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SWEDISH EXPLORERS, IN-SITU KNOWLEDGE, AND RESOURCE-BASED BUSINESS IN THE AGE OF EMPIRE

The period from 1870 to 1914 plays a unique role in the history of natural resource exploration and extraction. This article analyses, from a Swedish viewpoint, the connections between two actor categories of special importance in this context: scientific-geographical explorers and industrial actors. The article examines their activities in three broadly defined regions: the Arctic, Russia, and Africa. We show that the Swedes generally had far-reaching ambitions, on par with those of the large imperial powers. In some cases, notably in Africa, Sweden was not able to compete with the larger imperial powers; but in other cases, such as the exploration of the Arctic – from Spitsbergen to Siberia – and the industrial exploitation of coal at Spitsbergen and petroleum in Russia's colonial periphery, Swedish actors played a leading role, in competition with players from the larger European nations. Our paper shows that scientific exploration and industry were closely linked, and that foreign policy also influenced the shaping of these links. We distinguish different types of knowledge produced by the Swedish actors, pointing to local, situated knowledge as the most important type for many resource-based businesses, although modern, scientific knowledge was on the increase during this period.

Keywords Sweden, natural resources, in-situ knowledge, field sciences, industry, colonialism

1. Introduction

The period from 1870 to 1914 plays a unique role in the history of natural resource exploration and extraction. It does so in two ways. On the one hand, the period witnessed an unprecedented surge in geographical and scientific exploration, resulting

in new *knowledge* about natural resources worldwide and pushing the frontiers of known deposits to increasingly remote regions. On the other, the intensified industrialization process in the Western world meant that the *use* of and *trade* in natural resources – from near and afar – skyrocketed in both quantitative and qualitative terms.

In this article we explore the connections between these two trends: between scientific-geographical exploration of the world and industrial interests relating to natural resource extraction and trade. Earlier research on the above-mentioned period, which some scholars have referred to as the ‘Golden Age of Resource-Based Development’¹ and others as the ‘Age of Empire’,² has generated two literatures that, we contend, have not communicated sufficiently with each other. The first deals with geographical and scientific exploration on a global scale during the period, mainly through a history of science perspective.³ The other centres on the remarkable – and environmentally highly problematic – growth in resource-based industrialization and the international resource trade, and has mainly been a domain for economic historians and environmental historians.⁴ The extent to and ways in which scientific-geographical exploration interacted with large-scale resource extraction and industrial growth remain poorly understood.

Another problem with the existing literature is that it has been strongly biased towards studies of the large imperial powers. Our impression is that this has distorted mainstream interpretations regarding the dynamics of natural resource exploitation. Seeking to counter this state of affairs, this article studies the interaction between exploration and resource-based industrialization in the case of Sweden; a country that, during the period in focus, produced both world-famous explorers and highly competitive resource-based industries.

In 1850, Sweden was one of the poorest countries in Europe. Still predominantly rural, it lagged behind other European nations in terms of industrial development. In the course of the following century, however, Swedish industry boomed and the economy saw rapid growth in per capita income, bringing the country to the absolute top of the world’s income pyramid. To a large extent, Sweden’s economic success story has been attributed to its competitive export-oriented industry, which was founded on the basis of domestically abundant natural resources, notably iron ore, wood, and hydropower.⁵ The export-driven model, however, tends to overlook the country’s growing dependence on imports of critical inputs such as coal, petroleum, fertilizers, rubber, and alloying metals. The imports of ‘non-substitutable’ inputs to the Swedish economy grew dramatically from around 1890.⁶ As a result, Swedish industrial actors became increasingly integrated into the international resource trade. Foreign natural resources also played an important indirect role in Swedish industrial growth, as numerous Swedish companies set up resource-based production facilities abroad or won contracts for the supply of advanced equipment needed in foreign mining projects and the like.

When Swedish industry was still in the starting blocks, the economic crisis of 1873 led to a contraction of markets. The crisis accelerated the outward expansion and the sheer geographic scope of the Western economy.⁷ Industrial actors increasingly set out to make use of newly available transport and communication technologies – notably steamships, railways, and telegraph networks – to expand international activities.⁸ New regions of the world were integrated into the global economy, whereby surplus capital (and in some parts of Europe, surplus labour) could be used in unexploited regions of the world. As this ‘frontier’ expanded, capital and labour flowed from the centre to the periphery. Industrial actors in Europe and North America sought new

markets and investment opportunities in resource exploitation, while rural populations in Europe embarked on a global-scale migration in search of new land. Thus, a new era of imperial expansion took place on the peripheries: to the west in North America, to the north and east in Europe, and to the south in Africa.⁹

Earlier scientific expeditions in the 18th and early 19th centuries had contributed immensely to Western knowledge about the world. Explorers such as Cook and Humboldt acquired knowledge from regions never visited before by Europeans, whereby Swedish explorers and scientists – including several of Linnaeus' disciples – also gained an international reputation.¹⁰ As the resource-based frontier expanded in the 19th century, interest in geography grew markedly. Throughout the Western world, geographical societies were formed. The first societies were set up in Paris and Berlin as early as the 1820s, and from the 1890s the number of societies grew exponentially.

Sweden's first geographical society was established in 1877. From 1881 it was known as the Swedish Society for Anthropology and Geography (SSAG).¹¹ The SSAG connected different subgroups in the Swedish elite. Numerous business leaders were paying members; the 1884 membership records included 38 bulk traders, 27 resource processing industrialists, and 12 manufacturing industry representatives.¹² Among the more prominent industrialists were Alfred and Ludvig Nobel, Gustaf de Laval, and Oscar Dickson.¹³ Seeking access to the SSAG community, they also received the society's main publication, the journal *Ymer*.

Geography provided useful knowledge for the exploitation of remote resources, for access to markets, and for spreading 'civilization'. As shown by several scholars, scientific activity played an important part in imperial strategies, providing ideological underpinning, moral rules, and legitimacy for colonial acquisitions.¹⁴

In the following, we set out to explore the links between Swedish scientific-geographical exploration and industrial activity in the age of empire. More precisely, we shed light on the processes of gleaning first-hand information from remote, resource-rich parts of the world which actors considered commercially interesting in the short or long term. We will pay special attention to the role of 'in-situ knowledge'; that is, information on site about the quality and quantity of natural resources, the feasibility of their extraction, local geographical and social information, etc.

We focus geographically on Swedish scientific-exploratory and business activities in three regions: the Arctic, Russia, and Africa. As we will show, Swedish actors took great interest in all of them, but in different ways and with different outcomes in terms of commercial success. By uncovering how knowledge about local environments was formed, transmitted, and used during a critical stage in Sweden's industrial development, we hope to inspire new perspectives on not only the activities of actors from small countries within natural resource exploration and exploitation in the global context of Western colonialism, but also on the relationships between science and industry in this context.

2. The Arctic

From the mid-19th century, the Arctic region became a focus of interest both for scientists and for business actors in Sweden. The first Swedes to go there were scientists, who dominated the research scene in the European Arctic from 1858 into the first decade of the 20th century.¹⁵ From the late 19th century, several mining

companies established themselves at Spitsbergen. In this section we discuss the interaction between exploration, science, and industry in the region.

