foreign trade in general. In and of itself, this was not sufficient to launch an ice industry. However, it must have served as encouragement for the Norwegian shippers considering taking on board this volatile commodity.

4.6 The Boston ice trade

There have been several allusions to the US ice business thus far in the thesis. It is therefore necessary to provide a brief account of the main traits of the overseas ice exports from Boston, depicted in one comprehensive trade history as the “brainchild” of New England’s “Ice King”, Fredric Tudor.²⁷³ Tudor’s business flourished from the 1830s by obtaining broad exemptions from East India Company tariffs and procedures, as well as enticing community conscription for icehouses and cold storage. Tudor enjoyed a lengthy monopoly over profitable ice markets, such as those in Bombay and

²⁷¹ It is also one source of doubt about the reliability of the early figures for the ice exports. Conceivably, for the period before the legislation there could have been an impetus to understate volumes, but likely not to a significant degree.

²⁷² Cummings (1949 p. 17). Boston is contrasted with Philadelphia and New York, “ports with rich agricultural back countries”.

²⁷³ Bernstein (2008, p. 332).

Calcutta. He is reported to have become the first post-Revolutionary-dollar millionaire in the United States.²⁷⁴

The competition and scope of the US trade drove innovations such as the horse-drawn ice cutter, the steel blade ice saw, the ice plane, and icehouse construction. It has been alluded several times over in US literature that Norwegians were quick to copy the best practices advanced by the “Ice King” and others.²⁷⁵ This chapter has tried to nuance that perspective and point to alternative sources of innovation. However, with regards to developments after 1850, it is crucial to communicate an understanding of the New England ice trade. The next section of the chapter will present a few traces of knowledge in Norway about the methods of the US trade, roughly starting in the mid-1830s. This knowledge, which was demonstrably of a kind that there was something going on (“knowing that”), laid the groundwork for a later, partly decentralized, transfer of knowledge. In other words, some of the developments addressed here were being monitored in Norway.

By the 1820s, Boston ice merchants annually exported some 3,000 tons of lake ice.²⁷⁶ The markets for the ice were in the European colonies in the West Indies and cities of the Southern United States, such as Savannah and New Orleans. About two thirds of the volume were shipped by Fredric Tudor. His first load of ice to the caribbean island of Martinique resulted in a loss of between 3,000 and 4,000 dollars, but “[o]ver time, Tudor improved his methods of cutting, storing and transporting all the ice he sold”.²⁷⁷ The ice trade only slowly evolved before the 1830s, but picked up markedly when a more global trade was initiated; at its apex in 1856, 146,000 tons were exported. From then on, levels

²⁷⁴ Dickason (1991). For a lively, although quite hagiographic, depiction of Tudor's life and times, cf. Weightman (2003).

²⁷⁵ Anderson (1953); Cummings (1949); Mitchell (1895); Rees (2018).

²⁷⁶ Cummings (1949 p. 17).

²⁷⁷ Rees (2018, p. loc 247).

decreased, as much more of the US-produced ice instead came to serve domestic markets, which multiplied as new territories were included in the Union.

The dispersed and decentralized nature of the development of the US ice and refrigeration industries are usually highlighted when viewed in the broader time perspective.²⁷⁸ However, the rapid growth of both product produce and productivity from the 1830s onwards is accounted for either as chiefly the result of Tudor's personal exertions, or as the outcome of a tumultuous relationship over more than 20 years between Tudor and his sometimes employee, sometimes rival ice merchant, Nathaniel Jarvis Wyeth (1802–1856).²⁷⁹

Wyeth's ice innovations are associated with a specific location: Fresh Pond, in Cambridge, outside Boston, where his family operated a hotel. In 1825, perhaps inspired "by the marks left by sleigh runners on the surface of the Pond",²⁸⁰ he worked out a design for a horse-drawn ice cutter, which had iron runners 20 inches apart. The device cut two parallel grooves, and repetition deepened them. When the horse and contraption were driven at a right angle to these grooves, the surface was checkerboarded. Significantly, it was done so in 25 x 25-inch squares that split off comparatively easily, and the freed block was then floated to the end of a channel. There, it was raised from the water and placed in the icehouse by a special hoisting arrangement.²⁸¹ The innovation of cutting ice blocks into squares boosted the ice trade in two main ways. Firstly, the even shape of the blocks resulted in slower melting, as fewer creases meant a reduction in melting surface. Secondly, the uniform ice was more

²⁷⁸ Rees (2018, pp. loc 204-210).

²⁷⁹ Of the first kind; cf. Weightman (2003) and Rees (2018), the Wyeth–Tudor relationship in Cummings (1949 pp. 17-53).

²⁸⁰ Cummings (1949 p. 19).

²⁸¹ Cummings (1949 pp. 20-21).

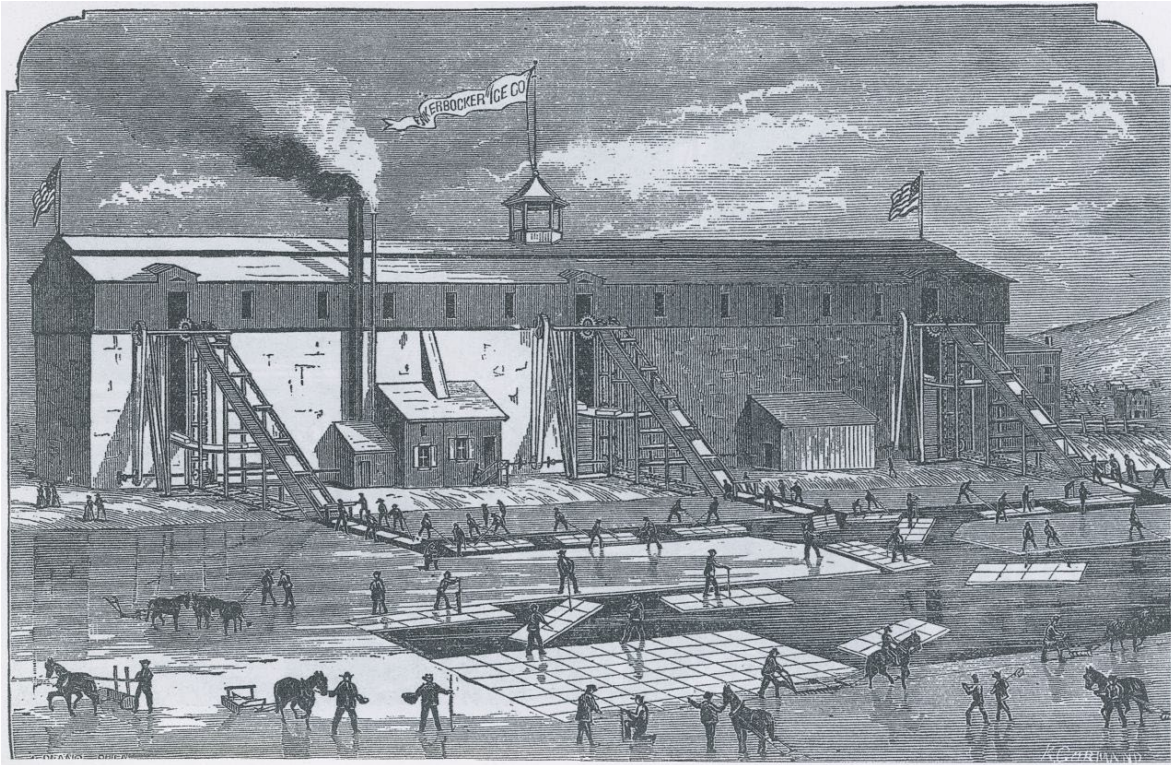


Figure 4.3. US ice harvesting and storing, 1880s. The Knickerbocker Ice Company operated in Maine, Delaware, New Jersey, and Pennsylvania. The US ice industry served greatly expanding domestic markets in the second half of the 19th century. The ice plane in the lower left of the image, used to prepare the ice, is only one of the inventions depicted that were originally devised by Nathaniel Wyeth. Note the square patterns of ice being floated, in this case towards steam-powered elevators into the icehouse. Figure originally published in *Journal of the Franklin Institute*, here from Anderson (1953, p. 34).

amenable to stacking, which made for cargo that shifted less in the ships, and thus reduced shippers' objections to taking ice on board.²⁸²

While the ice cutter contributed to the standardization of ice as a product, it was just one of several components from Tudor and/or Wyeth in the following years and decades. Other innovations included ice scrapers, an ice plane for chiseling off surface snow and contamination, using sawdust for insulation during storage and transport, and

²⁸² Anderson (1953, p. 13) indicates that the melting percentage for a season was reduced from 65% to 8% when storage in block form became the norm.

chutes and elevation systems for distributing ice into and out of the icehouses. Wyeth also continued improving ice-harvesting machinery and worked out a legal system for establishing cutting rights on Fresh Pond in 1842. The system was based on surveying and marking out sections proportionate to the land holdings along the lake shore. It essentially served to end the “free-for-all” stage of US ice harvests and made harvestable lake surfaces into an entity that could be “used, leased or sold”.²⁸³

Significantly, the implements and technologies of the ice harvests were not protected by patent rights. Wyeth had an 1829 patent on the initial ice cutter and related implements, but he was unable to uphold it in a court case in 1840. Tudor also filed for patents on different parts of the ice-harvesting process and storage techniques. The lack of patent enforcement meant that the practices spread to other locations in New England, and eventually other states and abroad. This was less of a problem for Tudor than for Wyeth, as the Tudor ice venture stressed control over storage and distribution in the overseas markets. The immense breakthrough in this regard was his securing rights to the ice distribution in Calcutta in 1833: That city formed the apex of a string of businesses that spread from Havana to Australia.

4.7 “The proper handling of ice”

By the mid-1840s, New England ice merchants sent shipments of ice to European harbors. These were primarily other merchants than Tudor, who seems to have mainly adhered to the profitable long-distance trade to tropical regions. The best-known company in the European trade is the Wenham Lake Ice Company, which established offices on the Strand, in London, and became a trade name for any “quality ice in England”.²⁸⁴ News of this reached Norway—specifically, that there was a superior

²⁸³ Cummings (1949 p. 43).

²⁸⁴ Dickason (1991).

quality of ice available. More than merely stating the fact, reporters and one powerful politician directed attention at the methods being used, expressing in different ways the desire to gain access to them. In the context of the Norwegian natural ice industry, the following will demonstrate a pivotal and new phase of knowledge of the *techne* kind. The underlying premises concerning the abundance of natural resources for the industry were analogous to the ones highlighted by Hertzberg 20 years prior, although with new elements added to the mix.

In October 1846, a French notice about a “large consignment” of Bostonian ice coming to Le Havre was picked up by the Norwegian newspaper *Morgenbladet*.²⁸⁵ Noting that “these kinds of expeditions” were usually destined for “countries in the hot zone”, primarily “British India”, the Americans were now sending ice to Britain and France. “East Indian cotton” was picked up for the return leg at Liverpool. The notice then provides data on the New England ice trade, and how the ice was shipped in regular block sizes, insulated by “gigantic amounts of sawdust”. Following the translation, the Norwegian editor expresses his wish to bring the notice to the attention of the “messieurs merchants and shipowners”. The candid incitement is complemented with a list of competitive advantages. Sawdust from the scores of water-powered framesaw mills was abundantly available and usually just a nuisance in Norwegian watercourses.²⁸⁶ With the much shorter distances to the European markets and the ice “just as easy to get as in North America”, prospects were so favorable for the Norwegians that “all competition from America would be unthinkable”. Noting that “some shipments” had been made from Norway, and that the printed report was far too brief to be a practical guide as to how the Americans conducted their business, the piece ends by stating that “in any case, it would be desirable to gain knowledge about the

²⁸⁵ *Morgenbladet*, October 24, 1846.

²⁸⁶ Sawdust pollution caused a depletion of trout stock in the Akerselva River in Christiania by the 1840s, as inferred from Peder Chr. Asbjørnsen's "Kversagn" ("Mill Tale"), cf. Bagle (2012).

manner in which the Americans treat their ice when shipping it".²⁸⁷ Reporting on the American ice business can be found in *Morgenbladet* later in the decade.²⁸⁸

The ice trade can be shown to have captured the attention of the political elite in Norway in the same period. Minister of the Interior Fredrik Stang (1808–1884) is widely regarded as one of the dominant forces in the mid-19th-century modernization of Norway, along with his Kragerø-born friend and parliamentary chieftain, Anton Martin Schweigaard (1808–1870).²⁸⁹ In 1847, in a section dealing with subsidiary activity ranging from beekeeping to hunting, Stang's quinquennial report states that ice was a commodity "that undoubtedly" could have returned more than was the case in 1844 and 1845. What was lacking was "knowledge of the proper handling of the ice".²⁹⁰ While Stang connects his observations specifically to two seasons, it can be assumed that the trade had had the attention of his circle, including Schweigaard, for years by that point.²⁹¹

4.8 Conclusion

By the late 1840s, shipments of ice had been leaving Norway in some fashion for more than 20 years. The product was cut from glacier and seawater ice, and the mode was generally direct shipments. Ice was taken straight from the source to the outbound ship, and there was no temporary storage in icehouses implied. The shipments made by

²⁸⁷ *Morgenbladet*, October 24, 1846: "I alle tilfælde maatee det være ønskeligt at erhholde nøiere Underretning om Maaden, hvorpaa Amerikanerne behandle Isen ved Afskibningen".

²⁸⁸ *Morgenbladet*, April 2, 1849.

²⁸⁹ Slagstad (2001, p. 11): "Ved inngangen til det moderne Norge står to skikkelser: Fredrik Stang og Anton Martin Schweigaard". See also Mestad (2009, p. 12).

²⁹⁰ *Amtmennes femårsberetninger*, 1841-45, p. XXIV. Available at: https://www.ssb.no/a/histstat/nos/st_25b_1840-45.pdf (Retrieved November 24, 2021). The full quote: "Udskibning af is er en Næringskilde som udentvivel kunde drives i langt større Udstrækning; men mangel paa Kundskab om den rette Behandlingsmaade af Isen har hidtil været Grunden til den ubetydelige Udskibning, der udgjorde i 1844 25 Com. Læster og i 1845 10 Com. Læster".

²⁹¹ Schweigaard was co-editor of the daily *Den Constitutionelle* between 1836 and 1840. One article has been found on the subject: "Transporten af is", *Den Constitutionelle*, September 27, 1836.

Norwegian merchants such as Henrich Biørn Jr. of Kragerø were highly speculative, sent off as consignment cargoes to be sold by the ship captain upon arrival. Government encouragement for the trade was passed in the 1842 customs tariffs, reducing the ship fees for ships outbound with ice.

Norway had enough ice and sawdust, and transport times to markets were shorter than for the New England merchants. Central to the modernizing aspect is the quest for more knowledge, specifically knowledge about the methods and implements used by the US ice exporters. Minister Stang's opinion of the fledgling Norwegian ice industry in 1845, bracketed alongside many other lines of business as a binary occupation, is an expression of this. It is clear that the lacking knowledges concern the *techne* kind, the knowing "how to do things"—notably, the word *techne* is also the root of *technology*.²⁹² The ability of Norwegian merchants to locate and serve the markets was largely taken for granted. Actual shipments of ice having gone from Kragerø to Algeria, and demonstrably returning a profit, reflect a command of shipping ice over long voyages. Broadly, it seems that the capacity of the shipping community to engage in the trade, having a new and volatile cargo on board, was not a cause for concern. What *was* a concern, however, was to produce a better crop of ice. It was down to entrepreneurial initiatives to make this happen, and that process is the theme of the next chapter.

²⁹² For an etymology of technology, cf. Hughes (2004, pp. 1-5).

5 A new ice culture, 1850–1870

5.1 Introduction

In the early 1850s, the Norwegian ice business entered a new phase. The transformation entailed harvesting ice from freshwater sources, and a shift towards a “regular” ice business. Crucially, this entailed an extension of the shipment seasons, from only winter and spring cargoes to greater shares of *summer shipments*. The anatomy of these changes is outlined in Tore Ourén’s research: in particular, his documentation of the gradual increase in the proportion of summer shipments, which depended on the erection of icehouses to store the ice between harvesting and shipping.²⁹³ The qualitative and quantitative shifts in the industry are also featured in the local histories of the districts involved in the ice trade.²⁹⁴

Very broadly, the above developments amounted to a particular ice culture. A cultural perspective on ice was partially applied in the previous chapter, with the discussion of the infrastructure uses of fjord ice in the 19th century. With the developments of the 1850s, the ice culture assumed new dimensions. Historian Per Norseng has referred to this as a shift from a “harvesting” to a “cultivating” kind of ice business.²⁹⁵ This terminology links with the etymological roots of “agriculture”: the processing of nature for human, or cultural, ends.²⁹⁶ This research has unearthed a few contemporary employments of “culture” with respect to ice that align with this aspect of the term.²⁹⁷

²⁹³ Cf. chapter two.

²⁹⁴ M. Olsen (1981): “Det var fra omkring 1850 at iseksporten tok til for alvor”.

²⁹⁵ Norseng (2014).

²⁹⁶ Which is problematic in a modern cultural theory perspective, since it partly rests on an obsolete divide between nature and culture, cf. Scott Sørensen, Høystad, Bjurström, Vike, and Nordgård (2008, p. 24).

²⁹⁷ On the use of “ice culture” in a Norwegian context (*iskultur*), see for example Christiania ice merchant Martin E. Nord (1817–1889), in *Underhandlinger [...] mellem Christiania Magistrat og M.E.Nord angaaende Byens Kloakanlæg fra Nordre Gravlund til Akersbækken, Sommeren 1883* (Private print): “tidsmæssigt Iskultur, nemlig, om Sommeren Vandets Udtømming, Bundens Rensning og Udlufting, og

An interesting one is a statement from an Edinburgh magazine in 1864, concurrent with developments discussed in this chapter:

Although Norway ice can be sold in England cheaper than American, it is not so good in quality, and is not the object of so remarkable a trade. It is to America that we refer when we speak of the *culture* of ice—namely, the careful management of bodies of water for this purpose only, with the view of producing an ice-crop which will pay all expenses and leave a profit.²⁹⁸

This quote suggests that Norwegian ice only gained a foothold as a cheaper, inferior product. It is not easy to determine its representativeness. Complaints about quality can be documented in the Dahll material of the 1850s, but it is uncertain whether this was primarily to pit the Norwegian supplier against the Americans. The Norwegians perhaps had some way to go in their “management of bodies of water”, but their ice was unquestionably brought to market for a “profit”. Despite these details, the concept of culture being employed is illuminative. It points to a geography of knowledge, the cultural translation of a processing method from one place to another.

This chapter examines the cultural translation taking place, by concentrating on the individual identified as crucial to the establishment of the “regular” ice industry in Kragerø, Johan Martin Dahll (1832–1877).²⁹⁹ The chapter will outline the most important events in this evolution and discuss how ice figured in Dahll’s strategic view. It is evident that cooperation and networking were essential to his success as an ice merchant. The access to the knowledge and influence provided through his family background will be addressed.

om Vinteren Snearbeide og andre, til Erholdelse af god Vare, nødvendige Foranstaltninger”. Manuscript in conjunction with a water rights dispute in 1883, in OCN, Ole Christian Nord’s private archive, Stockholm.

²⁹⁸ *Chamber’s Journal* (Edinburgh), February 13, 1864, p. 100. Original emphasis.

²⁹⁹ Rees (2013, p. 27): “The size of the Norwegian ice trade increased remarkably after a few representatives of the Norwegian industry visited America during the 1840s to learn about American innovations (such as ice tools and plows)”. I have no information in my material indicating that Johan Martin Dahll was among these anonymous travelers. The source for Rees’ assertion is Mitchell (1895), which supplies no reference to the circumstances of the purported Norwegian visit.

5.2 The “mild winter” of 1851

In March 1851, the *Kragerø Adresse* and other newspapers reported a “strong speculation” in ice in Kragerø and the surrounding districts. The push came from a mild winter in countries of “southern latitudes” (i.e., Britain, including Ireland, and France). The destinations were depicted as places consuming “a great amount of ice”,³⁰⁰ and the markets mentioned were ice cellars, kitchens, and cafés, as well as butchers, wild game shops, and fishmongers.³⁰¹

The fervor of the ice markets can be largely explained by the warmer winters in the receiving countries, which made local ice harvests fail. Temperature data suggest that January of 1851 was warm in central England, with a mean temperature of 5.6 degrees centigrade as opposed to 0.7 the year before.³⁰² The underscoring of local temperatures failing to yield ice indicates that Norwegian ice substituted local production, a continuation of occurrences in the past.

However, the ice from Kragerø and other places was evidently measured against the New England product on the European markets. The *Christiania-Posten* newspaper states that, provided that Norwegian traders “proceed sensibly” in their choice of ice quality, their product would not be perceived as inferior to US ice.³⁰³ In 1851, a mixture of qualities were sent off, as demonstrated in the table below. It lists two vessels at Porsgrunn loading “rough ice” (seawater ice) in the spring of 1851. A discourse on varying ice qualities had emerged. Freshwater ice was “block ice” (*Blok-lis*) or “lake ice”,

³⁰⁰ “En Mængde lis”, cf. *Christiania-Posten*, March 20, 1851. The actual issue of the *Kragerø Adresse* referred to has not been located.

³⁰¹ *Christiania-Posten*, March 24, 1851.

³⁰² Beamon and Roaf (1990, pp. 142-147): “Monthly mean temperatures of central England 1698–1957”.

³⁰³ *Christiania-Posten*, February 2, 1851. (“en fornuftig Fremgangsmaade saavel i Valget af lis som i Behandlingen deraf vil sikre saadanne Entrepriser et godt Udbydde og vil i Udlandet ei give den amerikanske lis noget efter”).

and seawater ice was termed "rough ice".³⁰⁴ The latter was less expensive, but in winters of high demand, it could sell at two thirds the price of freshwater ice—at 14 shillings per ton.

Table 5.1. Ice shipments reported, March 1851

| Ship | Owner | Place of loading | Destination | Price | Miscellaneous |
|---------------------|--------|-----------------------------|-------------|-------------------------|---------------------|
| <i>Vidar</i> (brig) | Wiborg | Stokkevannet, Bamble | Le Havre | 31 francs/ton | |
| <i>Freia</i> (brig) | Høegh | Stokkevannet, Bamble | Le Havre | 30.5 francs/ton | |
| "A schooner" | | Kragerø | France | 35 francs/ton | |
| "One vessel" | | Skien | | | |
| "Two vessels" | | Porsgrunn | (Britain) | 14 shillings/ton | "rough ice" |
| <i>Njord</i> | Blehr | Frierfjorden | Londonderry | £1/ton | |
| "Ca. 20 vessels" | | "Diverse places in Kragerø" | | | |
| "One ship" | | Kragerø | London | 25 shillings/ton (> £1) | |
| "Three ships" | | Larvik | NA | | |
| "Ships loading at" | | Kalstadtjern, Kragerø | NA | 25 Norw. shillings/CL | Price paid to Dahll |

Source: *Christiania-Posten*, March 20 and 24, 1851.

The press reports were reprinted in the Christiania press as well as in other local newspapers. They allow some inference about the makeup of the ice business. Clearly, some shipments of ice had been contracted in advance, apparently at a lower price than that attainable by February and March.³⁰⁵ This indicates the use of ice contracts. As the contracts consulted in this research all originated later than 1870, analysis of how they may have changed from the outset is not feasible.³⁰⁶ However, it can be assumed that the contracts stipulated amount and price, and that they contained certain clauses for damages and force majeure conditions. It did not take many seasons before the use of advance sales of ice (i.e., future contracts) was so routine as to merit no comment. This can be inferred from the reporting on a court case involving Kragerø merchant Thomas

³⁰⁴ *Christiania-Posten*, March 24, 1851. The *Blok-Is* is also referred to as *Läk-Is*, the orthography (ä = e) indicating English pronunciation. The article spells "sea ice" as "roof ice", clearly a misspelling.

³⁰⁵ *Christiania-Posten*, March 20, 1851.

³⁰⁶ The contracts I have consulted are from the Baasrud archive (cf. chapter six).

Thomesen (1816–1887), which among other things concerned a “breach of contract for delivery of ice” apparently having occurred in 1855.³⁰⁷

There were also shipments of ice leaving with either very short-term contracts, or simply on speculation that a buyer would be located upon arrival. The newspaper reports indicate how news traveled in this pre-telegraph period of the ice trade: It did so with men and ships. By the time the “one ship” from Kragerø sailed to London in early February, fetching more than £1 per ton for its ice, prices were on the rise and market news traveled back to Norway, finding its way to the printed press about a month later. Apparently, the “intelligence” (*Efterretning*) on the good prices came from the vessel itself upon return to Kragerø, illustrating that there was neither motive nor possibility to conceal tidings of the journey’s profits. Getting more than £1 per ton was considered “good business” (*en god Affære*). And there were knock-on effects: Without specific numbers offered, the “strong speculation” entailed good rates for the shipowners (in those instances, they were not identical to merchants selling ice). This explains why around 20 Kragerø vessels were loading ice, as reports were published in early March.³⁰⁸ These included the “largest ships of the town” (*stedets største Skibe*). (The town’s commercial fleet totaled around 80 ships.³⁰⁹) Ice was coming to the fore as a staple of the local shipping sector, a characteristic that would be embedded over the next 60 to 70 years.³¹⁰ For the season of 1851, there is mention of “a few” fishing smacks—evidently from Britain coming to Kragerø for ice, having tried in vain “further west”

³⁰⁷ *Morgenbladet*, October 9, 1858.

³⁰⁸ The three ships named can be corroborated and provided with size. The *Vidar* was a brig of 83.5 CL, belonging to S.K. Høegh in Trosvik/Brevik, cf. <https://kulturnav.org/9b6a80d2-1102-475f-a53b-e8dc713b0a97> (Retrieved November 11, 2020). The *Freya* was a brig at 93 CL, belonging to S. Wiborg Jr. and Captain H.N. Wiborg in Kragerø, cf. E. Pedersen (1933, p. 92). And the *Njord* belonged to Alb. Blehr, Stathelle, Brevik, sized 148 CL, cf. <https://kulturnav.org/070c14aa-dbdb-4701-9777-4749b3290bda> ((Retrieved November 11, 2020).

³⁰⁹ Cf. "Kragerøs handelsflåte 1850/1855 efter Ingemanns Fortegnelse", E. Pedersen (1933, pp. 91-93).

³¹⁰ E. Pedersen (1933, p. 56).

(*vester*).³¹¹ Freshwater ice that was “clear and transparent and free of any faults” received the best prices.³¹² As indicated by the number of ships, Kragerø formed a geographical hub of the trade. Here, entrepreneurs had “rented” ponds and had been keeping the ice free of snow during the winter. Thus, a measure of ice cultivation took place at more than one location that season. However, the only Kragerø ice lake actually identified is the “comfortably located” Kalstadtjern, belonging to the Dahll family’s Frydensborg estate. At this time, the Dahlls were selling ice to merchants and skippers, for prices reported at 25 (Norwegian) shillings per CL. Given the reported destination prices, this must have provided ample profits for the shipowners/merchants who were taking the cargo overseas.³¹³

There are reports on resource conflicts in the trade. Some lakes had several riparian zones. Additional parties could be entitled to damming, fishing, or other uses of a watercourse. At the Stokkavannet lake in Bamble, cantor (*kirkesanger*) Gunuldsen owned property while a man identified as Even Tangvald had rights to dam the lake’s water. Mr. Tangvald had organized the harvest and sale of ice without payment or rent to the “aggrieved” (*forurettet*) cantor. This is the first reported dispute over water rights in conjunction with the ice industry in the region, and likely in all of Norway. It was communicated in the newspapers as “quite a remarkable conflict”.³¹⁴

The geographic concentration at this early stage is on Kragerø, as well as Brevik, Skien, Porsgrunn, and Larvik. In comparison, the trade from Christianiafjord was quite modest, with a few ice loads recorded from Drøbak in 1850 and 1851. One of them was the

³¹¹ All quotes from *Christiania-Posten*, March 20, 1851

³¹² *Christiania-Posten*, March 20, 1851: “det skal nemlig være Ferskvandsiis, klar og gjennemsigtig, uden Feil”.

³¹³ *Christiania-Posten*, March 20, 1851. (“saa er saadanne Vand med bekvem Adgang nær Afskibningsstedet beven en betydelig Indtægtskilde for Eierne, hvilket bevises derved, at de Afladere, der tage sin Iis i Kalstadtjærene, herfor efter almindelige Udsagn betale 25 Sk. Pr. Komercelæst”).

³¹⁴ *Christiania-Posten*, March 20, 1851: “En i sit Slags ganske mærkelig Tvist”.

schooner *Neptunus*, captained by C.L. Michelsen, who had departed Drøbak with ice for Antwerp in late March or early April 1851. Shipping capacity back to Christiania and “surrounding destinations” was offered in an advertisement addressed to merchants (*Dhrr. Handlende*).³¹⁵ The journey of the *Neptunus* illustrates that outbound ice loads could be combined with tramp shipping, from distant waters in the Mediterranean to harbors closer to home.

The newspaper articles on the ice exports of the spring of 1851 concur with the trends in the trade statistics, in that they portray a steep rise in activity and overseas sales from 1850 to 1851. The developments are reflected in an ability to bring about a higher-grade product, making the ice trade profitable to property owners, shipowners, and merchants. The events of the 1851 season constituted a new threshold. Yet, the odd sentence signals an awareness of the unstable nature of the ice trade. A *Christiania-Posten* article about the Kragerø ice exports expresses the wish that the plentiful activity and profits may be upheld “in the years to follow”.³¹⁶ The underlying premise is that ice work was a boon to the rural peasantry in the districts it impacted, bestowed by the owners and entrepreneurs taking the brunt of the risk involved. It provided opportunities for salaried employment during the winter months, when there was typically less work to be had.

These were matters of some concern. The Kragerø community had been hard hit by the 1848 pan-European recession, with rising prices and unemployment rampant in an economy intimately linked to overseas business cycles.³¹⁷ Grievances were voiced and, for the first time, organized in the local chapter of the proto-labor Thranite movement, named after writer and social agitator Marcus Thrane (1817–1890). Thrane was himself present in Kragerø at the founding of the local association in 1849. While the movement

³¹⁵ *Christiania-Posten*, April 10, 1851. The advertisement was dated April 4.

³¹⁶ *Christiania-Posten*, March 20, 1851.

³¹⁷ A. Pedersen et al. (2016, p. 334).

caused a stir and signaled that municipal governance might not be a privilege of the merchant and civil servant classes in all eternity, the Thranite movement had a short-lived direct presence in the Kragerø district.³¹⁸ There are no explicit linkages being made between the movement and the contemporaneous startup of the regular ice trade. Broadly, however, the employment opportunities offered by the new industry continued to be emphasized in the press in the 1850s and 1860s.³¹⁹

If the ice trade was to be insurance against social unrest by creating work opportunities, the seasons following 1851 must have been sobering. The 1852 season totaled only 30% of the previous year's volume for Kragerø ice exports. The development through the 1850s is visualized in table 5.2. below, a tabulation of the first 25 years of ice trade recording. Including some of the first observations from 1835 and after, the graph confirms that the winter of 1850/51, reported as 1851, represented growth by several orders of magnitude.³²⁰ In order to say something about the regional variations taking place within the national aggregate, the custom districts of Kragerø and Drøbak are specified. The initial surge of 1851 was not reached again until 1859, which was another record-breaking season.

Three aspects of the table warrant some comments. The first is the timing of the breakthrough year of 1851. The second are the substantial annual fluctuations, a feature of the ice trade statistics that remained even as volumes increased in the later decades.³²¹ The third aspect are the regional variations: Do they indicate a discernable pattern of events?

³¹⁸ For an eyewitness account, cf. Hougen (1936, pp. 215-225); the author was treasurer for the association. On the Thranite movement, cf. Ringvej (2019); on the movement in Kragerø, see A. Pedersen et al. (2016, pp. 334-345).

³¹⁹ For example, *Morgenbladet*, September 14, 1866.

³²⁰ The national aggregate showed a more than 12-fold increase from 1850 to 1851. Kragerø growth was more than 21-fold in the same interval.

³²¹ Cf. Table 9.5.1., appendix.

Table 9.5.3. Ice Exports Norway, Kragerø, Drøbak, 1835-1859

| | Total, RT | Kragerø, RT | Drøbak, RT |
|-------------|-----------|-------------|------------|
| 1835 | 1,310 | 221 | 0 |
| 1844 | 53 | 0 | 0 |
| 1847 | 332 | 0 | 0 |
| 1848 | 1,888 | NA | NA |
| 1849 | 2,627 | NA | NA |
| 1850 | 1,535 | 286 | 246 |
| 1851 | 18,843 | 6,216 | 1,025 |
| 1852 | 7,239 | 1,867 | 271 |
| 1853 | 10,605 | 2,449 | 0 |
| 1854 | 2,755 | 1,611 | 670 |
| 1855 | 2,498 | 775 | 260 |
| 1856 | 4,702 | 909 | 1,432 |
| 1857 | 6,699 | 2,510 | 1,806 |
| 1858 | 9,234 | 2,535 | 3,179 |
| 1859 | 35,280 | 7,377 | 11,080 |

Source: NOS; *Statistiske Tabeller for Kongeriget Norge (Handel og Skibsfart), 1835-1859*

Here, a note should be made concerning the link between shipping growth and transformation and the increasing ice trade. The 1850s were a turning point for the Norwegian merchant navy. In statistician Anders Kiær's words, the period from 1850 to 1879 "was the most brilliant in the history of Norwegian shipping", because the

relaxation and subsequent repeal of the English Navigation laws induced the Norwegians to construct and purchase vessels of both better quality than those hitherto employed, which for the most part had been only intended for the timber trade between northern and western Europe.³²²

In addition, Norwegians enjoyed navigational advantages from the royal union with Sweden.³²³ While all major European ports were of significance, shipping to Great Britain and Ireland in particular picked up. While lumber and cereals dominated, other

³²² Anders N. Kiær (1893).

³²³ The Norwegian shipping community generally had ports that opened "even in March", while Swedish vessels in the Baltic were frequently frozen in until May. These conditions changed with the advent of icebreakers and steam shipping, cf. Anders N. Kiær (1893).

bulk goods were being introduced, such as cotton and wool, sugar and coffee, petroleum and coal, and ice. The sharp increase in ice exports thus corresponded to the growth of shipping activities, although that by itself does not fully explain why and how 1851 came to stand out so markedly.

In the 1850s, there was an association between shipping growth and the increased volume of ice exports. However, fluctuating levels from 1851 suggest that the ice exports rapidly developed dynamics that went beyond just being an addendum to shipping. This does not discount the fact that overseas ice exports were symbiotic with the shipping industry, but the demand of the ice markets—and the Norwegian suppliers' ability to meet that demand—became at least equally significant. The continuous trend of one or two peak years with subsequent troughs marked Norwegian ice export figures, even as the order of magnitude multiplied in the following decades. Still, any year in the 1850s, even the lows of 1853 and 1855, far exceeded what had come before.

Finally, it is only from the 1850s that the regional developments of the trade are sufficiently reflected. In the graph above, Kragerø and Drøbak are proxies for the Telemark coast and Christianiafjord region export areas, respectively. The relative significance of the districts varied in the 1850s and continued to do so. Kragerø more or less follows the national aggregate—with the interesting exception of 1854, when the district's production apparently accounts for more than half of the total exports from Norway. Røyken and the inner Oslofjord only pick up momentum in the latter half of the 1850s, and only in the standout year 1859 do the Drøbak figures surpass Kragerø's.

In sum, it is clear that the veritable increase in ice shipment activity during the spring of 1851 was dependent on market dynamics and failing ice harvests in London, Le Havre, and Londonderry.³²⁴ At the same time, the shift in quantity was linked to qualitative changes, above all the turn to a freshwater supply for natural ice. Reports from the subsequent season, the winter of 1851/52, give insight into the nature of information

³²⁴ Which are the destinations documented in the newspaper reports.

exchange in the pre-telegraphic ice trade.³²⁵ Apparently, one shipment of ice was sent from Kragerø as early as December 24th. Reports came back home of it having made “very bad business” (*meget slette Affæirer*). Consequently, “several” ships loaded with ice were held back until early March to await better prices. By now, transporting ice overseas was definitely part of a “factual exchange of goods”. Little remained of the ambiguity of the 1830s and 1840s (cf. chapter four, section 4.5.).

Most ships were destined for Britain, where average temperatures for central England did not deviate much from the preceding year. However, the markets in Le Havre were lost.³²⁶ The trade consul reported that due to “unusual frost”, ice collection had taken place “all over in great quantity”, and foreign trade in ice was out of the question. Beyond the obvious, general influence of temperature variations, events give indications about information speed. The report by the trade consul was dated January 9 and was published January 23 (in the source available to me).³²⁷ Even with allowance for news traveling faster than that, between the actual actors of the trade, it could be days and weeks before information on the overseas temperature and market situation might arrive. In the earliest stages of the ice business, it was a challenge that information on overseas temperatures and markets traveled with the speed of ships and men. It is not possible, on the basis of the material investigated in my work, to state unequivocally how much of an impediment this was to actual and potential ice traders. However, it is likely that it contributed to an institutionalization of the ice trade through contracts of future deliveries. As will be evident, this institutionalization rested on a complex set of factors, to which the actual evolution of processing technology was central.

³²⁵ *Moss Tilskuer*, March 20, 1852, relates a report from Brevik and the *Kragerø Adresse* dated March 10.

³²⁶ *Drammens Tidende*, January 23, 1852.

³²⁷ *Drammens Tidende*, January 23, 1852.

5.3 Johan M. Dahll and the technology of ice production

This section focuses on the activities originating in the “comfortably located” lake of Kalstadtjern (cf. the report from 1852 above). The principal landowners on the lake were the Dahll family, who resided at the Frydensborg estate. The second oldest son of the house, Johan Martin Dahll (1830–1877), was on his death credited as the “first in the [Kragerø] district to subject [ice harvesting] to rational operation”.³²⁸ His role as a pioneer is highlighted in the local historiography, alongside several other ventures that above all included the minerals nickel and apatite.³²⁹ In the words of Kragerø chronicler Fredric Hougen, Dahll was “a daring and industrious businessman who in few years accumulated great wealth”.³³⁰ The latter is borne out by historical evidence. At the time of Dahll’s death at 47, the tax commission assessed his estate as Kragerø’s second largest.³³¹ The task here is to examine how and why Dahll served to change the Kragerø—and most likely also the Norwegian—ice industry. This section surveys information offered in the literature, in the context of discoveries made in newspaper reports and the surviving fragments of business papers from the Dahlls.³³²

Around 1850, the Dahll family was a powerful entity in the Kragerø community. Among the members of this close family network was parliamentary politician and professor Anton Martin Schweigaard, who was Johan Martin Dahll’s first cousin.³³³ The Dahll home, Frydensborg, was originally part of the Søndre Kalstad property, which provided

³²⁸ *Morgenbladet*, December 12, 1877 (obituary).

³²⁹ Steffens (1916, p. 331), Midgaard and Tande (1953), M. Olsen (1981), who in this respect builds on the family chronicle of Dahll (1959, pp. 247-258). Also E. B. Finstad (2014) for insight into Dahll’s failed ice business at Folgefonna.

³³⁰ Hougen (1936, p. 184).

³³¹ *Morgenbladet*, January 22, 1876.

³³² This is material kept at the Berg-Kragerø Museum (BKM), cf. chapter three, 3.5.

³³³ Schweigaard was the son of the sister of Johan Martin Dahll’s father, see Dahll (1959, pp. 234-235).

much of the ground for the town of Kragerø, for which the family received rent.³³⁴ Widow Maren Dahll (1794–1874) was the residing proprietress. After two years of merchant training at Anderson's Institute in Bergen, Johan Martin Dahll returned to act as manager for the estate. He allegedly immediately "threw himself over the ice traffic".³³⁵ By the spring of 1851, Dahll was a visible contender in the region's business.

Location was one key to Dahll's entry into the ice business. The Kalstadtjern lake on the family property was a body of water with a surface of at least 300 metric hectares. It would provide a theoretical ice harvest of 180 metric tons.³³⁶ It shows prominently on 1850s Kragerø maps, with only a creek marked as the water's eastern exit into the sea, over a short distance of less than half a kilometer. The influx was rainwater and drainage from the north and west. The surroundings provided tranquility and good conditions for crystal ice formation, but the Kalstadtjern lake was also regulated by human hand. At a place called Lona, on its eastern tip, there was a dam and an intake for a water-powered grain mill belonging to Maren Dahll and the Frydensborg estate.³³⁷ The mill was situated downhill, on a headland called Skibodden that was also a ship-loading area used in the ice industry.

³³⁴ Hopstock (1975, pp. 11-18) for an extensive history of the Kalstad properties, including purchases made by Johan Martin from his mother in the 1860s, especially the properties on the Valberg peninsula. See also Hougen (1936, p. 184).

³³⁵ Dahll (1959, p. 247), *Morgenbladet*, December 12, 1877 (obituary): "Ved sin Hjemkomst kastede han sig over Istrafiken og var den første paa denne Kant, der gjorde den til Gjenstand for rationel Drift. Samtidig bestyrede han sin Moders Gaard, Frydensborg".

³³⁶ Water surface 300,000 m²*0.6 m (thickness of block ice) = 180,000 m³ and thus kilograms of ice. Area from Dahll (1959, p. 244).

³³⁷ Descriptions of the mill in fire insurance taxations from 1846 and 1856 in SAKO, Sannidal lensmannskontor, Y/Yc/Yca/L0001: Branntakstprotokoll, 1846-1868, folio 9 and 107-109 (also including a taxation of the Dahll family residence on the property).



Figure 5.1. 1857 map of Kragerø, showing the sheltered position of the Kalstادتjern lake. The ice was brought out to the fjord roughly in the direction of “Strandaasen”. Frydenborg and the settlement at Stilmæstangen, or just Tangen, at the top end of the map. Cartographer S.C. Gjessing, scale 1:50000. From the Amtskartsamling/Telemark, ©Statens Kartverk.

The mill, the docks, and the ice works tell us that the Dahll’s first ice harvests in Kragerø grew out of proto-industrial foundations. In the 1845 census, Frydensborg had in all 77 people living in 17 households (including proprietress Maren Dahll and her household of children and servants). The corresponding numbers in 1855 were 128 people spread across 23 households; in 1865, the numbers were 63 houses and 84 households, with a total of 391 people.³³⁸ The overwhelming majority were children. The increasing

³³⁸ 1845 census, Frydensborg numbers and breakdowns: <https://www.digitalarkivet.no/ft20140426011744>. The 1855 census with Frydensborg numbers: <https://media.digitalarkivet.no/view/65528/21>. 1865 census

population of Frydensborg, one of Sannidal's seven "works communities" (*Brugssted*), reflected the growth of Kragerø in general. The nearby labor stock added to the "favorable location" of the Frydensborg ice traffic.

