Journal of Northern Studies

Journal of Northern Studies

The *Journal of Northern Studies* is a peer-reviewed academic publication issued twice a year. The journal has a specific focus on human activities in northern spaces, and articles concentrate on people as cultural beings, people in society and the interaction between people and the northern environment. In many cases, the contributions represent exciting interdisciplinary and multidisciplinary approaches. Apart from scholarly articles, the journal contains a review section, and a section with reports and information on issues relevant for Northern Studies.

The journal is published by Umeå University and Sweden's northernmost Royal Academy, the Royal Skyttean Society.

UMEÅ UNIVERSITY

ISSN 1654–5915

Journal of Northern Studies

Vol. 15 • No. 2 • 2021

Published by Umeå University & The Royal Skyttean Society

Umeå 2022

The *Journal of Northern Studies* is published with support from The Royal Skyttean Society and Umeå University at www.jns.org.umu.se

For instructions to authors, see www.jns.org.umu.se

ISSN 1654-5915

Cover picture
Scandinavia Satellite and sensor: NOAA, AVHRR
Level above earth: 840 km
Image supplied by METRIA, a division of Lantmäteriet, Sweden.
www.metria.se
NOAAR. cESA/Eurimage 2001. cMetria Satellus 2001

Design and layout
Leena Hortéll, Ord & Co i Umeå AB
Fonts: Berling Nova and Futura

Contents

Editorial

Professor Lars-Erik Edlund initiated the *Journal of Northern Studies* in 2007. The initiative had been preceded by discussions within the Royal Skyttean Society, Sweden's youngest and northernmost royal academy with a mission to further scientific research on Northern Sweden, at the time presided over by Lars-Erik. The society wished to widen its scope on the international research arena in connection with its 50th anniversary. Lars-Erik was also the prime mover behind an application that resulted in Northern Studies being appointed one of the twelve strong research profiles at Umeå University in 2006. An international academic journal on Northern Studies seemed a logical step to further strengthen this profile at the university. With starting grants from Riksbankens Jubileumsfond and Kempestiftelserna, the Royal Skyttean Society and Umeå University guaranteed financing of the journal for the first eight years, a funding that has been regularly prolonged since then.

Studies on the North and northern conditions have been an essential part of research and education at Umeå University ever since its foundation in 1965. To a certain extent, this is due to the university's location in northern Sweden. However, northern research at Umeå University has never been limited to the study of local issues, nor just a local concern. A further strengthening of Northern Studies at Umeå University was the formation of its Arctic Centre, Arcum, in 2012, a research environment that provided new opportunities for interdisciplinary collaboration. Arcum and its then director, Peter Sköld, assistant editor of the *Journal of Northern Studies*, were also crucial in the setting up of the Arctic Five in 2017, a partnership between five Nordic universities in the northern parts of the countries involved, namely Luleå University of Technology, UiT The Arctic University of Norway, Umeå University, the University of Lapland and the University of Oulu. Together they form a knowledge hub on Arctic research issues. The *Journal of Northern Studies* is a vital part of this hub, and we aim to make this participation more formalised in the near future.

Since the foundation of the *Journal of Northern Studies*, the North and the Arctic have become more topical than ever before, both in research and in world politics. Global warming, which affects the polar areas more than any other parts of our planet, is causing a multitude of changes, some of which are already observed, some predicted and some that may, as yet, be unforeseen: melting glaciers and the rising of global sea levels; growing accessibility of the Northern Sea Route causing increased political tension and competition in the Arctic; new opportunities for Arctic tourism with its advantages and drawbacks; changes in flora and fauna affecting people's livelihoods and environments; the northward spreading of infectious diseases; migration and demographic alterations, etc. The call for a turn towards a more sustainable global society in the face of climate change has in some places led to a renewed industrialisation of northern areas (while, at the same time, some old industries are operating at an undiminished pace). New and old extractive industries resonate of earlier colonial exploitation, which has sparked protests from local and indigenous peoples of the North. Globalization and environmental issues have also become an impetus for northern indigenous peoples to connect with other indigenous peoples worldwide, making the indigenous movement not just a local concern.

The North faces many challenges, and so do researchers attempting to understand it. The North is not desolate and bare, but a complex and versatile social and natural environment. Therefore, in order to come to an understanding of it, we need multifaceted research that can shed light on various aspects such as the past and the present, cultural and linguistic diversity, humans' diverse attempts to make a decent living in a northern

environment, and changing politics and technology. The purpose of the *Journal of Northern Studies* is to be a venue for such diverse research.

The *Journal of Northern Studies* is a peer-reviewed inter- and multi-disciplinary academic journal. While the scope of the journal is quite wide, it has a special focus on human activities in northern spaces—on humans as cultural beings and on human societies in the North and their interaction with northern environments. Over the years, the journal has published articles by scholars from disciplines as varied as archaeology, anthropology/ethnology, ecology, economic history, ethnobiology, geography, history, history of science, linguistics, literature, political science, religious studies, social medicine and sociology. The range of topics covered in the journal include, for example, climate and environment, demography and migration, historical maps, human–animal relationships, media and photography, polar expeditions, politics, public health, runology, and tourism. Some themes are more recurring than others, e.g., issues involving indigenous peoples (especially, but not exclusively, the Sami) and industry and commerce. About half of the articles published so far concern historical topics (before 1970). A majority of the researchers who have contributed to our journal have been affiliated to Swedish or other Nordic universities. However, one fifth of the contributors are affiliated to other European universities, and another fifth to North American universities. We have also had contributions from scholars in Australia, Japan, and New Zealand.

We warmly welcome guest-edited special issues by cross-disciplinary research groups. So far, we have published some ten special issues: "Cultural Production and Negotiation of Northern Borders" (Vol. 3, No. 1), "Norrland Authors Seen from Abroad" (Vol. 8, No. 1), "Understanding North" (Vol. 8, No. 2), "Nations, Natures, and Networks. The New Environments of Northern Studies" (Vol. 9, No. 1), "Indigenous Wellbeing and Colonisation" (Vol. 10, No. 1), "Language and Space in Northern Spaces" (Vol. 11, No. 1), "The Making of the European Arctic" (Vol. 12, No. 2), "Beyond Melt. Indigenous Lifeways in a Fading Cryosphere" (Vol. 13, No. 2) and "Tracing the Arctic; Arctic Traces" (Vol. 14, No. 2). In addition, Vol. 12, No. 1 was a festschrift in honour of one of our board members, Håkan Rydving.

The journal also has a miscellanea section with notes on conferences, projects and obituaries of deceased colleagues. The book review section is usually extensive—we have published nearly 300 reviews of new books on various topics related to Northern Studies. The fact that prominent publishing houses such as, e.g., Ashgate, Brill, Novus Forlag, Palgrave Macmillan, Studia Fennica and many others, keep sending us new books for review, shows that our reviews reach relevant readers.

Over the course of the publication of no less than 15 volumes (two issues per year), Lars-Erik Edlund has been the driving force behind the journal, pushing it forward with his enthusiasm, editorial skills and rich networks in the academic community. He has now decided to retire as editor-in-chief as the journal moves on to the next level, with a slightly new organisation. Both personally and on behalf of all who have contributed to the *Journal of Northern Studies* over the years (financiers, art directors, authors and the editorial board), I wish to extend my warmest thanks to Lars-Erik for his long-standing work with the journal. Luckily, however, his retirement from the editorial chair does not mean that he will no longer be involved in the journal, as he will remain as the journal's book review editor.

Olle Sundström
Editor-in-chief
Journal of Northern Studies
Umeå University
Sweden
olle.sundstrom@umu.se

CORNELIA LÜDECKE

German-Soviet Cooperation in the Arctic during the Weimar Republic

Friedrich Schmidt-Ott's contribution

ABSTRACT Without Friedrich Schmidt-Ott, President of the Notgemeinschaft der Deutschen Wissenschaft/Emergency Association of German Science (today: Deutsche Forschungsgemeinschaft/German Science Foundation), and his good personal relations, favoured by the Treaty of Rapallo, German-Soviet-Russian cooperation in the Arctic would not have been conceivable in the early 1930s. It will be shown in this article how he helped to set up the International Study Association for the Exploration of the Arctic Region by Airship (in short: Aeroarctic), bringing researchers from Germany and the Soviet Union together again in an international research community while both countries were excluded from the International Research Council. The aim was to open up an Arctic transport route with airships. On the Soviet side, the polar researcher Rudolf Samoilovich played an important role in the preparation of the Arctic expedition of the LZ 127 *Graf Zeppelin*, which was planned by the Aeroarctic under Fridtjof Nansen and carried out after his death by Hugo Eckener together with the scientific director Samoilovich. In addition, Samoilovich facilitated the participation of German geophysicists in Soviet expeditions during the Second International Polar Year (1932–1933). Kurt Wölken carried out seismic ice thickness measurements on Novaya Zemlya, while Joachim Scholz determined air electricity and ultraviolet radiation on Franz Joseph Land and observed polar lights. In addition, both investigated sound propagation in the high atmosphere. Their different fates during the Third Reich are also revealed. It was not until 1998 that joint German-Russian research projects in the Arctic were resumed again.

KEYWORDS Trans-Arctic airline, northern sea routes, Aeroarctic, LZ 127 *Graf Zeppelin*, Arctic expedition, Second International Polar Year, Novaya Zemlya, Franz Josef Land, Rudolf Samoilovich, Joachim Scholz, Kurt Wölken

Introduction

> On the evening of 27 July [1931] [...] we approached the southern coast of Franz Josef Land. Delicate light blue hues of the sky were reflected in the motionless sea, and the yellowish, cold rays of the sun glowed in dazzling brilliance on the snow cover of the continental ice. Then the so-called Silent Bay [Tikhaya Buchta] opened up in front of us, on the shore of which we had built a geophysical observatory and a radio station two years ago. The airship began to descend slowly and steadily until the keel of its gondola touched the lead-grey, cold water. A boat quickly approached from the ice-breaker "Malygin." There was the head of the station Ivanov, my young assistant, who had already spent a year and a half at this station as its head, there was General Nobile and others. [...] Fifteen minutes later we went up again to make a photogrammetric survey of the least known parts of the archipelago. [...] We found that the islands of [H]armsworth and Albert Eduard did not exist. But when we had finished taking the photographs and turned north across the British Channel, we discovered some new islands. (Samoilowitsch 1931: 566–567)

The airship expedition of the International Study Association for the Exploration of the Arctic Region by Airship explored the geographical and geodetic conditions of the Russian Arctic from 26 to 30 July 1931 on board the LZ 127 *Graf Zeppelin* after taking off from Leningrad (today: St. Petersburg) (Samoilowitsch 1933: 27–28). In particular it made a survey of the island world of Franz Joseph Land with a focus on Alexandra Land as well as Severnaya Zemlya and Novaya Zemlya. En route, meteorological, aerological and magnetic measurements were systematically carried out and aerophotogrammetric photographs were taken with series measuring cameras to produce maps. In the process, the airship, which flew at an altitude between 200 and 1,000 meters, proved to be an excellent research platform in the air. A distance of 10,700 kilometers was covered non-stop on the round trip in 105 hours and 17 minutes. This expedition represented the first German-Soviet-Russian cooperation in the Arctic, in which other nations were also involved.

What internal and external conditions promoted this international project? Which special political or scientific circumstances played a role and how did personal contacts and interests affect it? I do not want to go into deeper detail concerning internationalism in science between the Soviet Union and the western world after the First World War, but focus on German-Soviet projects.

The following section will describe in more detail how the Arctic voyage of the LZ 127 *Graf Zeppelin* came about as well as the research projects that followed on from it during the Second International Polar Year (1932–1933) and their further effects.

Planned Trans-Arctic Air Connections

During the First World War, the development of airships advanced rapidly. They could cover long distances and transport a reasonably great weight, which was far beyond the possibilities that planes offered, although they were faster. In consequence, ideas soon arose after the war to connect the major cities of the continents via suitable flight routes for airships. In 1919, the retired Berlin airship pilot Captain Walter Bruns (1889–1955) proposed a direct route across the Arctic, which would make it possible to fly on an ideal route from Berlin via Leningrad, the Russian Arctic and a hub on the easternmost Aleutian island of Unimak to Tokyo or San Francisco (Fritzsche 2018; Kohlschütter 1927). To prepare such a flight connection, however, a feasibility study was first to be carried out, as no one had ever dared to pilot airships far into the Arctic at that time.

The attempts of the American journalist Walter Wellman (1858–1934) to fly to the North Pole with a dirigible from Spitsbergen in 1906, 1907 and 1909 were not successful (Nelson 1993: 278–279). In the summer of 1910, a study trip of the German Arctic Zeppelin Expedition to the west coast of Spitsbergen had revealed that far too little was known about the weather conditions in the far north to plan a safe airship flight (Miethe & Hergesell [eds.] 1911). Count Ferdinand von Zeppelin (1838–1917) nevertheless had a clear vision after his return from Spitsbergen that it would be possible in the future to perform flights by zeppelins to explore the Arctic (Zeppelin 1911). In order to obtain the weather information from the high atmosphere necessary for the planning of such expeditions, a geophysical observatory was established in 1911 on Spitsbergen at Advent City (today: Longyearbyen) and in 1912 it was moved to Ebeltofthamna on Mitrahalvøya. The observatory was operating continuously with a new crew of observers each year (Hergesell [ed.] 1914).

At this first permanent Arctic observatory, aerological ascents were carried out as often as possible with tethered balloons and kites to which self-registering measuring instruments for air pressure, temperature and humidity were fixed. Wind direction and speed could be determined by observing so-called free-flying pilot balloons with theodolites. However, these investigations came to an end with the outbreak of the First World War (Dege 1962).

Bruns' activities were initially concentrated to Berlin, where, among others, the German-Russian polar researcher and polar chronologist Leonid Breitfuß (1864–1950) was living (Schennerlein 2018: 32–33; Lüdecke 2001; Kohlschütter 1927). Breitfuß was committed to Bruns' plan (Fig. 1). Before leaving Russia, Breitfuß had been head of the Murman Expeditions and the meteorological and oceanographic department at the Ministry of the Navy and thus he not only brought a lot of his Arctic experience to the table but also his contacts with Soviet scientists.

In 1922, Bruns finally succeeded in gathering Berlin scholars and aeronautical experts together in a committee that was to push the project further. The president of the Notgemeinschaft der deutschen Wissenschaft (Emergency Association of German Science, today: Deutsche Forschungsgemeinschaft/ German Science Foundation) Friedrich Schmidt-Ott (1860–1956) also supported the committee with both advice and deeds.

Fig. 1. Leonid Breitfuß in 1936. Source: Herrmann 1949: 3.

Schmidt-Ott and German-Soviet Relations

Conducting a feasibility study in the Russian Arctic required scientific cooperation not

only at the international but also at the political level. The conditions for such cooperation were favourable before the First World War, as 21 academies based in 14 European nations and the USA were members of the International Association of Academies (Kevles 1971: 48). Especially prominent among the four German members was the Berlin Academy. All scientists were part of an international community. They met at conferences and exchanged publications. However, when Germany started the gas war and deployed submarines in 1915, the attitude toward German scientists changed abruptly and the end of international science was predicted.

After the First World War, every effort was made during the Weimar period to ensure that Germany and Russia could no longer build up military power and thus these nations were not included in the newly founded international scientific council, the so-called International Research Council (Forman 1973: 157–158, 161). Under no circumstances, would *Wehrkraft* ['military power'] and science, Germany's great flagships before the war, be allowed to gain strength again, especially science in the notion as a *Macht-Ersatz* ['power substitute']. As early as 1909, Schmidt-Ott (then called Schmidt), was of the opinion that a

> decline in Germany's scientific prestige reacts upon Germany's national repute and national influence in all other fields, leaving entirely out of account the eminent importance for our economy of superiority in particular fields of science. (Schmidt cited in Forman 1973: 161–162)

Besides, German *Kulturpolitik* ['cultural policy'] was "one of the few instruments of an active foreign policy remaining to Germany" (Forman 1973: 166). Against this background, economic relations between Germany and the Soviet Union were initiated as early as 1920 (Zeidler 1994: 47).

Schmidt-Ott, who became the president of the German Society for the Study of Eastern Europe in February 1920, did everything in his power to continue the German-Russian scientific relations that had already been established before the First World War (Schmidt-Ott 1952: 169, 174 ff.). Not only did the Soviet government attach great importance to these scientific contacts, but Russian scholars also greatly welcomed the continuation of personal exchanges. Schmidt-Ott, who had also been appointed president of the Emergency Association of German Science at the end of October 1920, kept the promotion of German-Soviet relations in mind when he was given a budget of three million gold marks in 1924 to support young researchers and promising research projects. The combination of both offices in one person was to prove very beneficial for the projects that followed.

A promising economic start was made as early as 1921 with the founding of the German-Russian Air Transport Company (Deruluft), which consisted of a merger of the Aero-Union and the Soviet government (Pollog 1934: 50). Aero-Union was a merger between HAPAG (Hamburg-Amerikanische Packetfahrt-Aktien-Gesellschaft, Luftschiffbau Zeppelin and AEG (Allgemeine Elektricitäts-Gesellschaft). After some preparations, the first scheduled flight to carry mail and official passengers between Königsberg in East Prussia, Smolensk and Moscow took place on 1 May 1922.

German-Soviet Russian relations were officially favoured by the Treaty of Rapallo, which was concluded between German and Soviet Russian representatives on 16 April 1922, on the sidelines of the unsuccessful World Economic Conference (Rapallo 1922). This marked the beginning of a new era of diplomatic relations between the two states on the basis of mutual equality. Reparations claims were cancelled in favor of supporting new economic relations. In addition, German-Soviet military relations were developed

in secret, leading to cooperation between the two nations' air forces beginning in 1924 (Zeidler 1994: 34–59, 64, 89–97). This was preceded by the establishment of a Junkers plant in Fili, a suburb of Moscow, aimed at reviving Russian aircraft production with the help of German know-how, namely, Junkers' metal construction methods. Scientific ties were also strengthened when, for example, the German Physical Society appointed physics professor Orest Chwolson (1852–1934) from Leningrad as its first honorary member in 1922 (Formann 1973: 167). It was also ensured that Russian articles appeared in German scientific journals.

The invitation to the celebration of the 200th anniversary of the Academy of Sciences in Leningrad in September 1925 provided Schmidt-Ott with an excellent opportunity to establish personal contacts with Soviet scientists on site (Schmidt-Ott 1952: 217 ff.). Especially valuable in this regard was a meeting with Trotsky's sister Olga Kamenev (1883–1941), the president of the Society for the Cultural Connection of the Soviet Union with Foreign Countries. She was very pleased with Schmidt-Ott's concern to promote mutual relations through publication exchange, invitations to lectures by specialized scholars, and mutual dialogues at congress events. Coincidentally, it also happened that Schmidt-Ott was able to explain the aims of the Notgemeinschaft to the Soviet head of state Mikhail Ivanovich Kalinin (1875–1945). Kalinin himself had already contemplated a beneficial residence in the Soviet Union for German scientists and technicians. Schmidt-Ott, however, propagated joint research projects for the benefit of both states from the very beginning. Following this exchange of ideas, he was able to discuss his proposals with representatives of the Soviet Academy of Sciences, and an agreement was reached on joint expeditions and the sending of Soviet fellows to German institutes. The first concrete action was the joint planning and implementation of the Alai-Pamir expedition led by Nikolai Petrovich Gorbunov (1892–1938), First Secretary of the Council of People's Commissars. The expedition consisted of eleven Soviet and eleven German members, who in 1928 would discover the Notgemeinschaft Glacier near the 77 kilometers long Fedchenko Glacier.

Further very good contacts were established in the course of time with the Director of the Institute for the Exploration of the North (in 1930 changed into Arctic Institute), Rudolf Samoilovich (1881–1939) and his later successor at the Arctic Institute, geophysicist Otto Schmidt (1891–1956), who visited Schmidt-Ott several times in Berlin.[1] Samoilovich had first studied at the Mining Academy in Freiberg/Saxony and then devoted himself to the exploration of the Russian Arctic. It was not only his knowledge of German that made him an extremely valuable partner in the airship project.

The deepening of German-Soviet cooperation happened especially in 1927 through personal encounters during the "Russian Explorer Week" in Berlin (Treue 1989: 236). During Schmidt-Ott's later visit to Georgia in 1928, a working partnership between Georgia and the Notgemeinschaft was agreed, in particular on the mutual secondment of young scientists to specialized institutes (Schmidt-Ott 1952: 242, 246). Overall, Schmidt-Ott's relations with the Soviet Union were considered particularly good, so his recommendations were gladly received.

Activities of the Aeroarctic

In 1924, Schmidt-Ott was visited by representatives of a Committee for the Exploration of the Arctic by Airship to discuss the concrete promotion of Zeppelin flights to the Arctic (Schmidt-Ott 1952: 307). A small scientific committee was formed, which Schmidt-Ott also asked the Zeppelin shipyard in Friedrichshafen, represented by its director Hugo

Eckener (1868–1954), to join. After the successful preliminary work of the committee, the International Study Association for the Exploration of the Arctic Region by Airship (from 1928: International Study Association for the Exploration of the Arctic Region by Aircraft), in short, Aeroarctic, was finally founded on 7 October 1924 (Studiengesellschaft 1924; Lüdecke 1995: 168–169). The presidency was offered to the old master of polar research, Fridtjof Nansen (1861–1930), who, through his work as the League of Nations Commissioner for Refugee Affairs, had campaigned for the repatriation of prisoners between the German Empire and Russia, as well as for aid measures for the Russian famine regions, and had been awarded the Nobel Peace Prize for this in 1922. Nansen's presidency was intended to signal to the global world that the association, as well as the planned airship expedition, was an extremely peaceful endeavour and by no means an illegal reconstruction of the German air force, which was shattered after the war.

Through previous targeted advertising, the founding memorandum "The Airship as a Means of Research in the Arctic" already listed 111 members from twelve countries, including the Soviet Union, Scandinavia, some European states, as well as Japan and the United States of America, among them the famous aircraft designer Hugo Junkers (1859–1935) from Dessau (Studiengesellschaft 1924: 16–20).

The memorandum outlined all the prerequisites for carrying out an exploratory flight to the Arctic. In assessing the most favorable time for an airship expedition, they could draw on the meteorological data from the German Observatory in Spitsbergen from the years 1911–1914.

Instead of the previous 29 travelling days on the Hamburg via San Francisco to Yokohama shipping route, the flight time via the trans-Arctic route to Yokohama would only be five and a half days and to San Francisco only six days, which was a tempting time saving compared to the ship journey. The fare, on the other hand, would only be 25 percent higher than that for a journey by steamer. This put Arctic air travel in a thoroughly realistic light.

On 12 October 1924, 432 years after Columbus disembarked in America, Eckener left Friedrichshafen on board LZ 126 (American name: ZR 3), the first zeppelin built after the war, to deliver it to the United States of America as part payment of the financial war reparations (Eckener & Italiander 1979: 25–30). The first trans-ocean flight of 3,800 kilometers between Europe and America was very successful and a huge, excited crowd awaited LZ 126's arrival in Lakehurst. This event proved, on the one hand, that the zeppelin could be used for long-distance flights and, on the other, that the flight was seen as a peace mission and a technical tour de force, as evidenced by the triumphant reception in New York.

Another event went through the world press the following year. On 21 May 1925, Roald Amundsen (1872–1928) took off from Spitsbergen with two Dornier-Wal flying boats in the direction of the North Pole (Amundsen 1925). However, one airplane had to make an emergency landing at 88 °N. Fortunately, with the help of the second airplane, all expedition members could be rescued. Long distance flights in the Arctic were still seen as dangerous for planes.

Although the ocean flight of ZR 3 was regarded as milestone in Germany, representatives of the government were very reluctant to finance the building of another airship as they favoured airplanes (Eckener & Italiander 1979: 39–47). "The main reason was that the airplane had great military value, while the airship had already played out its military role by the end of the First World War." (Eckener & Italiander 1979: 46). Thus, Eckener had to find other financial support for the construction of a new airship.

In order to further promote the Aeroarctic airship expedition to the Arctic, Schmidt-Ott took part in a promotional event organized by the Zeppelin shipyard at the Kurhotel in Friedrichshafen in August 1925 (Schmidt-Ott 1952: 307–308). On the occasion of the 25th anniversary of the first Zeppelin airship, a "People's Zeppelin-Eckener Donation" was launched to provide the financial means needed to build a new airship (LZ 127) in Germany. Besides, this airship could be also used for Aeroarctic's feasibility study. Schmidt-Ott held an "Appeal to the German People for the Implementation of the North Polar Plan" and also took over the sponsorship of the collection. Eckener and Schmidt-Ott hoped to generate interest in the project which could further strengthen the national pride after the successful flight of ZR 3.

