

Industrial Heritage in the Arctic: Research and Training in Svalbard, August 2004



Final Report

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Preface

The disciplined study of Industrial Heritage in Polar environments has received scant attention in the past. Through a series of chance encounters, followed by careful planning, a group of archaeologists and historians created an opportunity to explore and document well-preserved remnants of industrial activity on the archipelago of Svalbard during August 2004. A purposefully-international consortium of scholars and students from six nations gathered to study and record the remains of coal-mining sites dating from the first decades of the twentieth century. This collaboration not only crossed national boundaries, but generational boundaries, as well, since it included an explicit component of teaching the methods and perspectives of industrial archaeology to a rising generation of scholars.

This report describes the process and the products of the International Field Course in Arctic Industrial Heritage. Truly a product of collaborative efforts, the report includes contributions by virtually all members of the team, who are listed in Chapter 2. Primary credit for writing goes to Dag Avango, Miles Oglethorpe, Ian West, Larry Mishkar, Susan Martin, and Patrick Martin. Edward Tennant took primary responsibility for map work, assisted by Cameron Hartnell. Larry Mishkar assembled the manuscript and shot many of the photographs. Patrick Martin did the editing and thus, is to blame for errors of omission.

Primary financial support for the project came from the Bank of Sweden Tercentenary Foundation (\$20,000), from the United States National Science Foundation (\$14,000), the Arctic Centre of the University of Groningen, under the direction of Dr. Louwrens Hacquebord (\$10,000), and The Swedish Polar Research Secretariate, Swedish Royal Academy of Sciences (management and in-kind support).

Dr. Urban Wråkberg acted as Bursar for funds expended through Sweden. Dr. Dag Avango took on the primary responsibility for the considerable logistical arrangements that were necessary to support this substantial team in the field.

Chapter One

Introduction and Background

Introduction

The history of Svalbard, or Spitsbergen as it was generally known before the ratification of the Svalbard treaty in 1925, has always been connected to the exploitation of natural

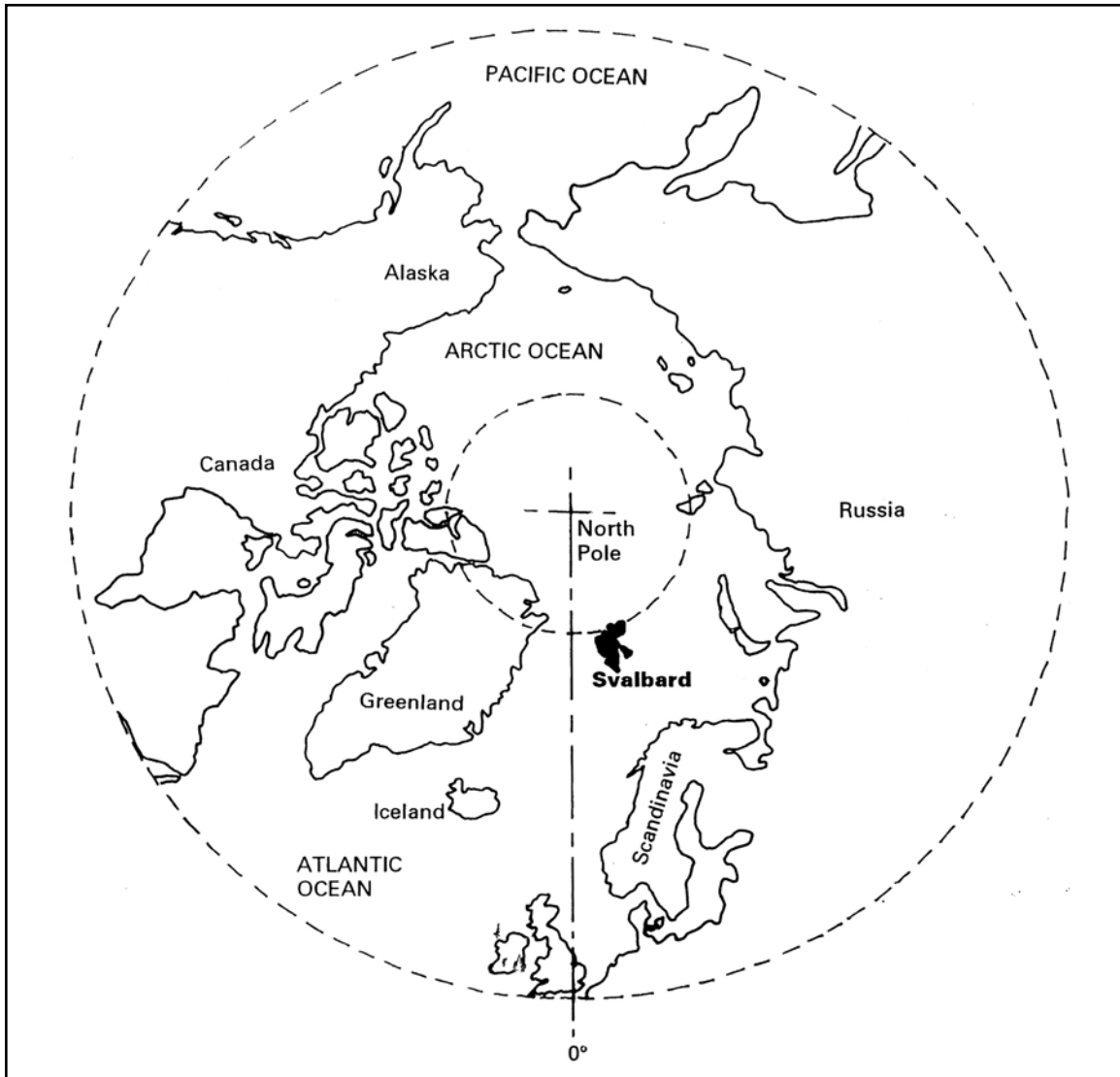


Fig. 1.1 Map showing Svalbard archipelago. Source: AIA Industrial Archaeology Review, Volume 24, page 24, 2002. Used by Permission.

resources (Figure 1.1). The archipelago was discovered in 1596 by Dutch explorer Willem Barents. In the following years, the islands became the scene of intense whale hunting activity. Whalers from several European nations were active all around the archi-

pelago, hunting for whales and producing oil in land based blubber cookers. For a period of time, it amounted to an industry. However, after a few decades the whale populations crashed and the whalers left the archipelago.

During the course of the 18th century, human activity on Svalbard was dominated by hunters from northwestern Russia, the Pomors. According to some archaeologists, the Pomors arrived on Svalbard in the 16th century or possibly even earlier. Most researchers, however, agree that the peak of Pomor activity took place in the 18th century. The Pomors used a wide-ranging system of base stations and outlying

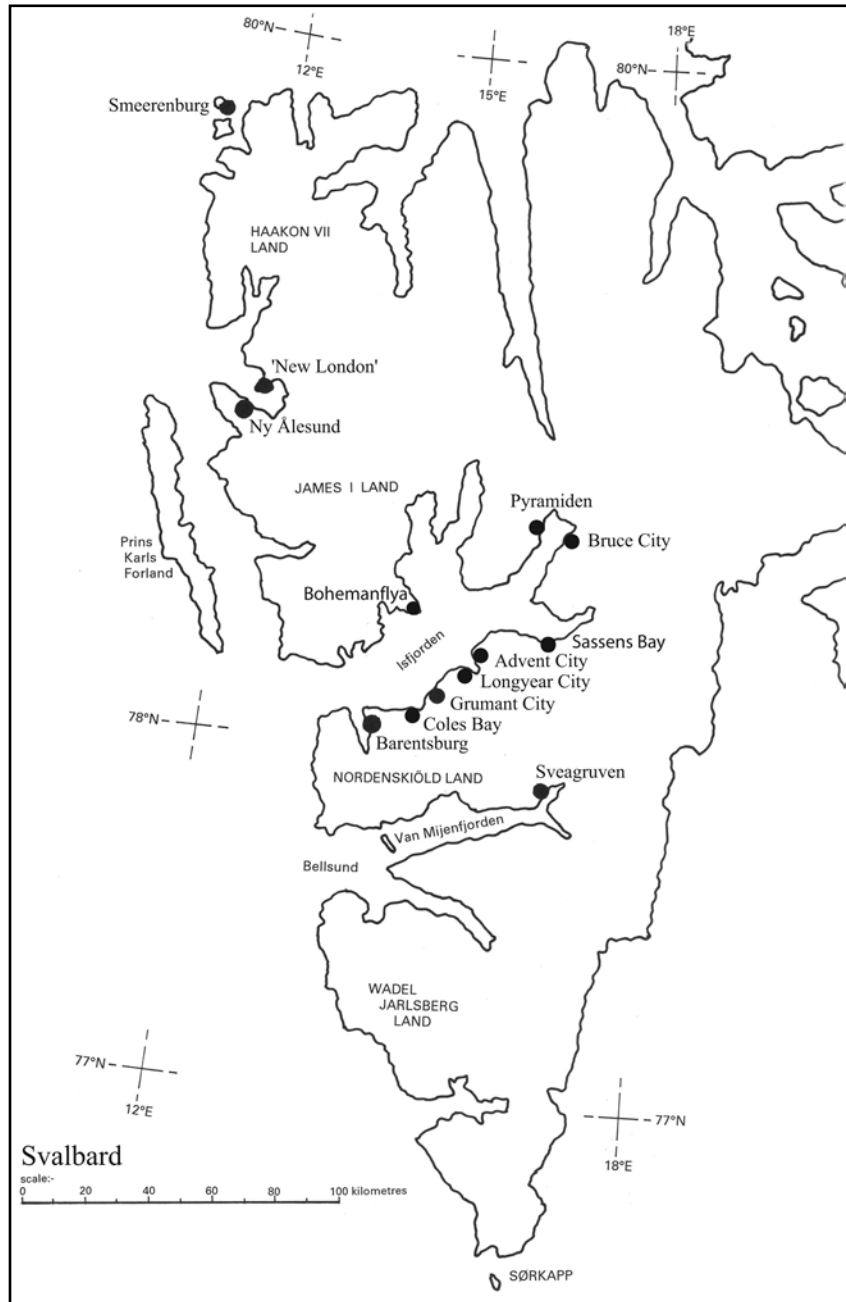


Fig. 1.2 Villages on Svalbard's west coast. Based on a map by Ken Catford. Modified by Cameron Hartnell/MTU. Source: AIA Industrial Archaeology Review, Volume 24, page 25, 2002. Used by Permission.

hunter's camps in their activities, but nothing that can be defined as an industry. Pomor hunting activity diminished in the early 19th century.

For most of the 19th century, Norwegian hunters and occasionally whalers dominated economic exploitation on Svalbard. During the same period, European scientists turned their eyes on the archipelago, with the natural resources as a source of knowledge and a potential economic asset. Over the whole century, with a peak towards its end, a large number of scientific expeditions were sent from several European countries, a substantial part coming from Sweden.

The coal mining industry on Svalbard developed during the early 20th century, but the use of the coal seams can be traced further back in time. On the west side of the main island Spitsbergen, the coal seams are exposed in the mountain sides on several locations, especially around the large fiord called Isfjorden in the center of the island (Figure 1.2). These coal outcrops were easy to discover for Europeans familiar with the visual appearance of coal. The Svalbard coal was first mentioned by the whale hunters of the 17th century, who used it on board their ships. Among them was Jonas Poole from Great Britain, who claimed the archipelago for the British king after discovering coal on the island of Bjørnøya. Coal was also discovered and used from time to time during the 19th century, by tourist cruisers, scientific expeditions and Norwegian skippers.

The first attempts to mine coal for commercial purposes were made in the late 1890's, when the international coal prices peaked. The first mine was opened by Norwegian skipper Sören Zachariassen at Bohemanflya in the Isfjorden. Zachariassen was successful and other Norwegian skippers followed his example, taking possession of coal seams that were easy available along the coastlines of the main fiords on western Spitsbergen.

Typically, these early Norwegian mining and prospecting companies only had access to limited financial resources and therefore failed to open larger scale, all-year coal mining. Their mining operations were only minor camps, consisting of a house or two, a mine pit in the mountainside and a simple pier. A few years into the 20th century, these companies offered to sell their properties, and buyers appeared. On the northern shore of the Adventfjorden, the claims of the Norwegian company "A/S Bergen-Spitsbergen Kulkompani" were transferred to the British "Spitsbergen Coal & Trading Company". This company opened the first mining settlement for year around production on the archipelago, Advent City. At the same time, another Norwegian mining company sold their claims on the southern side of Adventfjorden to American capitalists Frederick Ayer and John Munroe Longyear, who founded the Arctic Coal Company. This company established Longyear City, a mining town that came to be one of the most important on Svalbard in the 20th century. It is widely agreed among historians that the establishment of Longyear City and the Arctic Coal Company was of major importance for the later development of the mining industry on Svalbard. Their operations proved to other interested actors that it was possible to establish a successful coal mine in the Arctic. Longyear City was sold to the Norwegian company "Store Norske Spitsbergen Kulkompani A/S" in 1916 and now known as Longyearbyen, it is the administrative capital of Svalbard today.

There were also other parties from other nations involved in the coal rush developing on Svalbard between 1900 and 1925; British, Russian, Swedish and Dutch. Towards the end of the First World War, several mining settlements were established by these actors along the fiords of western Spitsbergen. More and more coal ships plowed the waters of the Arctic Sea as northern Norway became a center for the offices of foreign mining companies and a recruiting ground for mine workers.

There are several explanations for this coal rush. One is obviously economical; Europe was industrializing and the industrialization process was moving rapidly in the Scandinavian countries at the time. Moreover, the Scandinavian countries had only very limited coal resources and therefore Svalbard, relatively close at hand, became an attractive source. Another explanation is Svalbard's status as a "no-man's land", or "Terra Nullius", a national status widely agreed upon since the 17th century. The no-man's land condition meant that it was free for everyone who so wished to exploit the natural resources of the archipelago, without restrictions and taxation.

Another driving force was national prestige and strategies of foreign policy. In 1905 Norway broke up the Swedish-Norwegian union, an action that was very unpopular in ruling circles in Sweden. When Norway, a few years later, suggested that the no-man's land of Svalbard should be incorporated into Norway, this was interpreted as a provocation by the Swedish government. To strengthen the position of the Swedish government in future negotiations, the Swedish Ministry of Foreign Affairs successfully persuaded Swedish capitalists to occupy coalfields there. In the same way, the Norwegian government, with the active help of some Norwegian polar scientists, encouraged Norwegian mining interests to do the same. In the early 1910's, the Russian government took similar measures, for the same reasons. A Norwegian Svalbard was unthinkable to them, since the Svalbard archipelago had been regarded as an old Russian hunting ground. Thus, coalfields were occupied for the sake of Norwegian, Russian and Swedish foreign policy, as well as their economic value.

The political stakes in Svalbard coalmining were also addressed by the other actors involved in the coal rush, but with no support from their national governments. The British mining companies (The Northern Exploration Company and The Scottish Spitsbergen Syndicate) wanted the archipelago incorporated within the British empire. The same was true for the American Arctic Coal Company, whose principal owner John M Longyear argued for the United States to take over Svalbard.

Thus, there were both economic and political motives behind the activities of the mining companies on Svalbard. The political motives are reflected in the fact that the mining companies tried to occupy as much territory as possible, in order to strengthen their case in future negotiations on the national status of the archipelago.

The Svalbard coal rush came to an abrupt end in the 1920's for two main reasons; falling world market prices on coal and the fact that Norway established control over the archi-

pelago with the ratification of the Svalbard treaty in 1925. From the end of the 1920's, there were basically only two nations involved in the industry; Norway and the Soviet Union. The Norwegian "Store Norske" and "Kings Bay Kul Company" mined coal at Longyearbyen, Sveagruvan (formerly the Swedish Svea mine) and Ny Ålesund. The Soviet Trust Arktikugol mined coal at Barentsburg (formerly a Dutch property), Pyramiden and Grumant City-Coles Bay. This situation has changed little up this day, though active mining has ceased at Ny Ålesund, Pyramiden and Grumant City-Coles Bay.