The first mining company to establish itself at Spitsbergen was A. B. Isfjorden. It was founded in 1871 by the Gothenburg industrialist Oscar Dickson, along with the geologist and Arctic scientist Adolf Erik Nordenskiöld. The purpose of the company was to establish a phosphorite mining colony at a place called Kap Thordsen at Spitsbergen, which would provide raw material for the production of artificial fertilizer in Sweden; a resource that, as the company's promoters argued, was becoming scarce. The phosphorite in question took the form of coprolites (fossilized faeces).¹⁶

To achieve this, A. B. Isfjorden needed knowledge on how to successfully mine and export coprolites under the challenging environmental circumstances of this part of the Arctic. The company had access to such knowledge through Nordenskiöld, who had already conducted several research expeditions to Spitsbergen. Nordenskiöld, a leading Swedish geo-scientist focusing on the Arctic, had found the coprolites during an expedition in 1864.

Having succeeded in enlisting financial support from Swedish capitalists, Nordenskiöld returned to Kap Thordsen on a second expedition in 1870, accompanied by an engineer and the geologist Alfred Gabriel Nathorst, who later became a leading geo-scientist, promoter of Swedish involvement in mining at Spitsbergen, and head of the Swedish Museum of Natural History. Encouraged by the results of this expedition, Nordenskiöld joined forces with Oscar Dickson to set up A. B. Isfjorden.¹⁷

The investors relied heavily on Nordenskiöld's experiences before deciding to create the company. Nordenskiöld listed three main factors which, in his view, made the Kap Thordsen minerals a valuable resource. First, he pointed to the size of the geological deposit and its relative purity, which he described as favourable. Second, he argued that the site was accessible, as it was almost completely ice-free every year from June to August. An outer harbour was supposedly accessible even from the end of May. A third factor was the climate, which Nordenskiöld argued was similar to the climate in the Danish colonies on Greenland. Because of the North Atlantic current (the Gulf Stream), the winters could be expected to be even milder than in the Danish Greenland colonies. Nordenskiöld argued that, taken together, these factors showed that it would be unproblematic to establish colonies at Spitsbergen as well, and, if a company was formed, it would certainly make a profit.¹⁸

A fourth factor was distance. Carl von Otter, a sea captain with experience from Swedish research expeditions to Spitsbergen, who advised investors interested in A. B. Isfjorden, argued that Spitsbergen was often misunderstood as being very far from Sweden. In fact, he argued, the archipelago was just 10–12 days' travel away from Gothenburg, with the shipping season spanning four to five months. Von Otter believed that it would be possible to export 10,000 tons of coprolites per year, using three fairly large steamships of 1,000-ton loading capacity, with each ship travelling three times per year between Spitsbergen and a northern European port (Gothenburg and London were mentioned). Von Otter also discussed harbour conditions, estimating that, initially, a single pier would suffice as a loading harbour at Kap Thordsen, allowing one ship to be loaded at a time. If the company decided to increase production, however, it would need to build a railway to a nearby bay, which would allow the simultaneous loading of several ships.¹⁹

Based on the information that Nordenskiöld and von Otter provided, the investors who took an interest in the project decided to form the joint stock company, A. B. Isfjorden. The company also asked the Swedish government to claim Spitsbergen as a colony; an action which Urban Wråkberg has interpreted as a move to protect the investments A. B. Isfjorden intended to make.²⁰

In the end, A. B. Isfjorden never became a successful producer of coprolites for Swedish markets or did Kap Thordsen become a Swedish colony. In the summer of 1872, the company, led by the Swedish site manager Johan Tiberg and a work force made up of Norwegians, did open a mine with transport systems and housing. The operations ran into problems, however: the coprolites turned out to be difficult to mine and the harbour conditions, a steep rocky coastline with no shelter from winds, were intolerable. Moreover, the dynamics of the market price for a key competing phosphate resource – guano – made the project economically risky. For these reasons, the company's board lost faith in the project and, in the autumn of 1872, decided to disband their embryonic mining colony at Kap Thordsen. The following year the company was dissolved.²¹

Nearly 30 years after A. B. Isfjorden's failed attempt to turn Spitsbergen into a Swedish colony for resource extraction, another Swedish scientist tried to persuade Swedish business actors to invest in mining there. This time the focus was on the most important energy resource in the industrializing European economy: coal. The scientist was Johan Gunnar Andersson, a PhD student in geology from Uppsala University, whose interest in Spitsbergen's coal came about after his taking part in a large Swedish scientific expedition, led by Nathorst, to Spitsbergen and Bear Island (south of Spitsbergen's main island) in 1898. It was partly funded by the Gothenburg industrialist behind A. B. Isfjorden, Oscar Dickson.²² The expedition mapped various geographical and geological features, one of which being coal. At Bear Island, Andersson also came to witness the very start of what later became a race for Spitsbergen's mineral resources, with competing teams of mineral prospectors from Germany intending to claim their rights to various coal deposits.²³ Inspired by the Germans and armed with his fresh geological research results from Bear Island, Andersson tried to persuade Swedish investors to claim and mine the coal layers there. Yet Andersson was not successful. When he wrote about it in *Ymer* several years later, he blamed his failure on the 'coal barons' of southern Sweden, who had beaten him with their economic calculations.²⁴

The idea of setting up a coal-mining colony at Spitsbergen re-emerged in Sweden again in 1907, 1909, and finally in 1910 as Jernkontoret – the branch organization of the Swedish steel industry – decided to send an expedition to the archipelago to claim coal deposits for Swedish needs. At this time an international rush to Spitsbergen's coal resources was under way. Swedish business actors took part in it by laying claim to four substantial areas of land for the purpose of coal mining – Pyramiden, Erdmanns tundra, Bünsow Land, and Braganza Bay – marking the coast lines with wooden signboards stating that these lands were now 'under Swedish occupation'. A second Swedish colonial project had thus taken its start. In 1911, Jernkontoret formed the company A. B. Isfjorden-Belsund, which explored the Swedish coal fields during annual expeditions in the following years, preparing them for mining. In 1916, the owners formed a new company, A. B. Spetsbergens svenska kolfält, which opened a coal mine at their Braganza Bay coalfield. The company named the mining colony Sveagruvan – the Svea mine – and kept it in operation from 1917 to 1925. Simultaneously, the mining company maintained their claim to Pyramiden, Erdmanns tundra, and Bünsow Land, establishing prospecting camps and conducting test mining at those sites until the mid-1920s.²⁵

Three groups of Swedish actors pushed Swedish coal mining at Spitsbergen. The first was made up of business actors who wanted to secure a Swedish source of coal, for energy needs in general and for the steel industry in particular. The second consisted of Swedish scientists specialized in research about the Arctic. They supported the industry because they wanted to make their knowledge production usable for economic development (and thereby attract more funding for their research). The third group, it turns out, consisted of officials from the Swedish foreign ministry. Still upset by the dissolution of the Sweden-Norway union in 1905, the ministry wanted to take leadership in Scandinavian foreign policy by preventing Norway from getting its hands on Spitsbergen. A Swedish coal mine on Spitsbergen would serve this end. With support from the network of Arctic scientists, the ministry exerted its influence on Jernkontoret to take possession of land at Spitsbergen for mining in order to improve the Swedish position in coming negotiations on the legal status of the islands.²⁶