In the run-up to the First Ordinary Assembly of the Aeroarctic in Berlin, Breitfuß considered it urgently necessary to establish a Soviet national group (Schennerlein 2018: 33–35). This only happened after Gorbunov had vehemently advocated for it even before leaving for the Pamir expedition and also suggested suitable scientists from the fields of meteorology, scientific technology and aeronautical engineering. During the meeting of the Aeroarctic, which, after a postponement, finally took place on 16 November 1926 at the Aeroclub von Deutschland in Berlin, four German and five Soviet participants discussed the necessary weather briefings for the research flight, which were to be provided primarily by the Russian side (Berson & Breitfuß 1927) (Fig. 2).

Fig. 2. Participants at the welcome evening of the first ordinary meeting of the Aeroarctic on 9 November 1926 at the Aeroclub, Berlin. Front row from left to right: Albrecht Penck, Johann Schütte, Fridtjof Nansen, Ernst Kohlschütter, Gustav Hellmann. Second row from left to right: Captain Krupp, Arthur Berson, Walter Bleistein, Captain Walter Bruns, Heinrich von Ficker, Georg Wegener, Major von Kehler. Source: Nicklas, Frankfurt.

Weather stations on Novaya Zemlya and Franz Joseph Land were already being planned and the then Director of the German Naval Observatory (Hamburg), Vice-Admiral Hugo Dominik (1872–1933), wanted to provide measuring equipment for these stations from his holdings. In this context, Breitfuß even suggested a repeat on an extended scale of the international Polar Year of 1882–1883, when twelve meteorological and magnetic stations

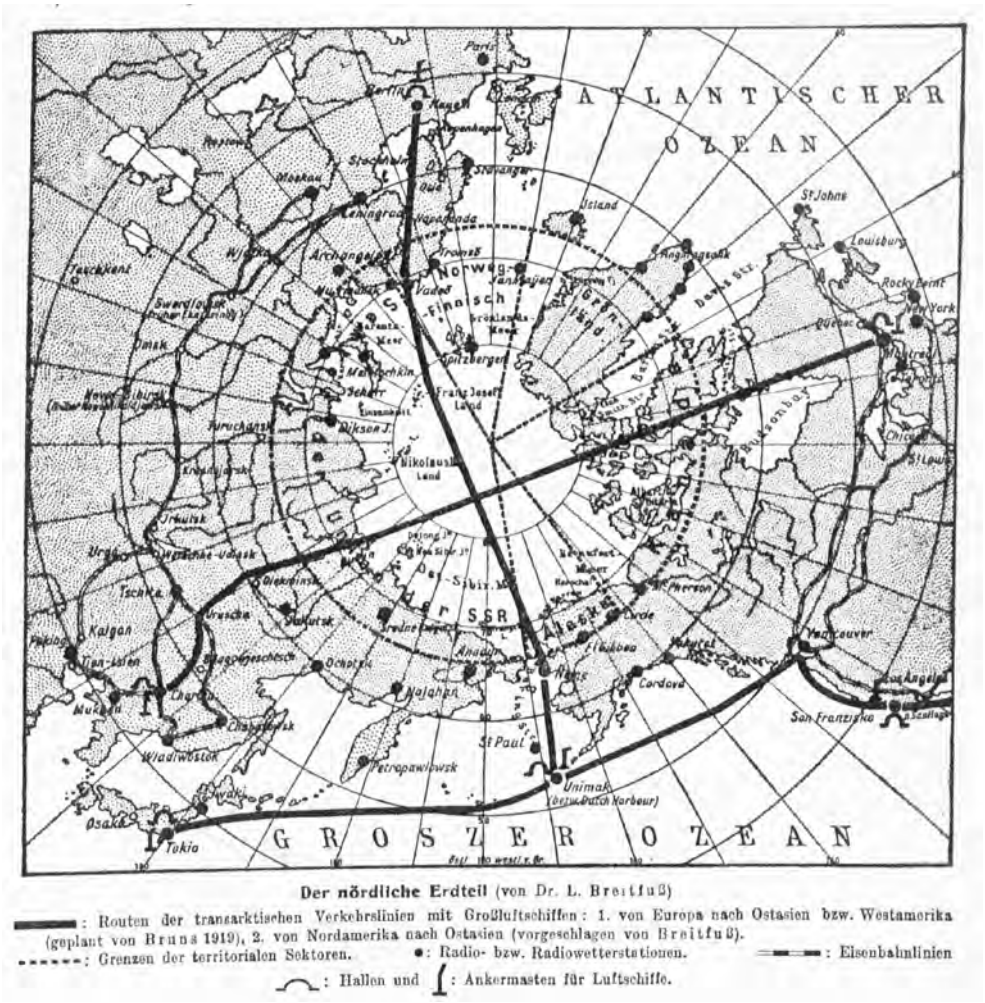

Fig. 3. Leonid Breitfuß's map of the Arctic with his proposed sector divisions, railway lines and planned routes of trans-Arctic transport lines by airship. 1) Brun's proposal from 1919: from Europe via Unimak to East Asia and the west coast of North America. 2) Breitfuß's proposal: from eastern North America to East Asia. The required anchor masts for airships and airship hangars are marked at the end points of these routes. The black dots indicate radio and radio weather stations. Source: Breitfuß 1928: 27.

had been set up around the Arctic for the duration of a year (Berson & Breitfuß 1927: 111–112). Dominik's colleague Johannes Georgi (1888–1972) supported Breitfuß and pleaded for the establishment of aerological stations around the Arctic Ocean to measure the meteorological conditions of the high atmosphere. This meeting was in fact the catalyst for the implementation of the Second International Polar Year 1932–1933, which was then successfully propagated by Dominik in relevant international organizations such as the World Meteorological Organization (Lüdecke & Lajus 2010: 141 f.).

Another interesting aspect is Aeroarctic's idea of to form "an international political-scientific union" in the League of Nations "for the permanent geophysical monitoring of the Arctic" (Nansen *et al*. 15 Sept. 1927: 165–166). The members of the union were to consist of the country chairmen of the Aeroarctic, who would be vested with powers by their governments. This would allow an Arctic observing network to be permanently financed and secured. However, this proposal could not be pursued.

In 1926, the Amundsen-Ellsworth-Nobile expedition proved that long-distance flights with airships were possible in the Arctic (Amundsen & Ellsworth 1927). Amund-

sen was indeed the first to cross the North Pole on his way from Spitsbergen to Alaska, accompanied by his financier Lincoln Ellsworth (1880–1951), the Italian officer and engineer Umberto Nobile (1885–1978), and the Italian-Norwegian crew on the airship *Norge* built by Nobile. Two years later, on 25 June 1928, Nobile's airship *Italia* crashed northeast of Northeast Land (Svalbard) on the way back from the North Pole with only eight of 16 participants surviving (Nobile *et al*. 1929).

Both events influenced the further planning of the Aeroarctic, which was discussed at the second meeting in Leningrad from 18–13 June 1928 (Lüdecke & Lajus 2010: 144–145). It was precisely the crash of the *Italia* and the rescue by the Soviet icebreaker *Krassin* in mid-July that supported the intensification of Arctic research in the Soviet Union, for which a special commission was established.

The subsequent Soviet five-year plan included the requirement to establish radio stations and meteorological-hydrographical stations along the northern sea coast and on remote Arctic islands with the aim of opening the northern sea route (Northeast Passage) to traffic. In this context, Breitfuß published a proposal for sector divisions in the Arctic as a "basis for internationally accepted demarcations," first in Russian in 1927 and in 1928 in German (Breitfuß 1928: 27–28; Schennerlein 2018: 39) (Fig. 3).

The Airship Expedition of the LZ 127 *Graf Zeppelin* in July 1931

When Nansen, the president of the Aeroarctic and expedition leader, died unexpectedly of a heart attack on 13 May 1930, Eckener was asked to succeed him and lead the planned airship expedition to success in 1931 (Eckener & Italiander 1979: 165–188; Rackwitz 1958: 216–248). However, due to the postponement of the expedition, more money had to be collected to finance it. A bright idea for raising money again came to Eckener when he heard about a planned expedition of the icebreaker *Malygin*, which was to make a supply trip to the meanwhile established meteorological station on Franz Joseph Land in July 1931 and then explore the northern surroundings in more detail. The exchange of mail bags between the airship and the icebreaker would excite polar philatelists from all over the world and the fees charged for this would be an additional source of income.

The Soviet national group had long since grown to become the second strongest national group after Germany (Schennerlein 2018: 35). Samoilovich, who had led Nobile's rescue on board the icebreaker *Krassin* in 1928 and had since been regarded as an Arctic authority, was now entrusted with the scientific leadership of the Zeppelin flight, not only for reasons of parity and because a large part of the route went over Soviet territory, but also because it was hoped that he would successfully carry out a comprehensive research programme (Berson, Samoilowitsch & Weickmann [eds.] 1933; Felden 1986: 138). A total of six German scientists, two Americans, including the polar-experienced Ellsworth, three Soviet scientists and one Swede took part in the expedition. During the flight, the Russian meteorologist Pavel Molchanov (1893–1941) was responsible for carrying out aerological measurements with a radiosonde he had developed, the data of which were needed for current weather forecasts on board the LZ 127 *Graf Zeppelin*. The innovative radiosonde system, which was still being tested, consisted of a balloon filled with gas and an instrument attached underneath to measure air pressure, temperature and humidity, with the measuring data being sent by radio to a receiver on the airship. The special feature of the new measuring system was that a weight was attached to the radiosonde before launch. After being released through an opening in the hull of the

airship, the sonde first fell downwards until the weight was blown off by an automatic ignition. Then the actual radiosonde ascent began from close to the ground upwards, so to speak. In this way, it was even possible to measure meteorological data from the altitude range between the airship and the earth's surface before the balloon carried the measuring device beyond the airship into the stratosphere, where it then burst and the measurements were repeated until the measuring device hit the earth's surface (Fig. 4).

Fig. 4. Preparation for the balloon launch. On the left, the meteorologist Ludwig Weickmann and on the right, the developer of the radiosonde Pavel Molchanov. Source: Lüdecke Collection.

Three of the four radiosonde ascents reached an altitude of more than 16 kilometers into the stratosphere. Another scientific task of the expedition was to explore the region between Franz Joseph Land and Nordland (Nikolaus II Land), as it was thought that there were unknown islands in this area. In particular, the island archipelago of Severnaya Zemlya, which had been discovered by Russians as recently as 1913, was to be mapped aerophotographically. This was of particular importance with regard to Soviet claims of ownership (Schennerlein 2014; Schennerlein 2018: 38) (Fig. 5).

> In Leningrad, everything that constitutes the "comfort" of the transport airship was left behind. From now on we eat from paper plates and sweep our cabins ourselves. All available space and all saved weight are used to carry the scientific apparatus for radio telegraphy, photography and film, geodesy, meteorology and magnetometry.
>
> Soon after leaving Leningrad, we are hovering above forests, rafts drifting on rivers towards the White Sea, in places we can't see the river for the trees. Arkhangelsk is the most important timber stacking point. The Barents Sea is ice-free and still shimmers bottle-green through the bright Arctic night. For us newcomers, it is a strange feeling to see the sun in the middle of the night; it pours an unreal yellow light over the sea, which is increasingly covered with ice floes.
>
> The Russian icebreaker *Malygin* is waiting for us off Franz Josef Land. We steer for it, supported by mutual radio direction finding. The evening sky, if you can call it

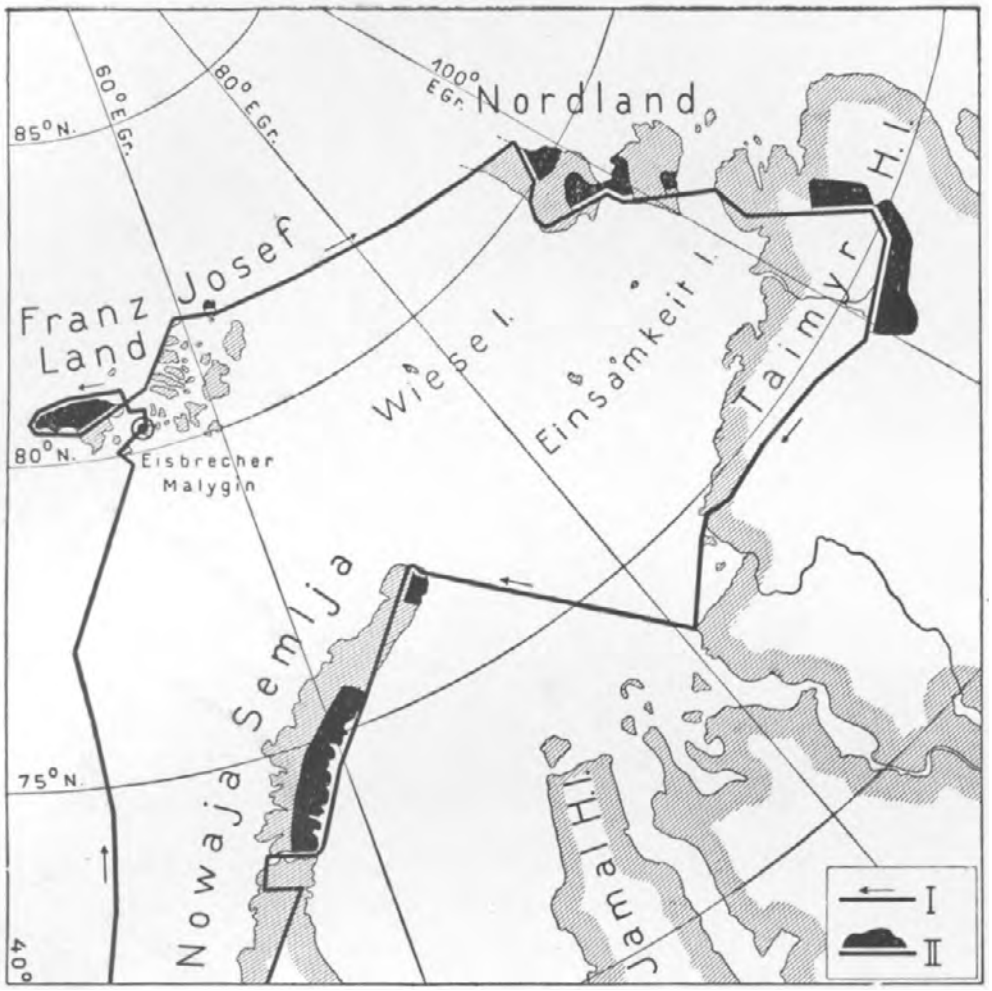

Fig. 5. Route of the LZ 127 *Graf Zeppelin* in the Russian Arctic (I) and areas mapped with the Zeiss Aerotopograph (II). Source: Berson, Samoilowitsch & Weickmann [eds.] 1933: Tf21, Fig. 5.

that, shows wonderful hues when we meet the Russian steamer in the late afternoon of 27 July in the Silent Bay of Hooker Island. As *Graf Zeppelin* slowly descends and then floats on its gondola buffers between floating ice floes, a boat detaches itself from the *Malygin*. A man in a fur hat stands tall in the stern, I recognize through the binoculars the unfortunate Nobile, whom fate had consigned to the Russians after the sinking of his second polar [air] ship *Italia*.

The boat lies alongside our guide gondola, we hand over the mailbags and photos destined for the steamer. One hand reaches out to Nobile: that of his polar companion Ellsworth, who is taking part in our research trip. Both are visibly moved, the rest of us also feel the tragedy of the Italian, with whom we had many a technical discussion in Friedrichshafen. [...]

The ice floes are about to approach curious polar bears, Eckener is getting restless because the buffer we are floating on can't take much strain. We bid a brief farewell to Nobile and the Russians and continue our journey along the coastal islands of Franz Josef Land. We discover that [H]armsworth Island and Albert Edward Island do not exist at all, despite all the maps. North of Franz Joseph Land, there is again nothing but pack ice. Professor Moltschanow, an excellent Russian scholar and a quiet, amiable man, eagerly sends his recording balloons into the stratosphere.

We turn east towards Nicholas II Land, now called Nordland. Glacier peaks almost a thousand meters tall rise above the sea of fog. Uncharted island territory is

> spotted. Continuing the exploration is rendered impossible by the ever-thickening fog. We therefore head south to the Taimyr Peninsula, where herds of wild reindeer flee from us, survey Lake Taimyr and discover previously unknown mountains. Later we drop mail and newspaper packages over the Dickson radio station at the mouth of the Yenisei. The six men who make up the station stand in front of their modest huts and look longingly at us as we turn west, back to inhabited lands and their culture.
>
> *Graf Zeppelin* crosses the Kara Sea, heading for the large double island of Novaya Zemlya, whose rocky mountains and glacial fractures drop a thousand meters into the sea, which is ice-free again here. Guillemots, similar to the penguins of the southern polar ocean, waddle on the cliffs and seagulls fill the air like snow flurries. Then we are back on the old route: Barents Sea, Arkhangelsk, Leningrad, Berlin, Friedrichshafen. We didn't need our sledges and weapons. (Lehmann 1936: 300–302)

The research voyage had gone smoothly thanks to the comprehensive weather briefings, so there had been no emergencies. Samoilovich summarized that the expedition had achieved a feat in about four and a half days which an icebreaker would need two to three years to complete (Felden 1986: 150 f.). The usefulness of airships for Arctic research was thus proven. In addition, the entire Alexandra Land in the west of Franz Josef Land as well as coastal areas of Novaya Zemlya and the still little explored Nordland were photogrammetrically recorded. The results of the research trip were published in 1933 and supplemented by new detailed maps of Novaya Zemlya and Severnaya Zemlya (Berson, Samoilowitsch & Weickmann [eds.] 1933). However, the evaluation of the entire material was prevented by a lack of financial means (Gruber 1933: 71). Although it had previously been stipulated that all results should also be handed over to the Soviet Union, the aerial photographs were probably withheld and not forwarded (Papanin 1981: 113–114; Schennerlein 2014: 79).

The seizure of power by the National Socialists and the change in research policy prevented the further pursuit of the planned trans-Arctic commercial airline. Finally, the crash of the "LZ 129 Hindenburg" on 6 May 1937 ended the era of airships.

German-Soviet Cooperation during the Second International Polar Year (1932–1933)

After their successful Arctic voyage, the expedition members gave numerous lectures about their experiences and results. When Samoilovich was invited to Freiburg/Breisgau in this context, he casually mentioned in his report that the Soviet Union was looking for German scientists for polar research (Mittelstraß 19 Nov. 1931). It was a good opportunity, because the repeat of the International Polar Year of 1882–1883 after 50 years, originally proposed by Breitfuß at the time, was indeed to be implemented with the support of the International Meteorological Organization (today the World Meteorological Organization) and the International Union of Geodesy and Geophysics from 1932–1933 (Lüdecke & Lajus 2010). Facilitated by international participation, meteorological and magnetic measuring stations were again to be set up in the Arctic. Their task was to investigate, using new kinds of measuring instruments, in particular the meteorological conditions in the high air layers and the air currents (jet streams) discovered there only a few years ago. Fourteen countries wanted to set up a total of 34 Arctic research stations. On the German side, no costly expeditions were planned for the Polar Year, apart from an increase in routine measurements, after the Notgemeinschaft under Schmidt-Ott had just financially supported Alfred Wegener's Greenland expeditions in 1929 and 1930–1931. The Soviet side, however, was planning the establishment of new polar stations, including a station

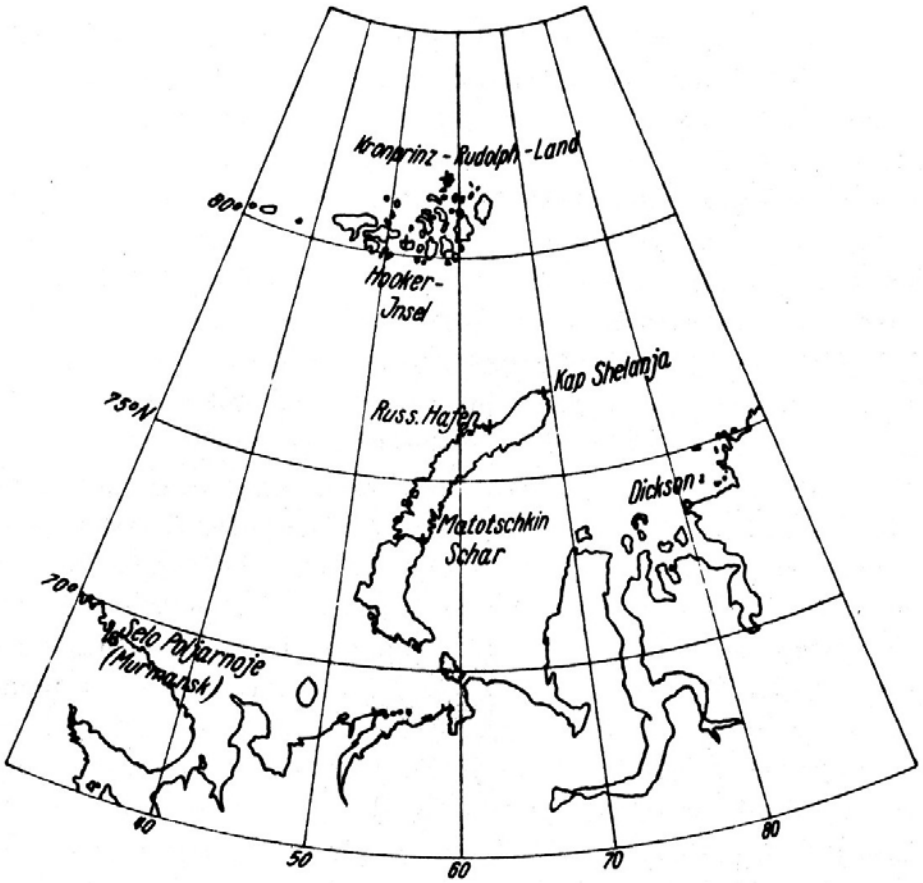

Fig. 6. General map of the Arctic with Novaya Zemlya in the south and Franz Josef Land in the north, including stations during the Second International Polar Year. Source: Wölken 1934b: 229.

on Prince Rudolf Island (in the Franz Josef Land archipelago) and a mountain station on Novaya Zemlya (Anonymous 1931: 109). In addition, the icebreaker *Malygin* was to carry out a research cruise along the North Siberian coast.

Apparently, an enquiry regarding the participation of German scientists in Soviet polar expeditions during the Second International Polar Year was forwarded via the Notgemeinschaft to the Aeroarctic, which had the best contacts with Samoilovich since the polar flight. At the beginning of February 1932, the latter was able to provide concrete information. Otto Schmidt, now head of the Arctic Institute in Leningrad, was looking for polar-experienced scientists who would work as "fully entitled members" of an expedition or polar station under the leadership of a Soviet polar researcher and under the same conditions as the Soviet members (Breitfuß 3 Feb. 1932). On the one hand, he offered wintering on the ice of the northern island of Novaya Zemlya between the Barents Islands and the Russian Harbour (Russkaya Gavan), which he considered the most interesting wintering. One group was to work on the west coast and the second, led by the young station manager Mikhail M. Yermolaev (1905–1991), a brother-in-law of Samoilovich, on the ice sheet in the middle of the island. On the other hand, wintering would also be possible on Hooker Island or Prince Rudolf Island (both in the Franz Josef Land archipelago), where a new station was to be built (Fig. 6). A third possibility would be to replace the four-person wintering crew of the station on Severnaya Zemlya.

However, as time was pressing, Breitfuß recommended that the Notgemeinschaft

contact Samoilovich at the Arctic Institute directly about the participation of German scientists. Finally, at the end of March, Samoilovich offered Schmidt-Ott two concrete places for German geophysicists in the Silent Bay (Tikhaya Buchta) on Hooker Island in the Franz Josef Land archipelago and on the ice sheet of Novaya Zemlya (Samoilovich 26 March 1932). He would come to Berlin at the beginning of April and would be happy to discuss further details with Schmidt-Ott personally.