The changes Dahll introduced are rendered in somewhat approximate terms.³³⁹ Still, the descriptions substantiate the argument that US methods were a model for Dahll's operations. His primary innovation was to construct a viable means of getting regular-sized, freshwater ice blocks from Kalstad tjern to the ships laid up close by in the Kalstadkilen fjord. The methods included several aspects that were clearly inspired by Nathaniel Wyeth's designs: In the pre-harvest grooming period, horse-powered shovels or planes were used to clear the ice for snow and irregularities. Dahll's workers used one or more horse-drawn ice ploughs. The reported "improved ice-cutting techniques" referred to the use of iron or steel ice saws and a "way of getting the ice much cheaper and faster into the ships than hitherto".³⁴⁰ The latter is a reference to a gravity chute from the lake's dam to the shipping point, which is reported in the family history as feasible, as the "main road was not there at that time".³⁴¹ It can be inferred that by the 1851 and 1852 seasons, Dahll was selling ice that adhered to what emerged

<https://media.digitalarkivet.no/view/38134/8> and details for Frydensborg (176a):
<https://media.digitalarkivet.no/view/38134/130>.

³³⁹ The primary source for the early innovations are two articles in *Morgenbladet*, January 8, 1852 and March 3, 1853, which are viewed against information in the Dahll family chronicle, Dahll (1959, pp. 247-250).

³⁴⁰ *Morgenbladet*, March 3, 1853.

³⁴¹ Dahll (1959, p. 247).

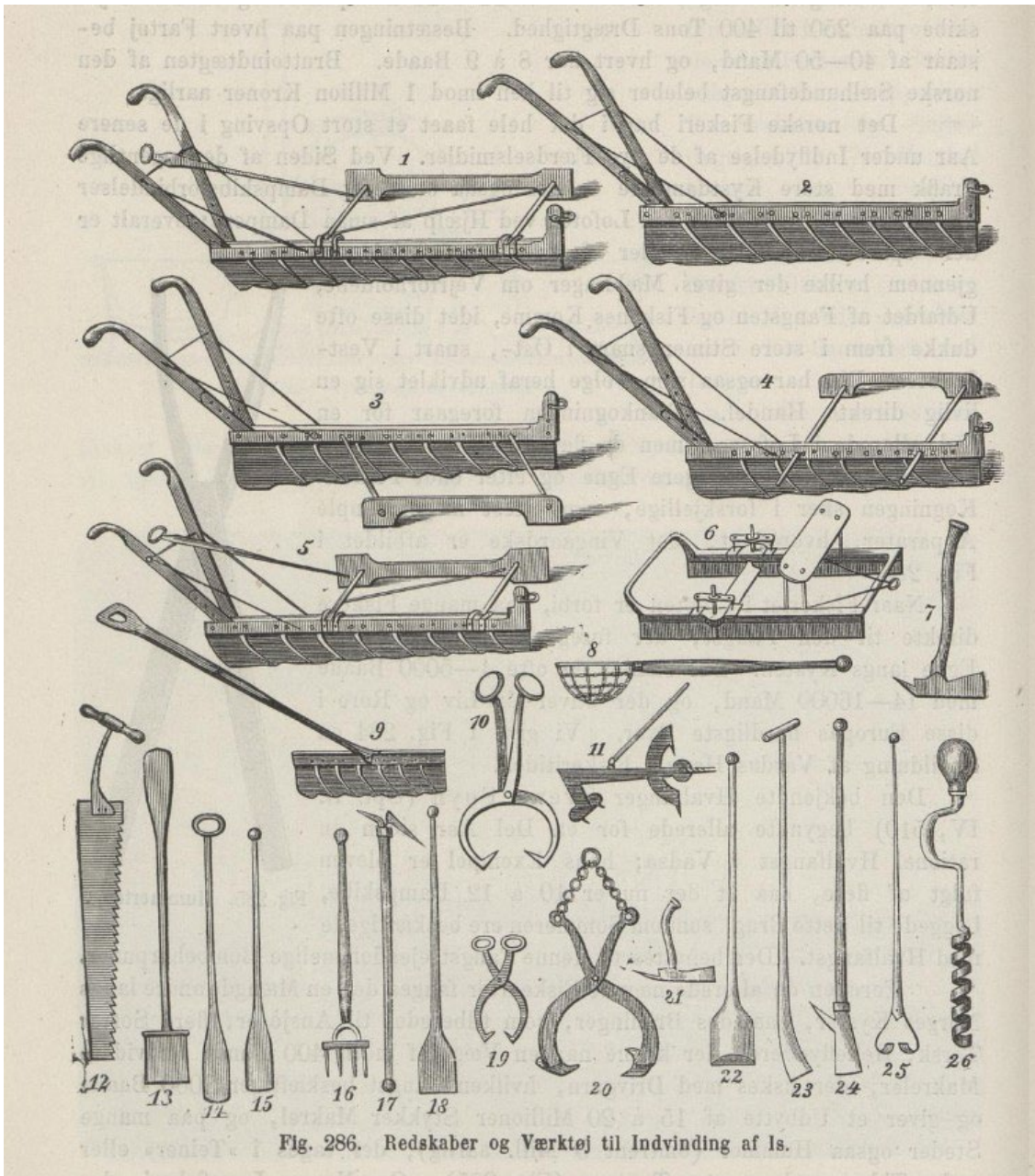


Fig. 286. Redskaber og Værktøj til Indvinding af Is.

Figure 5.2. “Nature assisted by Art”: The ice-tools and implements used in ice harvesting, of the kind that Johan Martin Dahll helped bring into common use in the Kragerø ice industry. Numbers 1) to 5) are variants of horse-drawn ice-plows used to mark out and cut ice, which was then sawed 12) or pried loose by iron bars, 22) and 23). The ice auger 26) was indispensable for ice measurements. Number 6) is an ice planer, used for clearing the top layer of the ice ahead of cutting. Tongs, 10) and 19), and 20), were used to lift ice, both onboard ships and in the harvests. Number 8) is a landing net for fishing valuable pieces of ice out of the water. The illustration is printed in a Danish technical encyclopedia, *Opfindelsernes Bog*, Copenhagen 1883 (p. 394). By this time the implements were considered generic, and no mention was made of Nathaniel Wyeth or other innovators of the implements.

as a business norm of 24- to 25-inch squares.³⁴² The clue to this is information that the horse-powered ice plough making the grooves had cutters “one *alen*” apart.³⁴³ Put together, all the improvements credited to Dahll were a case of “Nature assisted by Art” (*naar Kunsten kommer Naturen til hjælp*).³⁴⁴

The descriptions from the 1851 spring season indicate that the product was cut and transported to the ships for immediate overseas shipment. Dahll’s initial business model was to grow and cut the freshwater ice and then sell it to other Kragerø merchants. He left it to Henrich Biørn, Simon Wiborg, and others to take the shipping risk in the shifting markets (whether downside or upside). This phase likely lasted just until 1853, since the correspondence of J. Georg Dahll references a shipment by Dahll on his own account that year.³⁴⁵ Up to that point, it appears that no portion of the ice harvest was stored for later sales. According to Ourén, an icehouse for storing ice for export from Norway was first erected in Drøbak in 1852.³⁴⁶ As discussed in chapter two, Ourén attached great significance to this development, as it was a prerequisite for the “summer shipments” and possibility to make a greater profit from the ice. At Frydensborg, a “large icehouse” was being filled with ice in March 1853.³⁴⁷ Unsurprisingly, the drive to put up icehouses for distributing the year’s harvest over a longer selling season surfaced in several ice ports. In the case of the Dahll ice business, building icehouses was a step towards controlling more of the profits of the trade. Nearly a decade later, much more was retained for later sales. In April 1860, Johan Dahll was reported to have exported 5,500

³⁴² This was also the size that ice was cut in the 1950s and 1960s. Interview with Jens Høvik, September 11, 2019.

³⁴³ *Morgenbladet*, March 3, 1853. (One *alen* = 2 feet = 24 inches (*tommer*) = 62.8 centimeters).

³⁴⁴ *Christiania-Posten*, March 4, 1853.

³⁴⁵ BKM/Ba 114/J.G. Dahll Letterbook/Letter to Johan Dahll, August 12, 1857.

³⁴⁶ Tore Ourén (1991). Ourén builds on (Bugge & Worm-Müller, 1935).

³⁴⁷ *Morgenbladet*, March 3, 1853: “Frydensborgeiendommen, hvorpaa tillige er reist et stort lishuus, som man ogsaa fortiden er ifærd med at indlade”.

tons of ice in 14 consignments, to markets in "England, Ireland, and France". Only about half of the spring's harvests was being shipped. Between 4,000 and 5,000 tons were loaded in icehouses for summer shipments.³⁴⁸

Dahll expanded the productive area for freshwater ice production by having workers make ponds, damming arable land solely for the purpose. In 1853, it was noted that "a piece of land has been dammed for collection of ice".³⁴⁹ The field indicated was at Walbergjordet, across the bay. Exactly how large the pond was is not known. It must have been of sufficient size, as three out of seven ships were loading ice there. In my material, the ice dam at Valberg is the first documented instance of such a construction. It is likely to have been the first flooding of land for the purpose of growing ice in Norway. This was also largely a matter of location, as the fields were dammed in the vicinity of the sea and the shipping lanes. The practice of making such dams came to be widespread in Kragerø and other Telemark and Christianiafjord locations. Johan Dahll continued to increase the ice-producing surface of the waterways at the Valberg peninsula. In 1862, a lower dam was put in place and five years later the Øvre Valbergtjern pond was dammed.³⁵⁰

Making artificial ice ponds was one way to expand production capacity. Dahll also initiated business on relatively nearby ice lakes. The places indicated in the family chronicle are the Torsdalstjern lake in Kil, and Trosvik and Trosby in neighboring Bamble.³⁵¹ These were freshwater lakes with good access to the seaways, and extended the operations established on the Kalstadtjern lake in the early 1850s.

³⁴⁸ *Kragerø Adresse*, April 28, 1860: " Isafskibningen fra Indsøerne er nu fortiden endt [...] af Herr Johan Dahl er afskibet 14 Ladninger, til et Beløb af omtrent 5500 Tons Is, til England, Irland og Frankrig, og at han har lagret for Sommerafskibning omtrent 4 a 5000 Tons. Isen fra et Par af de benyttede Indsøer har havt en Tykkelse af indtil 20-21 Tommer og er af en udmærket Qualitet".

³⁴⁹ *Morgenbladet*, March 3, 1853.

³⁵⁰ Dahll (1959, p. 248). The pond is known today as Langtangtjenna.

³⁵¹ Dahll (1959, pp. 248-249).

There were a couple of setbacks to Dahll's expansions. The Kalstadjern facility had to be abandoned, likely in 1862. The reason given is the rumored contamination of the lake from nearby cemeteries. According to a 1953 book on Sannidal's history, a competitor—"an agent in London"—was the source of this rumor.³⁵² No further evidence has materialized on the substantiveness of the alleged contamination.³⁵³ The closure year coincides with the establishment of the Nordre Kalstad churchyard, just upstream from the lake.³⁵⁴ Evidently, the rumor itself, without any further sampling or chemical analysis, was enough to eliminate the original model freshwater ice lake from future maps.³⁵⁵

In 1859, Dahll set out to organize an ice business operation on the Folgefonna glacier, which had been the location of the very first ice export in 1822 (cf. preceding chapter). Dahll's rationale was to remove ice "during all of the summer" and make the glacier ice a profitable option when prices and demand were at their highest, especially in London. The trial lasted only one season—according to one source, this was because the "tools of the time were too primitive and the expenses too great", even though the ice apparently had been "well received in London".³⁵⁶ Transporting the ice from glacier to shipside likely still proved too difficult and costly. If Dahll was only present at Folgefonna for the 1859 season, as two sources indicate, he just missed the building of a road—Isvegen—that according to local historiography happened in 1861.³⁵⁷ As noted in

³⁵² Midgaard and Tande (1953, p. 62).

³⁵³ I searched for this in the Dahll papers at BKM, and have also run queries on the Nationalbiblioteket online newspaper content.

³⁵⁴ The town of Kragerø was growing fast, and there was also a serious 1859 dysentery epidemic, claiming more than 400 lives, cf. Homan and Hartwig (1860).

³⁵⁵ And in the 1870s the lake was drained to give more arable farmland to the Frydensborg estate, cf. Dahll (1959, p. 244).

³⁵⁶ Midgaard and Tande (1953, p. 63).

³⁵⁷ Lea (1914, p. 59).



Figure 5.3. Johan Martin Dahll, 1830-1877. Photographer unknown. BKM.F.000037

chapter two, the road did not lead to any significant breakthroughs in glacier ice exports, which remained spasmodic after Dahll's departure.

The Folgefonna attempt was by all accounts short-lived. It is nonetheless significant, as it points to an ongoing process of improving ice storage. If the primary objective of Folgefonna was to have abundant ice for the summer markets, this indicates that icehouses at Frydensborg and other places were not keeping enough ice from melting. There is some reference to Dahll, the scientifically inclined entrepreneur (cf. below), having experimented in this regard. The details and chronology, however, are blurry. According to maritime historian Einar Pedersen, Dahll initially had caverns blasted out in the hillsides for ice storage. Supposedly, the rock got "too hot", and the ice melted.³⁵⁸ This method does not surface in the 1850s news reports of the trade, but it may well have been a reality sometime in the years between 1851 and 1853. In the latter, a "large" icehouse is reported to have been present on the Frydensborg estate: exactly how large, and of what kind, is not known. In the 1953 Sannidal local history, which incidentally does not mention any blasting of mountain caverns, a two-step sequence is laid out.³⁵⁹ Johan Dahll was the first to have built "ice stacks" (*isbinger*): square, roofless, wooden structures with single boards around the frame. Generous amounts of sawdust were distributed between the floors or layers of ice blocks—which came to be known in Norwegian by the English-influenced term *florer*—as well as on top of and within the space between the ice and boards.³⁶⁰

After some unspecified time, the ice stacks proved unsatisfactory, and Johan Dahll became the first in the district—Kragerø and Sannidal—to erect proper icehouses. The roofs were either tiled or thatched with wood chips or cardboard. The icehouses were double boarded around the frames, and sawdust was primarily used to insulate between

³⁵⁸ E. Pedersen (1933, p. 17).

³⁵⁹ Midgaard and Tande (1953, p. 63).

³⁶⁰ Dahll (1959, p. 248) specifies a layer of 12 inches of sawdust.

the boards.³⁶¹ The poor heat conduction properties of sawdust, straw, and coal must have been well known to Dahll, and it was with these kinds of houses that “the winter coldness was kept inside and the spring and summer heat outside”.³⁶²

The preceding paragraph paints Dahll as somewhat of a pioneer in regional and national terms with regards to icehouses. This needs some specification. The term “icehouse” refers to a variety of materials, architectural principles, construction methods, and performance levels. In the 19th century, it could signify anything from the most ornate masonry structure on a manor house to wooden sheds for private farm use.³⁶³ Significantly, the term also encompassed a number of different approaches to ventilating water evaporation, which if left unchecked accelerated melting. Dahll’s contribution was to make a spacious variant of the US-style overground, wooden icehouse a common feature of the Norwegian ice business. A “large” US icehouse, of the kind serving the ice industry, could measure 100 by 40 meters and be several stories high.³⁶⁴ These barn-like structures became a fixture of the Kragerø archipelago and the whole coastal stretch from there until Christiania (Oslo). The use of icehouses, as noted above, was at no point restricted to the ports or regions engaged in the natural ice exports. In the fisheries, double-boarded, insulated, “above-ground” icehouses were referred to as the “American kind” by the mid-1860s. In Finnmark, such houses could

³⁶¹ Midgaard and Tande (1953, p. 63), Dahll (1959, p. 248). By the 1880s, icehouses were used as examples in physics textbooks in Norway, cf. Christie (1882, p. 69), explaining the poor heat-conductive properties of sawdust, coal, etc., which work that way in combination with the pockets of air. (“Skal man om sommeren bevare is fra at smelte, maa man omgive den med slette varmeledere, saa den ydre lufts varme ikke kan komme ind til den. Ved ishuse gjøres derfor væggene af dobbelt bordklædning, hvoremellem er anbragt smaakul, sagflis o.l”).

³⁶² Midgaard and Tande (1953, p. 63), E. Pedersen (1933, p. 17).

³⁶³ A full range of some of the variety in Britain, cf. Beamon and Roaf (1990).

³⁶⁴ Beamon and Roaf (1990, p. 36). In the Kragerø district, the largest icehouse belonging to Henrich Bjørn in the 1870s was about 80 meters by 15 meters, and a little over 7 meters high, cf. Midgaard and Tande (1953, p. 63).

basically be tent shaped, but still double walled and insulated with sawdust, bark, and/or coal.³⁶⁵ In Norway, the “American” icehouse could be many things.

5.4 New and old knowledges

Dahll was a regional pioneer in terms of implementing a version of the US ice harvests in Kragerø. In the previous section, that has been discussed in terms of the core elements of the procedures, tools, and methods involved in the actual *production* of ice. In the following section, the thrust is on how that capacity was combined with other crucial factors. Broadly speaking, it covers transport and marketing strategies, and are as such element in the managerial knowledge of the ice trade.³⁶⁶ The latter was designated as the overall organization of the production, as well as the insights and connections required and utilized to have the ice shipped and sold at a premium. It was also held that the two “spheres” interacted in countless ways. The following attempts to look at those dynamics by focusing on Dahll’s marketing work, and his gradual build-up of in-house shipping capacity.

On both counts, limited source material underscores that the following depictions and analyses of Dahll’s ice strategies make for a tentative interpretation—one that rests on an assessment of actions more than the actors’ own statements, rationalizations, or reflections.³⁶⁷ As mentioned, a complicating factor throughout is the manifold nature of Dahll’s business enterprises. The variation, however, was bound together by a concentration on minerals and economic exploitation of land resources. The remnant

³⁶⁵ Løberg (1864, p. 217). The purpose of these houses was to preserve the smelt used as bait. (“men at bevare Lodden som tjenlig til Agn hele Aaret vilde i Finmarken neppe være synderligt vanskeligt ved Indredningen af simple, men hensigtsmæssige Ishuse. Disse kunde lettest indrettes paa amerikansk Viis ved at bygges over Jorden. De bygges i Form af et Telt, eller en Finnegamme, kun av Bord, men med dobbelte Vægge”.)

³⁶⁶ Cf. definition in chapter two, section 2.5.

³⁶⁷ An elaboration on this point: The two main actors in the early Dahll ice venture were Johan Martin Dahll and his brother Georg J. Dahll, who both died relatively young and abruptly. The third brother involved in the story is the scientist Tellef Dahll (1825–1893), whose recollections and memories are likely a main source for relevant information in Dahll (1959), cf. preamble, p. 5–7.

sources I have consulted are a combination of a fragmentary collection of Dahll's business records in the Berg-Kragerø Museum and contemporary newspaper articles. The narratives I have consulted on the issue include the ones used in the previous section, as well as a book on the Gatti Ice Company in London.³⁶⁸ Despite these reservations, a cross-check of snippets of information has made it possible to propose some valid points.³⁶⁹

The first point is that, like everyone in the business, Johan Martin Dahll depended on a trading network. In light of that, the next few paragraphs will shift attention to his younger brother, J. Georg Dahll (1832–1875). Georg Dahll left Kragerø in the early 1850s and settled in London. After serving his apprenticeship, Georg Dahll established in 1858 what came to be a successful brokering office with compatriot Ole Erlandsen. The family chronicle states that the two brothers jointly started the Frydensborg ice harvests.³⁷⁰ It also credits Georg as having the idea to use the Frydensborg lake as freshwater source, which apparently came about after he noticed “the great lack of ice on the London fish markets”.³⁷¹ There is little information available to discuss this account of events, but it alludes to a not unlikely gathering of knowledge fostering innovation. However, J. Georg Dahll's letterbook from 1856 to 1859 sheds some light on the commercial interaction between the two brothers in the formative years of the ice trade, which seems to have been a mix of cooperation and independence.³⁷²

The letters contain reference to several occasions in which Georg Dahll acted as agent for the Frydensborg ice. On the 12th of August 1857, Georg informs Johan that he has visited the offices of the US-based Wenham Lake Ice Company, without disclosing the

³⁶⁸ Kinross (1991).

³⁶⁹ Cf. chapter three, section 3.6.

³⁷⁰ Dahll (1959, p. 247).

³⁷¹ Dahll (1959, p. 255).

³⁷² BKM/Ba 14/Letterbook Georg Johan Dahll.

result. The next day, he “had been around at several ice merchants” (“Jeg har i dag været omkring hos flere lishandlere”), and a Mr. Newby is mentioned as being in the market for 200 to 300 tons of ice.³⁷³ Georg then inquires of Johan as to whether he has any ice left for delivery, an instance reflecting the shift to *summer shipments* depicted above—this was August. There are references to competitor Norwegian suppliers, some of them shipmasters acting on their principals’ behalf. Ice merchant Newby has thus already commissioned “a cargo” from Captain Hjorth, from the *Thor* of Christiania. The negotiations include allusion to the qualities of ice demanded. Another one of the merchants visited was a Mr. Stevenson. Stevenson was offering 15 shillings per ton, and his request was for no less than 1,000 to 1,200 tons “during the winter”. The ice, however, was not to exceed a thickness of 11 inches and must be clear: This latter was a matter of “utmost significance” (*høist væsentlig*).

What was the function of Georg Dahll’s salesmanship in the family ice enterprise? The family chronicle asserts that Georg Dahll handled all the sales of Dahll ice in England.³⁷⁴ The letterbook suggests otherwise, at least for the years covered, 1856-59. There are several mentions of Johan Martin Dahll having contracted with other parties. In a letter from April 1856 to his sister Johanne (“Hanna”) Dahl (1821–1896), J. Georg Dahll implores her to convince Johan Martin to give him “commissions”.³⁷⁵ The letterbook provides a glimpse into the actions performed by Georg Dahll. These included the salesman legwork described above, as well as gathering intelligence on the several different ice markets around the British Isles and Ireland. He also kept track of individual buyers and experiences from direct interactions, such as when he reported to Johan Dahll in 1857 about ice dealer Mr. Thomson. Thomson was still dissuaded by having

³⁷³ All further quotes in the paragraph are from BKM/Ba 14/Letterbook Georg Johan Dahll, p. 94-96.

³⁷⁴ Dahll (1959, p. 256).

³⁷⁵ BKM/Ba 14/Letterbook Georg Johan Dahll, p. 1-2.

received a cargo of “poor ice” from Dahll in 1853.³⁷⁶ Furthermore, Georg Dahll monitored shipments and corresponding issues, such as trouble with the unloading or weighing of the ice. With some modifications, the relationship between the two brothers in this rather new enterprise rested on an institution observed in many cultures and time periods: the strategic deployment of kin and family to distant trading ports.³⁷⁷ The professional relationship between the agent Georg and his principal brother Johan Dahll was apparently somewhat open. Despite these qualifications, it is clear that J. Georg Dahll filled an important, if not exclusive, position as his brother's overseas agent for many years.³⁷⁸

In 1857, there were 10 ice merchants listed in London, most with backgrounds as fishmongers.³⁷⁹ J. Georg Dahll would have had cognizance of all of them, and evidently also agents and merchants in other UK ports. In the early 1860s, the company of Carlo Gatti evolved as an important customer for Norwegian ice. The link between Gatti and Dahll has been expounded on in a book on Gatti by Felicity Kinross.³⁸⁰ Carlo Gatti (1817–1878) was Swiss and came to England in 1847. He first made his mark as an ice merchant and confectioner, before he later established restaurants and music halls, all served by ice vaults at the Regent's Canal and others at the London docks. Gatti is credited with having a major role in making ice cream available to the general public by organizing the carts of Italian-speaking ice cream vendors—the “hokey-pokey men” offering “penny licks”. The Gatti company amalgamated in 1901 with two other firms to become the

³⁷⁶ BKM/Ba 14/Letterbook Georg Johan Dahll, p. 96: “Thomson [...] du undret over at han har saa lang Tid ikke havde gjort Forretninger med dig og Grunden maa nok tilskrives den slætte Iis han fik fra os i 53”. The statement corroborates that Dahll had commenced independent shipments by that year, cf. section 5.3.

³⁷⁷ For instance, see the discussion of kinship networks among medieval Hansards in Ewert and Selzer (2016).

³⁷⁸ Verified by the accounts for the Dahll & Erlandsen brokerage firm in Johan Martin Dahll's ledgers, cf. BKM/Ba 74 Johan Martin Dahll Hovedbog 1859-1874.

³⁷⁹ Kinross (1991, p. 27).

³⁸⁰ Kinross (1991).

United Carlo Gatti, Stevenson, and Slaters company.³⁸¹ The link to the Gatti ice and restaurant venture constitutes one case of natural ice imports impacting or facilitating cultural change. Kinross makes much of the liaison between Dahll and Gatti and maintains that Dahll obtained a “permanent contract with Carlo and thereafter all the ice came from that firm”.³⁸² What documentation exists for this statement is not clear, but it is certain that other Norwegian traders also catered to the ice merchant and restaurant mogul in London.³⁸³ It is possible that for a period during the 1860s, the Dahlls enjoyed a privileged position with Gatti. By the 1870s, it can be documented that others, like the Baarsrud ice company (cf. next chapter), were in on London’s restaurant ice trade—unsurprising, as a large, regular, and reasonably predictable customer was coveted.

5.5 Telegrams and ships

Gatti received Norwegian ice from several other suppliers than Dahll, and Dahll served markets beyond London. Indeed, Dahll had a network of agents and representatives in other ports.³⁸⁴ His 1860 shipments were recorded as going to Britain, Ireland, and France.³⁸⁵ While some foreign customers and agents were undoubtedly more significant than others, even a relatively large ice enterprise like Dahll’s maintained a degree of flexibility when chasing opportunities for the best price.³⁸⁶

³⁸¹ Kinross (1991, pp. 26-27).

³⁸² Kinross (1991, p. 26).

³⁸³ For instance Thorvald Baarsrud, cf. next chapter.

³⁸⁴ Based on his ledger, BKM/Ba 74 Johan Martin Dahll Hovedbog 1859-1874.

³⁸⁵ *Kragerø Adresse*, April 28, 1860.

³⁸⁶ The values attached to customers and relations are better documented in the Baarsrud ice business history, cf. next chapter.

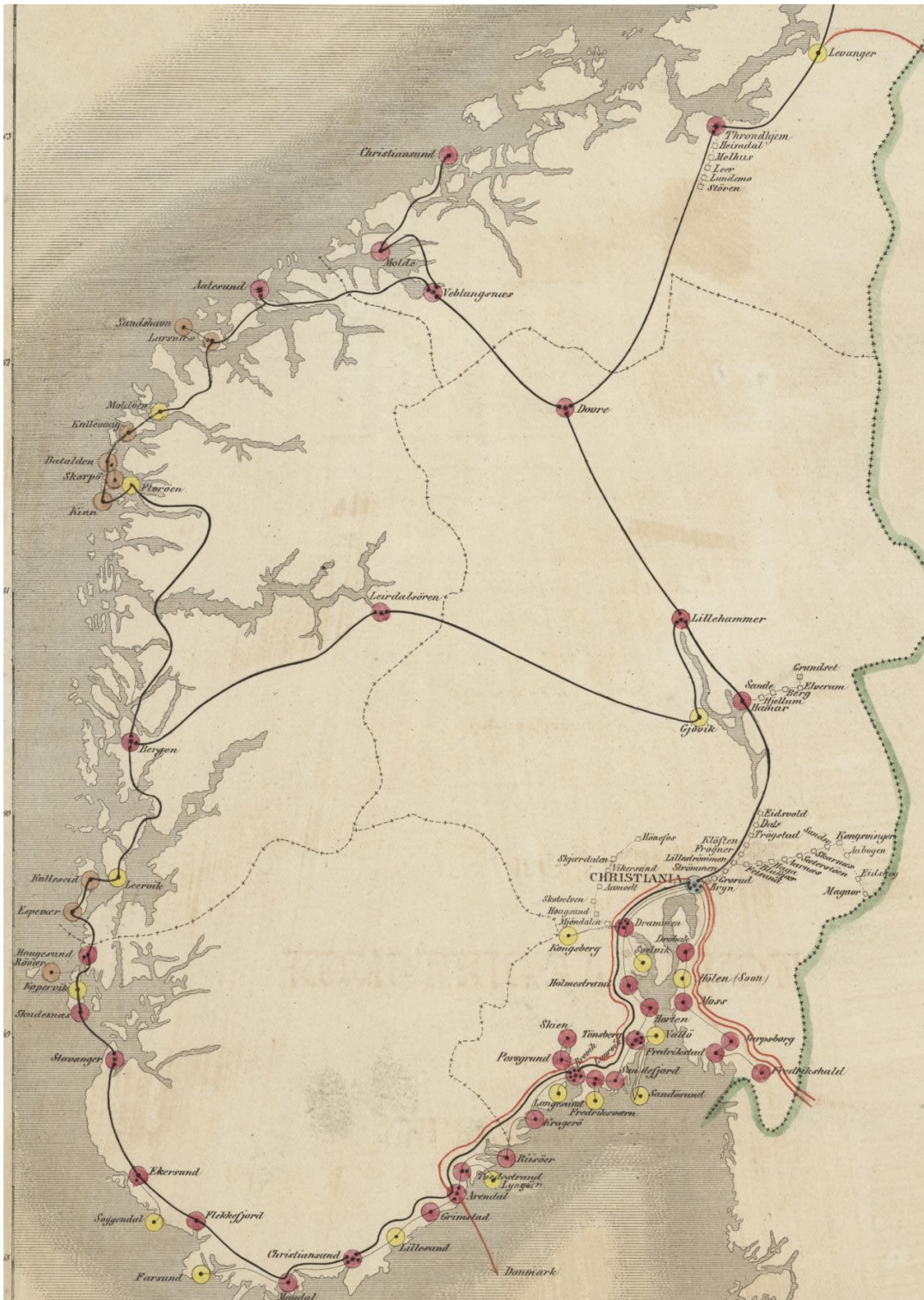


Figure 5.4. Excerpt from Norway's telegraph map, 1867. The lines were to connect the places of "mercantile and maritime importance", see main text 5.5. In 1870, Egersund (*Ekersund*) was connected directly to Britain, bringing down the time and cost of communications also from Kragerø. *Spesialkartsamlingen, Statens Kartverk.*

That flexibility was aided by the introduction of the telegraph. The electric telegraph was a radically new communication network of the 1840s, with “enormous impact” on 19th-century society.³⁸⁷ The speed of communication over great distances was reduced from days and weeks to a matter of hours. This had ramifications for the ice trade, but the connection has been given little attention. A focusing incident for the present research was a 1914 account of the ice trade written by one of its veterans, Thomas J. Wiborg of Brevik.³⁸⁸ In this account, Wiborg emphasizes the advent of the telegraph as enabling ice exporters and producers to monitor overseas markets, and to exploit swift demand hikes: all this because, as he writes, “mail delivery was very deficient”.³⁸⁹

Given Norway's demographics and topography, the telegraph became a vehicle for economic development.³⁹⁰ In 1854, the Norwegian Parliament sanctioned the building of a state-operated telegraph system. The first line, concluded by the fall of 1855, reached from the country's southeastern tip on the Swedish border, up and down the Christianiafjord, and further through the port cities on the Telemark and southern coast of Norway to Mandal, including Kragerø. This was augmented by a line stretching to Bergen on the west coast in 1857. By 1860, “all places of mercantile and maritime importance” south of Trondheim were connected in a 2,500-kilometer network encompassing 52 telegraph stations.³⁹¹ Telegrams were expensive, and the price was compounded by fees in each transmitting country along the grid. With the laying of a direct sea cable between Norway and Britain in 1869 (the Egersund–Peterhead cable),

³⁸⁷ Mokyr (1990 pp. 123-124).

³⁸⁸ T. Wiborg (1914/1980). The second focusing event was the discovery of the telegraph books in the Wiborg archive in BKM, see chapters three and seven. Thomas Wiborg of Brevik was a relative of the Wiborgs of Kragerø, cf. chapter seven.

³⁸⁹ T. Wiborg (1914/1980).

³⁹⁰ Rinde (2005, pp. 11-12).

³⁹¹ Rinde (2005, p. 58).

Anglo-Norwegian telegraph communication more than doubled in less than two years.³⁹²

It is not surprising to find Johan Dahll among the early adopters. The telegraph, which put Kragerø within hours' reach of London and other important destinations, expanded the range and speed of decisions coming out of the company office at Frydensborg, which from 1866 moved into Kragerø.³⁹³ None of Dahll's actual ice-related telegrams are in the BKM archive. However, an examination of Dahll's expense accounts for the ice business between 1859 and 1872, labeled *Isconto*, provides an illustration of the telegraph's significance.³⁹⁴ The first year (1859) merely has one lump-cost entry for postage, amounting to eight speciedaler, conceivably including telegram fees. Over the 1860s, Dahll's *Isconto* evolved into a somewhat comprehensive account of costs and revenues—in all, tokens of the administrative costs of Dahll's ice business. In 1860, the ratio of costs for telegrams versus postage was slightly less than 45%: or to be precise, 14 speciedaler, 1 ort, and 2 skilling for telegrams versus 32/2/14 for postage. By 1871, there were 41 cost entries. In 1872, there were 79, of which 39 were telegram payments, totaling 77 speciedaler.³⁹⁵ There are no entries for postage costs that year. This is not to suggest that Johan Dahll abandoned the mail system or that the telegraph became his sole means of communication, but it suggests a link between the increased volume of Norway's ice trade and the growth in telegraph traffic. The approximate doubling of cost entries from 1871 to 1872 in Dahll's case indirectly reflects broad trends; the total

³⁹² Rinde (2005, p. 104).

³⁹³ As it did for other traders in the community. There were several ways to celebrate the event, such as the naming of a new brig ship (the *Thelegraf* in 1855), cf. E. Pedersen (1933, p. 115).

³⁹⁴ BKM/Ba 74/Hovedbog Johan Dahll. Folios 26, 95, 99, 132, 135, 140, 178, 179, 184, 203, 221, 226, 230, 237, 254, 263, 268, 274, 304, 316, 317, 328, 383, 391, 428, 461, 462, 469, 513, 533, 571, 595, 621, 622.

³⁹⁵ Actually, this is the tally for the period until November 5, 1872 (folio 622). Reference to the continuation from November to December on page 656, missing in my material.

volume of Norwegian ice exports jumped from about 76,000 register tons to 130,000 over the same two years.

Telegrams were symbols of a communications revolution. With respect to the other main aspect of communication in the ice business—that is, shipping—Dahll also came to exert some influence as an innovator. This occurred in the 1870s, after some years of accumulating a shipping fleet along fairly traditional lines. Ship owning was not new to the Dahll family, as Johan's merchant father John Georg Dahll (1788–1832) had run a shipping and lumber exports business, with part or sole ownership in three vessels.³⁹⁶

In the late 1850s, Johan Dahll acquired two secondhand sailing ships, the *Askur* and the *Embla*, both built locally. In the course of the 1860s, six more sailing vessels were built at Dahll's own shipyard at Sandåsen (close to the Frydensborg property).³⁹⁷ The increase in sailing ship capacity reflected larger amounts of ice being shipped. The ice business is noted as primary motivation for Dahll's move into shipping.³⁹⁸ It very likely was also a primary reason for investing—jointly with other Kragerø merchants, including his father-in-law L. Larsen (and Thomas Wiborg, cf. chapter seven)—in two steam tugs: the *Frithjov*, in 1873, and the *Sex*. During spells of windless weather, the tugs could spell the difference between success and failure for an ice shipment.³⁹⁹

The increase in shipping capacity within the firm was gradual. It likely never obviated the need for shipping services offered by other Kragerø district shipowners. The Kragerø merchant navy was increasing in the period from the 1850s to the 1870s, as was the Norwegian merchant fleet. While other seafaring towns sent more tonnage off to serve trades between foreign ports, including Atlantic journeys, the Kragerø merchant fleet

³⁹⁶ Dahll (1959, p. 236).

³⁹⁷ An overview over Dahll's shipping fleet is rendered in table 9.5.3. in the appendix.

³⁹⁸ Midgaard and Tande (1953, p. 65), Dahll (1959, p. 249).

³⁹⁹ Cf. Freeman (2018, pp. 68-69), in which there is even mention of a sailing ship being tugged across the North Sea in 1905.

attended to steadily increasing exports of ice and lumber. While 64 Norwegian ships were cleared from Kragerø in 1855, 210 were cleared in 1870—the majority of which were Kragerø ships.⁴⁰⁰ The ice trade is reported to have been almost exclusively via Kragerø keels.

Some aspects of the nature of these shipping services are illuminated in an 1865 Supreme Court ruling involving Dahll. The case sheds light on the speed of the ice logistics in the 1860s, and also points to the precariousness of ice shipments.⁴⁰¹ The case concerned the 170.5-commercelæster ship *Regina*, owned by Sannidal farmer and shipowner Eilert Olsen-Rinde and associates. Dahll hired the ship in January 1864 to carry a cargo of ice destined for Harvey & Sons in Cork, Ireland. The *Regina* anchored in Passage West instead on February 26. Due to interruptions, the unloading of some 496.5 tons finished more than a month later, on March 30. The contract had stipulated that 30 tons would be unloaded per day, which would have taken about 16 working days for the load the *Regina* carried. The delay occurred because the customers shifted the point of unloading, so there were missing tugs and pilots and the captain refused to relocate the ship. The legal dispute did not concern melting or loss of merchandise, but Dahll's refusal to pay £45 for the *demurrage*—the period over the time allowed for loading, unloading, and sailing—to the shipowners. He was sentenced to do so. This extra expense, amounting to more than 760 speciedaler, would noticeably cut any profit on one shipment.

The court case sheds some light on Dahll's strategies. There was a continued use of external shipping capacity, but the verdict may have induced Dahll to increase his autonomy in this regard. Although losing £45 was patently not a disaster for Dahll, his

⁴⁰⁰ E. Pedersen (1933, pp. 24-25).

⁴⁰¹ The verdict of Høyesterett (the Supreme Court), summary in *Morgenbladet*, July 21, 1865. All quotes, unless otherwise noted in this paragraph, are from the summary.

refusal to pay through all court rulings up to the Supreme Court attests to a tenacious mindset.

Before the 1870s, the growth of the Kragerø fleet was almost exclusively driven by the acquisition of sailing vessels. Some were home-built in the various shipyards around the archipelago, while full riggers, clippers, and other vessels were secondhand purchases from abroad. In 1872, Johan Dahll had a large wooden vessel built in Kragerø, the *S/S Heimdal*, which had a barquentine type of rigging, but was fitted with a steam engine and was thus considered Kragerø's first steamship.⁴⁰² Dahll was one of several Norwegian shipowners commissioning this transformational type of vessel in the early 1870s: which, it was hoped, might combine the regularity of steam shipping with keeping some of the wood-based coastal shipyards busy.⁴⁰³

There is little evidence to evince Dahll's own strategic vision for the steamship. The family chronicle claims that he was ready for a transition to steel steamships, and that the symbolic name of *Vale* ("Farewell") for his last commissioned wooden sailing vessel signaled this.⁴⁰⁴ According to maritime historian Einar Pedersen, the *Heimdal* made profits on its freight in the years up to 1875, but not as much as some of its competitor sailing vessels.⁴⁰⁵ Consequently, to the Kragerø shipping milieu, the lessons from the venture were mixed. To Dahll, however, it may have made sense. The 1870s were a period of increased overseas demand for ice—including in the British markets, to which Dahll primarily tended. Increasingly, however, natural ice was only one source of refrigeration. The introduction of steam-powered ice factories and ocean liners equipped with refrigeration machinery meant that the markets were gradually

⁴⁰² E. Pedersen (1933, p. 28), except for a passenger steamer used locally.

⁴⁰³ *Morgenbladet*, February 18, 1872.

⁴⁰⁴ The *Vale* was launched after Dahll's death. Dahll (1959, p. 249).

⁴⁰⁵ E. Pedersen (1933, p. 26).

becoming accustomed to a predictable, regular supply of cold.⁴⁰⁶ Combining natural ice exports with steam shipping was a reactive response; investing in steam was a way to ensure greater regularity of shipments, which would trickle down to more predictable terms for the entire ice logistics.

To some, the combination of liner steam shipping and exporting natural ice promised to open new markets for Swedish and Norwegian goods in India and Southeast Asia. An 1876 report from the trade consul in Alexandria pointed to the opening of the Suez Canal, and the geographical advantages offered to Nordic shippers relative to the Americans, who would still typically spend three to four months at sea.⁴⁰⁷ It called for the “elite” of the trading community to consider engaging in competition with the Tudor Ice Company and the ice machines in Calcutta, Rangoon, and Aden. Dahll might have harbored similar ideas, but nothing like the consul’s suggestions came to pass, from him or any other Kragerø or Norwegian ice exporters. The North Sea remained the primary operative area. In the subsequent decade (cf. chapter seven), Dahll would pass the steamship baton to other shipowners and ice exporters in Kragerø, primarily Thomas Møller Wiborg.

5.6 Ice in a strategic perspective

The previous sections address core and supporting elements in Johan Martin Dahll’s ice enterprise. In this section, the observed facts are a background to a more general discussion of the strategies and mindset of this Kragerø entrepreneur. It has already been clarified that Dahll was not solely engaged in ice. The other lines of his business—apatite and nickel extractions—rose to an economic significance at least equal to the ice exports. The exact proportions of the various activities can only be sketched here: The essential part is to look at the initiatives of this one entrepreneur in light of the research problems of this thesis. Does Dahll’s ice career square with Sejersted’s dictum about a

⁴⁰⁶ See, for example, Perren (2006).

⁴⁰⁷ *Den norske Rigstidende*, March 3, 1876.