What knowledge did the Swedish mining companies use and how? To begin with, it is clear that they utilized knowledge that Swedish scientists had produced during research expeditions in the late 19th and early 20th centuries. Jernkontoret acquired this knowledge, first and foremost, from the geologist and polar researcher Gerard de Geer, who wrote several reports, in which he advised Jernkontoret on where it would be possible to find coal of the quality Jernkontoret was interested in. Jernkontoret and A. B. Isfjorden then hired an Uppsala geologist, Bertil Högbom, who had previously worked as an assistant to de Geer. Given his experience from two geological research expeditions to Spitsbergen, the companies appointed Högbom leader of its expedition in 1910, undertaken to find the coal that he and de Geer knew of from previous scientific research, primarily at Pyramiden and Bünsow Land.²⁷

Despite the fact that the Swedish mining company was able to find and claim Pyramiden and Bünsow Land based on knowledge acquired from these scientists, they never opened any mines there (apart from the above-mentioned test mining).²⁸ Instead, A. B. Isfjorden-Belsund decided to establish the Svea mine at the only site that had not been identified by a scientist, at Braganza Bay. The company found this coal field based on advice from a fisher-farmer from Tromsø in northern Norway, Hans Norberg, who spent his summers in Spitsbergen fishing, hunting, and sometimes working as a prospector for companies interested in minerals there. In 1906, Norberg had worked as a prospector for a British firm in the area of Braganza Bay and had found pieces of coal lying around in a creek bed. Assuming that the coal had been transported downstream by the water, he laid claim to the area on behalf of his British employer. Four years later, in 1910, Norberg was back in Spitsbergen on a private hunting trip, during which he met the Swedish mining company's prospecting expedition. Norberg informed the Swedes about the coal he had found at Braganza Bay back in 1906. The company followed his advice and under his guidance went to the bay, identified the coal seam and claimed the area as 'under Swedish occupation'. The mining company valued the Braganza coal field as by far the most suitable for establishing a mine. This is why they established their mining colony, 'Sveagruvan', there in 1917.²⁹ As a matter of fact, none of the coal fields in which the large coal mining colonies at Spitsbergen were established were discovered as a consequence of previous scientific research; they were found by actors with local and experience-based knowledge.

Despite the fact that the mining companies made rather limited use of the knowledge provided by scientists, they often argued that their industrial operations were based on scientific knowledge. The explanation for this was a need for legitimacy.

The mining companies needed to convince potential investors and political supporters that their business idea – to conduct mining not far from the North Pole – was feasible and serious. A. B. Isfjorden-Belsund actively pursued such a strategy by persuading scientists such as de Geer and Andersson to publish articles about their coal fields. As a result, in 1913, de Geer published a piece in *Ymer*, the SSAG's journal, in which he claimed that the extensive scientific work by Swedish researchers at Spitsbergen had provided a 'firm and reliable foundation' for a mining industry there, ending by pointing to the great potential of A. B. Isfjorden-Belsund's coal fields. In 1914, Bertil Högbom published an article with a similar message in *Jernkontorets Annaler*, an engineering journal read by a large number of potential investors in the Swedish steel industry. Just like de Geer, he argued that the company's coal fields had great potential for profitable mining, emphasizing that Swedish scientists had found and assessed the coal fields. According to Högbom, A. B. Isfjorden-Belsund's coal fields would be able to satisfy Sweden's entire coal demand 'for one or several hundred years'.

The company used similar rhetoric in various contexts over the years; sometimes as a narrative to defeat competing mining companies who laid counterclaims to their coal fields, and sometimes to enlist financial and political support.

Thus it is clear that even though the mining companies did make use of knowledge provided by prominent Arctic geo-scientists, they made similar use of knowledge provided by non-scientific actors. From the companies' perspective, it seems clear that the most valuable contribution of the scientists to their businesses was legitimacy and heightened esteem.

3. Russia

Swedish actors' interests in Russian natural resources had two main origins. The first was a direct continuation of the Arctic ventures. Swedish explorers were among the most active in exploring Russia's long Arctic coast, its archipelagos, and its Siberian hinterland. In 1875, Adolf Erik Nordenskiöld became the first Western explorer ever 'to reach the mouths of the great Siberian rivers from the Atlantic Ocean by ship'. Back in Sweden, he argued with great fervour that the tundra of the lower Yenisei region rested on valuable natural resources that should be mobilized for industrial purposes, and that the great Siberian rivers were suitable for large-scale shipment of commercial goods. He argued that this would 'be of immense practical significance for all of Siberia'.³⁰ Nordenskiöld used the same arguments when seeking to convince industrialists of the necessity to fund geographical exploration of the Northeast Passage. This project was eventually carried out with support from the Swedish king, but also from Oscar Dickson, the Swedish industrialist, and Alexander Sibiryakov, the wealthy son of a Siberian mine owner.³¹

The expedition's ultimate success in 1879 paved the way for Nordenskiöld's world fame and made him a national hero in Sweden. From a business perspective, however, Sweden did not profit from his exploratory ventures in the Russian Arctic. In the 1890s, the results of the famed voyages did find important use, as the builders of the Trans-Siberian railway made active use of the new geographical knowledge to enable shipments of construction materials into the interior of Siberia, but no Swedish business interests were involved.³² Yet, if seen in a longer historical perspective, the information gathered and distributed in the context of the scientific expeditions contributed significantly to raising overall awareness of northern Russia's resource

riches and the business opportunities linked with them. This had interesting consequences for Swedish industry, particularly during the first decade of Soviet power. Lenin's government launched a massive investment programme, promoting the construction of new infrastructure – notably roads and railways – as a strategic tool for enabling natural resource exploitation in the far north. Swedish industry – featuring companies such as Nydquist & Holm A. B. (Nohab) – won several contracts for the supply of advanced transport equipment, especially locomotives, which the Soviets eagerly put to use for this purpose. In addition, Swedish businesses delivered equipment for a nascent aluminium smelting industry in the region.³³

The second origin of Swedish business interests in Russia had to do with the raw material needs of Swedish-owned industrial establishments in that country. During the second half of the 19th century, numerous Swedish industrial companies – including L. M. Ericsson, ASEA, SKF, and many others – self-confidently set out to internationalize in eastern directions, setting up plants in the Russian Empire, the markets of which seemed to be developing in a highly promising way. In Russia the companies often found it unprofitable or even logistically impossible to use Swedish supply chains. To compensate for this, they tried to obtain a range of raw materials from internal Russian sources. Instead of using Swedish iron and wood, for example, they spent a great deal of effort trying to secure access to equivalent Russian resources. This sometimes led to vertical integration in the form of direct Swedish investments in Russian ironworks, sawmills, and the like. The industrialists Hugo Standertskjöld and Ludvig Nobel, for example, thus acquired an iron ore mine just north of Lake Ladoga, while also discussing the possibility of establishing a factory in the iron-mining areas of the Urals.³⁴ We found no such instance in which Swedish industrialists called upon Swedish explorers or geologists to identify or survey iron ore deposits in Russia, however.³⁵

The Nobel family came to play a unique role in the history of Swedish resource-related business activities in Russia. Their story is illustrative of the surprising twists and turns that characterized the interaction between in-situ knowledge, geographical exploration, and business activities in Russia's colonial regions. In the late 1860s, the brothers Ludvig and Robert Nobel, who were second-generation Swedish immigrants to St Petersburg, had taken over a weapons factory that had been founded by their father. The rifles that were produced depended on ample access to high-quality hardwood. In early 1873, the brothers decided to determine whether Caucasia, which had been colonized by the Russians a few decades earlier and was reputed for its walnut forests, could be integrated into their supply network of raw materials. For this purpose, Robert Nobel left on a journey to the Caucasus to carefully survey these forests. The results were disappointing. The region's forests were found to be in bad shape; the trees were either too large or too small, and much of the wood was found to be rotten.³⁶ This example illustrates that anecdotal evidence regarding a region's natural resource riches may contribute to shaping business strategies, but that its reliability is typically highly uncertain.