The Soviets also contacted Reinhard Süring (1866–1950), director of the Meteorological and Magnetic Observatory Potsdam on Telegrafenberg, who had been a member of the German Commission for the Second International Polar Year (1932–1933) since 1930 where he was responsible for the fields of radiation and atmospheric electricity (Körber 1993: 28, 42). Samoilovich asked Süring to release a scientist for air-electric measurements on Hooker Island for the duration of the Polar Year. Only one was thought to be the right person for this task, namely Joachim Scholz (1903–1937), an assistant at Süring's observatory, who had already made a name for himself by developing a new nucleus counter ("Scholzscher [condensation] nucleus counter") (Benndorf 1937*a*; Benndorf 1937*b*; Körber 1993: 42–43, 88), an optical instrument for counting small particles (aerosols) in the atmosphere which are the nuclei for condensation. Scholz had been at the observatory in Potsdam since November 1926 and had initially had a grant from the Notgemeinschaft to carry out air-electric studies and then spent a year in 1928–1929 as a fellow at the Physics Institute of the University in Graz under Professor Hans Benndorf (1870–1953), an authority in the field of air electricity and earthquake research. Scholz thus submitted at short notice a research programme for extensive air-electric measurements of various parameters in the Silent Bay on Hooker Island (Scholz no date *a*; Scholz no date *b*). Due to long-distance telegraphy and the unexplained long ranges of radio waves in special weather conditions, these investigations were of great interest for practical purposes to understand the influence of electricity within clouds on radio transmission. The necessary instruments were provided by the observatories in Potsdam and Lindenberg southeast of Berlin, as well as by the Notgemeinschaft (Körber 1993: 43).

The second scientist to apply was Kurt Wölken (1904–1992) of the Geophysical Institute, University of Göttingen, who had participated in the "German Greenland Expedition Alfred Wegener" in 1930–1931. On Novaya Zemlya he wanted to carry out sound measurements and work in the glaciological team at the base station at Russian Harbour in order to carry out ice thickness measurements on the glaciers in the surrounding area (Wölken 12 April 1932). The objective outlined in his work programme was to determine the thickness of the inland ice by serial measurements at four stations and to investigate the abnormal propagation of sound during the polar night in relation to solar radiation, the ozone layer and air movements in the upper stratosphere. For this purpose, two blasts were to be carried out on precisely defined dates at each of the three coastal stations in winter, spring and summer. The investigation of sound propagation in the atmosphere by determining the zone of silence in order to draw conclusions about the state of the atmosphere in high air layers above 30 kilometers, was at that time part of the research projects specially funded by the Notgemeinschaft (Notgemeinschaft der Deutschen Wissenschaft 1933: 19).

On 6 May 1932, a meeting took place between two representatives of the Notgemeinschaft and Samoilovich, the selected researchers Scholz and Wölken, as well as the renowned professors Süring, Albert Defant (1884–1974, director of the Museum and Institute of Marine Sciences in Berlin) and Heinrich von Ficker (1881–1957, director of the Prussian Meteorological Institute in Berlin). Interestingly, all three professors were

members of the Aeroarctic and also members of the German Polar Year Commission, which was headed by Dominik (Lüdecke 1995: A19; Lüdecke & Lajus 2010: 149). Besides, Dominik and Samoilovich had been members of the Aeroarctic board since 1928 (Wegener, Bruns & Berson 1928: 116). This unusually dense personal network, in which a few people acted in several bodies at the same time, was very conducive to the cause, since no German North Polar expeditions could be equipped during the Second International Polar Year due to the prevailing shortage of funding, but at least German participation in Soviet expeditions now seemed feasible.

The meeting concluded that all the necessary measuring equipment for the German participation would be provided and that the travel costs of the scientists to the Russian border would be covered by the German side. Samoilovich suggested that Scholz and Wölken should arrive in Leningrad in July, i.e. three to four weeks before the departure of the expedition ship, in order to familiarize themselves with the Soviet participants. Samoilovich left the processing of the scientific material after the expedition to the individual participants. However, the first publication of the results was to take place at the Soviet Arctic Institute and could be written in German. A total of six men were to be sent to Novaya Zemlya, distributed between a coastal station and an inland station 70 to 80 kilometers away. The observatory on Franz Joseph Land, where Scholz was to be housed, had been set up in 1929 and was manned by an average of 16 men. All stations were able to communicate with home via a small radio station.

Experiences of the German Participants of Soviet Expeditions (1932–1933)

During the familiarization period in Leningrad, the expedition participants got to know each other. After all preparations were completed on schedule, the ships set off for their Arctic destinations. The expedition to Franz Joseph Land to relieve the wintering crew was led by Ivan Papanin (1894–1986), who would winter there in the Arctic for the first time (Felden 1986: 132; Fritzsche 1991: 161–162). At 78° 48' N, an unusually large drift ice field stood in the way of the *Malygin* (Akademia 25 July 1932). Scholz reported that the icebreaker had to leave the planned route to sail around the ice masses in a south-easterly direction. As a result, the arrival at Franz Joseph land was uncertain. If the attempt to bypass failed, the ship would be stuck in the ice. However, since there was enough food on board for the wintering crew to last until autumn 1933, they would not have to go hungry for the time being.

In any case, the expedition work would be delayed. Finally, on 3 August 1932, the Notgemeinschaft received a telegram with the news that Scholz had finally arrived in Franz Joseph Land after his interesting journey (Deutsches Generalkonsulat 2 Aug. 1932).

The geophysicist Yevgeny Fedorov (1910–1981) had already made friends with Scholz in Leningrad even though his knowledge of English was poor (Fjodorow 1986: 49). In his eyes, Scholz represented the typical German: tall, blond, blue-eyed, and strong. Within six months, thanks to Fedorov's interpreting work, Scholz had learned enough Russian to be henceforth able to communicate in that language, and Fedorov had become fluent in English (Fig. 7).

They had built the air-electric laboratory next to the base station 100 meters up on a slope, where all instruments were housed away from any local influence from the station (Fjodorow 1986: 67). In mid-September, the air-electric house was completed, consisting of a measuring room and a sleeping room (Scholz 3 Oct. 1932). In winter, all necessary

Fig. 7. Joachim Scholz (left) and Yevgeny Fedorov (right), fetching snow for the drinking water supply at the station. Source: Fjodorow 1986: 272.

instruments were set up in the large room (Scholz 1935*a*: 113). In summer, the Dobson spectrograph was set up in the other room, where there was a folding bedstead and three consoles that could be used as worktables. On one of them was a telephone connecting the laboratory with the station. On the other consoles were accumulators and anode batteries (Eltax batteries), as well as spare parts for the measuring instruments.

In the beginning, Scholz still struggled with the isolation of the electrometers, but then he succeeded in achieving very interesting results (Scholz 1935*a*: 113). However, the measurements made with the Dobson spectrograph to determine the intensity of the UV radiation as an indicator of the total ozone content of the atmosphere were disappointing. The sun needed for the measurements only shone long enough on a few days and, in addition, the instrument did not function at low temperatures. Fortunately, Scholz had a quartz spectrograph on loan from the Astrophysical Observatory in Pulkovo, a suburb of Leningrad (now a district of St. Petersburg), with which he could make recordings of the lunar spectrum, at least in winter. Even though the house was heated, it was so cold in his laboratory that he did his measurements, which lasted up to twelve hours, dressed in fur clothes and smoking a cigar (Fjodorow 1986: 67). Benndorf, with whom Scholz had been in close contact, pointed out in his obituary of Scholz that

> his friendly manner and sense of genuine comradeship [...] enabled him to master even very serious situations, although he had certainly had to prevail in the extreme conditions of a polar expedition under unavoidable factual and personal difficulties [...] completely on his own. (Benndorf 1937*a*: 222)

In order to eliminate the meteorological influence on the air-electric measurements caused by the local location of the laboratory on the southern slope of a plateau (80°19' N, 52°48' 0), Scholz, with the help of his young assistant Yakov Lubin,[2] carried out parallel

air-electric measurements on the island of Skott-Kelty, eight kilometres from the Silent Bay, in March 1933 and on the island of Itteridge, 46 kilometers to the south in the following month (Fjodorow 1986; Scholz 1935*b*; Scholz 1935*e*).

Physicist Alexander Verigo (1893–1953) from the Vernadsky Radium Institute in Leningrad, who was engaged in the study of cosmic radiation (Harvey & Zakutnyaya 2011: 9) arrived on the second visit by the ice-breaker *Malygin* to be guided through the air-electric station (Scholz 3 Oct. 1932). After the tour, he was so enthusiastic about the German station that he wanted to submit an application to the Soviet government so that the Soviet Union could take over the air-electric equipment after the measurements were completed. Scholz informed Verigo that the decision on the placement of the instruments lay with the Notgemeinschaft and the Prussian Meteorological Institute. In this context, Scholz asked the Notgemeinschaft to inform him about the future placement of the instruments, otherwise he would return all the measuring instruments to Germany at the end of the Polar Year.

Due to reconstruction work at the radio station, Scholz did not get in touch with Germany until the beginning of February, when he reported on the problems and successes of the air-electric measurements so far (Scholz 4 Feb. 1933). He was in good health and the relationship with the other station members was good. He was supported in his work by a young Soviet student (Lubin). Overall, it turned out that the electrical elements were very dependent on the local climate of the island archipelago. In January, the weather was quite mild with temperatures above zero degrees and the sea was even ice-free in places. He registered the first sound measurements of blasts on Novaya Zemlya with the Kühl undograph as soon as the weather permitted. Samoilovich himself later sent more detailed information to Germany on the twelve sound measurements, which were carried out over seven days (Samoilovich 12 Feb. 1933).

During the wintering, Scholz was subjected to a "gradual political education" by his Soviet expedition mates in the course of many discussions through which he came to know and appreciate the Soviet promotion of science by the party and the government (Papanin 1981: 131–132; Fjodorow 1986: 122 ff.).

Then he learned of the National Socialists' takeover of power in his homeland via German radio stations. Fuelled by radio propaganda, Scholz, who was described by his comrades as a German patriot, initially very much liked the idea that Germany would become strong again and that everything would change for the good of the common man. Now the political discussions on Franz Joseph Land fell silent. However, when a supply ship again brought newspapers and mail with reports of first-hand negative experiences from relatives and friends, Scholz's positive opinion of the new politics back home changed abruptly.

To help him, Papanin even suggested that he stay with his new friends in the Soviet Union, but Scholz did not want to leave his mother behind alone and only wanted to move to the Soviet Union with her consent. Before the overwinterers were picked up, Scholz continued to observe the ion balance until 26 August 1933 and the intensity of the ultra-radiation using the ionisation chamber until September, according to Werner Kohlhörster (1887–1946), his colleague from the Potsdam Observatory (Scholz 1935*c*; Scholz 1935*f*).

At first, there was nothing unusual to report from Wölken's expedition. Their destination was the northern island of Novaya Zemlya, which was covered by an ice cap about 400 kilometers long, 60 to 80 kilometers wide and almost 1,000 meters high. Having reached the base station Russkaya Gavan ['Russian Harbour'] at 76°14'N and 62°39' E

on the snow- and ice-free north-west coast, Wölken began seismic measurements of the permafrost at sea level (Wölken 1934 unpublished; Wölken 1961: 89). Furthermore, on the inland ice at a distance of 15 kilometers from the coast, he set up the stations Barriere oben ['upper barrier'] at a height of 380 meters and Barriere unten ['lower barrier'] at a height of 320 meters. The stations were only 1.5 kilometer apart (Wölken 1934 unpublished: 4).

Apparently, no problems were reported in communications with home at first. But in March 1933, there was concern about the expedition leader Yermolaev, who was missing together with Wölken on an expedition with the early type of snowmobile (Generalkonsulat 10 March 1933).

However, the Arctic Institute announced that there was no reason for serious concern, as the expedition members were experienced polar explorers and had enough food with them. The weather was now clearing and all rescue measures were in place. Two days later, Samoilovich announced that Wölken was safe (Generalkonsulat 12 March 1933). The snowmobile, which had failed due to the extreme cold, had been abandoned on the way and the expedition had continued on foot.

Due to overtiredness, Wölken had stayed behind in the tent 20 kilometers from Cape of Desire. He would now be picked up by sledge and was expected to arrive at the station soon. On 14 March it was finally reported that he had arrived at the camp (Generalkonsulat 14 March 1933). With the help of his comrades, he had returned in good health to Cape Zhelaniya on 13 March 1933 after a difficult three-week journey (Wölken 15 March 1933).

However, the continuation of his investigations in other places turned out to be very difficult.

> The coincidence of various unfavourable circumstances for the expedition and the impossibility of taking enough provisions and the 200 kg of scientific material required for ice thickness measurements further into the interior on dog sledges or hand sledges over the melted needle ice in mid-July forced us to seek out a working area that could be reached on foot from the base station. We found such an area on the Chayev Glacier. (Wölken 1934 unpublished: 5)

At the end of the melting period, from 25 August to 19 September 1933, he surveyed a 5.4 kilometers long profile on the outflowing glacier 20 kilometers east of the base station, which was located at about 200 meters above sea level 8 kilometers above the glacier front in an east-west direction across the glacier movement (Wölken 1961: 89 f.). Because of the strong winds, they were only able to carry out work to determine the ice thicknesses at that place on seven days in seven weeks.

Results of the German Participants from the Russian Arctic

In the meantime, ever since the Reichstag elections on 5 March 1933, the political regime in Germany had changed a lot under the new order of the National Socialists. This also affected the future of the German scientists who had taken part in Soviet expeditions during the Second International Polar Year.

After completing their measurements, all expedition members returned safely from the Arctic to Leningrad. Wölken arrived on 17 October 1933 to report in person to the Arctic Institute (Wölken 18 Oct. 1933). Scholz had only just left Franz Joseph Land on the icebreaker *Taimyr* at this time and would also soon arrive in Leningrad. Wölken was very pleased with the preliminary scientific results.

> 28 sound measurements had shown that long-distance sound waves also exist during the polar night and that there is a difference between "winter sound" and "summer sound" in terms of the physical character of the waves. (Wölken 18 Oct. 1933)

The 43 ice thickness measurements had not worked out so well because Wölken, due to transport difficulties, had not been able to take measurements at the places that would have been the best. Ice thicknesses of between 60 meters and 450 meters were determined, with the bedrock up to 200 meters below sea level in many places.

A conference was scheduled for 19 October 1933 to discuss the processing of the results. Wölken assumed that he would probably need two months to collect all the data he needed for the evaluation and that he would therefore not be able to arrive back in Germany until December. It was agreed that Scholz would hand over his sound observations to Wölken for evaluation of the total material of the blasts, whose undograph stations were distributed in Novaya Zemlya on Cape Zhelaniya, Russian Harbour and Matochkin Shar (Scholz 1935*a*: 113; Hergesell 1933).

After Scholz had reported on his work on Franz Joseph Land to the Scientific Council of the Arctic Institute and other Leningrad institutions, he returned to the Potsdam Observatory at the end of 1933 because of his longing after his mother (Fjodorow 1986: 123 f.). Like a man possessed, he prepared all the material for printing within five months and then prepared the results for publication in the *Meteorologische Zeitschrift* and Gerland's *Beiträge zur Geophysik* by the end of 1934 (Scholz 1935*a*; Scholz 1935*b*; Scholz 1935*c*; Scholz 1935*d*; Scholz 1935*e*; Scholz 1935*f*; Benndorf 1937*a*: 222; Körber 1993: 43). Remarkably, in four of these articles, his affiliation was given as Staff of the Arctic Institute in Leningrad during the International Polar Year 1932–1933 (Scholz 1935*a*; Scholz 1935*d*; Scholz 1935*e*; Scholz 1935*f*), while in the papers on air-electric parallel measurements and measurements of ion numbers for which he used instruments from the Potsdam Observatory, his affiliation was simply given as "Potsdam" (Scholz 1935*b*; Scholz 1935*c*).

Schmidt-Ott was still president of the Notgemeinschaft, which had been known as the Deutsche Forschungsgemeinschaft since 1929 and was now subordinated to the Reich Ministry of Education in April 1933 (Schmidt-Ott 1952: 292–294). There were signs that future research would also involve national defense. On 23 June 1934, Schmidt-Ott was informed that he was to be replaced by the National Socialist supporter Johannes Nikolaus Stark (1874–1957), winner of the 1919 Nobel Prize in Physics and founder of the so-called German Physics, in order to bring the research community into line. Schmidt-Ott, who was almost 74 years old and a great promoter of science, immediately resigned from his post because he did not agree with Stark's political goals.

About a year after the expedition, Scholz sent a manuscript to Leningrad for publication in the Arctic Institute's series of publications. The manuscript with a Russian introduction appeared in 1936 (Scholz 1936; Israël-Köhler 1936). In January 1935 he fell seriously ill and finally met a "tragic end all too soon" in 1937 which saved him from further suffering, it was said (Benndorf 1937*a*: 222; Benndorf 1937*b*: 133). This was a great loss for science, because, with a longer life and favourable working conditions, his unusual diligence and his special ambition to "achieve something efficient" would have "produced many a valuable contribution to the solution of the numerous problems of air-electric research still remaining" (Benndorf 1937*a*: 222–223).

The former expedition comrades Papanin and Fedorov spoke in more detail about Scholz's death in their memoirs. In 1937, a postcard from the emergency community had arrived at the Arctic Institute to the effect that Dr. Scholz had succumbed on 19 January

1937 to bodily injuries that he had sustained on Franz Joseph Land, something that Papanin could not understand at all (Papanin 1981: 131–132). Fedorov also could not remember any such serious injuries, which would certainly not have gone unnoticed by him as he had shared a room with Scholz during the entire wintering period.

In May 1945, immediately after the German capitulation, Fedorov, now head of the Hydrometeorological Service of the Soviet Army, was tasked to put the German Meteorological Service in Soviet-occupied territory back into operation (Körber 1993: 49). In Potsdam, this brought him together with the almost 80-year-old Süring, who was then acting head of the observatory. On this occasion, Fedorov asked about his former work colleague Scholz in order to find out more about his death (Fjodorow 1986: 122 ff.). He learned that Scholz had gone somewhere around 1934 and was never seen again. His deaf mother, with whom he lived and to whom he was very attached, was left alone and had then died (Benndorf 1937*b*: 133; Fjodorow 1986: 125). Fedorov assumed that the political education during the joint wintering had done its work and that Scholz had perished in a concentration camp, but this was never confirmed by the German side (see e.g., Benndorf 1937*a*; Benndorf 1937*b*; Körber 1993: 82).

Wölken, on the other hand, did not publish so diligently after his return to the Geophysical Institute in Göttingen. In July 1934, he submitted the results of a comparison of the intensity of ultra-radiation over Greenland and Germany for publication in the *Zeitschrift für Geophysik* (Wölken 1934*a*). There he also published his only paper on the preliminary processing of the registrations of sound blasts during the Polar Year at three of four stations (Wölken 1934*b*). He analysed Scholz's measurements at Hooker Island, his own at Russian Harbour station and those of his colleague at Cape Zhelaniya, while the records at Matochkin Shar were not considered.

In the same year, Wölken transferred to the German Maritime Weather Service, where he was responsible for providing weather forecasts to the German South Atlantic flights until 1938 (Schneider 1990). He then went to Buenos Aires, where he held various managerial positions in the Argentine Office of Meteorology, Geophysics and Hydrology until 1976. In 1961, he also became a full professor of meteorology and climatology at the Universidad del Salvador in Buenos Aires. Perhaps it was then he finally wrote his paper on the results of his seismic ice thickness measurements on Novaya Zemlya, which was published in 1963 in the German journal *Polarforschung* for the year 1961, although he had already completed a manuscript in 1934 (Wölken 1934 unpublished; Wölken 1961). According to his first manuscript, Wölken wanted to publish his preliminary results within a year after his return, because he was prevented by his other assignments "from completing the detailed work in the near future" (Wölken 1934 unpublished: 1). In 1961, Wölken, without providing any details, mentioned that the material he had delivered to Leningrad had been lost during the war and that he had therefore not been able to fully evaluate the data due to the change of his workplace (Wölken 1961: 87 f.).

His results showed that the ice surface did not reflect the profile of the rocky subsoil in an attenuated form, as the differences in elevation were much greater in the rocky subsoil and, moreover, because most of the subsoil was below sea level. Wölken suspected that the transverse valleys, like the Matochkin Shar strait, connected the Karian Sea with the Barents Sea. Another observation was that in 1934 the ice sheet was in retreat (Wölken 1934 unpublished: 4).

Although little was known in Germany about his investigations on Novaya Zemlya, he received a commemorative medal from the Arctic and Antarctic Institute in Leningrad in 1970 in recognition of his achievements.

Current German-Russian Cooperation

After the Second World War, German-Russian relations were resumed in the German Democratic Republic (GDR) when a German-Soviet agreement on cultural and technical-economic exchange was signed on 30 May 1959 (BMBF 2011). On 22 July 1986, another German-Soviet intergovernmental agreement on scientific and technical cooperation was concluded, which entered into force on 7 July 1987. After the political turnaround in Germany and the reunification of East and West Germany, the Central Institute for Physics of the Earth (Zentralinstitut für Physik der Erde) was transformed into the Research Unit Potsdam of the Alfred Wegener Institute in Potsdam on Telegraphenberg in order to preserve the scientific potential of GDR polar research (Hempel 2010: 187–190). Finally, German-Russian cooperation in polar and marine research was agreed on 10 February 1995.

At the end of the twentieth century, scientists at the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research in Bremerhaven began to take an interest in the impact of climate change in the Arctic. In 1998, as part of the renewed German-Russian cooperation, they began to expand the existing Russian research station Samoylov on Samoylov Island (72°22' N, 126°28' E) in the Lena Delta near the Laptev Sea in order to jointly conduct long-term studies of changes in the permafrost and in the carbon budget.[3] In the same year, international drilling campaigns also began at Lake El'gygytgyn in the Anadyr Plateau (Eastern Siberia), whose lake sediment contains a highly informative climate archive.[4] In 2007–2011, German-Russian measuring campaigns were also conducted in the Laptev Sea Polynya with a view to investigating the birthplace of sea ice (Kassens & Volkmann-Lark [eds.] 2013). Finally, Jürgen Graeser (b. 1958) of the Alfred Wegener Institute observed meteorological conditions over the central Arctic for seven months in the winter of 2007/2008 on the North Pole Drift Expedition N-35, which was manned by twenty Russian scientists.[5] The joint exploration of the Russian Arctic is becoming increasingly important in the context of making the Northeast Passage permanently usable as a result of the current climate change.

Conclusion

Based on the above, it could be shown that today's German-Soviet scientific cooperation in the Arctic had successful predecessor projects in the early 1930s, the foundations of which were laid in the 1920s. On the political level, they were made possible by the Rapallo Treaty and the secret military cooperation, especially with regard to the German air force. Schmidt-Ott, in his capacity as president of the Notgemeinschaft der deutschen Wissenschaft and later the Deutsche Forschungsgemeinschaft, was an outstanding mediator between the two countries in favour of joint research projects, which, among other things, led to an expedition to the Alai-Pamir. Support for cooperation in the Arctic also resulted from the personnel links between members of the Aeroarctic and the organisation of the Second International Polar Year (1932–1933).

The Aeroarctic and the expedition it carried out with the airship LZ 127 *Graf Zeppelin* in 1931 were also globally integrated through their international participation and served not least to connect Germany and the Soviet Union, who were not accepted into the official Research Council at the time, to the international research community. The participation of two German scientists in Soviet measurement campaigns in the Arctic during the Second International Polar Year yielded valuable results. However, the new political leadership in the Third Reich destroyed the promising start of German-Soviet

cooperation. Schmidt-Ott resigned, and one scientist, Scholz, died under unexplained circumstances while Wölken fled to South America.

ACKNOWLEDGEMENTS

This article is based on a presentation I gave at the conference "The Soviet Arctic: Exploration, Investigation, Representation," hosted by the German Historical Institute in Moscow on 20–21 February 2014. The discussion with the participants and subsequent correspondence via email have rounded off the article. In particular, the useful comments by Barbara Schennerlein and Diedrich Fritzsche should be mentioned here. I would also like to thank Siegfried Nicklas, Frankfurt, for the group photo from the Aeroarctic meeting. I am also indebted to the reviewers for their valuable comments.

NOTES

1. The Institute for the Exploration of the North was founded in 1925 and became the Arctic Institute in 1930. When research was extended to the southern polar region, the name of the institute was changed to the Arctic and Antarctic Institute (ARRI) in 1958 (see www.aari.ru/main.php?lg=1&id=54; access date 17 March 2021).
2. Lubin succeeded Fedorov as director of the Arctic Institute in 1940 (Papanin 1981: 121).
3. See www.awi.de/expedition/stationen/insel-samoylov.html; access date 29 April 2021.
4. See www.elgygytgyn.uni-koeln.de; access date 29 March 2021.
5. See www.pro-physik.de/nachrichten/sieben-monate-auf-einer-treibenden-eisscholle; access date 29 March 2021.

REFERENCE

Unpublished Sources

Akademia (25 July 1932). Internationale Polarjahr-Expedition von Treibeis umklammert. Akademia Sonderdienst. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 216.

Breitfuß, L. (3 Feb. 1932). Brief an Stuchtey. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 191.

Deutsches Generalkonsulat (2 Aug. 1932). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte .35, Bl. 213.

Generalkonsulat (10 March 1933). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 104.

Generalkonsulat (12 March 1933). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 101.