“modernizing ideology” tempered by a degree of technological conservatism to avoid social disruption?⁴⁰⁸

There is nothing in Johan Martin Dahll’s biography to suggest technological conservatism. The commendations his ice venture received in the early 1850s were largely due to the technological innovations that he, and likely his brother Georg J. Dahll, brought to the industry. Dahll’s penchant for direct involvement in technical and scientific matters—especially anything to do with chemistry and metallurgy—is pronounced with regards to the mining extraction ventures. In 1853, Dahll was hired as a local manager for the British company Evans & Askins’ apatite works at Løkken, and for the same company’s nickel mines at Bamble, where noted UK geologist David Forbes (1828–1876) was also present.⁴⁰⁹

Dahll acquired ownership of both enterprises by the early 1860s.⁴¹⁰ The family chronicle emphasizes his direct involvement in the methodical development of nickel ore, obtaining a far superior product comprised of nearly 70% nickel. Dahll had a “for its time modern laboratory” built at Hestøen, close to Kragerø, where the smelting also occurred.⁴¹¹ By 1863, Dahll was granted a five-year patent for a drilling machine.⁴¹² He was also regional commissioner for, and likely high-end user of, nitroglycerine dynamite

⁴⁰⁸ F. Sejersted (1993, p. 73).

⁴⁰⁹ The biographical data for the different mining enterprises are from Dahll (1959, pp. 250-251), and A. Pedersen et al. (2016, pp. 275-280). Apatite is a term for any group of calcium phosphate minerals, constituent in 19th-century fertilizers. On chemist and geologist David Forbes (1828-1876), cf. [https://en.wikisource.org/wiki/Dictionary_of_National_Biography,_1885-1900/Forbes,_David_\(1828-1876\)](https://en.wikisource.org/wiki/Dictionary_of_National_Biography,_1885-1900/Forbes,_David_(1828-1876)) (Retrieved December 2, 2021).

⁴¹⁰ From 1872, Dahll was also one of the main operators of a new ore for apatite discovered at Ødegården in Bamble, which became one of “Norway’s biggest mining works”, cf. Rovde et al. (2014, pp. 46-48).

⁴¹¹ Dahll (1959, p. 250).

⁴¹² *Den norske Rigstidende*, April 14, 1863.

in 1865.⁴¹³ The preceding year, Dahll had published two short articles in the leading techno-scientific journal of the country, *Polyteknisk Tidsskrift*—one on apatite in Kragerø and one on the Bamble and Meinkjær nickel mines.⁴¹⁴ The journal was the main outlet for an association of practically oriented entrepreneurs, landowners, and scientists in Norway's capital, Christiania.

The scientific orientation of the commercially trained entrepreneur Dahll was nurtured by a solid personal network. The family chronicle mentions correspondence between Dahll and several chemistry and metallurgy professors in Norway and abroad. However, there were closer sources. As noted above, older brother Tellef Dahll (1825–1893) was a prominent geologist, credited with extensive surveys of the Norwegian land mass between the 1850s and 1870s.⁴¹⁵ From the early 1860s, Tellef Dahll was public mining officer (*Bergmester*) for the southwestern region of Norway. While commercial ventures were off-limit in his capacity as public geologist, Tellef Dahll (along with David Forbes) offered “guidance” (*veiledning*) to Johan Dahll.⁴¹⁶

The above paragraphs are well-documented connections and networks that contributed informational input to the mineralogy aspect of the Dahlls' business. A further background, which possibly links the geological drive to ideology, may be traced through the Dahlls' kinship with professor and politician Anton Martin Schweigaard.⁴¹⁷ An economist, jurist, and politician, Schweigaard belonged from the 1830s to a circle of the Christiania intelligentsia that were advocating for cultural and economic

⁴¹³ *Morgenbladet*, December 19, 1865. A dynamite accident at Dahll's Bamble nickel mines, where one worker lost his arm, was front-page news in *Morgenbladet*, January 18, 1870.

⁴¹⁴ *Polyteknisk Tidsskrift*, 1864, p. 171-173. Dahll published nothing in the journal on ice harvesting or production.

⁴¹⁵ Cf. https://nbl.snl.no/Tellef_Dahll (Retrieved December 2, 2021).

⁴¹⁶ Dahll (1959, p. 250).

⁴¹⁷ On the kinship, see above.

modernization.⁴¹⁸ Infrastructural programs, like the first railways and the telegraph communication of the 1850s visited above, can be linked to the thinking and advocacy of the group Schweigaard belonged to.⁴¹⁹

Some of the roots of Schweigaard's views can be found in his 1840 statistical survey of the Norwegian economy.⁴²⁰ While measures to secure liberalization of trade and expansion of the shipping sector are given considerable space, Schweigaard also forwards views on the prospects of Norwegian industry.⁴²¹ In his view, the mining and quarrying industries were crucial, as they constituted an important "school of mechanic and technical skills".⁴²² Juxtaposing the output of Norwegian agriculture with the products and efforts of the mining sector, Schweigaard holds that "the land mass of Norway gives a richer return to the natural scientist for his research, than the farmer gets for all his efforts".⁴²³ In other words, examination with a view to exploit rocks, forests, and lakes was a much more profitable venture than marginal agriculture. It is obvious that the model of the research-driven natural scientist, *Naturforsker*, was an inspiration to the Dahlls in their future exploits as geologists and businessmen. The innovations they brought to their ice business from the early 1850s were nourished by the same stimulus.

This industrial policy that was beneficial for landowners links with issues of the political regulation of natural resources. Dahll's several business ventures in mining and ice came about in the mid-19th century, which according to one comparative study was a window

⁴¹⁸ Mestad (2009, pp. 22-26).

⁴¹⁹ Slagstad (2001, pp. 55-72).

⁴²⁰ Schweigaard (1840).

⁴²¹ Schweigaard's pessimism on the prospects of developing Norwegian manufacturing industries to supply the "finer goods of consumption", cf. Schweigaard (1840, p. 121).

⁴²² Schweigaard (1840, p. 111).

⁴²³ Schweigaard (1840, p. 12): "Norges faste Masse giver Naturforskeren en rigere Løn for hans Granskning, end Landmanden for hans Møie".

of “laissez-faire” regulation of natural resources, in which “private investors—both foreign and domestic—were in most cases free to exploit resources as they pleased and retain any profits they might gain from the venture”.⁴²⁴ This statement is broadly applicable in Johan Martin Dahll’s case. By the mid-1870s, the various businesses of mining, shipping, and ice had made Johan Martin Dahll the second richest individual in Kragerø, judging from the Kragerø tax rolls.⁴²⁵ In 1875, he was listed as having an assessed estate at 115,000 speciedaler: it was valued at 125,000 the following year. The capital estimates were likely highly conservative. In just one transaction in 1873—in which he sold his apatite fields in Bamble to a French company—Dahll received 120,000 speciedaler.⁴²⁶ While the highest taxpayer and ostensibly wealthiest family in Kragerø was still the Biørn family at this time, the rise of Johan Martin Dahll on the tax rolls signifies ice and shipping as a means of making an immense private fortune. For both years, Dahll’s income was estimated at about 14,000 speciedaler (56,000 kroner). The tax levied directly on Dahll as an individual consisted of two components.⁴²⁷ There was a business tax (*Næringsskat*), which hovered around 500 speciedaler (i.e., a tax rate at 3.3%), and a poor tax (*Fattigskat*) at 175 speciedaler in 1875, which was reduced to 120 speciedaler in 1876. In addition to these taxes, by the 1870s the magistrate also levied taxes on export commodities. The taxable commodities listed for Kragerø were several different qualities of lumber, ice, and apatite, and a 10% tax on shipping, estimated from tonnage tax value. In 1875, the tax on ice was 1 speciedaler per CL on spring shipments

⁴²⁴ Sanders, Sandvik, and Storli (2019, p. 5).

⁴²⁵ The years 1875 and 1876, in *Morgenbladet*, April 12, 1876 and *Morgenbladet*, January 22, 1876.

⁴²⁶ *Morgenbladet*, November 18, 1873. This is also a sign of an exit strategy regarding apatite from Dahll.

⁴²⁷ On the 19th-century Norwegian tax systems, before the tax reform of 1882, cf. Gerdrup (1998, pp. 8-15).

(*Vaarskibning*), and 2 speciedaler and 60 skilling on summer shipments (*Sommerskibning*).⁴²⁸ On all counts, the taxation was modest.

Dahll's enterprise was one of unbound capital accumulation, but a few more traits must be considered. The most significant of Dahll's operations had a regional or local base. There was a level of traditionalism inherent to it, which likely aligned well with a generally conservative viewpoint. As such, Dahll likely associated with the *embetsmannstat* outlook of Schweigaard: the pre-parliamentarism period when the civil servant class was dominant, blending liberalization in economic affairs and conservative approaches in most other respects.⁴²⁹ Dahll likely considered himself a "pillar of society", without the mortal irony of Henrik Ibsen's 1877 play of the same title.⁴³⁰ Dahll was involved in local politics (he was mayor of Sannidal from 1863 to 1866) and was elected to Stortinget (Norwegian Parliament) in 1876.

Dahll's conservative outlook transferred to his relations with his labor force. When he died unexpectedly in 1877, the most "magnificent and expensive" funeral in the town's history was held in Kragerø, bankrolled by the municipality to honor the deceased "pioneer".⁴³¹ An honorary guard was established by some of the 400 workers who were regulars in the Dahll labor force, and who "had for a long time looked up to him as a decent and caring employer".⁴³² This quote indicates a paternalistic relationship between Dahll and his workers. More evidence would be required to make a nuanced

⁴²⁸ *Morgenbladet*, April 12, 1875. The next year there was only a flat rate, at one speciedaler for all shipments.

⁴²⁹ Conservatism is a relative entity: Dahll helped finance a new school for girls in Kragerø in 1876, cf. *Morgenbladet*, December 8, 1877.

⁴³⁰ This alludes to the shipowner and consul K. Bernick in the play, who knowingly sends out an unseaworthy vessel. For a discussion of the Ibsen play in light of maritime safety in the 1870s, cf. Paulsen (2014, p. 56).

⁴³¹ Hougen (1936, pp. 186-187).

⁴³² *Morgenbladet*, December 8, 1877. The flavor of the original statement is lost somewhat in translation: "Dybt vil han blive savnet af sin efterladte Hustru og 2 Børn [...] og af sine talrige Arbeidere, der i lang Tid har vænnet sig til at se op til ham som en god og kjærlig Arbeidsherre".

statement about whether such bonds were limited to the Kragerø workers or applied as a general guiding principle. The nature of the work opportunities provided by Dahll's ventures—on ice lakes, on ships, and in mines—was strenuous and sometimes dangerous, but in this respect did not really constitute a qualitative break with the reality of past generations. At his funeral, gratitude was expressed to Dahll for having provided more work for more people. An example of this is the expanding number of workers living on the estate premises, although it cannot be inferred that all of them were in Dahll's employ. Between 1845 and 1865, the number of people listed in the census for Frydensborg's *Brugssted* ("works community") increased from just under 80 to about 390.⁴³³

Dahll and the other ice entrepreneurs who started up in the 1850s and 1860s depended on an experienced and weathered workforce. This workforce's contribution to profits was little appreciated in the liberal or conservative media. The image of the ice entrepreneur acting as social benefactor and deserving of the "Fatherland's gratitude" was expressed in an 1866 *Morgenbladet* review of Søren Parr's business in the Christianiafjord districts, maintaining that "many mouths are fed by his money, long before he sees a penny on his expenses".⁴³⁴ Similar expressions of the "blessings" (*velsignelse*) of the ice entrepreneurs' activities have survived into family histories of the Biørn and Dahll families in the Kragerø district.⁴³⁵

The final element to be considered is one of competition. While Dahll seems to have captured a central position in Kragerø's ice enterprise by the 1860s, his business was

⁴³³ Cf. above, 5.3.

⁴³⁴ *Morgenbladet*, September 14, 1866: "Mange hundrede Mænd og Heste sættes i Rekvisition, og de kan tjene sin Daler om Dagen og nære Mand og Hest; en lignende Fortjeneste kan Isskjærere ogsaa opnaa. Enhver, der kan finde paa nye Næringsveie, der forskaffer Arbeiderklassen lønnende Sysselsættelse, gjør sig fortjent af Fædrenelandet, lad egen Interesse længe nok spille Hovedrollen. Vil Spekulanten have Sit frem, maa han have Hjælp, og han maa betale for den. Mange Munde mættes ved hans Penge, længe før han ser en Skilling af sit Forskud".

⁴³⁵ Hopstock (1975, p. 250), Dahll (1959, p. 249).

never without competitors. In the early 1850s, he faced competition from both US suppliers and other Norwegians, although it was the latter that came to dominate in the 1860s. The competitive environment was also evolving in the local context, as potential Kragerø-district ice entrepreneurs picked up on the processes of freshwater ice cultivation. In 1860, the *Skaatmyhr* farm was for sale.⁴³⁶ In addition to 80 *maal* of arable land, there was also a marsh that could be dammed, “off which ice [could] be taken for export”.⁴³⁷ In the 1860s and early 1870s, several of Dahll’s fellow Kragerø-district merchants turned to the freshwater system for their own ice enterprises. One of the most forward-leaning of these was Consul Thomas Møller Wiborg (1835–1918), who amassed a number of ice-producing localities.⁴³⁸ Several more local farmers and merchants came to be involved in the ice trade, with or without shipping included. This likely did not cause too much concern for Dahll, considering his solid ice trade network, technological system, and shipping capacity.

After some years, however, the competition—which spelled cuts in the profit margins—was apparently just as much a nuisance as a complement. In January 1873, Dahll and three of the country’s other most prominent ice exporters convened a meeting at the Christiania Stock Exchange. The objective of this meeting was to discuss the ice trade “in general”, but also to bring the ice exporters in unison to prevent “untimely competition”.⁴³⁹ The resolution from the meeting was that the exporters present agreed that “something had to be done to have the ice trade going better”, and to meet at least annually in the capital to discuss the trade. A committee—to which Johan M. Dahll was appointed alongside three leading ice exporters—was convened to propose actions and

⁴³⁶ Likely Skottmyr today, but this is not certain, as the farm is supposed to have been on Børtø.

⁴³⁷ *Kragerø Adresse*, March 15, 1860. (“Paa Eiendommen er Anledning til at opdamme en Myr, hvoraf kan tages lis til Udslibning”).

⁴³⁸ Cf. Chapter Seven, Section 7.2.

⁴³⁹ *Morgenbladet*, January 17, 1873. (“Samling paa Børsen forat diskutere Ishandleen i Almindelighed og specielt for at samle Isexportørene til en større Enighed for derved at forhindre en utidig drevne Konkurrence”).

ensure the execution of any resolutions passed in an undefined future.⁴⁴⁰ In other words, there was no action. The initiative is nevertheless interesting. It was directed against local Norwegian ice croppers who were in the process of striking out on their own, forging their own trading networks on the same markets that Dahll, Parr, and Heftye had tended successfully for about two decades. Some were rival merchants and grocers; some were foreigners with direct investments in ice in Norway. Others were farmers, who had traditionally possessed little in the way of trading rights or options to raise capital outside loans from relatives.

5.7 Conclusion

In this chapter, the emphasis has been on the shift from random occurrences to regular industry in the Norwegian ice trade, amounting to a particular “ice culture”. The transformation accelerated from the early 1850s, but still seeing wide fluctuations in demand. The transformation was first systematically defined by Tore Ourén, and there is no reason to deny his emphasis on climatic fluctuations as a driver of overseas demand.⁴⁴¹ The contribution of this chapter is to connect the shift to the observable actions and strategies of one of the dominant early ice merchants in Kragerø. At the same time, the close study of the “breakthrough” 1851 season serves to illustrate that Johan M. Dahll was never the only player. While certain businessmen were powerful linchpins in their regional settings, the ice industry was decentralized.

How may the transformations in the actual practices of ice exporting have been impacted by the strategic deliberations of a powerful actor like Johan Martin Dahll? He was a businessman who approached profit opportunities in land and mineral resources with the methodical rigor of a *Naturforsker*—a man of the natural sciences. The basis for these approaches can be found in his immediate surroundings and networks. His

⁴⁴⁰ The other exporters were Chistiansen & Co., Larvik, Thomas Heftye, Christiania and Søren Angell Parr, Drøbak/Christiania.

⁴⁴¹ Cf. Chapter One, Section 1.4.

older brother Tellef Dahll became a noted geologist, while his cousin Anton Martin Schweigaard ranks as a primary agent of economic modernization in mid-19th-century Norway. Dahll's modernizing impulse also fed on a practical-minded willingness to learn from, copy, and adapt technologies and practices developed elsewhere.

The rudiments of the freshwater ice harvests, as developed in New England over the preceding decades, were mastered by Dahll and his workers by 1851. In the first few seasons, this mainly concerned shifting to lakes as sources of ice and employing ice ploughs and harvesting methods. These provided the square blocks that could weigh about 200 kilograms, all handled manually with the assistance of ice saws, spikes, and tongs. In the first two or three seasons, the business model was mainly to supply natural ice to other Kragerø and Norwegian shippers who would then take it overseas. Systematic improvements followed in the 1850s and 1860s. Dahll implemented double-walled icehouses insulated by wood shavings or straw, which contemporaries labeled "American" icehouses. It is also apparent that Dahll was an early adopter of the telegraph communications network to enhance his ice trade. After nearly 10 years in the business, Dahll acquired his own ships and much of his product was carried on these to international markets.

The entrepreneur Johan Martin Dahll acted in a time of industrial and infrastructural innovations, which gives reason to further examine the possible "industrial logic" to these events. Dahll developed the industry as a decidedly rural phenomenon, providing opportunities for wintertime employment. The work cycle, with its push to mobilize workers before the spring harvests in the fields, or the departure of ships, did not drain the coastal countryside of workers. As such, the ice industry was basically an incremental innovation to the social system of Kragerø, fitting into the working rhythm of this coastal community. At the same time, it was to become an agent of social change. The system of ice harvesting introduced by Dahll and other entrepreneurs in the 1850s and 1860s opened doors of opportunities for members of the farming class, not only in Kragerø but in other communities on the southeastern coast of Norway. The next chapter turns to one of the main actors from such a background.

6 “A dangerous business”? Ice exporter Thorvald Baarsrud and his times

6.1 Introduction

This chapter moves from the Kragerø district to Røyken, and the studies the leading ice venture of the Røyken parish: the Baarsrud ice business. The case study is chosen to research further aspects of why and how the natural ice industry became a regular occurrence in coastal communities. This chapter, along with the next on Wiborg, is directed towards the last two questions raised in chapter one, section 1.5: How did the ice business feature in the mix of economic activities of different social groups? How can different modes of operation be accounted for? Furthermore, the Baarsrud case provides insights into how the natural ice industry impacted by the competition from “artificial ice”?

Baarsrud provides a metaphorical thermometer for the regional ice business, in periods of strong expansion and notable peaks, as well as gradual and abrupt levels of decline. A reason to concentrate on Baarsrud is the availability of historical source material, stored and catalogued as the AS Søndre Nærsnes private archive at the State Archive in Kongsberg. This has been addressed in chapter three and will only be briefly revisited: Baarsrud's is the only ice business, out of hundreds in Norway, to have left a publicly available, catalogued archive.⁴⁴² One unique asset of the archive is Thorvald Baarsrud's private reflections on the ice business, written down at irregular intervals between 1882 and 1898.⁴⁴³ The manuscripts show Baarsrud's own hand, and were not intended for

⁴⁴² A full catalogue and provenience of the archive (AS Søndre Nærsnes) are in the State Archives at Kongsberg, cf. <https://www.arkivportalen.no/entity/no-a1450-04000000284381> (Retrieved March 3, 2021). In addition, there is also the private collection of Baarsrud material, owned by Knut Baarsrud (b. 1944). This material is not catalogued, but referenced here as KBC, plus detail on the documents surveyed.

⁴⁴³ SAKO P-1359/R/Rb/L0003. It is a collection of pithy and brief instructions, in all approximately 3,650 words (in my transcription).

readership beyond the family.⁴⁴⁴ They were written in the same private ledger that held his annual balance sheets. These reflections are perhaps more precisely termed “instructions”, addressed to his children. They concerned elements like: How to deal with sales representatives and agents in London? Who was the most important customer? In which month would the market conditions of that year become clear? Baarsrud’s frank discussions of these questions provide a direct insight into the outlooks of a Norwegian ice entrepreneur.

6.2 Blueprint for the Røyken ice industry?

Thorvald Baarsrud (1837–1910) was the leading ice producer and exporter of his community, which for all purposes may be defined as Røyken, the rural parish situated some 40 kilometers south of Oslo. Local historiography agrees on this. According to Andreas Killingstad (1873–1946), writing his local history when ice harvesting was still taking place, Baarsrud had been “without comparison” the community’s chief ice exporter.⁴⁴⁵ Thorvald Baarsrud reached that local and regional position through improvements and consolidations. However, he was not the local pioneer of the ice trade.

The processes whereby knowledge of the US-style freshwater ice harvests came into the community did not initially involve Thorvald Baarsrud. However, his brothers were active participants in the initial phase, which reveals some contrasts to the Kragerø case visited in the previous chapter. Generally, however, a similarity was the fact that merchants in nearby towns did much to organize the regional trade. The Drøbak

⁴⁴⁴ Actually: "Det jeg her nedskriver er noget som De beholder for eder selv med hensyn til Ishandelen du maae jo ikke give andre eller Konkurrenterne Oplysning om hvordan man skal bære sig ad".

⁴⁴⁵ Killingstad (1928, p. 160). Martinsen (2004, pp. 74-78) elaborates on Baarsrud’s position in the ice trade. Martinsen utilized the AS Søndre Nærnes archive in his work before it was deposited in State Archive in Kongsberg (which happened in 2014).

merchants and shipowners were instrumental in developing the inner Christianiafjord ice industry from the 1850s onwards. To some extent, this entailed their renting land and water resources from local farmers. In Røyken, however, farmer entrepreneurs came to wield control over the local ice trade, whereas in Kragerø it remained predominantly in the hands of merchant class actors like Dahll and Wiborg. These contrasts were not preordained or simply explicable with reference to social structures: They involved such elements, certainly, but were also the outcome of individual actions and strategies.

In the case of Røyken and Nærsnes, a template for a freshwater ice business preceded the actual operations by a few years. In 1852, a farmer entrepreneur from the neighboring parish of Asker, Martin Blakstad, persuaded brothers Ludvig Adamsen Baarsrud (1826–?)⁴⁴⁶ and Gabriel Adamsen Klemmetsrud (1832–1876) to partner in an initiative to harvest ice on the Baarsrudtjern lake.⁴⁴⁷ Klemmetsrud and Baarsrud were each proprietors of two farms named Nordre Klemmetsrud and Baarsrud, the principal landowners on the Baarsrudtjern lake. At this time, Blakstad was also trying to initiate ice businesses on other lakes in Asker; for example, he had partnered with a Drøbak merchant, Christian Møller, who died shortly after.

Gabriel Adamsen Klemmetsrud was legally still a minor, and as his guardian would not accept the contract, it eventually came to nothing. However, the initiative and the contract contain details that warrant reflection.⁴⁴⁸ There was a stipulation that the ice was to be cut in squares measuring 24 by 24 inches, and this implies the use of US-modelled ice ploughs to checkerboard the surface. It was to have a minimum thickness

⁴⁴⁶ Alive in 1891, according to the census: <https://www.digitalarkivet.no/census/person/pf01052793001149> (Retrieved March 19, 2022).

⁴⁴⁷ The story of the 1852 initiative is related in Thue (1984, p. 72), and Martinsen (2004, pp. 67-68).

⁴⁴⁸ The original contract: SAKO, Lier, Røyken og Hurum sorenskriveri, G/Ga/Gab/L0005: Pantebok nr. 5, 1850-1855, s. 317 Digital link: <https://www.digitalarkivet.no/tl20080429091039> (Retrieved September 8, 2021).

of 12 inches and was to be groomed in advance of harvesting. A surface of about 15,000-square alen (roughly 6 metric acres) was to be kept free of snow and sleet through the winter. Crucially, the contract stipulated a large icehouse on the Nærnes beach. To be furnished with a slated or thatched roofing, and double-boarded framework “responsibly” filled with wood shavings or sawdust, the icehouse was to be large enough to take the full quantity of 2,000 tons of ice and to cost a maximum of 400 speciedaler to construct. This demonstrates that knowledge of procedures linked to the freshwater ice trade was in the public domain more or less concurrently with Johan Martin Dahll’s reorientation of the Kragerø ice business (cf. previous chapter).

The 1852 contract laid out a business model that signals an associative inclination between a town merchant and a group of farmers, and also details the enterprise’s distribution of risk and profits. Essentially, the proprietors (Klemmetsrud and Baarsrud) were to be sub-suppliers on regular terms. They were to deliver to the joint company 2,000 tons of ice every year, at a fixed price of 2 ort—or 40% of the worth of a Norwegian speciedaler—per ton. That price was only a fraction of that offered for Norwegian ice in London in 1851, which was upwards of £1 per ton. The arrangement possibly gave a calculable return on landed property. Still, the farmers had to cover the labor costs of preparing, harvesting, and transporting the ice to icehouses or shipside; one of the contingencies here would be the amount of snowfall during the winter. The Adamsen brothers would then not shoulder the risks and rewards in the volatile ice market, which were firmly in the hands of the ice-exporting companies and individuals. Termination of the contract was exclusively a right for Blakstad and Møller, while the Adamsen brothers were not to sell ice to anyone else. The terms were lined with the prospect that the two young farmers might become partners in the venture, with a combined one-third share. If so, the 400 speciedaler investment in the icehouse was to be divided equally among the shareholders. It is not related whether it was the nature of the terms or the pecuniary risks that prompted Gabriel Klemmersrud’s guardian to reject the contract, but neither is unthinkable.

6.3 Ice exporter Søren A. Parr's Christianiafjord ice producers

Nonetheless, a few years after the rejected contract, ice harvesting and exporting was a reality on the Baarsrudtjern lake. Although its constellation had changed, indications are that the system outlined in that 1852 contract remained a template: farmers supplying merchants with ice from their land, at a fixed rate. The rights to the lake were still principally divided between the two farms of Nordre Klemmetsrud and Baarsrud. Gabriel Adamsen Klemmetsrud was still proprietor of the former; his sister Lisa Adamsdatter (b. 1828) and brother-in-law Johan Hansen (b. 1829) had taken over the latter.⁴⁴⁹ Johan Baarsrud was the first to cut and sell ice from the lake, and this likely took place in 1858. Gabriel Klemmetsrud later joined in with ice from his section of the lake. It is related that cooperation between the two brothers-in-law was not good.⁴⁵⁰ They seem to have operated separate business entities and recruited their own labor and horse drivers. The latter intermittently came to blows on the narrow road of about one kilometer from the lake down to the icehouses in the bay.⁴⁵¹

According to local historiography, for an unspecified number of years, Klemmetsrud and Baarsrud largely supplied one Drøbak ice exporter: Søren Angell Parr (1815–1903).⁴⁵² Parr was a captain, shipowner, and merchant, whose timber-trading father from Yorkshire had settled in Norway in the early 1800s.⁴⁵³ Søren Parr is usually identified as

⁴⁴⁹ Killingstad (1928, p. 580). They had the farm in 1865, cf. census <https://www.digitalarkivet.no/census/person/pf01038093002626> (Retrieved December 5, 2021), but lost it sometime close to 1875. Thorvald Baarsrud obtained it on allodial right in 1879, cf. below. The death years of Lisa A. and Johan H. Baarsrud could not be located.

⁴⁵⁰ Killingstad (1928, p. 160).

⁴⁵¹ Killingstad (1928, p. 160).

⁴⁵² Martinsen (2004, p. 69) and Killingstad (1928, p. 158).

⁴⁵³ Egeberg (1957).

the individual principally responsible for organizing the Christianiafjord ice trade.⁴⁵⁴ As with the Dahlls in Kragerø, Parr was practically born into a trading network, stretching into Britain in particular, but also other North Sea and Baltic ports that were visited by the family's ships. While the claims that Parr more or less singlehandedly established the region's ice trade may be exaggerated, there is no denying that he was a crucial exporter in the 1850s and 1860s.

By the season of 1857, Parr had seven ships sent to "the English Market", five of which were in the spring and two were summer shipments. The subsequent year, prospects were such that he would have more than 3,000 tons sent to the same markets, where prices ranged between 18 shillings and 35 shillings per ton. By this time, the business model was to "collect" product in the icehouses. In March 1858, Parr had more than 4,500 *skippund*, or 720 metric tons, stored.⁴⁵⁵ He eventually came to lease property and ice-cutting rights in at least five different locations in the Christianiafjord, with lakes or ponds in the immediate vicinity of the sea.⁴⁵⁶ By 1862, Parr controlled at least 13 icehouses in the fjord.

A surviving 1859 contract stipulates some of the terms of Parr's organization. It ordered farmer Gunder Verpen, of Sætre on the west side of the Christianiafjord, to deliver the "usable ice" (*den brugbare is*) from his lake at nine skilling per *skippund* to Parr, who

⁴⁵⁴ The best account is in C. H. Holm (1996, p. 217 ff). For a contemporary source, see *Morgenbladet*, November 25, 1869: "Mr. Parr, the first in this part of the country to have initiated rational ice harvesting" (*Hr. Parr, som er den første, der paa denne Kant af Landet har drevet et rationelt Isbrug*).

⁴⁵⁵ *Adresse-Tidende for Brevig, Stathelle og Langesund*, March 3, 1858. The notice is a source for the conversion of volume to weight in 1850s shipments: 3 tons (imperial) per CL is noted as the norm.

⁴⁵⁶ Egeberg (1957, p. 32).

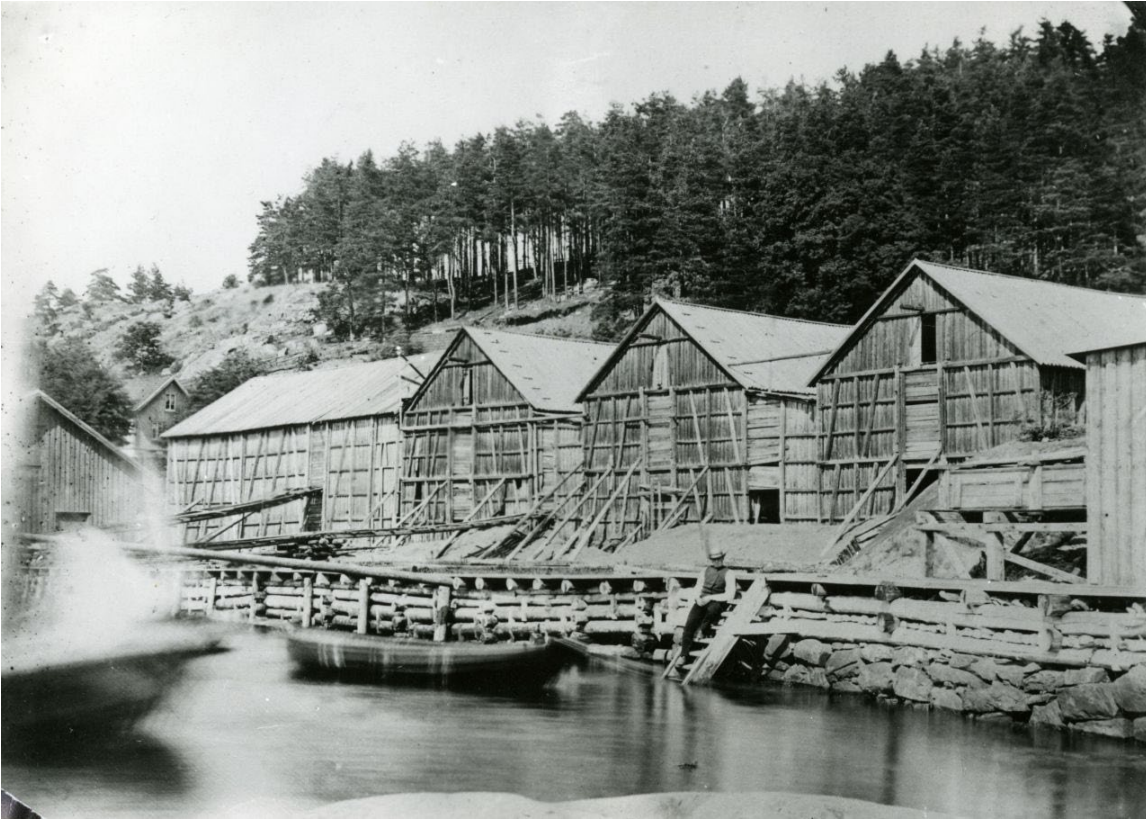


Figure 6.1. Søren A. Parr icehouses in Drøbak. Undated photograph. NSM.3000-024.

was also entitled to rent-free lease of ground for an unspecified number of icehouses.⁴⁵⁷ Despite some differences in the details, the contract was analogous to the thwarted contract from 1852 on Baarsrudtjern lake. It formulated a differentiated set of responsibilities, however, whereby the farmer-cum-landowner was to provide product at a fixed rate for a period of seven years. All risk and profit from shipside to overseas markets was born by the merchant (Parr). Arguably, Parr was still a shipowner primarily and an ice exporter as a function of that. In the 1860s, his share of the family shipowner company was five vessels, ranging from mid- to medium-large tonnage for the time.⁴⁵⁸

⁴⁵⁷ SAKO A-89 Lier, Røyken og Hurum Sorenskriveri, G/Ga/Gab/L0006: Pantebok nr. 6, 1855-1864, s. 333.

⁴⁵⁸ The Parr family fleet of 1837, 1855 to 1856, and 1864 is rendered in Egeberg (1957, p. 27).

As with the ships of his brother, Henry Parr, the vessels plied the Baltic and North Sea trades in timber and ice.

Søren A. Parr's most widely known market move was the appropriation of the Wenham Lake Ice brand name.⁴⁵⁹ Ice from Wenham Lake, in Massachusetts, was on the London and British markets from the 1840s. It could be mixed directly with food and drink and was used "by Queen Victoria and the upper classes".⁴⁶⁰ The company ran into financial trouble and ceased operation sometime in the 1850s, and Parr somehow obtained the right to use the name for his Christianiafjord Norwegian ice. A "couple of years prior to 1864", Parr had a sign reading "Wenham Lake" installed beside the Oppegårdtjernet lake, the nominal rechristening obviously to secure a commercial excuse.⁴⁶¹

The ice business of Parr made use of several localities and resources. An interesting question is what his function was in establishing the ice industry on the Baarsrudtjern lake? He is credited with being the first to erect an icehouse in the Nærnes bay area.⁴⁶² Local historian Killingstad identifies Parr as the one who laid down the requirements of regular-sized blocks, 22 inches squared, and free of chewing tobacco since the ice was destined for "the lords of London".⁴⁶³ Parr seems to have been the principal shipper of the product, at least in the early 1860s. While he trusted the farmers to harvest, transport, and store the ice on land, the stowage on board the ships was exclusively handled by Drøbak stevedores.⁴⁶⁴ These tasks were gradually taken over by the local workforce. It is not reasonable to doubt Søren A. Parr's crucial role in setting up the

⁴⁵⁹ An occurrence repeatedly mentioned in US ice and refrigeration histories, cf. Cummings (1949 p. 48), Dickason (1991).

⁴⁶⁰ Dickason (1991).

⁴⁶¹ C. H. Holm (1996, pp. 216-217).

⁴⁶² Killingstad (1928, p. 192).

⁴⁶³ Killingstad (1928, p. 158)

⁴⁶⁴ Killingstad (1928)

commercial viability for the Nærnes and Røyken ice trade, but on exactly what terms this rested is a bit unclear.

In contrast to what can be demonstrated in the neighboring parishes of Hurum and Asker, Parr does not seem to have registered long-term rental agreements on icehouse or lakes in Nærnes or Røyken.⁴⁶⁵ This also holds for the kinds of agreements that would be registered in the public records as a charge on property, and not “ice contracts”. Parr was likely also a significant buyer of Nærnes and Røyken ice, although the terms may have varied somewhat. This was in the phase before the mid-1870s. In the years between 1874 and 1894, only one contract from 1888 for ice sales between Parr and Baarsrud has survived.⁴⁶⁶

6.4 Farmers moving in

Perhaps Parr's hold on Røyken was more restricted than has been assumed. The crucial point, however, is that by the mid-1870s, the time when Thorvald Baarsrud was establishing his position in the industry, there were a number of actors active in the local ice business.⁴⁶⁷ In 1871, a visitor from Bergen noticed that the inner Christianiafjord coastline and islands were “teeming with icehouses”.⁴⁶⁸ Like in the neighboring districts of Hurum, Asker, and Nesodden, the Røyken business was a composite of local initiatives and outsiders, many of whom were British nationals. Ice had emerged as a crucial cargo for outbound local shipping, but there were also foreign vessels coming in to fetch the

⁴⁶⁵ The most likely place for such agreements to have been publicly registered is SAKO A-89 Lier, Røyken og Hurum Sorenskriveri, G/Ga/Gab/L0006: Pantebok nr. 6, 1855-1864.

⁴⁶⁶ KBC: Ice contracts 1874–1894.

⁴⁶⁷ This section builds on Martinsen (2004, pp. 71-79).

⁴⁶⁸ *Bergens Adressecontoirs Efterretninger*, January 19, 1871. “Nu er Ishandelen almidenlig udbredt over hele den indre Del af Kristianiafjorden; navling vrimler Askerlandet og de derved liggende Øer af Ishuse”.

“steel ice” from Baarsrudtjern and other lakes and ponds. There were (at least) eight icehouses in operation by 1876.⁴⁶⁹

The exporting based on the Baarsrud lake induced more people to get involved, both locals and outsiders. Christiania merchants O.N. Tandberg and G.G. Maarud had registered rights in at least two of the icehouses. In 1870, Maarud had purchased “the rights to the icehouses at Nærsnes and Nærsnesstranden belonging to the Baarsrudtjern lake” from debt-ridden Johan Baarsrud.⁴⁷⁰ In 1867, Drammen lawyer Jens Arbo Schwartz (1831–1898) had acquired the right to flood a parcel of land for an ice pond for a minimum of 30 years.⁴⁷¹ Another individual, whose relatively short duration in the Nærsnes district is still remembered, was the English proprietor Charles Bamford (1839–1882). He owned the Søndre Nærsnes farm from 1869, and his widow sold the property to Thorvald Baarsrud in 1883. Bamford came to the district in a futile search for silver ore, and Nærsnes was only one of the places in Norway in which he resided. Bamford, or his local steward, developed an ice business on two ponds on the farm's premises.

The outside merchants and entrepreneurs thus did conduct business with the Røyken and Nærsnes farmers, whose strategic focus shifted. They became more active in the dealings of the ice trade, some having more fortunate outcomes than others. The brothers-in-law Gabriel Adamsen Klemmetsrud, at the Nordre Klemmetsrud farm, and Johan Hansen, at the Baarsrud farm, were rivals to the Baarsrud lake ice harvests (as indicated above).

Johan H. Baarsrud fell on hard times, which is in no small measure attributed to his attempts at striking out on his own in 1865 as ice producer *and* shipper. He had

⁴⁶⁹ *Morgenbladet*, September 15, 1876. (Sales advertisement for Nordre Klemmetsrud).

⁴⁷⁰ KBC: "Gjenpart. Pantobligation 2. okt. 1899" (with appendices), "I skjøde af 9de thl. 15de februar 1870 overdrager Johan Baarsrud sin ret i Baarsrudkjernet til ishusene over Nærsnes og Nærsnesstranden til G. G. Morud".

⁴⁷¹ Myrvang (2017) The dam, which still exists, is known locally to this day as “Svartsedammen”.

contracted the bark *Vestalinden* from local shipbuilder (and ice farmer) Christopher Larsen Morberg (1810-1886), for the purpose of transporting his own ice overseas.⁴⁷² Johan Hansen, however, did not have the crucial overseas networks, and from the context it seems the ice was shipped without a contract.⁴⁷³ It is not entirely clear whether this failed venture alone was the cause of Johan Hansen Baarsrud's downfall. He and his family, counting Thorvald Baarsrud's elder half-sister Lisa, were eventually evicted from the Baarsrud farm in the late 1870s. Johan Hansen Baarsrud's fate served as a cautionary tale regarding the inherent risks of the ice trade: at least, it did so for Thorvald Baarsrud, who in 1884 reminded his children to "always accumulate funds on the year's activities, only one example: J. Baarsrud who had to witness his estate being sold off to strangers and having to go as day laborer after".⁴⁷⁴ Little is related about how the debacle of such a social fall was handled by the actual people affected. However, in the context of Thorvald Baarsrud's allusions to "honor" and admonishment to his children about not "doing anything you may regret", he likely would prefer death to the fate of his brother-in-law.

While this chapter is devoted to Thorvald Baarsrud's ice business, it must be noted that there were several other successful "ice farmers" in the Røyken community. Shipbuilder, farmer, and ice harvester Christopher Larsen Morberg (see above) built a more diversified, low-risk venture that included ice harvesting on his own premises, being the first in the district to erect ice dams in the 1860s.⁴⁷⁵ Other farmers in the community in

⁴⁷² The ship was taken over by famous Norwegian shipowner Petter Olsen in 1866, cf. <https://kulturnav.org/2e6360ba-849b-4272-bcb5-32dad31b5d88> (Retrieved March 19, 2022)

⁴⁷³ Cf. Martinsen (2004, pp. 71-79), and Killingstad (1928, p. 154).

⁴⁷⁴ SAKO P-1359/R/Rb/L0003: "Kjære Børn, jeg vil give eder et godt Raad med paa Veien, vis eder aldrig karig imod eder selv eller andre, men heller ikke overflødig, bortkast aldrig Penge der naar Dem kan spares, og stel eders Økonomiske Stilling saaledes at de altid har lagt dere op lidt i Aarets Løb naar di gjøre op deres Regnskab, kun et Exempel i J: Baarsrud som maatte se sin Eiendom solgt ved offentlig Auction til andre, og selv gaa som Dagarbeider bagefter".

⁴⁷⁵ Morberg's was apparently a very close husband and wife cooperation, with the wife Oline Adamsdatter Morberg (1813-1885) handling business correspondence as the nominal head of the family was illiterate, see Killingstad (1928, p. 153).

the ice trade included the families Graff, Ramton, and Høvik. The proprietor Bernhard Kjekstad, owner of the largest farm in the “inland region” of Røyken, also invested in ice, but he had his ice ponds in Knivsvik, in the neighboring district of Hurum.

By the early to mid-1870s, after more than 10 years in the business, Gabriel Klemmetsrud had established a regular ice business on the Baarsrudtjern lake. Surviving correspondence from Klemmetsrud’s hand on the 1875 and 1876 seasons documents that he had direct relationships with a number of agents and brokers, primarily in Britain, but also in the Netherlands and Belgium.⁴⁷⁶ The dominant names in the correspondence are ship and assurance broker James Jepps, of 24 Leadenhall Street, in the City of London, and Vincent Sheppard of Newcastle-upon-Tyne.