Yet in a twist of serendipity, Robert Nobel's trip to the Caucasus was not in vain. During his stay in Baku, which had been his base for acquiring more knowledge about the region's forests, he was struck by the extremely dynamic business climate with regard to another resource-based industry: petroleum extraction and refining. It had already been known for a long time that the Baku area rested on vast oil and gas deposits. The eternally burning gas flames at Surakhany, a few miles outside Baku proper, had even become the basis for a famed religion: Zoroastrianism. Hence there

was no need for geographical explorers to ‘discover’ this region’s natural resources. In this case, the anecdotal evidence regarding the resource in question seemed to rest on a firmer basis than in the case of walnut, judging by the actual investment activities.³⁷ Yet the importance of actually having seen the extraction of oil in the region with one’s own eyes became clear as Robert’s brother, Ludvig Nobel, remained critical for quite some time of Robert’s idea that Baku oil represented a once-in-a-lifetime investment opportunity. Only when Ludvig himself actually arrived in Baku in 1876 was he convinced. What followed was one of the most remarkable success stories ever in Swedish – and Russian – business history. Within a few years, the Nobel brothers had come to dominate the Russian petroleum business and even challenge the global hegemony of Standard Oil in the world market.³⁸

Further exploitation of the Caucasian oil fields depended on detailed scientific mappings of the area’s geology, as well as on careful analyses of the chemical composition of the oil from various wells. This prompted the Nobel Brothers Petroleum Production Company (Branobel) to bring in scientific expertise in geology and chemistry. Just as Jernkontoret did in the case of Spitsbergen a little more than a decade later, the Nobel brothers recruited these scientists from Uppsala University. Thus, in 1885, Branobel employed Hjalmar Sjögren, an Uppsala mineralogist and geologist, as its chief geologist. The perceived importance of the geologist’s contribution to the operations of the company was reflected in the formulation of his main tasks. In particular, the geologist was to decide on the places in which drilling was to take place and to outline the company’s geographical path of expansion to new resource-rich regions.³⁹

Seeking to live up to these expectations, Sjögren spent great efforts trying to gain access to reports by earlier explorers and scientists who had studied Caucasia and neighbouring regions, but, in order to complement and expand the existing knowledge base, he also undertook far-reaching exploratory activities himself. This included several expeditions not only to Baku’s immediate vicinities but also to regions such as Dagestan, Chechnya, and the Kara-Kum Desert in Central Asia; the latter having been occupied and annexed by Russia just a few years earlier in the context of its imperial expansion and the Great Game.⁴⁰ Sjögren’s readings and expeditions fed into Branobel’s strategic decision-making. But while some of the finds were considered company secrets, he was also able to use the new knowledge to pursue his academic career, and so the members of SSAG were able to read about his exploratory activities in *Ymer*.⁴¹

Branobel was, technically, a Russian company; it was not the subsidiary of any company registered in Sweden. However, a clear majority of its shares was controlled by the Nobel family – with Alfred Nobel as one of the most important shareholders alongside Ludvig and Robert Nobel – and other Swedish citizens with close links to Swedish industry and the Swedish scientific community. As already mentioned, Ludvig Nobel was also a prominent member of the SSAG. Against this background, it is hardly surprising that the presence of such a company in the Caucasian and Central Asian setting generated opportunities for Swedish scientists, in both their industrial and their academic roles. In this context it may also be noted that the Nobels’ sprawling business empire became the starting point for Sweden’s most famous Asian explorer, Sven Hedin. Hedin arrived in Baku in 1885, while still a young student, to work as a private teacher in the family of one of the oil directors. Hedin had earlier dreamed of following in the footsteps of Nordenskiöld to become a Polar explorer, but his appointment in Baku made him change his mind. From that point on, he had his

mind set on Asia.⁴² His first exploratory journey was carried out in immediate connection to his employment in Baku during 1885–1886 and covered the Baku area itself, the geologically and culturally interesting Apsheron Peninsula, and a few somewhat remoter areas in nearby Persia and the Ottoman Empire.⁴³ The results of the expedition shaped Hedin's determination to continue his exploratory travels by moving further east. From 1894 to 1908, Hedin undertook three long expeditions to China's Xinjiang region, Tibet, the Pamirs, and eastern Persia.⁴⁴ Branobel had thus become the point of departure for Swedish geographic exploration of Eurasia.

4. Africa

In this case study, we look at Swedish exploratory activities in West and Central Africa during the 'Scramble for Africa', and how in-situ knowledge was acquired and transmitted to the communities of science and of commerce in Sweden.⁴⁵ As the Western economy expanded outwards, it came to engulf a continent that was short of capital and labour, but rich in natural resources: Africa.⁴⁶ Exploratory activity in Africa, fuelled by imperial ambitions in Great Britain, Germany, and France, had, in the 1870s, produced medial heroes like David Livingstone and Henry Stanley.⁴⁷ Moreover, new technology such as steamboats, modern rifles, and quinine made colonial expansion into Africa's interior not only feasible but also relatively cheap.⁴⁸ Friction soon arose between the European competitors taking part in the scramble. To soothe the animosity and facilitate the partition of the 'African pie', in 1884, Chancellor Bismarck invited all the major players to Berlin.⁴⁹ Sweden-Norway was but a minor player at this conference, which introduced ground rules for African colonization and trade. By signing the Berlin convention and securing a trade treaty with the Congo Free State, however, the Swedish government sought to protect future business interests in Africa.⁵⁰ As a new vast space opened up for Swedish actors, there was a similarly vast information gap about this new environment.

The 'scramble' was by no means an absolute starting point for Swedish enterprise in Africa. As early as 1650, the Swedish Africa Company had built a fort on the Cape Coast (today's Ghana), securing access to the lucrative gold, ivory, and slave trades. Yet the West Africa venture proved short-lived, as the company soon found itself in violent conflict with England, Denmark, and the Netherlands.⁵¹ A Swedish government expedition to Senegal in 1787 also failed to establish a Swedish colony.⁵²

Swedish scientific activity in Africa goes back at least to Linneaus and his disciples. Peter Forsskål was a leading scientist in the Danish Niebuhr expedition to North Africa and the Middle East in 1761.⁵³ Other students of Linneaus – Daniel Solander, Anders Sparrman, and Carl Peter Thunberg – all journeyed to the Cape in the 1770s.⁵⁴ Other examples include the anatomist Gustav von Düben (later a leading figure in the SSAG), who, in 1845, explored South Africa and Mozambique, and J. M. Kinberg, who carried out zoological investigations in the Cape colony in 1853.⁵⁵

After the Berlin Conference, Swedish scientific activity in Africa virtually exploded. This 'scientific scramble' is reflected in *Ymer*. During the first four years of this journal's publication (1881–1884), only two articles are related to Africa, but in 1885 there were four and in 1886 no less than eight articles dealing with it. The following years produced a steady stream of knowledge on Africa's economic geography and anthropology, eventually fading out in the 1890s. Throughout, there was a strong focus on the Congo and West Africa.⁵⁶

Interestingly, the first Swedish Congo explorers typically had no scientific background, nor had they come to African soil for the purpose of scientific exploration. Many of them, like Georg Pagels, Arvid Wester, Peter Möller, C. R. Håkansson, and Edvard Gleeurup, were Swedish army officers who served in the Belgian-run Congo Free State's *La Force Publique*. Two of the explorers, George Valdau and Knut Knutsson, owned a large plantation complex in Cameroon. Only one was actually a scientist: Hans Hugold von Schwerin from the University of Lund. He was a pioneer among geographers, and, in 1897, he became Sweden's first geography professor.⁵⁷ What united this highly mixed lot – apart from being Swedes in West Africa – was that they were all drawn into the circles of the SSAG and that they wrote in *Ymer*.