Generalkonsulat (14 March 1933). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 98.

Mittelstraß, G. (19 Nov. 1931). Brief an Stuchtey. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 200.

Nansen, v. Ficker, Bruns, Berson, Bleistein & Krell (15 Sept. 1927). Erläuterungen zum Arbeitsprogramm der "Aeroarctic" nach dem Stand vom 15.9.1927. Bundesarchiv Potsdam, 15.01, Nr. 26815, Bl. 154–166.

Samoilovich, R. (26 March 1932). Brief an Schmidt-Ott. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 183.

Samoilovich, R. (12 Feb. 1933). Brief an Hergesell. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 112–113.

Scholz, J. (no date *a*). Programm für die luftelektrischen Messungen auf Franz-Josefs-Land. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 79–80.

Scholz, J. (no date *b*). Programm für die Messungen auf Kaiser-Franz-Josephs-Land. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 146.

Scholz, J. (3 Oct. 1932). Brief an Professor. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 211–212.

Scholz, J. (4 Feb. 1933). Radiomeldung für die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 163.

Wölken, K. (12 April 1932). Brief an Samoilowitsch, Bundesarchiv Koblenz, R 73, Bl. 131–132, 135–138.

Wölken, K. (15 March 1933). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 95.

Wölken, K. (18 Oct. 1933). Brief an Professor. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 230–231.
Wölken, K. (1934). Vorläufiger Bericht über seismische Untersuchungen (Eisdickenmessungen in Nowaja Semlja). Unpublished manuscript. Archive Cornelia Lüdecke, Munich, to be handed over to the archive of the Alfred Wegener Institute for Polar and Marine Research at Bremerhaven.

Literature

Amundsen, R. (1925). *Die Jagd nach dem Nordpol. Mit dem Flugzeug zum 88. Breitengrad*, Berlin: Ullstein.
Amundsen, R. & Ellsworth, L. (1927). *Der erste Flug über das Nordpolarmeer*, Leipzig, Zürich: Grethlein.
Anonymous (1931). "Neues aus den Polargebieten," *Arktis*, 4, pp. 109–110.
Benndorf, H. (1937*a*). "Nachruf für J. Scholz," *Meteorologische Zeitschrift*, 54, pp. 222–223.
Benndorf, H. (1937*b*). "Joachim Scholz zum Gedächtnis," *Gerlands Beiträge zur Geophysik*, 50, pp. 132–134.
Berson, A. & Breitfuß, L. (1927). "Sitzung des Sonderausschusses am 16.11.1926," *Petermanns Geographische Mitteilungen*, Ergänzungsheft 191, pp. 110–113.
Berson, A., Samoilowitsch, R.L. & Weickmann, L. (eds.) (1933). *Die Arktisfahrt des Luftschiffes "Graf Zeppelin." Wissenschaftliche Ergebnisse* (Petermanns Geographische Mitteilungen, Ergänzungsheft 216), Gotha: Justus Perthes.
Breitfuß. L. (1928) "Die territoriale Sektoreneinteilung der Arktis im Zusammenhang mit dem zu erwartenden transarktischen Luftverkehr," *Petermanns Geographische Mitteilungen* 74, pp. 23–28.
BMBF (2011). *Lebende Ausstellung. Brennpunkte der deutsch-russischen Zusammenarbeit auf dem Gebiet der Meeres- und Polarforschung*, flyer, Berlin: Bundesministerium für Bildung und Forschung.
Dege, W. (1962). "Deutsches Observatorium Ebeltofthafen – Spitzbergen. Zur 50. Wiederkehr der 1. Überwinterung 1912/13," *Polarforschung*, 32:1–2, pp. 136–140.
Eckener, H. & Italiander, R. (1979). *Im Luftschiff über Länder und Meere*, München: Heyne.
Felden, D. (1986). *Ein Leben für die Arktis. Die Nordpolarexpeditionen von Rudolf Samoilowitsch*, Leipzig: VEB F.A. Brockhaus.
Fjodorow, J. (1986). *Aus meinen Polartagebüchern*, Leipzig: VEB F.A. Brockhaus; Moscow: Progress.
Forman, P. (1973). "Scientific internationalism and the Weimar physicists. The ideology and its manipulation in Germany after World War I," *Isis* 64:2, pp. 150–180.
Fritzsche, D. (1991). "Potsdamer Geowissenschaftler und ihr Einfluß auf die deutsche und internationale Polarforschung bis zum 2. Polarjahr 1932/33," *Polarforschung*, 61:2–3, pp. 153–162.
Fritzsche, D. (2018). "Walter Bruns und die Aeroarctic," *Polarforschung*, 88:1, pp. 7–22.
Gruber, O. von. (1933). "Die photogrammetrische Ausrüstung des 'Graf Zeppelin' auf der Arktisfahrt 1931, über die Auswertemethoden und die bisherigen Ergebnisse aus den gewonnenen Aufnahmematerial," in *Die Arktisfahrt des Luftschiffes 'Graf Zeppelin.' Wissenschaftliche Ergebnisse* (Petermanns Geographische Mitteilungen, Ergänzungsheft 216), eds. A. Berson, R.L. Samoilowitsch & L. Weickmann, pp. 68–77.
Hempel, G. (2010). "Blühende Landschaften im Ewigen Eis," *Polarforschung*, 79:3, pp. 181–191.
Harvey, B. & Zakutnyaya, O. (2011). *Russian Space Probes. Scientific Discoveries and Future Missions*, New York: Springer.
Hergesell, H. (ed.). (1914). *Das Deutsche Observatorium in Spitzbergen. Beobachtungen und Ergebnisse* 1 (Schriften der Wissenschaftlichen Gesellschaft in Straßburg 21), Strassburg: K.J. Trübner.
Hergesell, H. (1933). "Kurze Bemerkungen über die arktischen Sprengungen während des Polarjahres," in *Rapport de la Commission Internationale de l'Année Polaire 1932–1933* (Secretariat de L'Organisation Meteorologique Internationale No. 16, III[e]), Utrecht: Kemink en Zoon N.V., pp. 94–96.
Herrmann, E. (1949). *Professor Dr. Leonid Breitfuß zu seinen 50jährigen Polarforschungs-Jubiläum (1898–1948) und seinem 85. Geburtstag (1864–1949)*, Kiel: Archiv für Polarforschung.
Israël-Köhler, H. (1936). "Besprechung von Scholz, J., 1936, Luftelektrische Messungen auf Franz-Josefs-Land während des II. Internationalen Polarjahres 1932–33," *Meteorologische Zeitschrift*, 53:12, pp. 483–484.
Kassens, H. & Volkmann-Lark, K. (eds.) (2013). *Russisch-Deutsche Zusammenarbeit System Laptev-See. System Laptev-See Polynja II, Eurasische Schelfmeere im Umbruch – Ozeanische Fronten und Polynjasysteme in der Laptev-See. Schlussbericht FKZ 03G0759*, Kiel: Sekretariat System Laptev-See.
Kevles, D.J. (1971). "'Into 'hostile political camps.' The reorganization of international science in World War I," *Isis* 62:1, pp. 47–60.
Kohlschütter, E. (1927). "Bericht über die Entstehung der Internationalen Studiengesellschaft zur Erforschung der Arktis mit dem Luftschiffe und ihre bisherige Tätigkeit," *Petermanns Geographische Mitteilungen*, Ergänzungsheft 191, pp. 2–15.
Körber, H.-G. (1993). *Die Geschichte des Meteorologischen Observatoriums Potsdam* (*Geschichte der Meteorologie in Deutschland* 2), Offenbach am Main: Selbstverlag des Deutschen Wetterdiensts.
Lehmann, E. (1936). *Auf Luftpatrouille und Weltfahrt. Erlebnisse eines Zeppelinführers in Krieg und Friede*, Berlin: Wegweiser-Verlag.

Lüdecke, C. (1995). "Die deutsche Polarforschung seit der Jahrhundertwende und der Einfluß Erich von Drygalskis" (Berichte zur Polarforschung158), diss., Bremerhaven: Alfred Wegener Institut für Polarforschung; https://epic.awi.de/id/eprint/26336/; access date 21 Dec. 2021.

Lüdecke, C. (2001). "Leonid Ludwig Breitfuß (1864–1950) in Deutschland – Chronist der Polarforschung und die Umstände des Verkaufs seiner Bibliothek nach England," *Polarforschung*, 71:3, pp. 109–119; https://epic.awi.de/id/eprint/28503/; access date 21 Dec. 2021.

Lüdecke, C. & Lajus, J. (2010). "Second International Polar Year (1932–1933)," in *The History of the International Polar Years (IPYs)* (From Pole to Pole 1), eds. S. Barr & C. Lüdecke, Berlin, Heidelberg: Springer-Verlag, pp. 135–173.

Miethe, A. & Hergesell, H. (eds.) (1911). *Mit Zeppelin nach Spitzbergen*, Berlin: Deutsches Verlagshaus Bong & Co.

Nelson, S.B. (1993). "Airships in the Arctic," *Arctic*, 46:3, pp. 278–283

Nobile. U. *et al*. (1929). *Die Vorbereitungen und die wissenschaftlichen Ergebnisse der Polarexpedition der 'Italia'* (Petermanns Geographische Mitteilungen, Ergänzungsheft 205), Gotha: Justus Perthes.

Notgemeinschaft der Deutschen Wissenschaft (1933). *Zwölfter Bericht der Notgemeinschaft der Deutschen Wissenschaft (Deutsche Forschungsgemeinschaft) umfassend ihre Tätigkeit vom 1. April 1932 bis zum 31. März 1933*, Berlin: Karl Sigismund Verlag.

Papanin, I. (1981). *Eis und Flamme. Erinnerungen*, Berlin: Dietz.

Pollog, C.H. (1934). "Der Luftverkehr in Sowjetrussland," *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, 1934, pp. 49–56, 145.

Rackwitz, E. (1958). *Reisen und Abenteuer im Zeppelin. Nach Erlebnissen und Erinnerungen des Dr. Hugo Eckener*, Neuenhagen bei Berlin: Verlag Sport und Technik.

Rapallo (1922). "Der deutsch-russische Vertrag (Rapallo-Vertrag)," 16. April 1922; www.1000dokumente.de/pdf/dok_0017_rap_de.pdf; access date 17 March 2021.

Samoilowitsch, R. (1931). "Der Arktisflug des 'Graf Zeppelin,'" *Atlantis*, 3, pp. 563–572.

Samoilowitsch, R. (1933). "Die Flüge in den Polargebieten," in *Die Arktisfahrt des Luftschiffes "Graf Zeppelin." Wissenschaftliche Ergebnisse* (Petermanns Geographische Mitteilungen, Ergänzungsheft 216), eds. A. Berson, R.L. Samoilowitsch & L. Weickmann, Gotha: Justus Perthes, pp. 9–32.

Schennerlein, B. (2014). "Das aerophotographische Forschungsprogramm der Arktisfahrt des Luftschiffes 'Graf Zeppelin' LZ 127 im Juli 1931," *Polarforschung*, 84:2, pp. 67–92.

Schennerlein, B. (2018). "Die Aeroarctic und die Arktisfahrt des Luftschiffes 'Graf Zeppelin' LZ 127 im Juli 1931 und die Fahrt des U-Boots 'Nautilus,'" *Polarforschung*, 88:1, pp. 31–48.

Schmidt-Ott, F. (1952). *Erlebtes und Erstrebtes 1860–1950*, Wiesbaden: Franz Steiner.

Schneider, O. (1990). "In memoriam Hermann Kurt Wölken," *Polarforschung*, 60:3, pp. 231–232.

Scholz, J. (1935*a*). "Das luftelektrische Laboratorium auf Franz-Josefs-Land," *Meteorologische Zeitschrift*, 52:3, pp. 110–113.

Scholz, J. (1935*b*). "Luftelektrische Parallelmessungen auf zwei 46 km voneinander entfernten arktischen Stationen," *Meteorologische Zeitschrift*, 52:2, pp. 54–57.

Scholz, J. (1935*c*). "Messungen der Ionenzahlen auf Franz-Josephs-Land unter gleichzeitiger Bestimmung von Potentialgradient und vertikalem Leitungsstrom," *Gerlands Beiträge zur Geophysik*, 44, pp. 86–97.

Scholz, J. (1935*d*). "Polarlichtuntersuchungen auf Franz-Josephs-Land," *Gerlands Beiträge zur Geophysik*, 44, pp. 145–156.

Scholz, J. (1935*e*). "Die Ionenbilanz in der Arktis," *Gerlands Beiträge zur Geophysik*, 44, pp. 306–320.

Scholz, J. (1935*f*). "Messungsergebnisse der Ultrastrahlung auf Franz-Josephs-Land," *Gerlands Beiträge zur Geophysik*, 44, pp. 377–380.

Scholz, J. (1936). *Luftelektrische Messungen auf Franz-Josefs-Land während des II. Internationalen Polarjahres 1932–33* (Transactions of the Arctic Institute 16), Leningrad: Izd. Glavsemorputi.

Studiengesellschaft (1924). *Das Luftschiff als Forschungsmittel in der Arktis. Eine Denkschrift*, Berlin: Internationale Studiengesellschaft zur Erforschung der Arktis mit dem Luftschiff.

Treue, W. (1989). "Neue Wege der Forschung, ihrer Organisation und ihrer Förderung: Schmidt-Ott (4.5.1860–24.4.1956)," *Berichte zur Wissenschaftsgeschichte*, 12:3, pp. 229–238.

Wegener, G., Bruns, W. & Berson, A. (1928). "Bericht über den Verlauf der 2. ordentlichen Generalversammlung der Aeroarctic vom 18. bis 23. Juni 1928 zu Leningrad," *Arktis*, 1, pp. 113–120.

Wölken, K. (1934*a*). "Vergleich zwischen der Intensität der kosmischen Ultrastrahlung über Grönland und Deutschland," *Zeitschrift für Geophysik*, 10, pp. 300–307.

Wölken, K. (1934*b*). "Schalluntersuchungen im Polargebiet," *Zeitschrift für Geophysik*, 10, pp. 222–234.

Wölken, K. (1961). "Seismische Eisdickenmessungen auf Nowaja Semlja 1932/33," *Polarforschung*, 31:1–2, pp. 87–91.

Zeidler, M. (1994). *Reichswehr und Rote Armee 1920–1933. Wege und Stationen einer ungewöhnlichen Zusammenarbeit* (Schriftenreihe des Militärgeschichtlichen Forschungsamtes 36), 2nd ed., München: R. Oldenbourg.

Zeppelin, F. von (1911). "Hat unsere Expedition die Zweckmäßigkeit der Verwendung meiner Luftschiffe zur Erforschung der Arktis ergeben?" in *Mit Zeppelin nach Spitzbergen*, eds. A. Miethe & H. Hergesell, Berlin: Deutsches Verlagshaus Bong & Co., pp. 284–291.

AUTHOR

Prof. Dr. C*ornelia Lüdecke* is retired from the University of Hamburg. Her main research interest is the history of Polar research, history of geography since the nineteenth century and the history of meterology. Among her publications are *The Third Reich in Antarctica. The German Antarctic Expedition 1938–39* (2012) and G*ermans in the Antarctic* (2021).
c.luedecke@lrz.uni-muenchen.de

INGVAR SVANBERG & SABIRA STÅHLBERG

Historical and Contemporary Uses of Sea Buckthorn, *Hippophae rhamnoides* L., in the Nordic Countries

ABSTRACT Human interest in certain plants can vary considerably over time. At the end of the twentieth century, the orange-yellow fruits of sea buckthorn, *Hippophae rhamnoides* Linnaeus, became a trendy addition to the diet in some Nordic countries, especially in Sweden and Finland. The soft and juicy fruits are very rich in vitamin B12, C and E, and this fact has greatly contributed to its popularity among contemporary health-conscious consumers. As a cultivated plant, it is nowadays suitable also for a colder climate, and yields an abundant harvest.

In pre-industrial times, the sour-tasting sea buckthorn berries were rarely harvested, although some examples are known from older sources. In 1732, Carl Linnaeus recorded that the berries were used to make a kind of simple sauce served with fish along the Swedish coast of the Gulf of Bothnia. In the nineteenth century, increasing availability of sugar made it possible to consume and preserve the berries on a larger scale, and today they are used in confectionery, cordial, ice-cream, jam, juice, marmalade, mash, parfaits, smoothies, sweets, beer, yogurt products and hygiene products (shampoo and soap).

This article discusses how a rather unknown wild shrub, mostly unnoticed in peasant folk botany along the northern European coasts, has become common as a cultivated plant. Sea buckthorn is a classic example of how the interest in a particular plant and its edible parts varies over time due to economic, cultural and social changes. Ethnobiologist must study not only the human-plant relationships (folk knowledge and utilisation) in the specific socio-cultural context, but also answer questions about how a plant was utilised and viewed, when, where and by whom, as well as why.

KEYWORDS: berries, folk medicine, historical ethnobiology, ornamental plants, traditional wild food

Introduction

Sea buckthorn, *Hippophae rhamnoides* Linnaeus (fam. Elaegnaceae), is today a popular berry not only in Nordic countries such as Sweden and Finland, but also in Russia, the Baltic states, Germany and other countries, in Central and East Asia, as well as in North America. Sea buckthorn has, according to some researchers, "gained the status of one of the most sought-after plant in the pharmaceutical and cosmetic based industries, besides health food processing industries the world over" (Suryakumar & Gupta 2011). It is a versatile plant which today is vastly used in the food industry, for medical purposes, and in the cosmetic industry (Bal *et al*. 2011). Sea buckthorn also has some regional significance: in western Finland and the Åland Islands, sweet dishes made from the berries are nowadays considered regional specialities. The shrub itself is a provincial plant of Satakunta, located on the western coast of Finland (cf. Enkola 1940).

Today, sea buckthorn is a widely spread garden plant, and most berries used for consumption are harvested from cultivated plants. Picking berries from the wild shrub has become a rare hobby. Prior to sugar becoming a common and inexpensive product in the nineteenth century, the sour-tasting fruits of the wild plant were hardly ever used. Another probable reason why the berries were overlooked is that the wild shrub has sharp thorns, which makes harvesting difficult. This undemanding and hardy shrub is today suitable for cultivation also in a colder climate. It is commonly used as an ornamental element in gardens because of its decorative foliage and colourful berries. Furthermore, it is considered to possess great potential in modern landscaping (Svanberg 2013: 940).

One of the earliest records mentioning sea buckthorn use in Sweden is found in Carl Linnaeus' *Flora lapponica* (1737: 296). Linnaeus reported that fishermen along the coasts of the Gulf of Bothnia used the astringent berries of sea buckthorn for preparing a tasty but simple sauce, which was consumed with fish. He had the opportunity to observe the thorny shrub in Österbotten (Ostrobothnia) and the Åland Islands during his journey to the north of Sweden, Lapland, and the eastern province of Finland, in the summer of 1732. He also recorded a couple of local folk names, *finnbär* 'Finn berry' and *surbär* 'sour berry' near the town of Vasa in Österbotten (Linnaeus 2003: 188).

This observation is one of very few older notes showing traditional utilisation of the berries. In general, the berries were left untouched by both humans and animals. According to observations from the Åland Islands, dating to the beginning of the twentieth century, only crows ate the berries in late autumn, although the islanders observed that small birds also sometimes picked at the berries (Palmgren 1913). Also globally, the berries were hardly noted in any folk botany, and it is not until recently, from the end of the twentieth century, that sea buckthorn products have become more widely spread for commercial purposes and made available to consumers.

This article discusses how a little known and rarely used shrub and its berries, chiefly unnoticed in traditional folk botany, has become a popular health product which is much in demand among innovative chefs, especially those influenced by the concept of the New Nordic Cuisine movement (Nordic Council of Ministers 2008). Various botanical, ethnographic, gastronomical and topographical sources are used for this study, which connects with our earlier publications and expands our long-term historical ethnobiological work on traditional plant use (e.g., Ståhlberg & Svanberg 2010; Ståhlberg & Svanberg 2011; Łuczaj *et al*. 2012; Svanberg 2012; Svanberg & Ståhlberg 2021). All translations of quotations in Nordic languages are by the authors of this article.

Fig. 1. Sea buckthorn plant with fruits at Harnäs, Gästrikland, Sweden. Photo: Ingvar Svanberg, 2008.

Botany and Ecology

Sea buckthorn is a thorny, silver-leaved deciduous shrub, usually between one and six metres high. The thorns can grow to a length of up to ten centimetres. It is dioecious, meaning it possesses male and female plants. The male flowers are located in short spikes near the base of the branches, while the female flowers are single. In the autumn, the bush carries yellow or reddish orange fleshy berries densely attached to the shoots (Jeppsson 1999; Svanberg 2013: 937).

The wild shrub is found in coastal areas in northern Europe, the Baltic Sea region and the British Isles, and above the tree line in mountainous areas of central Europe, Russia, Central Asia and China (Hultén & Fries 1986). The shrub is very weak in territorial competition with other plants. It is only found on meagre, pebbly, sandy, or shingle soil in the beach zone, while higher up it is replaced by other bushes and trees (Svanberg 2013: 938). In the Nordic countries, it is distributed on both sides of the Baltic Sea coast from the Uppland and Gästrikland provinces in Sweden, and is found only sparsely northwards; in Finland it grows along the coast of the Gulf of Bothnia, from Åland and Uusikaupunki (Nystad) to Tornio (Torneå) in the north. It can also be found as a coastal dune shrub in Denmark and around the Trondheim Fjord in mid-Norway (Hultén & Fries 1986).

Local Names

Sea buckthorn is currently known as *havtorn* (*hav* 'sea' and *torn* 'thorn') in Sweden, the Åland Islands, and the Swedish-speaking parts of Finland. The name was first recorded in 1745 as *hafstorn* in Roslagen, the coastal area of the province of Uppland in Sweden (Linnaeus 1745: 296; Thedenius 1871: 469). Among Swedish speakers in Österbotten, Finland,

it was earlier known as *hafstörne*. Similar names are recorded in the late nineteenth and early twentieth century in the Åland and Åboland archipelagos in Finland (Olsson 1896; Liro 1915: 21; SLS: FMK 39, FMK 81). The Swedish name can be compared with the local German phytonyms *Seedorn* 'sea thorn' and *Meerkreutzdorn* 'sea cross thorn' (Marzell 1972: 874).

A historical name is *finnbär* 'Finn berry', recorded for the first time in 1729 on both the Finnish and Swedish sides of the Gulf of Bothnia (Artedi [1729] 1985). This name was still in use in the twentieth century and has been explained by the fact that the Finns gathered and ate the berry, or possibly that it came to Sweden from Finland (Linnaeus 1737: 296; Fries 1880: 38; Grapengiesser 1936: 37; Ahlbäck 1992: 52; ILF: ULMA 19 857; Fridner 1999). *Törnbär* 'thorn berry' is a name recorded from Holmön, Västerbotten (Westrobothnia) (ILF: ULMA 29403: 19). On the island of Vätö in the Norrtälje archipelago, the shrub was known as *altornsbuske* (Schagerström 1889: 6).

In Norwegian, the name *tindved* was recorded as early as 1772 (Gunnerus 1772: 11; see also below). Other names are *tørn*, *tørne* 'thorn' and *tistelved* 'thistle wood' (Høeg 1974: 385). In Danish, sea buckthorn has been called *havtorn* at least since the late eighteenth century (the earliest record is from 1767) and in Jutland it is referred to as *sandtidse* 'sand thistle' (first recorded in 1796). Local names such as *klintepil* 'cliff willow' (Møn), and *strandpil* 'beach willow' (Møn, Falster) have also been used until fairly recently in Denmark (Lange 1959: 718; Brøndegaard 1979: 31). The common Finnish name *tyrni* (first recorded in 1850) is probably derived from Swedish *thörne* 'thorn' (Suhonen 1936: 177; Häkkinen 2004). Meänkieli speakers in the northernmost part of Sweden also know the bush as *tyrni* (Erling Wande *in litt*. 2015).

Fig. 2. Sea buckthorn, *Hippophae rhamnoides* (Palmstruch 1809).

Folk Botany and Local Use as Food

Although the sea buckthorn berries have a unique taste, the documentation about their historical utilisation is scarce in the Nordic countries. A dissertation from Åbo Academy in Finland from 1789 mentions, but contains little information about, the traditional economic use of sea buckthorn (Hellenius 1789). Sea buckthorn berries were, however, harvested and used. Linnaeus and Artedi noted during the early eighteenth century that fishermen living along the coast of the Gulf of Bothnia used the astringent crushed berries for a kind of

sauce served with fish dishes (Artedi [1729] 1985; Linnaeus 1737: 297; Linnaeus 1749: 60). Linnaeus' record that the berries were eaten also in the Åland Islands has often been quoted, but this was a lapse of memory, which Fredric Wilhelm Radloff was able to prove already in 1795 (Radloff 1795: 235).