The most prized business was obviously that of London coffee, ice cream, and restaurant mogul Carlo Gatti.⁴⁷⁷ Broker James Jepps acted as clearing and sales agent, with a 5% commission. This arrangement was to last for decades. The parties had a printed ice contract template, in which “G. Klemmetsrud, Esq. of Røyken, near Drammen” signed agreements for sales of “Fresh Water ice, to be in square blocks, clean and free from snow, as customary, shipped from his Steel Ice Lakes in Røyken”.⁴⁷⁸ Klemmetsrud’s own correspondence to brokers are in the Norwegian (i.e., Danish) language—an indication of the overseas contacts’ general trade connections with Scandinavia. Some of the overseas broker houses were (partly owned and) run by Norwegians/Scandinavians, for instance Brodersen & Vaughan of Liverpool.

⁴⁷⁶ SAKO P-1359/B/Ba/L0001. This is a copy book marked 1878, but contains some folios of Klemmetsrud’s correspondence dating back to 1875. Thorvald Baarsrud continued the same protocol.

⁴⁷⁷ Cf. Kinross (1991), and chapter five.

⁴⁷⁸ KBC: Ice contracts 1874–1894. Original capitalization of words.

6.5 From shipmaster to ice exporter

Evidently, Gabriel Klemmetsrud had done a great deal to promote the “steel ice” from “his lakes” in the years before his death at 44 years, in 1876.⁴⁷⁹ A telling sign is Thorvald Baarsrud use of a standard ice contract for many years whose heading ran “Thorvald Baarsrud, Røyken—*Successor to the Late G. Klemmersrud*—Ice Exporter”. This template was used well into the 1890s, although by then it was one of several editions of Thorvald Baarsrud’s contracts. It is a token of collaboration years ahead of the formal takeover as “successor”. In July 1874, Thorvald Baarsrud acted as independent ice trader in London for a cargo of 200 to 300 tons of ice aboard the ship *Ansgard*, using Klemmetsrud’s template contract for a sale made to Carlo Gatti.⁴⁸⁰ A letter from Gabriel Klemmetsrud to Thorvald Baarsrud in London on August 3, 1876, indicates that Baarsrud acted on occasions as agent or broker for Gabriel Klemmetsrud.⁴⁸¹ The two instances more than hint at Thorvald Baarsrud’s acquiring direct access to customers, above all the treasured Gatti business. Correspondingly, he gained a host of specific skills relevant to the ice trade before he established a business on his own. Baarsrud’s apprenticeship was framed within a traditional kinship structure of “mutually dependent and complementary roles”.⁴⁸²

Thorvald Baarsrud started in ice when he was nearly 40 years of age; however, it was not coincidental that he settled in Nærnes to do so. He was born into a family with a lineage stretching for generations in the community, and his childhood and early youth was on the Baarsrud farm. As son number three in the second marriage of his father, Adam Gabrielsen (1800–1847?), he faced limited prospects of property inheritance. However, he did hold entitlements under the Norwegian *odal* (allodial) system for land

⁴⁷⁹ Formulation in SAKO/P-1359/B/Ba/L0001.

⁴⁸⁰ KBC: Ice contract 1874.

⁴⁸¹ SAKO/P-1359/B/Ba/L0001, folio 94.

⁴⁸² Burke (2005, p. 54).

property. Thorvald Baarsrud “left the home of his forefathers” at the age of 15 to go to sea. He worked his way—in his own words, “step by step”—to become ship captain in 1864.⁴⁸³ The first ship under his command was the 292 CL *commercelæster*, Swedish-built (1854) and formerly British-owned *Manila* of Drammen. Although plying the North Sea and Baltic with sundry freight, possibly sometimes ice, the *Manila* is also listed as a ship that took emigrants to Canada.⁴⁸⁴ Baarsrud was in charge of the ship for at least five years.

According to family lore, it was as captain of the *Manila* that Thorvald Baarsrud met lone émigré Kirsten Hansdatter Hiiden (1847–1935) from the (inland) Hadeland district.⁴⁸⁵ Thorvald dissuaded Kirsten from her plans, apparently setting his sight on returning with her to the “home of his forefathers” after their wedding in Chicago in 1868. Kirsten Baarsrud was eventually to give birth to 11 children, of whom 9 made it to maturity, between 1869 and 1889. By 1875, the family of five were tenants on the Østre Grini farm in Røyken.⁴⁸⁶ Thorvald Baarsrud was recorded as “shipowner and skipper” (*Skibsreder og skipper*), in both capacities connected to the full-rigged, 350 CL *Sophie* of Drammen, owned by “A. Tofte with others”.⁴⁸⁷ By his own account, Baarsrud finally quit life at sea

⁴⁸³ Quotes from SAKO P-1359/R/Rb/L0003. Full transcript of passage: “Nu ogsaa lidt om mig selv jeg forlod Fædrene Hjemmet da jeg var 15 Aar og gik til Søes maatte arbeide mig Skridt for Skridt frem til jeg blev Skibsfører i 1864, jeg maatte hjelpe mig selv hele Tiden, til den Dag i dag, og vil haabe at mine Børn og Efterkommere vil vide at holde Navnet Baarsrud i Agt og Ære, og ikke indlade sig paa noget som man behøver at blues for”.

⁴⁸⁴ Bio of the ship in NMM Malmstein Register: <https://kulturnav.org/c6dbf544-de43-43e2-a22a-f9fb33b2dc25> (Retrieved April 29, 2021). Notice of the *Manila* departing Gravesend for Härnösand, July 1865, with Baarsrud as skipper, *Morgenbladet* July 11, 1865. Baarsrud’s account for the *Manila* for December 1864 and January 1865, while in Fredrikstad, is kept in SAKO P-1359/R/Rb/L0001.

⁴⁸⁵ AS Søndre Nærnes historiehefte, p. 15. DNV registry 1869 lists T.A. Baarsrud as the captain of the *Manila*.

⁴⁸⁶ 1875 census post (Retrieved Apr 29, 2021): <https://www.digitalarkivet.no/census/person/pf01052125000107>.

⁴⁸⁷ *Det Norske Veritas Fortegnelse 1876*, p. 329.

in 1876. By then, he had accumulated the funds, networks, and trade-specific knowledge to get a start in ice.



Figure 6.2. Thorvald Baarsrud, undated (but after 1880). Photographer Rude. Picture courtesy of Jon Hovind, see appendix 9.3.

Following the purchase of the Nordre Klemmetsrud farm from his late brother's widow Karoline Klemmersrud in late 1876, Thorvald Baarsrud's career as an ice business owner, and manager, spanned some 33 years.⁴⁸⁸ Each season represented a combination of generally similar main factors: climate fluctuations home and abroad, negotiating ice contracts, and chartering ships. The overall trend was years of growth up to about 1900, after which the years were challenging and yielded reduced profits. This picture hides major annual fluctuations that must have hardened everyone involved, serving to counterweigh sanguine notions about the long-term future of the ice business.

As a sailor and ship officer, Thorvald Baarsrud acquired skills and knowledges that were crucial in his later business life as an ice exporter. He would be instantly aware of a ship's capacities and well acquainted with shipowners, brokers, and the merchant fleet of his region. Equally significant, he knew from firsthand experience about the busy ports of metropolitan continental Europe, Britain, and North America, rather a far cry from the piers of the Christianiafjord.⁴⁸⁹ The neatly kept accounts also document that Thorvald Baarsrud, like any captain acting as agent for his principals, was attentive to the recordkeeping aspect of his business transactions. Baarsrud mastered the English language, extensively documented in his ice correspondence. While this fact would not distinguish him from fellow ship officers or town merchants, it did in the local setting of rural Røyken. Gabriel Klemmersrud's remaining correspondence is, as noted above, all in Norwegian (i.e., Danish).

Baarsrud writes, quite matter-of-factly, about weather and climatological turns—likely a vestige of his years at sea. In itself, a career as a seafarer does not fix a person's viewpoints "meteorologically", even when weather was a matter of life and death. In broad terms, however, his viewpoints could be positioned along a continuum from

⁴⁸⁸ Karoline Klemmersrud (1831–19xx?) became a childless widow. In the 1891 and 1900 censuses, she was listed as economically self-sufficient (*lever af sine egne Penge*), but evidently had to move around late in life, cf. <https://www.digitalarkivet.no/census/person/pf01037122003880>

⁴⁸⁹ Some of his journeys in a ship accounts ledger date back to 1864, in SAKO P-1359/R/Rb/L0001.

rigorous traditionalism to the emerging scientific procedures of meteorology. An overriding manifestation of the latter was to drastically shorten the time horizon for prognostications. It went from years to hours, or a maximum of a few days ahead, and with the specific aim and justification of forecasting storms at sea. The 1854 almanac witnessed the University of Christiania's last printing of an entire annual weather forecast based on a 19-year lunar cycle, an indication of weather-related ambiguity stretching well beyond the uneducated masses.⁴⁹⁰ There is little in the material from Baarsrud to position him clearly regarding such matters, other than perhaps that, ultimately, it was subject to God's will. In terms of pragmatics, Thorvald Baarsrud, both a farmer and seaman, would be doubly inclined towards self-sufficiency in assessing the weather. He may as well have been close to the norm described in the early 1870s by Henrik Mohn (1835–1916), the first director of the Norwegian Meteorological Institute. Mohn wrote on the "seaman on the ocean and farmer without access to telegrams" using the barometer and thermometer, in combination with experiential local weather signs, to make reasoned, but limited judgments of the future weather.⁴⁹¹ At the same time, Mohn emphasized the advantage for those with access to information on a "greater surface of the earth"; their use of "the instruments" coupled with "good insights into the science of weather" would be vastly superior to the pragmatism of the farmer or seaman.⁴⁹²

Baarsrud had a good grasp of the risks of the ice trade more or less as he entered it. A basic element of that risk was the forwarding of expenses on uncertain contracts. Although this risk element was hardly unique to the ice trade, it was a feature praised in the press, as noted earlier when *Morgenbladet* wrote of Søren Parr that "many mouths are fed by his money, long before he sees a penny on his expenses".⁴⁹³ In Baarsrud's

⁴⁹⁰ Nilsen (2016, p. 32).

⁴⁹¹ Mohn (1872, p. 288) My translations.

⁴⁹² Mohn (1872, p. 288). Baarsrud had ample access to telegrams, however.

⁴⁹³ *Morgenbladet*, September 14, 1866. Cf. chapter five above, section 5.6.

case, the financing of the winter work was conducted partly on credit, at least in the initial seasons. In an 1877 letter to the *Christiania Bank og Kreditcasse*, Baarsrud requests an extension “without down payment” for a bill of 9,000 kroner due December 31, on account of the “times being hard” and “having a large stock of labor employed during the winter in my ice business”.⁴⁹⁴ Baarsrud wanted the bill to be extended until the summer, which he was granted, securing liquidity for the season. His appeal to social responsibility must have weighed in.

Decisions based on the outlook for the coming season would impact the need for laborers. In Røyken, ice labor was generally piecework, but apparently with some exceptions for supervisory roles (“foremen”). Baarsrud’s accounts seem to corroborate a marked “productivity increase” in ice labor roughly between 1880 and 1900, which will be investigated below. First, however, this section will attempt to attach some numbers to the growth of Baarsrud’s ice business, and what this signified to him and his family, as well as indirectly to the community. The growth was a result of strategic dispositions, which will also be illuminated.

6.6 Years of growth: From 5,000 to 20,000 tons per year

An analysis of Thorvald Baarsrud’s accounts of the two first seasons of ice trading, 1877 and 1878, indicates that the volumes produced and shipped hovered around 4,500 to 5,000 RT.⁴⁹⁵ Both seasons were bull years in the national average, 1877 being the first year with recorded exports exceeding 200,000 RT.⁴⁹⁶ Although the volumes are an estimate on the basis of registers of turnover and listed voyages, they provide a base expression for the size of Thorvald Baarsrud’s ice business when he took over about half of the Baarsrud lake rights. What is evident, and addressed in general terms in local

⁴⁹⁴ SAKO/P-1359/B/Ba/L0001, folio 105. Letter to Kredittkassen December 15, 1877. The connection with the bank was established by Gabriel Klemmersrud, cf. same source, folio 31.

⁴⁹⁵ SAKO P-1359/R/Rb/L0001.

⁴⁹⁶ Cf. table 9.1.1., appendix.

historiography, is that Baarsrud's output grew over the following years. First, he seized control of the entire Baarsrudtjern lake production with the purchase of his childhood home, Baarsrud farm, in 1879. With regards to this farm, he had an odal right, but had to buy it for 28,000 kroner. In Thorvald Baarsrud's view, it was a pricey valuation that he read as a sign of an "opinion against me".⁴⁹⁷ Still, it was imperative that he get the farm, for the ice business as well as to stop the "family odal estate" from once again "falling into the hands of strangers".⁴⁹⁸ This was three years after sister Lisa and brother-in-law Johan Hansen Baarsrud had to let the farm go (cf. above).

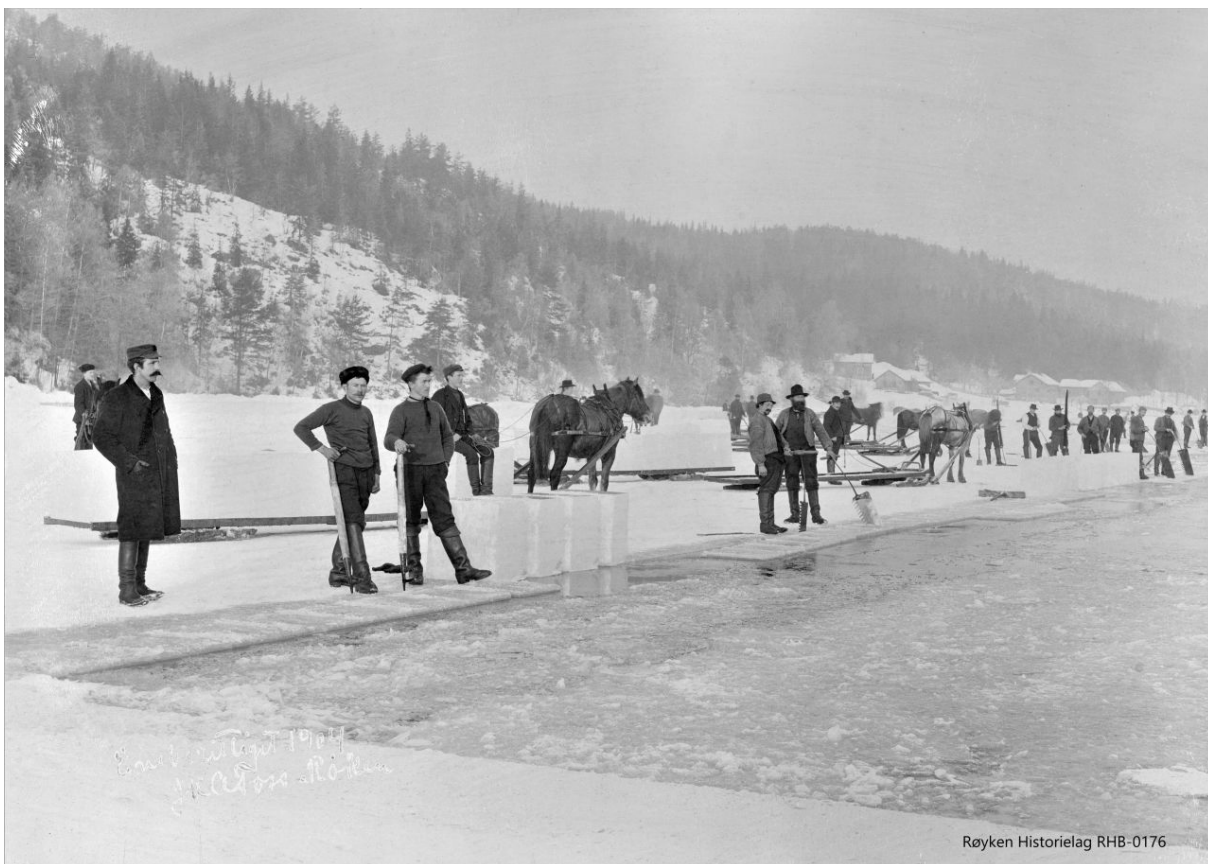


Figure 6.3. Ice harvesting and transports Baarsrudtjern lake, 1904. Adam Baarsrud to the left. Photographer unknown. Picture in the *Røyken historielag* collections.

⁴⁹⁷ SAKO P-1359/R/Rb/L0003.

⁴⁹⁸ SAKO P-1359/R/Rb/L0003.

Thorvald Baarsrud purchased the Søndre Nærnes farm from the *enkefru* (widow) Bamford in 1883 for £3,500, gaining unhindered access to the sea and icehouse grounds as well as taking over production capacity on the farm.⁴⁹⁹ In his own words, this implied “some debt”, but the exceedingly good ice season of 1884 meant that he would be able to pay down “most of it”. At the time of purchase, there were ice dams on the premises, but these were replaced in the late 1890s by two dams (Nydammene). These dams, along with a workers’ barracks that still stands on the premises, represented the last major investment by Baarsrud directly related to the ice business.

Thus, the Baarsrud ice company’s fixed assets were primarily an agglomeration of property rights—water, roads, and moorings—pertaining to the three farms. This formed the productive area for what Baarsrud referred to as “my ice”. There was one direct investment in another ice venture, the Yggeseth Iscompagni, established in 1885 just across the border of the Asker parish at Bjerkås. It had been established as a “limited liability” company operating three dams, by a consort of local farmers and Christiania merchants in 1885.⁵⁰⁰ Baarsrud took over Christiania wholesaler Ludvig Olsen’s 25% share of the company in October 1898, and apparently acted as a commercial manager for the company.⁵⁰¹ In a way, this served to bring the company quite close to the commercial networks established by Baarsrud. The ice produced by the Yggeseth company was an important appendix to the Baarsrud production in the generally difficult years of the early 1900s.

While there were annual variations, the above translated to a growth in ice-production capacity to about 20,000 register tons, or roughly a quadrupling over some 10 to 20 years. Both 1893 and 1898 totaled this figure or slightly above it, with the overall profits

⁴⁹⁹ Transferred into an obligation loan for 1 to 2 years to Bamford, set at 27,800 kroner.

⁵⁰⁰ SAKO/P-1359/A/Aa/L0003 Møtebok og kassabok for Yggeseth Iscompagni.

⁵⁰¹ SAKO/P-1359/A/Aa/L0003. Baarsrud bought the share for 6,750 kroner; Olsen had a return of 170% on his investment from 1885 to 1898.

for 1893 being about 6,000 kroner⁵⁰²—a somewhat mediocre sum. In the boom year of 1884, Baarsrud professed to have made in excess of 12,000 kroner on a single shipment.⁵⁰³

The year 1898, which marks the all-time high for national ice export levels with some 554,000 RT, Baarsrud's reports his total sales to have been 22,000 RT.⁵⁰⁴ In 1905, when the markets were down and a reportedly mild winter "since the end of January" had impeded lake ice growth, Baarsrud sold 15,000 RT, of which 1,191 were collected "elsewhere".⁵⁰⁵ This hints at a practice of subcontracting ice from other ice harvesters, which he did despite cautioning his sons about the risks of "speculation in other men's ice". In Baarsrud's 1891 view, it was futile to try to make a profit from buying and selling ice produced in other places than on the Baarsrudtjern lake. He felt this would only result in losses. Baarsrud stated that even just a "shilling or two" more on freight, presumably per ton, would mean "giv[ing] away just about everything you have sold".⁵⁰⁶ The important thing was to sell what was produced on the family's own property.

This basic precept reveals Baarsrud's "agricultural logic" to the ice business. To Baarsrud, ice was a bounty of the land, although it was a special commodity—one that had allowed him to accumulate more land in the first place. And this was just not any land, it was the family properties that destiny, and his own hard work, had put him in a position to pass on to his offspring. The outlined logic was rather paradoxical: While Thorvald Baarsrud

⁵⁰² KBC: "Issalg 1893".

⁵⁰³ SAKO P-1359/R/Rb/L0003.

⁵⁰⁴ SAKO P-1359/R/Rb/L0003.

⁵⁰⁵ SAKO P-1359/R/Rb/L0005. The 1905 account is likely unique in that Thorvald Baarsrud compares his own sales with the national total: 300,000 RT. That figure corresponds closely with the one supplied by historical statistics (cf. table 9.5.1). He also provides an estimate for the total ice storage capacity of Norwegian icehouses, which he puts at 250,000 RT. A majority of these he reports as "emptied" in 1905.

⁵⁰⁶ SAKO P-1359/R/Rb/L0003, 1891: "[G]aar Tiderne op og Fragtforskjellen bliver en a to Shilling høiere end beregnet, saa er det give bort omtrent det Du har solgt, Speculer aldrig i anden Mands Is til høie Priser da dette medfører som oftes Kuns Tab. Naar De kuns sælger hvad di producerer saa kan di ikke ruinere eder[.]"

himself was more than a “farmer ice cropper” and demonstrably did sell “other men’s ice”, he did not trust his sons to do so viably. In terms of the farming social context, he was exceptional; his family background was not.

6.7 Personal profits and ripple effects

The indicated quadrupling of production translated into several social effects. On one level, there was the observable wealth accumulation. Although profits fluctuated from shipment to shipment and year to year, the ice business was the prime driver in making Thorvald Baarsrud and his family affluent. According to his own estimations, Baarsrud’s worth increased more than tenfold, from 26,930 kroner in 1877 to 397,471 kroner in 1910, the year of his death. In this stretch of time, 1901 was the zenith, when he reckoned his worth to be 409,381 kroner.⁵⁰⁷ That same year, the Røyken municipality estimated the total assets of its 1,269 taxpayers to be 3,135,150 kroner.⁵⁰⁸ The municipality would know very well that Thorvald Baarsrud was among its wealthiest men, but exactly how they estimated his assets is not clear.

Baarsrud’s wealth was a conglomerate of three farms, with their corresponding amenities, lakes and ponds, cropland and pastures, buildings and inventory, livestock, and forests. By 1900, it also included a brickyard in the Nærsnes bay, one of several such in the community largely catering to the construction industry in nearby Christiania and Drammen.⁵⁰⁹ The farm properties formed the principal capital base for all of Baarsrud’s economic activity, in ice or otherwise.⁵¹⁰ Security in property was the only way to obtain short-term (one-year, although frequently prolonged) credit for cost outlays on ice

⁵⁰⁷ SAKO P-1359/R/Rb/L0003. The “Status bog” records non-audited figures from Thorvald Baarsrud’s own hand (i.e., private estimations of his worth).

⁵⁰⁸ Killingstad (1928, p. 445). The ratio of taxpayers to total population circa 30%.

⁵⁰⁹ Martinsen (2004, p. 91): Experiencing a dramatic downturn around 1900, Baarsrud’s brickyard was farmed out to a Danish company before shutting down in 1920.

⁵¹⁰ In 1885, Thorvald Baarsrud estimated the value of his three farms to be at 220,000, out of a net fortune of 234,100 kroner, cf. SAKO P-1359/R/Rb/L0003.

worker payments, chartering costs, and other expenses. Growing out of this capital base were bank accounts, investments in ships and industrial corporations, and outstanding claims with overseas ice merchants, as well as to people in the community, relatives, and associates in the Baarsrud network.⁵¹¹ Usually, only limited amounts of cash would be kept at home.⁵¹² The net value of liquid assets were offset by the year's debts, of which ice business (obligation) loans formed a major part.

Thorvald Baarsrud especially valued the Søndre Nærsnes farm acquisition in 1883. The value of this property was listed at 120,000 kroner for many years, while the other two with the actual rights to the main ice-producing lake, Klemmetsrud and Baarsrud, were valued at 50,000 each (still almost double what he actually had to pay for the Baarsrud farm, cf. above).⁵¹³ As the farms' amenities constituted the main capital assets for the ice trade, the feedback loops were strong. In other words, the ice trade prospects were directly reflected in the estimations of net worth.⁵¹⁴ This is most evident with the purchase of the Søndre Nærsnes property, which by a stroke provided vital storage and shipment grounds in the Nærsnes bay area, in addition to the existing water rights for the lake.

A composite question is the contribution of Baarsrud's ice business to the local economy. In 1900, the municipal committee of Røyken wrote in a review that the ice business was the "subsidiary income" that had contributed the most to local prosperity over the preceding 40 years. It had "brought thousands of kroner each year" to the

⁵¹¹ The evolving credit structure from 1877 to 1910 in the "Status" (SAKO P-1359/R/Rb/L0003) provides a great deal of detail on these matters.

⁵¹² 1884 has 800 kroner as *Kontanter i Kassen* (still a sizeable sum).

⁵¹³ SAKO P-1359/R/Rb/L0003.

⁵¹⁴ This 1886 statement: "Det ser nu ud til at Ispriserne blir saadanne at denne Forretning ikke bliver Lønnede længere, derfor maa nu Eiendomspriserne sættes ned saa at min Status vil vise langt lavere Formue 1887 end den gjorde 1886".

community.⁵¹⁵ Presumably, the committee had in mind the revenue going to the ice exporters, to the workers and their families, as well as to the parish coffers in the form of taxes.



Figure 6.4. Ships loading summer ice in the Nærnes bay, photo ca. 1890-1910. Photographer unknown, photo AS Søndre Nærnes.

The ice business was taxed by local authorities in Røyken at least since 1870, when the municipality decided on a tax of 1 Norwegian shilling per CL (= 2.1 RT) of Røyken ice shipped.⁵¹⁶ This rate entails that Baarsrud's late 1870s exports would annually be taxed

⁵¹⁵ Martinsen (2004, p. 192): "Her fra Bygden har nemlig I de sidste 40 Aar foregaaet en ikke ubetydelig Isudskibning som har bragt Tusinder af Kroner hvert Aar".

⁵¹⁶ Martinsen (2004, p. 188).

about 80 kroner.⁵¹⁷ This taxation underwent an increase, which varied from year to year, and with a wide discretion for deductions. Nonetheless, Baarsrud's ice account for 1899 documents that the business was charged 550 kroner in "state tax" and 1,200 kroner in local taxes.⁵¹⁸ What did this mean in a local context? The total 1901 budget of the municipality (i.e., the primary recipient of the taxes) was 51,529 kroner. This sum was parsimoniously activated to cover the expenses of "local self-government". There were 8 schools staffed by 7 teachers, paid "on average 15.40 kroner per week".⁵¹⁹ Taxes also financed poor relief for 176 people, "among others 27 children born out of wedlock". Of the total budget, "assets and income" were taxed at nearly 45,000 kroner and the earlier agricultural land tax accounted for about 4,200.

Employment from and ripple effects of the ice industry in Røyken have been addressed in local historiography. Killingstad holds that the Baarsrud ice works employed "as a rule, each year", 20 to 30 ice cutters and 30 to 50 horses for a period of 7 to 9 weeks.⁵²⁰ In general, 1 horse would be accompanied by 1 man, giving a range from 50 to 80 men depending on the business cycle. Other relevant tasks were snow shoveling, icehouse stowage, and stevedoring on the ships. He writes that, in the top ice-exporting years, 200 people from Røyken (of a population of circa 4,100) received an income from the ice trade.⁵²¹ That includes all activity on all the ice works in the parish, not just Baarsrud's, whose business nonetheless made up a sizeable portion. Only a fraction of workers would be employed full-time. Martinsen illustrates this by pointing out that 56

⁵¹⁷ 5,000 RT at 1 kroner per 63 RT. The ice accounts have no entry for taxes in 1877 and 1878.

⁵¹⁸ SAKO P-1359/R/Rb/L0005.

⁵¹⁹ Killingstad (1928, p. 445).

⁵²⁰ Killingstad (1928, p. 160).

⁵²¹ Martinsen (2004, p. 73).

individuals described themselves as “ice workers” in the 1900 Røyken census⁵²²—the census year closest to the pinnacle ice-exporting years of 1898 and 1899.

Thorvald Baarsrud worked his way up to become a significant local employer. His ice business also yielded considerable tax returns for the municipality. Moreover, the local economic significance of the ice industry meant that its leading entrepreneur became a person of great importance in the local community. In his writing, Baarsrud often expresses a profound attachment to it, a sentiment that was undoubtedly reinforced by the successful consolidation of the family estates under his ownership.

6.8 Ice laborers: More work for less pay?

Although yielding shifting profits, Thorvald Baarsrud's ice business stayed well afloat through the cyclical turns of the trade, at least during his lifetime. How was this achieved? The answer, in broad terms, is rooted in his managerial strategies: a combination of flexible business approaches and constant surveillance of the freight market. The extent to which this answer lies in Baarsrud's personal characteristics, prudence, and work ethic has been highlighted; in the next section, it will also be demonstrated that Baarsrud also viewed himself in this light. Before that, however, it must be pointed out that the causes of growth, which benefited Baarsrud personally, were also to be found in the productivity increase in ice labor. Workers had to produce more for roughly same pay, viewed between the 1880s and circa 1900. There are no indications that this trend reversed in subsequent years, although it may have abated.

Local ice workers' tacit skills and productivity improved over the decades, contributing crucially to Baarsrud's profits. The entry point to this insight is Killingstad (1928), based on information from still-active ice cutters and exporters. Lacking somewhat in precision, Killingstad relates that in “the first period” a team of ice cutters, the two-man constellation known as a *beite*, would cut between 250 to 400 skippund a week, but

⁵²² Martinsen (2004, p. 74).

“now” they were up to 3,000 a week.⁵²³ That implies a roughly tenfold productivity increase.

The traditional shipping measure of a skippund—corresponding to 160 kilograms in the 19th century—was the crucial weight conversion for the local ice cutting and handling in Røyken. The rule was that a 24-inch square block would be assumed to “weigh as many *lispund* as they were thick”.⁵²⁴ A 20-inch-thick block would make a skippund. In other words, ice harvesters would typically have a quick measure of the weight of the product: This was an important yardstick. It was a measure for the ice cutters and the horsemen transporting the ice from lake to icehouses, pier, and/or shipside. The measurement was also entered into Baarsrud’s accounts, mostly as a record of the output of the laborers on the ponds and in the icehouses.

During the weeks of ice harvest, the work of cutting ice was intense. During a 6-day work week, the figures provided by Killingstad translate to handling about 400 to 500 ice blocks a day, each weighing 150 to 200 kilograms, sometimes more. Such workloads can be corroborated from other sources.⁵²⁵

According to Killingstad, the increase in productivity corresponded to a sizable reduction of the payment per skippund, from 20 to 27 øre “before” to just 4 øre “now” for the ice cutters. The figures are outstanding, but are they reflected in Baarsrud’s own accounts? Two years have been isolated for comparison—1877 and 1899—and in the table below the actual labor costs are specified and viewed in relation to total costs and turnover. Both years’ wages comprised about half the total expenses of the ice business. Other significant cost elements were shipping freight and maintenance. The first year in which

⁵²³ Killingstad (1928, p. 158).

⁵²⁴ Killingstad (1928, p. 159) 20 *lispunds* in a skippund, so 20 inches was assumed to correspond to a 1-skippund block (i.e. roughly 160 kg).

⁵²⁵ From both Kragerø, Røyken, and Asker, see for example Melien (1990). Furthermore, I have conferred payment protocols for the Høvik ice farm, from 1911–1918, which were lent to me in conjunction with the interview of Arne and Inger Høvik, October 31, 2018 (see appendix, 9.3.).

Baarsrud operated on his own apparently did not return a profit. In 1899, he entered 9,215 kroner as a profit after all expenses, including local and state taxes. In macro terms, the two years reflect the annual price fluctuations of the trade: the year 1877 well below average at 79.6 and 1899 estimated at slightly above 109 in Klovland's 1866 to 1920 price index for natural ice.⁵²⁶ 1899 was therefore a successful year. It was one of just 16 years of 54 in total, noted above the 100 mark in the index. However, what is significant, but not really disclosed in either cost or profits, is the fact that Thorvald Baarsrud's production in 1899 was several times larger than what it had been in 1877—indeed, about four times larger, keeping with the estimates in section 6.6.

The table corroborates Killingstad's observation of reduced wages, although not as dramatic as a reduction from 20 to 4 øre per skippund for ice cutting would imply. In this table, the reduction is only 25%. Killingstad's time span was likely longer than 20 years. He addressed the ice cutting, while the table indicates that wages went down across the board. Shoveling snow is the only task where there is some symmetry in variable costs. This increased from just under 1,000 kroner to about 4,000 kroner and seems to neatly match the quadrupling of production. However, it was payment for a much larger area of ice surface being worked.

⁵²⁶ Cf. table 9.5.2. in the appendix.

Table 6.1. Baarsrud ice turnover, labor costs and taxes, 1877 and 1899

| <u>Year</u> | <u>1877</u> | <u>1899</u> |
|--------------------------------|-------------|-------------|
| Sum revenue | 19,388 | 74,375 |
| Total costs | 20,454 | 65,160 |
| Profits | -1066 | 9215 |
| <u>Labor costs</u> | | |
| Snow shoveling | 984 | 3,898 |
| <i>Isvækning</i> (icebreaking) | 172 | NA |
| Ice cutting | 2,452 | 7,575 |
| Ice transport by horse | 4,980 | 9,526 |
| Stowage/icehouse work | 1,980 | 5,857 |
| Foremen (2 x 80 days at 3 kr) | NA | 480 |
| Manager salary | NA | 1,500 |
| <u>Taxes</u> | | |
| State tax | NA | 550 |
| Municipal tax | NA | 1,200 |

Sources: SAKO P-1359/R/Rb/L0001 and L0005.

The rudimentary comparisons illustrate that Thorvald Baarsrud paid less for ice labor, in a very general way expressed as “per tonnage shipped”. At the same time, greater production meant that more hands had to be employed, and this was the aspect highlighted when Baarsrud and other ice exporters received expressions of gratitude for

their business.⁵²⁷ While the data confirm that Thorvald Baarsrud was a somewhat parsimonious employer, they do not say whether he was more or less so than other ice croppers and exporters. It is evident in the 1899 and other books that he valued management work far above all else. The compensation for management was likely also a way to keep more of the ice profits in the family. By 1899, his oldest son Adam Baarsrud filled this position.

One of the ways to keep costs down was by subcontracting tasks. The employment schemes of Baarsrud's ice business are outlined by Martinsen (2004), particularly for the late 1880s onwards. He relates the story of local smallholder Fredrik Hansen Hagen, who acted as foreman for Baarsrud for a number of years from the late 1880s. In that capacity, he was most likely one of the men receiving the payment of 240 kroner stipulated above. However, he was simultaneously also a subcontractor, with the responsibility for "putting in all the ice Thorvald Baarsrud wishes to have in his stacks in 1898 and 1899 and executing the necessary sawdust labor in the icehouses", and sundry corresponding tasks, for a fixed price of 2,500 kroner.⁵²⁸ In addition came the right to stow ice on board ships not manned to do so, at fixed rates per RT for sailing and steam vessels. The contract was made late in 1898. This would have been a very generous payment for one person, but, as Martinsen points out, Hagen had to be assisted. Exactly how many people Hagen had to hire and pay to fulfil his obligations is not explicated. The point is that the arrangement meant that more people than just the owner of the ice business were incentivized to cut costs.

⁵²⁷ Cf. above section 6.7.

⁵²⁸ Martinsen (2004, p. 75).

6.9 “Keep as much of the London business as possible”

This thesis “follows the owners” of Norwegian ice businesses.⁵²⁹ Were they just routinely responding to external factors and market opportunity dictated by the climatic variations, as emphasized by Ourén? Or, alternately, were there deliberate counter strategies? Baarsrud’s extensive correspondence, and in essence through his “instructions” to his children, provide the basis for insights into his commercial understandings of the trade. They document a connection between the ice trade and general ideas about life, work, and rewards. In the context of Norwegian ice traders, this is a rare treat.

First, a reflection on the close relationship between Thorvald Baarsrud, the individual, and his ice business. The growth of the business is ascribed by several to Thorvald Baarsrud’s business acumen. Local historian Terje Martinsen characterizes him as a “hard and capable businessman”.⁵³⁰ Baarsrud did not always regard himself in the same light, but he did equate the pecuniary outcome of an ice season with his individual effort. In the peak year of 1898, Baarsrud had the previous fall contracted more than 20,000 RT for advance sales. When high prices and a mild winter set in during January, Baarsrud apparently feared that the season would spell his ruin, but “through intense work and consideration I managed to procure as much I had sold”.⁵³¹ There is no mention of the ice cutters, horse drivers, or stevedores: all matters of production and sales were apparently down to Baarsrud himself.

⁵²⁹ For discussion of “behavior” at “the entrepreneurial level” as opposed to descriptive macro analyses in Norwegian maritime history, cf. Johnsen (1998, p. 19).

⁵³⁰ Martinsen (2004, p. 78). In Killingstad (1928, p. 160) the crux is that “one man” takes over the lake and all necessary properties down to the sea.

⁵³¹ SAKO P-1359/R/Rb/L0003, 1898 entry: “[D]a jeg havde solgt cirka 22 000 Register Tons for Skibning, da jeg troede at skulde blevet Ruineret, men ved ihærdigt arbejde og omtanke fik jeg fremdrevet saa meget Is som jeg havde solgt, og fik skibet lidt Vaarskibning uden med til god Pris saa at Aaret i heletaget blev godt alligevel men ikke med den Fortjæeneste som det burde have været”.

This is not to say that Thorvald Baarsrud, or any other ice business owners, suffered from the delusion that they could do it all on their own. But it testifies to ideas about thrift, hard work, and self-sufficiency. Baarsrud framed his advancement from sailor to ship captain, and later success in the ice trade, as “having to help myself all the time, until this very day”.⁵³² Judging from his ledgers, he was keen to transfer such ideas onto the next generation, both his sons and his daughters.⁵³³

The ledger commences with a brief entry for 1882, after the acquisition of the Nordre Klemmetsrud and Baarsrud farms. The first piece of advice to “my successors” about the ice trade is from the season of 1883. It concerns a recurring theme: when to sell the season’s produce. Baarsrud sees “good reason to be satisfied with the season”, only he could have made “double” the profit if he had withheld more ice for later sales. In April, prices for UK sales rose to “30–35 shillings per ton”. Baarsrud had entered agreements in January for July delivery of at least 500 RT with main customer Carli Gatti in London, at 17 shillings per ton.⁵³⁴ Fortunately, there were reserves in the icehouses for later transactions, with Baarsrud making 12,900 kroner “minus commission” on just one shipment. The takeaway from this season was “not to take many contracts before Christmas”, instead to try to sell ice during “the first half of January” when the winter is “knowable”. And not to sell “other men’s ice”, as it would usually be too costly for profit.

Baarsrud seems to have followed his own advice the next season, which nonetheless turned out to be spectacular. 1884 stands out in the history of the Norwegian ice trade with a total recorded export of nearly 490,000 RT.⁵³⁵ By April, the outlook in Norwegian newspaper *Dagbladet* was that “spring shipments have been considerable” and that “demand later in the summer will come back with renewed energy”. Foreigners would

⁵³² SAKO P-1359/R/Rb/L0003, 1884 entry: "jeg maatte hjelpe mig selv hele Tiden, til den Dag i dag".

⁵³³ All quotes in the following, except where noted otherwise, are from SAKO P-1359/R/Rb/L0003.

⁵³⁴ KBC: Ice contract January 8, 1883.

⁵³⁵ See table 9.5.1.

have to get used to not paying “starvation prices” for the commodity.⁵³⁶ It was customers first and foremost in Germany, but also in France, the Netherlands, and Belgium, who turned to Norway due to an uncommonly warm winter.

Thorvald Baarsrud rode that season well. In national terms, a greater share of the ice was going to continental markets, and Baarsrud's business aligned broadly with the trend. Judging from 17 surviving ice contracts, he made 8 contracts for London delivery between November 1883 and February 1884, to his regular customer Carlo Gatti as well as ice merchants George Stevenson and Henry Mark—all trades represented by the British broker James Jepps.⁵³⁷ While 1884 was not the first year in which Baarsrud sold ice to the Continent, it seems to have been the first year of semi-regular contact with an agent in France, the broker firm J.M. Allum of Boulogne-Sur-Mer. Allum apparently specialized in Nordic lumber and Swedish iron (*bois du Nord, fers du Suede*). The company was to become a regular trading partner for the French ice market over the years, but not the only one.

The 1884 season was a high point for Thorvald Baarsrud. The ice business had returned a more than satisfactory profit. He used the proceeds to reduce his debts, which had been in excess of 80,000 kroner at the outset of the year. A year later, the net debt was only circa 30,000 kroner. Baarsrud expressed “great satisfaction” at having bought the three farms he considered to have been his “forefathers' property”.⁵³⁸ With the two ice lake farms (Nordre Klemmetsrud and Baarsrud) now having “their own beach”, Baarsrud reckoned their worth to be 120,000 kroner each, an evaluation “you may keep to yourself”. The turn of events prompted him to write an account of his family history,

⁵³⁶ *Dagbladet*, April 15, 1884.

⁵³⁷ KBC: Ice contracts 1884.

⁵³⁸ SAKO P-1359/R/Rb/L0003, entry 1884: “jeg har haft den store Tilfredsstillelse at kunde kjøbe igjen mine Fædres Eiendom, mine Forretninger har gaat godt saa jeg antager ved dette Aars Opgjør at min Gjæld ikke bliver stor igjen naar jeg brugte de i hende værende Contanter og indbetalte Gjælden med. Jeg kan saaledes have Ret til at sige til Eder som jeg overlader Eiendommene til, pas vel paa eders Arvegods”.

since “this book will maybe remain in the family’s hands and future generations interested in knowing a little about their forebears”. Thus the 1884 account is also the longest of the ones in the Status book.

The next entry is from August 1886. Baarsrud confesses to having been “not well” (*ikke været rask*). Not expecting to recover fully, this is where he starts to outline how he wants the properties and estate shared between his children after his death. The gloom was not helped by a general downturn of the ice markets after the bonanza of 1884, and Baarsrud states that “it looks like the ice prices will become such that this will no longer be a profitable business”. Thus, the valuations on the farm properties had to be lowered: The “status for 1887 will display a much smaller estate than 1886”. Baarsrud reduced his net worth by more than half. It took until 1896 before he reached the 1884 and 1885 levels again.