Looking at the *Ymer* articles related to Africa in this period, we can see that they transmitted a broad range of in-situ knowledge. First, there were the metrics of nature, including the geographies of mountains, forests, rivers, and lakes, topography, hydrology, and rainfall. An example here is the article published in 1885 by Theodor Westmark, one of the Swedes employed by the International Congo Association, in which he describes the tributaries to the Congo River.⁵⁸ Second, we find information concerning the local population, their cultural habits and preferences, religions, and social life, as when Georg Valdau in 1885 shared with the *Ymer* readers his observations on the 'Ba-Kwileh people' in Cameroon.⁵⁹ A third kind of information dealt directly with the economic potentials of the area: what crops grew or what resources could be found. In this category, we find von Schwerin's enthusiastic reports about the minerals shown at the Congo exhibition in Antwerpen in 1885, which he visited en route to Africa:

Here we see a complete collection of the copper and lead-containing ores, which in unusually large amounts exist at Buko Songho in Manyanga district at the lower Congo. In particular, the malachite found here is immensely rich, containing up to 60 or 80 percent of copper.⁶⁰

In a similar vein, Valdau reported from the interior of Cameroon in 1887:

All the villages we passed so far have had a rich supply of kautschuk, although Mokåå and Båvjångo have not yet begun to collect it in larger amounts. On the 5th we left Båvjångo and headed N 57° W through a mostly open and cultivated country.⁶¹

Finally, there was practical information about access and security, about diseases, climate-related nuisances, and available modes of transport from the coast to the interior. This included first-hand experience about how to deal with, for example, African carriers, as in Lieutenant Gleeurup's account from 1886:

They marched, however, exceedingly slowly, and therefore I decided to force them to urgency. An old experienced missionary advised me to hit them in the head, something which, however, especially provokes the Zanzibari people. [...] I then solemnly made halt, commanded them all to take down their burdens and dismantle their turbans, after which I hit every man a couple of times in the head with a cane.⁶²

As noted, most of the Swedish explorers in West Africa in the late 19th century had no scientific background or training, and many were enrolled in the large-scale exploitative

machinery orchestrated by the Belgian King Leopold II. Not surprisingly, their background was reflected in their publications, which rarely lived up to the scientific standards of the times. This notwithstanding, bit by bit, knowledge about the local West African environments, their resources and people, and practical ways of getting things done there was collected by Swedish explorers at the height of the Scramble for Africa. This information travelled through established routes of science communication, and particularly through *Ymer* and lectures arranged by the SSAG. As noted earlier, several prominent businessmen were members of the SSAG and they thus had access to what the explorers wrote. Another route of transmission was the newspapers. Several Swedish explorers, such as Gleerup, Pagels, and Matts Julius Juhlin-Dannfelt, regularly wrote about their African adventures in the Swedish dailies.⁶³

In our investigation of the links between Swedish scientific exploration and commercial natural resource interests in Africa, we have repeatedly come across a third group of actors: those representing Swedish foreign policy interests. Swedish consuls and legations were important conveyors of information for the business community. Just months after the Berlin conference, the Swedish Ambassador in Brussels, Carl Burenstam, sent several reports to the Foreign Ministry in Stockholm about the riches of ivory, coffee, rubber, palm oil, and possibly iron in the Congo, as well as indications about a potentially good market for Swedish exports.⁶⁴ To alert Swedish companies to these opportunities, the Ministry forwarded Burenstam's report to the Swedish National Board of Trade, which in turn put out an advert in *Post- och Inrikes Tidningar*, the official government bulletin.⁶⁵ At this time, Sweden-Norway's foreign policy and trade interests increasingly relied on a global network of consulates. To facilitate trade and transmit business-related information back home, Sweden-Norway expanded its number of consuls in foreign ports in the course of the 19th century. From around 1850, the expansion of Swedish and Norwegian consulates followed in the footsteps of the imperial powers' colonialist expansion. As argued by Aryo Makko and Leos Müller, the consular expansion became a substitute for colonialism.⁶⁶

After the Swedish and Norwegian parliaments had ratified the Congo convention and the trade agreement with the Congo Free State in April 1885, the Swedish government had to consider how best to help Swedish companies utilize the opportunities in the region, including the establishment of a consulate. This was not a simple task in the face of scant access to first-hand information on the ground, and no local representation. But the Swedish exploratory activity offered a way forward. In July 1885, after the geographer Hans Hugold von Schwerin, through SSAG, announced his plans for an expedition to the Congo, the prime minister of Sweden, Robert Themptander, pounced on this opportunity and issued official instructions to von Schwerin. He was to investigate – on top of his scientific tasks – the business potential for Swedish commodities in the Congo and assess the need for a Swedish consulate.⁶⁷

Hans Hugold von Schwerin left Sweden in October 1885 and returned in July 1887, having spent around a year and a half in West Africa.⁶⁸ In his report back to the Swedish Government in June 1887, von Schwerin concluded that there was indeed immense potential for Swedish business actors in the Congo and that there would be a market for a range of products; but not just yet, due to the transport problems faced by anyone trying to trade in bulk commodities. Von Schwerin underscored the necessity of a railway past the great cataracts upstream from the harbour in Banana, at the mouth of the river. As long as the railway was still lacking, he argued,

there would be no point in trying to increase Swedish business activity in the Congo, or to establish a consulate.⁶⁹ So adamant about this was he that he advised the commander of the Swedish Navy expedition that would set sail for the Congo later in 1887 to abandon any plans for trying to promote Swedish goods in the Congo, as these 'would be predestined to fail'.⁷⁰

It would take more than a decade before the Congo railway was built. Several Swedes were involved in the daunting task of surveying and constructing the railway past the cataracts, including Christer Posse, C. R. Håkansson, and Mats Julius Juhlin Dannfelt.⁷¹ In March 1898, the Swedish legation in Brussels informed Stockholm that the first journey on the new railway had been completed;⁷² however, by that time, interest in the Congo had waned in Sweden and the scientific and business communities had turned their attention to other colonial regions. The imports of Swedish and Norwegian goods to the Congo in 1901 remained marginal.⁷³

An analysis of Sweden's import and export records shows that Africa never became an important region for Swedish commercial enterprise in the period 1870–1910. In 1870, trade with African ports amounted to only 0.4% of Sweden's total trade value, and although it increased rapidly from 1890, by 1910 it still only made up 1.7% of the total.⁷⁴ On the African continent south of the Sahara, it was only South Africa that became a major trading partner during this period. When the Swedish exporting industrialists formed the Swedish Export Association in 1887, one of the first things they did was to establish an export agent in Cape Town.⁷⁵ The rest of Africa remained a marginal arena for Swedish business. Only from 1907 was there any more substantial Swedish trade with the Congo, as imports of rubber started to take off.⁷⁶ It would seem far-fetched, however, to suggest that the rising import of rubber in any way profited from the in-situ knowledge acquired by Swedish scientists and explorers in the region 20 years earlier.