In northern Sweden, coastal inhabitants used to break off whole branches with berries, which they then left to dry below the ceiling. During the winter, they would peel off the berries and make a custard of them, a habit known until the beginning of the twentieth century (Grapengiesser 1922: 315; Ågren 1976). A recipe by Selma Brackander, wife of the lighthouse keeper at Gaddens fyr, Holmöarna, Västerbotten, was recorded in 1911. Her recommendation was that the berries should be consumed as juice, after being cooked in 10 litres of water:

> The berries are so juicy and have such a thin peel that they cannot be picked one by one, one has to use the whole branch. The water is brought to the boil and the branches are dipped in the water until the berries are crushed. The branch is then pulled up to the pot's edge and the berries and juice will drop off by themselves. When the juice is thick enough, it is filtered through a cloth, put into bottles, corked, and the cork is sealed with resin. The juice is mostly and best used for custards. (ILF: ULMA 29403:19)

The berries were also dried and used as a flavour additive on porridge or gruel in northern Finland (Svanberg 2013). They had to be picked after they had frozen in late autumn, otherwise the berries would be too acid and unpleasant to eat. After freezing, the berries were regarded as delicious and eaten also by children. In north-western Jutland in Denmark, peasants used the berries to make gruel (Brøndegaard 1979: 32) and in Norway, according to records from Ørland, children ate the berries as a snack (Furuset 2009).

Fig. 3. Market vendor at Fyris torg, Uppsala, selling products made of wild sea buckthorn berries harvested in Uppland, Sweden. Photo: Börge Pettersson, 2002.

Applied Economic Botany

Carl Linnaeus' notes about sea buckthorn inspired some eighteenth-century economic practitioners to harvest and use the berries. His pupil Pehr Kalm, who wrote extensively on ethnobotany and documented peasant habits, also became enthusiastic about applied economic botany. He harvested sea buckthorn berries one summer in the early 1740s in Grisslehamn, Uppland, in order to "try to squeeze wine [out of them], or some other pleasant drink, or at least vinegar, preferably, as these berries have a cooling and invigorating taste, albeit slightly sour" (Kalm 1745: 252).

This experiment failed, however: the pressed juice fermented and just as Kalm began to hope for something more, the gardener inadvertently broke the juice jar in the cellar. "All my happiness and hopes were crushed," he wrote. Still, he gained some results: the cloth, through which he had filtered the juice, had turned a yellow colour which was impossible to wash out. He had found a new dye plant, and recommended it to the textile industry for development. Kalm believed firmly in the future potential of his project and sea buckthorn, and hoped that others:

> who have the opportunity to stay and live at the coast, where this tree grows abundantly, and where they could easily get [berries and other materials from] it, would continue experimenting, as both berries and bark provide dye, and also try to use it to make wine, vinegar or some other beverage. If one or both of these [experiments] are successful, just think what use one could have from a tree which is abundant in our archipelagos in the most meagre places [soil] and among hard rocks, where other trees and herbs cannot grow or thrive. (Kalm 1745: 253)

No further attempts to transform the berries into wine are documented in older sources. For a successful fermentation, large amounts of sugar are needed.

Modern Developments

When sugar became cheaper and easily available in northern Europe in the nineteenth century, many kinds of berries, which had been too sour for the peasant's taste, suddenly became popular (Svanberg 2012). Sugar entered rapidly into every household (Mintz 1986) and changed both tastes and cooking habits. The evolution of taste and demand for sugar as an essential food ingredient also resulted in a major dietary change. Among the berries which became interesting to harvest were also sea buckthorn. Danish coastal dwellers picked and sold the berries, cooked into jam, in the weekly markets in Copenhagen (Brøndegaard 1979: 32). Harvesting wild sea buckthorn berries has continued in Denmark until today. It appears to have been especially popular in home-flavoured schnapps, although juice and jam were also, and are still being, made (Meyer 2017: 326; Steerup & Kyster 2014: 104).

Fig. 4. Sea buckthorn berries. Photo: Ingvar Svanberg.

Although sugar nicely camouflaged the sour taste, it was still difficult to pick the berries because of the thorns. In Sweden and Finland, sea buckthorn berry

Fig. 5. A sign at a vendor's stall with sea buckthorn products at Helsinki Market Square, Finland. Photo: Osva Olsen, 2008.

picking remained a marginal occupation for the population in Norrbotten (North Bothnia), Västerbotten and Österbotten (Ågren 1976). Older cookbooks contain no recipes containing sea buckthorn, either in Sweden or in Finland. In the Åland Islands, the berries were not sought after until the mid-1900s (Palmgren 1913; Liro 1915; SLS: FMK 39). Yet, a note from Lemland in the 1930s states that the berries were sometimes prepared into a tasty drink accompanying food (SLS: FMK 81). In the 1970s, a survey in Sweden showed that there was a small group of people who picked the berries and prepared juice, custard, soup, jelly, or even home-made wine, but data about their social or commercial dimensions are lacking (Armfelt Hansell 1978: 380–387).

It was not until the 1980s that the alleged positive health effects of sea buckthorn were discovered by a growing health-conscious customer base in some Nordic countries. Despite the difficulties for pickers, harvesting berries from wild bushes in Uppland and Åland began on a larger scale. Sea buckthorn suddenly found a new role as health food (Svanberg 1998; Svanberg 2012; Ingmanson & Holmberg 2002: 60–61). The soft and juicy fruits are very rich in vitamin B12, vitamin C, vitamin E, carotenoids, and a variety of bioflavonoids (Bal et al. 2011). A study of ten Finnish populations showed that the vitamin C concentration varied from 28 to 201 mg/100g of berries among shrubs, and from 60 to 122 mg among the populations (Yao, Tigerstedt & Joy 1992).

Especially along the coasts of Finland, sea buckthorn picking became a profitable business, as interest in the high vitamin and nutritional content of the berries created a strong demand. The sharp thorns, however, cause serious difficulties for harvesters, and in Uppland, Sweden, those who harvest the berries have developed their own tools. Since the 1970s, it has been forbidden in Finland to use tools which damage the bushes. Only picking by hand is allowed, but the law was amended in the autumn of 2005 to also allow certain tools, yet only during specified periods and in some regions. The berries are mostly preserved by drying or freezing (Yao, Tigerstedt & Joy 1992; Svanberg 2013: 939).

Cordial and marmalade have been available in the weekly markets in Uppsala, Sweden, since the early 1990s, but profits remained low and harvests small-scale in the first decade (Svanberg 1998; Ingmanson & Holmberg 2002: 61). Today in north-western Finland and the Åland Islands, dishes containing sea buckthorn berries are considered regional specialities. Innovative chefs develop new dishes, which are served in restaurants as delicacies. Sea buckthorn is nowadays an integrated part of the New Nordic Cuisine movement (Łuczaj *et al.* 2012; Svanberg 2013; Signer 2017). Sea buckthorn berries are made into confectionery, cordial, ice-cream, jam, juice, marmalade, mash, parfaits, smoothies, sweets, yogurt products, and much more (Svanberg 2013). The main Swedish provider of alcoholic drinks, Systembolaget, also offers a beer (Clarys Honungs- och Havtornsöl) flavoured with sea buckthorn berries in its shops.

Other Uses

Although the berries, leaves and roots of sea buckthorn have been used in traditional medicine in several regions in Eurasia, for instance Mongolia, China, Russia, Tajikistan, Tibet and Turkey (Khan, Akhtar & Mahmood 2010; Suryakumar & Gupta 2011), there are few reports of sea buckthorn berries having been used in folk medicine in the Nordic countries. According to Norwegian botanist Johan Ernst Gunnerus (1772: 11), the peasants in Bindal and Nærøy in Norway used a potion made from the bark, leaves and flowers as a diuretic. From Vendsyssel in Denmark, records tell of using the juice on warts (Brøndegaard 1979: 32).

Another use is mentioned by Høeg (1974: 385), who suggested that as the tough, hard wood of sea buckthorn was used to make rake teeth in Trøndelag in Norway, its vernacular name, *tindved*, should be interpreted as 'rake tooth wood'. This interpretation has recently been questioned. Closer examination has revealed only three records of sea buckthorn being used in this way, all limited to the same municipality. Instead, *tind* could be interpreted as 'spike' or 'thorn' (Furuset 2009). The plant was, as Høeg himself also states, never popular among the Norwegian coast dwellers (Høeg 1974: 385).

Twigs and shrubs of sea buckthorn have been gathered as fuel by coastal inhabitants in Jutland (Brøndegaard 1979: 31). There are also historical Danish records of the berries being used for feeding pigs (Lange 1959: 719). In northern Sweden, the bush has been used to produce yellow and brown dye, just as Pehr Kalm recommended in the 1740s. The berries provide a rich yellow colour, and branches and leaves brown and red-brown nuances (Fridner 1999; Kalm 1745; Sandberg & Sisefsky 1981; cf. Brøndegaard 1979: 32).

Sea buckthorn shrubs were planted in gardens for ornamental purposes in the eighteenth century in Denmark. It was also used as a hedge plant in order to keep out cattle, and to create hiding places for pheasants (Brøndegaard 1979: 31). The Danish Code (*Dansk Lov*) from 1683 forbade the destruction of sea buckthorn thickets on the western Jutland coast, as its roots prevented erosion; the shrub has a long history of binding dunes along coastal areas in northern Europe, especially in Denmark (Brøndegaard 1979: 31). In Germany, the shrub has long been planted for ecological rehabilitation of degraded lands and control of soil erosion (Suryakumar & Gupta 2011).

Twigs from the wild bushes have had some ornamental use. In the 1930s, there was a certain demand for branches in the Nordic countries, as they fitted the decoration ideals of functionalism. The breakthrough of functionalist interior design replaced palms and ferns with tight cacti; sea buckthorn twigs were brought into this fashion trend, and demand grew rapidly (Sundstedt 1934). The branches also became common as decorations in shop windows and homes in Denmark and Sweden, and were sold in weekly markets and shops. In Sweden, most twigs were harvested in northern Uppland, and in Denmark

Fig. 6. A cake with a layer of sea buckthorn jam served in a confectionery in Tartu, Estonia. Photo: Ingvar Svanberg, 2019.

in eastern Møn. After 1935, the trend declined and demand fell (Sandberg 1937; Brøndegaard 1979: 32; Persson 1987), but the thorny branches still have some ornamental value.

The regional significance of sea buckthorn is shown by the fact that it was chosen as the provincial flower of the Finnish province Satakunta; it is also important in Åland Island cuisine, as well as in the northern areas of the Gulf of Bothnia. Sea buckthorn is depicted on a Finnish stamp from 1991. The wild plant has become a cultural symbol, although the berries which are consumed usually originate from cultivated specimens (Svanberg 2013).

Cultivated Sea Buckthorn

Wild sea buckthorn berries remain a marginal food product in the Nordic countries today and picking the wild berries is a hobby for a few enthusiasts. However, the unique taste and high content of vitamins have awakened the interest of the food industry. As the berries ripen, the vitamin C content decreases, which means that an early harvest supports the preservation of high concentrations of this vitamin. This has created new developments in cultivation and today most of the berries on the market come from cultivated sea buckthorn bushes.

Sea buckthorn has been cultivated and experimented with in Siberia since the 1930s with a view to producing bigger berries. In the 1980s, the bush became a popular cultivated plant in Sweden and Finland, as well as in many other countries in the northern hemisphere (Bal *et al*. 2011; Svanberg 2013). The bush is easy to cultivate and unpretentious about the soil. During the past few decades, sea buckthorn plants without thorns have reached the Swedish market from Russia via Finland. In particular, the vendors target Norrland in the north of Sweden. Finnish and Swedish authorities have also promoted it as a new crop, a kind of niche product for the future (Svanberg 2013).

Since 1986, experiments have been carried out at Balsgård in Sweden, in particular with the cultivars *Romeo* and *Juliet* of Russian origin; the female cultivar yields bigger harvests. Both are apparently suitable for the Swedish climate, and they are resistant against the plant pathogen (bacterium) *Pseudomonas syringae*. In 1997, 3,000 plants from Russia were brought to Öjebyn in Norrbotten, in the hope that they would provide the region with future income and a plant which is useful for the food industry. The experiment has been a success and it is now extended into a transnational cooperation project in the region of the northern Gulf of Bothnia (Larsson 1997; Svanberg 1998).

Many different cultivars of sea buckthorn exist today for fruit production, but some are also grown for ornamental purposes as garden plants (Jeppsson 1999). Since the 1990s, distinguishing between cultivated and wild berries available on the market has become very difficult. However, the majority of the products are made from cultivated plants. In 2011, sea buckthorn was cultivated on 171 hectares in Finland (Klemettilä & Jaakkola 2011; Svanberg 2013), but in 2020 the 172 companies cultivating sea buckthorn used 95 hectares which yielded a total of 30,000 kg berries. Almost half of these companies were located in Österbotten and along the coast, while three were in the Åland Islands (LUKE 2020).

In contrast, the berries are still, or at least until recently, primarily harvested from wild shrubs in Denmark (Meyer 2017: 326), and some pick the wild berries for household consumption in Finland and Sweden, too. Yet, it was only when cultivated plants became available on the market and abundant enough to yield larger harvests that the interest in sea buckthorn berries as a commercial food ingredient, especially in restaurants and confectioneries, increased and reached its present levels. Successful marketing of its health

benefits, quickly echoed by mass media in the 1990s and 2000s, has had a great impact on the general public's awareness of the merits of sea buckthorn.

Final Remarks

From having been a little known and used plant, sea buckthorn became interesting when the availability and cheaper price of sugar enabled consumption and preservation of its berries in the nineteenth century. Since then it has been on a slow upward trend, which has accelerated since the 1980s, especially in some countries in northern Europe. The products are sold today as the "Nordic super berry" or a "natural vitamin bomb," and restaurants, especially in Sweden and Finland, serve the berries in various forms, from sauces to jams and ice-creams. A wide range of sea buckthorn products is available in shops and supermarkets, not only as food or an alternative medication, but also in the form of cosmetics and hygienic products (shampoo and soap). The bush is also cultivated in Estonia and Latvia, as well as in northern Germany, Russia, North America, and Central and East Asia (Svanberg 2013). However, sea buckthorn berries are still a fairly expensive product and demand seems to have diminished in recent years.

There have been some other uses of sea buckthorn as well, and there is still a demand for sea buckthorn plants as ornamental garden plants in both Europe and North America. The thorny shrub provides protection for small birds, and the yellow berries last all winter. In addition, the shrubs are both cold and drought resistant, and hardy survivors in the cold climate in most of northern Europe (Löwenmo 1962: 166; Svanberg 2013). The shrub is also recommended for hedges (van Elsen & Immel 2001). The question is now what impact climate change, which is already transforming the vegetation also in the Nordic countries, will have on the sea buckthorn and its growth areas.

Human interest in different plants varies over time and the reason is not just economic or successful marketing, but factors such as resilience, edibility and harvesting are also important (Łuczaj *et al*. 2012; Łuczaj & Pieroni 2016; Svanberg 2012). Without sugar and the growing awareness of the health benefits of vitamins, sea buckthorn would probably have remained a forgotten plant of only minor local significance. This overview of the history of sea buckthorn shows that a wild shrub can become so important that cultivation and developing cultivars without thorns to make harvesting easier are seen as necessary. The rise of sea buckthorn also reflects the (r)evolution of taste and the vast and fast-growing public interest in health issues. The journey of the sea buckthorn berries from fishermen's sauce to fine dining in luxurious restaurants also highlights the importance of plant characteristics, such as plant pathogen resistance and modest soil requirements, which are essential for the plant to survive in a region with a harsh climate. This plant has also, probably more than any other, provided opportunities for regional cooperation across national borders in northern Europe, and especially in the area around the Gulf of Bothnia.

REFERENCES

Archival sources

ILF = Institute for Language and Folklore, Uppsala, Sweden: folklore records (ULMA).
SLS = The Society of Swedish Literature in Finland, Helsinki, Finland: The Archives of the Swedish Language (FMK).

Literature

Ågren, K. (1976). *Västerbottnisk örtabok* ['Herbal book from Westrobothnia'], Umeå: Västerbottens museum.

Ahlbäck, O. (1992). O*rdbok över Finlands svenska folkmål* 2 ['Dictionary of Swedish dialects in Finland 2'], Helsinki: Forskningscentralen för de nordiska språken.

Armfelt Hansell, Ö. (1978). *Mormors sylt och farmors saft* ['Grandma's jam and Granny's cordial'], Stockholm: LT.

Artedi, P. [1729] (1985). *Peter Artedi och Nordmalings flora jämte en levnadsteckning och en utredning av släkten Artaedius* ['Peter Artedi and the flora of Nordmaling, with a biography and investigation of the Artaedius family'], Nordmaling: Nordmalings hembygdsförening.

Bal, L.M., Meda, V., Naik, S.N. & Satya, S. (2011). "Sea buckthorn berries. A potential source of valuable nutrients for nutraceuticals and cosmoceuticals," *Food Research International*, 44:7, pp. 1,718–1,727.

Brøndegaard, V.J. (1979). *Folk og flora. Dansk etnobotanik* 3 ['People and flora. Danish ethnobotany 3'], Copenhagen: Rosenkilde og Bagger.

van Elsen, T. & Immel, K. (2001). "Nutzung und Gestaltung von Hecken und Wildfruchtgehölzen im Ökologischen Landbau," in *Beiträge zur 6. Wissenschaftstagung zum Ökologischen Landbau*, *6.–8. März 2001*, *Freising-Weihenstepahn*, Berlin: Verlag Dr. Köster, pp. 353–356.

Enkola, K. (1940). "Tyrnipensas (*Hippophaës rhamnoides* L.) Rauman saaristossa" ['Sea buckthorn (*Hippophaës rhamnoides* L.) in the Rauma archipelago'], *Silva Fennica*, 53, pp. 1–23.

Fridner, G. (1999). *Folkliga växtnamn i Västerbotten* ['Popular plant names in Westrobothnia'], Umeå: Dialekt- ortnamns- och folkminnesarkivet i Umeå.

Fries, E. (1880). *Kritisk ordbok öfver svenska växtnamn* ['Critical dictionary of Swedish plant names'], Stockholm: Norstedt.

Furuset, K. (2009). "Tindved *Hippophae rhamnoides* som emnetre for rivetinder" ['Sea buckthorn *Hippophae rhamnoides* as wood for rakes'], *Blyttia*, 67, pp. 179–182.

Grapengiesser, S. (1922). "En blick på Holmöarnas flora" ['A glance at the flora of Holmöarna'], *Botaniska Notiser*, 85, pp. 313–316.

Grapengiesser, S. (1936). "Några norrländska växtnamn" ['Some Norrland plant names'], *Norrland i ord och bild*, 9, p. 37.

Gunnerus, J. E. (1772). *Flora Norvegica*, *observationibus praesertim oeconomicis panosque norvegici locupletata*, Pars posterior, cum iconibus, Hafniae: Vinding.

Häkkinen, K. (2004). *Nykysuomen etymologinen sanakirja* ['Etymological dictionary of modern Finnish'], Helsinki: WSOY.

Hellenius, C.N. (1789). *De Hippophaë*, diss. Åbo University, Finland (Resp. P. Stenberg).

Høeg, O.A. (1974). *Planter og tradisjon. Floraen i levende tale og tradisjon i Norge 1925–1973* ['Plants and tradition. Botanicals in oral transmission and tradition in Norway 1925–1973'], Oslo: Universitetsforlaget.

Hultén, E. & Fries, M. (1986). *Atlas of North European Vascular Plants. North of the Tropic of Cancer*, Königstein: Koeltz Scientific Books.

Ingmanson, I. & Holmberg, P. (2002). *Svenska bärboken. Våra bär i historien, naturen och matlagningen* ['The Swedish book of berries. Our berries in history, nature and cooking'], Stockholm: Prisma.

Jeppsson, N. (1999). *Genetic Variation and Fruit Quality in Two New Berry Crops. Sea Buckthorn and Black Berry*, Alnarp: Swedish University of Agricultural Sciences.

Kalm, P. (1745). "Förtekning på några Inhemske Färge-gräs" ['List of some native dye plants'], *Kongl. Swenska Wetenskaps Academiens Handling*ar, 6, pp. 243–253.

Khan, B.A., Akhtar, N. & Mahmood, T. (2010). "A comprehensive review of a magic plant, Hippophae rhamnoides," *Pharmacognosy Journal*, 2:16, pp. 65–68.

Klemettilä, H. & Jaakkola, L. (2011). *Mansimarjasta punapuolaan. Marjakasvien kulttuurihistoriaa* ['From strawberry to cloudberry. Cultural history of berry plants'], Helsinki: Maahenki.

Lange, J. (1959). O*rdbog over Danmarks plantenavne* 1 ['Dictionary of Danish plant names 1'], Copenhagen: Munksgaard.

Larsson, B. (1997). "Havtorn – vår nordliga vitaminbomb" ['Sea buckthorn—our northern vitamin bomb'], *Norrbottningen* 10 August.

Linnaeus, C. (1737). *Flora lapponica*, Amstelædami: Salomon Schouten.

Linnaeus, C. (1745). *Flora svecica*, Stockholm: Lars Salvius.

Linnaeus, C. (1749). *Flora Oeconomica, Eller Hushålls-Nyttan Af de i Swerige, Wildt wäxande Örter* ['Flora economica, or economic uses of Swedish native plants'], Stockholm: Lars Salvius.

Linnaeus, C. (2003). *Iter Lapponicum = Lappländska resan 1732* 1. *Dagboken* ['A tour in Lapland 1732 1. The diary'], utgiven efter dagbokshandskriften av Algot Helbom, Sigurd Fries och Roger Jacobsson, Umeå: The Royal Skyttean Society.

Liro, J.I. (1915). *Åländska växtnamn* ['Åland plant names'], Helsinki: Societatis pro fauna et flora fennica.

Löwenmo, R. (1962). *Trädgårdens buskar och träd i färg* ['Garden shrubs and trees in colour'], Stockholm: Almqvist & Wiksell.

Łuczaj, Ł., Pieroni, A., Tardio, J., Pardo-de-Santayana, M., Sõukand, R., Svanberg, I. & Kalle, R. (2012). "Wild food plant in 21st century Europe. The disappearance of old traditions and the search for new cuisines involving wild edibles," *Acta Societatis Botanicorum Poloniae*, 81, pp. 359–370.

Łuczaj, Ł. & Pieroni, A. (2016) "Nutritional ethnobotany in Europe. From emergency foods to healthy folk cuisines and contemporary foraging trends," in *Mediterranean Wild Edible Plants. Ethnobotany and Food Composition Tables*, eds. M.C. Sanchez-Mata & J. Tardío, New York: Springer, pp. 33–56.

LUKE Natural Resources Institute Finland (2020); https://statdb.luke.fi/PXWeb/pxweb/en/LUKE/LUKE__02%20Maatalous__04%20Tuotanto__20%20Puutarhatilastot/03a_Avomaatuotanto_syotavat.px/table/tableViewLayout2/?rxid=001bc7da-70f4-47c4-a6c2-c9100d8b50db; access date 17 Dec. 2021.

Marzell, H. (1972): *Wörterbuch der deutschen Pflanzennamen* 2, Leipzig: Verlag S. Hirzel.

Meyer, C. (2017). *Store Naturalmanak* ['Large nature calendar'], Copenhagen: Lindhardt og Ringhof.

Mintz, S. (1986). *Sweetness of Power. The Place of Sugar in Modern History*, New York: Penguin Books.

Nordic Council of Ministers (2008). *The New Nordic Cuisine*, Copenhagen: Nordic Council of Ministers.

Olsson, P.H. (1896). "Svenska växtnamn i sydvästra Finland" ['Swedish plant names in south-western Finland'], *Botaniska Notiser*, 59, pp. 1–10.

Palmgren, A. (1913). *Hipphophaës rhamnoides auf Åland*, Helsinki: Societatis pro fauna et flora fennica.

Palmstruch, J.W. (1809). *Svensk botanik* 6 ['Swedish botany 6'], Stockholm: Carl Delén.

Persson, O. (1987). "Havtorn. Den undanskymda busken som blommade under funkistiden" ['Sea buckthorn. The hidden shrub which flowered during the functionalist era'], *Studiekamraten*, 69:2, p. 12.

Radloff, F.W. (1795). *Beskrifning öfver Åland* ['Description of Åland'], Åbo: J.C. Frenckell.

Sandberg, G. (1937). "Handeln med havtorn. En naturskyddsundersökning" ['Trade in Sea buckthorn. A nature conservation survey'], *Sveriges Natur*, 28, pp. 37–50.