Project Background

After meeting during the late 1990s, Professors Nisser and Martin exchanged visits between their respective universities, The Swedish Royal Institute of Technology (KTH) and Michigan Technological University (MTU), to present lectures and pursue institutional cooperation. Because both were engaged in research and teaching in the field of industrial heritage studies/industrial archaeology, their common interests provided a basis for extensive and wide-ranging discussion. At some point, Nisser described her ongoing work on Svalbard, and in particular the documentation of the Svea Mine complex that was being done by KTH graduate student Dag Avango.

Before her visit to Michigan Tech in the Fall of 2001, Nisser mentioned to Martin that the American mine operator had been from Michigan, and expressed an interest in pursuing information about him during this visit. The American was John M. Longyear, a notable citizen of Michigan's Upper Peninsula. Longyear was a well-known historical figure, having had a distinguished career in the land, timber, and mineral industries of the Upper Midwest region of the United States. Longyear lived much of his life in the town of Marquette (less than 100 miles from Houghton, the home of Michigan Technological University.) He and his family had been thoroughly involved in civic activities, endowing an historical library in Marquette, among other things.

Martin made an inquiry at the Marquette Historical Society library, confirming that some documents regarding Longyear's Svalbard activities resided there, and checked with MTU Archivist Erik Nordberg to see if anything related to Longyear was present in the collections at MTU. Through this inquiry, Martin learned that Longyear had a long involvement with MTU, served for more than 20 years on the Board of Control of the Michigan Mining School, as the University was then known, and hired a number of the School's graduates for his various mining interests. Nordberg reported that fairly extensive collections of Longyear material were available, including a specific group of Spitsbergen/Svalbard materials, as well as a collection donated by one of the graduate mining engineers who had worked for Longyear's Arctic Coal Company venture on Spitsbergen. An additional inquiry further revealed that Spitsbergen materials were available in a private collection in the area, materials amassed by another of Longyear's former mining engineers.

These revelations sparked considerable interest in Nisser and Martin, and they determined that a joint research project, combining the interests and expertise of researchers

from both KTH and MTU should prove mutually rewarding. An archival visit to MTU by Dag Avango in November 2002 confirmed that Longyear's Arctic Coal Company materials in Michigan could provide valuable insights into Svalbard mining, both in particular reference to Arctic Coal Company operations, but also to the general history of the place and to the conduct of industrial activities in the Arctic.

Nisser and Martin explored several avenues for supporting joint research ventures on Svalbard with no immediate success. In 2003, a Research Conference sponsored by Professor Vadim Starkov in the Russian mining settlement of Barentsburg provided a venue for carrying this effort forward. Because representatives from several countries were present, this proved to be an appropriate opportunity to promote the notion of an international field course focused on the industrial heritage of Svalbard. Nisser made an explicit proposal for such an undertaking in her presentation to the conference, while Martin reported on the recently discovered Arctic Coal Company materials in Michigan, and Avango reported on his research. The discussions and site visits during the Barentsburg Conference were stimulating and informative for all concerned, especially Louwrens Hacquebord of Groningen University and Urban Wråkberg of the Swedish Royal Academy of Sciences, both of whom had extensive previous experience in Svalbard. The parties resolved, with renewed determination, to pursue a joint expedition. The 2004 project can be traced directly to the discussions at Barentsburg, following the earlier less formal discussions. Subsequent fundraising efforts proved successful both in Sweden and in the United States.

Research Proposals

Nisser, Avango, and Urban Wråkberg (of The Royal Academy of Sciences) discussed among themselves the appropriate avenues for pursuing financial and logistical support for the 2004 project, and settled on writing a proposal to the Bank of Sweden Tercentenary Foundation, an effort that proved successful (See Appendix A). The Swedish Fund provided generous logistical support for fieldwork and for a planning meeting, to be held in Stockholm. In addition, the project was managed and supported under the sponsorship of The Swedish Polar Research Secretariate's program SWEDARCTIC 2004. Considerable additional support was provided by the Arctic Centre and Groningen Institute of Archaeology, University of Groningen, the Netherlands.

Martin determined that the most likely avenue for successful support of a research and training effort on the US side would be the National Science Foundation. He made contact with two programs; the Science, Technology and Society Program (STS), and the Social Science program within the Office of Polar Programs (OPP). Following a personal visit with the program officers, he submitted a proposal to both for support under the Small Grants for Exploratory Research program. As the year progressed, it became clear that STS would be the initial granting program, and OPP provided supplemental support. (See Appendix B)

Martin's proposal focused on the exploratory nature of this undertaking, as well as its

international dimension. He emphasized that the Swedish colleagues had already been successful in attracting support from their country, and that scholars from Norway, the Netherlands, the United Kingdom, and Russia had been recruited to participate. The proposal requested funds to support travel and accommodations for two faculty and four students to visit Svalbard in August of 2004 in order to foster international cooperation, build a network of junior and senior researchers, explore methods and techniques, and begin to document the industrial heritage of the Arctic.

Planning

In March of 2004, the core members of the project team gathered in Stockholm to make explicit plans for the field course. Present were Nisser, Martin, Avango, Wråkberg, Gustav Rossnes of the Directorate for Cultural Heritage of Norway, Louwrens Hacquebord of the Arctic Institute, University of Groningen, and Miles Oglethorpe of the Royal Commission on the Ancient and Historical Monuments of Scotland (RCHAMS.) Over a period of three days, the group discussed possible approaches to pursue, as well as contributions of each national group. We covered logistics, equipment, travel and accommodations, as well as scientific and historical rationales and desired outcomes. This was a lively and productive session, arriving at a strong consensus on all matters.

The team agreed that the international nature of historical use of Svalbard made our international collaboration especially appropriate. While our long-term interests would ultimately reach to examples of all nations' occupations, we agreed to focus our attention to a more limited range of sites for the initial project. Because Longyearbyen is the most convenient base of operation and accommodation, because Longyearbyen (formerly Longyear City) was the primary base for Arctic Coal Company (ACC) operations, and because Longyearbyen is the location of substantial physical remains of ACC operations, we decided to concentrate our efforts there in 2004. We agreed to also make forays to several other locales where other interests pursued coal mining, exploring and documenting what we found. But our initial focus would be devoted to recording remains of ACC in the Longyearbyen vicinity. We would further use this activity to foster cooperation and interaction among our national groups, and to expose students and professionals from all nations to various approaches to the documentation of industrial heritage remains.

Chapter 2

Implementation

Participants

The International Field Course in Arctic Industrial Heritage was planned to accommodate the complex schedules of the various participants. August 10-20 proved to be the best time alternative, though even this period did not allow complete participation by all parties. This period in August was also selected for the potential of clement weather conditions and maximal availability of transport and accommodations.

Project faculty from each nation sought out student participants. The teams of faculty and students and their institutional affiliations are listed below.

Sweden

Faculty: Professor Marie Nisser, KTH
Dag Avango, KTH
Dr. Urban Wråkberg, Swedish Royal Academy of Sciences
Students: Ulf Gustavsson
Oscar Törnqvist

United States

Faculty: Dr. Patrick Martin, MTU
Dr. Susan Martin, MTU
Students: Larry Mishkar, MTU
Edward Tennant, MTU
Arron Kotlensky, MTU
Michael Deegan, MTU

The Netherlands

Faculty: Dr. Louwrens Hacquebord, University of Groningen
Students: Martha de Jong, Groningen
Wouter Ytsma, Groningen
Jorieke Rutgers, Groningen

United Kingdom

Faculty: Dr. Miles Oglethorpe, RCHAMS
Student: Ian West, Leicester University

Norway

Faculty: Dr. Gustav Rossnes, Directorate for Cultural Heritage of Norway
Tor Einar Fagerland, Norwegian University of Science and Technology

Student: Roy Åge Håpnes, Norwegian University of Science and Technology

Russia

Faculty: Professor Vadim Starkov, Russian Academy of Sciences
Eugene Bouzney, Russian Academy of Sciences

Seminars and orientation

During the first two days on Svalbard, the entire group participated in a series of seminars and orientation trips designed to provide background and introduction to the landscape, history, and research questions that would be encountered during the field course. Presentations included:

- Louwrens Hacquebord: “From whaling ground to scientific laboratory.” Overview of Svalbard history 1500-1900 in the general context of US/European colonisation of the Arctic/Antarctic.
- Dag Avango: “The industrialisation of Svalbard 1870-1925 – science, coalmining and international politics in a no mans land.”
- Gustav Rossnes: “Trapping history of Svalbard and its relationship to other economic and scientific activities.”
- Marie Nisser: “International cooperation in coalmining research.”
- Patrick Martin: “Michigan’s role in Arctic Coal.”
- Urban Wråkberg: “History of polar exploration and science.”
- Miles Oglethorpe: “General issues related to coalmining in Svalbard.”
- Vadim Starkov: “Coles Bay and Grummant City.”

All participants, students and faculty alike, discussed their individual backgrounds and expectations for the course, outlining the questions that they wished to pursue and the contributions that they hoped to make.

The team took excursions by bus around Longyearbyen and up the Advent Valley, as well as walking tours to workings of the Arctic Coal Co. in the vicinity. This served to orient participants to the local conditions and the layout of the cultural resources that were of interest. Discussions focused on the nature of the physical remains, the landscape, and logistical considerations, such as team safety and environmental protection. The organizers took particular care to emphasize safe behavior in remote locations and during boat excursions. Furthermore, we discussed the sensitive nature of the Arctic landscape, flora and fauna, and the official Norwegian policies regarding protection of the Svalbard natural environment.



2004 International Fieldwork Group. Front row (l to r): Patrick Martin, Ian West, Susan Martin, Michael Deegan, Louwrens Hacquebord, Jorieke Rutgers, Martha de Jong, Dag Avango, Marie Nisser. Back row (l to r): Roy Åge Håpnes, Larry Mishkar, Tor Einar Fagerland, Arron Kotlensky, Urban Wråkberg, Wouter Ytsma, Oscar Törnqvist, Ulf Gustavsson, Gustav Rossnes, Edward Tennant. Photo by Miles Oglethorpe.

Chapter 3

Methods and Techniques

The team examined five mining areas during the field course (Figure 1.2). Two of these (Old Longyear City and Advent City) received fairly intensive survey attention, defined by the number of hours of effort and the detail of documentation. Three other areas (Sas-

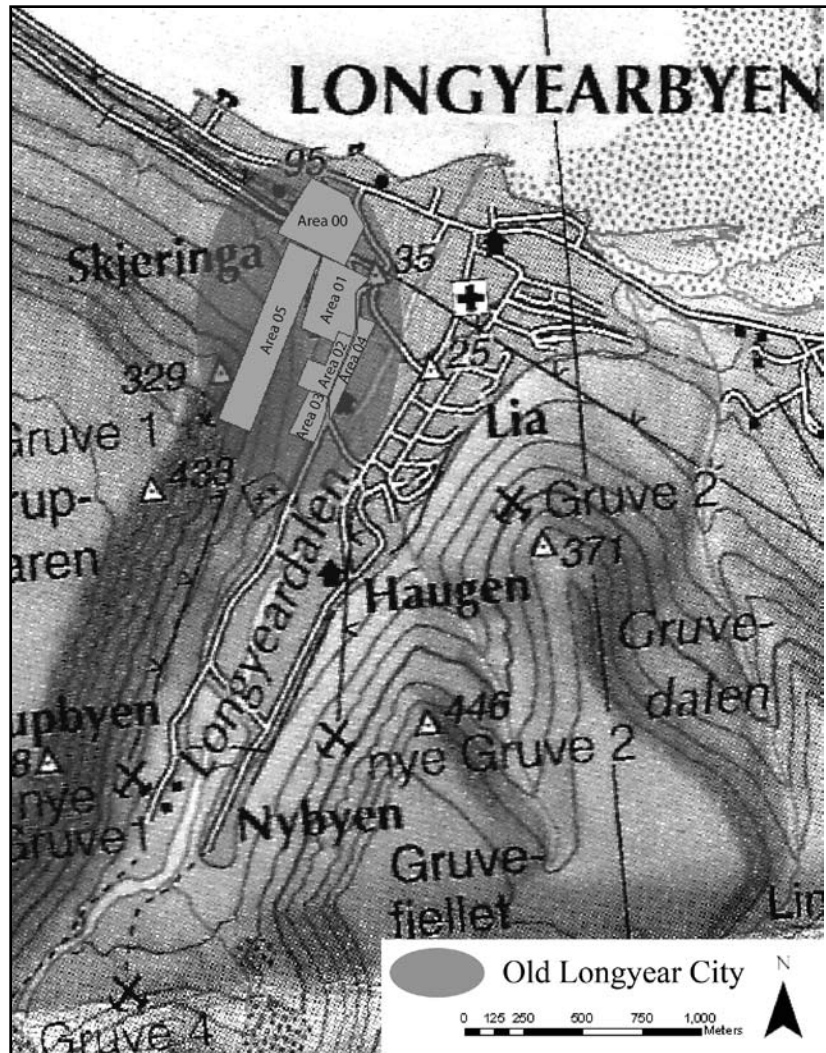


Fig. 3.1 Map showing survey area of Old Longyear City. Map by Cameron Hartnell/MTU.

sen Bay, Coles Bay, and Bruce City) received more superficial attention in a reconnaissance mode, with limited time and effort.

Old Longyear City

This area was of primary interest for the Field Course, partly because of its historical importance as the seat of the Arctic Coal Co. operations, partly because rich documentary resources are available for comparison with the physical remains, and partly because it

was logistically convenient for our documentation exercise (Figure 3.1). The convenience of the location, near our accommodations, made it possible to do most of our formal training at this place; we were able to easily introduce our methods and equipment in detail, and to discuss the physical features encountered before traveling to more remote locations. Therefore, of the five areas explored, the team expended the greatest amount of time and energy on this site.

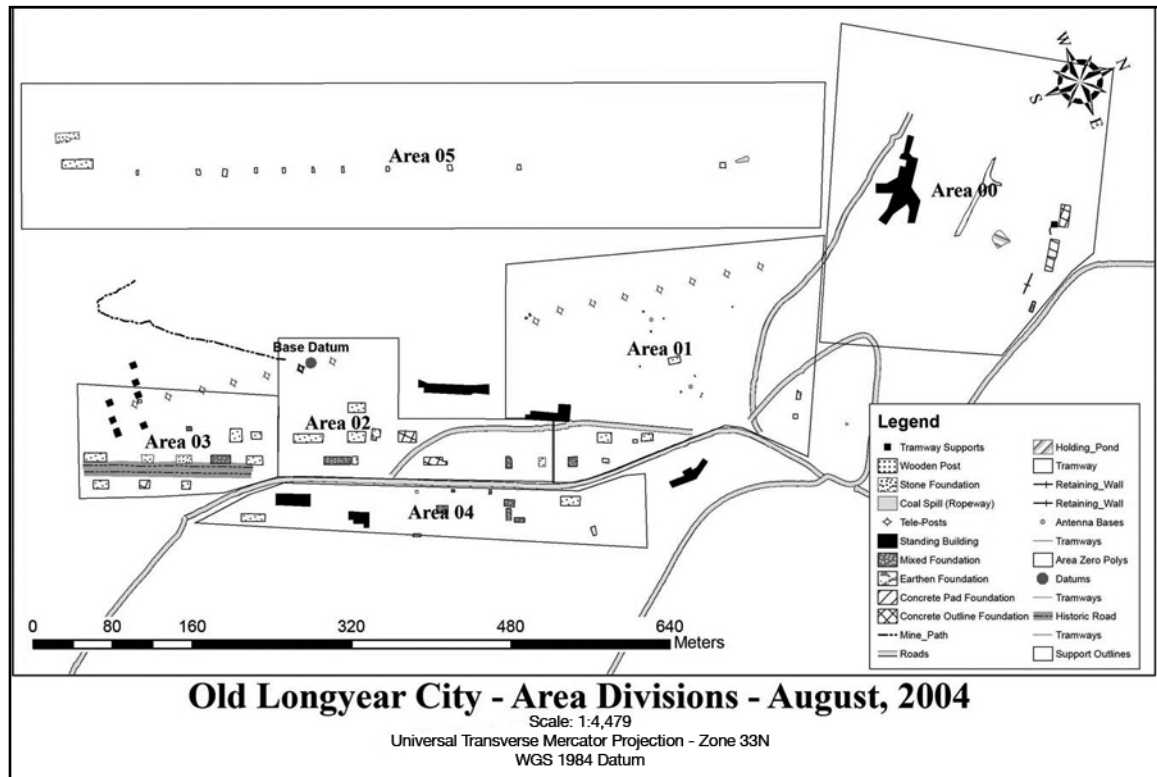


Fig. 3.2 Area map produced with GPS survey data. Ed Tennant/MTU.