By 1890, the markets were in an upturn, and “with the years conditions and viewpoints change”. The ice business was now in “good shape” (*i en god gjenge*), and his heirs could count on the Baarsrud premises to yield “15–20,000 tons” every year. Still thinking his days were numbered, Baarsrud expressed that he wanted his three sons to continue the ice business in cooperation, when each was allotted a farm of his own. This was to be as a limited liability, joint-stock company under the name of “Baarsrud & Co.” or “Baarsrud Brothers” (*Brødrene Baarsrud*), with a capital of 10,000 kroner and registered rights to the common icehouses, lakes, and ponds. He would prefer that things were arranged in this way, since ice trade was “a dangerous business” (*en farlig Forretning*), and thus no one stood to lose more than the 10,000 kroner. The brothers—Adam, Gabriel, and Thorvald Jr.—did in fact adhere to their father’s wish in 1911. There is little indication that Baarsrud imagined the emerging entity of the joint-stock company to be a vehicle for attracting external investment, as the limited liability offered was a means to reduce risks. Ice companies in the vicinity had already been organized on this principle.⁵³⁹

⁵³⁹ For example the Yggeseth Iscompagni, see above 6.6.

In the following years, Thorvald Baarsrud planned the future management of his estate several times over. His final will from 1908 is presented in some detail in local historiography.⁵⁴⁰ It contains instructions directed especially to his three sons who were to take over the properties (and the ice trade), with the admonishment that “your father’s eye from on high will look down on you with love, and vigilance, granted you take care of all my little ones”.⁵⁴¹ Baarsrud’s testament makes evident that his overriding concern was for the whole family, and while only the sons were to be given actual farm property, the daughters—“my little ones”—were to be financially independent. This arrangement testifies to the blending of tradition and modernity in his mindset. It also indicates an aim to distribute family property fairly among his offspring, not giving any of the sons a conspicuously privileged position over the others.

Since the ice trade had been such a crucial contributor to the family’s wealth, this is the branch of the family business given almost all the attention. What did Thorvald Baarsrud’s “recipe book” about the ice trade contain, after some 20 to 25 years of managing the business? In essence, it was a timetable of essential activities, sprinkled with instruction to continuously evaluate key points: A number of developments were to be surveilled in the most vigilant manner. The first rule was to have “at least two regular agents”, and to try to keep “as much of the London business as possible”. Baarsrud held that he had done a lot to make his ice “recognized a lot of places”, claiming that “especially in London it is preferred over other ice”. Contracts for the coming year would be out in September, October, and November. Deals would be made “silently” (*i*

⁵⁴⁰ Martinsen (2004, p. 135).

⁵⁴¹ SAKO P-359/R/Rb/L0003: The original passage is caring: "Samtidig maa jeg gjøre eder mine Sønner opmærksomme paa at de har her faaet godt Kjøb, hvorfor jeg fordrer igjen at di skal tage eder af alle eders smaae Søskende, lade disse være i Sammen i Eders Huus, for en billig Forpleining til dem er konfirmerede, Lærerinde maa der ogsaa underholdes i Eders Huus, for endel af Smaapigernes Rentepenge alle maa ikke gaae til i Aaret Løb, noge maa tillægges Capitalen, Deres Moder vil maaske fraflytte Stedet, men lad Børnene være hos eder, eders Faders Øie høit oppe vil see ned til eder med Kjærlighed, og bevaagenhed, naar de tager vel vare paa alle mine Smaa. En Pligt har jeg tilige til at paalægge eder angaaende mine Smaapiger det er naar disse med Tiden gifter sig saa skal di være forpligtede til at give hver pige i medgifte minst Kr. 500 og op til Et Tusinde Kroner efter som de har Raad til, da det ikke er godt naar man skal kjøbe alt selv, jeg ved selv af Erfaring det ikke er saa godt naar man skal hjelpe sig alene".

al stilhed), most of them in November. Then followed a quiet period until January, when in particular "Gatti comes to market" (*saa er det stille igjen til Januar og naar især Gatti kommer i markedet*). Gatti was to be courted attentively so that his contracts were not "lost", even though as a rule he paid less than others. Longevity trumped one-offs.

At the same time, more things had to be considered, especially the weather. By January and the midwinter frost, it would emerge whether the coming harvest would be a 6- or 8-week season, corresponding roughly, perhaps, to the gap between "15–20,000 tons every year". Baarsrud does not mention labor recruitment, partly outsourced as described above. Maybe the dealings with the workers were so evident in the everyday life that nothing had to be codified.⁵⁴² Clearly, the assessment of harvest size impacted the perceived need for ice cutters, and all other functions. That it was not problematized indicates that labor recruitment was not really perceived as a challenge.

The moment ice was 13 to 14 inches thick, it was time to start the "operations and make sure the icehouses and stacks are full by the end of February". This was the only way to safeguard the fulfillment of all contracts.⁵⁴³ The statement confirms that most of the harvest would be transported from lake to icehouse and secured there for storage until shipment time. The time frames sketched would mean the safest route to avoid loss and potential ruin, provided also that contracts were only made for the Baarsrud farms' own production.

On the business side, Baarsrud emphasized contracting with ship brokers for the freight in the spring and summer. The freight rate would determine the profit of the individual contract. Only rarely would it be possible to get the kinds of prices for ice as in the past,

⁵⁴² Except maybe as part of general advice to "act like good citizens and especially mind the time" and "never be stingy nor prodigal". Indirectly, his advice and instructions also concern how to behave as part of the local elite.

⁵⁴³ SAKO P-1359/R/Rb/L0003: "Derfor naar Isen er 13 a 14" Tyk om Vinteren saa maa man begynde at drive, og se til at faae fylt alle sine Stabler & Ishuse inden Februar Maanedes Udgang, føren Di har Isen i Ishusee før er Du ikke sikker paa at opfylde Dine Kontracter".

“since there are so many working the ice that there will always be sufficient amounts”, so “it cannot help to specialize in getting extraordinary prices”. A price of 3 to 3.50 kroner per RT, delivery either “free on board” (f.o.b.) or “cost insurance freight” (c.i.f.) would be enough to make a decent profit.

Provided that these steps were mastered, the next question concerned how much of a season's harvest to retain for summer “speculation”. Over the 1890s, Baarsrud wrote down three versions, generally similar with slight nuances. In 1890, he wrote that in November and January it would be wise to shift two thirds “of the quantum obtainable in the winter” and keep one third to “speculate with” because “as a rule there is but little ice to be had in the summer since all contracts are made during the winter”. The following year, the formula was somewhat altered: Never sell more than one third or maximum half of the production before Christmas. Sell 3 quarters of it by January if the ice is 14 to 15 inches thick by the middle of the month and the prices are “acceptable”. When “you have filled all the icehouses sell the rest for summer or autumn delivery”, as apparently few contracts would be made in the summer. Monitoring the freight market was alfa and omega—a difference of “one to two shillings per ton” to the calculation could mean “giving away all that you have sold”. This was also the background for the oft-repeated “do not buy ice from other producers at a high price”, as this would only result in losses.

The final version of his instructions came after the exceptional 1898 season, noted in the historiography and statistics as the absolute volume peak of the Norwegian ice trade.⁵⁴⁴ A review in the shipping and trade daily *Norges Handels og Sjøfartstidende* sketches the anatomy of a year marked by fervent ice speculation.⁵⁴⁵ The dynamics were chiefly driven by Germans active on the Norwegian ice market. All over Europe, including Britain and Scandinavia, the first months of 1898 were mild. While this caused some

⁵⁴⁴ See table 9.5.1.

⁵⁴⁵ *Norges Handels og Sjøfartstidende*, January 3, 1899. (“Ishandelen i 1898”).

trouble for traditional Norwegian ice suppliers on the coast, Baarsrud being one of them, it meant that there was practically no “native ice” in European countries. When rumors spread of Germans offering high prices—particularly one contract for 4,000 RT at 20 Reichmarks per ton, f.o.b.—the “ice fever became massive”. The *Norges Handels og Sjøfartstidende* report states that

on all possible lakes and ponds a previously unmatched harvesting of ice began. Along railway lines and rivers ice was stacked in huge volumes, and the ripples of speculation only spread, so that far up in the country, more than a day's rail journey from the shipment ports, ice was cut for export. To make matters grand, speculators even traveled to Hudikswall in Norrbotten to store extra fine merchandise, and the speculation moved onto Finland and Russia, the Baltic provinces for the first time sending ice over the North Sea ports.⁵⁴⁶

The report then depicts that while some of these speculators were successful, others were not. In all, the year's ice harvests brought a gross export income of 4.5 million kroner. Furthermore, a number of decommissioned vessels from the Atlantic trade had been used, also earning 4.5 million. The total of 9 million kroner stood in some contrast to 1897's export volume of 385,523 RT, which according to the newspaper grossed merely 645,000 kroner for ice and ship rates combined.

The events of the year only confirmed the advice from Baarsrud to his sons about not speculating using other men's ice, only with the telling addendum, “unless you have to”.⁵⁴⁷ Baarsrud unquestionably counted among the “older ice exporters, who had partaken in previous booms, staying away from this wild business based on panic prices”.⁵⁴⁸ Still, even experienced ice traders were subject to weather conditions and market outlooks. Baarsrud had apparently contracted 22,000 RT by January, an amount close to the full capacity of his own ponds and lakes. The mild January that set in was

⁵⁴⁶ *Norges Handels og Sjøfartstidende*, January 3, 1899. (“Ishandelen i 1898”, all quotes my translation).

⁵⁴⁷ SAKO P-1359/R/Rb/L0003, entry 1898.

⁵⁴⁸ *Norges Handels og Sjøfartstidende*, January 3, 1899. (“Ishandelen i 1898”).

initially a crisis making him fear “ruin”. This is where his “intense work and consideration” (cf. above) came in and saved the day. The contracts made—some back in late 1897 which was a less-than-mediocre year for ice trade—were priced low but Baarsrud would stick by them anyway. The season was thus saved by a some “cheap” ice he managed to buy “early”.

However, Baarsrud also had to get ice at 15 kroner f.o.b., with substantial markups on the 3 to 3.5 kroner that would otherwise yield profit for his ice. Although the year 1898 was ultimately viewed as good, it was “not with the profit it should have gotten”. Nonetheless, the revenues increased his net worth by almost 30% from 1898 to 1899 (230,000 to 303,000 kroner). Baarsrud still advised his successors to not sell more than one third before Christmas, one third in February and March, and then one third in July and August. The last batch was a change from his previous advice, where all ice was to have been sold or contracted by that time. The business was getting more prone to speculation and uncertainty. Into that mix came a novel attention from abroad to the quality of the water, making ice “steel” or “crystal”: a new challenge to a business already under pressure.

In Thorvald Baarsrud's framework, natural ice was seen as a product of the land, and it served as both the main source and target of his economic activity. However, his background and experience meshed the local circumstance of production with the international reality of his trade. His strategy was to engender a predictable business from volatile market conditions, which would imply taking chances, but not in a foolhardy way. Baarsrud's strategies and actual practices attest to the power of knowledge in the natural ice business. However, there were new tests in the offing.

6.10 Deadly microbes?

The previous pages depict responses to an intricate interplay between climate variations, fluctuating freight rates, and overseas market conditions: dynamics and uncertainties that were largely routinized and mastered. However, the basic premises

of the trade were changing, noticeably so after 1900. Baarsruds' ice enterprise lived through that time, even after Thorvald Baarsrud's passing in 1910. It must have been increasingly obvious to the three sons taking over the business that ice was a sunset industry, but it was not given up. The final sections of this chapter address the stages of decline, delving into how ice may have featured in a strategic view.

The overall factor of concern, viewed from the perspective of Norwegian exporters of natural ice, was the advance of mechanical refrigeration (i.e., the "artificial production" of ice in plants near the British and European centers of consumption). Trade consuls had warned against this since the 1870s, as a major factor in pressing prices and relegating some regions as defunct markets for the ice.⁵⁴⁹ The signals, however, were often mixed. In an 1896 report on the ice markets, the consul in Britain offered assurance that though mechanical refrigeration had gained ground in the transport of butter, fresh meat, and "similar products from distant colonies", the expensive machines and construction costs ensured that ice plants would not be economic in coastal towns, only inland.⁵⁵⁰ In other words, Norwegian ice would be competitive for the foreseeable future, at least in the fishing ports. This was an overly optimistic view, ominously demonstrated by the construction of the Grimsby Ice Factory, and others in the British fishing ports, in the years around 1900.⁵⁵¹

Linked to the advance of artificial refrigeration were controversies about the contamination of water used in ice production, both for the "natural product" and the "artificial" one. The new discourse on ice in the 1890s was intimately connected to new understandings of the microbiology of waterborne diseases, such as cholera and typhoid

⁵⁴⁹ SSB, diverse: *Indberetninger om Handel og Søfart i Aaret 1879*, p.256-258. https://www.ssb.no/a/histstat/div/is/is_117.pdf (Retrieved December 8, 2021).

⁵⁵⁰ *Beretninger om Handel og Skibsfart. Uddrag af Aasberetninger fra de forenede Rigers Konsuler for 1895 m.V.* Published by Departmentet for det Indre, No. 7, 1896, p. 225.

⁵⁵¹ Robert David (1995). Adam Baarsrud reported on a new ice factory in Brighton in a letter to his father, Thorvald Baarsrud, October 1909, cf. SAKO/P-1359/E/Eb/L0010, letter October 14, 1909.

fever.⁵⁵² Economic historian Robert David holds that the arguments could go both ways.⁵⁵³ To some, the remote locations of the Norwegian ice lakes guaranteed purity. Then again, a 1904 investigation by Doctor W.H. Hamer into the trans-shipment of Norwegian ice, commissioned by the London County Council, uncovered several backflows from sewage systems to canal ice stores. Similar analyses in other European countries served to discredit imported ice. “Artificial” ice was responsible for 62% of all the ice sold in Britain in 1907, and the verdict in the trade press was that “it must be obvious that factory-made ice is ousting ice from nature’s factory”.⁵⁵⁴ This view is taken up by David, who describes a phase of decline for the ice trade before the war in 1914.

What did all this mean for a medium-sized Norwegian ice exporter like Thorvald Baarsrud and his progeny taking over the business? Broadly speaking, it fostered two responses. The first was to diversify beyond the ice business. In a way, a farming, forestry, and ice-producing entity would always be “diversified”. Nonetheless, Thorvald Baarsrud sought to extend the operations of the area by erecting the abovementioned brickyard in Nærnes bay in the late 1890s. The brickyard was the most industrially oriented of the diversification attempts, at best only modestly profitable before it finally folded in 1920.⁵⁵⁵ Another line of investment was to buy shares in freight vessels. Thorvald Baarsrud continued investing in ships until late in life, including ownership of the 509-RT bark *Cito* between 1903 and 1910, as well as a short foray between 1906 and 1908 into steam shipping with the 1875-built, 228-gross-tonnage steamer *Blenda*.⁵⁵⁶ From the context, it is fair to conclude that the ships were purchased with the view to

⁵⁵² A contemporary US perspective in Cumming (1914).

⁵⁵³ Robert David (1995).

⁵⁵⁴ *Cold Storage and Produce Review*, Vol 13 No. 152, November 1910, p. 309. Cited in Robert David (1995).

⁵⁵⁵ Martinsen (2004, p. 91): Experiencing a dramatic downturn around 1900, Baarsrud’s brickyard was farmed out to a Danish company before shutting down in 1920.

⁵⁵⁶ SAKO/P-1359/E/Eb/L0008 1906-1908.

engage in general tramp shipping, rather than as an attempt to build in-house shipping capacity for the ice exports. What Baarsrud considered his main legacy were the three farms that constituted the areas for producing, storing, and loading ice. Keeping the farm ownership within the family was the crucial issue. Any diversification attempts were mainly to substitute for the function of ice.

The Baarsrud ice enterprise responded to the competition from “artificial ice” and the concomitant controversies about ice water contamination, as documented in the archival material from the 1890s to 1920. Generally, mechanical refrigeration and ice machines were part of the competitive picture that had to be contended with, alongside the Norwegian competition, to which Baarsrud referred as the “conditions of the trade”.⁵⁵⁷ Focusing specifically on questions of contamination in ice, the Baarsrud archive contains evidence that far from everyone trusted the remoteness of Norwegian ice lakes to guarantee a safe ice product.⁵⁵⁸ The purity and quality of the Baarsrud ice had been a selling point back in the days of Gabriel Klemmersrud, and the parlance of “crystal”, or best-quality block ice from the lake was immediately adopted by Baarsrud. An April 1878 disagreement about ice quality involving the Gatti ice company illustrates this point: In a letter to his agent, Jepps, Baarsrud vehemently denies (“I strongly protest”) that there may have been “snow” in a cargo of ice carried by the *Agnes*.⁵⁵⁹ Such disagreements arose every so often over the following years. Some were undoubtedly attempts by the overseas buyer to cut the price.

To Baarsrud, there was an existential difference between single cases of quality disagreements and global perceptions of natural ice as unhygienic or dangerous. In

⁵⁵⁷ SAKO P-1359/R/Rb/L0003.

⁵⁵⁸ Documents pertaining to this also found in Knut Baarsrud's private collection of Baarsrud ice history, KBA.

⁵⁵⁹ SAKO/P-1359/B/Ba/L0001, folio 219 (Letter, April 17, 1878). He does however admit that there may have been some “bad blocks between the beams in the lower hold” but insists that “Gatti will have to take the cargo”. The outcome of the matter was likely to Baarsrud's advantage.

1893, British medical journal *The Lancet* established as fallacy the notion that water becomes sterile when frozen.⁵⁶⁰ Baarsrud received a report on this and other writings in the journal, from one or more of his UK agents.⁵⁶¹ The UK ice merchants took sides in the disputes, all according to what position they had in the increasingly complex cold storage business. A long-time purveyor of Norwegian ice in Ireland, G.N. Harvey (of Harvey & Sons) wrote to the *Cork Daily Herald* in July 1900.⁵⁶² He opposed an article reprinted in the paper from the *London Daily Express*, headlined: “Perils of Ice. Where the Deadly Microbe Comes in”. The article held that Norwegian lake ice was prone to contamination of all sorts. Its use had allegedly been banned in Italy— “home of the ice cream”—because it had been proven that deaths from typhus in Turin “had resulted from the consumption of ice from certain Norwegian lakes”. In France, the article continued,

a new police regulation has just been put into force, by which every purveyor must hang up in his shop a notice indicating whether the ice offered for sale has been made from pure spring or sterilized water or not.

London was “behind in this respect”, and the “filthiest ice is allowed to be sold to the public”. It was maintained that the old ice depots still had rights to cut ice from canals “near London” in the case of “hard winter”. It was left to the reader to conclude as to the sanitariness of such a practice. To all these allegations, G.N. Harvey and his sons, who had their ice depot at 26 Lower George’s Street in Cork, retorted that they had a sample of the Norwegian ice they sold analyzed by a “well-known analyst of this city”, and it was “quite free from organic matter, and in other respects of extreme and

⁵⁶⁰ Robert David (1995).

⁵⁶¹ KBC: Undated, anonymous note.

⁵⁶² Clippings in the KBC. Harvey & Sons were also the recipients of the 1864 ice cargo from Dahll, cf. chapter five (5.5.).

exceptional purity”.⁵⁶³ The matter went back and forth between the editor of the *Cork Daily Herald* and Harvey, and the latter alleged that the editor of the paper had ownership interest in the Cork Pure Ice and Cold Storage Company.

The Norwegian ice exporters were not entirely powerless to counter the agitation popping up in the markets where ice factories were established. Still, the situation was complicated by the nature of the logistics chain for ice. There was the alleged contamination of the water source itself. Then there was the long chain of points vulnerable to contagion from the receiving harbor facilities, through various stages of trans-shipments and storage to end consumption, whether in a private home, restaurant, or used industrially. An actor like Thorvald Baarsrud could only really address the purity of the water source, and only partly claim that that purity was upheld through some stages of the shipments. Chemical analyses of Baarsrud ice water quality were made in 1897 and 1905. The first is signed by R.R. Tatlock, Public Analyst for the City of Glasgow.⁵⁶⁴ The report concerned a sample from a shipment by the Norwegian Ice Company, with ice from the “Baarsrud Lakes”. It was “drawn by us” from a vessel discharging at Kingston Dock. Comparing the melted ice with the Glasgow’s own drinking water reservoir Loch Katrine, the analysis was that the Norwegian water was superior and “quite free from the slightest trace of matter of the nature of sewage”.⁵⁶⁵ The amounts of lime, magnesium, and sodium are listed in grains per gallon, leading the public analyst to conclude that the Baarsrud ice water is “very soft” and of “very great purity”.

However, ice merchants in both Britain and France continued to complain, with increasing sting in their allegations. Among them was the Liverpool ice merchant H.T. Ropes. In a correspondence running between 1903 and 1905, Ropes holds that while

⁵⁶³ Clipping dated July 3, 1900, in KBC.

⁵⁶⁴ SAKO/P-1359/E/Ea/L0003, folder “Analyse”.

⁵⁶⁵ Original emphasis.

“we were paying you the highest price paid to you by any of your merchants [...] we were receiving the very poorest quality of ice”. All Ropes received in return, allegedly, were “only long letters to the effect that your Ice was the best in Norway, to which we could only reply that it was quite evident that we were not receiving the best Ice in Norway”.⁵⁶⁶ Ropes would be taking his business elsewhere.⁵⁶⁷ The incident may have sparked the taking of a set of samples from the Baarsrud ice water on March 23, 1905, by the city chemist of Christiania, Ludvig Schmelck (1857–1916). The samples were from the Baarsrudtjern lake, and the ponds constructed in 1896. The bacteria content varied from five per cubic centimeter in the lake to two in the ponds: all locations deemed to have ice that was both in “bacteriological and chemical respect satisfactory”.⁵⁶⁸ Baarsrud was entitled to only use the chemist’s analysis for marketing “abroad”. Baarsrud had the favorable results made public in the *Cold Storage and Ice Traders’ Review* in Britain.⁵⁶⁹ The chemical analyses of the *lacs du Nærsnes* were also published on the flipside of a postcard of the Giard Glacière in Saint Melo, France.⁵⁷⁰

⁵⁶⁶ SAKO/P-1359/E/Eb/L0007, memorandum, January 24, 1905.

⁵⁶⁷ No shipments to Liverpool were recorded after 1910, cf. SAKO/P-1359/R/Rb/L0005.

⁵⁶⁸ SAKO/P-1359/E/Eb/L0007, letter, bill, and test results were from Stadkemikerens Laboratorium, Christiania.

⁵⁶⁹ *Cold Storage and Ice Trades Review* (Vol 8), 1905.

⁵⁷⁰ Postcard in the *Leif Ulland private collection*. This is only one of the initiatives Baarsrud was involved in with regards to opposing waves of “frigorofobie” in France. From 1909, there is correspondence with the Norwegian Ministry of Foreign Affairs about the proposed increase in duties on Norwegian ice in France, a sign of some coordination between the Norwegian ice traders in this matter, cf. SAKO/P-1359/E/Eb/L0010, letter May 1, 1909.

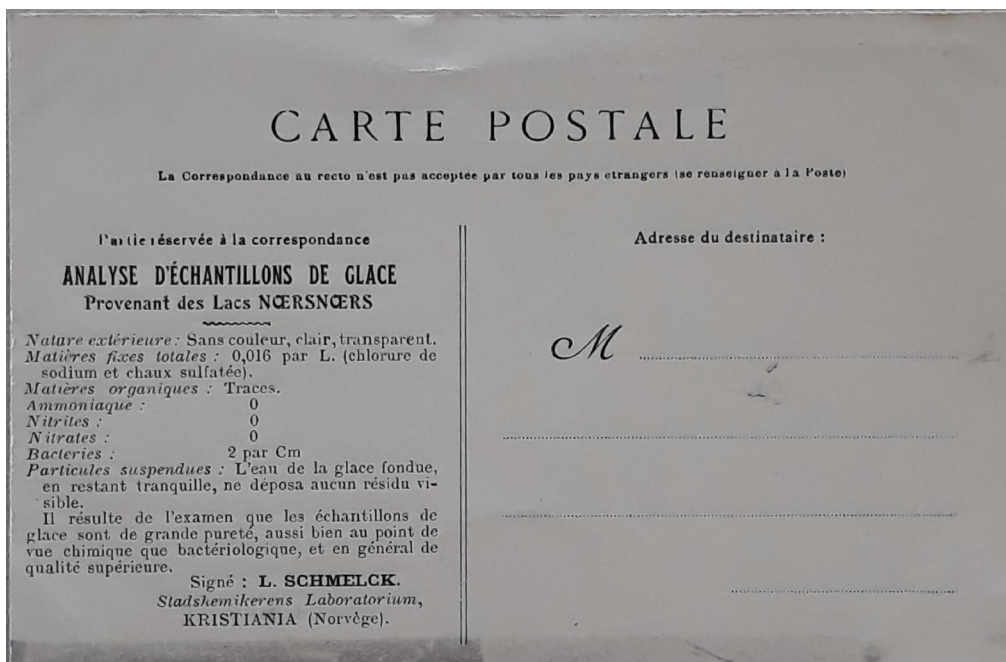


Figure 6.5. French ice marketing postcard, 1905, with the results of the favorable chemical and bacteriological samples of the Baarsrud lakes and ponds on the flipside. Photographer unknown. Postcard from the Leif Arne Ulland collection (private).

A survey of the 1908 to 1922 ice traffic ledger from Baarsrud indicates a noticeable change in the market situation. Thorvald Baarsrud's advice to "keep as much of the

London trade as possible” was proving difficult to adhere to.⁵⁷¹ After 1910, practically all of the London, Liverpool, and Ireland trades were gone. London was visited by only one ship in 1912, and one in 1913. There was a concentration in the last years before the First World War on the northwestern coast of France, especially the ports of Dieppe, Cherbourg, and Le Havre, and on the southern coast of England, with an emphasis on Southampton, Shoreham, and Brighton. Some of the French contracts were for three years of deliveries.⁵⁷²

The controversies surrounding ice water quality were complex. They manifested during the breakthrough phases of “artificial refrigeration”, especially between the mid-1890s and 1910. As demonstrated by the surge in exports in 1898, the controversies were not enough by themselves to stamp out the natural ice business, although exporters like Baarsrud took care to not let the reputation of natural ice disintegrate. In these efforts, the very purity of the lakes in Røyken was an asset. However, it was coming under threat. For the Baarsruds’, and indeed several other Røyken and Asker ice croppers, the uncontaminated water supply was jeopardized when the nearby Christiania Portland Cement Factory in Slemmestad installed new rotary furnaces after a fire in 1908. The furnaces helped bring the annual cement production from 36,000 to 123,000 tons, but it also caused visible cement dust pollution within a radius of 1½ kilometers of the factory.⁵⁷³ The local ice producers took the factory to court, which found in favor of the ice exporters and sentenced the cement factory to pay damages for crops of ice that had been rendered “completely unsellable due to the dust”.⁵⁷⁴ Compensation for cement dust pollution of the ice lakes was paid at least until the 1934 season.⁵⁷⁵

⁵⁷¹ SAKO/P-1359/R/Rb/L0005, “Isdrift” accounts.

⁵⁷² SAKO/P-1359/R/Rg/L0002.

⁵⁷³ Myrvang (2020).

⁵⁷⁴ Myrvang (2020). Quotation from the verdict summary in *Fremtiden*, February 5, 1916.

⁵⁷⁵ SAKO/P-1359/E/Ea/L0002, Folder “Eksekusjonsforretninger, overskjønn, panteattest mv».

This section has demonstrated two different responses to rather existential threats to the ice business: the combination of rumored and actual pollution of the lake ice source. Thorvald Baarsrud monitored overseas agitation against Norwegian natural ice, and he sought to counter it by having the water source examined for invisible contaminants. The chemical analysis testifies to his flexible mindset of employing new knowledges when necessary. While Baarsrud may have been positioned at a crossroads of tradition and modernity, in this instance, a reactive but nonetheless modern mindset is revealed on his part. The court cases against the neighboring cement factory occurred after his time, when the Baarsrud sons and other local ice producers appealed for social justice to alleviate the damages wrought to their water source. Both instances reveal a willingness to salvage any future prospects of the ice business, although opposing forces must have seemed quite overwhelming.

6.11 War and ice

The court verdict was passed in 1915, when Europe and the world were at war. The First World War was an exceptional chapter in all matters concerning trade in the North Sea. Norway's maritime sectors were greatly impacted. The belligerents' blockades meant huge profits for some shipowners and some export industries.⁵⁷⁶ For ice traders such as the Baarsruds, who were mainly producers and did not possess their own fleet, the war implied further reorientation of the business. The first German naval blockade of 1915 meant that the British trawler fleet was largely barred from going out, and with that went nearly all of the markets for ice to the UK fisheries.⁵⁷⁷ The markets for natural ice, crumbling well before the war, all but vanished from about the 1916 season. Compounding that, the freight rates skyrocketed.⁵⁷⁸ The effects of these factors are evident in the national ice exports statistics (cf. table 9.5.1), where the volume dropped

⁵⁷⁶ Sandvik (2018, pp. 166-169).

⁵⁷⁷ Robert David (1995).

⁵⁷⁸ Tenold (2020, pp. 105-114).

from 183,850 RT in 1914 to just 54,869 in 1915. In the Baarsrud ice accounts, the number of ice ships going out decreased from 48 in 1914 to 13 in 1915, and just 3 in 1916. After that, there are no entries before 1921.⁵⁷⁹ Several of the overseas agents, even those in Britain, expressed generally vague hopes concerning future business with ice.⁵⁸⁰

While many leading exporters (e.g., Nicolay Wiborg, who is visited in the subsequent chapter) seized the war as an opportunity to exit the ice trade, the Baarsruds stayed on. The three brothers—Adam (1870-1960), Gabriel (1877–1943), and Thorvald Baarsrud Jr. (1879–1964)—had largely organized the ice business according to their father's instructions. Setting up a joint stock company in 1911, Adam Baarsrud was the acting manager for the firm that for years used their father's name as a trademark. Adam Baarsrud was likely primed to take over the management of the ice business on behalf of the family. His commercial training had consisted of 10 years in Spain with the Norwegian-Spanish lumber company *La Compañia de Maderas*.⁵⁸¹ Fluent in Spanish, French, and English, Adam Baarsrud's primary field of interest and competence seems to have been with matters concerning the forests and timber trades. The Baarsruds were also involved as suppliers of "mine props" and lumber, but the extent of the trade was limited, even compared with the ice business in the years up to 1914. As the son of Thorvald Baarsrud, and equipped with international experience, Adam Baarsrud was the leader of and central to the Røyken municipal provisioning committee during the war—one of the most salient state interventions in the Norwegian economy during the First World War.⁵⁸²

⁵⁷⁹ SAKO/P-1359/R/Rb/L0005, "Isdrift" accounts.

⁵⁸⁰ For instance Brodersen and Vaughan in Liverpool—brokers and "Timber & Ice Agents", who maintained that "note you agree with us that nothing can be done with Ice at present but we hope later on to take this business up with you again". The agents were more interested in what Baarsrud may have been willing to offer for mining timber, deals, and battens. ("We note you are working a little in wood goods"). SAKO/P-1359/E/Eb/L0013, letter January 9, 1917.

⁵⁸¹ Aukrust (2017, pp. 149-150,197).

⁵⁸² Sandvik (2018, p. 169).

Adam Baarsrud made a number of wartime investments, financed by mortgaged credits. In the post-war recession, these became extremely expensive. By the mid-1920s, the situation was dire and both his and his brothers' properties were at risk. There was some hope during the bustling ice season in 1925, in which demand from the German markets drove the Norwegian ice exports for the last time to 6-figure volumes, at 105,000 RT. Adam Baarsrud had 42 contracts for ice, with Germany as the top taker.⁵⁸³ The ice market flurry did nothing to alleviate matters. In 1926, Thorvald Baarsrud's six daughters pooled a good part of their heritage to secure continued family ownership of the Søndre Nærnes properties.⁵⁸⁴ The company, which is still running, was mainly established to administer properties, centered on the old Søndre Nærnes farm. With sisters Gina Baarsrud (1875–1967) and Jenny Baarsrud (1883–1979) taking active roles on the board of the company AS Søndre Nærnes, Adam Baarsrud managed a reduced version of the ice business until his death at 90, in 1960. The ice business was organized as a separate entity under the name of Adam Baarsrud AS but was a family stock company like AS Søndre Nærnes AS.⁵⁸⁵ Nearly all the ice went to the west of Sweden.

That Adam and his siblings continued ice harvesting and even some exports after 1920 can be attributed to traditionalism, in the sense of following in the footsteps of their illustrious father and displaying loyalty to the wellspring of their family fortune. The rescue operation by the sisters in 1926 was largely motivated along similar lines. At the same time, it was perhaps an unintended bonus of Thorvald Baarsrud's insistence on his daughters being granted economic independence. Again, tradition mixed with a modern mindset. It was obvious, however, that the heyday of the ice exports were solidly in the

⁵⁸³ SAKO/P-1359/R/Rg/L0002: 14 contracts with Germany, 10 with Sweden, 9 with Denmark, 8 with the United Kingdom, and 1 with Norway. There were also rejects, for instance a letter from Small & Co. in Lowestoft, pointing to the local ice factory producing 1,500 tons of ice per week so there was no demand for natural ice, cf. SAKO/P-1359/E/Eb/L0015, letter December 22, 1925. Two complaints of bad quality ice are noted, one from Sweden and one from Britain.

⁵⁸⁴ This depiction rests partly on an interview with Jon Hovind (b. 1927), son of Thorvald Baarsrud's second-youngest daughter, Raghild Hovind (1887–1949).

⁵⁸⁵ SAKO/P-1359/A/Aa/L0002: Forhandlingsprotokoll for A/S Adam Baarsrud 1926–1961.

past. Over the years, it receded into the background of the family business, which came to be focused on managing the forests, as well as selling increasingly attractive real estate. Gina Baarsrud sent off the last shipment of ice in March 1961, with the Swedish motor schooner *Ellen*, bound for the west-coast fishing village of Hamborgsund.⁵⁸⁶

6.12 Conclusion

Thorvald Baarsrud's career as an independent ice exporter started in 1877 and lasted more than 30 seasons. He owned and managed the ice business centered on his own properties, attending to the matter personally with vigilance. Success followed from a mix of knowledges, skills, and an outlook that Baarsrud himself ascribed to having had to work his way up to become shipmaster. In the 1870s, this was still a position marked by independent decision making, confidence, and authority as well as firsthand knowledge of ports and the essentials of running any business contingent on freight and the shipping markets. His correspondence suggests that much of the captain's self-assertiveness was carried over into the on-land leadership of an ice-exporting venture.

The case of Baarsrud provides a rare insight into how a Norwegian ice exporter acted on both long- and short-term prospects of the business. His instructions on ice exporting give crucial understanding about a method of risk diversification in this volatile trade, which he labeled as "dangerous" in 1890. Baarsrud's is very much a case of expressing an "agricultural logic" to the business: Profits would depend on the season's climate, and only in January was it possible to have a tentative idea of the full extent of the year's business. The markets would determine the demand, but it was the best possible marketing of the family property's product that was the main target. Baarsrud advised his sons to shun "speculation in other men's ice" and cautioned them about being "indebted to strangers". While he evidently only partially upheld these guidelines himself, they are expression of caution from experience.

⁵⁸⁶ SAKO P-1359/E/Eb/L0017.

The agricultural logic outlined here must have informed several ice croppers, even those whose involvement in the business was primarily as producers of ice and not exporters. The close connection between climate and yield, the proclivity to be reticent in mortgaging land and to shy away from speculative aspects of the trade, applied in greater measure to other farming-class entrepreneurs than it actually did to Thorvald Baarsrud himself. Baarsrud did share that background and moved within that social circle, but after only a few years in the ice trade developed a capital base that outshone that of other farmers in the Røyken district. Profitable ice years were promptly exchanged into land accumulation and consolidation. In his dealings with overseas agents, shipbrokers, and sea captains, he was as much of an international businessman as most town merchants. Baarsrud knew that it was an exacting business. Much of what we know about his thoughts on it derives from a concern that his sons and family would be facing very different prospects for ice exporting.

7 Decoding the Wiborg ice company

7.1 Introduction

This final chapter examines the strategies of the Kragerø Wiborg family ice enterprise, emphasizing the time span from the early 1890s into the First World War. In those years, the enterprise ranked among the largest ice-exporting firms in Norway. Wiborg's recorded sales volumes amounted to 8.6% of the national total in 1895, and 20.3% in 1912.⁵⁸⁷ It was an integrated ice production and shipping operation, employing hundreds of seasonal workers. Commencing with the takeover by proprietor and consul Nicolay Wiborg (1867–1946), it was apparently “returning a profit every year” until he pulled out of the ice trade in 1917.⁵⁸⁸ Alongside Ambortius Lindvig (1855–1946), who also operated an ice and shipping combination, Wiborg was the leading early 20th-century Kragerø contender in steam shipping.⁵⁸⁹ Both men amassed fortunes, but none of their shipping companies outlasted the interwar years.

The rationalization and centralization of an increasingly complex operation was key to the financial success of the Wiborg ice enterprise. Here, the coordination and risk management will be analyzed through a particular prism, the company's telegraph codebooks—hence the title of the chapter. The books are an unusual historical source.⁵⁹⁰ The more than 3,000 code phrases, spread over three editions from 1880,

⁵⁸⁷ Cf. table 7.2. below (Nicolay Wiborg ice exports 1895-1915, select years).

⁵⁸⁸ H. Wiborg (1943/1996). This source is a 1943 account of the Wiborg family's ice business, written by Nicolay Wiborg's son Haakon Wiborg (1897–1958). There is a typed copy in the Berg-Kragerø Museum collections, in BKM/112. It was published in a local history journal in 1996 and will for simplicity be referenced as H. Wiborg (1943/1996). Differences between the archival copy and the print version are insubstantial. The account provides key data on production facilities, ship ownership, and shipment volumes and destinations, which seem to be based on company records.

⁵⁸⁹ In 1913 to 1914, Kragerø was listed with nine shipowners in Det Norske Veritas Registry, of which three had steamships: A.O. Lindvig (11 ships in Kragerø, 6 in Kristiania/Oslo), Nicolay Wiborg (8 ships in Kragerø) and K. Salvesen (2 ships in Kragerø). *Det norske Veritas Register over Norske Skibe 1914*, p. 437 and 439.

⁵⁹⁰ On telegraph communication and 19th-century economic development, see for example Lew and Cater (2006) and Kaukiainen (2001).

1896, and 1903, are essentially detailed premeditations of events and situations arising along the production, commercial, and logistical points of the ice trade, including overseas deliveries, settlements, and payments.⁵⁹¹ The codes were undoubtedly formed from experience and actual practice, but they also addressed *potential* uncertainties and adversities, effectively constituting sets of instructions. On the whole, they must have served to bolster the owner's control over the operations.

7.2 Strategies of growth: The ice trade of Thomas Møller Wiborg

By the early 1890s, the Wiborg ice enterprise had been operating for more than three decades.⁵⁹² Starting initially in the shadow of Johan Martin Dahll and the other Kragerø merchants, it was described in 1890 as “without comparison” the largest ice-exporting company of Kragerø.⁵⁹³ How was this position attained?

Merchant Simon Wiborg of Kragerø (1801–1854) owned at least five ships and dealt in timber exports and other goods.⁵⁹⁴ He was one of the merchants taking ice from Dahll's Kalstadtjern during the spring season of 1851.⁵⁹⁵ When Simon Wiborg died in the midst of a shipping boom offset by the Crimean War, his sons Simon Wiborg Jr. (1834–1924) and Thomas Møller Wiborg (1835–1918) partnered to take over the family business.⁵⁹⁶ Thomas Wiborg had been sent abroad at the age of 15 for commercial training. The

⁵⁹¹ Berg-Kragerø Museum collections, BKM/Wiborg/112.

⁵⁹² The Wiborg family had two branches that came to be heavily involved in the ice trade; for family history, cf. Fleischer (1925). Thomas Johannes Wiborg (1812–1874) was the initiator of the Brevik branch, he was in on the Stokkavann trade in 1851, cf. chapter five. He was apprenticed to Henrich Biørn's Kragerø office from the age of 12, and likely knew well the 1830s and 1840s ice journeys to France and Algeria.

⁵⁹³ *Vestmar*, October 9, 1890.

⁵⁹⁴ In A. Ingemanns *Fortegnelse over Den Norske Handelsflaade 1850*, p. 41-44, Simon Wiborg is listed as an owner of 5 vessels (out of 78 total ships in Kragerø).

⁵⁹⁵ Cf. chapter five, and Midgaard and Tande (1953, pp. 67-68).

⁵⁹⁶ The demand for maritime transport for the British and French forces in the Black Sea boosted the Norwegian shipping sector, Kragerø shipowners being no exception, cf. E. Pedersen (1933, p. 17).

brothers managed to stay well afloat in the shipping downturn that followed in 1857. In 1858, their estate was listed as the 8th largest in Kragerø, at 25,000 speciedaler, with an estimated income of 3,000.⁵⁹⁷

The Wiborg brothers were initially merchants and shipowners.⁵⁹⁸ In other words, as far as the ice trade is concerned, they were first freighters and traders, and only after some time did they add production to the mix. The first entries of new ship acquisitions are from the late 1860s.⁵⁹⁹ Initially, the Wiborgs seem to have followed the Kragerø preference for commissioning new vessels locally; Kragerø and Sannidal sported a number of yards.⁶⁰⁰ Starting in the 1870s, purchases were also secondhand, foreign-built, and relatively larger vessels. The biggest was the *Guldregn*, a bark at 874-register-ton capacity built in New Brunswick. The ship was in Thomas M. Wiborg's possession until 1884.⁶⁰¹ Most vessels were controlled through the traditional collective ownership structure of *partsrederier*. These were mainly one-ship companies, with potentially many stakeholders and usually dissolved on the scrapping or loss of the vessel—a not infrequent occurrence towards the end of the 1800s in Norwegian shipping.⁶⁰² The first Wiborg stock company for shipping purposes was established in 1874, for the purchase of the Canadian-built *Birgit*, a bark that was evidently passed into Simon Wiborg Jr.'s control in the 1880s.⁶⁰³ For most purposes, these two ownership structures were not markedly different at the time, and the Wiborg shipping operations represent an

⁵⁹⁷ *Kragerø Adresse*, March 29, 1858.

⁵⁹⁸ (Hougen, 1936, pp. 512, 717) refers to them as *Kjøbmann* and *Handelsmann*, which broadly aligns with referring to them as merchants.

⁵⁹⁹ An overview of the Kragerø Wiborgs' vessels is provided in table 9.5.4. in the appendix.

⁶⁰⁰ A. Pedersen et al. (2016, pp. 258-263).

⁶⁰¹ Information from *Det Norske Veritas Klasseregister 1879*, p. 170–171. For Norwegian ownership of the vessel, which was scrapped in 1900 after at least two shipwrecks, cf. <https://kulturnav.org/11bc8914-59e1-429b-ad3a-cc313b0c1600>.

⁶⁰² Tenold (2020, p. 26).