In the 1880s, the two Swedish entrepreneurs Knut Knutsson and Georg Valdau – who also wrote in *Ymer* – ran a large rubber extraction estate in Cameroon. The two had arrived there in the late 1870s, before the Scramble, yet they found themselves outmanoeuvred by the German colonizers in the 1890s. Germany had made claims on Cameroon in 1884 and, ironically, the two Swedes had then helped the Germans to establish colonial rule, assisting in negotiations with local leaders.⁷⁷ Apart from this, we have not found any indications of Swedish enterprises establishing any significant natural resource-related presence in West Africa during the last two decades of the 19th century. The archives of the Swedish Foreign Ministry, the Swedish Legation in Brussels, and the Swedish Export Association are void of traces of any major Swedish business establishment or exploitative industrial activity in the Congo. More in-depth research could possibly be able to uncover now forgotten but interesting cases of Swedish entrepreneurial activity in West Africa.

Our African case shows that Swedish explorers quickly mobilized after the Berlin conference to collect necessary in-situ knowledge of potential interest for commercial actors. Despite the rapid increase in exploratory activity and the remarkable growth of first-hand information, however, the Congo and its resources never became an interesting venture for Swedish entrepreneurs. The foreign ministry also played a prominent role in promoting Swedish industrial activity and trade in West Africa and in conveying relevant knowledge. In the knitting of networks that connected foreign interests with scientific and business interests, the SSAG once again played a role.

Discussion and conclusion

In the introduction to this article we argued that the interaction between scientific-geographical exploration and resource-based industrial activities remains under-researched. We also noted that the existing literature is strongly biased towards studies of the large colonial powers. For this purpose, we set out to explore the relations between science, exploration, and resource-based business during the period 1870–1914 from a Swedish perspective. Our focus was on Swedish activities and interests in three very different regions: the Arctic, Russia, and Africa. In the following, we first make a few concluding remarks about each of the three cases. We then discuss our general findings.

The knowledge about the environment at Spitsbergen assembled by Swedish scientists played an important role for the Swedish business actors who established the Swedish mining colonies there. Since this is a claim that both the mining companies and the scientists were fond of making themselves, however, it is important to reflect critically on the character of the knowledge that business actors actually used. On the one hand, it is clear that the mining companies were indeed able to find some of the mineral deposits they laid claim to on the basis of knowledge provided by geoscientists. On the other hand, however, several companies also found coal by using information provided by non-scientific actors, whose knowledge was situated and local. The only mineral deposits that mining companies actually developed into full-scale mining operations were found by the latter category of actors.

Most of the knowledge that scientists such as Nordenskiöld and de Geer provided to Swedish mining companies had a similar character. It took the form of in-situ knowledge about Spitsbergen: observations of the kind that any intelligent person could have made simply by spending some time there (coal in the mountain side, the amount of ice in the fjord, and the summer temperature). It is also important to note that the knowledge provided by the scientists consisted not only of observations of geological features and climatic conditions, but also of a wider range of technological issues and political conditions, which business actors regarded as just as important as geology.

Our African case study makes clear that at the onset of the 'Scramble for Africa', Swedish actors had only scant knowledge about this continent. To be able to exploit Africa's resource riches along the lines laid out in the Berlin convention, Swedish business actors needed more and in-situ knowledge. Information about environmental factors such as geography, population, natural resources, and how to access them in practice became the *sine qua non* for any other activity. We also saw that most of the 'explorers' providing information to actors in Sweden were non-scientists. They were people who, in a manner quite similar to that in the Arctic, happened to be 'on the spot' in the African environment, and were drawn into the overlapping networks of Swedish business, science, and politics. In contrast to the Arctic case, however, Swedish businesses did not find the knowledge that Swedish explorers actually produced in Africa sufficiently encouraging to launch any concrete business initiatives on its basis. The new knowledge seemed to indicate that during the period under study here, actors did not (yet) think the time ripe, or believed that there was only a poor chance of succeeding in the face of competition from the larger colonial empires of the Western world. As Sweden lacked a political and military presence in West Africa, Swedish business on site was at the mercy of the colonizing powers, as entrepreneurs like Knutsson and Valdaу soon discovered.

Swedish scientists and explorers were also highly active in Imperial Russia. Nordenskiöld, extending his exploratory efforts from Spitsbergen in the direction of the Russian far north, played a key role in the exploration of northern Siberia, while the geologist Hjalmar Sjögren, employed by the Nobel Brothers Petroleum Production Company in Baku, surveyed Caucasia and parts of Central Asia. Nordenskiöld's efforts, although they were partly funded by Swedish business interests, did not generate any Swedish business initiatives; at least not in any direct way. Sjögren's activities, meanwhile, were closely related with Swedish business interests. In contrast to the Arctic case, scientists did not play any role in convincing business actors to invest in Baku's oil; on the contrary, it was Branobel that brought Sjögren to Baku. His role there, focused on geological investigations of the oil fields and of related resources in Caucasia and Central Asia, was typical of a modern resource-based industry, in which companies rely crucially on scientific knowledge for their survival. In addition, Sjögren and other Swedish citizens who were drawn to Baku in the context of the great oil rush – like Sven Hedin – initiated geographical exploratory activities of the Caucasian surroundings, and ultimately of Asia's greater interior. As a matter of fact, Sweden's special role in the geographical exploration of Asia can hardly be understood without taking the Branobel company into account.

In conclusion, our study offers three major findings. First, during this 'Age of Empire', Swedish actors were involved in both scientific-exploratory ventures and resource-based business activities worldwide. In some cases, as is evident from our African case study, the Swedes were not able to compete with the large imperial powers. But in other cases – notably in the exploration of the Arctic from Spitsbergen to Siberia, and the industrial exploitation of petroleum in Baku and coal on Spitsbergen – Swedish actors actually played a leading role, competing heads-to-head – albeit with varying outcomes – with players from the larger European nations. This testifies to the relevance of including the smaller nations in analyses of global resource-related developments in both science and business. It cannot be argued that the smaller nations played only negligible roles.

Second, Swedish scientific-exploratory ventures and Swedish resource-based business activities interacted with each other in a number of ways, which are important to grasp. One dimension to take into account here is the *type* of knowledge produced by scientists and explorers which businesses found useful. Our evidence points to the prominence of situated, local knowledge as the most important type of knowledge from a business point of view, rather than scientific knowledge in a more modern sense. In fact, this *in situ knowledge*, as we call it, could be sourced from people on site with a good understanding of local conditions but without scientific education. Explorers and scientists sometimes acted as transmitters of such knowledge to businesses, but in some cases, as is obvious from our Arctic study, businesses actually obtained their knowledge directly from locals, without involving scientists. This local knowledge was often of a kind that did not relate to natural resources as such, but more often to the broader environmental and cultural contexts in which they would have to be exploited, including crucial aspects of the transport and distribution of bulky goods. The theoretically relevant conclusion here is that it would be useful to adopt what we may call a systems perspective on the relations between science, exploration, and business in the colonial context; that is, a perspective on natural resource-oriented industries that includes not only resource extraction as such, but also infrastructural, institutional, and cultural components.