Fieldwork commenced with pedestrian reconnaissance, walkovers that allowed the team to examine the surface indications of historic structures and landscape alterations. Though Old Longyear City was burned by a German naval bombardment during 1943, remnants of foundations are clearly visible. In addition, the remains of roads, tramways, and mining features are also visible.

The area of interest was extensive, so the team subdivided the area into six sections of convenient size (Figure 3.2) and the group was divided accordingly. We combined members of each national group into the sectional groups to encourage interaction. Each sectional group began by making simple sketch maps of their area and placing pin flags onto cultural features that deserved documentation. This was an interactive exercise; faculty reviewed students' maps and feature determinations, refining and expanding where deemed necessary and/or desirable.

The area sketch maps (Figure 3.3) served primarily for orientation and to aid in giving

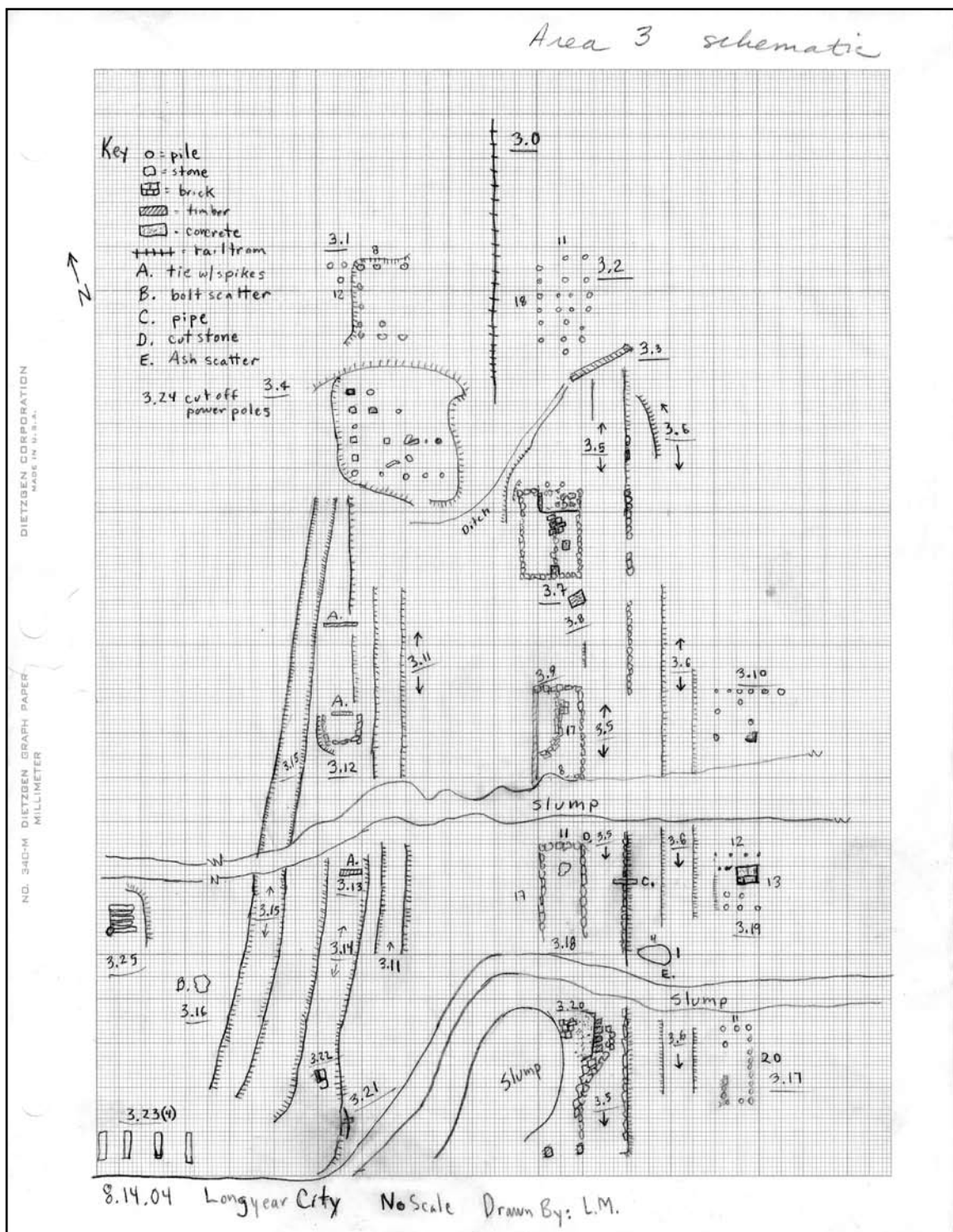


Fig. 3.3 Area three sketch map. Drawn by Larry Mishkar/MTU.

each feature a unique identification number. Then the teams produced relatively detailed feature maps, drawn to scale and accompanied by prose descriptions of the feature's characteristics. The teams recorded details such as building materials, presence of artifacts, the condition of the remains, such as evidence of burning, and the orientation of the

Svalbard Archaeology Field Form Michigan Technological University	
Site Name/Number: _____	Date: _____
Recorder Initials: _____	Project Name: _____
Other Recordation Methods (GPS, TDS, etc): _____	
Feature Number: _____	
Feature Type: <input type="checkbox"/> Artifact <input type="checkbox"/> Structure <input type="checkbox"/> Transportation <input type="checkbox"/> Other: _____	
Feature Description: _____ _____ _____ _____ _____ _____	
Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> Ruined <input type="checkbox"/> Standing	Currently in use: <input type="checkbox"/> Yes <input type="checkbox"/> No
Materials Present: <input type="checkbox"/> Wood <input type="checkbox"/> Brick <input type="checkbox"/> Posts-wood <input type="checkbox"/> Concrete <input type="checkbox"/> Stone <input type="checkbox"/> Iron <input type="checkbox"/> Glass <input type="checkbox"/> Coal <input type="checkbox"/> Other: _____	
Photographs Take: <input type="checkbox"/> Yes <input type="checkbox"/> No	Photograph info: Roll #: _____ Exposure #: _____
Feature Use <input type="checkbox"/> Residential <input type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input type="checkbox"/> Unknown	

Fig. 3.4 Example of field forms used by the team.

features. The teams used a standard feature form to ensure a degree of recording consistency (Figure 3.4).

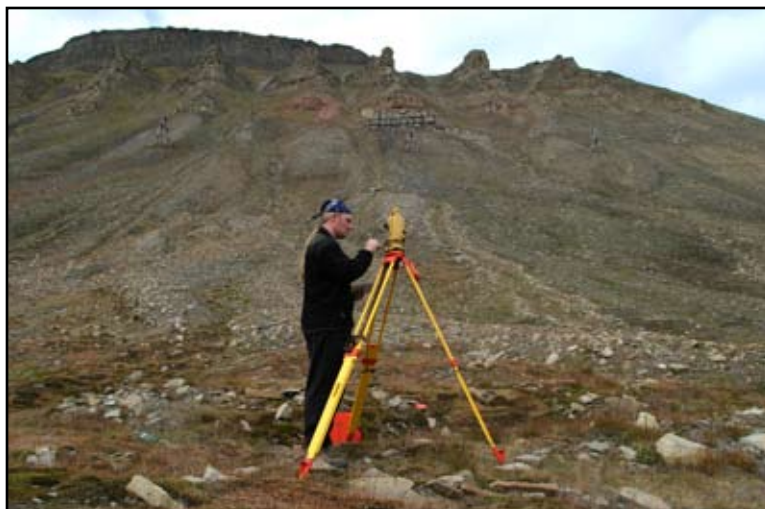


Fig. 3.5 Arron Kotlensky using a total station. Photo by Larry Mishkar/MTU

After teams became comfortable with the feature recording process, work began on making a more precise map of the site area. The mapmaking process was undertaken using two laser transit total stations, one from the Netherlands team and one from the United States (Figure 3.5). The team integrated the results from the two instruments to produce a single, unified map. Most, if not all, team members participated in the mapmaking exercise, gaining experience with the operation of the total station. This is not to say that all team members became fully competent instrument operators, but rather that all were sufficiently exposed to the equipment and to the process to understand and appreciate the

value of this approach to documentation. Many team members did develop a significant degree of expertise in operation, and all certainly became capable of selecting and marking data points with the prism rod. Professor Louwrens Hacquebord of the Netherlands and students Mike Deegan and Arron Kotlensky of MTU took primary responsibility for the total station work and instructing their colleagues on the use of this technology.

To provide a consistent measurement base and semi-permanent reference points for the survey, the team established a baseline and a series of benchmarks from which to map the features. The baseline was placed partway up the slope overlooking Longyear City, oriented east/west, and four benchmarks were placed along this straight line to act as mapping locations. The benchmarks were spread sufficiently far apart to insure that all of the features of obvious interest could be seen from at least one, if not more of the benchmarks. One of the benchmarks, the base datum, was marked with a large copper pin topped with a brass head, a common surveying item. We inscribed the initials "MTU/IA, 2004" into the brass head to identify it. The team set up the total stations above these established reference points and measured archaeological features from the benchmarks, recording distance and angles in the instruments' data loggers. At the end of each day, sometimes more frequently, mapping data would be downloaded into laptop computers for storage and manipulation. Team members then imported the data files into mapping programs, such as ArcGIS, to assure that reliable and useable data were being collected. Edward Tennant of MTU took responsibility for downloading and manipulating data in ArcGIS.

The real-world location of the base datum was established by using a Global Positioning System (GPS) receiver, in this case a Trimble GeoExplorerXT, to record coordinate data for 10 minutes over the total station set up on the datum. The coordinate data recorded by the GPS unit was in the universal transverse Mercator (UTM) system. This was then programmed into the total station. The major advantage of using a UTM coordinate for the base datum meant that each point shot with the total station (over 400 in total) was already in a coordinate system, and no conversion was necessary. Therefore, once the points were downloaded out of the total station, they could be imported directly into ArcGIS and compared to many other types of data. Another advantage of this combination of total station and GPS unit allowed for the discontinuous use of the GPS unit while the total station recorded positions. In other words, while the total station was used by a team to record points and features, the GPS unit was used to collect surrounding features (i.e. roads, paths, etc.). The GPS unit was also used to zero set the total station. To do so, the operator moved the unit 100 meters to the north of the base datum using the real-time coordinates displayed by the unit, and the total station crew sighted the GPS unit for the zero set.

The field accuracy of the GeoExplorer allows it to record coordinates within a meter or less. This level of accuracy is enlarged as one moves towards the poles, where the GPS satellites tend to bunch up and dramatically improve the entire system's performance. In the high arctic environment, that so often taxes the limits of both worker and machine, the GPS system often performs in superior fashion when compared to use of the same



Fig. 3.6 Student, left, using GPS to map a feature. Photo by Michael Deegan/MTU.

used in cultural resource mapping projects around the world, and the degree of attainable accuracy is increasing, as well. At a minimum, GPS was judged to be more appropriate than the total stations for documenting features that extended over some distance or over



Fig 3.7 Example of feature documentation process. Photo by Larry Mishkar/MTU.

inconvenient terrain, features such as roads, tramlines, and the aerial ropeway alignment. To document these long features with the total stations would require multiple setups and considerably more time and effort. The GPS proved its utility in this setting, as well as demonstrating a considerable time saving over total station use.

After feature maps and descriptions were completed, and during the overall area mapping phase, team members shot a series of record photographs of the features and the landscape. The team shot representative views of most features using 35mm black & white and color slide film, with a scale stick and a north arrow visible and a chalkboard to identify the feature and area (Figure 3.7). In addition, the team also made digital images of a large sample of features. We used film for quality and permanence, while the digital images allow for quick reference and for ease of use in a web environment, as well as transmission and sharing. Larry Mishkar of MTU took primary responsibility for photography, and also provided some instruction on standard archaeological photography for those students who wished to learn about it.

While we did occasionally refer to historic photos and maps of Old Longyear City during the fieldwork process, we explicitly avoided interpreting the remains in detail. The process we employed called for privileging the physical evidence, rather than letting documents or photos guide the observational process. This proved difficult, particularly when historic images were of high quality. The temptation to make a facile identification, and

equipment in middle and lower latitudes.

While most mapping was accomplished through use of the total stations, some features were only mapped using a GPS receiver (Figure 3.6). The team used GPS as a check on the efficiency of this technology for this application, and as a comparison to the total station mapping. GPS is increasingly being

used in cultural resource mapping projects around the world, and the degree of attainable accuracy is increasing, as well. At a minimum, GPS was judged to be more appropriate than the total stations for documenting features that extended over some distance or over

then base subsequent observations upon that judgment, was often hard to resist. But the team was consistently urged to avoid pitfalls such as the problem of interpretation on the basis of early photos, when we knew that later occupants added additional structures, and the remains on the ground represented the full period of occupation. Therefore, the team concentrated on documenting what was visible first, then trying to match the evidence with the historical record.

The team collected data on over 70 features. A typical feature sketch is reproduced here as an example. Results of the survey are discussed in Chapter Four.

Advent City

Fieldwork at Advent City (Figure 1.2) followed much the same pattern as that at Old Longyear City, but was considerably abbreviated, all taking place during a single day's visit. The team traveled to the site by Zodiac inflatable boats and spent the full day on site. Work began with a walkover of the site area to assess the range of features present. Then small teams were formed to mark features of interest and begin the process of documenting them with feature forms, sketch maps and photographs, much as had been done at Longyear City. The composition of survey teams continued the practice of mixing national representatives, with the specific goal of increasing interaction and exchange of perspectives and experience.

A major difference between the Longyear City and Advent City work was the complete reliance on GPS for site mapping at Advent City. Because we would only devote one day to the task, we decided that use of the total stations would be too time-consuming. This also allowed many of the team members to spend some time with the GPS instruments and gain some experience with that technology. This also allowed us to assess whether GPS mapping was sufficient for a documentation exercise of this sort; we concluded that it was, indeed. Edward Tennant, MTU graduate student, was the primary user and instructor on the GPS technology.

The team collected data on 16 structural features and several linear transportation features, such as paths, tramways and ropeways. Results of the survey are discussed in Chapter Four.

Sassen Bay, Coles Bay and Bruce City (see Figure 1.2)

At each of these locations, only a portion of the project team participated, since transportation access was limited and expensive. Other team members continued the work at Old Longyear City while parts of the team traveled for one day to each of these more remote locations. The pattern of work was similar at each place; pedestrian walkover to discover features of interest, followed by GPS mapping, drawing and photography. The results of these site visits are described in Chapter Four.

Chapter Four

Results

Old Longyear City

Historical Background (derived primarily from Dole, *America In Spitsbergen*).

John M. Longyear first visited Spitsbergen in the summer of 1901, on a tourist steamer, with his wife and son. He made a second visit, with a cousin named William Munroe, who was a mining engineer, as part of a larger inquiry into possibilities of iron production in Norway. This second visit, in 1903, included Olaus Jeldness, a Norwegian who proposed development of coal mining property in partnership with Longyear. During the 1903 visit, Longyear, Munroe and Jeldness examined several seams of coal in the Advent Bay area, and collected samples for analysis. George Koenig, a chemistry professor at the Michigan College of Mines analyzed the samples upon their return to the United States, convincing Longyear of the potential value of the mining property.