Sandberg, G. & Sisefsky, J. (1981). *Växtfärgning* ['Dyeing with plants'], Stockholm: Norstedt.

Schagerström, A. (1889). *Ordlista öfver Vätömålet i Roslagen* ['Word list of the Vätö dialect in Roslagen'] (Nyare bidrag till kännedom om de svenska landsmålen ock svenskt folklif 10:1), Stockholm: Norstedt.

Signer, R. (2017). "The new Nordic. The Scandinavian food trend that's suddenly everywhere," *The Vogue* 1 March.

Ståhlberg, S. & Svanberg, I. (2010). "Gathering food from rodent nests in Siberia," *Journal of ethnobiology*, 30:2, pp. 184–202.

Ståhlberg, S. & Svanberg, I. (2011). "Gathering dog's tooth violet (*Erythronium sibiricum*) in Siberia," *Journal de la Société Finno-Ougrienne*, 93, pp. 339–352.

Steerup, N. & Kyster, C. (2014). *Kryddersnapse og hvad dertil hører* ['Flavoured schnapps and what goes with it'], Copenhagen: Linghardt og Ringhof.

Suhonen, P. (1936). *Suomalaiset kasvinnimet* ['Finnish plant names'], Helsinki: Societatis Zoologicæ-Botanicæ Fennicæ Vanamo.

Sundstedt, F. (1934). *Den svenska växtvärlden. En botanisk läsebok* ['The Swedish plant world. A botanical reader'], Stockholm: Nordisk Rotogravyr.

Suryakumar, G. & Gupta, A. (2011). "Medicinal and therapeutic potential of Sea buckthorn (*Hippophae rhamnoides* L.)," *Journal of Ethnopharmacology*, 138:2, pp. 268–278.

Svanberg, I. (1998). "Knallgul saft på Fyris torg" ['Intensely yellow cordial at Fyris torg'], *Biodiverse*, 3:3, pp. 8–9.

Svanberg, I. (2012). "The use of wild plants as food in pre-industrial Sweden," *Acta Societatis Botanicorum Poloniae*, 81, pp. 317–327.

Svanberg, I. (2013). "Sea Buckthorn," in *Encyclopedia of Cultivated Plants* 3, ed. C. Cuno, Santa Barbara, CA: ABC-CLIO, pp. 937–940.

Svanberg, I. & Ståhlberg, S. (2021) "Wild European dewberry, *Rubus caesius* L. (fam. Rosaceae), in Sweden. From traditional regional consumption to exotic dessert at the Nobel Prize banquet," *Journal of Ethnic Foods*, 8; doi.org/10.1186/s42779-021-00114-3; access date 4 March 2022.

Thedenius, K.F. (1871). *Flora öfver Uplands och Södermanland fanerogamer och bräkenartade växter* ['Flora of vascular plants and ferns of Uppland and Södermanland'], Stockholm: Thedienius.

Yao, Y., Tigerstedt, P.M.A. & Joy, P. (1992). "Variation of vitamin C concentration and character correlation between and within natural sea buckthorn (*Hippophae rhamnoides* L.) populations," *Acta Agriculturae Scandinavica, Section B—Soil & Plant Science*, 42:1, pp. 12–17.

AUTHORS

Dr. *Sabira Ståhlberg* is an independent scholar focusing on cultural and historical studies, ethnobiology, and linguistic and cultural contacts in Central and East Asia, Siberia, and the Balkans.

sabirien@pm.me

Ingvar Svanberg is senior lecturer at the Institute for Russian and Eurasian Studies, Uppsala University, Sweden. His research focuses on ethnobiology, fishing cultures and food studies. He has published several books and scientific articles in these fields.

ingvar.svanberg@ires.uu.se

Louise Bäckman (1926–2021)

Photo: Anneli Bäckman

Professor Louise Bäckman passed away on 4 October, 2021, just over a month before she would have celebrated her ninety-fifth birthday. Those who will feel her absence most acutely are her children, Nils and Lena, and their families. Her son Ulf passed away in 2018.

Louise Bäckman held several honorary posts, both in the Sami academic world and in international academia. She became a Fellow of the Royal Skyttean Society in 1986, an Honorary Doctor at Umeå University in 2003, and was one of very few Honorary Life Members of the International Association for the History of Religions (IAHR). She received various accolades from Sami organisations, including the development prize of the Sami Women's Forum (Sámi NissonForum) in 2010 and special prizes from the Umeå Sami Week (Ubmejen Biejvieh) in 2012 and from the Swedish Sami Association (Sámiid Riikkasearvi) in 2019.

Louise Bäckman's passing marks the end of a truly remarkable academic career. Louise (or Göta, as she was called at home) was born into a reindeer herding family whose summer settlement lay at the foot of the sacred mountain Aatoeklibpie (Atoklimpen). From early childhood she showed an interest in Sami traditions and began to ask her father and other community elders to share what they knew about traditional Sami conceptions of the world. From the age of seven until she was thirteen, she received just six months of schooling each year. At the boarding school, away from their families, pupils were not allowed to speak their own language, Sami, and had to use Swedish instead. Teaching focused on Swedish language, history, and culture. This would have discouraged most people in her position from pursuing higher education, but not Louise, who continued studying, initially from home by correspondence course, while still helping her parents. As a young woman, she moved to Stockholm where she followed evening classes, despite a full-time job as an office employee. After taking the equivalent of A-levels, she married, became a mother, and raised three children. Beside a job as a supply teacher, she entered university, where she studied ethnography, history of literature, and later comparative religion. With an MA under her belt, she continued to focus on comparative religion, obtaining a licentiate's degree in 1971. In 1975 she successfully defended her doctoral thesis on the South Sami *saajve*-beings, becoming only the third Sami in history to gain a doctorate, the earlier two being Johan Gerhardsson, later Graan (1610–1679), and Israel Ruong (1903–1986). Louise Bäckman was engaged as a senior lecturer and later as a reader at the Department of Comparative Religion, Stockholm University. In 1986, her appointment as professor in the same field and at the same university made her not just one of very few female professors but also the first Sami to occupy a professorial chair.

Back in the day when Louise Bäckman began studying Sami indigenous religion, the most common interpretative approach was to ask questions of origin and nearly

everything in Sami religion was regarded as borrowed from the Scandinavians. One of her most important achievements was to question that approach, studying Sami religion instead for its own sake, rather than as an offshoot of Old Norse religion. By studying aspects of Sami religion in relation to Eastern parallels, she could show that the religious traditions of the Sami were far more probably indigenous, even if some names and concepts were loans. In her research, she endeavoured to distinguish between what was originally Sami and what had been coloured by Scandinavian and Christian traditions. Also, she was keen on regionalising the Sami traditions and often emphasised that they had changed over the course of time.

A theme she returned to frequently in her research was the *noaidi*, the most important ritual specialist, whom outsiders—from the Old Norse texts right up to our time—have presented as a sorcerer, terrifying and dangerous, whereas in Sami society he was respected and had important functions as mediator, healer, prophet, leader of ceremonies, cultural guide, and both a stabilizer and a renewer of society, to borrow some of the terms Bäckman used to describe the *noaidi* in one of her articles. During her retirement, one of the projects Bäckman worked on was a monograph about the destructive impact of Christian missionizing on Sami culture, from the Middle Ages onward, a project that sadly proved impossible to complete due to her steadily deteriorating eyesight.

Bäckman often spoke of her disappointment on realising just how few of the indigenous religious traditions had been conveyed to younger generations in the area where she grew up, even in the form of stories, and how frustrating it was to have to rely on the biased written sources from the seventeenth and eighteenth centuries when she studied Sami religion. By means of a close reading, undertaken with recourse to her own Sami background, she was, however, able to find Sami voices in at least some of those texts. Thus, recognising how important it is for Sami culture and religion to be studied by Sami researchers, she encouraged Sami students to continue studying their own culture.

Louise Bäckman was a source of inspiration in many circles, as a woman and a Sami, as a researcher and a teacher. She was enormously knowledgeable, but very humble. Her thirst for knowledge and dedication to research were remarkable. Her research texts dramatically changed our understanding of indigenous Sami religion. In addition, she was a good listener who knew how to make those around her feel safe. She set many good examples for us who knew her to follow. We will keep her in grateful memory.

Håkan Rydving
Dept. of Archaeology, History, Cultural Studies, and Religion
University of Bergen
Norway
hakan.rydving@uib.no

Roger Andersson (ed.), *Heliga Birgittas texter på fornsvenska. Birgittas Uppenbarelser. Bok 5* (Sällskapet Runica et Mediævalia. Editiones 14), Stockholm: Sällskapet Runica et Mediævalia 2020, ISBN 9789188568786, 126 pp.

The infrastructure project "Bridget of Sweden digitally. Making St Birgitta's revelations in Old Swedish accessible" is supported by Stiftelsen Riksbankens Jubileumsfond. The project is aimed at making all text carriers of Bridget's writings available online in high-resolution colour images, transcribing all text witnesses and preparing a "critically comparative and synthetic edition." The work will result in both a printed book and a digital online version published by the Literature Bank. The previous four volumes have been presented in this chronicle and we will now turn our attention to the fifth, which occupies a special position in the text corpus, both formally and content-wise. Unlike the previous volumes, it is set up as a series of questions (*interrogaciones*) which are asked by an inquisitive monk to our Lord, i.e., it is a "book of questions," as stated in chapter 1. Among the questions are also some revelations (*revelaciones*), where, in the customary manner, the Father, the Son or the Virgin Mary speaks to Birgitta. Initially, Roger Andersson provides an elucidatory account of the origin of the text and the Old Swedish adaptation. There are some obvious differences between the Old Swedish translation and the Latin original. For example, chapters 23–26 (pp. 113–121) in the Old Swedish translation do not exist in Book 5 of the Latin original; these added chapters may be characterised as being central to Bridgettine piety and monastic life in Vadstena. All *interrogaciones* in the Latin text are included, but four of its *revelaciones* are completely excluded. It is interesting that, for example, the fourth revelation, which describes Mary's beauty, is not included. In this revelation, the different parts of her body are examined one by one "in a rather sensual way with an emphasis on the degree to which Mary's virtues pleased the Son" (p. 17)—perhaps this text was perceived as being too candid. In addition, certain tendencies can be observed in the Old Swedish adaptation. Andersson points to a certain dilution of the original content consisting in descriptions of people and places being less concrete due to the fact that the Old Swedish adaptation is more focused on religious edification. A few examples of the content of the book will be given here. For example, the monk asks (p. 25): "Why should I strive for divine wisdom when I have worldly wisdom?" The initial reply to this question is "He who is wise in the world is blind and foolish in the divine. In order to receive divine wisdom, it must be pursued with humility and diligence," after which the reply is further elaborated on. There are many kinds of questions, for example: "Why were cruel animals and harmful worms created?" (p. 27), "Why do the words *ugly* and *beautiful* ('fwlt ok faghert') exist at all?" (p. 34), "Why can't we see angels and devils?" (p. 39), "Why was God born of a virgin?" (p. 60) and "What are the causes of disease and suffering?" (p. 78). Andersson states at the outset that, in this book, God "is compelled to take a stand on, and provide answers to, a series of questions about the mysteries of faith that arise in the human mind" (p. 9), and provides an apt quote by Bridget Morris who, on the subject of this book, stated that it "articulates a genuinely searching and reflective debate—by a woman—that excapsulates and embodies ordinary Christian life and morals in mid-fourteenth century Sweden." However, the book provides rewarding reading also for people of a much later time. This publishing project is proceeding in a purposeful manner, which is highly gratifying.

Lars-Erik Edlund
Dept. of Language Studies
Umeå University
Sweden
lars-erik.edlund@umu.se

Kåre Hoel, *Bustadnavn i Østfold 19. Eidsberg. Utgitt av Institutt for lingvistiske og nordiske studier, Universitetet i Oslo ved Tom Schmidt*, Oslo: Novus Forlag 2020, ISBN 9788270999286, 711 pp. + map.

With the publication of this very extensive penultimate volume, this onomastic masterpiece will soon be completed. As has been stated in several previous chronicles, the interpretations in *Norske Gaardnavne* (*NG*), Kåre Hoel's extensive treatment of the area's place-names and the' editor's, in this volume Tom Schmid's, name investigations are presented separately. There are three parishes in Eidsberg herred, viz. Eidsberg, Trømborg and Hærland. By all accounts, the interpretation of *Eidsberg* can be based on the terrain word *eið* 'a path along a body of water,' where, thanks to Kjell Frøyset's terrain studies, the old travel routes have been clarified (pp. 21 f.). The second element in *Trømborg* is *borg* 'stronghold, castle,' a name element which may also have denoted a height reminiscent of a castle, while the first element appears to be a byname, **Treginn*, the background of which is discussed (p. 329). *Hærland* derives from the name of the Hærland farm, where the second element *land* 'land, soil' is likely preceded by the river name *Hæra*, whose reference is subject to a thorough discussion (p. 446). It is easy to find many other interesting name investigations in the volume. Regarding the name *Elgetun* (pp. 31 ff.), two completely different interpretations are presented, where a pre-Christian sacral interpretation—based on an assumed but highly questionable **elgr* fem. thought to be related to Gothic *alhs* 'temple'—is contrasted with an interpretation based on the animal name *älg*, where the compound **elgjartún* would likely mean a 'fenced-in area for moose,' denoting a trapping device. Also given the remote location of the farm, the authors favour the latter interpretation (pp. 31 ff.). Another interesting discussion involves the first element in *Biltveten*, where a connection of this element to Old Norse *bildr* m. 'ploughshare' is preferred, here, as in other parts of the Nordic countries, used for comparative purposes about a terrain formation: "a small, but pronounced ridge that ends in a sharp point" (p. 286). Another rewarding investigation is that of *Skjør* (pp. 291 f.) in connection with **stjórr* m., **stjór* n. 'staff, rod,' referring to a protruding and tapering neck of land or ridge. With regard to *Rånås* (pp. 330 ff.), the discussion results in an informative name investigation in which individual writing forms are analysed and possible etymologies weighed against each other. The obscure name of *Tenor* (pp. 49 f.) is perceived by Hoel as a compound with *hóll* 'rounded height' in the second element and a formation from the Old Norse verb *þenja* 'stretch' in the first element; based on this interpretation, the name would likely mean 'the extended (wide) height,' a thought-provoking derivation which is also factually substantiated. *Kviller* (pp. 506 ff.) is convincingly interpreted in relation to other *kvill* names (which have been investigated by Harry Ståhl) as a designation for a 'fork (in a watercourse).' The background of *Neple* (pp. 372 f.), which seems to be a name derived from an older **Kneppill*, from *knappr* 'button,' referring to a height, is the subject of another thoughtful investigation. *Klypa* (pp. 461, 510, cf. p. 584) also originally referred to a terrain formation, a narrow area of land. Several explanations are given for the name *Lyeholen* (pp. 73 f.), and it is not immediately easy to determine conclusively which is the most likely one. The first element of *Barkerud* (pp. 119 f.) is also ambiguous; it seems likely that it contains a personal name which is not easily interpreted, but other alternatives should be kept open. The old *vin* name *Mysen* (pp. 145 f., cf. p. 186) is another name whose background does not seem to have been clarified in all respects, as the assumed river name in its first element is associated with quite a few diverse problems. The first element in *Finnestad* (pp. 23 f.) is also ambiguous and there are several different interpretation alternatives. It is also difficult to get to grips with the first element of *Tulkeryd* (pp. 471 f.). The name *Tattafin* (p. 90) is something of an enigma. For a number of reasons, however, it can hardly be interpreted in the way suggested by Ola Stemhaug, namely from the elements *tatte* 'nipple' and *finn* 'sharp edge.' A well-motivated correction of Rygh is found under *Køya* (pp. 211 f., cf. p. 301), which quite simply seems to be the definite form of *køy* 'primitive cabin, primarily one made of earth,' and thus has nothing to do with *køya* fem. 'small, marshy place with tall grass'

(see *NG* I, p. 72). Quite a few more recently formed names are also treated of, e.g., humorous names like *Tempelet* (p. 106) and the imperative names *Skrapopp* (p. 115), *Tromopp* (pp. 382 f.) and *Pissut* (p. 462). There are of course also a number of transfer names in the area, with *Sululand* (p. 119) and *Kongo* (p. 125) being two of the more eccentric ones. In this connection, the borrowed names *Sorgenfri* (p. 228) and *Fuglesangen* (pp. 245 f.) can also be mentioned. In addition, the national romanticist name *Breidablick* (p. 238), the laudatory name *Frydenlund* (p. 242) and the derogatory name *Styggtomt* (pp. 72 f.) are discussed. *Roligheta* (p. 414) is an example of a young place-name. At the end of the book is a section of lost names and older district and village names, which is followed by an extensive section on topographical words (pp. 563–612). An eighty-page index completes the book. This is as mentioned the penultimate volume in the series *Bustadnavn i Østfold*. The twentieth and last volume is presented in this chronicle where more general views on the entire publishing project can be found.

Lars-Erik Edlund
Dept. of Language Studies
Umeå University
Sweden
lars-erik.edlund@umu.se

Kåre Hoel, *Bustadnavn i Østfold 20. Rakkestad. Utgitt av Tom Schmidt*, Oslo: Novus Forlag 2021, ISBN 9788270999323, 679 pp. + map.

With the publication of the twentieth volume, this major publishing project is now completed. As is well-known by now, the interpretations in *Norske Gaardnavne* (*NG*), Kåre Hoel's treatment of the district's place-names and Tom Schmidt's name investigations are presented separately, as a result of which one sometimes gets an insight into interesting internal name discussions. Rakkestad herred consists of three parishes, Rakkestad, Degernes and Os, and these names are investigated in this volume. In *Rakkestad*, a name which is well recorded from an early date, the first element is ambiguous. Hoel (p. 21), however, appears to be in favour of his predecessor's, Rygh's, suggestion that it is an otherwise unknown male name. *Degernes* is originally the name of a large headland (from Old Norse *digr* 'large') (p. 255), while O*s* derives from *os* 'mouth of a river' (p. 393). Naturally, the volume also contains investigations of many older names, for example, *Kån* (pp. 49 f.), which derives from a word corresponding to Old Norse *kaun* 'boil, abscess' and probably refers to a round height. It is believed that the first element of G*julum* (pp. 74 f.), a *vin* compound, contains *gjor*ð fem. 'a band that goes around something,' referring to some kind of round enclosure, perhaps even a kind of holy place. G*udum* (pp. 43 f.) is a *heim* name, composed with *gu*ð, which belongs in a sacral context together with *Lund* (p. 48) and a lost *Þinghbærghom* (p. 44). The reader is invited into an interesting discussion between Rygh, Hoel and Schmidt about the *vin* name *Hen* (pp. 201 ff.), probably formed from *hå*, meaning 'meadow with a good regrowth.' The same can be said for the discussion about the factual background of *Skjekle*, derived from a word meaning 'outer edge,' perhaps "originally a lake name denoting the long and narrow Skjeklesjøen, but it may also have been used about the relatively narrow road on the west side of the lake" (p. 368). Several intricate questions are brought up in the discussion about the first element of *Skjøljabogen* (pp. 268 ff.), and quite how *Frøne* (*j Fridnu*; pp. 121 f.) is to be understood is not clear, at least not factually. As for *Velund* (pp. 344 ff.), it appears that the discussion is not quite settled. There are also certain problems involving the etymology of the first element in *Dørjuhaugen* (pp. 456 ff.), and the first element of *Røsek* (pp. 437 f.) is very difficult to interpret. As regards *Ski* (from an original *Skei*ð) (pp. 172 f.), derived from s*kei*ð 'running or horse-racing track,' or 'village road between fields,' it would have been useful if the discussion could also have included some Swedish names derived from the same element. This also applies to the discussion of *Lannem*

(pp. 325 ff.) where parallel Swedish names might have been considered. As in the previous volumes, some more recent names are also included, for example humorous imperative names such as *Rivopp* (p. 52), *Tullopp* (p. 264) and *Tittut* (p. 423). The name *Finnpå* (p. 126) may have its origin in a spoken phrase like "finn på noe, du," but this is, of course, only a speculative theory. It is not unlikely that a coarser sense of humour is behind the names *Ettfitt* (p.140) and *Tofitt* (p. 142) in view of what is said about *Tafitrud* (p. 316). *Kaffikjær* (p. 403) is another humorous name, which can be interpreted as 'the place where they like coffee.' *Pettersborg* is a later coinage which derives from a personal name but in all probability also from the Russian city name (p. 32). *Bergenshus*, *Bernhus* (pp. 36 f.) are of course named after *Bergenshus*, and other transfer names are *Asterdam* (*Amsterdam*; p. 220) and *Lybekk* (pp. 242, 259, 440). The name *Fuglesangen* (pp. 191, 476) is ubiquitous in the area; no less than eleven places in *Østfold* bear this name. A special section is devoted to a number of lost names and district names. Among the latter, *Skaun* (pp. 529 ff.) is the subject of an interesting discussion in which Eva Nyman's accurate interpretation is presented. This is followed by a list of topographical names which shows that there are six names that end in *heim* (pp. 548 f.) in Rakkestad herred, possibly two belonging to an older group of names ending in *lösa* (pp. 558 f.), some sixty older names ending in *rud* (pp. 566 ff.), about twenty in *stad* (pp. 572 f.) and four in *vin* (pp. 578 f.). The volume is concluded with a literature list and extensive indexes. Having reviewed the different parts of *Bustadnavn i Østfold* in *Journal of Northern Studies* for many years now, it is now time to sum up my overall impressions of this work. First of all, great credit must be given to Oluf Rygh's pioneering work *Norske Gaardsnavne* and his interpretations, which are so often correct. At the same time, it is striking how many additional place-names in Østfold Kåre Hoel has presented and interpreted in this work. In addition to the ancient names, we also find a large number of later names which are important to investigate. True, these place-names are not etymologically challenging, but they illustrate very well the multifaceted nature of name formation, with associative name formation, names patterned on other names, transfer names etc. This is a treasure trove of names which is given rightful place in the volumes, in the same way as in many of the volumes in the Swedish place-names series *Ortnamnen i Göteborgs och Bohuslän* and *Skånes ortnamn*. Building in a constructive manner on Hoel's research, the editors', Tom Schmidt's (volumes 1, 3, 5, 7, 9, 11 and 13–20) and Margit Harson's (volumes 2, 4, 6, 8, 10 and 12) discussions sometimes result in convincing linguistic and factual revisions of Hoel's interpretations, always in a considerate dialogue with the latter. Their name interpretations are usually well underpinned, not least factually, but in a number of places, I would have like the editors to have argued more clearly for one particular alternative where several are given. It is a pity that it has not been possible to include photographs and map segments in the work, not least with a view to substantiating the name interpreters' factual considerations. In the most recent volumes of the official Swedish place-name publications *Sveriges ortnamn*, *Skånes ortnamn*, *Ortnamnen i Göteborgs och Bohuslän* and *Övre Norrlands ortnamn*, photographs and maps significantly enhance the presentation. In connection with some derivations, one sometimes misses reference points from word and name material from other Nordic languages. The carefully crafted list of topographical words deserves praise, as do the extensive indexes, which make *Bustadnavn i Østfold* a valuable encyclopaedia for Nordic name researchers (all names will eventually be made searchable in a digital index). When one looks at this impressive suite of twenty volumes, Horatius' classic words *monumentum aere perennius* come to mind, as this is a lasting masterpiece in the field of Nordic onomastics. We owe a great debt of gratitude to Tom Schmidt and Margit Harsson for bringing Kåre Hoel's work to a successful conclusion in such a purposeful manner.

Lars-Erik Edlund
Dept. of Language Studies
Umeå University
Sweden
lars-erik.edlund@umu.se

Irene R. Kupferschmied, *Die altisländischen und altnorwegischen Marienmirakel*, 2 vols. (Münchner Nordistische Studien 17), München: Herbert Utz Verlag 2017, ISBN 9783831642779, 467 pp. + 176 pp.

It is well-known among scholars of Old Norse-Icelandic hagiographic literature that the corpus of Marian material is vast and complex and that, as such, any study of its contents presents an enormous challenge to the researcher. The publication of C.R. Unger's two-volume edition *Maríu saga* in 1871 provided an important basis from which later scholars, such as Hans Schottmann, Ole Widding, William Heizmann, and others could build in the following centuries. However, the Marian miracle tradition has not been given comparable scholarly attention as *Maríu saga* and Marian poetry, nor has it been treated comprehensively and in a way that traces the various individual miracles' Latin sources and manuscript dissemination. Irene R. Kupferschmied's study on and concordance of Old Norse-Icelandic Marian miracles is, therefore, an extremely welcome contribution to scholarship on Old Norse-Icelandic hagiographic literature, and serves as a valuable and indispensable resource for scholars interested in working on miracle literature from medieval Iceland and Norway.