Another dimension here refers to the ways in which businesses actually used the knowledge that was produced or acquired by scientists and explorers. Here, one of our main findings is that such knowledge was often crucial in the context of taking key decisions on whether or not to invest in a project, as well as in setting up business plans. The most prominent examples here are the roles of Högbom's and de Geer's assessments of the geological characteristics of the coal layers at Spitsbergen, which formed the basis for how the company valued their potential for mining, and the codified importance assigned to Sjögren as Branobel's chief geologist, who, according to the company's rules, was to have the main say in strategic decision-making concerning the expansion of oil exploration to new regions.

Related to this is the importance for resource-based businesses of not only the knowledge generated by scientists and explorers, but also these scientists and explorers as individuals. Resource-extracting companies used the status, reputation, and legitimacy of the explorers and scientists (and the expeditions they had undertaken) as rhetorical tools when seeking to attract investors and market their shares and products. Hence, for example, de Geer's, Nordenskiöld's, and Högbom's positions as well-known scientists actually seem to have been more important to the mining companies in Spitsbergen than the actual knowledge they provided. Their reputation as Arctic scientists rendered their advice to potential investors credible. The explorers assumed pivotal roles as credible information carriers – what Mary Morgan has called 'Chaperones'⁷⁸ – between the scientific, business, and political spheres in the unfolding colonial world order.

While we set out to look at business, science, and exploration, the third key finding in our study pertains to the distinct role played by another actor – the Swedish foreign ministry – in the interaction between scientific and commercial interests. In the African context, the foreign ministry promoted Swedish commercial activity not only by conveying information about business opportunities but also through directly instructing the Congo explorer von Schwerin to investigate the commercial potential of the basin from a Swedish point of view. In the Arctic case, commercial and scientific activities also fused with foreign policy objectives. A. B. Isfjorden wanted the Swedish foreign ministry to claim Spitsbergen as a colony of the Swedish-Norwegian union, in order to protect their investments in the mine. After the dissolution of the union in 1905, Swedish foreign policy actors sought to influence the future legal status of Spitsbergen and therefore supported research activities, land claims, and mining, using them as representations of Swedish effective occupation in negotiations with other states with which Sweden competed for influence: first and foremost Norway. By contrast, in our Russian case, Swedish foreign policy actors are not visible to the same extent. Taken together, these observations call for further research on the interaction between Swedish interests and actors within foreign policy on the one hand, and science and business on the other.

It is interesting to note how the Swedish actors, although we have studied their activities here in three distinct regions, were connected with each other in what appears to have been a fairly tight network of key individuals. These individuals often knew each other from having worked together, from their studies, or simply through association by class, as many of the explorers and businessmen belonged to the upper social echelons. Given the relatively small size of Sweden, the social élite did not comprise a huge number of people. The formation of the SSAG helped to strengthen and formalize these networks, tying together the scientific sphere with

the political and commercial spheres. In our analysis, the most instrumental person for the formation of these networks was, without doubt, Adolf Erik Nordenskiöld. He was not only a pivotal figure in Spitsbergen and Siberia and a source of inspiration for a new generation of scientists and explorers such as Alfred Gabriel Nathorst, Johan Gunnar Andersson, Gerard de Geer, Hjalmar Sjögren, and Sven Hedin, he was also a founding father of the SSAG, through which explorations of new frontiers – such as Africa – were promoted, and he lent von Schwerin equipment for his Africa expedition. Using his reputation, Nordenskiöld not just acted as a *chaperone* in the transmission of knowledge; he was also a *primus motor* in the Swedish exploration of non-Swedish territories in the late 19th century. The significance of these networks, and how they came to link a range of smaller actor-networks and sectors in industry, science, and politics, can hardly be overstated in our study of 19th-century Sweden.

We believe that the confluence of not only science and industry but also foreign policy in Swedish history is a field with great potential for future research. Firstly, it would be interesting to follow up our research regarding the relevant types of knowledge by looking into the period beyond 1914. In our Russian case study, we saw that the Branobel company came to consider scientific knowledge – that is, knowledge that can be generated only through the application of theoretical insights and advanced methods – as crucially important for its business success. It appears probable that the rapid development in the field sciences and related disciplines such as chemistry was bound to shift the balance in terms of relevance from situated, local knowledge towards a greater – though hardly exclusive – role for scientific contributions.

We also believe there is still a lot to unpack and reconsider in the writing of a more holistic and globally centred interpretation of how Sweden found its niche in the world economy and in geopolitics. We are just scratching the surface of what may unfold into a new, wider, narrative about Sweden in the global economy. This narrative would have to emphasize not only the role of Swedish industrial exports but also how the need for resources not available within Sweden itself created an outward drive in the spheres of science, commerce, and politics, and thereby helped to shape Sweden's wider destiny in the modern world.

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Notes

- 1 Barbier, *Scarcity and Frontiers*, 368–462.
- 2 Hobsbawm, *Age of Empire*.
- 3 See, for example, Waller, *Pundits*; McLynn, *Hearts of Darkness*; Stafford, *Scientist of Empire*; Romgard, *Embracing Science*.

- 4 See, for example, Barbier, *Scarcity and Frontiers*; Landes, *Wealth and Poverty of Nations*; Magnusson, *An Economic History of Sweden*; Hughes, *An Environmental History of the World*, ch. 7; Radkau, *Nature and Power*, chs 5–6; McNeill, *Something New under the Sun*.
- 5 Schön, 'Internal and External Factors'; Schön, *En modern svensk ekonomisk historia*; Sjögren, 'Welfare Capitalism'; Jörberg, *Growth and Fluctuations*; Magnusson, *An Economic History of Sweden*.
- 6 Bohlin, *Structural Change*.
- 7 Barbier, *Scarcity and Frontiers*.
- 8 Headrick, *Tools of Empire*.
- 9 Ibid.; Schön, *En modern svensk ekonomisk historia*; Sörlin, *Världens ordning*.
- 10 Ibid.
- 11 Helmfrid, 'A Hundred Years of Geography'.
- 12 Based on titles in the membership list. The 'bulk trader' category refers to the Swedish title 'grosshandlare'. Industrial activity in resource processing refers to titles including the Swedish word 'bruk'. The most commonly used title under this category is 'bruksegare'; that is, an owner of a rural-based industrial works based on logging or mining. Those classified as manufacturing industry representatives used the title 'fabriksidkare'.
- 13 SSAG, *Ymer* 4 (1884), 1–4.
- 14 Drayton, *Nature's Government*; Anker, *Imperial Ecology*; Avango, *Sveagruvan*.
- 15 Ibid.; Wråkberg, 'Det internationella intresset för Arktis'.
- 16 'Protokoll hållet vid sammanträde med de personer hvilka tecknat sig för bildandet av ett Bolag i ändamål att låta bearbeta på Spetsbergen upptäckta koprolitlager, inom Börshuset här i staden den 8 Januari 1872, kl. 5 e.m.', A.E. Nordenskiöld Archive, Royal Swedish Academy of Sciences (KVA), Stockholm; A. E. Nordenskiöld, 'Promemoria rörande förekomsten af fosfatlager på Spetsbergen och förslag om deras tillgodogörande', 4 September 1871, A. E. Nordenskiöld Archive, KVA; see also Cushman, *Guano and the Opening of the Pacific*.
- 17 Liljequist, *High Latitudes*, 43–75; Wråkberg, *Vetenskapens vikingatåg*, 150–8.
- 18 'Protokoll hållet vid sammanträde med de personer hvilka tecknat sig för bildandet af ett bolag i ändamål att låta bearbeta å Spetsbergen upptäckta koprolitlager, inom Börshuset här i Stockholm den 24de November 1871.' Handlingar rörande AB Isfjorden och annan affärsverksamhet 1872–1874, F 05:1, KVA Archives.
- 19 See note 10.
- 20 Wråkberg, *Vetenskapens vikingatåg*.
- 21 Awebro, 'AB Isfjorden och fosforitbrytningen'.
- 22 Liljequist, *High Latitudes*, 264.
- 23 Andersson, 'Några drag af Beeren Eilands'.
- 24 Andersson, 'Spetsbergens koltillgångar'.
- 25 Avango et al., 'Between Markets and Geopolitics'.
- 26 Avango, *Sveagruvan*.
- 27 De Geer to Jernkontoret, 'P.M. Om kolförekomster vid Isfjorden på Spetsbergen af Gerard de Geer 1909', Stockholm, 5 April 1909, vol. 1, 15–21, Spitsbergen Archive, Swedish National Archives (RA), Stockholm; Bertil Högbom, 'Kortfattad redogörelse rörande förberedelser och plan för Spetsbergenexpeditionen sommaren 1910', Uppsala, 16 May 1910, vol. 1, Spitsbergen Archive, Swedish National Archives (RA), Stockholm; De Geer, 'The Coal Region of Spitsbergen'.