Together with his long-time partner Frederick Ayer, and Jeldness, Longyear negotiated with the Trondheim-Spitsbergen Coal Company, claimholders of the property since 1900. Jeldness obtained an option on the property in early 1904, and in 1905, he and Munroe began the process of establishing a mine in Advent Bay. During the summer of 1905, Munroe chose an appropriate opening for the mine, began excavation and construction of a tramway to the shore, and made an initial sale of coal. Jeldness sold out his interest to the principals, Ayer and Longyear, and the Arctic Coal Company was registered in 1906, with Ayer and Longyear the primary stockholders.

William Munroe returned to Advent Bay in 1906 with his wife, a load of timber, supplies and men to continue development of the mine property. During this season, he named the Longyear Valley and began the mining camp that came to be known as Longyear City. Despite some difficulties with workers due to conditions in the camp, and an unsatisfactory engineer, Munroe made progress, and left a crew of men to over winter and continue work. He also established stations at both Green Harbor and Sassen Bay, two other Arctic Coal Company claims, and marked their claim at Cape Boheman, as well.

After leaving Spitsbergen, Munroe initiated the contracts with the Bleichert Company in Leipzig to build aerial tramways for the moving coal from the mine to the dock, and then returned to America. In February of 1907, Munroe lost his life in the sinking of the British mail steamship *Berlin* enroute from Harwich to Rotterdam. Longyear, on his way to Egypt with his wife, received the news in Naples, and personally proceeded to replace Munroe for the season on Spitsbergen. He hired Kenneth Gilson as a mining engineer, referred by contacts through the Michigan College of Mines, and together they managed to procure the extensive supplies, materials and workmen needed to extend the operation another season. During the winter the crew, led by Mr. Mangham, had made great head-

way on construction of a coal dock. An old tourist hotel located some distance from the mine had been purchased for crew housing, and an engineer's house had been built nearby during the previous season. In addition, a barracks for workers had been constructed closer to the mine. Longyear made three trips to the mainland in ACC's vessel the *William D. Munroe*, primarily for building materials and supplies. Construction focused on storehouses, coal dock and storage, an eating-house for the crew, and a blacksmith shop near the mine.

Early in 1908 Longyear hired his wife's nephew Frederick Burrall as general manager of the Arctic Coal Company to replace Munroe. A graduate of the Michigan College of Mines, Burrall had extensive mining experience, and Longyear was relieved to be replaced in the day-to-day operations. Burrall brought the mine into full production, partly by means of finishing the aerial tramways. He also faced some conflicts with competing interests regarding claims at Green Harbor. After spending only two seasons on the mine, Burrall resigned, citing a reluctance to spend so much time away from his wife, and was replaced by John Gibson of Pennsylvania. Gibson traveled to Norway early in 1910 to begin work. Though he continued to be extensively occupied in resisting opposing claims in the Green Harbor area, he managed to make headway with mine development. With a workforce numbering 121, the powerhouse was completed and outfitted with extensive machinery, including boilers, generators and a machine shop. Additional work was devoted to the aerial tramway, the inclined tramway at the dock, and extensive equipment installed in the mine, including electric lighting and coal cutters. Three double houses for family use were built, extending facilities to house nearly two hundred in total.

In 1911, Gibson worked diligently to establish a wireless communication system between Spitsbergen and Norway. Upon arrival at the mine in the spring, he faced a striking workforce and was physically attacked by one disgruntled miner. Though the strike was stopped, Gibson chose to resign shortly afterward, and was replaced by Scott Turner, another graduate of the Michigan College of Mines and relative of Mr. Longyear. After a visit to the property in the summer of 1911, Turner began work for the ACC that winter. He began by extending the Company's shipping capacity and the marketing of coal, as well as buying a house for the Company in Tromsø. Turner faced some serious labor problems in the spring of 1912, as well as technical challenges, such as broken and worn equipment. A new concrete blacksmith shop and lunch room were constructed at the mine entrance, the dock was strengthened, two new family houses were built and occupied by two American foremen, and a fifth bunkhouse for 64 workers was erected. One structure was hauled from Advent City, as well. A new office building and other buildings were also constructed in this season. And a second mine was opened on the opposite side of the Longyear Valley.

In 1913 Longyear visited the mine once again, and was happy to see 25 to 30 buildings in good order. He examined the new mine (Mine 2), and went to see for himself some of the various competing mine operations on contested lands in Green Harbor and Coles Bay. Disputes over mining rights continued to complicate the situation, but Longyear and his Company steadfastly protected their interests and pressed on the mining operations.

Matters were not only contested at the level of individuals and corporations, but also at the level of international conferences to determine matters of sovereignty. For several years, discussion and negotiations were underway among agents of the US, Norway, Sweden, Russia, Germany, France, Denmark and Great Britain, often stimulated by the interests of Longyear and his partners. The outbreak of World War I halted formal negotiations. Ayer and Longyear reorganized the Arctic Coal Company to protect themselves from what they perceived as arbitrary treatment from the Norwegian government.

The World War complicated many matters for the Arctic Coal Company. For example, mine manager Scott Turner was on board the *Lusitania* when that vessel was torpedoed in May of 1915 off the Irish coast, losing many important company documents and nearly losing his life. Terrible ice conditions in that summer complicated transport in northern waters, and together with the War, resulted in very little business being conducted. The mine was closed for that winter, with a skeleton crew left to occupy the site, and the Company's primary ships were sold, as operations wound down. Various offers for the purchase of the company had been forwarded for some time, but at the end of 1915, negotiations came close to conclusion. By September of 1916, the Store Norske Spitsbergen Kulcompagni syndicate purchased the land and assets of the Arctic Coal Company, as well as those of their chief rivals in the area.

Store Norske operated and expanded the mines in Longyear Valley, and continue to produce coal in the general vicinity today, though both Mines 1 and 2 have long since been closed. The camp at Old Longyear City continued to be an important component of the mining operations until World War II, when it was shelled and burned by German military forces. Since that time, a small number of the building foundations have been reused, with new buildings constructed on top, but the bulk of the site was abandoned, with new construction being developed further up the valley and across the valley to the east in the community now known as Longyearbyen.

Surface Features at Old Longyear City

An observant visitor to the site area is quickly struck by the numerous regular outlines of ruins scattered over a substantial portion of the west side of the Longyear Valley. There are linear alignments, rectangles of wooden pilings protruding from the surface, piles of broken brick and concrete, pathways lined with stones, depressions and mounds that are clearly not the result of natural processes, building ruins on the hillside and a row of tramway towers leading from the mine opening toward the shore. Our team's careful survey took note of all of these features, mapping them with the total station to produce a map, seen in Figure 4.1. When one zooms into the electronic map, to a closer scale, one can perceive more detail. Therefore, Figure 4.2 presents a more detailed view of Survey Area 00, at the northern extent of Old Longyear City, including the end of the aerial tramway leading from the mines, the angle station that brought together tramways from several mines during the modern period of operation, remnants of the coal loading and storage areas, some building ruins probably related to the power station, a segment of the industrial railway leading from the settlement toward the loading area, and modern features

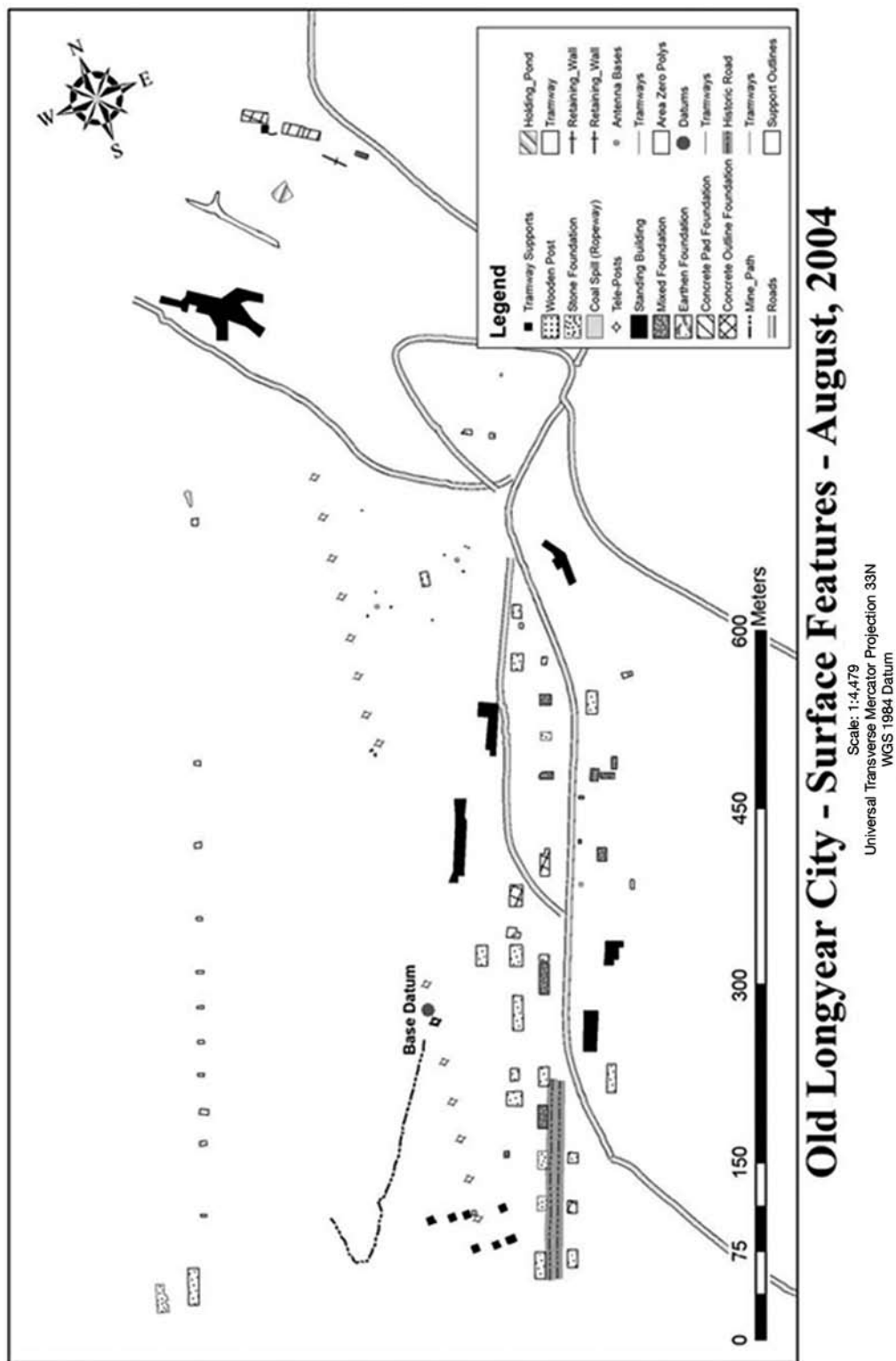


Fig. 4.1 Surface features, Old Longyear City. Map by Edward Tennant/MTU.

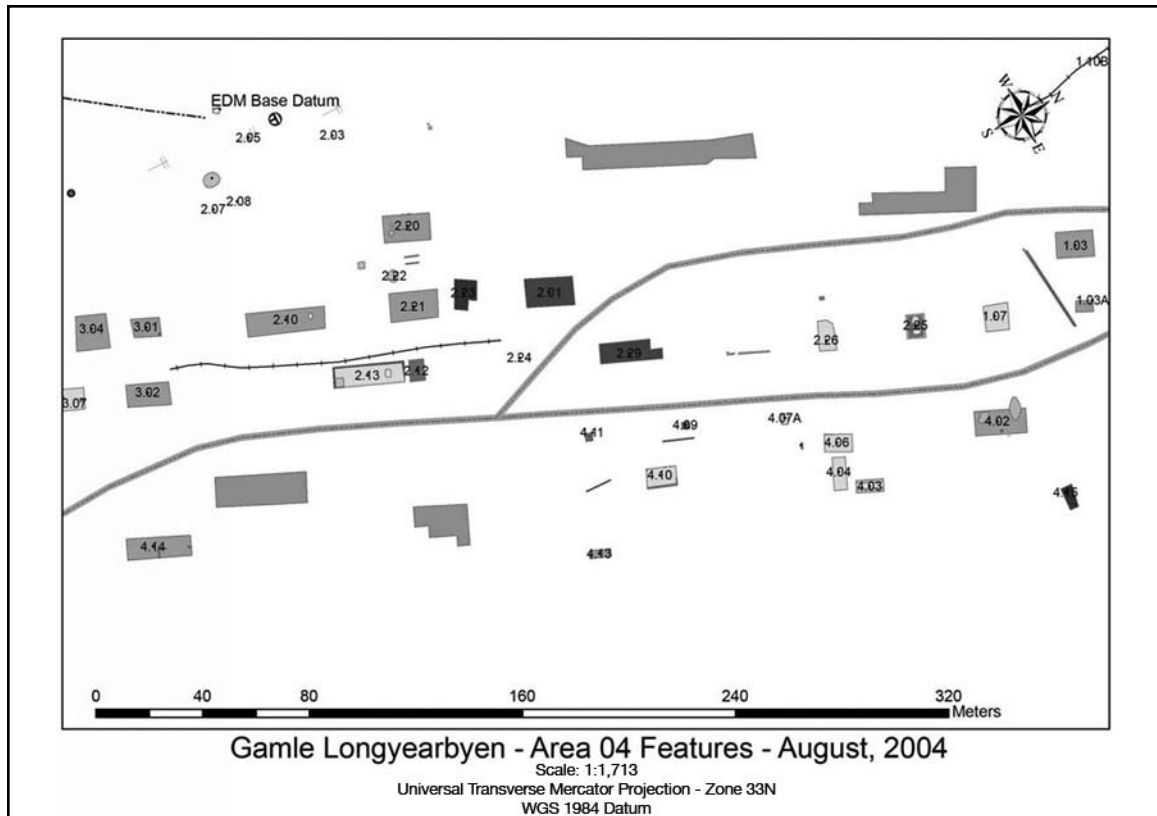
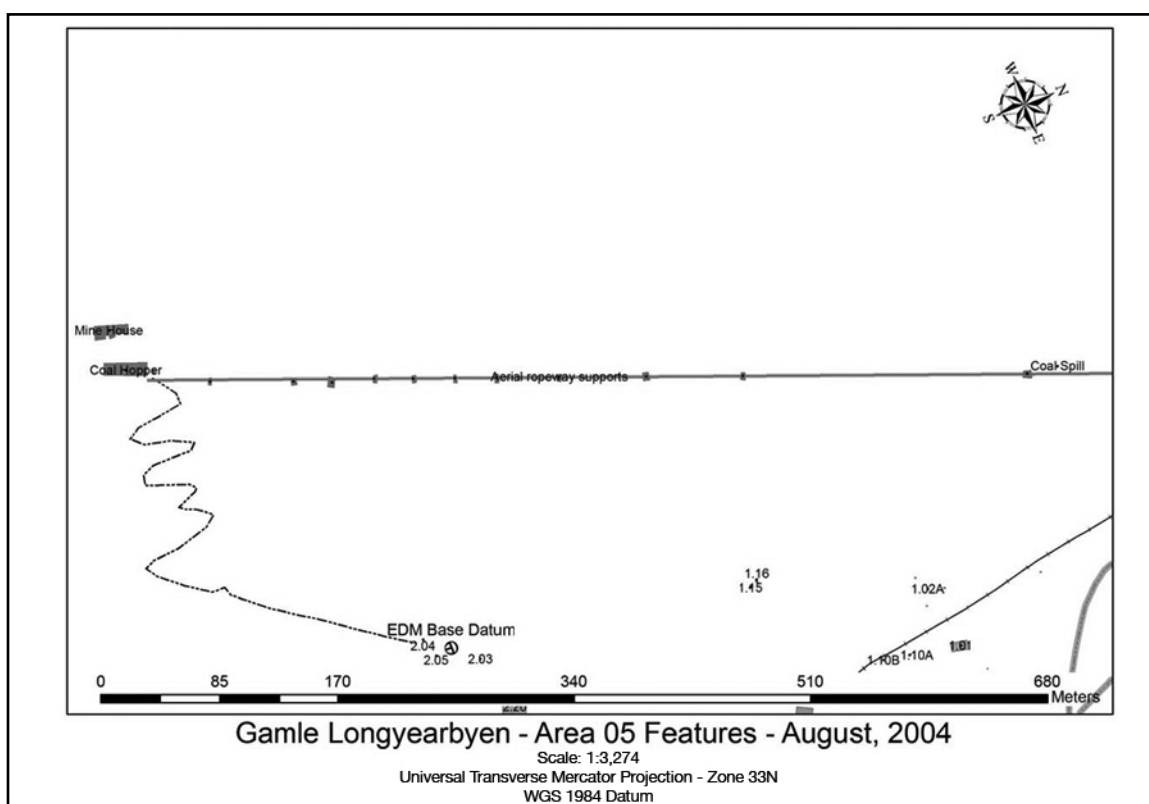
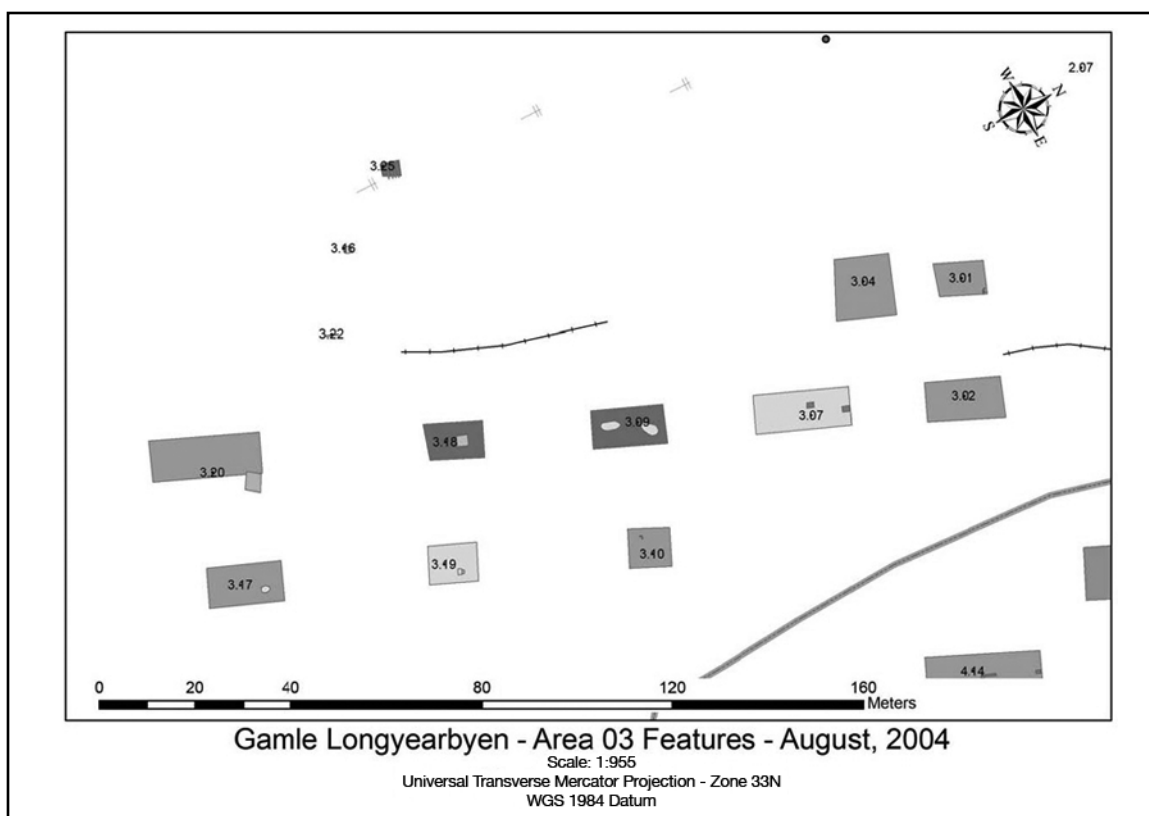