Die altisländischen und altnorwegischen Marienmirakel, which is based on Kupferschmied's doctoral research, comprises two volumes. Volume 1 is the main part of the study, and contains seven chapters, including the introduction and the summary chapter. The introduction summarizes previous scholarship on the Old Norse-Icelandic life and miracles of the Virgin Mary, thereby situating Kupferschmied's work and demonstrating its importance. Kupferschmied states that "Die vorliegende Arbeit hat sich zum Ziel gesetzt, neue Erkenntnisse über die Erstehung und Bearbeitung der Marienmirakel in Norwegen und Island zu gewinnen" ['the aim of the present work is to gain new knowledge about the creation and editing of Marian miracles in Norway and Iceland'] (p. 10). The author then provides brief summaries of the contents of the two volumes, and outlines textual and translation principles.

The main body of Volume 1 is chapters 2–7. Chapter 2 focuses on Marian devotion in Norway and Iceland during the Middle Ages, and provides an excellent and important context for the philological analysis of material that follows. It begins with an overview of the development of Marian veneration in Europe, and considers the peak of Marian devotion among monastics around the time of the twelfth century. The appeal of the Virgin Mary to a broader public is then discussed, and evidence of Marian veneration in Norway and Iceland and impacting factors (and figures) on Marian devotion are the focus of the remainder of the chapter. Chapter 3 then defines Marian miracles and miracle collections, and discusses miracles as a phenomenon, their importance to people of the Middle Ages, and their regulation by the medieval church. Kupferschmied then looks at Marian miracles as literary evidence, and considers their relationship to Marian legends before turning to Marian miracles in medieval literature. Miracle versions and variants of motifs are discussed, as are particular features and structural motifs of miracles. Chapter 4 provides an overview of the different Old Norse-Icelandic Marian miracle collections and Marian legends. European exemplars are discussed before turning to groups of Old Norse-Icelandic Marian miracles. Next is a discussion of the manuscript witnesses and collections of Old Norse-Icelandic miracles of the Virgin Mary. The final section of this chapter examines the three redactions of *Maríu saga*, focusing on authorship, sources, and key features of each redaction.

Chapters 5 and 6 focus on the two groups of Old Norse-Icelandic Marian miracles; the former chapter focuses on the so-called "classical" collection (*"klassische" Sammlung*) of Marian miracles—Mirakelsammlung B. The older B-collection of miracles, of which there are three complete representatives, shows a much greater influence from Latin models. Chapter 6 turns to the "innovative" miracles (*"Innovative" Mirakel*) in other miracle collections, which draw independently from a number of sources and often function as short *vitae* of important figures from church history (such as Hugo of Cluny, Bernhard of Clairvaux, and Petrus Monoculus). In this way, the Marian miracles echo the two stages of Old Norse-Icelandic hagiography:

the first stage, in which legends were straightforward translations of Latin models, and the second, in which legends were written in florid style and were compiled from a variety of sources, and often included commentary. Kupferschmied concludes that the tradition of Marian miracles "zeugen somit vom regen Geistesleben in Norwegen und Island im Mittelalter, von der Gelehrsamkeit der Kompilatoren und der Marienverehrung der Bevölkerung" ['thus testify to the lively intellectual life of Norway and Iceland in the Middle Ages, of the erudition of the compilers and the Marian veneration of the people'] (p. 425).

Volume 2 comprises an extremely useful concordance of Marian miracles, which provides a tremendous service to any scholar working on Marian material in Old Norse-Icelandic translation. The lengthy and detailed concordance lists and summarizes the 237 individual miracles extant in Old Norse-Icelandic tradition and the manuscripts in which they occur. This section is followed by a catalogue of those 46 manuscripts containing Marian miracles and *Maríu saga*, and includes details on the specific miracles included as well as other texts preserved in each manuscript witness. The second volume concludes with an alphabetical miracle index.

Kupferschmied is to be applauded for her thorough and excellent study of the Old Norse-Icelandic Marian miracle tradition, and for providing a worthy addition to existing studies on literature on the Virgin Mary from medieval Iceland and Norway. I would welcome this study (or a summary of it) in English translation, so that it might be more widely available to non-German speaking scholars working both within and outside of the field of Old Norse-Icelandic studies on medieval Marian literature and devotion. At the very least, the concordance might be made available as a translation, as it is an extremely valuable resource for scholars and deserves the maximum possible visibility. As a whole, Kupferschmied has done a major service to scholars of medieval Icelandic and Norwegian hagiography, and her work will surely be a fundamental reference work for many years to come.

Natalie M. Van Deusen
Modern Languages and Cultural Studies Dept.
University of Alberta, Canada
vandeuse@ualberta.ca

Katharina Leibring & Ingvar Svanberg (eds.), *Nötkreatur i Sverige. Kulturhistoriska och samtida perspektiv*, Uppsala: Institutet för språk och folkminnen 2020, ISBN 9789186959708, 177 pp.

In November 2018, a symposium was held in Uppsala that dealt with cattle, or, rather, the relationship between humans and cattle, in Sweden. However, the perspectives of some of the contributions were geographically considerably broader. Nine contributions are presented in this volume. A deeper historical perspective is taken by Ingvar Svanberg, who, among other things, mentions that domesticated cattle stem from the aurochs, which was domesticated 10,500 years ago. Subsequent selective breeding has resulted in different native and cultural breeds. Anne-Sofie Gräslund writes about cattle from an archaeological point of view, starting with the mythological primordial cow Audhumbla. Gräslund then deals with cattle in images from older times, and also the cattle population during the Iron Age. At the end of the article, a possible iron age bull cult in Southern Scandinavia is discussed. Jesper Larsson dwells on cattle along with sheep and goats during early modern times, and shows that the number of cows was fairly constant over time, while goats and sheep varied in number. An important contribution by Annika Karlholm presents a dialectal vocabulary for adult males of cattle. With reference to the etymological literature, she discusses the derivations of the words *oxe* 'ox,' *tjur* 'bull,' *stut* 'steer, bullock' and *böl* 'neutered bull.' Additional words are presented in tables, for example from Skåne, *batting* 'one to two-year-old, neutered, untrained male' and *sigg* 'incompletely neutered male (with one testicle left).' Similarly, in Närke, there are similar words for 'a unneutered, one to two-year-old male': *ungtjur*, *tjurapes*, *tjuramule*, *tjuraknabb* and

tjurbuk, while in Uppland, 'a younger bull calf,' in addition to the transparent *oxkalv* and *tjurkalv*, could be referred to as an *oxpyttil*, *oxpyssil* or *oxbyvill*. Command words used to control cattle draft animals are also reported, and they show considerable variation: to get the animal to back up, commands like *back*, *rygga*, *gå avigt*, *hoppa*, *hömme*, *ptro*, *pro-back*, *ptro-tebaks*, *stryk*, *å´ttera-del* and a few others were used. One would have liked to have seen linguistic comments on some of these words as well. Katharina Leibring writes in an interesting way about proper names given to bulls and oxen. In her article, she provides a number of examples of names appearing in inventory lists of mansions from the seventeenth and eighteenth centuries, such as *Boman*, *Fällman*, and *Stjernberg*, and among common proper names of oxen and bulls in eighteenth-century Värmland, she mentions *Burman*, *Stjärnoxen* and *Gråberg*. Many of these names are reminiscent of soldier names and surnames. Tommy Kuusela deals with folklore about the cow in Swedish pre-industrial agrarian society, and provides abundant examples from folklore records. The remaining contributions treat of the mountain cow (Camilla Eriksson), cows and people in everyday life (Carin Martiin) and the Swedish cow from a veterinary perspective (Ylva Persson). As can be seen, the contributions are written by representatives of various different subjects—agricultural history, rural sociology, veterinary science, archaeology, dialect and name research, ethnology and folklore—and this has resulted in a rich and multifaceted volume. On the whole, the book gives a favourable impression.

Lars-Erik Edlund
Dept. of Language Studies
Umeå University
Sweden
lars-erik.edlund@umu.se

Cornelia Lüdecke, *Germans in the Antarctic*, Cham: Springer Nature Switzerland AG 2021, ISBN 9783030409234, 302 pp; eBook at https://doi.org/10.1007/978-3-030-40924-1. (Translated from the German language edition *Deutsche in der Antarktis*, Berlin: Christoph Links Verlag GmbH 2015.)

This book by the distinguished German historian of science and specialist on the history of German polar research, Professor Cornelia Lüdecke, is a history of science book with a mission to accomplish. What mission? To give an accurate overview on German scientific initiatives in Antarctica during the twentieth century. Elaborate conspiracy theories combined with fantastic tales of science fiction can be found on the Internet informing the unsuspecting reader about the sinister presence of the Third Reich in Antarctica during the Second World War and even later.

Historical facts: Kriegsmarine U-boats were sighted in Antarctic waters during the Second World War, 9 millimetre Parabellum rounds have been found ashore after target practice by U-boat crews. The real presence of two German U-boats in Argentinian waters months after the surrender in 1945 could confirm this hypothesis of German naval presence in Antarctic waters and ashore. An area of the Norwegian Antarctic claim, Queen Maud Land, was explored by German flying boats in the years 1938–1939. The flying boats were based on the expedition vessel *Schwabenland* and during reconnaissance flights the crews dropped swastika flags on the ice cap as claim markings for the Third Reich.

Conspiracy theories: The exploratory flights of the Dornier Wal flying boats were actually smokescreens for the real mission of the *Schwabenland* expedition. It established a secret military base on the ice cap or perhaps even under it. This secret base became the new home for prominent Nazis after the German surrender in 1945, possibly even for the Führer and Eva Braun. Apparently, they never committed suicide in the Reichstag bunker. The Nazis had access to advanced technology such as flying saucers, or "anti-gravity planes," for the defense

of the base. The American military expeditions Operation Highjump in 1946–1947, and Operation Windmill in 1947–1948, are believed to be attempts to finish off these remnants of the Reich. Both missions failed and finally the Americans in 1958 had to resort to using atomic bombs to destroy the high-tech base under the ice cap. A tongue in cheek tale about Nazi fugitives establishing a secret high-tech base, in this case on the dark side of the moon, is told in the acclaimed Finnish science-fiction film *Iron Sky* from 2012. It is obviously inspired by the Nazis in Antarctica stories.

One of Professor Lüdecke's intentions with her book is to deconstruct all these tall tales of the German presence in Antarctica told by conspiracy theorists. Instead she furnishes the reader with an even more interesting history of German scientific accomplishments in Antarctica during the twentieth century. Lüdecke's book is based not only on published sources such as expedition reports and articles in scientific journals but also on a variety of unpublished sources such as letters, memoirs and high-quality photographs reproduced in her book. Findings in these sources, usually kept by relatives of the expedition members, enables her to question some of the stories about the Germans in Antarctica. One example: The striking story about the dropping of swastika flags on the flights of the *Schwabenland* expedition is still somewhat of a mystery and it is not evidently clear if all the flags were hastily dumped in one place or intended as markers, as the published expedition report claims. One unpublished source states that all the poles were dumped in one place because the Dornier flying boat pilot lost sight because of low fog and a dangerous mountain range lay ahead on the route back to the ship. All extra weight had to be gotten rid of and so the poles were dumped.

The story of German scientific expeditions to Antarctica begins in the last decades of the nineteenth century. In the Wilhelminian era Germany was a scientific superpower but now Germans "verlangen auch unseren Platz an der Sonne" as the Foreign secretary Bernhard von Bülow stated in the Reichstag on 6 December 1897. From now on Germany would become a global superpower with a modern navy according to the geopolitical *Weltpolitik* ideas. However, the financial means for this program of military and political expansion was lacking, especially in the years before the Second World War. This lack of state funding became a hinderance for German polar exploration in general as expedition plans were made during the earlier more expansive periods and then had to be modified as the budgets were cut, Lüdecke writes.

In 1865, at a convention of German geographers, Georg von Neumayer proposed a German South Polar expedition. Nothing came of this as the meagre German resources instead was directed towards the Arctic. The doyen of German geography, August Heinrich Petermann, advocated Arctic research as he wanted to confirm his hypotheses of the existence of an open polar sea far up North around the Pole and he also believed that Greenland was much larger than anticipated. In 1895 Neumayer again proposed an Antarctic expedition at the German Geographers Convention and now this body supported the idea. A German Commisson for South Polar Research was founded with Neumayer as president and the geographer Erich von Drygalski as proposed leader of the expedition. Drygalski had surveyed in Greenland in the 1890s and he specialized in glaciology and geophysics.

A scientific program was put forward by Drygalski in 1898 that included oceanographic, geophysical, magnetic and meteorological measurements, natural history collecting, astronomical observations and geographical surveys. As Lüdecke points out, Drygalski planned the activities of the expedition in a manner that is still valid today with oceanographic measurements to be done on ship voyages to and from Antarctica, stationary measurements made ashore during the overwintering and exploration trips around the intended winter station in spring and summer. Lüdecke argues that the first German Antarctic Expedition, was "the last of its kind, being totally bound to Humboldtian ideals of research, i.e. examining everything from all sides as comprehensively as possible." From then on polar expeditions become ever more specialized and narrow in their scope. I think this is a very valid observation.

What about the contemporary craze for finding the South Pole then? This was not a priority for Drygalski even if he did mention the Pole in his plans. Lüdecke writes that the instruction for the expedition was of a general nature that emphasized the principle of free-

dom for the participants of the expedition. In order to avoid conflicts between the scientific staff and the ship captain and crew the different responsibilities of these two bodies of the expedition were in detail regulated by a directive from the German Ministry of the Interior, the government agency that organized the expedition. The ship captain, Hans Ruser was far from popular, something Drygalski mentions in his unpublished diaries without giving any further details. Drygalski is somewhat of a hero in Lüdecke's story of the first German Antarctic Expedition. He is presented as a professional expedition leader, liked by everyone. He addressed the complicated issues of leadership in a competent manner and the usual conflicts of authority between the ship crew and the scientific staff were avoided.

The Norwegian Fridtjof Nansen was at the time pioneer of constructing specialized polar research wooden vessels with hulls that could withstand the pressure of the ice. The high-tech expedition ship *Gauss* was inspired by the Norwegian art of polar shipbuilding. It also had all the latest naval and scientific equipment aboard that Germany could provide, that meant the best equipment money could buy at the time.

On 22 February 1902 the *Gauss* was stuck in the ice about 80 kilometres off the Antarctic mainland and overwintering began. Small huts for the carpenter and black-smith were set up on the ice and scientific equipment was installed in huts made of snow and ice. Sledge journeys complemented the series of static measurements and during these excursions rock samples were collected and astronomical position measurements were taken despite the harsh winter conditions. During the overwintering Drygalski managed to engage all members of the expedition in useful work, especially in the program of scientific data gathering. This was the proven antidote against "arctic ennui" or in German *Polarkoller*. In this case the dangerous psychological condition was of course "Antarctic madness"! Another antidote to the *Polarkoller* were popular scientific lectures and musical entertainment, i.e. singing and playing the piano in the *Gauss* salon. In April 1903 the *Gauss* finally broke free from the ice and the ship arrived in Kiel on 25 November 1903. The expedition was as major scientific success but the geopolitical aims of Kaiser Wilhelm was not fulfilled as the British had managed to plant their Union Jack much further south than the German *Reichsflagge*! So the expedition members were met with a somewhat lukewarm reception from official Germany and the Kaiser was disappointed.

The story of the Second German South Polar expedition of 1911–1912 is a tragic one. Again, geopolitics and the rivalry between Imperial Germany and Great Britain affected the planning of this polar expedition. The infantry officer Wilhelm Filchner—geographer, geophysicist, and mountain climber—was the advocate for the undertaking. He had some polar experience as he had travelled in Spitsbergen in 1910. The energetic Filchner managed to get funding for the expedition despite the lack of interest in official Germany apart from a few government officials that had earlier supported Drygalski. Lüdecke incorrectly writes that Otto Nordenskjöld, who supported Filchner's plan, was a Norwegian polar researcher but actually he was Swedish. He was one of the most accomplished Antarctic explorers and polar scientists of the era which Lüdecke does inform the reader about.

The competition for the South Pole was still on, and as Drygalski had earlier, Filchner declared that he had no intention to compete with the British Antarctic explorers, i.e. Scott and Bruce, that wanted to conquer the Pole. And then the cunning Norwegian Amundsen tricked them all and his expedition was first at the South Pole on 14 December 1911. Filchner managed to find a Norwegian polar research vessel complete with captain and a mixed crew of Germans and Norwegians. The overall aim of the expedition was to test three hypotheses on the structure of the Antarctic continent by traveling through the area. Geological and geophysical measurements and natural history gathering was to be made. Filchner as an infantry officer could not command an expedition that become a Kasierliche Marine or German Naval expedition so Filchner became second in command. The captain of the expedition vessel *Deutschland*, the German Richard Vahsel, was first in command of the expedition and he seemed to be very difficult to cooperate with. There were numerous quarrels and a lot of bad feelings among the participants, people even left the expedition prematurely blaming bad health. At one instance Filchner becomes the target of a prank when his ship cabin was littered with

pictures of scantily clad women, messy clothing was put on the walls and a stinking stockfish was placed in the gramophone funnel.

There was also a conflict regarding the placement of the winter station in January and February 1912. The Norwegian ice pilot Björvik protested against Vahlsel's novel idea of establishing the station on a floating iceberg. Björvik argued that this was impractical and even dangerous if the ice moved, which it later did—the men and animals working on the ice were saved but a lot of the building material for the station and a dog were lost. New attempts were made to establish depots and a small station ashore on the shelf ice but Captain Vahlsel's fear of *Deutschland* becoming trapped in the ice led Filchner to decide that the expedition should return to South Georgia. The expedition could then resume its work next summer when the ice conditions perhaps had improved. Nothing came of this as the ship was trapped in the ice in March 1912 and it began to drift across the Weddell Sea. Research was now done according to the scientific program, for instance in meteorology, earth-magnetism and oceanography. Sledge surveying journeys were also undertaken.

The dreaded polar night was passed without any major problems as the weather was favorable, which was fortunate considering the bad feelings among the members of the expedition. During the autumn of 1912 conflicts escalated even further as murder attempts were made both against Filchner and his friend, the somewhat unconventional alpinist König. A mutiny was about to take place late in 1912 because the new captain Lorenzen totally refused to obey any orders from Filchner. The station leader at the Norwegian whaling station at Grytviken on South Georgia, Larsen, however managed to convince the mutineers to fall back or they would lose their polar bonus payments. Order was thus temporarily restored by Larsen but the reputation of the expedition was later further damaged by a series of honorary trials between Filchner and the naval officers and then also with the scientists when they came back to Germany. These conflicts affected the publications of the expedition as the scientists that supported Filchner refused to publish their observations along with their antagonists. Filchner was a complete failure as an expedition leader, states Lüdecke. His background as an infantry officer was ill suited to command such a complicated operation as a polar expedition. He was de facto also always subservient to the captains of the ship. The military command structure he was used to as an officer to did not work well in contact with the scientists either.

The Third German South Polar Expedition of 1938–1939 is the most famous German polar expedition of them all as we have noticed earlier, especially among conspiracy theorists. The rationale behind this expedition was the dire German shortage of dietary and industrial fats during the 1930s. Whale oil was still an important fat source that could be processed into all kinds of high-quality fats, but whale oil had to be imported from the whaling industry of Norway. Many Reich marks went into Norwegian pockets and the dependence on Norway for this essential commodity was a difficult problem for the German economic planners to solve. As in contemporary Soviet Russia the new Nazi government put forward extensive economic plans that also aimed to solve the German dependence on foreign raw materials. Support to the then emerging German whaling industry thus became an important task for the economic experts Helmuth Wohlthat and Hjalmar Schacht at the Reich Ministry of Economics. They were supervised by Reichsmarschall Hermann Göring from 1936 onwards.

In the season 1936–1937 the First German Whaling Company began operation in Antarctica. It was followed by other German companies and Norwegian ships were also chartered by German firms. The whaling program in Antarctica was a huge success as the Reich in a few years could reduce the import of fat in half. Now the German Foreign Office became concerned about the lack of any German claims on the continent, the vital whaling operations had to be protected. There was no German military interest in Antarctica at the present time, the Foreign Office legal experts explained. They also concluded that the continent was already monopolized by the United States, England, Norway and France. The legal basis for these nations' claims on the continent, that was and still is divided in national sectors, was not seldom scientific activities such as the establishment of permanent stations. The Germans were good at all kinds of earth sciences so why not establish a scientific station on the continent that could back German territorial claims in the near future? This station could also

in the near future perhaps become an airbase for Lufthansa intercontinental flights between South America and Australia. Now the ardent aviator and Luftwaffe commander Göring had another good reason for getting interested in the planned South Polar expedition.

The experienced polar sea captain Alfred Ritscher was appointed by Hermann Göring as the leader of the Third German Antarctic Expedition. The assignments of the expedition were considered to be a secret Reich matter, but the mission was to explore by air the hinterland area of the continent between 20° W and 20° E and document it with aerial photos. The endpoints of the flight routes would be marked with swastika flags as provisional claims of territory. The usual meteorological, oceanographic and geomagnetic observations would also be made during the expedition, both at sea, ashore on the shelf ice and during flights. Science was put forward as the sole aim of the expedition. When the prominent German scientific institute, the Kaiser-Wilhelm Gesellschaft, agreed to operate the expedition vessel *Schwabenland*, no one, even abroad, could question the expedition's scientific nature.

The extensive scientific program of this short summer expedition was carried out despite harsh conditions and the Dornier Wal flying boats performed well. Modern scientific methods were used such as echo sounding for surveying the ocean floor and fragile radiosondes gathered meteorological data from high air layers. Aerial photo documentation of the Antarctic topography was also a fairly new method, and the photographs of the serial mapping cameras were of an extremely high quality as can be seen from the reproductions in Lüdecke's book. On the way back to Germany the expedition carried out a secret mission from the Kriegsmarine to explore the Brazilian South Atlantic islands of Trinidade and Martim Vaz. Was it possible to use these isolated islands as bases for the Kriegsmarine in the event of a coming war? At least the island of Trinidade was not suitable for German needs because of very difficult to access beaches. Finally, on the 11 of April 1939 the expedition ship *Schwabenland* anchored in Cuxhaven where Helmuth Wohlthat among other dignitaries greeted them heartily. In Hamburg a grandiose banquet at the Hotel Vier Jahreszeiten officially terminated the expedition.

Lüdecke concludes her book on Germans in Antarctica with a chapter on the post-war German presence in Antarctica. BRD or West-Germany, had for many years great difficulties in organizing and funding any polar expeditions or permanent stations. The DDR polar scientists could take part in Soviet undertakings but it was not until 1976 that the East-Germans established their own Georg Forster station lying close to a Soviet station. In 1979–1980 a BRD-expedition was sent out to the Ross Sea and a small hut was erected on land. A year later the West-German Georg von Neumayer Station was established in the, to the Germans so familiar, area of the Weddell Sea. After 1990 and the reunification of Germany the two German Antarctic research facilities were also unified. The Georg Forster station was however closed and dismantled because it did not meet with the requirements of the environmental protection program.

Professor Lüdecke's book on Germans in the Antarctic is a well-written, well-researched, well-illustrated, exciting and entertaining book on a topic not as well-known as the story of British Antarctic expeditions. Science was always put forward as the main priority of the German expeditions and the competition for being the first on the South Pole was not of any interest to the Germans. But naval and economic motives were included in the secret assignments of the German expeditions even if the high-tech Nazi flying saucer inland base never existed!

Pär Eliasson
Dept. of Historical, Philosophical & Religious Studies
Umeå University
Sweden
par.eliasson@umu.se

Poetry in Fornaldarsögur 1–2 (Skaldic Poetry of the Scandinavian Middle Ages 8), ed. Margaret Clunies Ross, Turnhout: Brepols 2017, ISBN 9782503519005, pp. xcvi + 1076.

The present volume is the eighth in what will eventually be a nine-volume edition of skaldic poetry published by a consortium of scholars under the editorship of Margaret Clunies Ross. Each volume is dedicated to the poetry of a different genre of Icelandic literature: Christian skaldic poetry and that in kings' sagas and treatises on poetics has already appeared. The original plan was to include only poetry narrowly defined as "skaldic." Happily, the difficulty of defining poetic genre led to the addition of the present volume containing the poetry from *fornaldarsögur* (sagas about ancient times) whose metres are often closer to those of eddic poetry.

Each stanza is presented in normalized text followed by a re-ordered version of the wording and an English translation, in which kennings and their meanings are explicated. There follows a detailed discussion of the text, including previous scholarship and alternative interpretations.