⁶⁰³ <https://kulturnav.org/5d870b6c-9ffd-4217-8273-081f1f5d9b7b> (Retrieved January 31, 2022).

individual example of the gradual phasing in of the stock company in Norwegian shipping.⁶⁰⁴ There was also at least one case of assuming ownership of a vessel that had been in operation for years. In the late 1880s, Thomas Møller Wiborg took over a part of the 569-register-ton, full-rigged *Rinde*, launched in 1866.⁶⁰⁵ This business connection with the family of late farmer entrepreneur Eilert Olsen-Rinde (1809–1885) of Kil and Sannidal lasted for some four years.⁶⁰⁶

Until the 1880s, the shipping expansion of the Wiborgs was limited to sailing vessels. In this respect, they were in line with the general trend in Kragerø shipping—which, however, was not without nuances. The latter half of the 1870s were challenging years for Kragerø shipping, as indeed was the case for Norwegian shipping more generally.⁶⁰⁷ Many of the traditional markets for the sailing vessel fleet were in decline. This was partly because Norwegian shipping was being “gradually driven out of the shorter European trades”.⁶⁰⁸ The decline in Scandinavian lumber exports and other trade developments also mattered. The tramp trades were being surpassed by regular liner traffic, based on steam shipping. The Kragerø response to the shipping recession was basically twofold. The first aligned to that of several other Norwegian shipping ports: to have their sailing vessels get involved in transatlantic and quite distant trades, using low cost as a prime selling point. There were Kragerø ships taking freight to the West Indies, Australia, and the US Pacific coast.⁶⁰⁹ The other response was to intensify the employment of local tonnage in the ice exports. In the words of maritime historian Einar

⁶⁰⁴ Tenold (2020, pp. 79-80).

⁶⁰⁵ Information on the early history of the vessel in *Det Norske Veritas Klasseregister 1867*, p. 185. Also <https://kulturnav.org/7a481d1a-fe15-4fb4-b3b5-e40c2016ffb2> (Retrieved February 1, 2022).

⁶⁰⁶ Midgaard and Tande (1953, p. 151).

⁶⁰⁷ E. Pedersen (1933, pp. 37-51), Anders N. Kiær (1893, pp. 348-355).

⁶⁰⁸ Anders N. Kiær (1893, p. 351).

⁶⁰⁹ E. Pedersen (1933, p. 37).

Pedersen, the strategy was simple: “[I]f the ships themselves returned losses, there was perhaps money to be made on the ice”.⁶¹⁰

To make money on ice implied acting as an ice trader or exporter. Back in 1851, Simon Wiborg had purchased ice from Dahll on his own terms, and this business model was initially taken over by Simon Jr. and Thomas M. Wiborg. It seems to have taken several years before they settled into the role as actual producers, or “ice croppers”. The ownership advances on land were likely similar to the partnerships at sea, entailing the piecemeal acquisitions of entitlements noted in the Røyken chapter above. Thus, the interwoven structures of ownership were likely for the Wiborgs in the 1860s and 1870s. Simon Wiborg Jr.’s assets are the easiest to account for, as he emerged the smaller entrepreneur. He settled at Stabbestad, outside the town of Kragerø in 1870, taking control of a marshland that had been dammed for ice production by a farmer in 1864.⁶¹¹ He erected “several icehouses” in conjunction with the dams.⁶¹² According to Haakon Wiborg’s listing, Stabbestad yielded on average about 3,000 register tons annually, and employed some 20 to 25 men.⁶¹³

It appears that Thomas Møller Wiborg was primarily a shipowner and general merchant until the early 1880s. It is probable that, during the 1860s and 1870s, he controlled and explored rights or shares in ice-producing facilities, likely including a few relatively smaller properties and facilities—like Mørkevik, with its 3,000-register-ton annual production. There is a registration of a beach property, “Solstrand”, that was sold to

⁶¹⁰ E. Pedersen (1933, p. 37).

⁶¹¹ Sannes (1950, pp. 470-471).

⁶¹² Fleischer (1925, p. 29). Judging from an undated photo in Midgaard and Tande (1953, p. 68), at least four icehouses.

⁶¹³ H. Wiborg (1943/1996).

Thomas Wiborg for the purpose of starting an “ice business” (*Isforretning*); this endeavor was ultimately abandoned and the land resold.⁶¹⁴

Soon, however, Thomas Møller Wiborg upped the scope and scale of his ice and shipping business by several notches. In 1882, he acquired the seaside farm property of Frøvik, with a contiguous property stretching to the sheltered Snekkevik lakes. The seller was Kragerø merchant Thomes Thomesen (1816–1887).⁶¹⁵ Snekkevik had a downstream sawmill on the beach, ideally situated to provide sawdust for icehouse and shipping insulation. Wiborg made a substantial investment in the ice-producing facilities over the ensuing decade, building a reported 20 icehouses, which in the early 1890s might store about 16,000 RT. Wiborg had also developed the ice facility at Svartjern. It was described as the Kragerø district’s largest single icehouse: 300 feet long, 130 feet wide, and 30 feet tall, and it could store 12,000 RT of ice.⁶¹⁶

Thomas M. Wiborg picked up the mantle left by the late Johan Dahll and ventured into steam shipping. He raised 140,000 kroner to order the steamship *Krystal* in 1884.⁶¹⁷ The ship with its machinery was built at “Trondhjem’s Mekaniske Værksted”, which by this time had delivered a number of steamers to Norwegian coastal and inland shipping companies.⁶¹⁸ The *Krystal* was refitted and extended in the 1890s and served Wiborg’s fleet for more than 20 years. It was, as became the norm for the steamers in the Wiborg fleet, organized as a stock company. Upon delivery, it is noted to have been the second-costliest ship acquisition to have taken place in Kragerø.⁶¹⁹ Suitably named, the *Krystal*

⁶¹⁴ Sannes (1950, p. 593).

⁶¹⁵ According to a biography of Thomesen’s daughter, politician Fernanda Nissen (1862–1920), he had fallen on hard times, cf. Jonassen (2013, pp. 21-23).

⁶¹⁶ *Vestmar*, October 9, 1890.

⁶¹⁷ E. Pedersen (1933, p. 40), *Dagsposten* (Trondheim), October 21, 1884. The ship was delivered in 1885.

⁶¹⁸ The engineering workshop and shipyard was the first in Norway to deliver a steam vessel, in 1850, cf. Sandvik (1994, pp. 114-120).

⁶¹⁹ E. Pedersen (1933).

was specifically equipped for the ice trade. Its hull was painted light grey to reflect sunshine. The boiler was placed so that it did not “come in contact” with the cargo hold, which in turn was wood-lined so that no ice would touch the iron hull. The cargo hold was separated in two parts, allowing one section to remain cold while the other was loaded or unloaded.



Figure 7.1. Steamship, possibly the *Krystal*, loading ice at Wiborg's Frøvik (Snekkevik) ice plant, probably 1900-1910. Hand-colored image, photographer A.B.Wilse, BKM.F.003112.

Thomas Wiborg continued the expansion in the second half of the 1880s, so that by 1890 he controlled three to four “relatively small facilities”, as well as the two “colossal ice works” at Svarttjern and Snekkevik. In addition to the lakes and icehouses, there were an unspecified number of roofless ice stacks, insulated with sawdust, where the ice may “remarkably keep for years”.⁶²⁰ Following the purchase of the *Krystal* in 1884, Wiborg expanded his steam fleet with two more vessels, the *Klar* and the *Koral*. They did trade in all seasons. At the Wiborg ice piers life could be busy, with “the one vessel quickly replaces the next, and sometimes more ships are loaded at once”, all revolving with “American restlessness” (*Det gaar med amerikansk Rastløshed*). It was estimated that Thomas Wiborg’s ice business would soon reach a capacity of 50,000 to 60,000 RT annually, or “almost as much as the sum of Kragerø’s exports these days”.⁶²¹

While it would take some years before such amounts were reached, it was evident that by the early 1890s Thomas Wiborg was the top ice trader in the Kragerø district. He had firmly relegated his elder brother at Stabbestad to the shadows. The exact nature of the business relations between the brothers, as well as with the remainder of the ice-exporting community of Kragerø, was mixed. In a sense, all of the actors were competitors, but they also conducted business with each other. Wiborg commissioned ice from other Kragerø producers, and his ships likely more than once freighted other exporters’ ice. In 1890, the players on the level below Wiborg’s were chiefly two large works close to his own at Frøvik. There was Consul Larsen’s Lien, and Thordal’s Isbrug, belonging to Jens Olesen, in partnership with the British company Alcock.⁶²² In addition to a large number of smaller ice works, a “not insignificant” (*ikke ubetydelige*) player was the Skarbo ice plant belonging to J. Aalborg and company. Moreover, both the Biørn and the Dahll families were still involved in ice exports.

⁶²⁰ All quotes from *Vestmar*, October 9, 1890. In 1890, the total exports from Norway were 317,000 RT.

⁶²¹ *Vestmar*, October 9, 1890. According to Wiborg (1943/1996), the family ice sales only exceeded 60,000 RT in 1911, totaling 64,700 RT, of which 11,400 was purchased from other producers.

⁶²² Foster Alcock of Glasgow, according to E. Pedersen (1933).

Wiborg's expansions required access to capital, which rested on local as well as international networks. Between the brothers Simon and Thomas Møller Wiborg, Thomas Wiborg proved to be the extrovert, equipped with a willingness to take risks. Thomas Wiborg was characterized by Kragerø teacher Frederik Hougen as "[Kragerø's] most educated and ablest businessman".⁶²³ Wiborg's ascent generally attests to his abilities, but the praise received from Hougen also reflects that Thomas M. Wiborg, like Hougen himself, sided with the liberal *Venstre* party during the constitutional strife of the 1870s and 1880s.⁶²⁴ In this respect, Wiborg was at odds with the conservative outlook of the Kragerø merchant elite.⁶²⁵

For more than three decades, Thomas Wiborg balanced credit and income, rising in the hierarchy of the Kragerø society. However, this was not a steady process. Wiborg defaulted on loans and was in a tight spot in the late 1860s. The liberal newspaper *Dagbladet* reported that Wiborg, thanks to his "unique diligence and energy", managed to make good on his debts over the ensuing years, "with a few exceptions".⁶²⁶ It is apparent that Wiborg was driven to repay his most important creditors. This can likely be attributed to motivations related to honor, as emphasized by *Dagbladet*, as well as to survivor instinct. What is interesting to this research is the fact that adversity seems to have whetted Wiborg's appetite to become an even more advanced ice producer and exporter. From the experience he had gained, Wiborg might agree to Thorvald Baarsrud's perspective that the ice trade was "dangerous".⁶²⁷ However, far from being a farmer proceeding with caution after his relative's devastating social fall, Wiborg

⁶²³ Hougen (1936, p. 717): "Byens mest dannede og dyktige handelsmann".

⁶²⁴ For an example of Wiborg's polemics, in which seafarers' safety and politics are interwoven, cf. *Vestmar*, February 21, 1884.

⁶²⁵ Cf. Hougen (1936, pp. 713-717).

⁶²⁶ *Dagbladet*, January 30, 1893: "Ved en enestaaende Flid og Energi oparbejdede han paany sin Stilling, og det er en offentlig Hemmelighed, at han i Aarrækker suksessivt, paa ganske faa undtagelser nær, skal ha betalt sine Kreditorer det Tab, de i Slutningen af Sextiaarene led ved ham".

⁶²⁷ Cf. previous chapter.

raised the stakes. Of course, there might also have been considerable social consequences related to financial ruin for the section of society to which Wiborg belonged. At the outset of 1893, it was a possibility that Thomas Wiborg might join the ranks of disgraced merchants. The first seasons of the 1890s were meager, and many Norwegian ice harvesters ceased operation and “storage of ice in the icehouses”.⁶²⁸



Figure 7.2. Thomas Møller Wiborg at Frøvik farm, 1915. Photographer unknown. BKM.F.012623.

⁶²⁸ *Dagbladet*, January 30, 1893.

In January 1893, Kragerø and Norway was notified that Thomas M. Wiborg was insolvent. The cause was allegedly a loss on bank endorsements amounting to 100,000 kroner, in combination with “devastatingly” low ice prices.⁶²⁹ It was estimated that Thomas Wiborg had lost more than 300,000 kroner, and the newspaper report hints at criticism leveled at him for not letting go of one or two of his steamships to bring the situation under control. In his capacity as the Kragerø district’s largest employer in ice, the pithy reports conceal what must have been palpable levels of bitterness. The ensuing unemployment of 400 people was even reported in the US–Scandinavian press.⁶³⁰ Only in late February was it reported that there was work on the ice ponds and in the icehouses, although at lowered wages. The season had been “miserable”, and such a strong term communicates that the winter had been very hard for the workers and families who usually depended on winter employment in ice.⁶³¹

The unfolding of events suggests that Thomas Møller Wiborg’s bankruptcy was a flawed, but still managed, transition of ownership. His eldest son Nicolay Wiborg took the helm. To what extent they were assisted in this endeavor by good will from their financiers, local or not, is difficult to ascertain. It is not improbable that the Wiborg ice and shipping businesses had reached a position where they were deemed to “too large to fail”, within the context of the Kragerø community. Law and decorum demanded that the senior Thomas Møller Wiborg had to go, effectively retiring from the business before turning 60.⁶³²

In conclusion, Thomas M. Wiborg harbored progressive political leanings, which set him somewhat at odds with the merchant establishment in Kragerø. His strategy was

⁶²⁹ *Dagbladet*, January 30, 1893.

⁶³⁰ *Nordisk Tidende*, February 10, 1893.

⁶³¹ “Kummerlig”. *Norges Sjøfartstidende*, February 23, 1893.

⁶³² Thomas M. Wiborg enjoyed a retirement in excess of 20 years, the only one to do so of the ice entrepreneurs studied in this research. A portion was spent traveling and reporting from the Americas, the Middle East, and North Africa. His travel essays are published in T. M. Wiborg (2009).

informed by the reactive Kragerø approach to shipping and ice trading, in which ice was a hedge for fluctuating or even decreasing shipping rates. In the 1880s, however, his business broke the bounds of this predominantly sailing-ship-based strategy by venturing into steam shipping. Ostensibly failing financially in the early 1890s, Thomas Møller Wiborg secured a managed transition of the core of the family ice and shipping business to his son, Nicolay Wiborg.

7.3 Controlling lakes, icehouses, and production

Then in his mid-20s, Nicolay Wiborg was well primed to take charge of the family business. He had his business training from Dresden in Germany and was granted power of attorney by Thomas Wiborg in October 1891.⁶³³ Nicolay Wiborg ran a company dealing in insurance brokering, debt collecting, and other financial services. His dealings placed him in close contact with the Bergen steam-shipping milieu, by far the leading in Norway.⁶³⁴ By February 1893, less than a month after news broke on the consul's insolvency, the Svarttjern ice harvest was run on Nicolay Wiborg's "account". A few months later, he beat Alcock & Co. at auction, bidding for the facilities, with only 100 kroner above the British company's offer at 45,000 kroner.⁶³⁵ The consul's idyllic farm at Frøvik and the veritable Snekkevik ice plant do not figure in the newspaper reports on the bankruptcy case. They may still have been in jeopardy, but either way, the crucial productive assets of the ice businesses remained under family control. Nicolay Wiborg kept the farm at Frøvik, and transferred the *Krystal* and other vessels, except the steamer *Klar*, to new stock companies. This strengthens the suggestion made above that

⁶³³ *Norsk Kundgjørelsestidende*, October 29, 1891. Nicolay Wiborg was sent "at an early age" to France, England, and Germany to "learn languages", cf. Fleischer (1925, p. 32).

⁶³⁴ Advertisements in *Norges Sjøfartstidende*, February 3, 1891: Freight commissioner, debt collection, and agent for "Bergens Fragtassurancesforening for Dampskibe" (Insurance). On Bergen as the steamship capital of Norway, see for example Tenold (2020, p. 27).

⁶³⁵ *Norges Sjøfartstidende*, June 28, 1893.

the Wiborgs actually wielded a degree of control in the transition, and also demonstrates financial astuteness and clout.

The 45,100 kroner offered for Svarttjern reflects the capital worth of one of the two “colossal” Wiborg ice works, although the auction price was likely low. The number is about a third of the capital raised for the steamship *Krystal* in 1884 (142,000). Roughly speaking, this suggests that the shipping capacity was likely the more capital intensive, particularly so when steamers entered the picture. They were certainly the more flexible assets, as general cargo ships could be put to several uses, while the interconnection of lakes, chutes, and icehouses, after all, was for one purpose only. Still, the lakes and infrastructures, and the workers who manned the operations, were vital to the hybrid shipping strategy of the Wiborgs. Judging from the table below, which builds on Haakon Wiborg's recollections from the 1940s, the operations involved hundreds of laborers every year. For reasons to be explicated towards the end of this section, the table represents the production and employment ranges in years of full-scale production.

Table 7.1. Wiborg Kragerø ice production facilities, 1890-1920

| | RTs per year | Men employed | Horses used |
|-------------------|---------------|----------------|--------------|
| Svarttjern | 10,000 | 40–50 | 6–8 |
| Snekkevik(Frøvik) | 10,000 | 50–60 | 6–8 |
| Bjelkevik | 3,000 | 20–30 | 3–4 |
| Sjørsvik | 1,500 | 20–30 | 3–4 |
| Levang | 1,000 | 20–30 | 3–4 |
| Lerdalen | 3,000 | 20 | 2 |
| Mørkevik | 3,000 | 30 | 4–6 |
| Sillehullet | 1,000 | 30 | 4–6 |
| Gumøy | 1,500 | 20 | 2–3 |
| Barmen | 2,000 | 30 | 4–6 |
| Kil | 5,000 | 30 | 4–6 |
| Stabbestad | 3,000 | 20–25 | 2–3 |
| Skarbo | 3,000 | 30 | 3–4 |
| SUM | 47,000 | 360–415 | 44–64 |

Source: Haakon Wiborg (1943).

The table lists the ice-production facilities known to have been controlled or owned by the Wiborgs. Some of the smaller places on the list were only owned for a few years, like Sjørsvik, acquired in 1910.⁶³⁶ It must also be noted that Stabbestad belonged to Nicolay Wiborg's uncle Simon Wiborg Jr. A dimension not obvious from the table is the physical extension and decentralized character of this operation, even though all these facilities were in the Kragerø and Sannidal parishes. The largest facilities at Snekkevik and Svarttjern were more than 10 kilometers apart, by land.

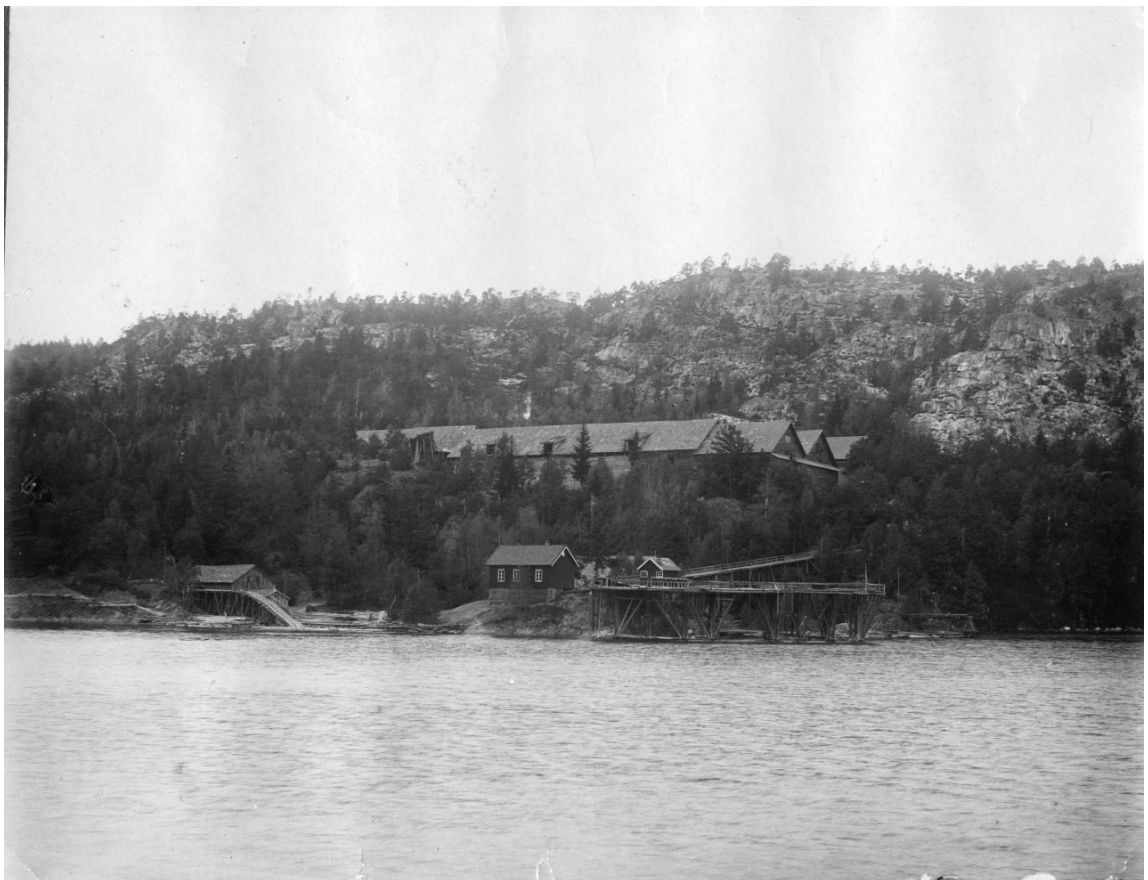


Figure 7.3. The pier, sawmill, and parts of the 20 icehouses at Snekkevik/Frøvik, picture ca. 1900. Notice the chute going down from the icehouses to the pier. The lakes are uphill and not seen here. Norway's largest single ice producing locality with a storage capacity of 16,000 RT. Photographer unknown, BKM.F.012708.

⁶³⁶ *Skandinavian*, December 12, 1910.

The Wiborg office in the town of Kragerø was the nerve center of the physical extension of the locations for grooming, harvesting, storing, and outbound shipping of natural ice. The only description of office life is offered by Haakon Wiborg (b. 1897), who likely knew it well. He depicts it as a place of hectic activity, where the staff, including the “youngest ones”—errand boys, possibly even himself at times—had their hands full with dispatching messages and information concerning arriving and departing ships, loading, and clearances. Overall, proprietor Nicolay Wiborg’s direct control is assumed, even if via his office manager when he was absent on business trips. The level of activity only increased in the late summer months, Haakon Wiborg recollected, when “the heat set in abroad” and ice ships were loaded day and night—including on Sundays, as “contracts had to be kept”. Another function of the office was to have samples of ice sent in from the various production sites, to make judgments on the quality. Haakon Wiborg recalls that “sometimes” the ice was so clear that “a newspaper might be read through it”: Such ice was called “steel ice” (*stålis*).⁶³⁷ The quality check was a very material expression of the linkages between the office, lakes, and ultimately the overseas markets. Another such material dimension were the means of communication. Thomas Wiborg had a telephone line installed between the Frøvik farm, close to the Snekkevik plant, and his Kragerø office in 1884.⁶³⁸ That is the same year that he commissioned the steamship *Krystal*. The telephone lines were local only until 1897, when Kragerø was connected to the national and international grid.⁶³⁹ Before that, and for a long time afterwards, telegrams represented the crucial, instant communication enabling a new kind of ice trade, especially that based on steamship capacity. The impact of telecommunications on the Wiborg ice trade is subject to further inquiry in the next section of this chapter.

⁶³⁷ All quotes from H. Wiborg (1943/1996).

⁶³⁸ The original contract for the construction of the telephone line was consulted on a visit to Frøvik farm in June 2019.

⁶³⁹ Steffens (1916, p. 431).

Nicolay Wiborg was the single largest employer in the Kragerø ice business, even allowing for some fluctuations from one year to the next. It must be kept in mind that he also bought ice from producers both in the Kragerø district and elsewhere, so in peak years the actual number of people engaged surpassed those directly employed at the facilities in table 7.1. According to chronicler Haakon Wiborg, Wiborg's workforce predominantly comprised local men and boys. One of these was Kristian Thommessen Blankenberg (1887–1957), a farmhand, lumber laborer, and ice worker, with several seasons in the ice industry (*issjau*). Blankenberg kept a diary, which is a source of a few aspects of the Wiborg ice business expounded on below.⁶⁴⁰

According to Haakon Wiborg, locals such as Blankenberg were accompanied by people coming “all the way from Drangedal and Gjerstad”, “happy for the employment they could get for themselves and their horses”.⁶⁴¹ The mix between local and itinerant workforces in action was inherent in the ice industry, and far from unique to Wiborg's ice harvests.⁶⁴² The flurried mobilization of labor was a feature of the industry throughout.⁶⁴³ For individuals like Blankenberg, this meant an annual cycle of tasks involving more employers than just Wiborg. It appears that Kristian Blankenberg walked to and from work every day. In other words, he did not have to share the cramped lodgings of the itinerants, the conditions doing little to mitigate transmission of common colds, or infection from pneumonia or tuberculosis. The nature of the work, the “shoving, cutting, and storage of the ice”, exposed the ice workers all the more to the effects of disease. This was reported by a district's medical official in 1903, who also

⁶⁴⁰ Obituary in *Varden*, March 20, 1957. A selection of Blankenberg's diaries from 1907 to 1950 are kept in the collections of the BKM, as BKM/Bd 13.

⁶⁴¹ H. Wiborg (1943/1996).

⁶⁴² It is a recurrent theme for study of the Asker ice communities of Vesseltun (1994).

⁶⁴³ C. H. Holm (1996, p. 228) is particularly instructive on the annual cycles of the ice work.

pointed to conditions on the ice ships—the sudden interchanges between cold and heat—as a “risk to health”.⁶⁴⁴

Despite the decentralized nature of the work operations, the Wiborgs maintained a firm handle on them. The management of the labor force was in the hands of local foremen, a few of whom are identified in Haakon Wiborg's account. Mr. Ole Persen at Svarttjern and Ola Aanevik at Snekkevik had the greatest responsibilities in terms of production, storage, and the handling of manpower.⁶⁴⁵ The speed with which the cutting and storing crews got the ice in-house is illustrated in Kristian Blankenberg's diary from 1908. On Saturday, February 1, Blankenberg was working at Wiborg's Frøvik icehouses and notes that “three houses are full”.⁶⁴⁶ The following Wednesday, after having one day off on Sunday, Blankenberg records that five houses were filled. From then on, the teams were hectically shoving and storing the thousands of tons of ice until March 6, when all 20 houses were full, and the workers were “finished with putting ice in the houses”. On one Tuesday in mid-February, Blankenberg stayed home because he was ill.⁶⁴⁷

Did workers like Kristian Blankenberg need the Wiborg enterprise, or was it the Wiborgs who needed them? The period from 1890 to 1930 witnessed palpable changes in the “loyalty of dependence” among the working-class population in Telemark County. This concept is from historian Knut Kjeldstadli's discussion of the evolution of working-class cultures, among other things impacted by the county's emerging wood-pulping, papermill, and electro-chemical industries.⁶⁴⁸ Kjeldstadli does not devote much space to

⁶⁴⁴ Quotes from *Vestmar*, February 17, 1903.

⁶⁴⁵ H. Wiborg (1943/1996). It is not improbable that these foremen were mandated to strike deals with cutting and stevedoring teams of workers, like Baarsrud had with his in Røyken. This detail has not been possible to establish on the basis of my sources.

⁶⁴⁶ BKM/Bd 13, Kristian T. Blankenberg diary 1907-1913.

⁶⁴⁷ In all likelihood losing that day's payment, and he writes that later in the day he was out chopping firewood.

⁶⁴⁸ Kjeldstadli (1987).

ice work, but it can be inferred that in his scheme it belonged in broad terms to the rural labor force, either that of agriculture and forestry, or to the works communities where vertical loyalty bonds remained vibrant into the 20th century. The most salient contrast to these rather traditional structures was the politically conscious and organized labor force at Norsk Hydro's Rjukan plants. Even though the scattered and spasmodic nature of ice labor made organized action difficult, there were cases of local action and strikes, as will be expounded on below. Very generally, these may have been connected to increased opportunities for work elsewhere.

The exact distribution in the Wiborg work force between locals and itinerants has not been possible to ascertain, but part of it being mobile contributed to a loosening of the vertical loyalty bonds between employer and worker. This process was reciprocal, also affecting the outlook of the employer. There are hints that the element of impersonality in labor market relations were reinforced after 1890. In early 1891, there was a remarkable and well-organized strike among Kragerø's ice workers, when a parade of ice laborers marched under a red banner, demanding a pay raise from 2 kroner to 2.50 per day.⁶⁴⁹ After days of negotiations, they convinced the employers, who were also evidently coordinated, to compromise at 2.25. Some proprietors were enraged at the affront and wanted the police to act, likely in the same vein as the quelling of the Thranite movement in the early 1850s.⁶⁵⁰ On that count, dominant employer Thomas Wiborg dissented, a stance that local historian Håkon Finstad attributes to Wiborg's liberal (*Venstre*) progressive leanings.⁶⁵¹ It is likely that Wiborg was central to forging the settlement, and this suggests a business-like pragmatism to his outlook on labor relations. There were no arrests, so Wiborg's view held the day.

⁶⁴⁹ H. Finstad (1999). See also *Norges Sjøfartstidende*, January 24, 1891.

⁶⁵⁰ Cf. chapter five.

⁶⁵¹ H. Finstad (1999).

It seems that impersonality in these relations increased over the following years. In 1899, after Nicolay Wiborg had taken over, there was a strike among his workers. The demand was a raise to 2.40 kroner per day. Wiborg is reported to have addressed the workers assembled outside his house and told them that he would discontinue the entire ice harvest before he would negotiate.⁶⁵² His response is ostensibly in line with that noted by Knut Kjeldstadli for the archetypical patriarchal, traditional manager, who simply asserted that “if you don’t like it here, you can go elsewhere”.⁶⁵³ Wiborg’s was perhaps just as much a calculated reaction. It was a way of sending the entire stakes back to the workers, rather a more callous delivery than the expression of an unforgiving proprietor patron dealing with his insubordinate children. Wiborg may in effect have simply been saying that the year’s harvest did not matter all that much to him.

Still, in the years after 1899, exports of ice produced on the family’s own lakes, by laborers like Kristian Blankenberg, remained a crucial contribution to the Wiborg ice and shipping enterprise. The table below, and the far-right column, indicates only a few years of Nicolay Wiborg substantially augmenting it: specifically, 1910, 1911, and 1913. The 1911 season marks the last instance of a speculation season in Norwegian natural ice. The speculation was that the high prices offered for natural ice in 1910 would last into the next year, which they did not.⁶⁵⁴

⁶⁵² Gumø (1980, p. 16).

⁶⁵³ Kjeldstadli (1987).

⁶⁵⁴ Cf. table 9.5.2., appendix.

7.2. Nicolay Wiborg ice exports 1895-1915, select years

| | RT total | Percentage of Norway total | Percentage sold f.o.b | Percentage from own production |
|-------------|----------|----------------------------|-----------------------|--------------------------------|
| 1895 | 27,831 | 8.6 | NA | 85–100* |
| 1903 | 28,037 | 10.1 | NA | 100 |
| 1904 | 34,363 | 11.3 | 4.3 | 100 |
| 1909 | 35,395 | 12.9 | NA | 100 |
| 1910 | 45,956 | 11.6 | 11.2 | 69 |
| 1911 | 64,723 | 16.7 | 15.2 | 74.5 |
| 1912 | 46,596 | 20.3 | 6.2 | 83.5 |
| 1913 | 37,825 | 17 | 0.5 | 56 |
| 1914 | 24,550 | 13.4 | 1.0 | 95.6 |
| 1915 | 12,316 | 22.4 | 1.1 | 100 |

Source: H. Wiborg (1943/1996) and *Historisk Statistikk 1948*, table 120. * = Unclear if “other places” (*andre steder*) refers to NW’s own production facilities, range indicated.

The table suggests that Wiborg was involved in supplying some ice, under the terms of f.o.b., to external exporters, who then stood to take the profits or loss in the end markets. Throughout, however, the majority of shipments were Wiborg ice on Wiborg ships, c.i.f.: that is, cargoes for which Wiborg had total liability until they reached their overseas destinations and were taken over by the importers or their agents upon arrival. This was in line with Wiborg’s self-presentation, as expressed in a 1908 statement, in which he represents the “bigger ice exporters” who dealt in fixed contracts, whereas only the “smaller exporters or speculators” might have anything to gain from short-term price fluctuations.⁶⁵⁵ The company’s actions during the 1910 and 1911 seasons suggest that the divisions between regularity and speculation were not as sharp as Wiborg’s statement might imply.

The above table has a number of deficiencies. The high-point year of 1898 is not included. There is no information on why Nicolay Wiborg’s son Haakon Wiborg considered only certain years to be presentable for posterity. Despite the need for

⁶⁵⁵ *Kysten*, September 2, 1908.



Figure 7.4. Nicolay Wiborg observing man and horse working an ice-plow, at Bjelkevik in 1911. Photographer unknown. BKM.F.012461.

caution, the numbers supply ground for a few inferences about the industrial nature of the Wiborg ice enterprise. In a strategic perspective, the involvement in ice production was an adjunct to the shipping business. It was so in Thomas Møller Wiborg's time, and this tendency was only amplified after the takeover by Nicolay Wiborg and his investments in steam shipping. There may have been productivity gains in the cutting and storing of ice, some attributed to improvements in tools.⁶⁵⁶ After 1900, the range and nature of the ice harvests were still fluctuating, and few reasons must have

⁶⁵⁶ For instance, in 1890, ice ploughs operated by one horse and one man were reported to cut 18-inch ice, whereas previously the limit was 10 to 12 inches. The improvements were attributed to a Kragerø blacksmith named J. Enger, "an exceedingly capable man", *Vestmar*, October 9, 1890.

appeared for long-term commitments or transformative investments, regarding the land-side of the operations. For the Wiborg workers, the decline in job opportunities set in before the outbreak of the First World War. The 1912 and 1913 seasons were bleak. The amount of ice shipped in the latter year indicates that Wiborg hired less than half of the 400 workers that were normally engaged.⁶⁵⁷ If the future belonged to the workers, it did not belong to ice work.

To conclude thus far, it is evident that the ice production, exports, and shipping operations of Nicolay Wiborg did not represent a qualitative break with that of his father. However, the coordination and speed of operations increased, while a degree of flexibility was also built into the system. It is possible that the different attitudes displayed in the strikes of 1891 and 1899 reflect different approaches between Thomas Møller and Nicolay Wiborg. The former may still have been influenced by the traditional, reciprocal loyalty bonds of the Kragerø society, but the evidence does not allow elaboration on their relative positions. It is possible, however, that Thomas Møller Wiborg was prone to assuming risk on behalf of the family operations. These aspects will be further examined in the section below, delving into the fluidity of operations visible in the company's telegraph codes.

7.4 Coded dynamics

The Wiborgs frequently credited their success to the ability to manage and coordinate production, storage, and shipments.⁶⁵⁸ To manage risks was in essence to outguess future market fluctuations. Weather and sailing conditions, the degree of distribution of

⁶⁵⁷ One comment by Wiborg located on the contraction of the 1912 and 1913 seasons was a concern for Kragerø pilots, who were given much fewer commissions, *Norges Handels- og Sjøfartstidende*, February 19, 1913.

⁶⁵⁸ And regarding Kragerø's superior capacity for loading ice ships, see for example Nicolay Wiborg in *Norges Handels- og Sjøfartstidende*, June 26, 1913.

ice from lakes and ponds to icehouses and/or ships, were all part of constant calculations. Besides providing an overview of the capacities of different components of the Wiborg ice enterprise, and to analyze their strategic implications in a somewhat static perspective, this chapter also aims to dive into the *dynamics* of the Wiborg shipping and ice enterprise.⁶⁵⁹

It does so by scrutinizing Wiborg's telegraph codebooks. The codebooks from 1880, 1896, and 1903 are essentially long lists of single words corresponding to plaintext phrases. They contain 1,000, 500, and 1,800 such phrases, respectively, all in English except for the 1896 book. The codebooks provide insight into the flow of business risks, guessing games, and relationships that transpired in the ice trade. This is especially true for the Wiborg's combined enterprise of ice and shipping.

What were the codes there for, how did they function, and what can be inferred from their structure? This multi-pronged question requires a presentation of the codebooks as a phenomenon before I venture an analysis of the key strategic changes reflected in the codes. To start with just one code: The 1880 codebook lists "Alone" to stand for "Safely arrived, all well, the ice cargo has melted very little". This would be a highly desirable message to receive at the office in Kragerø and must have been so hundreds of times. However, there were plenty of disturbing messages, as well, such as "Adder: Safely arrived, all well, buyer insolvent, telegraph instructions".⁶⁶⁰ Thus, the codes illuminate a range of situations arising before and after reaching the overseas destination, where the ice was to be unloaded and carted to consumers in the town and the countryside. Some situations were unique to the ice trade, while others were generally applicable to the maritime business of the late 1800s. For instance, the phrase

⁶⁵⁹ Since Wiborgs' was multi-unit set of businesses centered on ice and shipping, the term «enterprise» is employed in this chapter to cover the range of businesses under the control of this one family.

⁶⁶⁰ BKM/Bb112/Wiborg.

“telegraph instructions” indicates the default position that captains were not mandated to find just any solution for the cargo.

The term “codebook” suggests secrecy and cryptology. In a global perspective, the advent of the telegraph was a major event in the development of cipher communications for military ends. However, for high-consuming business users of the telegraph, the purpose of the codes were rather more mundane. Of course, trade secrets were guarded and communication via public systems risked exposure. Unlike letters, telegrams involved third-party operators to transform a message back and forth between ordinary text and Morse code dots and dashes. Despite widespread initial suspicion, cryptology historian David Kahn noted that “[a]s businessmen and the public used the telegraph more and more, they found that their fears of lack of privacy were exaggerated. The clerks dealt impersonally with the messages”.⁶⁶¹

Telegraph communication was paid for by the letter, and the final bill for a message was a function of length and distance to the receiver, including relay stations along that distance, and standard rates for message delivery to address. The purpose of “commercial codes”, to which category the ice exporters’ codebooks belong, was primarily to reduce the number of signs necessary to get a message across.⁶⁶² The system of substituting a single word for a phrase (i.e., “nomenclature”) did not arrive with the telegraph: It was a continuation of communication systems dating back to the 1400s. With telecommunication, a deluge of commercial codes came into operation. Some were openly advertised on companies’ letterhead; others were more individual to a company or business. In the early 1880s, there were advertisements in *Morgenbladet* for *The Timber Trade Journal Telegraph Code*, “compiled for the use of timber merchants, in English, Swedish, and French”. The book was expensive: 10.50 kroner at H. Aschehough & Co.’s outlet in Christiania, when other business books were marketed

⁶⁶¹ Kahn (1967 p. 189). Cf. also Rinde (2005, p. 83).

⁶⁶² Kahn (1967 p. xv).

for less than 1 krone.⁶⁶³ Still, given that a “single message” (*enkel Skrivelse*) of 25 words from Kragerø cost 4.33 kroner to send to Stockholm, 12.30 to Berlin, and 21.13 to London in the 1860s (the price to London going down with the direct line after 1870), the book may have been a highly viable investment.⁶⁶⁴ The telegraph was certainly no chatline.

It was likely impossible to keep codes secret for long. Since the codes facilitated rapid, low-cost communication, they required distribution. An indication that the Wiborg codes were disseminated are the structural similarities between them and a remaining portion of what must have been codes for the Baarsrud ice business (cf. previous chapter).⁶⁶⁵ Wiborg's books are printed and bound (at Bundi's bookbinding store in Kragerø), while Baarsrud's is a handwritten sheaf. The plaintext phrases are in many cases identical, with only the code word changed. The phrase “safely arrived, all well” is “Adagio” in the Wiborg code, and “American” in Baarsrud's. The two codes might have built on an unknown third source, but it is just as likely that Wiborg's system served as a standard for Baarsrud, and others.

The headings of the “chapters” reflect how Thomas and Nicolay Wiborg organized the various components of their enterprise, with noticeable increments in the 20-plus year period from the first to last code edition. Throughout, the basic fact of the ice trade as a particular maritime enterprise is undisputable. The headlines of the books indicate that the majority of codes dealt with commercial aspects of the ice trade. A range of questions between seller and purchaser standardized modes of offering and acceptance of price, quantity, and quality. A typical question used to kick off the process was the 1880 code “Damage: Will you buy about ... tons of ice for prompt shipment at the rate

⁶⁶³ *Morgenbladet*, May 7, 1881. For examples of other book advertisements from the same year, see for example, *Aftenposten* November 29, 1881).

⁶⁶⁴ Prices from Steffens (1916, p. 429).

⁶⁶⁵ SAKO/P-1359/E/Ea/L0001.

of ...? Telegraph acceptance or utmost counteroffer".⁶⁶⁶ The correspondence was intended for direct communication between the seller at the home office in Kragerø/Norway—close to the action of producing, storing, and shipping ice, and chartering ships—and different conversation partners: ship captains, end buyers, brokers, and agents.

7.3. Telegraph codebook chapters, Wiborg and Baarsrud

| 1880 | 1896 | 1903 | Baarsrud's codes (derived from T.M.W. 1880?) |
|---|--------------------------|---------------------------|--|
| Telegrams on Arrival | Ankomst-Telegrammer | Arrival | A. Telegrams on Arrival |
| Telegrams on Arrival and General Remarks | Afgangs-Telegrammer | Sailing | B. Telegrams on Arrival and General Remarks |
| On the Sale of Cargoes. Questions (from Seller) | Veir og Vind | Sale of Ice | C. Telegrams on Leaving Port |
| On the Sale of Cargoes. Questions (from Agent or Buyer) | Losning | Shipment | D. On the Sale of Cargoes. Question (from sellers) |
| On the Sale of Cargoes. Replies (from Seller) | Issalg | Loading | |
| On the Sale of Cargoes. Replies (from Agent or Buyer) | Fragter | Discharge | |
| On Freights. Questions. | Klager, Reduktioner etc. | Complaints | |
| On Freights. Replies & General Remarks. | Liggedage | Quality and Thickness | |
| | Diverse | Weighing | |
| | | Commissions | |
| | | Options | |
| | | Draught and Lighterage | |
| | | Tonnage and Chartering | |
| | | Position | |
| | | Demurrage | |
| | | Settlement and Remittance | |
| | | Wind and Weather | |
| | | Sundries | |

Sources: BKM/Bb 112/Wiborg, SAKO/P-1359/E/Ea/L0001

Most arrival codes address situations in which the ship has arrived, at least at a location that has telegraph connection, but where there is trouble either due to damage, portside issues, or problems with the buyer. Some court cases comprehensively describe such situations, but only a fraction of calamities would have resulted in litigation. The codebooks constitute a catalogue of known predicaments, to be handled jointly by the captains, agents, and home office. Some were generic to all sailing-ship traffic. What to do if both anchors were lost? What if the ship's bow was "stoved" in a collision? There was also a code for absconding, a much-discussed problem of the late 19th-century

⁶⁶⁶ BKM/Bb/112 Wiborg.