Fig. 4.4 Surface features, Area 02, Old Longyear City. Map by Edward Tennant/MTU.

such as the current road. In Figure 4.3, Survey Area 01 contains more of the modern road system, an angle station for the modern mine up the valley, more of the industrial railway, a line of telephone or power poles, what appear to be the bases of the two radio antenna masts (Feature 1.02 a and b), and ruins of several as yet unidentified buildings. Survey Areas 02 and 04, seen in Figure 4.4, contain two large modern structures on the west side, the school and the church. There are a number of unidentified building ruins arrayed in a linear fashion along the modern roadway, and a segment of the historic industrial railway alignment, as well. Survey Area 03 (Figure 4.5), further to the south, continues the same linear arrangement of buildings and railway segments. Some stone tramway supports that lead directly up the slope to Mine 1 are also located in this area. Survey Area 05 (Figure 4.6) includes a long north/south oriented strip of the hillside that contains the ruins of Mine 1, the tramway loading station and remnants of the aerial tramway leading to the shore, as well as a switchback footpath from the settlement to the mine. As an example of the increased detail that is visible by zooming in within the GIS is seen in Figure 4.7, a detailed view of the mine entrance, coal hopper, trail and ropeway complex.

This array of surface features fits well with historical evidence from a variety of sources. For instance, in 1912 a survey group from the United States Geological Survey visited Longyear City and made a detailed topographical map of the vicinity (Figure 4.8). This map provides an excellent view of the mine's surface and underground workings, the system of tramways and ropeways, as well as the dock and buildings of the settlement in relation to the natural landscape. The linear arrangement of the camp that fieldworkers



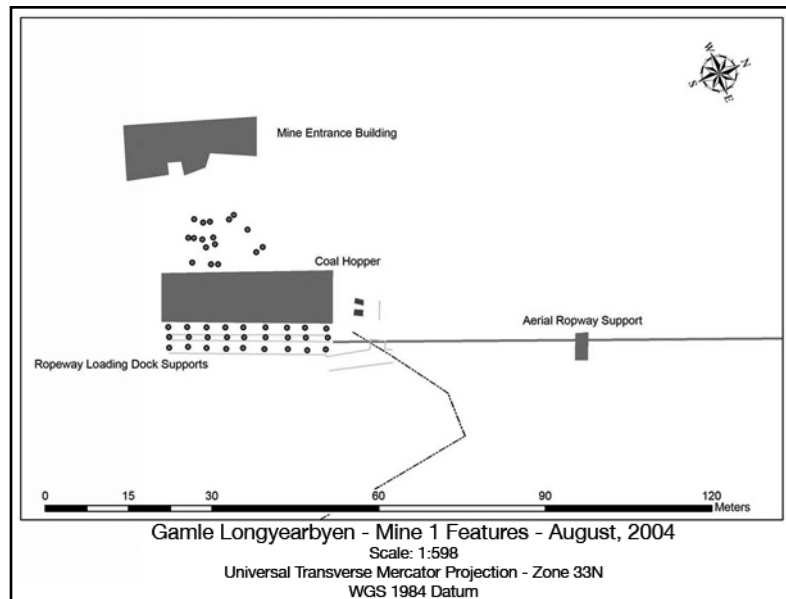


Fig.4.7 Mine 1 feature detail. Map by Edward Tennant/MTU.

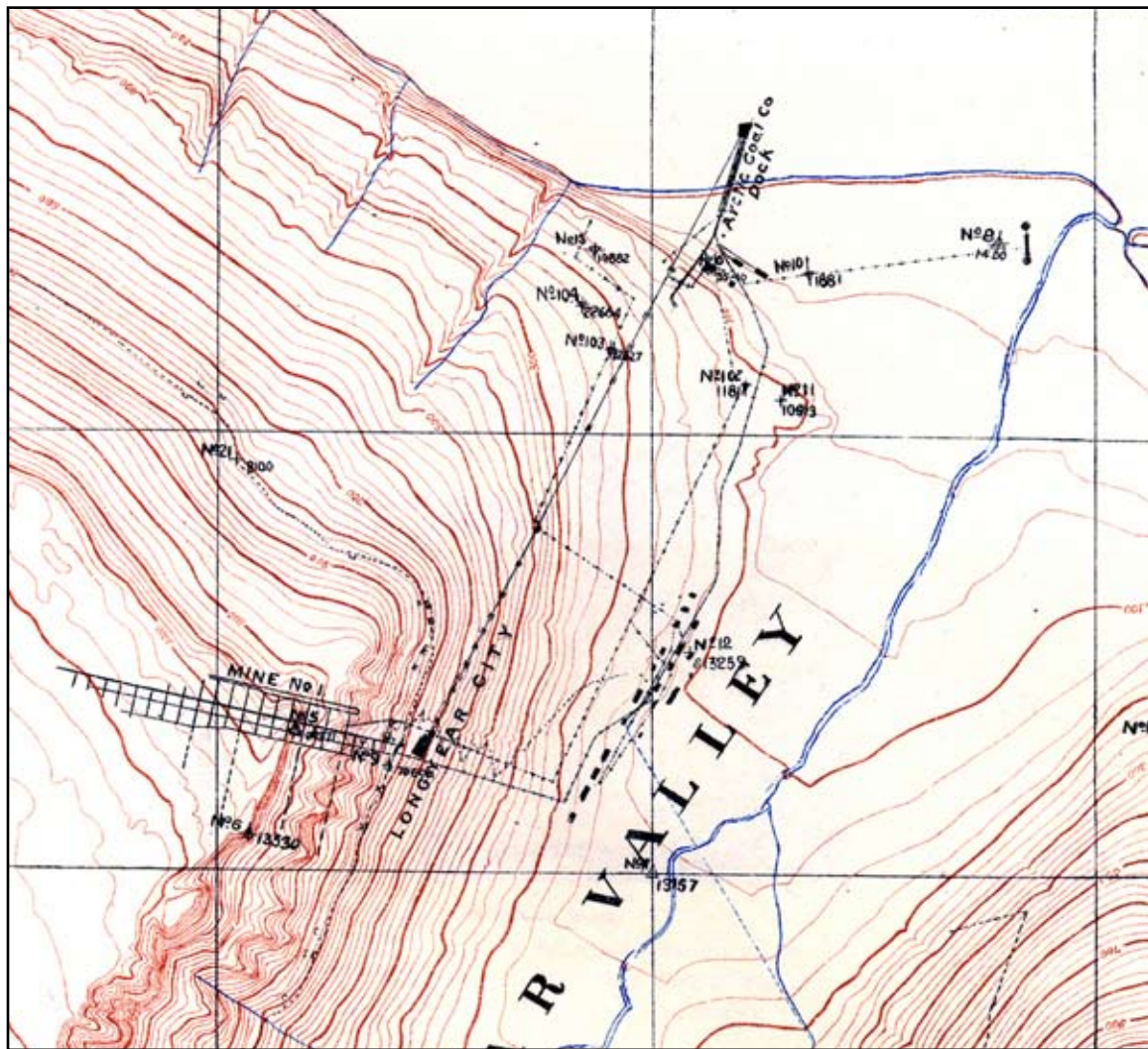


Fig.4.8 1912 USGS map. Michigan Technological University Archives and Copper Country Historical Collections.

encountered in 2004 is directly reflected in this map, though our group found a slightly larger number of structures. This, of course, is explained by the fact that ACC was not totally finished with their physical plant in 1912 when the surveyors were mapping, and Store Norske erected additional buildings after they took over the mine. However, the layout and much of the specific arrangement is clearly the same on the ground and on the map.

The historic photos reproduced in Figures 4.9 – 4.11 are drawn from a large body of available images, and show some critical elements of the historic landscape. Figure 4.9 is a panoramic view of Longyear City and Mine 1, probably taken by Longyear himself in 1912 or 1913. The view is looking toward the west with the camp laid out in a long line of structures and the mine located up the hillside. A tramway to the mine for men and materials is clearly visible on the left, side, and the towers that carry the aerial ropeway for coal are arrayed across the upper part of the photo. The viewer can make out the switchback trail that also leads from mine entrance to settlement. The stream that drains the glaciers up the valley is visible in the middle distance.



Fig. 4.9 Panoramic view of Old Longyear City, ca. 1912-1913. Michigan Technological University Archives and Copper Country Historical Collections.

Figure 4.10 is a view down onto the settlement of Longyear City taken from a point partway up the hill below and somewhat south of Mine 1. This perspective offers a view of the tramway leading up the hill, as well as the sweep of buildings lined up along the roadway/railway line. Probably also taken by Longyear, this view also represents the situation in 1912 or 1913. Adventfjord is clearly visible, as are the hills that rise on the opposite shore.

Figure 4.11 is a photo taken by professional photographer Anders Beer Wilse, probably in 1908. It shows the final towers of the aerial ropeway leading to the ACC coal dock. One



Fig. 4.10 View down onto Old Longyear City, ca. 1912-1913. Michigan Technological University Archives and Copper Country Historical Collections.

ship is loading coal, while two others lie at anchor nearby. A small stockpile of coal lies beneath the ropeway.

The 2004 survey has generated substantial data for intensive study and identification of individual structures within the Old Longyear City site, but that type of work has not yet been undertaken. An example of what kinds of detailed study might be attempted in the future follows; an examination of the industrial railway based on a comparison of the physical remains on the ground and the historical evidence found in documents and photographs.

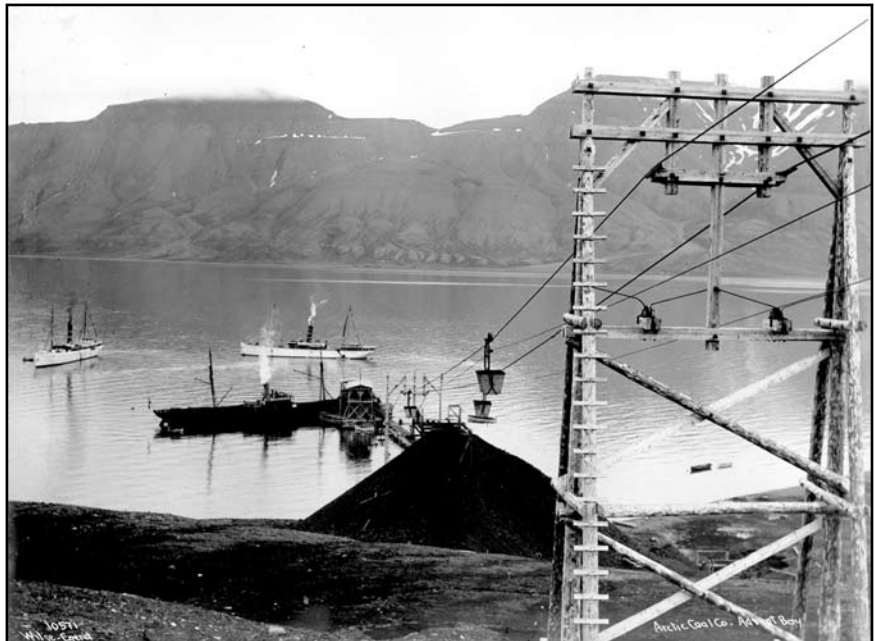


Fig. 4.11 View of coal loading, Old Longyear City, ca.1908. Michigan Technological University Archives and Copper Country Historical Collections.