The volume provides far more than editions. The 40-page introduction contains an excellent overview of Icelandic saga literature and poetry, including metrics, and how they relate to each other in different literary genres. The relationship of *rímur* to prose and other poetry is also discussed. The authors of the introduction point out—something that is often forgotten—that neither poetry nor prose are static; both are continuously reworked to suit the taste of the time of writing. One effect of this is that, since the *fornaldarsögur* tend to be preserved in late manuscripts, the poetry in most of them is much easier to understand than that in the formal skaldic diction of some other genres; on the other hand, the vocabulary may in some cases be closer to that of *rímur*. The poetic language has not been normalized to the mid-thirteenth century standard, but to a form closer to the manuscripts in which it is found (see pp. xci -xciii and the individual poems). The manuscript contexts of the poems—both dates and contents of the manuscripts containing the sagas which contain the poems—are discussed in detail. These are often the most recent scholarly discussions of the saga in question.

In addition to "all extant poetry that is judged to be of medieval origin in the manuscripts of twenty-one *fornaldarsögur*" the volume contains two outliers that are not found in *fornaldarsögur*. *Merlínusspá I–II* ['The Prophecies of Merlin I–II'], from *Breta saga* ['The saga of the Britons'], based on Geoffrey of Monmouth's *De Gestis Britonum/Historia regum Britanniae*, is included because it "can be understood as creating a legendary history for the British in a manner similar to the Old Icelandic *fornaldarsaga*'s recreation of prehistoric Scandinavian history" (p. lxi). The commentary on this poem reminds us that its author, Gunnlaugr Leifsson, one of the most learned Icelanders of his day—author of Latin *vitæ* of Óláfr Tryggvason and Jón Ögmundrson and Latin miracles attributed to St. Þorlákr—was also expert in the native poetic tradition. The discussion of *Merlínusspá I–II* includes careful comparison with the Latin, including examination of the meaning and occurrence of individual vocabulary items, which can provide insight into Gunnlaugr's use of sources and translation philosophy.

At the other end of the spectrum, *Skaufhala bálkr* ['Bálkr (poem) about Tassel-tail'], by a named and located author (whose identity is nonetheless not absolutely certain, see pp. 952–955, and also the forthcoming article by Haukur Þorgeirsson in *Skírnir*) shows familiarity with beast fables like that of Reynard the Fox (one of the interesting features of the poem is the many terms for *fox* that it includes; *tassel-tail* is only one). The fox's lament before his death is a parody of the *ævikviða*, 'life poem,' which is found in a number of *fornaldarsögur*.

Numerous keys to abbreviations and manuscripts, definitions of technical terms, an index of first lines, names (including nicknames, ethnic and regional names and place-names) and terms, aid the reader; in the rare case that an abbreviation, such as LH (for Finnur Jónsson, *Den oldnordiske og oldislandske litteraturs historie*, 2nd ed. from 1920–1924, alphabetized under 'L') is not included in one of these, it can be found in the bibliography.

Slips are few and far between. What Gunnlaugr Leifsson recited at Hólar was not a "life"

of St. Ambrose but rather a *historia* or rhymed office (p. 38). The volume carefully translates nicknames of characters as far as possible, and we are told that the first element of Ǫrvar-Oddr means 'arrow' (p. 305). Oddr is, of course, a personal name, but it might have been helpful to remind readers that it also has a meaning, and that the hero's name can be translated 'arrow-point.' When Ǫrvar-Oddr shoots and flays a bear, puts a spike through its mouth and then places it on the cliff facing towards the mainland (p. 901), the commentary refers to Sami and Finnic bear hunts but not to the parallel example in *Egils saga Skallagrímssonar.* One can, in fact, learn quite a lot about supernatural beings and magical spells from this volume.

The stated aim of "The Skaldic Project" was to provide an annotated critical edition and English translation of the corpus of Scandinavian poetry from the Middle Ages, excluding only the Poetic Edda and closely related poetry, and the *rímur*. To this the current volume of poetry from *fornaldarsögur* has now been added. There remains, however, one type of poetry—comparable in form and diction to that in the *fornaldarsögur*—that should be included if coverage is to be complete, namely the religious verse edited by Jón Helgason in *Íslenzk miðaldakvæði* and by Jón Þorkelsson in *Kvæðasafn eptir nafngreinda íslenzka menn frá miðöld.* Neglect of this material was noted by Martin Chase in 2014; it has only recently begun to attract the scholarly attention it merits. May we hope that the editors of the series will change their minds once again, and add a volume which would bring the total number up to an even ten? Including poetry which expresses the religious beliefs and aspirations of late medieval poets can only add to our appreciation of other kinds of verse.

Finally, saving the best until last: those who purchase the volumes of this indispensable series have access on-line at the site "Skaldic Poetry of the Scandinavian Middle Ages;" others must wait three years. All publications to date, including this one, are now accessible (at http://skaldic.org).

REFERENCES

Chase, M. (2014). "Devotional poetry at the end of the Middle Ages in Iceland," in *Eddic, Skaldic, and Beyond. Poetic Variety in Medieval Iceland and Norway*, ed. M. Chase, New York: Fordham University Press.

Margaret Cormack
College of Charleston, USA
University of Iceland
cormackM@cofc.edu

Daniel Sävborg, Eva Liina Asu & Anu Laanemets (eds.), *Studier i svensk språkhistoria 15. Språkmöte och språkhistoria* (Nordistica Tartuensia 21), Tartu: University of Tartu Press 2020, ISSN 14066149, ISBN 9789949032648, 97899490338-8 (pdf), 312 pp.

The fifteenth meeting in the series *The History of the Swedish Language* was held on 13–15 June 2018 at Tartu University. Tartu also hosted the seventh meeting in 2002, whose theme was "The history of the Swedish language in the Baltic Sea region," and the conference volume from that meeting was published by Svante Lagman, Stig Örjan Ohlsson and Viivika Voodla. The theme chosen for the fifteenth meeting was "Language meetings and language history," and in this way, the organisers linked the theme to the historical situation of the Swedish language in Estonia, where Swedish has existed for a long time alongside a number of other languages: Estonian, German, Russian and Latin. Three plenary lectures were held at the meeting. Henrik Rosenkvist spoke about "Estonian Swedish—an East Swedish dialect and a Germanic vernacular," where he gave a brief outline of features in Estonian Swedish and, above all, discussed a couple of syntactic phenomena in Swedish vernaculars, more specifically negation harmony (double negation as in *Jag har inte sett ingen* 'I have not seen no one') and

referential subject ellipsis (omission of personal pronouns in subject position), as in Elfdalian (Sw. *älvdalsmål*) *nu irið iema* ('now [you] are at home'). The syntax in dialects and standard languages is discussed in an interesting way in relation to each other. This study whets one's appetite for more. There were multiple perspectives in Lars Wollin's plenary lecture "Translation—Language History—Great Power. The Carolingian Janus Face," which provided a picture of the ideology that guided the direction of the translation culture at that time. The language policy in the "transmarine provinces was pragmatic, apparently cleansed of the cultural chauvinism in the core country" (p. 51), while Swedish "in true Gothic spirit, was patriotically inflated" (p. 52). Thus, as the cultural view was contradictory, one can speak of a "Janus face." The third plenary speaker, Kersti Börjars, spoke on the topic of "Early Swedish nominal phrases in a Germanic perspective," but this lecture is not included in the volume. In addition, there are nineteen section lectures of the usual varied content. Linguistic development as a result of language meetings in different contexts is dealt with in a number of contributions. Thus, Mikko Kauko writes about the functions of Latin in the Royal Library's manuscript A 49 (*Nådendals klosterbok*), where the Swedish in the texts is permeated by lexical, syntactic and stylistic Latinisms. Theresia Pettersson deals with the writing that emerges in the court records and memoranda (Sw. *tänkeböcker*) of the City of Stockholm in the late Middle Ages from a broader European perspective, a writing which, however, is also "characterised by various activity-specific functional linguistic expression needs" at the local level. Phraseological loans from Middle Low German into older Icelandic and Swedish are the focus of Veturliði Óskarsson's contribution. Ellipsis of *ha* ['have'] in subordinate clauses, as in *Jag känner en som* [*har*] *bott i Berlin* ['I know someone who (has) lived in Berlin'] is discussed by Linnéa Bäckström in connection with High German language contacts. Mikael Kalm deals with historically adverbial infinitive phrases in Swedish, discussing, among other things, to what extent this may be a borrowed system which later developed further on its own. This issue requires further evaluation. Several language historical phenomena at different language levels and from different times are highlighted in other articles. Johan Schalin writes about the early rounding umlaut sounds, presenting an analysis of the Old Swedish vocabulary which provides new starting points for the reconstruction of those sounds. Magnus Källström analyses the Viking Age language in Gästrikland, Hälsingland and Medelpad on the basis of testimonies provided by runic inscriptions. What is referred to in the Swedish Academy's grammar (SAG) as *huvudsatsekvivalenter* in laws texts, saint legends and rhyming chronicles is discussed by Bo A. Wendt. Under the heading "Från *sten denna* och *fader sin god* till *denna sten* och *sin gode fader*" [approximately: 'From *stone this* and *father his good*, to *this stone* and *his good father*'], Ulla Stroh-Wollin writes about the development of the nominal phrase word order in Old Swedish. The representation of the spoken language in the nineteenth-century clergyman Pehr Stenberg's biography is treated of in Kristina Persson's and Göran Stenberg's co-authored article, which contains illustrative examples. Based on a survey of teachers' comments on student essays from Högre Allmänna Läroverket ['The upper secondary school'] in Falun in the 1870s, Anna Sahlée and Mikael Kalm present a picture of the perceptions of "the good essay" at that time. It will be interesting to follow the authors' expanded research activities in this field. Some articles dwell on Swedish as a scientific language in older times, namely those by Anna Helga Hannesdóttir on Christopher Polhem's writings in theoretical and applied *mechanique*, and by the trio of authors Hans Landqvist, Lena Rogström and Greta Horn on Clas Bjerkander as a scientific writer. Linguistic work based on Språkbanken's historical material is dealt with in an article written by the trio Klas Hjortstam, Joakim Lilljegren and Anna Helga Hannesdóttir, and corpus linguistics is the focus of Ida Larsson's and Johan Roxendal's article, which addresses spelling normalisation and automatic annotation of verb particles in a historical text. Bodil Rosqvist and Bo A. Wendt write about the planned revision of the Swedish Academy's dictionary. In addition, there are a couple of contributions based on completely different materials. Johan Hedberg writes about the development of the surname system in the Västerbotten countryside in the eighteenth century and the beginning of the nineteenth century. A contribution by Martin Ringmar and Eva Olander deals with a dialectal development, namely, as the authors put it, "the accusative's last mainland stronghold: Våmhus / Orsa / Ore." There

has long been a great need for synthetic works on language history in the Nordic area, but these gaps are now being filled. As far as Norwegian is concerned, such a work comprising four volumes has recently been published, and as for Danish, a similar work is well underway, with four of six planned volumes published so far; these works have been reported in previous chronicles in *Journal of Northern Studies*. A large number of researchers are involved in these multi-volume works. Moreover, Bo Ralph is working on a new history of the Swedish language on behalf of the Swedish Academy. It is obvious from the considerations behind this latter book project, which are presented in the conference volume, that we have good reason to look forward with great anticipation to this new Swedish language history, *Seklernas svenska*. The contributions in the volume *Studier i svensk språkhistoria 15* are rich in content, and, overall, the volume shows that we can look to the future with confidence when it comes to the exploration of Swedish language history. The researchers are quite numerous, there is breadth in the choice of subject matters, diversity in the choice of theoretical and methodological points of departure, as well as depth in many of the analyses.

Lars-Erik Edlund
Dept. of Language Studies
Umeå University
Sweden
lars-erik.edlund@umu.se

Klas Wikström af Edholm, *Människooffer i myt och minne. En studie av offerpraktiker i fornnordisk religion utifrån källtexter och arkeologiskt material*, Turku: Åbo Akademis förlag 2020, ISBN 9789517659765, 476 pp.

Whether human sacrifice has ever existed in ancient Scandinavian societies has been hotly debated by scholars within history of religions as well as by archaeologists. The practice of human sacrifice has of course existed in other cultures, perhaps the best known being the Mayan and Aztec cultures. This has led researchers to put forward the (incorrect) hypothesis of a "death belt" geographically located within the equatorial areas. Famous researchers, from James G. Frazer (1890–1915), with his fertility-related motives, to Walter Burkert (1983), with his theory of collective aggression, have attributed various causes and characteristics to human sacrifice, also on the basis of Scandinavian and Icelandic examples. In later research traditions, however, there is skepticism among scholars towards the existence of the practice of human sacrifice in Scandinavia, especially regarding whether it occurred during the latter part of the Iron Age. There are archaeological findings that might be evidence of human sacrifice, but these are primarily bog findings dated to the first half of the Iron Age and their interpretation can sometimes be ambiguous. Thus, a study of human sacrifice during the Iron Age in Scandinavia is highly relevant to the field, and this is the theme of the thesis *Människooffer i myt och minne* ['Human sacrifice in myth and memory'] (2020) by the historian of religions and archaeologist Klas Wikström af Edholm. As an archaeologist, he relies not only on textual material but incorporates other source materials well, such as archaeological findings, iconography and place-names. He then follows a path within the history of religions that has recently been established by researchers such as Olof Sundqvist (2002), Torsten Blomkvist (2002) and Andreas Nordberg (2004). This can be contrasted with the latest handbook on ancient Scandinavian religion, *Myths of the Pagan North* (2011) by Christopher Abram, where the author mainly focuses on Norwegian and Icelandic texts.

As a point of departure, Wikström af Edholm holds that archaeologists do not distinguish between the categories "human sacrifice" and "ritual killing" in their evaluation of findings (skeletons). These categories are known in the field of religious studies, but rarely used in archaeology.

Theoretically, Wikström af Edholm leans towards Henri Hubert and Marcel Mauss's definition of sacrifice as described in their classical *Essai sur la Nature et la Function du Sacrifice*, which Wikström af Edholm finds "useful," but also towards texts by Maurice Bloch (1992), Caroline Humphrey and James Laidlaw (1994) and Anders Hultgård (2001).

The thesis is divided into seven main chapters, including the conclusion. The second chapter presents an extensive research history where anthropological texts, as well as religious studies and archaeological texts with a focus on Scandinavia, are discussed. The conclusion is that, based solely on the material circumstances, archaeological research cannot determine whether or not a person has been sacrificed, as very little information is provided about the cases. Text-based researchers—including historians of religions—have recently become more cautiously text-critical, for example Anders Hultgård, or even hyper-critical, like Rudolf Simek (2014). Perspectives taken in legal history research, on the other hand, have been too narrow by not relating to mythical themes (cf., for example, Ulf Drobin's [1991] text on the poetic mead), according to the author.

In chapter three, a source review is presented where Wikström af Edholm makes the usual division into primary sources and secondary sources. Among the primary sources are poetic and Eddaic poems, but the author wisely points out that the Eddaic poems may very well end up in between direct and indirect sources. Regarding archaeological sources, the author reports on findings made over the past fifteen years, but which consist of samples that cannot "constitute a sufficiently large basis for reliable statements about general patterns over time or larger geographical spaces." But is the archaeological material on which the investigation is based really insufficient? In view of the fact that these archaeological findings are from seven different places in present-day Sweden, for example Uppåkra, Scania, and Bokaren, Uppland, they should add considerable weight to the ongoing discussion on human sacrifices.

The next chapter is devoted to "religious and social contexts" in which war-related human sacrifices were made as a part of the cult of Odin. While it is not made entirely clear what the differences are between the religious and social contexts, this chapter contains examples of how prisoners of war may have been given as sacrifice to Odin. There was also a custom to promise the fallen to Odin before a battle, which can be seen as a kind of sacrifice, too.

Several literary examples are reproduced and interpreted, including the possible ritual of carving blood eagles. This has been interpreted by several researchers as a purely literary phenomenon rather than a real practice, but Wikström af Edholm maintains that these may be real cases, even if they cannot be confirmed by archaeological findings.

The fifth chapter addresses human sacrifice that can be linked to recurring, calendric festivals and rituals. There is a lot of anthropological research to lean on, but also pitfalls, such as sacrifices of a ruler. However, the author navigates skilfully between these and stays safe. Here, the question is raised whether convicts could be executed as a human sacrifice, a possible tradition previously discussed by Folke Ström, who rejected this idea.

In the sixth chapter, where the author focuses on "overarching themes that concern human sacrifice within the two contexts that have been analyzed in previous sections," which may well be understood as in-depth case studies, the heat is turned up. Here, the author is bolder, as he approaches metaphysical perspectives: as recipients, deities can demand the highest sacrifice, which may, or may not, be what happened to some legendary kings at Uppsala. This is described in, for example, *Heimskringla* by Snorri Sturluson. Wikström af Edholm enters into a polemic with Bruce Lincoln, who believes that Snorri did have access to various traditions about characters like the pagan ruler Aun the Old—who is told to have sacrificed his sons—but created a completely fictional story. However, Wikström af Edholm emphasizes that human sacrifices occurred in times of crisis, that calendar festivals may have required this type of sacrifice (the highest) in an elite society to maintain order, peace and prosperity, or when the social order may have been threatened by the death of a ruler and a successor is to be appointed. The author also mentions the recipients of sacrifices, and argues that Odin is by far the most common one in the sources. Other deities may have been recipients in connection with calendar cult festivals, but Wikström af Edholm admits that the evidence for this is scarce.

In the conclusion, the author concurs with some of the claims previously made in religious studies and anthropological research, namely that there is a difference between ritual killing and sacrifice and that it is important to strengthen the interpretation of findings through contextual analysis where these categories are considered. The archaeological material is by itself "mute" and cannot provide all the information about the actions that preceded the events needed to determine whether the rituals were human sacrifices. He also concludes that the practice of human sacrifice decreased towards the end of the Viking Age and then occurred chiefly in large cult environments such as the great *blót* at Uppsala, rather than in smaller cult environments such as in Iceland, where the notion of human sacrifice rather lived on as a fading memory from older periods.

The thesis has a somewhat weak theoretical approach, as the author does not relate to Hubert and Mauss in his analysis. After all, Mauss had an idea of how societies were organized on the basis of the gift institution, so why not relate to this? Perhaps a chronological outline of the thesis would have been more beneficial, not least pedagogically. For example, the first half of the Iron Age, with the bog corpses, and the latter half of the Iron Age could be treated separately according to a timeline. The archaeologist Charlotte Fabech (1991) has presented a theory on how different categories of sacrifices (including human sacrifices) developed during the Iron Age, from being performed in wetlands to being centralized to (cult) buildings. This work is admittedly referred to, but could have been given more space as some of the author's conclusions are in line with Fabech's.

The thesis provides an impressive overview of the research literature and this alone constitutes a major research effort by Klas Wikström af Edholm. However, more rigorous editing could have improved readability and some of the prose translations could have been replaced by standard translations. Nevertheless, the author still makes the most of a material which is very difficult to interpret where he also weighs in archaeological findings. It should now be possible to maintain the view that human sacrifices actually occurred also during the latter half of the Iron Age, not least in the light of the archaeological findings presented.

Stefan Olsson
Independent scholar
ellesolsson@gmail.com

REFERENCE

Abram, C. (2011). *Myths of the Pagan North. The Gods of the Norsemen*, London: Continuum.

Bloch, M. (1992). *Prey Into Hunter. The Politics of Religious Experience*, Cambridge: Cambridge University Press.

Blomkvist, T. (2002). *Från ritualiserad tradition till institutionaliserad religion. Strategier för maktlegitimering på Gotland under järnålder och medeltid* ['From ritualised tradition to institutionalised religion'], Uppsala: Uppsala University.

Burkert, W. (1983). *Homo Necans. The Anthropology of Ancient Greek Sacrificial Ritual and Myth*, Los Angeles: University of California Press.

Drobin, U. 1991. "Mjödet och offersymboliken i fornnordisk religion" ['The mead and sacrificial symbolism in Old Norse religion'], *Studier i religionshistoria tillägnade Åke Hultkrantz, professor emeritus den 1 juli 1986*, eds. L. Bäckman *et al.*, Löberöd: Plus Ultra, pp. 97–141.

Fabech, C. (1991). "Reading society from the cultural landscape. South Scandinavia between sacral and political power," in *The Archaeology of Gudme and Lundeborg*, eds. I.P. Nielsen, K. Randsborg, & H. Thrane, Aarhus: Aarhus Universitetsforlag, pp. 11–37.

Frazer, J.G. (1890–1915). *The Golden Bough. A Study of Comparative Religion*, New York & London: MacMillan & Co.

Hubert, H. & Mauss, M. (1981). *Sacrifice. It's Nature and Functions*, Chicago: University of Chicago Press.

Hultgård, A. (2001). "Menschenopfer," in *Reallexikon der Germanischen Altertumskunde* 19, ed. R. Müller, Berlin: Walter de Gruyter, pp. 533–546.

Humphrey, C. & Laidlaw, J. (1994). *The Archetypal Actions of Ritual. A Theory of Ritual Illustrated by the Jain Rite of Worship*, Oxford: Clarendon Press.

Mauss, M. (1990). *The Gift. The Form and Reason for Exchange in Archaic Societies*, New York: Norton.
Nordberg, A. (2004). *Krigarna i Odins sal. Dödsföreställningar och krigarkult i fornnordisk religion* ['The warriors in the hall of Odin'], Stockholm: Stockholm University.
Simek, R. (2014). *Religion und Mythologie der Germanen*, Darmstadt: Theiss.
Sundqvist, O. (2002). *Freyr's Offspring. Rulers and Religion in Ancient Svea Society*, Stockholm: Elander Gotab.

Northern Studies Monographs/Nordliga studier

The *Journal of Northern Studies* hosts two monograph series, *Northern Studies Monographs* (publication languages English, French and German) and *Nordliga studier* ['Northern Studies'] (publication languages Danish, Norwegian and Swedish).

Northern Studies Monographs (ISSN 2000-0405)

1. Heidi Hansson & Catherine Norberg (eds.), *Cold Matters: Cultural Perceptions of Snow, Ice and Cold*. Umeå 2009.
   ISBN 978-91-88466-70-9

2. Giuseppe Nencioni, *The Italians in the Arctic Explorations: A Critique of the Reinterpretation of Nationalism*. Umeå 2010.
   ISBN 978-91-88466-76-1

3. Ann-Catrine Edlund, Lars-Erik Edlund & Susanne Haugen (eds.), *Vernacular Literacies: Past, Present and Future.* Umeå 2014.
   ISBN 978-91-88466-86-0

4. Ann-Catrine Edlund, T.G. Ashplant & Anna Kuismin (eds.), *Reading and Writing from Below: Exploring the Margins of Modernity.* Umeå 2016.
   ISBN 978-91-88466-88-4

5. Andrej Kotljarchuk & Olle Sundström (eds.), *Ethnic and Religious Minorities in Stalin's Soviet Union: New Dimensions of Research.* Huddinge 2017.
   ISBN 978-91-7601-777-7

6. Anne Heith, *Laestadius and Laestadianism in the Contested Field of Cultural Heritage: A Study of Contemporary Sámi and Tornedalian Texts.* Umeå 2018.
   ISBN 978-91-7601-827-9-7.

7. Anne Heith, *Indigeneity, Ecocriticism, and Critical Literacy*. Umeå 2022.
   ISBN 978-91-7855-751-6 (print); ISBN 978-91-7855-752-3 (PDF)

Nordliga studier (ISSN 2000-0391)

1. Olle Sundström, *"Vildrenen är själv detsamma som en gud": "gudar" och "andar" i sovjetiska etnografers beskrivningar av samojediska världsåskådningar*. Umeå 2008.
   ISBN 978-91-88466-74-7

2. Gunnar Gjengset, *Matti Aikio: verk og virke*. Umeå 2011.
   ISBN 978-91-88466-77-8

3. Ann-Catrine Edlund (eds.), *Att läsa och att skriva: två vågor av vardagligt skriftbruk i Norden 1800–2000.* Umeå 2012.
   ISBN 978-91-88466-81-5

4. Ann-Catrine Edlund & Susanne Haugen (eds.), *Människor som skriver: perspektiv på vardagligt skriftbruk och identitet.* Umeå 2013.
   ISBN 978-91-88466-85-3

The *Journal of Northern Studies* is a peer-reviewed academic publication issued twice a year. The journal has a specific focus on human activities in northern spaces, and articles concentrate on people as cultural beings, people in society and the interaction between people and the northern environment. In many cases, the contributions represent exciting interdisciplinary and multidisciplinary approaches. Apart from scholarly articles, the journal contains a review section, and a section with reports and information on issues relevant for Northern Studies.

The journal is published by Umeå University and Sweden's northernmost Royal Academy, the Royal Skyttean Society.

UMEÅ
UNIVERSITY

ISSN 1654–5915