Norwegian merchant navy: "Candidate: Sailready but detained through desertion of part of crew".⁶⁶⁷ Interestingly, there is no such code in the 1903 book. Statistician Anders N. Kiær maintained in 1890 that steam crews were less prone to escape their ships, mainly because of the shorter seaport turnarounds.⁶⁶⁸

Other damages were specific to the practice of freighting ice, the only cargo specified in the Wiborg codebooks. Collisions or other factors leading to a "leaky vessel" were dire, not just for obvious reasons but also the seawater's potential to melt the ice cargo. By extension, waiting for pilotage, and delays in berthing or unloading posed severe challenges if melting had set in. All were likely occurrences in the ports visited by some of the ice ships. The busiest of these was London, where by one 1890s estimate more than 300 international ships arrived and departed every day, in addition to domestic and coastal traffic.⁶⁶⁹ The codebooks operate throughout with two simple categories for the reporting of melt loss upon arrival. Either the cargo had melted "very little", or "considerably". In the latter case, a new set of instructions were sent off, concerning liability or failure to fulfill the contract. It is challenging to pinpoint unambiguously what constituted a considerable loss, and this was frequently subject to litigation. Haakon Wiborg cites a 5 to 10% loss rate from melting as "average" across the North Sea, generally a little more in summer.⁶⁷⁰ "Considerable" melting must have exceeded such levels.

The structure of the codes thus reflects the dynamic networks of the trade. A main point is that there were a number of uncertainties, and contingencies ranging from climatic

⁶⁶⁷ BKM/Bb/112 Wiborg.

⁶⁶⁸ Anders N. Kiær (1890 p. 50): "Et andet forhold, hvorved damskibsfarten for besætningernes vedkommende antagelig stiller sig fordelagtigere end seilskibsfarten, er den mindre anledning, den giver til rømning. Dette beror vel hovedsagelig paa dampskibenes kortere havneophold [...] men andre forhold er muligens ogsaa medvirkende".

⁶⁶⁹ Anders N. Kiær (1894 p. 329). London and the other seven maritime centers of Britain constituted 87% of all maritime traffic to Britain and Ireland, according to same source.

⁶⁷⁰ H. Wiborg (1943/1996).

conditions to the shifts in relationships between owner Nicolay Wiborg and his captains and agents. The structures of the codes were not a given. The recorded uncertainties were premeditated, in the first instance by Thomas Møller Wiborg, and in the following two by Nicolay Wiborg. It is therefore interesting to note that certain contingencies were not addressed at all. For instance, the eventuality of lacking ice due to a labor shortage, including the occurrence of strikes among ice workers, does not appear in any of the books. By 1903, these were not unknown phenomena, and their absence from the books is not proof that this never impacted proceedings. What can be inferred, though, is that social factors were perceived as less critical than the fluctuations of natural conditions.

The above is just one of several limitations to the informational value of the codebooks. That being said, the evolution from the 1880 to the 1903 codebooks grounds observations on changes in the nature of the Wiborg ice enterprise, which was heavily impacted by the application of steam shipping. As the trend towards that kind of shipping was only more pronounced after Nicolay Wiborg's takeover, the following largely pertains to his approach to being in both the ice and the shipping business.

7.5 Market intelligence and ice qualities

One aspect of the dynamics of Wiborg's ice trade concerns the relative distribution between long-term and short-term business connections. It is indicated by Haakon Wiborg, and also the way Nicolay Wiborg himself depicted it in 1908, that the dominant ice traders were dealing in "regular contracts", which built on connections honed over time. Haakon Wiborg mentions the most important clients and brokers in Liverpool, London, Boulogne, and Oostende. In London, ice merchants and restaurant owners Gatti & Stevenson, Slatters Ltd., as well as brokers J. Goodchild & Co. are singled out. Liverpool has the Anglo-Norwegian brokering house Brodersen & Vaughan, also well-known from the correspondence of Dahll, Baarsrud, and others on the Norwegian side. However, the connections in France and Belgium also implied steady business. The "pleasant" connection of Altazin Fourny and the broker J.M. Allum in Boulogne was crucial to at

least 300 journeys to that port over the years.⁶⁷¹ Simon Wiborg's brig the *Valentine* made more than 100 trips to Oostende, where the main importer's name was Casteals de Coene. It is mentioned that contracts with the most principal business partners were made by Nicolay Wiborg in person every year, a routine he most likely inherited from his father.

However, the codebooks give ample reason to believe that the use of telegraph communication and steam shipping, in combination, provided much greater leeway for deals to be struck—including making deals while the ships were already at sea, judging from the phrase “will you buy a cargo of ice by the ... now at ... at the rate of?” By far, however, most codes address more stable transactions, ranging from numbered sets of consecutive voyages to requests for contracts over time periods, like the 1880 question concerning the “lowest rate for ice delivered by a vessel of the capacity of about ... tons of ice to run all the year, commencing ...”.⁶⁷² A subset of communications in this regard was the monitoring of local ice markets by the local agents. Reports were sent back to Norway on the local climate, such as “extremely hot weather; expect rates will go up”/“no ice saleable at present owing to sharp frost”. The 1896 book provides eight reasons for little or no outlooks of sales “at the moment”. Three causes are listed for absolutely no sales: a) the icehouses are full, b) there is a collection of “native ice”, and c) there is *a considerable* collection of “native ice”.

Another development is an increasing number of codes related to ice quality. Questions about quality were evidently at play even in the earliest instances of the trade.⁶⁷³ Undoubtedly, communication about product quality was understood in the 1880 Wiborg codes, but it was rarely expressed directly. Much seems to be captured in the seller's (i.e., Wiborg's) statement, “I will guarantee transparent clear ice, free of snow”; other

⁶⁷¹ H. Wiborg (1943/1996). Atazin & Fourny—Boulogne fisheries, cf. trawler recorded here: <http://www.clydeships.co.uk/view.php?ref=12620> (Retrieved February 12, 2021).

⁶⁷² All quotes, BKM/Bb/112 Wiborg.

⁶⁷³ Cf. chapter five.

issues were relegated to the contract. There are few other references to specific qualities, with the exception of general exchanges concerning complaints on quality—for instance, rejected by the code “entirely groundless”—or mention that “small ice” must be priced individually. The 1903 book provides a much richer texture in this regard, particularly manifest in the separate chapter on “Quality and Thickness”.

With more than 50 codes for different qualities of freshwater block ice, this section of the codebook arguably provides the most insight into the factual, commercial distinctions made between different grades of freshwater ice. The standard contracts provide more limited guidance. The 1903 Wiborg codes relate that there were highly relative ways of communicating various qualities, while of course thickness was instantly measurable. What the distinction between “good hard ice guaranteed” and “excellent ice guaranteed” may have been is difficult to form a solid opinion about.

Evidently, past experience was an important yardstick for quality, whether related to the ice shipped last year, or the ice shipped before that. There are several codes covering such outcomes—for example, the insistence of a potential buyer or agent that the product “must be better ice than last”. With regards to quality, these codes contain reservations on the part of the seller, which might have preempted complaints or distributed risk; there were phrases for “thickness” or “quality” being “not guaranteed”, or “fear new ice unsuitable”. Conceivably, a measure of ice quality was transparency, for instance legibility through a given thickness, but no such benchmarks are indicated. There is no standard for requests for or assertions about bacteriological or chemical analyses conducted on the ice, although by 1903 this was not uncommon (cf. chapter six). Of course, such issues might also have been assumed to fall under a general heading of quality and phrases for communicating disagreements in the wake of trades, including the option of “shall I go to law”.

40 Quality and Thickness.

| | |
|-------------|---|
| Fuglepibe. | State thickness of the ice. |
| Fuglereede. | State quality and thickness. |
| Fuglesang. | Must be good ice. |
| Fuglesteg. | Must be excellent ice. |
| Fugleunge. | Must be best and thickest ice. |
| Fugtig. | Must be thicker ice. |
| Fugtighed. | Must be thicker ice than last. |
| Fugtning. | Must be better ice. |
| Fulas. | Must be better ice than last. |
| Fuldblod. | Must guarantee thickness. |
| Fuldendt. | Must guarantee quality. |
| Fuldgod. | Must guarantee thickness and quality. |
| Fuldhed. | Must send your best and thickest ice. |
| Fuldmaane. | Must be same ice as shipped per..... |
| Fuldmagt. | Same ice as shipped per |
| Fuldrig. | Sending my best and thickest ice. |
| Fuldskab. | Good hard ice guaranteed. |
| Fuldskjeg. | Excellent ice guaranteed. |
| Fuldtegne. | Thickness same as last. |
| Fuldtone. | Quality same as last. |
| Fuldtro. | Thickness and quality same as last. |
| Fulminant. | This years ice. |
| Fumarole. | Last years ice. |
| Fumarsyre. | New ice inches. |
| Fund. | Old ice inches. |
| Fundgrube. | Good hard ice, but signs of spring. |
| Fundament. | Thickness not guaranteed. |
| Fungere. | Quality not guaranteed. |
| Funke. | Thickness and quality not guaranteed. |
| Funklen. | Cannot guarantee thickness and quality. |
| Funktion. | Fear thickness unsuitable. |
| Funtus. | Fear quality unsuitable. |
| Furet. | Fear thickness and quality unsuitable. |
| Furevis. | Fear new ice unsuitable. |
| Furie. | The ice is too thin. |

Figure 7.5. A page in the 1903 Wiborg codebook, with a sample of crucial codes for ice quality. **BKM Bb 112.**

The one term that specifies quality here is “free from spring” (*vaar*), meaning free of layers of snow or frozen meltwater, visibly blurring the product. That concept was also in currency in the 1880 book. In contrast, there was expansion in the specification of ice thickness. From being categorized as either “thick” or “thin”, the 1903 Wiborg system lists 7 steps, increasing by an inch, from “not under 14 inches” up to “not under 20 inches”. All of these qualities were likely sometimes in demand, as long as the thickness

was agreed upon prior to portside handover to the buyer. It is not clear whether the oft-referenced “small ice”, used for stowage but also sold separately, would only be chunks under the minimum 14-inch mark. This was likely a somewhat gliding scale: What constituted “small ice” might have varied over the years and between the shipments.

Do the codebooks reflect developments in practices of the ice trade between the 1880s and early 1900s? The overall answer is yes. One measure is the increased number of codes and a more complex grid of situations covered. They were a product of higher volumes and speed of transactions over the oceans. More specifically, the development has left traces of changes in organization and coordination, in more elaborate descriptions of the physical qualities of the ice, as well as changes linked to the advent of steam shipping, especially concerning the range for planning ahead.

7.6 Managing captains, managing time

A trend that stands out between the codebooks is the increased direct control wielded by Nicolay Wiborg from his office over the actions of his captains overseas. In this respect, the book from 1896 is particularly interesting. It comprises about 500 codes, all in Norwegian. This collection seems primarily to have been for exchanges between the home office and the Wiborg company's shipmasters once they reached their destinations. The codes in this book are mainly about situations at sea, but they also contain a separate section on “ice sales” (*Issalg*). This signals that, well into Nicolay Wiborg's career, the company ship captains were highly involved in the commerce of ice trading. Given the kind of instructions listed here, the ice ship captains evidently retained a function of being traveling salesmen. Many of the phrases request permission or authority to settle a range of issues. One of the more telling concerns ice sales, with the code word *Afriq*: “Will you give me liberty to do my best?” (“Vil De give mig frie Hænder til at gjøre mit bedste?”).⁶⁷⁴

⁶⁷⁴ BKM/Bb/112/Wiborg.

Besides the contraction of the shipmaster's action range on the steamships, the organizational change that is reflected most clearly between the books is the emergence of the "shipbroker". In short, their function is captured in the increased number of codes under the headings "Options", "Draught and Lighterage", and especially "Tonnage and Chartering". In the age of 19th-century European economic integration, not only European and North Sea shipping, but also "[s]hipping movement worldwide was directed via cable communication with the ports [...] by the polyglot owners and shipbrokers at the (modestly named, but actually global) Baltic Exchange in London".⁶⁷⁵ The shipbrokers were linchpins in a "sophisticated mix of financial, managerial, risk control, exploration, engineering, investment, and logistic services".⁶⁷⁶

The time elapsing from the 1880 book to the 1903 book encapsulates the Wiborgs' transition into transporting ice via steamship. The special adjustment of the *Krystal* (in 1885) was noted above. In a sense, this was a microscale manifestation of a global rupture in transport modes. Alongside the railway, steam shipping ranks as a principal technological change of the 19th century. It allowed the establishment of scheduled and regular liner traffic, with predictable timetables semi-independent of the favorable winds required by sailing vessels. On a global scale, it is estimated that steam shipping contributed decisively to bringing down shipping rates by 1.5% per year after 1850.⁶⁷⁷ Large companies "that could organize regular shipping dates gained a commercial advantage", according to UK economic historian C. Nick Harley.⁶⁷⁸ Wiborg's was as close to this ideal as any Norwegian steam shipping based on ice came. The "organization" of such enterprises did of course include many things, basically access to much more capital per ship than the norm of the sailing vessels. However, as pointed out by maritime historian Einar Pedersen writing on Kragerø, it also signaled a break with past

⁶⁷⁵ Hannah (2008).

⁶⁷⁶ Hannah (2008).

⁶⁷⁷ Mokyr (1990 p. 130).

⁶⁷⁸ Harley (2008).

traditions and practices.⁶⁷⁹ Thomas Møller Wiborg had both the social position and confidence to be one of the few to take the step in Kragerø, and this move reflects a mindset of rationalization and growth.

In a very general way, steamships offered a number of advantages. Not only were they relatively independent of wind and weather, at least compared with sailing vessels,⁶⁸⁰ the shift to steamships was also linked to increased speed of transport and stowing of ice. Haakon Wiborg wrote that, “in the 1880s”, the ship *Geir* (a 230-ton sailing vessel) could throw its ballast and load ice in 1.5 to 2 days. In contrast, the steamer *Krystal*, at 500 tons, was fully loaded in 6 hours.⁶⁸¹ However, more rapid movement is not the only time dimension of interest here: The steamers’ regularity also allowed planning, and for making ever-more-precise calculations regarding time.

The time-management codes relating to “regular shipping”, or shipping being executable according to plan, render the 1903 edition some 80% larger than the 1880 codebook. More than 200 codes for “sailing” and 170 more for “shipments” encompass an intriguingly complex set of time-related phrases. They strongly indicate that the involved parties might offer and demand specific times for shipments, to a degree unmatched in the 1880 book. The codes are both flexible (“sailing soonest possible”, “sailing this or next month”) and very specific (“prompt sailing guaranteed”, “shipment Wednesday”). There were planning horizons coded for the coming week or month, and every month of the year. In the longer term, there are specifications for the “usual spring shipment”, “spring and summer shipment”, or just “summer shipment”. These options for setting departures days, weeks, and months ahead gave sellers and buyers the opportunity to detail their logistics. The expanded range for agreements related to time

⁶⁷⁹ E. Pedersen (1933, p. 37), especially on Johan Martin Dahll exhibiting “initiative and courage” by moving into steam shipping.

⁶⁸⁰ They were also generally considered to be safer places to work for the seafarers, cf. Anders N. Kiær (1890).

⁶⁸¹ H. Wiborg (1943/1996).

is reflected in an increasing set of phrases for sales, and for the closing or canceling of long-terms contracts.

7.7 Exiting ice

The previous pages have emphasized increased control and strategic management of uncertainty, facilitated by the combination of steamship regularity with continuous and rapid communication via telegraph. The Wiborg ice enterprise was flexible in the most important dimensions. As noted in section 7.4., this was amply demonstrated during the last two seasons (in 1910 and 1911) resembling anything akin to peaks in Norwegian natural ice exports. The following two seasons were contractions, and the First World War meant the final end of the ice trade. However, the last ice sold by Nicolay Wiborg was a shipment to Denmark in September 1917, a full three years into the war. Here, the spotlight is on the Wiborg exit from the ice trade. Was it a calculated affair, like the premeditations and practices discussed thus far?

By 1914, Nicolay Wiborg had been the head of the family ice business for nearly 20 years. Although he was not the one having introduced the innovation of steamships in the ice business, he did implement continuous systematization, rationalization, and control. More steamers were put into service, and turnaround times for the ice ships were reduced from days to a matter of hours. A premium was placed on keeping ships employed in a kind of triangular route network between Kragerø and destinations on both sides of the English Channel. Coordination of ice production, shipping, and selling ice required new levels of decision-making routines. Much of the on-the-spot decision making was transferred from shipmasters to the central office at the Kragerø waterfront.

In the first decades of the 1900, being a large employer and one of Kragerø's dominant shipowners still translated into renown and admiration in Kragerø society. Nicolay Wiborg continued the family and merchant class tradition of public service: At the outbreak of the war in 1914, Wiborg was mayor of Kragerø. At that time, Nicolay Wiborg was for all purposes a conservative politician. He left the liberals, the *Venstre* party, in

1903.⁶⁸² The last time Nicolay Wiborg seems to have offered himself for public office was in the parliamentary elections in 1915, but he was not elected.⁶⁸³ Wiborg had a long career in local politics and as a deputy to parliament. He was not the only one, however, and he was outshone by fellow Kragerø shipowner and ice exporter Ambortius Lindvig (1855–1946). Lindvig served many terms in parliament, as mayor and—for a few years before the First World War—as minister of trade.⁶⁸⁴

That Wiborg turned conservative in political terms may have reflected many things. There is insufficient information to relate it to outlooks on worker–owner relations. As will be recalled from earlier in the chapter, the young Wiborg (at least in 1899) demonstrated a somewhat more unforgiving attitude than that of his father some eight years before. Either way, by 1914, there was nothing in his public profile to seriously indicate that the town's leading ice entrepreneur was contemplating relinquishing the ice business, despite a few bad years. Wiborg had downsized ice-production operations but was by all tokens still entering profits into his annual balance sheets.

In 1913, two steamers were added to the Wiborg fleet, the *Nico* and the *Vale*, each requiring a stock capital of more than 240,000 kroner.⁶⁸⁵ Naming a vessel *Vale* may have been sending a message. In at least one instance, that of Johan Martin Dahll's sailing ship of the same name more than 30 years earlier, the naming was a deliberate "farewell". In that case, it is noted to have been a symbol for the end of the sailing vessel era.⁶⁸⁶ No reasoning along such lines is provided for Nicolay Wiborg's naming a new steamer *Vale*. However, if it was a way of signaling a valediction, to what exactly may

⁶⁸² *Morgenbladet*, August 15, 1903.

⁶⁸³ *Norsk Kundgjørelsestidende*, October 10, 1915. He was candidate on a combined list for the *Høire* (conservative) and *Frisinnede Venstre* (conservative-liberal) parties.

⁶⁸⁴ Norsk Biografisk Leksikon, https://nbl.snl.no/Ambortius_Lindvig (Retrieved August 15, 2021).

⁶⁸⁵ *Norges Handels og Sjøfartstidende*, July 5, 1913.

⁶⁸⁶ See chapter five, 5.5.

that have been? That the age of ice and steam shipping was reaching its end, as far as Wiborg was concerned? Either way, the outbreak of war in the fall of 1914 was to change the premises of the ice trade in a most fundamental way.⁶⁸⁷

As a shipowner and ice exporter, Wiborg's was a different predicament to that of the non-ship-operating ice farmers and even exporters, who only had their ice to sell and witnessed freight rates skyrocketing. Wiborg changed the structure of his ship companies in October 1914, making all the shares in the different shipping companies available to public trading.⁶⁸⁸ This was undoubtedly a move to bolster the financial situation, to prepare for a more varied shipping operation decoupled from ice. Wiborg ships continued to go to sea during the war, but it did not take long before Wiborg became intent to downsize. Most of the fleet (four vessels) were sold on what must have been lucrative terms during the feverish shipping speculation of 1915 and 1916. Tragedy also struck. The fairly new steamer *Nico* was sunk by Germans off Harwich in December 1915. The 11-man crew and the pilot were allowed to disembark, but two men were reported dead.⁶⁸⁹ The *Nico* was insured at 250,000 kroner in the new War Risk Insurance scheme, *Krigsforsikringen for Skib*. The *Excellence Mehnert* was wrecked in June 1916, while carrying wood pulp from Drammen to Gravesend.⁶⁹⁰ A few vessels even departed with ice, despite the severe limitations to the trade. In one instance in 1916, the Wiborg steamer *Forsete* was taken into custody by a German patrol outside the Danish port of Esbjerg. Quickly determining that ice was not contraband, the ship was released.⁶⁹¹ The *Forsete* incident illustrates an attempted reorientation of ice sales to Scandinavian fishing ports, tentatively setting a course for what remained of the Norwegian natural

⁶⁸⁷ See chapter six, 6.11.

⁶⁸⁸ *Norske Kundgjørelsestidende*, October 2, 1914.

⁶⁸⁹ *Dagbladet*, December 20, 1915, *Norges Handels and Sjøfartstidende*, December 20, 1915.

⁶⁹⁰ *Morgenbladet*, June 3, 1916. From the description, it is hard to determine whether it was caused by an act of war. Apparently, the crew survived.

⁶⁹¹ *Vestmar*, August 26, 1916.

ice industry for the next few decades.⁶⁹² However, that was not the case for Nicolay Wiborg. The last shipment under his authority left Kragerø in September 1917, bound for Denmark.⁶⁹³

Soon after, Nicolay Wiborg and his family moved from Kragerø to the capital Christiania. In this respect, he followed the example of fellow Kragerø steamship owner and ice exporter Ambortius Lindvig, as well as a score of other coastal shipowners and capitalists. These were capitalists on the move. In August 1917, Nicolay Wiborg's taxable estate was estimated at 2,143,000 kroner—the highest in Kragerø that year.⁶⁹⁴ He had ranked in the top echelon well before the war. His closure of the ice production and gradual exit from shipping most certainly did not spell financial ruin for Nicolay Wiborg, or other members of the Wiborg family. In the mid-1920s, he committed himself to a couple of shipping ventures for a short period, but without any connection to natural ice. It seems he was divested from the ventures by 1927 and lived thereafter as a rentier.⁶⁹⁵ Nicolay Wiborg had indeed “transformed ice into bread”, in the words of pastor Nils Hertzberg 100 years earlier.⁶⁹⁶

7.8 Conclusion

The Wiborg shipping and ice exporting enterprise was for many years of the largest such combinations in the Norwegian natural ice industry. A study of its developments casts vital light on why and how the ice trade for decades came to be a regular activity in southeastern Norwegian coastal communities. The case study of the preceding pages has demonstrated that the business far from remained unchanged in the period from

⁶⁹² Cf. previous chapter on Baarsrud.

⁶⁹³ H. Wiborg (1943/1996).

⁶⁹⁴ *Vestmar*, August 2, 1917.

⁶⁹⁵ He was still referred to as a "shipowner" in a listing of Oslo's millionaires by the Communist press from 1928, cf. *Norges Kommunistblad*, December 21, 1928.

⁶⁹⁶ Cf. chapter four.

the 1880s to the beginning of the 1900s, a set of changes that have largely here been read through the lens of the company's telegraph code books.

The Wiborg ice enterprise contained a considerable element of modernization and rationalization, and the quest to bring *time* under control. Thomas M. Wiborg was the local innovator when it came to employing purpose-built steamships in the ice trade, starting with his 1885 acquisition of the 360-ton *Krystal* for 140,000 kroner. Raising that kind of capital meant establishing joint-stock companies. The shift to steam was intensified under the ownership of Nicolay Wiborg. While the ice and steamship business did not really entail the establishment of regular trade lines, it did usher in a level of regularity. Some ice routes saw hundreds of return visits.

The management of time permitted by the combination of telegraph communications and steam shipping was a qualitative break in the ice business. Thomas Møller and Nicolay Wiborg's businesses offer insights into how the telegraph was used to collect intelligence on the foreign ice markets, and also how it enabled continuous sales operations regarding vessels already at sea. They demonstrate an "ordering" of the ice trade, on the side of the suppliers in Norway. Certain messages upon arrival and departure were routinized. There is much to suggest that the centralization served to curtail the shipmasters' independence in commercial matters.

Risks and predicaments were categorized, establishing a sense of order and control over events. The natural variation in ice properties was reduced to a list of 50 codes for different "qualities". Standardization never eliminated ambiguities and discretion, as exemplified by the potential variations covered by terms such as "good hard ice" and "excellent ice". Wiborg's list was a company invention indicating increased differentiation and refinement around the natural ice product. In short, the telegraph codes are a convoluted set of instructions, but one that reflects one ice company's increasing mastery of a complex environment.

8 Conclusion “Natures’ Factory”

8.1 Revisiting the research questions

This thesis has been researched and written to produce new knowledge on why and how the natural ice trade came to be a regular economic activity in southeastern Norwegian coastal communities, in the time between 1840 and 1920. The approach is to regard this development as a case of industrialization. This means acknowledging industrialization as a broad social transformation, containing many more technological developments than just the “key technologies” usually shortlisted for attention.⁶⁹⁷ The method has been to subject the actions of four ice entrepreneurs and their ice companies to closer examination. This contrast-oriented research has provided much detail. This conclusion will therefore first discuss the empirical findings in light of the research questions, as defined and specified in chapter one. The final element of the conclusion is to deliberate how these answers might contribute to Norwegian historiography.

The research question was broken down into three lines of enquiry, which have done much to define the structure of this thesis. The first investigation, centered on the shipping and ice businesses of Henrich Biørn jr. and Johan Martin Dahll, concerns the transformation from “sporadic” to “regular” shipments of ice from the Kragerø area. The two following questions concern the ice industry in the period after the crisis of the 1870s, through the 1890s and into its decline just before and during the First World War. The two questions are essentially: How did the ice industry figure in the mix of economic activities among Norwegian exporters, and how did the competition from overseas “artificial ice” impact the strategies of Norwegian ice entrepreneurs? Both questions have the volatility and risks of the ice trade as backdrop. The answering of these two questions will mainly draw on findings in chapters 6 and 7. Thorvald Baarsrud’s ice

⁶⁹⁷ Bruland (2022, p. 108). Cf. chapter two, section 2.4.

business provides a detailed case study of how a farming enterprise approached the ice industry. Questions of risk and volatility are directly commented from Baarsrud's own hand. The Wiborg ice and shipping business of Kragerø was different type of operation to Baarsrud's, but both entrepreneurs operated in the same time period and presumably under similar market conditions. The two cases open avenues for contrasts.

8.2 From sporadic to regular ice exports

The first phase of transformation addressed in this thesis concerns the early phase of the ice exports. Chapters four and five address the question about which drivers were crucial in the transformation from sporadic to regular exportation of natural ice from Norway. A shift of the Norwegian ice exports into a regular, annual activity from about 1850 has been identified in the research of Tore Ourén.⁶⁹⁸ However, there have been no real attempts to examine the activities of the crucial actors involved in this process, let alone to systematically survey this as a case of innovation or technological development. There is recognition that overseas international ice business was an innovation that originated in the United States. How were the tools, knowledges and technology of the trade brought into use in Norway?

In answering this question, a couple of presuppositions for my work must be revisited. The first is the view of technology as a combination of knowledge, skills, management, and artefacts that together make it possible to create "functional products".⁶⁹⁹ Industrialization is inextricably linked with technological innovation, which is basically a social process. It is also a cumulative and collective process. My study has taken a long view of the process whereby Norwegian ice harvests and exports went from a sporadic to an annually, recurring phenomenon. This process involved many individuals and contact networks across the seas. As such, the ice industry is also a testimony to the

⁶⁹⁸ See Tore Ourén (1991), cf. chapter one.

⁶⁹⁹ Bruland (2022, p. 29), cf. chapter two, section 2.5.

adaptability of 19th century coastal shipping communities, those that largely depended on the sea for their livelihood.⁷⁰⁰

In the first half of the 19th century, no less than three distinct modes of “ice harvesting” can be identified. They correspond to the categories of ice forming from water in the natural world: Glacier ice, seawater ice and freshwater ice. Glacier ice was in theory available all year but was difficult and expensive to get at, and it remained an outlier in the saga of Norwegian ice exports. Seawater ice, apparently first taken out from Kragerø and a few other southeastern ports in 1835, was loaded directly onto outbound vessels in the spring. The ice may have been a commodity in itself, or a kind of ballasting device, or both in combination. Seawater ice – “rough ice” in trade jargon – can be documented to have been in currency until 1860, it is not unlikely that such ice found markets also long after that.

However, it is the blocks of freshwater ice from coastal ponds and lakes that have come to represent the Norwegian natural ice exports. Before 1850 such ice blocks only came from the USA. Creating a functional ice product that could compete on the British markets depended on the use of new tools and methods. Furthermore, it was also about tying together a resource extraction and shipping operation in a logistical system. All this required labor and management of labor, as well as knowledges and capital. There is little reason to not regard this as an instance of industrialization. My work has identified crucial elements that explain why entrepreneurs in towns such as Kragerø took resorted to ice exports in the early 1850s.

There is no one date in time, or one historical person, that can be identified as exclusively significant in the development of the Norwegian ice exports. That statement may be a little counterintuitive, given the emphasis on case-studies of personal, family firms in this thesis. However, the cases themselves underpin the very point. Henrich Biørn jr. ran a combined sawmilling and shipping company from Kragerø. Lumber

⁷⁰⁰ Cf. chapter two and discussion of perspectives in P. Holm (1991) and Bråstad (1992).

products were manifestly the mainstay of his outbound shipping operations. This was also the case when Biørn decided to have the ship "Commerce" loaded with a cargo of ice, on its first journey for France in the spring of 1835. Biørn was the first entrepreneur from Kragerø to do so, but similar shipments of ice went out from five other Norwegian ports the same year. Biørn's early ice shipments can be regarded as a vehicle for broadening the scope and profits of his shipping operation. His motivations for, and methods of, sending ice across the seas are probably representative for other Norwegian entrepreneurs entering the trade during this time, those in Brevik, Drammen and Larvik.

A few traits of this operation merit attention, as they diverge from the ice industry after 1850. There is firstly the question of what kind of markets existed for this ice, or how the entrepreneurs located them. In chapter four, the communication concerning the 1851 London ice market is described as market news traveling onboard ships, between the metropolis and Kragerø. This represents the situation before the advent of the electric telegraph in Kragerø and the other "significant maritime towns in Norway" in 1855, and it must have impacted entrepreneurial outlooks on the profitability of ice exports. On the 1839/40 journey of the "Commerce" with ice from Kragerø to Algiers, the first leg of a year-plus tramp tour to the Black Sea and back, the ice was a consignment cargo shipped off without prior contract.

It can be documented that the "Commerce" ice received a 12 000 Francs payment in Algiers. That value was apparently beneath that of other Norwegian cargoes in the same year (stones and planks), but it may have been cheaper to collect ice in this phase, and thus the prospect of profits were there. The Algeria voyage documents capability to keep ice intact, over a distance that actually far surpassed those that came to be the dominant later, that is, between southeast Norway and different destinations in Britain and continental Europe. Apart from that, not much in the business operation with ice suggest variation from the methods of selling timber and planks. In the early phase, the ice was typically a complement to this trade. It was organized by many of the same people, using the same ships, and several times ships were loaded with both ice, planks,

and boards. Using sawdust or wood chippings as insulation for ice is regarded as a US invention, and it is probable that this was quickly adopted by Norwegian ice shippers. This is just one of the ways even this early stage of the ice exports represent innovation for profits. The industry was sporadic or irregular. The government ship tariff incentive of 1842 seems to have labelled it as a kind of ballasting of sailing vessels. The official recording of the ice exports started in 1835, and ice was despite ambiguities a commodity by the 1840s. However, the need for innovation was voiced.

As discussed in chapter four, during the late 1840s several Norwegian commentators acknowledged that the product supplied from the American ice industry on the French and British markets was superior to the Norwegian. There were calls to Norwegian entrepreneurs and shipowners to acquire the methods used by the Americans. A powerful statement was made by minister Fredrik Stang in his 1841-45 quinquennial report, when he stated that Norwegians lacked the skills and knowledge required for the “proper handling” of ice.

Less than a decade later, the situation was different. And by the 1860s, the industry had diffused to new locations and also involved members of the farming class as entrepreneurs. It was based on using American tools and methods, but these methods were subject to adaptations and continuous local innovation. The industry had also taken steps towards making ice a commodity that could be exported during longer periods of the year. The shift from “spring” to “summer shipments” identified by Ourén was gradual. It was also very significant, especially during the peak years of the exports after 1880.

Certainly, this was the outcome of technology transfer from the USA to Norway, disseminated via physical encounters in port towns in France and, crucially, London. But the case of the ice industry is also a testimonial to how much this transfer process depended on local social frameworks and diffusion of knowledge. The following discussion of these developments draws upon the study of Johan Martin Dahll in Kragerø in chapter five, and the developments in the Oslofjord presented in the first part of chapter six.

The study of Johan Martin Dahll's ice business in chapter five provides details about the initial phases of this technology transfer process. The text emphasizes Dahll's utilization of the topographical endowment of his family's estate, to establish a new kind of ice industry in Kragerø in the early 1850s. Newspaper sources verify that Dahll essentially modelled his methods on American patterns, and that many of the recognizable tools and methods had been implemented in a systematic fashion no later than 1853. Essentially, this system relied on relatively still bodies of freshwater ponds and lakes located not too far from the ship lanes. It has also been documented that the work community of the Dahll family property experienced grew markedly between the 1840s and the 1860s, which must have been beneficial for a technological system relying heavily on manual labor. Taken together, the organization of these elements resulted in a product that initially complemented, then later competed with, the American ice on the London and other European markets. Furthermore, it was the use of ice houses to store ice for more profitable sales in the late summer season. Dahll was in the market for such sales already during the late 1850s, and by 1860 about half of his harvest was described as "spring shipments", the rest was kept in local storage for more profitable sales in the summer.

How instructive is the case of the Dahll ice company, as an answer to the question about US ice technology was brought into use in Norway? There are a number of issues that the source material have at best only allowed indirect answers to. This goes for the specifics on how Dahll acquired the necessary knowledge about the American ice technology, and details about how he had the workers organized and trained in order to create a functional product. With regards to these "hardware" and technical sides of the ice trades, I have only been able to pinpoint the 1850s and 1860s sequence of events referenced above, which nonetheless open for inferences. The transfer of technology implies movement of knowledge and/or artefacts across borders, and this movement in most cases imply travel by humans – as invited craftsmen, as workers, or as industrial

spies.⁷⁰¹ Johan Martin Dahll's brother George J. Dahll went to London in 1850 and soon settled down there. It is possible, even likely, that it was there, in London, that he picked up the basics about the tools and methods of the New England ice industry. His correspondence documents that he visited the London ice merchants and the American Wenham Lake Ice Company in the 1850s.

In the case of the Dahlls' businesses, and as was the case for just about all Norwegian ice entrepreneurs (and workers), production and shipping of natural ice was one component in a mix of economic activities. Dahll was involved in mining and other industries, and his hands-on approach to technological and scientific knowledge is highlighted in chapter four. I have also suggested that the Dahlls' outlooks and strategies were influenced by their powerful cousin Anton Martin Schweigaard, who in his 1840 economic survey took a very positive view on the prospects of Norwegian mining industries. Seen in the context of the lines of the family business, especially those of apatite and nickel, it is doubtful that mastering the American natural ice technology presented major problems. This point may be generalized: The American ice technology must have, also to less technologically alert merchants than Dahll, appeared comprehensible and feasible to execute. The abandoned 1852 Baarsrudtjern contract discussed in chapter six, is just one instance demonstrating that the basics were disseminated to other coastal communities, just as Dahll and his workers were pioneering it as a workable system in Kragerø. The opportunities for profits opened by the comparative advantage of shorter shipping distances to European ports from Norway, compared with Boston, were obvious to several merchants in several ports.

Johan Martin Dahll operated his ice business in a competitive environment, and this is the premise for a few final observations on the Norwegian system of ice exports being established in the 1850s. Evidently, the Dahlls were very significant in making the ice industry a feature business life of Kragerø and the surrounding areas, but other

⁷⁰¹ See studies in Bruland (1991).

entrepreneurs filled this function for other regions on the coast. The Dahll 1850s correspondence corroborate that captains and agents acted in London on the behalf of other Norwegian ice producers. Søren Parr of Drøbak and Thomas J. Wiborg of Brevik were among the significant other ice merchants from the 1850s onwards. Parr's system of putting out production and storage of ice to local farmers has been visited in chapter six. It was in the economic interest of Parr, and probably also Dahll and the other ice merchants to have farmers master the technologies for production and storage of freshwater natural ice. This was a driver for the diffusion of the American ice production technology among farmers and smallholders along the Norwegian coast, which were to contribute greatly to the production capacity in the 1870s and beyond. However, the full scale operation of exporting ice included operating shipping and overseas commercial networks. It was in the operation of these networks that the peculiar Norwegian system of natural ice exports emerged.

Even large Norwegian ice exporters like Dahll could never aspire to a monopolist position in London, or on any other European markets for ice and cold storage. That situation is somewhat a contrast to the New England Tudor ice company, operating in British colonies in India from the 1830s onwards. This trade that was largely founded on concessions and periods of regional exclusive rights granted by the colonial administration.⁷⁰² Thus, Tudor's system of trade meant that his firm's own icehouses were set up in receiving ports in the Caribbean and India, to act as bases for local sales. Norwegian ice entrepreneurs never achieved anything like that. There was usually competition on the overseas markets – from other Norwegian ice exporters, from local ice harvesting, or increasingly, from “artificial ice” plants. So, while the methods of production and overseas shipments of natural ice had many similarities between New England and Norway, these were systems operated within contrasting economic, social, and political frameworks.

⁷⁰² See chapter four, and Dickason (1991).

One aspect of this is that the Norwegian version of the natural ice exports underwent an extension in its social participation. Farmers and smallholders entered the business, primarily as producers of ice. Some ventured on to take a more active part in the trading of ice. As the volumes of ice exports grew, then, there emerged different scales and versions of “nature’s factory”. The largest ice exporters had entire infrastructure of pond or lake, icehouse and loading pier, often spread out over several locations. Small ice firms consisted of little capital investment other than a small pond and a few implements. As has been pointed out by Ourén, building icehouses was a central precondition for the ability of the Norwegian ice companies to benefit from higher prices in the summer heat.

In less than a decade, Johan Martin Dahll’s ice business grew in size, a growth that cannot be separated from innovations to its sales operations. By 1860, Dahll kept about half of the season’s harvest in ice houses for later, presumably more profitable sales. This extension of the season presupposed a duality of long-term and short-term contracts for ice. Contracts for next year’s delivery of ice were signed by Dahll and other Kragerø merchants by the mid-1850s, and this arrangement was most likely not restricted to Kragerø. At the same, the southern coastal towns of Norway were connected to the international telegraph network. This allowed for more short-term deals, and the Dahll archive indicates increasing significance of telegrams in the 1860s and 1870s. It is difficult to imagine how the Norwegian system of natural ice exports, as it evolved towards 1900 and beyond, could have functioned if not for the electric telegraph. The telegraph became a tool for an industry that was, unlike the American, not integrated across the seas, but one in which the most successful operators managed a dynamic relationship between regular and sporadic customers and markets.

8.3 Ice in the mix of economic activities

The ice trade was throughout marked by volatility. All the same, merchants and shipowners got involved in exporting ice, and from about the 1860s, also members of

the farming class. How did the ice business feature in the mix of economic activities of these different social groups? How can different modes of operation be accounted for? This thesis makes no claim to give an exhaustive answer to these questions. However, the case-studies of Thorvald Baarsrud (chapter six) and the Kragerø Wiborgs (chapter seven) allow for generalizations, as far as concerns those actors who had investments in the production and/or transports and logistics of the ice trade.

Evidently, Norwegian ice exports were run by people who had a variety of economic engagements. At least, none encountered in this work appear to have had just natural ice as a source of profits. This is not to say that it was immaterial, and evidently the business represented the economic backbone for some. There appears to have been three main categories of operations among the entrepreneurs and capitalists of the ice exports. This categorization is based on their degrees of integration into production, logistics and sales in the natural ice industry. The groups can be labelled traders, producers, and combined producers and shippers.

In this thesis, the traders have only appeared indirectly. Several years, especially during such high points as 1898, sources mention "speculants" or traders in ice. These were actors who did not represent capital investment in the ice industry, that is, in production sites or vessels on the Norwegian side. Largely, but not exclusively, this group of actors were foreign and closer to the overseas markets served. Their letterheads indicate different combinations of shipping, metals, lumber and timber products, natural ice and cold storage, and coal trading. One such was the firm of J. Allum in Boulogne-sur-Mer, who organized ice sales for Baarsrud in that area of France, but whose main lines of business are listed as "Nordic wood and Swedish iron" (*bois du Nord, fers du Suede*). The relations between Norwegian producers and such agents or traders were dynamic and ambiguous.

The entrepreneurs of the Norwegian natural ice industry studied in this thesis were either in the group of producers of ice (Baarsrud), or the group which included both production and shipping. Whereas Johan Martin Dahll and his family company did much to pioneer this form of operation in the Kragerø district, actors such as Wiborg

developed it further in the 1880s and beyond. In no small measure, the contrast between Baarsrud and the Wiborgs reflects deep-running social divisions in 19th- century Norway, concerning the rural farming class and the urban merchants.⁷⁰³

Thorvald Baarsrud's career as an independent ice exporter lasted more than 30 seasons, starting in earnest in 1877. As was described at some length in the first part of chapter six, the Baarsrud ice operation had started as a cooperation between the merchant Parr and Baarsrud's brother Gabriel Klemmetsrud, who lived on the Nordre Klemmetsrud farm until his death in 1876. The ice business quickly became a very prominent aspect of the farm's resource base, which also included forestry and agriculture. Significant overseas agents in Baarsrud's networks were in the market for both ice and lumber products. It has not been possible to work out a detailed survey what proportions lumber, agriculture and ice constituted of Baarsrud's total economy, but ice was overwhelmingly important.