Arctic Coal Company Industrial Railways

An example of combining archaeological fieldwork and archival research concerning the Arctic Coal Company (ACC) is the focus of this paper. We are fortunate to have rich documentary resources covering the development and improvement to the industrial infrastructure extending from the docks in Advent Bay, through the community of Old Longyear City, and finally to the mines above the Longyear Valley. The survival of amateur photographs by John M. Longyear and those made by the noted Norwegian landscape photographer Anders Beer Wilse are an important part of the photographic resource.¹ The Arctic is also kind to the archaeologist in providing an environment where artifacts do not quickly break down into the soil. Instead, they may remain undisturbed and readily accessible for study on the surface decades after deposit.

This report studies the 1.25-mile industrial railway that ran from the company docks to mine (Figure 4.8). Authors of various company reports refer to this segment of railway as a surface tramway or lateral tramway, while blueprints of the site use the term industrial railway.

Two photographs inform our interpretation of these features (Figures 4.12 and 4.13). The common feature between the photographs is the hotel, moved to Old Longyear City from Hotel Point by the Arctic Coal Company. These two photographs suggest that the location



Fig. 4.12 Wilse's 1908 photograph showing 2-foot gauge railway. Michigan Technological University Archives and Copper Country Historical Collections.



Fig. 4.13 Undated photograph showing 3-foot gauge railway. Michigan Technological University Archives and Copper Country Historical Collections.

of the right of way for the industrial railway changed from the downhill side of the hotel to the uphill side. Closer examination also suggested that the gauge of the track increased with the move. Not only did the photographer Wilse sign his work, he also dated it (Figure 4.12). This information proved helpful to locating possible remaining historical documents.

Three questions arose from the study of these photographs: Did the industrial railway right of way change; did the gauge of the railway change; and if the first two assumptions proved correct, what influenced these changes?

As part of our documentation project covering the Old Longyear City site, our group performed a reconnaissance survey of the area below the mine to the waterfront on Advent Bay. Within this area we quickly found the former right of way from the industrial railway. Artifacts included rails, ties, spikes, and drainage pipes (Figure 4.14). Docu-



Fig. 4.14 Ties and rail remain in situ on the surface. Photo Larry Mishkar/MTU.

mentation of these artifacts included sketches, measured drawings, and photographs.

Two important finds helped to answer our question concerning track gauge. The location of crossties with spikes in situ provided measurements that confirmed that a gauge change took place. Numerous ties from the 3-foot gauge remained in the roadbed near the base of the man and material hauling tramway from the mine entrance. We also lo-

located rails and spikes in this area. Measurements taken from between the spikes revealed a distance of three feet. Another tie, located east of the present day church and near foundations from the Old Longyear City occupation period revealed a gauge distance between spikes of two feet. Thus with these two artifacts, we concluded that a gauge change did take place, as suggested by interpretation of the historic photographs.

A visible difference between the right of ways suggested a difference of roadbed quality. The 2-foot track is rather bumpy and appears not to have been supported with much, if any, ballast, thereby insuring a rough operating surface. In a report, a mining engineer described the track as having “varying grades and curvatures” (Coulson: 3). Industrial railways on such a small scale are not generally known for high quality roadbed construction, and one can imagine that building such a line in a remote location like Svalbard would be done as inexpensively as possible. However, the 3-foot gauge track does show improvement in this regard, and it appears that the line was graded prior to the laying of track. Field evidence gathered during the survey revealed that the line was graded and drainage provided with the installation of iron pipes encased in a plank-framed box running perpendicular to the right of way (Figure 4.15). The areas where the pipes remain in situ are still rather wet with standing water nearby.

Thus, after our fieldwork session we could confirm that a gauge change did indeed take place, that the roadbed location was moved, and that the new roadbed was an improved version from the first. Now it was a matter of answering the third question, Why?

To answer this question we turned to the Svalbard collection housed in the Michigan Technological University Archives and Copper



Fig. 4.15 Drain pipe and wood enclosure in roadbed. Photo by Larry Mishkar/MTU.

Country Historical Collections. Based on dates on the photographs, we focused on the period 1908 to 1911. A letter dated October 6, 1909 began to shed some light on this question. In this letter, a mining engineer from Pittsburgh, Pennsylvania, USA, explained that he was contracted by the Arctic Coal Company to examine the “scientific and economical conditions” at the coalmine (Coulson: 1). William L. Coulson concludes in his report that “you will note that the proposition is more of a shipping problem than a mining one” (Coulson: 7). In his report he finds no fault with the quality of the coal available from the mine and instead points to ways to improve efficiency of the mine, ending the report by stating “An increase in the output means a decrease in the production costs per ton...” (Coulson: 7). An important part of his implementation plan called for the use of electricity to light the camp and plant [mine] to facilitate work in the winter. He also suggested installing heavier rail and new ties in the mine, using electric mine engines to move mine cars within the mine, and implementing a “mining machine plant” to eliminate the mining of coal on a day labor basis, thus reducing the number of miners.² All of these changes pointed to improving the efficiency of coal production by the Arctic Coal Company.

It should be briefly mentioned that the general push to improve efficiency in the manufacturing sector was the result of studies during the latter decades of the 19th century in the United States by Frederick Winslow Taylor, the “father of scientific management” (Kakar: 1). Taylor’s work at Midvale Steel Company at Philadelphia, Pennsylvania, from 1878 to 1889, first as a machinist, then a manager, led him to develop management ideas that had enormous influence on industrial work around the world (Kakar: 2). His early time and motion studies, standardized maintenance procedures, and piece rate systems for machinists became known as the ‘Midvale’ way (Nelson: 43). William L. Coulson, the mining engineer hired by the Arctic Coal Company during this period of applied efficiency procedures worked first as a General Superintendent at a Pennsylvania coal mine, then as a mining engineer in the steel town of Pittsburgh, not far from Philadelphia.

It is this focus on increased efficiency and the ACC manager’s willingness to implement

Coulson's recommendations that resulted in the industrial railway gauge and location change in 1910. Nearly two months to the date after Coulson's 1909 letter appeared at the Arctic Coal Company's offices in Boston, Massachusetts, USA, the manager at the coalmine, John Gibson, writes in his report, "this will increase the working efficiency about 10%" (Gibson: 8). He was referring to the construction of a man and material hauling tram from the Old Longyear City to the mine. This letter contains a materials list and the costs for implementing infrastructure and machinery upgrades for the mine. Gibson also writes that all tracks within the mine would be changed to a wider gauge (from 2 foot to 3 foot), and the aerial tramway would no longer haul anything but coal. It appears that all machinery and supplies for the mine had been carried in the coal buckets. Obviously this unconventional use of the aerial tramway slowed the movement of coal from the mine to the ships and could cause damage to the support towers if items moved during transport. Without the use of the aerial tramway, the industrial railway would now move machinery, materials, and soon men to the mine. Thus a better quality line was needed to implement these changes.

It is, however, the manager's report from 1910, which outlines work completed that year, that lists the widening of the surface tramway from the dock to the Old Longyear City, then later from Old Longyear City to the mine, to a broader gauge (Gibson: 3). His statement suggests that the track ran from the mine to the dock without any break between the horizontal track through the camp and the track laid at a 45-degree angle up to the mine. The track up to the mine entrance rested on trestlework about five feet above the ground, keeping it free from snow. For this segment of the line, an electric drum engine provided the lifting power for the men and materials. No mention is made about the power source used to move materials from the dock to Old Longyear City, but a surviving photograph shows a horse pulling three cars of possibly coal during the early period of operation (Figure 4.16). By hauling men between the mine and Old Longyear City, the owners



Fig. 4.16 Another 1908 Wilse photograph showing early industrial railway and motive power. Michigan Technological University Archives and Copper Country Historical Collections.

reduced travel time for the miners from between 45 to 60 minutes down to three minutes. Norwegian custom at the time required companies to pay workers from the time they left their homes until their return.

At the end of 1910, the industrial railway running from the dock to the depths of the mine was standardized to a single gauge. The unwieldy mining equipment off loaded from the ships moved directly to the mine without the costly interruption of coal hauling on the aerial tramway. The improved construction and wider gauge of the new industrial railway could now safely and securely handle its new task. Men also moved more quickly to the mine, and with the installation of electricity, work continued throughout the year. Frederick Taylor's theory of scientific management for industrial efficiency put its mark on the Arctic Coal Company and the mine at Old Longyear City.

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Endnotes

¹ Anders Beer Wilse, 1865-1949. Wilse emigrated to the United States in 1884 and began his photographic career in the US, buying his first camera in Minneapolis, Minnesota. He worked as a railroad construction engineer and did photography in the Midwest before setting off to Seattle, Washington, where he worked professionally as a photographer. He and his family returned to Norway in 1900 never to return (Cleven: 19).

² Coulson mentions the two-foot gauge inside the mine, but does not specifically suggest broadening the gauge. Instead he recommends using larger capacity cars.

Advent City

Advent City lies on the northern shore of Adventfjorden (15° 37' E, 78° 16' N), in an area now known as Revneset, approximately 5 km north of Longyearbyen. Its location near the mouth of Adventfjorden means that it faces the wide-open water of Isfjorden to the west (Figure 4.17).

Founded in 1903, it is the site of the earliest significant mining settlement on Svalbard. Despite substantial investment on the part of its British owners, the venture failed after less than four years' operation but its remote location has meant that much physical evidence of the settlement still remains today. It therefore provides a potentially rich resource for archaeological investigation, particularly a comparative study with more successful undertakings such as Longyear City, to enhance our understanding of the technological and social issues surrounding the early mining industry on Svalbard.

Historical Background

A coal mine was initially established on this site in 1903 by a Norwegian company, *Bergen Spitzbergen Kulgrubekompani*,¹ but its interests were sold to a Sheffield-based English company, *The Spitzbergen Coal and Trading Company* (SCTC) in 1904. It is not clear the extent to which the new owners inherited a working mine,² but it is certain that they injected substantial capital at a time when there was great international interest in the mineral wealth of Svalbard.

The Scottish explorer, R. N. Rudmose Brown, provided the following description of Advent City as it appeared in 1909.³ '...the settlement consists of over a dozen exceedingly well-built log houses with a considerable amount of mining and electric light plant

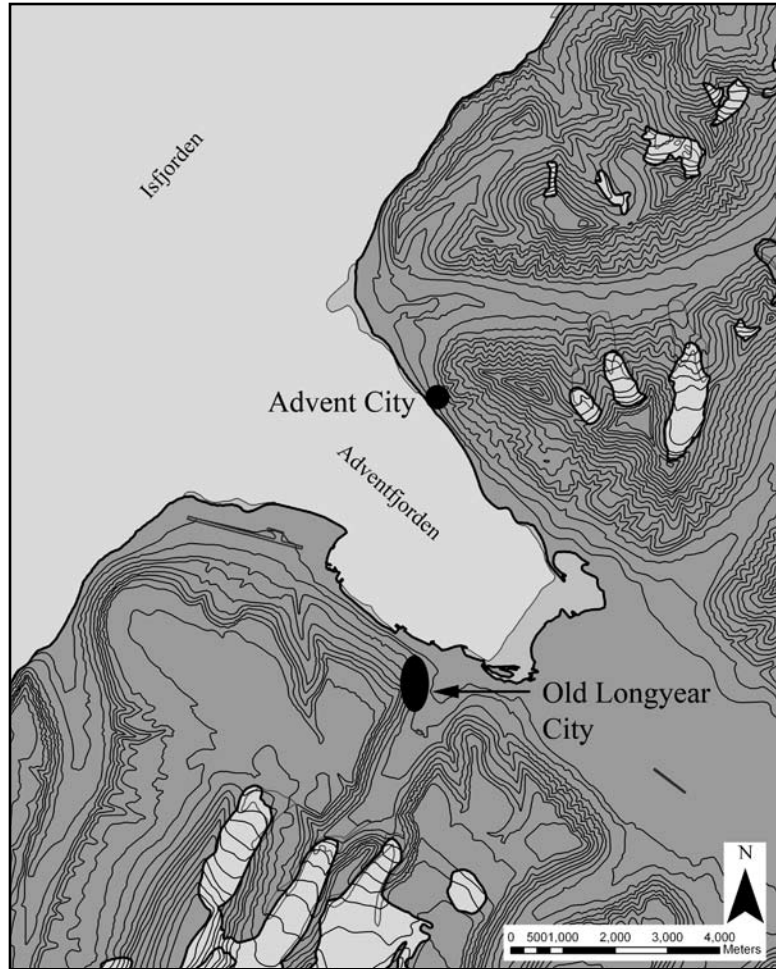


Fig. 4.17 Location of Advent City. Map by Cameron Hartnell/MTU.

and a tramway down the hillside to the end of the jetty'. He observed that the mine itself was situated above the settlement on the hillside, and comprised a gently sloping adit into the strata. By the time this description was written, the site had already been effectively abandoned by the SCTC, as shown by the photographs taken by this expedition (Figures 4.18 – 4.21).



Fig. 4.18 Tramway leading to mine, 1909. Source: Royal Scottish Geographical Society, William Spiers Bruce Collection.



Fig. 4.19 Buildings at Advent City, 1909. Source: Royal Scottish Geographical Society, William Spiers Bruce Collection.



Fig. 4.20 Pier at base of tramway. Source: Royal Scottish Geographical Society, William Spiers Bruce Collection.



Fig. 4.21 View from mine entrance on the hill above Advent City. Source: Royal Scottish Geographical Society, William Spiers Bruce Collection.

The Spitsbergen Coal and Trading Company was founded by a group of English and Norwegian investors, and was registered with the Board of Trade in London on 23 June 1904.⁴ The founding documents (see Figure 4.22) record the agreement between William Black of 'the City of Sheffield Colliery' and several others, its registered offices being at Kings Chambers, Angel Street, Sheffield. Shares were issued to the value of £1,969, and half of the founder shareholders were Norwegian. The English shareholders, most of whom were from Sheffield, comprised a wide range of professions, including: colliery managers, engineers and agents; an architect, surveyor, solicitor, estate agent and chartered accountant; iron, steel and timber merchants; a licensed victualler and a wholesale stationer; manufacturers of steel cutlery, silk cloth and lead pipes; and a 'gentleman' and two 'married women'.⁵ This reflects the excitement that prevailed at the time, the inten-

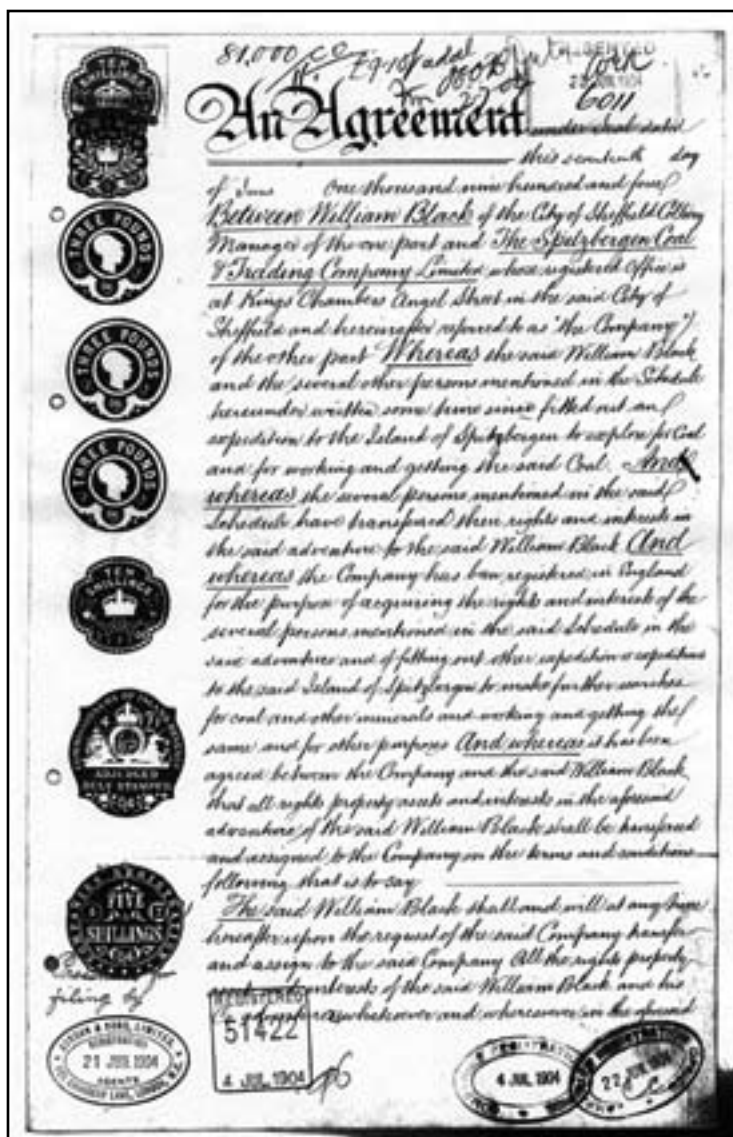


Fig. 4.22 Front page of original agreement founding the Spitsbergen Coal and Trading Company, signed in Sheffield, 23 June, 1904. Source: The National Archives, Kew, London: BT31/17239/8100.

sity of which was sufficient to encourage a significant number of professional people to invest in what was in reality a very risky Arctic mining venture.