- 28 Hoel, *Svalbard*, 224–39, 300–11, 554–557, 586–601; Dole, *America in Spitsbergen*, 233–42; Hartnell, *Arctic Network Builders*, 46–53.
- 29 Avango, ‘Vägen till Braganzavågen’.
- 30 Nordenskiöld, *Vegas färd kring Asien och Europa*, vol. 1, 297.
- 31 Bonhomme, *Russian Exploration*, 70; Nordenskiöld, *Vegas färd kring Asien och Europa*, vol. 1, Introduction.
- 32 Kish, ‘Discovery of the Northeast Passage’, 393.
- 33 Josephson, *The Conquest of the Russian Arctic*, 13; Haywood, *Modernising Lenin’s Russia*.
- 34 See, for example, Tolf, *Russian Rockefellers*, 49–50.
- 35 The Lupikko mine, Tolf notes, was started up by an English industrialist, Alfred Hill.
- 36 Åsbrink, *Ludvig Nobel*.
- 37 Ibid.; Tolf, *Russian Rockefellers*.
- 38 For overviews of the history of the Nobel Brothers Petroleum Production Company, see Åsbrink, *Ludvig Nobel*; Tolf, *Russian Rockefellers*.
- 39 ‘Förslag till organiseringen av förvaltningen i Balakhany’, Hjalmar Sjögren Collection, F2:8, Archives of the Centre for Science History/Centre for Business History, Stockholm.
- 40 See, for example, Hjalmar Sjögren, ‘Om svafvelfyndigheten Deoruta i Kara-Kum-ökenen’, Hjalmar Sjögren Collection, F2:8, Archives of the Centre for Science History/Centre for Business History, Stockholm.
- 41 See, for example, Sjögren, ‘Meddelande om slamvulkanerna i Baku’.
- 42 Hedin, *My Life as an Explorer*, 2.
- 43 Hedin, ‘Om Baku och Apscheronska halfön’; Hedin, *Genom Persien, Mesopotamien och Kaukasien*.
- 44 See, for example, Odelberg, *Vi som beundrade varandra så mycket*.
- 45 In this paper, West Africa includes the Congo.
- 46 See note 7.
- 47 Pakenham, *Scramble for Africa*; Wesseling, *Söndra och härska*.
- 48 See note 8.
- 49 Chamberlain, *Scramble for Africa*.
- 50 Nilsson, *Sweden-Norway at the Berlin Conference*.
- 51 Granlund, *En svensk koloni*.
- 52 Winquist, *Scandinavians and South Africa*.
- 53 Hansen, *Det lyckliga Arabien*.
- 54 See note 52.
- 55 Von Duben, *Resa till Kap*; Winquist, *Scandinavians and South Africa*.
- 56 See the digitized issues of *Ymer* at <http://runeberg.org/ymer>
- 57 Dahlgren, ‘Om svenskarna i Kongo’, 189–237; Tusch-Jenssen, *Skandinaver i Congo*; Helmfrid, ‘A Hundred Years of Geography’.
- 58 Westmark, ‘Om de senaste upptäckterna’.
- 59 Valdau, ‘Om Ba-Kwileh folket’, our translation.
- 60 Von Schwerin, ‘Kongostaten på verldsutställningen’, our translation.
- 61 Valdau, ‘Nya färder i länder’, our translation.
- 62 Gleerup, ‘En resa genom Afrika’, our translation.
- 63 Dahlgren, ‘Om svenskarna i Kongo’.
- 64 Burenstam to the Foreign Ministry, 14 May 1885, 20 June 1885, and 30 June 1885, RA UD 1902/100.

- 65 Swedish National Board of Trade, 'Protocol', 18 August 1885, RA, Kommerskollegium Huvudarkivet/Kollegiets protokoll huvudserie /A I ga/ 1885; Koncept huvudserie/ B II a/ 1885 band 3; Utgående Diarier, huvudserie / C II aa/ 1885, 'Annonser'.
- 66 Makko and Müller, 'Introduktion', 25.
- 67 Themptander to von Schwerin (koncept), 8 September 1885, RA 1902/100, Vol 4618.
- 68 'Sällskapets förhandlingar. Sammankomsten den 25 november', *Ymer* 7 (1887), xix ff.; Persson, 'Skånsk adelsman förste vetenskapsmannen i Kongo'.
- 69 Von Schwerin to the Foreign Ministry, 12 June 1887, RA 1902/100.
- 70 Von Schwerin to Hjelm, September 1887, Schwerin brevsamling, Handskriftsektionen, Lund University Library.
- 71 Dahlgren, 'Om svenskar i Kongo'; 'Sällskapets förhandlingar. Sammankomsten den 25 november', *Ymer* 7 (1887), xi.; Tusch-Jensen, *Skandinaver i Congo*, 211–12.
- 72 Swedish Legation, Brussels, to the Foreign Ministry, 29 March 1898, RA UD 1902/42.
- 73 'Kongostatens indførsel fra Sverige og Norge', RA UD 1902/100/vol. 4619: Skandinaver i Kongo-staten.
- 74 Commerce Collegii årsberättelser, Bidrag till Sveriges Officiella Statistik, for 1870 and 1910.
- 75 Styrelseprotokoll 1887, 1888. Sveriges Allmänna Exportförenings arkiv, A1/styrelseprotokoll.
- 76 Based on official trade data, from Kommerskollegii 1907, 1908, 1909, 1910.
- 77 Ardener, *Swedish Ventures in the Cameroon*.
- 78 Morgan, 'Travelling Facts'.

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