As a successful ice trader, the most so in his local surroundings, Baarsrud remained at the intersection between maritime and agrarian life. Baarsrud ascribed his success to having to work his way up to become shipmaster. In the 1870s, this was still a position marked by independent decision making, confidence, and authority as well as firsthand knowledge of ports and the essentials of running any business contingent on freight and the shipping markets. His correspondence suggests that much of the captain's self-assertiveness was carried over into the on-land leadership of an ice-exporting venture.

The case of Baarsrud provides a rare insight into how a Norwegian ice exporter acted on both long- and short-term prospects of the business, as a demonstration of the flexibility of the system pioneered by Johan Martin Dahll and other early ice merchants. Baarsrud's agrarian roots surface in the way he explains the distribution of short-term

⁷⁰³ Which were partly carried over into the 20th century, and industrialization is typically viewed as creating new formations. One example, cf. historian Knut Kjeldstadli's "two societies, three classes" as a framework for the 1905 to 1935 period of Norwegian history: agrarian/rural versus industrial/urban societies corresponding to self-owning farmers versus the industrial bourgeoisie, and the emerging industrial working class as a wedge into both "societies". Kjeldstadli (1994, pp. 13-19).

and long-term arrangements of selling ice: Profits would depend on the season's climate, and only in January was it possible to have a tentative idea of the full extent of the year's business. Chapter six has detailed how Baarsrud slightly changed his advice on what proportion of the year's harvest to keep in storage for later sales. There are also several ambiguities in his advising his sons and heirs to shun "speculation in other men's ice" and cautioned them about being "indebted to strangers". He only partially upheld these guidelines himself. But he had seen relatives taken unmanageable risks and been "reduced to day laborers". No wonder the ice trade was "dangerous", as he wrote in 1890. The danger lay in the capacity of the ice trade to make the family lose the farmlands, and the social fall associated with that.

Despite all ambiguities, however, in the end Baarsrud considered himself primarily an ice producer and exporter. His sons and daughters struggled to uphold this feature of the family business, into the beginnings of the 1960s. The story of the Wiborg shipping and ice company in Kragerø is different. The production and exports from this company far exceeded that of Baarsrud, and regularly employed up to ten times as many workers. In addition to that, the Wiborgs were also considerable shipowners. 38 ships have been identified in their ownership between 1850 and 1930.⁷⁰⁴ What was the function of ice in this operation?

Until the 1880s, the shipping expansion of the Wiborgs was limited to sailing vessels. In this respect, they were in line with the general trend in Kragerø shipping. The latter half of the 1870s were challenging years. Many of the traditional markets for the sailing vessel fleet were in decline. The decline in Scandinavian lumber exports and other trade developments also mattered. The tramp trades were being surpassed by regular liner traffic, based on steam shipping. The Kragerø response to the shipping recession was basically twofold. The first aligned to that of several other Norwegian shipping ports: to have their sailing vessels get involved in transatlantic and quite distant trades, using low

⁷⁰⁴ See table 9.5.6., appendix.

cost as a prime selling point. The other response was to intensify the employment of local tonnage in the ice exports. It is close to reason that to the Wiborgs, shipping was the primary activity. Ice production and sales was an adjunct, although sometimes a profitable one, in this combination.

The size of relative capital investments between ice production infrastructure and ships is one way to look at it. As long as sailing vessels reigned, ice production may have been comparable with shipping in terms of capital requirement. In the 1880s and 1890s, when steam ships entered Thomas Møller Wiborg's operation, this changed. Early 1890 figures reported in conjunction with the Wiborg bankruptcy indicates that one of the largest ice works in the country, *Svartjern*, was estimated at about one third of the capital raised for the steamship *Krystal* in 1884. It has been noted that ships were certainly more flexible assets than ice production facilities. Despite the apparent highlighting of ice transports onboard Wiborg's own ships, they remained general cargo ships and were basically still doing tramp trade.

Coordination of ice production, shipping, and selling ice required new levels of decision-making routines. Much of the on-the-spot decision making was transferred from shipmasters to the central office at the Kragerø waterfront. Clearly, this managerial consolidation was amended by the immediate information relays facilitated by the electric telegraph. In the fall of 1914, Nicolay Wiborg transformed the shares of his shipping companies to marketable stock, a move which must have contributed to making him the wealthiest taxpayer in Kragerø by 1917.

The different strategies and combinations of activity between Baarsrud and both generations of Wiborgs is not a static reflection of the social positions of a farmer ice exporter and a merchant-class family. They also illuminate the different strategic emphases entailed in conducting two different kinds of enterprises centered on natural ice. Baarsrud's focus was on the land and on ice as a crop that increased the value and yield of the property. Thomas M. Wiborg's was primarily a synthesis of the approaches of Henrich Biørn Jr. and Johan Martin Dahll, whom he superseded as Kragerø's dominant natural ice exporter. In this strategy, it was the combination of ice sales and making

profits on shipping services that counted. This strategy was identified in Einar Pedersen's 1933 maritime history of Kragerø, as one where the potential sales of ice might offset modest returns, even losses, on the actual shipping business.⁷⁰⁵ While certainly improving upon it, Nicolay Wiborg complied with the strategy until the outbreak of war in 1914. Then, the natural ice and the infrastructure connected to it, became nearly worthless, considered in relation to the booming value of his shipping fleet.

8.4 Impact of competition

The aim of this thesis is to produce new knowledge on why and how the natural ice trade came to be a regular economic activity in southeastern Norwegian coastal communities, in the time between 1840 and 1920. The transformation of the ice industry from a sporadic to a regular economic activity has been accounted for, and also how the ice industry was a flexible, yet significant component in different kinds of economic ventures. Findings from the case-studies of Baarsrud's and Wiborg's ice businesses provided the empirical basis for that discussion, and that also goes for answering the final set of questions raised in chapter one: How was the natural ice industry impacted by the competition from "artificial ice", or from other sources of social or technological changes of the last three decades of the 1800s?

An apparent paradox serves as backdrop for these questions. That is, a predominantly non-mechanical means of attaining transfer of coldness reached its highest levels of performance only as alternatives became available. As will be recalled from the outline of the ice exports in chapter one, the volumes the Norwegian natural ice exports increased by many factors during and after the 1870s. During the 1850s and 1860s, singled out as formative years in the establishment of a "regular" ice industry, annual volumes of natural ice exported never surpassed the 100 000 RT threshold. That happened in 1872, and five years later the total volume doubled to more than 200 000 RT. At its peak in 1898, the exports of Norwegian natural ice came close to 500 000 RT.

⁷⁰⁵ E. Pedersen (1933, p. 37), cf. chapter five, 5.5.

Undeniably, a major driver for this development was the increased overseas demand for cooling and forms of cold energy.⁷⁰⁶

The expanding market for cold energy can serve to solve some of the paradox. A total increase in demand for cold explains that there was space for natural ice for a while after the “artificial ice” and refrigeration machines spread. In chapter six, a consular report on the British ice markets from 1879 was cited. It indicated a rapidly rising demand for cold storage, but also that ice factories soon would constitute serious competition to the Norwegian natural ice exports. By the 1890s, the natural ice industry emerged a second-best technology, and on the British markets it went into a sunset phase after 1900.⁷⁰⁷ The entrepreneurs of the Norwegian ice industry studied in this thesis countered these developments in different ways. Their measures helped making natural ice a profitable business for them, and their communities, for decades after the first warnings about the impending competition. Again, the relative position of an entrepreneur in the value chain of the ice industry impacted his responses to the shifting fortunes of the ice exports. In the following, the cases of Baarsrud and Wiborg again allow for inferences.

As an ice exporter who predominantly marketed his own product and was in charge of ordering shipping services for their overseas transports, Thorvald Baarsrud's ice company display a variety of responses to changing market conditions. These must have contributed to the increase of both volumes and productivity in the 1880s and 1890s. In chapter six, it was registered that Baarsrud's annual production volumes of ice increased from 5000 to 20 000 RT from the late 1870s to around 1900. This increase followed from scale expansion, wielding control over the entire Baarsrud lake and extending productive area by damming two new ponds. In this respect, the growth strategy of this one firm, which has been linked to Baarsrud's satisfaction of gaining control over

⁷⁰⁶ Cf. chapter one, sections 1.3. and 1.4.

⁷⁰⁷ As pointed out by Robert David (1995), cf. chapter one.

farmlands he considered rightfully his, reflects in its own manner how larger volumes of Norwegian ice were being produced on new ponds dammed along the coast. Larger areas to groom and harvest, and larger volumes to stack and ship also implied increased labor costs. Comparing these costs for the years 1877 and 1899 has allowed for a rough estimate, suggesting that the labor costs decreased by some 25 per cent per unit of shipped ice between those two years. There is little reason to doubt a productivity increase over the years for this firm, although it probably was not linear. Improved skills among Baarsrud's workers must have been a considerable source to the company's productivity increase.

Both the strategies and sources of the output growth sketched above are partially recognizable from those of Dahll in the 1850s and 1860s. In the case of Baarsrud, the source material has allowed for a close reading of his reasoning behind his operations, which can be considered an individual adaption to the flexible mode of operations that Dahll and other 1850s ice entrepreneurs pioneered in Norway. The previous section of this conclusion has documented how Baarsrud distributed long-term and short-term contracts. Or, rather, it shows how he between 1883 and 1898 came up with changing ideas about how to do it, ending finally with a prescript of contracting maximum one third of the estimated harvest for long-term delivery before Christmas, one third in February and March, and then one third in July and August. It is also telling that Baarsrud advised his heirs to "keep as much of the London business as possible". The statement indicated some resignation already when it was written in 1898. After 1910, only two shipments of ice to London can be traced from Baarsrud. The constant search for new markets and opportunities did not cease, and like many other Norwegian ice exporters the Baarsrud ice company had to locate new openings in France and Continental Europe.

An intriguing aspect of natural ice as second best technology were the controversies surrounding the hygienic quality of the product. They surfaced in the 1890s and did not really cease before the First World War and the end of large-scale Norwegian ice exports. In chapter six, the complexity of these discourses has been indicated. Basically, the mechanical refrigeration industries were instrumental in spreading uncertainty

about the purity of natural ice. This caused concern in the Norwegian ice industry. To the extent that ice exporters made efforts to counter the campaigns, they did it very much in the fashion of their business: Independently and by combining new knowledges into their managerial practices. Baarsrud had samples from his lakes and shipments of ice to Glasgow analyzed by city chemists to verify that his water was “of great purity”. He could only really address the purity of the water source, and only partly claim that that purity was upheld through some stages of the shipments.

The campaign against natural ice is one manifestation of how the ice exports became more complex in the 1890s, while the physical methods of grooming, harvesting, and storing ice underwent only incremental changes from its 1850s incarnations. Thorvald Baarsrud fashioned an individual adaption of the Norwegian system for freshwater natural ice industry, which had emerged in the decades before he took over operations in 1877. Such individual adaptation, which also effectuated further developments and innovations, also applies to the Wiborg ice company of Kragerø. In this case the shipping component of operations appears to have been of overriding economic significance. In the previous section, the Wiborg strategy has been associated with that formulated by maritime historian Einar Pedersen, who held that Kragerø shipping companies clung to ice as a means of reducing the risks of tramp shipping.

The reading of Wiborg's different versions of telegraph codebooks from 1880, 1896 and 1903, as well as other sources visited in chapter seven, allow for some elaboration of Pedersen's viewpoint. Chapter seven has confirmed that Wiborg's position as one of the dominant Norwegian ice exporters and shippers in the early 1900s was achieved in a turbulent fashion. It even entailed a spectacular bankruptcy in 1893. The fact that the low ice prices of 1892 are cited as among the reasons for Wiborg's ostensible downfall, do indicate the central position of ice sales in his combined operation.⁷⁰⁸ Looking at the time interval from then, until Nicolay Wiborg finally abandoned the ice business in 1917,

⁷⁰⁸ The year 1892 is also the one with the lowest index value in J.T. Klovland's price index, cf. table 9.5.2 in the appendix.

it is evident that the relative significance of ice to shipping decreased markedly. This did not happen in a linear or even fashion, it was the circumstances created by war that made shipping assets far outshine those of the family's considerable ice manufacturing. That fact is an entry into figuring the role of steam shipping in the Wiborg enterprise. The steamers put in service from 1885 onwards constituted a significant innovation into their, and by extension, the Norwegian system of natural ice exportation. The steam ships were more independent of wind and weather than sailing vessels. If they were not always faster, they were generally more predictable than sailing vessels. The layout of the ships made for faster stowing and unloading of ice. The new levels of planning and prediction allowed by this mode of shipping is reflected in a very direct manner in the difference between the 1880 and the 1903 editions of Wiborg's telegraph code books. The latter contained 80 per cent more codes than the former, which was issued before steam ships entered company service.

Wiborg's and others' steamers link the natural ice industry of the late 19th and early 20th century quite close to industrialization. However, while they signaled innovation and improvements, Wiborg's ships were essentially put into a tramp system of shipping. There is no indication that the ships were anything but general purpose cargo vessels, despite several measures being taken to facilitate and improve the actual ice transports. This became all the more evident when the price for tonnage went through the roof in the first years of the war. The main point of this reflection is to draw the connection between the 1890s innovations and those of Dahll in the 1850s. The use of steamers in the ice exports represented more continuity than break.

To the relatively capital-intensive combined shipping and ice company of Wiborg, communication and coordination became paramount. The telegraph code books disclose, albeit in a somewhat indirect way, how instant communication assisted crucial decisionmakers like Nicolay Wiborg in their market dealings. They also disclose that this function of communication was intensified as the levels of ice trade increased during the 1890s.

The gradual transformation from spring to summer shipments of ice from the 1850s entailed the use of icehouses for storage. While these were a basic requirement for annually recurring ice exports, it is maintained above that the transformation also depended on telegraph communication. The 1880 Wiborg telegraph codes reflect the pace of communications and options for decisions that were available when there were only sailing vessels transporting ice. Some twenty years later, the number of codes for both shipping details and questions pertaining to ice trade were greatly expanded. In the 1903 book, more than 200 codes for "sailing" and 170 more for "shipments" encompass an intriguingly complex set of time-related phrases. They demonstrate how the involved parties were able to offer and demand specific times for shipments, to a degree unmatched in the 1880 book. The codes are both flexible ("sailing soonest possible", "sailing this or next month") and very specific ("prompt sailing guaranteed", "shipment Wednesday"). There were planning horizons coded for the coming week or month, and every month of the year. In the longer term, there are specifications for the "usual spring shipment", "spring and summer shipment", or just "summer shipment". These options for setting departures days, weeks, and months ahead gave sellers and buyers increased opportunity to detail their logistics. The expanded range for agreements related to time is reflected in an increasing set of phrases for sales, and for the closing or canceling of long-terms contracts.

In 1903 there are more than 50 codes for different ice "qualities". Standardization never eliminated ambiguities and discretion. This is highlighted in chapter seven with several examples, for instance the possible variation between the terms "good hard ice" and "excellent ice". Wiborg's list amply indicates increasing differentiation and refinement with regards to the natural ice product. In short, the telegraph codes are a convoluted set of instructions, but they reflect one ice company's increasing mastery over a complex environment. In other words, the risks associated with the ice industry could never be eliminated, but they could be managed in a profitable way.

8.5 Lessons from Nature's Factory?

It was stated at the outset of this thesis that natural ice from Norway has received limited attention in historical writing. The statement was elaborated. Economic historians Fritz Hodne, Camilla Brautaset and Pål Thonstad Sandvik reference the ice industry in their discussions of exports and economic growth in 19th century Norway. Just by doing so, they all attach significance to the ice trade, although perhaps indirectly. The case-studies of this thesis have supplied more detail to how the harvesting and storing of natural ice became a recurring and growing industry in the decades after 1850, despite its volatility. This final section of my conclusion takes a broader view of my findings, to answer how they add to the understanding of Norwegian history. The contexts elaborated in chapter two form a backdrop to the generalizations.

In Norwegian economic history, the function of the exports sector to growth has been widely discussed. Estimated rates of GDP growth suggest that the mid-19th century represents a breaking point, allowing for population increase that emerged among the top in Europe: Between 1820 and 1920, Norway's population went from 960 000 to about 2,6 million people. International trade liberalization, among which British legislation from the 1840s onwards count as particularly significant, opened up opportunities for the "outward-oriented" capitalists and industries.

The substantial 1840-1870s growth rates in shipping services, lumber, and to a lesser degree, fishing exports, support ideas of connections between the overall economic growth and the export sectors. Some regard this as mainly expressions of quantitative rather than qualitative change, i.e., more people manning more ships and sawmills that were basically as they had been during the 18th century. In this perspective, then, it was the crises that followed the recessions of the 1870s led to a radical reorientation. Others take a view of more dynamic change also in the preceding decades. In his discussion of the 1840-1870s economic expansion, historian Sandvik stresses that "internal and external factors reinforced each other and created a faster economic growth than ever

before in the history of the country”.⁷⁰⁹ The underlining of these reinforcing mechanisms also make “local culture and competence” a force for economic development, qualities that Sandvik explicitly attributes to the maritime region of the south and southeastern coasts of the country. The ice industry emerged within this area. Overall, the implementation and adaptation of ice harvesting and transports in Kragerø and Røyken attest in different ways to the dynamics of the coastal regions. This was a time of new demographics. Local towns acted as nodes in international networks and exerted impact on their surroundings.

It is not a discovery of this work that the coastal populations adapted life under conditions of “economic pluralism”, rendered in Norwegian as *mangesysleri*. Combinations of means of living are regarded as a general survival strategy for coastal families, and they are associated with tradition and notions of “pre-industrial” social organization. The historic ice exports provide fresh examples of yet more applications of such diversification strategies, but in this work, the cases are connected with a view of industrialization. More specifically, it is one recently formulated by Norwegian historian Kristine Bruland. One of her arguments is that technological innovation was “often intensely” manifest in all areas of economic activities, not just the archetypical *industrial revolution* sectors of textiles, steam, and iron.⁷¹⁰ Thus, this thesis connects the social reality in which the ocean is of “direct economic significance”, to a reality where entrepreneurial and capitalist strategies foster continuous innovation and change.

Historian Kjell Bråstad, whose concept of coastal culture informs this thesis, indicates that the proclivity to “take chances” was one of the key social characteristics that made some coastal skippers and merchants wealthy. At first glance the ice business seems to offer a very substantive example of taking chances, or assuming risks. The Norwegian ice exports emerged after the 1850s as a way some people on the coast could bet on

⁷⁰⁹ Sandvik (2018, p. 101)

⁷¹⁰ Bruland (2022, pp. 86-108), cf. chapter two.

how hot the summer was going to be in London or Paris the following year. However, the ticket to the lottery was the ability to produce and/or ship a “functional product” of ice that could generate profits. The capacity to do so was the domain of a select few men, and to those belonged the lion's share of the profits of the trade. Their ability to reap these profits rested on access to technology, conceived here as a combination of knowledge, skills, management, and artefacts that together made it possible to create such functional products.⁷¹¹ Significantly, the combinations of knowledges and artefacts did not restrict themselves to the actual implements and methods used in the ice industry as such – tongs, plows, saws, and icehouses. While collections of these would be the mainstay in any museum exhibition of the ice trade, this thesis proposes to view the electric telegraph as a one crucial explanation for what I call a Norwegian system of natural ice exports. The task has been not only to assert this in a general manner. Here, a closer look has been taken into how it was used as a tool for coordination and risk management, factors that go some way to explain how a seemingly unpredictable and volatile line of business became a recurrent feature of a modernizing economy.

The story of the natural ice exports may constitute a new chapter in 19th and 20th century economic and technological history. This thesis suggests that it is best approached by taking a broad view of industrialization and innovations, an approach likely to produce also new historical insights into other, neighboring branches of economic life. As such, the rise and fall of the natural ice industry is also a chapter in the long history of Norwegian exports of energy. The blocks of ice were not exported for their natural beauty, but their ability to transfer coldness. The natural ice industry was economically sustainable for a while. It did entail risks, but these were individual and local, compared with the risks to global climate posed by 20th century modes of refrigeration.

⁷¹¹ Bruland (2022, p. 29)

9 Appendices and bibliography

9.1 Archives

Riksarkivet (National archive), Oslo

S-1094: Finansdepartementet, Tabellcontoret

| | |
|------------|-------------------------------------|
| D/Da/L0001 | Skiplister (Konsulatinnberetninger) |
| D/Da/L0004 | Skiplister (Konsulatinnberetninger) |
| D/Da/L0003 | Skiplister (Konsulatinnberetninger) |
| D/Da/L0005 | Skiplister (Konsulatinnberetninger) |
| D/Da/L0002 | Skiplister (Konsulatinnberetninger) |
| D/Da/L0007 | Markedspriser |
| D/Da/L0006 | Fortegnelse over nybygde skip |
| D/Da/L0008 | Markedspriser |

S-2227: Statistisk Sentralbyrå, administrativt arkiv

| | |
|----------------------|---------|
| RA/S-2227/B/Ba/L0001 | Kopibok |
| RA/S-2227/C/L0141 | Journal |
| RA/S-2227/C/L0142 | Journal |
| RA/S-227/C/L0143 | Journal |

| | |
|----------------------|---------------|
| RA/S/D/Da/L0001/0001 | Journalsaker |
| RA/S/D/Da/L0002/0002 | Journalsaker |
| RA/S/D/Da/L0003/0003 | Journalsaker |
| RA/S/D/Da/L0004/0004 | Journalsaker |
| RA/S/D/Dd/L0001 | Diverseserien |
| RA/S/D/Dd/L0017 | Diverseserien |
| RA/S/D/Dd/L0024 | Diverseserien |
| RA/S/D/Dd/L0038 | Diverseserien |
| RA/S/D/Dd/L0137 | Diverseserien |

Statsarkivet (State archive), Kongsberg

SAKO P-1359 AS Søndre Nærsnes (Thorvald Baarsrud)

Protocols

| | |
|------------|---|
| A/Aa/L0001 | Forhandlingsprotokoll 1911–1914 |
| A/Aa/L0002 | Forhandlingsprotokoll for A/S Adam Baarsrud |
| A/Aa/L0003 | Møtebok og kassabok for Yggeseth Iscompagni |

Correspondence

| | |
|------------------|----------------------------------|
| B/Ba/L0001 | Kopibok 1878 |
| B/Ba/L0002 | Kopibok 1878–1881 |
| B/Ba/L0003 | Kopibok 1884–1885 |
| B/Bb/L0001-L0009 | Telegrambøker |
| E/Eb/L0001 | Diverse korrespondanse 1878–1902 |
| E/Eb/L0002 | Diverse korrespondanse 1889–1902 |
| E/Eb/L0003 | Diverse korrespondanse 1891–1902 |
| E/Eb/L0004 | Diverse korrespondanse 1891–1958 |
| E/Eb/L0005 | Diverse korrespondanse 1894–1954 |
| E/Eb/L0006 | Diverse korrespondanse 1899–1958 |

| | |
|------------------|-----------------------------------|
| E/Eb/L0007 | Diverse korrespondanse 1901–1915 |
| E/Eb/L0008 | Korrespondanse 1906–1908 |
| E/Eb/L0009 | Korrespondanse 1904–1908 |
| E/Eb/L0010 | Korrespondanse, diverse 1909 |
| E/Eb/L0011 | Korrespondanse, diverse 1909–1914 |
| E/Eb/L0012 | Korrespondanse, diverse 1914 |
| E/Eb/L0013 | Korrespondanse, diverse 1913–1917 |
| E/Eb/L0014 | Korrespondanse, diverse 1918–1979 |
| E/Eb/L0015 | Korrespondanse, diverse 1925 |
| E/Eb/L0016 | Korrespondanse, diverse 1933–1941 |
| E/Eb/L0017 | Diverse 1899–1940 |
| E/Ea/L0001-L0004 | Diverse brev/privat materiale |

Accounting

| | |
|------------|---------------------------------------|
| R/Rg/L0001 | Iskontrakter og oppgjør 1887–1903 |
| R/Rb/L0003 | Statusbok Thorvald Baarsrud 1877–1910 |
| R/Rg/L0008 | Frakteskip |
| R/Ra/L0001 | Hovedbok 1907–1910 |

SAKO A-89, Lier, Røyken og Hurum sorenskriveri

| | | |
|------------|----------------|---------------------------|
| Pantebøker | G/Ga/Gab/L0006 | Pantebok nr. 6, 1855–1864 |
|------------|----------------|---------------------------|

SAKO/A-1037 Kragerø Tollsted

| | | | |
|----------------|-----------------------|----------------|-------------------|
| G/Gb/Gbb/L0001 | Utgående tollbok 1840 | G/Gb/Gba/L0001 | Inngående tollbok |
| 1841 | | | |

C/Ca/L0002 and L0003 Journal

G/Ge/L0001 Diverse regnskapsprotokoller

F/Fd/L0001 Innladningsbok 1841

G/GE/L0002 Kassererforretningen 1850–1858

C/Cb/L0001 Journaler og overgripende registre – opsynsforretninger

Berg-Kragerø museum (Telemark museum)

| | |
|------------|---|
| BKM/Ba 10 | Johan M. Dahll Regnskapsbok 1878–1882 |
| BKM/Ba 12 | Johan M. Dahll Kassabok 1875–1878 |
| BKM/Ba 14 | J. Georg Dahll Letterbook 1856–1859 |
| BKM/Ba 66 | Henrich Biørn Eksportfaktura 1850–1859 |
| BKM/Ba 74 | Johan M. Dahll Hovedbok 1859–1874 |
| BKM/Bb 112 | Firma Nicolay Wiborg, Kragerø. Iseksport. |
| BKM/Bd 107 | Gumø Isbruk 1903–1953 |
| BKM/Bd 113 | K Thommessen Blankenberg |

9.2 Private collections

AH = Arne Høvik, Oslo, payment protocols for the Høvik ice works, Røyken, 1911–1918.

KBC = Knut Baarsrud, Nærsnes, Collections of Ice Contracts and diverse material after Thorvald Baarsrud and family ice business.

OCN = Ole Christian Nord private archive, pertaining to Christiania ice merchant Martin E. Nord (1817-1889).

LAU = Leif Arne Ulland, Bærum, collection of postcards with ice motives.

9.3 Interviews

Interviews with written summaries, approved by interviewees. Referenced in texts as Interview/Name/Date.

| Date/Place | Interviewee | Relation to subject |
|----------------------------|--|--|
| October 31, 2018, Oslo | Inger Høvik (b. 1939) Arne Høvik (b.1947) | Children to Rolf and Inga Høvik, who operated Oslo's longest surviving ice dam at Årvoll (ice sold until 1965-66) |
| September 9, 2019, Bærum | John Hovind (b. 1927) | Grandson of Thorvald Baarsrud, childhood participation and observation of ice harvests at Søndre Nærnes. |
| September 11, 2019, Røyken | Jens Høvik (1933-2020) | Farmer at the Høvik gård, Røyken. Experience with ice production and sales during the 1950s. |
| November 5, 2019, Røyken | Knut Baarsrud (b. 1947) | Great grandson of Thorvald Baarsrud. General information in conjunction with privately owned material and on the Baarsrud family's ice enterprise. |
| November 27, 2019, Oslo | Dag Erichsrud (b. 1949) | Great grandson of Thorvald Baarsrud, long serving chairman of the AS Søndre Nærnes. Involved in transferring the archive to the State Archives in Kongsberg. |
| June 25, 2021, Oslo | Øyvind Melien (b. 1958) | Melien conducted interviews with ice workers in the 1970s, some of whom had been active in the pre-First World War era. |

9.4 Online resources

Nasjonalbiblioteket (National library), Oslo: www.nb.no. All press sources cited in this thesis have been located through this search engine.

Digitalt museum, digitaltmuseum.no, a joint data base for collections in Swedish and Norwegian art and cultural historical museums. Operated by KulturIT AS, which was

established by Norsk Folkemuseum and Maihaugen in 2007. Has been primarily used for finding figures.

Statistisk sentralbyrå (SSB, Statistics Norway), portal for historical statistics: <https://www.ssb.no/a/histstat/nos/index.html>. Source page for all of the historical statistics used in this thesis.

Arkivportalen, arkivportalen.no, a service run by the National archives, containing catalogues of Norwegian public and private archives. Have been used here mainly for locating source material, as well as ordering in advance of archive visits.

Digitalarkivet, digitalarkivet.no; portal for digitized public archives, operated by the National archives, Oslo. Used here to locate individuals in censuses, see chapters six, and chapter 5 for reference to censuses on Frydensborg (Dahl). Furthermore, registries like G/Ga/Gab/L0006, see above, have been consulted online through the service.

Stortinget (Norwegian Parliament), stortinget.no, portal for parliamentary papers (Stortingsforhandlinger). Used in this thesis to locate sources for chapter 4, especially section 4.5. The actual references used in this thesis are written out in accordance with principles outlined here: <https://www.stortinget.no/no/Stortinget-og-demokratiet/Arbeidet/Om-publikasjonene/Hvordan-henvise-til-Stortingsforhandlinger/>.

9.5 Tables

Table 9.5.1. Volume of Norway ice exports, 1844–1947

| Year | R.T. | Year | R.T. | Year | R.T. |
|------|---------|------|---------|------|---------|
| 1844 | 53 | 1879 | 138,547 | 1914 | 18,3850 |
| 1845 | | 1880 | 163,240 | 1915 | 54,869 |
| 1846 | | 1881 | 179,847 | 1916 | 29,828 |
| 1847 | 332 | 1882 | 225,172 | 1917 | 8,709 |
| 1848 | 1,888 | 1883 | 216,749 | 1918 | 8,085 |
| 1849 | 2,627 | 1884 | 489,970 | 1919 | 12,089 |
| 1850 | 1,535 | 1885 | 227,836 | 1920 | 20,601 |
| 1851 | 18,843 | 1886 | 254,479 | 1921 | 48,105 |
| 1852 | 7,239 | 1887 | 266,277 | 1922 | 40,435 |
| 1853 | 10,605 | 1888 | 243,692 | 1923 | 28,042 |
| 1854 | 2,755 | 1889 | 291,236 | 1924 | 14,600 |
| 1855 | 2,497 | 1890 | 317,795 | 1925 | 105,162 |
| 1856 | 4,702 | 1891 | 279,796 | 1926 | 24,521 |
| 1857 | 6,699 | 1892 | 296,271 | 1927 | 57,999 |
| 1858 | 9,234 | 1893 | 339,702 | 1928 | 17,159 |
| 1859 | 35,280 | 1894 | 328,728 | 1929 | 17,251 |
| 1860 | 10,834 | 1895 | 324,983 | 1930 | 44,029 |
| 1861 | 6,978 | 1896 | 408,129 | 1931 | 17,498 |
| 1862 | 21,422 | 1897 | 385,556 | 1932 | 23,719 |
| 1863 | 40,440 | 1898 | 553,647 | 1933 | 25,523 |
| 1864 | 18,516 | 1899 | 511,581 | 1934 | 42,631 |
| 1865 | 31,376 | 1900 | 350,743 | 1935 | 39,415 |
| 1866 | 76,738 | 1901 | 346,744 | 1936 | 43,499 |
| 1867 | 46,087 | 1902 | 284,948 | 1937 | 36,180 |
| 1868 | 66,830 | 1903 | 276,727 | 1938 | 35,042 |
| 1869 | 88,414 | 1904 | 303,717 | 1939 | 24,082 |
| 1870 | 60,039 | 1905 | 299,503 | 1940 | 4,727 |
| 1871 | 76,268 | 1906 | 495,632 | 1941 | 5,490 |
| 1872 | 129,921 | 1907 | 279,181 | 1942 | 4,746 |
| 1873 | 154,138 | 1908 | 303,414 | 1943 | 7,348 |
| 1874 | 143,512 | 1909 | 275,537 | 1944 | 9,270 |
| 1875 | 126,015 | 1910 | 396,581 | 1945 | 7,662 |
| 1876 | 141,775 | 1911 | 386,661 | 1946 | 12,011 |
| 1877 | 209,220 | 1912 | 230,033 | 1947 | 9,246 |
| 1878 | 218,214 | 1913 | 223,086 | | |

Source: *Historisk Statistikk 1948*, table 120. RT = Register ton (2,83 m3). For the period up to 1875, 1 CL = 2.1 RT, cf. *Historisk Statistikk 1948* p. 209.

Table 9.5.2. Klovland's price index of Norwegian natural ice, 1865-1920

| Year | Index | Year | Index | Year | Index |
|------|-------|------|-------|------|-------|
| 1866 | 191 | 1884 | 143,3 | 1902 | 57,9 |
| 1867 | 88,6 | 1885 | 69,6 | 1903 | 53,8 |
| 1868 | 107,4 | 1886 | 53,7 | 1904 | 58,2 |
| 1869 | 95,5 | 1887 | 67,6 | 1905 | 75,6 |
| 1870 | 83,6 | 1888 | 47,8 | 1906 | 97,3 |
| 1871 | 84,6 | 1889 | 59,7 | 1907 | 61,1 |
| 1872 | 95,5 | 1890 | 79,6 | 1908 | 107,9 |
| 1873 | 153,2 | 1891 | 51,7 | 1909 | 64,8 |
| 1874 | 191 | 1892 | 39,8 | 1910 | 212,1 |
| 1875 | 113,6 | 1893 | 95,5 | 1911 | 88,6 |
| 1876 | 111,4 | 1894 | 65,7 | 1912 | 85,1 |
| 1877 | 79,6 | 1895 | 56,6 | 1913 | 100 |
| 1878 | 95,5 | 1896 | 71,4 | 1914 | 77,7 |
| 1879 | 79,6 | 1897 | 50,3 | 1915 | 77,7 |
| 1880 | 79,6 | 1898 | 261,3 | 1916 | 117,6 |
| 1881 | 69,6 | 1899 | 109,2 | 1917 | 117,6 |
| 1882 | 252,7 | 1900 | 75 | 1918 | 188,2 |
| 1883 | 89,6 | 1901 | 62,7 | 1919 | 282,4 |
| | | | | 1920 | 541,2 |

Source: Klovland (2013). On method of data collection, see pp. 56-57. The index has 1913=100 and is rendered in the publication's table A2-6.

Table 9.5.3. Countries importing Norwegian natural ice, 1873, 1884, 1910.

| | 1873 | 1884 | 1910 |
|---------------------|---------------|---------------|---------------|
| Sweden | 25 | 3596 | 8695 |
| Denmark | 25 | 29843 | 9367 |
| Iceland | | 92 | 196 |
| Britain and Ireland | 124522 | 210312 | 183703 |
| Russia and Finland | | 787 | 1421 |
| Germany | 10252 | 152913 | 148775 |
| Netherlands | 964 | 35687 | 5190 |
| Belgium | 947 | 25235 | 14722 |
| France | 16458 | 28032 | 24512 |
| Portugal | | 422 | |
| Spain | 945 | 357 | |
| Italy and Austria | | 258 | |
| USA | | 301 | |
| Others | | 2135 | |
| | 154138 | 489970 | 396581 |

Sources: NOS C No. 3b: Tabeller vedkommende Norges Handel i Aaret 1873, table 11, NOS III, 4: Tabeller vedkommende Norges Handel i Aaret 1884, table 11, NOS IV, 151: Norges Handel 1910, table 11a.

Table 9.5.4 Volume ice exported from Norwegian ports, select years

| | 1873 | 1884 | 1898 | 1910 |
|--------------|---------------|---------------|---------------|---------------|
| Halden | | | 735 | 115 |
| Sarpsborg | | 737 | 338 | |
| Fredrikstad | | | 932 | |
| Moss | 1775 | 12230 | 13748 | 3944 |
| Drøbak | 33067 | 78367 | 108079 | 49415 |
| Kristiania | 46036 | 114535 | 136918 | 69683 |
| Drammen | 2925 | 37279 | 47065 | 14742 |
| Holmestrand | | 420 | 3227 | |
| Tønsberg | | 309 | 216 | |
| Larvik | 12109 | 30715 | 8113 | 575 |
| Kragerø | 28104 | 78539 | 85461 | 84909 |
| Langesund | | 13453 | 6537 | 13756 |
| Brevik | 16044 | 58705 | 74808 | 103731 |
| Porsgrunn | 6697 | 33665 | 48268 | 45134 |
| Skien | | 2524 | 11608 | |
| Risør | 5828 | 26482 | 2836 | 4745 |
| Tvedestrand | 956 | 1902 | 294 | |
| Mandal | 63 | | | |
| Kristiansand | 69 | 30 | | 13 |
| Sokndal | 63 | | | |
| Farsund | 86 | 78 | | |
| Stavanger | 48 | | 931 | 136 |
| Kopervik | | | | 30 |
| Haugesund | | | | 30 |
| Bergen | | | 2561 | 5623 |
| Molde | 248 | | | |
| Trondheim | 21 | | 972 | |
| SUM | 154138 | 489970 | 553647 | 396581 |

Sources: NOS C No. 3b: Tabeller vedkommende Norges Handel i Aaret 1873, table 12, NOS III, 4: Tabeller vedkommende Norges Handel i Aaret 1884, table 13, NOS III, 316: Tabeller vedkommende Norges Handel i Aaret 1898, table 13, NOS IV, 151: Norges Handel 1910, table 13a.

Table 9.5.5. Johan Martin Dahll shipping fleet, 1857-1878

| Vessel Name | Type of vessel | Launched | Size, CL or RT | Comments |
|------------------|------------------|----------|----------------|--|
| <i>Askur</i> | Sailing ship | 1857 | 152 CL | Owned in partnership with captain J. Nilsen. Sold to Grimstad, NA. |
| <i>Embla</i> | Brig | 1855 | 57.5 CL | Sold 1891 to Larvik |
| <i>Hermod</i> | Bark | 1864 | 195 CL | Foundered 1906 |
| <i>Uller</i> | Schooner | 1865 | 125.5 CL | Abandoned in Atlantic 1890 |
| <i>Hugin</i> | Bark | 1867 | 198 CL | "sold abroad" (NA) |
| <i>Valkyrien</i> | Bark | 1870 | 127.5 CL | Scrapped 1894 |
| <i>Heimdal</i> | Steamer with rig | 1872 | 142.5 CL | First Kragerø-owned steamer, sold 1894 (Tønsberg) |
| <i>Gungner</i> | Schooner brig | 1875 | 83 CL | Sold to Aalborg 1903 |
| <i>Vale</i> | Bark | 1878 | 563 RT | Stranded Florida 1899 |
| <i>Frithjov</i> | Steam tug | 1873 | | |
| <i>Sex</i> | Steam tug | | | |

Source: Dahll (1959, p. 249), E. Pedersen (1933, pp. 94-118).

9.5.6. Wiborg (of Kragerø) shipping fleet, 1850-1927

| Vessel name | Propulsion 1) | Tonnage 2) | Enter service | Stock capital 3) | Exit service |
|------------------------------|----------------|------------|---------------|------------------|--------------|
| <i>Claus Thomesen</i> | Sail | 116 CL | 1850 | | 1891 |
| <i>Tjalf</i> | Sail | NA | 1851 | | 1888 |
| <i>I.H. Schwensen</i> | Sail | NA | 1866 | | 1904 |
| <i>Rinde</i> | Sail | 569 | 1866 | | 1902 |
| <i>Skarbo</i> | Sail | NA | 1868 | | 1899 |
| <i>Professor Schweigaard</i> | Sail | 159,5 | 1869 | | 1893 |
| <i>Kvik</i> | Sail | 92 | 1869 | | 1872 |
| <i>Freia</i> | Sail | 107 CL | 1869 | | 1875 |
| <i>Birgit</i> | Sail | 419 | 1874 | | 1889 |
| <i>Geir</i> | Sail | 231 | 1875 | | 1887 |
| <i>Guldregn</i> | Sail | 874 | 1878 | | 1884 |
| <i>Diana</i> | Sail | 253 | 1878 | | 1885 |
| <i>Krystal</i> | Steam (I) | 361/428 | 1885 | 142,000 | 1907 |
| <i>Valentine</i> | Sail | 293 | 1886 | | 1913 |
| <i>Dido</i> | Sail | 372 | 1888 | | 1893 |
| <i>Klar</i> | Steam (I) | 518 | 1889 | | 1900 |
| <i>Bertha</i> | Sail | 455 | 1889 | | 1904 |
| <i>Koral</i> | Steam (I) | 361 | 1890 | | 1893 |
| <i>Gloria</i> | Sail | 265 | 1894 | 8,000 | 1898 |
| <i>Nora</i> | Steam (W) | 424 | 1897 | | 1902 |
| <i>Ørnen</i> | Sail | 567 | 1898 | 11,500 | 1909 |
| <i>Kjartan</i> | Sail | 342 | NA | 13,500 | NA |
| <i>Embla</i> | Steam (W) | 497 | 1900 | | NA |
| <i>Forsete</i> | Steam (W) | 523 | 1903 | | NA |
| <i>Triton</i> | Sail | NA | NA | | 1904 |
| <i>Fridtjof</i> | Steam (I) | 716 | NA | | 1909 |
| <i>Hekla</i> | Steam (W) | 524 | 1905 | | 1915 |
| <i>Isbjørn</i> | Steam (I) | 578 | 1907 | | 1915 |
| <i>Sonora</i> | Sail | 548 | 1908 | 13,000 | 1912 |
| <i>La France</i> | Steam (I) | 616 | 1909 | 178,000 | 1916 |
| <i>Excellenz Mehnert</i> | Steam (I) | 646 | 1911 | 190,000 | 1916 |
| <i>Nico 4)</i> | Steam (I) | 712 | 1913 | 246,000 | 1915 |
| <i>Vale</i> | Steam (I) | 719 | 1913 | 240,000 | 1915 |
| <i>Cort Adeler 5)</i> | Sail | 270 | NA | | 1917 |
| <i>Noris</i> | Steam (W) | 558 | NA | | 1916 |
| <i>Nico</i> | Steam (I) | 1219 | NA | | NA |
| <i>Nemo</i> | Steam (W or I) | 421 | NA | | 1927 |
| <i>Nessund</i> | Steam (I) | 649 | NA | | NA |

Sources: Wiborg (1943/1996), Det norske veritas (DNV) registries (several 1864-1914) Malmsteinregisteret / Norwegian Maritime Museum, Pedersen (1933).

Notes:

- 1) (I) stands for steamship with iron or steel hull, (W) wooden.
- 2) Register ton (RT) unless noted as commercelster (CL). Differentiation between steamship and sailing vessel RT not made.
- 3) Equity at acquisition point. The listed ships were subject to different ownership structures, the ships with numbers represent the minimum of ships that were organized as stock companies. Steamships were likely all stock companies.
- 4) Sunk by Germans, see *Dagbladet*, December 20, 1915.
- 5) According to Gumø (1980, p. 7), this ship was sunk by Germans in the North Sea.

Errata

9.6 Literature

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