The circumstances surrounding their investment is significant in that it determined to a considerable extent the nature and physical form of the buildings and plant that were erected at the mine. Spitsbergen was still 'Terra Nullius', belonging to no country, and therefore was not bound by national or international law. There was therefore a race to claim what was imagined to be substantial mineral wealth.

A number of other factors added to the potential attraction of the Advent City project, and to mining in Svalbard in general. International demand for coal was high, and therefore prices were favorable. Furthermore, although the 'lawlessness' was regarded at times as being a cause for alarm, it also ensured freedom from increasingly restrictive health and safety leg-

islation in mainland Europe relating to mines. There was, in addition, no requirement to pay royalties or any national or local taxes, and with increasingly radical workers in the established European coalfields, the possibility of exploiting a non-unionized workforce was also attractive.⁶

In the case of Advent City, the coal seams were easily accessible, and initially appeared to be contained within relatively uncomplicated geology, comprising only gently dipping strata, with comparatively little faulting. The position of the outcrop on the hillside above a coastal location also permitted easy transport from mine to ship via an inclined tramway, and there was therefore no need to sink expensive shafts. In addition, perpetually frozen underground conditions avoided the need for pumping, and also tended to bind together the roof of mine workings, reducing the need for artificial support. Finally, there

was little perceived danger from explosive gases, and consequently no need for mechanized ventilation. These conditions combined to ensure that the surface arrangements of this and Svalbard's other collieries were relatively simple compared, for example, with contemporary new mines in the UK, Germany, Belgium or France.

There were, however, some serious disadvantages and risks associated with the project. The weather could at times be very hostile, and had a 'disintegrating effect' both on plant and the stocks of coal produced for shipment.⁷ The workings were so dry that there was a greatly enhanced danger of explosion from coal dust, especially where mining machinery was used. The long polar night led to the freezing of the sea, leaving only a three-month window during which coal could be taken away by ship. It was also difficult to maintain morale over such long periods of darkness. This was compounded by the need to import all materials and food supplies. These supplies, however, were not enough to balance the shipping capacity required to export the coal, so most vessels arrived in Svalbard light or in ballast, increasing transport costs.⁸

The years of operation

During the first years of operation, activity was confined to the summer. Early work focused on the construction of the tramway and pier, and the building of a mess hall. The mine was operated for the first time through the winter in 1905-6, and in the following winter, 70 people remained on site to work and develop the mine. The workforce was reduced by half in the winter of 1907-8, prior to the cessation of production later in the year. In the meantime, Advent City itself had been further expanded during 1906 with the construction of more buildings, including a clubhouse and bar.⁹

During this period, worsening working conditions and serious conflicts between labor and management resulted in comparatively little work being done, given the extent of the investment. The company had put the mine under the control of an ex-British Army officer who had recently seen service in the Boer War. His abrasive management style, which depended heavily upon the threat of firearms and controlling supplies of alcohol for personal profit, undermined efforts to improve productivity.¹⁰ The extent of the unrest was at one point so severe that the British Ambassador was asked to send a navy vessel to restore order.¹¹ The British Foreign Office was unable to intervene because of international agreements that prohibited military intervention in Spitsbergen, and perhaps because the company had failed to pay substantial debts owed to British consular officials.¹²

Seen from across the Fjord by John Longyear, proprietor of the Arctic Coal Company, the operations of the English company did not inspire admiration. As a teetotaler, he was appalled at the abuse of alcohol by the Scandinavian workers in particular, and believed that far too much capital had been expended on plant and buildings without even attempting to extract coal and prove the viability of the mine. Longyear therefore believed the facilities were oversized, particularly given the poor quality of the coal. Furthermore, he was worried by the failure of the colliery to adequately clean and prepare its coal,

the result being that several customers had received especially poor batches of coal with high levels of impurities. This was perceived to be a stain on the reputation of Spitsbergen coal in general, and an impediment in the continuing struggle to expand markets for Arctic coal.¹³

Closure

By 1908, it was clear that the colliery was losing money, and the company became increasingly interested in selling the plant. It was reported in *The Mining Journal* that, ‘The English company whose mines lie opposite to those of the American company, has maintained caretakers during the winter. According to rumor, the company, which has laid out a considerable sum in the venture, is disposed to transfer the property to others, though as yet no final decision has been taken on that point.’¹⁴ Overtures had already been made to the Arctic Coal Company, whose representatives had met William Black in London in 1906.¹⁵

When production ceased, failure was blamed on a variety of factors, several of which were identified in a report by Professor A. MacWilliam of the University of Sheffield.¹⁶ These included the poor quality of the Jurassic coal, which could not compete with the Tertiary Coal from Longyear City. Just as significant were the poor geological conditions, such as surprisingly serious faulting, and thinning seams. Also important were the difficult loading conditions at the pier, which was in an exposed location;¹⁷ it was reported in 1912 that “the anchorage is untenable during westerly and south-westerly winds”.¹⁸

Ultimately, however, much of the blame was attributed to poor management, dire working conditions, and appalling industrial relations. Also cited was the investment in unsuitable or unnecessary plant.¹⁹ It was noted that, ‘The English company is wasting resources on unnecessary frills – large fancy buildings, club houses, stores etc. and also putting up electric light plant and the like. But they are neglecting the development of the mine itself...’.²⁰ This point was reinforced by a British Foreign Office memorandum of 1910 which observed that:

As a sample of the management, it is said that expensive gas-driven coal boring and cutting machinery was erected, to run with anthracite coal, costing 20s a-ton, that had to be brought from England, whereas an electric plant, for which local fuel would have been available, should have been erected.²¹

This specific allegation is examined in more detail below.

Advent City after 1908

Following the cessation of mining in 1908, the company maintained two hunters to act as guards at the site for a year, but they were not paid the promised salary. They consequently hired two boats and salvaged as much moveable plant as they could, taking it to be sold at auction in Tromsø.²⁰ This explains the rapidity of the decline in the condition of

Advent City in this period.

Rudmose Brown, who had visited the site and found it in good order in 1909 (see Figures 4.18 – 4.21), was shocked by its rapid demise on a return visit in 1912. He wrote that:

The present state of Advent City is an illustration of the lawlessness and insecurity of property which obtain today in Spitsbergen. Little more than the frameworks of the houses remain standing; windows and doors have been smashed, and stores wantonly destroyed. Everything portable and of value has been carried away; what is left has been wrecked.²³

Using the situation to advocate British government intervention (and even annexation) to enforce law and order, he continued, ‘This disgraceful treatment is what every other temporarily abandoned mining settlement may suffer if Spitsbergen remains neutral territory.’ His Scottish colleague, H M Cadell, reinforced this view in an article published in 1920, which stated, ‘The case of Advent City illustrates the need for a police force to put an end to the state of anarchy in Spitsbergen. The wanton damage was such as might have been done by a German army in a French or Belgian village, save that the settlement had not been set on fire.’²⁴

Four years after the cessation of mining activity, a Norwegian, Fredrik Hiorth from Kristiania, took an option on the claim and plant at Advent City. He later investigated the Tertiary coal seams high up the mountainside at what is now Hiorthhamn. A Bergen-based company, A/S De Norske Kulfelter Spitsbergen was subsequently formed in 1916, formally taking over the claims of the Spitsbergen Coal and Trading Company, the latter having been ‘wound up’ following a meeting on 3 October 1917.²⁵ In the same year, much of the surviving salvageable plant and the remains of eight barracks blocks were moved to the new adjacent mining operation at Hiorthhamn, which produced coal until 1921, and then again briefly between 1938 and 1940. These buildings are still standing in 1997.

Advent City today

The site occupies an area approximately 400 x 300 meters, rising approximately 115 meters in elevation from the shore in the SW to the mine entrance in the NE. A rapid survey of the site was carried out in August 2004, confined to GPS, simple measured drawings and photography. Figure 4.23 shows an outline of the features recorded by the GPS survey. The shoreline was not recorded but lies just beyond the left hand edge of the plan. The key elements of the site can be considered in the following groups:

- mine entrance
- inclined plane running from mine entrance to the shore
- main settlement structures (features 1-15)
- power station (feature 16)

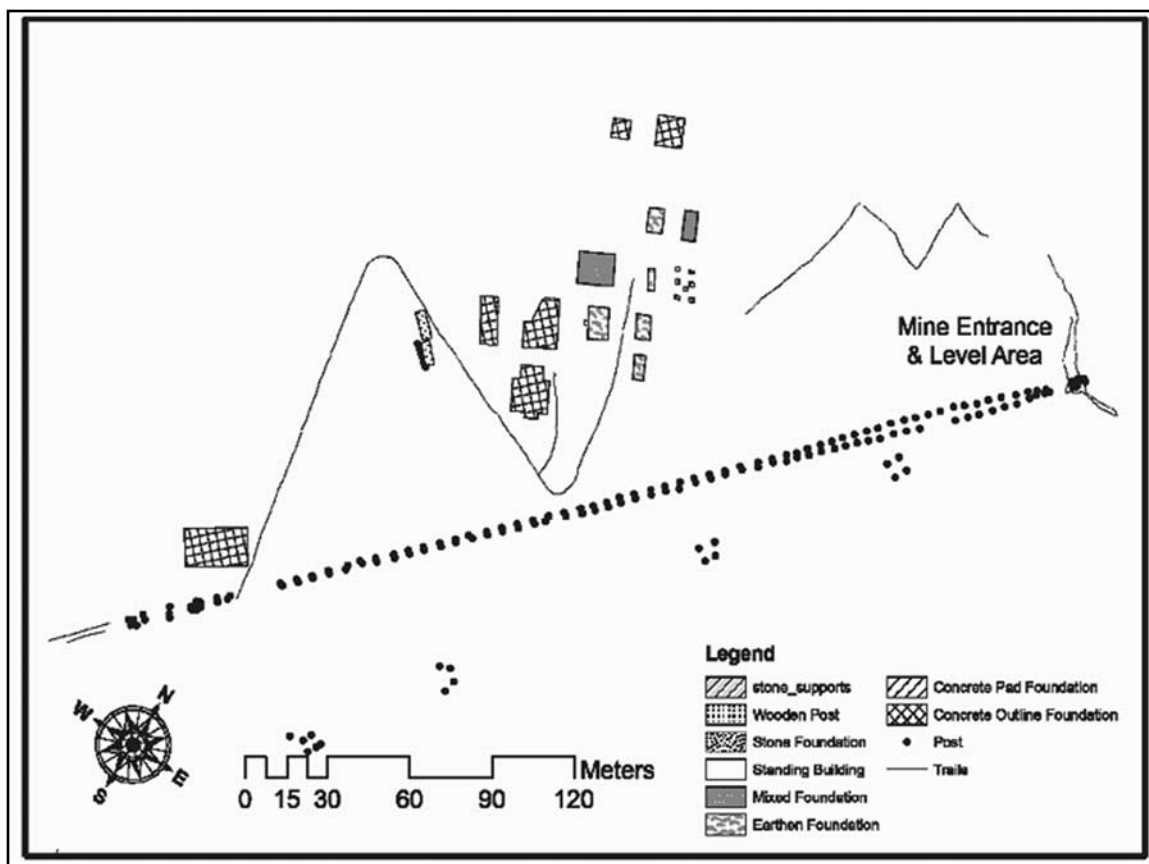


Fig. 4.23 Surface feature map of Advent City. Map by Ed Tennant/MTU.

A “zigzag” path runs from close to the power station to the main settlement area and then continues above there to the mine entrance level. Figure 4.24 shows the site in August 2004.

Mine entrance

A platform, generally around 2 m wide has been cut into the hillside at the mine entrance level. There is a stone retaining wall immediately down-slope of the platform. The sides of the main mine entrance are lined with stone; the mine drift itself is blocked by fallen stone at the entrance. The remains of the stone walls of a building, possibly an office, approximately 4x2m in plan, are located 15m east



Fig. 4.24 View down onto Advent City site from mine entrance, August 2004. Photo by Miles Oglethorpe.

of this entrance. In front of and just below the mine entrance are a number of vertical and horizontal timber posts which are assumed to have formed part of the inclined plane. A second, smaller, mine entrance lies approximately 25m north of the main entrance. The features of this entrance are more obscured by fallen rock than the main entrance. The contemporary photograph of this part of the site, Figure 4.25, shows a building or other structure NW of this entrance but no trace of this was found.

Inclined plane

The inclined plane, running in a straight line from the main mine entrance to the shore is a dominant feature of several of the contemporary photographs of the site, such as Figure 4.25. The existing remains consist of pairs of square timber posts, set into the ground at an angle of typically around 20° to the vertical (although ground movement makes this variable and difficult to assess). Within each pair, the posts are furthest apart approxi-

mately 50m SW of the mine entrance, where the fall of the ground meant that the deck of the inclined plane was the greatest distance above ground level. The pairs of posts are located at between 5 and 6 m centers and all the posts appear to have been sawn off at between 0.4 and 1m above ground level, presumably to allow the timber to be recovered for re-use. There are additional vertical foundation posts close to the power station, possibly to support the structure for unloading the coal tubs adjacent to the power plant, which can be seen in Figure 4.25. The remains of

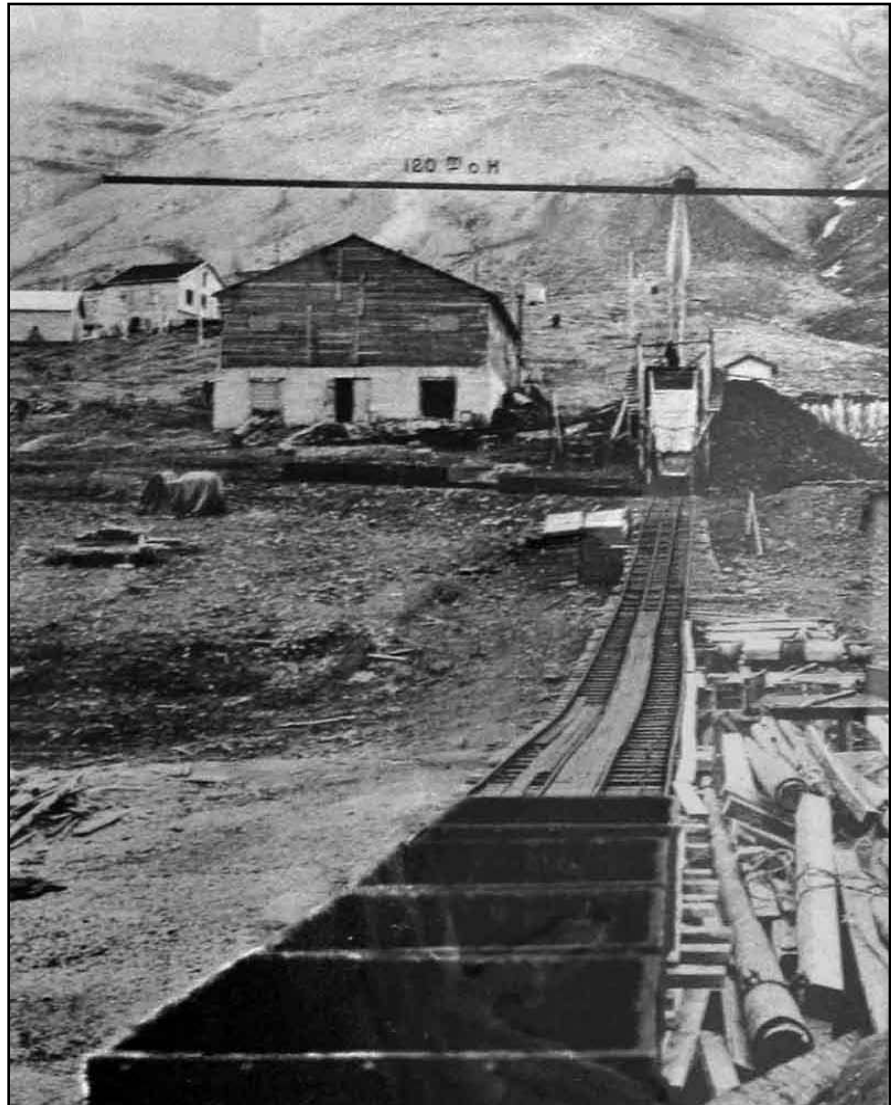


Fig. 4.25 Inclined plane running from mine to shoreline. Source: photograph on display in the Spitsbergen Hotel.

the inclined plane from here to the shore are presumed to have been largely destroyed by the action of the sea and the stream which flows down from the hillside, although some sleepers and rails on a raised stone embankment were recorded (but, unfortunately, not mapped) as Feature 18. Part of this stone embankment can be seen in Figure 4.20. South-east of the inclined plane are three groups of four timber posts and a fourth group of six posts, also cut off just above ground level. It is possible that these are the remains of pylons, which supported an aerial ropeway, which was superseded by the inclined plane.²⁶

Main settlement

The remains of 15 separate buildings or structures were recorded in this area.²⁷ It is notable that, with the exception of Features 9 and 14, these all appear to be different sizes and shapes. They range from simple rectangular building platforms with no obvious foundation piles to complex shaped structures with concrete foundation walls. Almost all of these features can be identified on the photograph taken in 1909 by the W S Bruce expedition (Figure 4.28). Two of the buildings, Features 15 and 11, can be seen in more detail in Figure 4.19.

Power Station

The power station (Feature 16) provides the most substantial of the modern remains (Figure 4.26). The building, which can be seen in Figure 4.25, had an overall size of 20 x 14 m and is in two sections. The larger, southern section had stone walls and is dominated by the stone and mass concrete plinths on which were mounted the gas engines and dynamos. Two engines and dynamos are still in situ. The third engine is standing on the shore and parts of the third dynamo are still in their packing case, to the north of the building. The plinth for this dynamo is incomplete and it is therefore likely that the third engine and dynamo set was never installed.

The gas engines bear the makers' name 'The Campbell Gas Engine Co Ltd, Halifax England,' who were one of the major manufacturers of this type of equipment. They would have also supplied the suction producer gas plant which provided fuel for the engines. All the major components for this plant, together with the inter-connecting pipework, are lying either inside or adjacent to the building today. Due to the sloping nature of the



Fig. 4.26 Gas engines at the power station ruin. Photo by Ian West.

site, the northern section of the building has a much higher floor level than the southern section and shows no evidence of having had stonewalls. It contains a brick hearth, which may have heated a gas retort and, amongst the debris artefacts are fragments of coal, coke and the remains of lime barrels.

Archaeological interpretation and discussion

The brief survey of the Advent City site in August 2004 has highlighted a number of aspects which improve our understanding of the nature of this enterprise and the reasons for its failure as well as aiding our interpretation of the surviving documentary evidence.

Location

One of the striking aspects of the Advent City site is its exposed location, facing onto open sea. Contemporary reports refer to the difficulty of using the anchorage in certain conditions and the physical evidence supports this view. There is no evidence of any attempt to construct any form of harbor. The coal loading facilities shown in the photograph (Figure 4.20) appear very rudimentary. There was also no evidence of a foundation for any crane, so unloading heavy items of plant such as the gas engines must have been problematical. Whether these shortcomings were a contributory cause or a consequence of the settlement's early demise must remain open to debate but there is no doubt that loading and unloading of ships was more difficult here than in more sheltered locations, such as Longyear City.

Building design and construction

It is apparent that almost all of the buildings are different in plan, as if each had been designed for a specific function. Rudmose Brown described Advent City as consisting, in 1912, of "over a dozen well constructed log houses" (e.g. Figure 4.19). Three of the buildings have relatively complex concrete foundation walls, stepped to accommodate the sloping site.

This is in marked contrast to the remains at Longyear City, where most of the buildings in the original settlement area, which are contemporary with those at Advent City, have a simple rectangular plan and wooden pile foundations. The American founder of Longyear City, John Longyear, is reported to have been critical of the SCTC's extravagance in investing so heavily in the enterprise before its returns had been proven and this contrast in the sophistication of their settlement buildings perhaps illustrates his point.²⁸ Longyear also chose to build light frame structures with air spaces for insulation, rather than the traditional Norwegian log construction.

Coal transport

Archaeological evidence supports the suggestion that an aerial ropeway was originally used to transport coal from the mine to the shore before the construction of the inclined

plane. Given the short operating life of the facility, this could be interpreted as more evidence to support John Longyear's allegations of profligacy. No particular conclusion can be drawn from the choice of an inclined plane over an aerial ropeway. Longyear's Arctic Coal Company (ACC) made extensive use of aerial ropeways but their route from mine to shore was longer and more tortuous than that at Advent City. Inclined planes were used at Longyear City for movement of coal over short straight routes.

The nature of the inclined plane is a little curious, running straight from the mine to the pier where ships were loaded. The scale of the investment at this site suggests that it was intended to operate all year round and so one might have expected one transport system to connect the mine to a coal storage area and another one to move the coal from this area to the dock. This was the arrangement which is believed to have been used at Longyear City and enabled coal mined during the winter to be stored until such time as ships could reach the harbor. Figure 9 appears to show a small amount of coal stored beside the inclined plane on the opposite side to the power station but there are no signs of any coal handling machinery in the picture, nor were any physical remains of such machinery found. It is hard to see how this arrangement for coal transport could have coped successfully with year-round coal production.

Power generation plant

Discussion above records the critical report to the British Foreign Office in 1910 that 'expensive gas-driven coal boring and cutting machinery was erected, to run with anthracite coal, costing 20s a-ton, that had to be brought from England, whereas an electric plant, for which local fuel would have been available, should have been erected'.²⁹ The original source of these allegations is not known, but it may have been Longyear's ACC. This is clearly a misunderstanding of the issue, since the machinery itself was not 'gas driven' and the SCTC did erect an 'electric plant'. The correct question would appear to be whether a gas powered electrical generating plant was as suitable for this application as a steam powered one, such as the ACC used at Longyear City.

The Advent City power station used a "suction producer gas plant". A number of different types of gas producers were developed in the last quarter of the 19th century in Europe and North America. Common types included Dowson and Mond plants, in which a mixture of air and steam was blown through hot coke.³⁰ The low calorific value gas produced was unsuitable for gas lighting purposes but was used to supplement conventional gas supplies or to power gas engines. However, these plants needed a steam boiler, power to drive the fan and a small gas holder to absorb any difference between the rates of gas production and consumption.³¹ A simpler version, using air pulled through the producer vessel by the suction of the gas engine piston, was patented in France in 1891³² and is first recorded as having been used at Verviers in Belgium in 1901.³³

By 1905, over 40 manufacturers were reported to be offering suction gas plants in Britain, but at that stage the UK Local Government Board still regarded them as unproven technology and refused to finance their purchase by municipal electricity supply companies.³⁴

However, by 1910, the suppliers of the Advent City generating plant were listing in their advertising brochure over 230 locations in the UK alone where their suction producer gas plants were in use, mostly for electricity generation.³⁵ Their simplicity, flexibility and short start up time (15 minutes is quoted by one source³⁶) would seem to make this an ideal choice for a remote, stand-alone plant such as Advent City. Certainly, any other form of gas plant, which would require a gas holder, could not be used in the low temperatures of a Svalbard winter. Furthermore, the manufacturers claim that their plants were suitable for use with “anthracite, charcoal, semi-anthracite, gas coke, coke oven refuse, bituminous coal, lignite, wood refuse, etc.”³⁷ a claim supported by other sources.^{38,39} It is, therefore, hard to believe that the Advent City plant could not have been made to operate successfully with fuel available locally.

Conclusions and recommendations for further work

The limited archaeological evidence obtained so far lends support to some allegations of poor planning, mismanagement and profligacy with respect to the settlement buildings and the coal transport arrangements at Advent City but probably not with regard to the power generation plant. Further work could improve our understanding of these issues as follows:

- documentary research might reveal more about the origins and true nature of the allegations quoted in Hertslet (1910) and Johannessen (1997).
- the preliminary comparisons made here between buildings and coal handling arrangements at Advent City and Longyear City should be reviewed once an interpretation of the field data from Longyear City is available.
- identification of the function of the major buildings at Advent City would be helpful in interpreting the planned scale of the operations at this site. As a first step, the data from Advent City should be compared with surviving structures or remains at Hiorthhamn, where some recording is believed to have taken place in recent years. Further fieldwork at Advent City, including excavation and analysis of artefacts, might be required to identify the function of all the buildings.

The work carried out to date tells us very little about the people who worked at Advent City at this time. It is not even known from where these people came. A comparison between the workforce here and at other settlements, particularly Longyear City, might shed light on the poor labour relations which apparently contributed to the demise of this enterprise. This analysis could be furthered by both documentary research and fieldwork.

Acknowledgements

The authors are indebted to Dr David Munro and Kerr Jamieson of the Royal Scottish Geographical Society for their generous help, and for permission to reproduce Figures 4.18–4.21, from the William Spiers Bruce Collection. They also wish to thank Helen Ford of the UK National Gas Archive.

Features recorded in main settlement area

- Feature 1: Mass concrete foundation walls 10.8 x 9.8 m
Foundations built in two tiers plus remains of 4 upright timber posts in centre. Artefacts include remains of stove.
- Feature 2: Foundations of building 7.2 x 6.5 m
Mass concrete walls, with possible base for stove in centre.

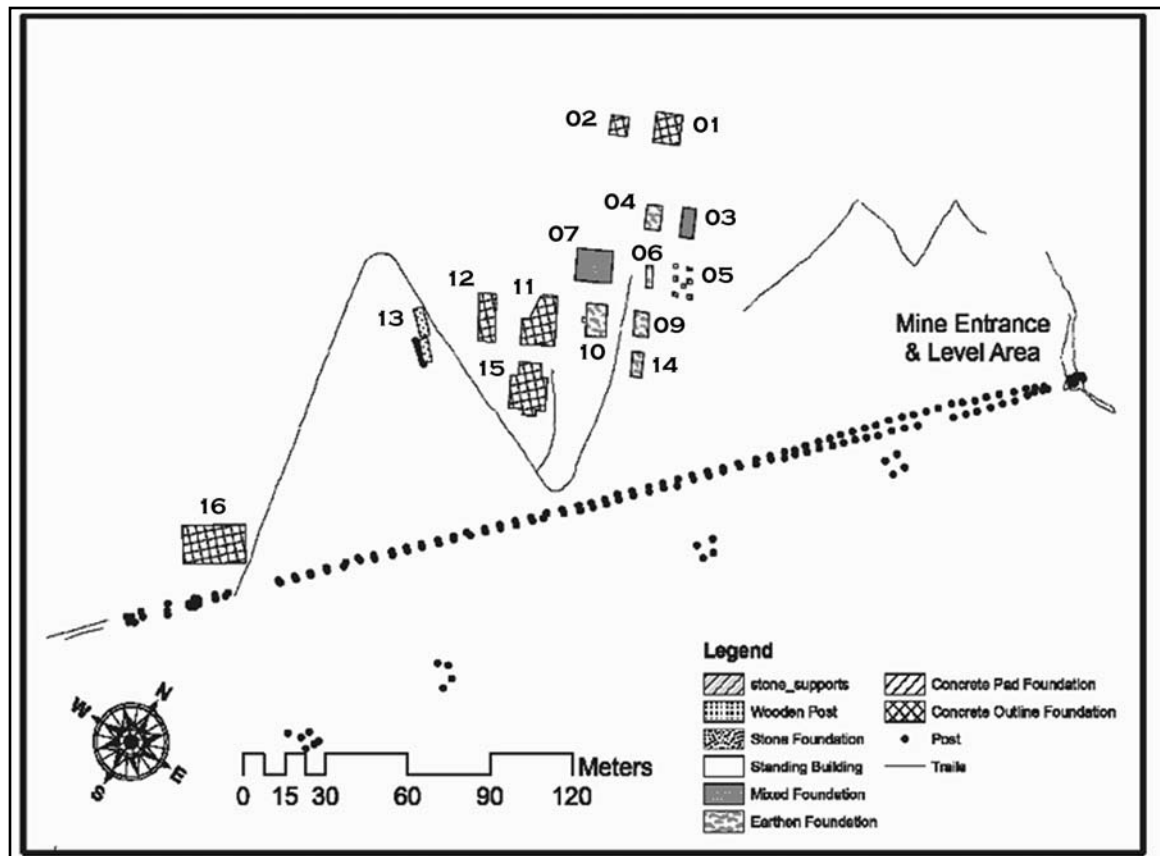


Fig. 4.27 The location of surface features in Advent City. Map by Edward Tennant/MTU.

- Feature 3: Building platform 12.5 x 5.5 m
No obvious foundations but much brick rubble.
- Feature 4: Building platform 11 x 6.5 m
No obvious foundations, some scattered timber.
- Feature 5: Six rectangular piers built from sandstone blocks, size 10.1 x 4.7 m.
The 4 corner piers are approx 1m square, the 2 centre piers are approx 1.5 x 1 m.
- Feature 6: Rectangular building platform 10 x 7 m
No obvious foundations, some embedded and scattered timber.
- Feature 7: Building platform 13.7 x 12 m
Remains of brick internal walls, door frame and timber partitions, possibly building

8.6x12m with timber extension.

- Feature 8: Rectangular structure constructed of horizontal timber planks.
- Feature 9: Rectangular building platform 9.6 x 5.4 m
No obvious foundations, remains of stove, stove platform and door frames.
- Feature 10: Rectangular building platform 12 x 8m
No obvious foundations; L-shaped brick foundation W of platform.
- Feature 11: Mass concrete foundations walls 19 x 12.6m
Walls extend full extent of E side, half of N side, full extent of S wall – stepped at two levels – and half of W side. Timber panels on outside of N wall. Possible L-shaped building with W portion floor level lower than remainder.
- Feature 12: Mass concrete foundations 19 x 6.5 m
Foundation walls extend all round perimeter, but W half stepped down 0.6 m in similar manner to F 11. Building includes base of chimney. Adjacent to the N wall is the remains of a timber rectangular structure.
- Feature 13: Rectangular building platform overall size 16.5 x 3.5 m
Remains of timber uprights and horizontal timber planks. Remains of dividing wall and the use of different shapes of uprights in the northern and southern halves suggest that this was possibly two separate buildings. N section includes fragments of concrete slab and there is a raised timber platform with many fragments of coal between this part of the structure and the track to the E.
- Feature 14: Rectangular building platform 9.8 x 5.4 m
No obvious foundations but many brick fragments. Appears very similar to F 9.
- Feature 15: Mass concrete foundation walls of rectangular building with projections to N and S, overall size 15.8 x 11.4 m
Includes remains of internal timber partition. The number and variety of artefacts, including barrels and equipment suggest this may have been a stores building.

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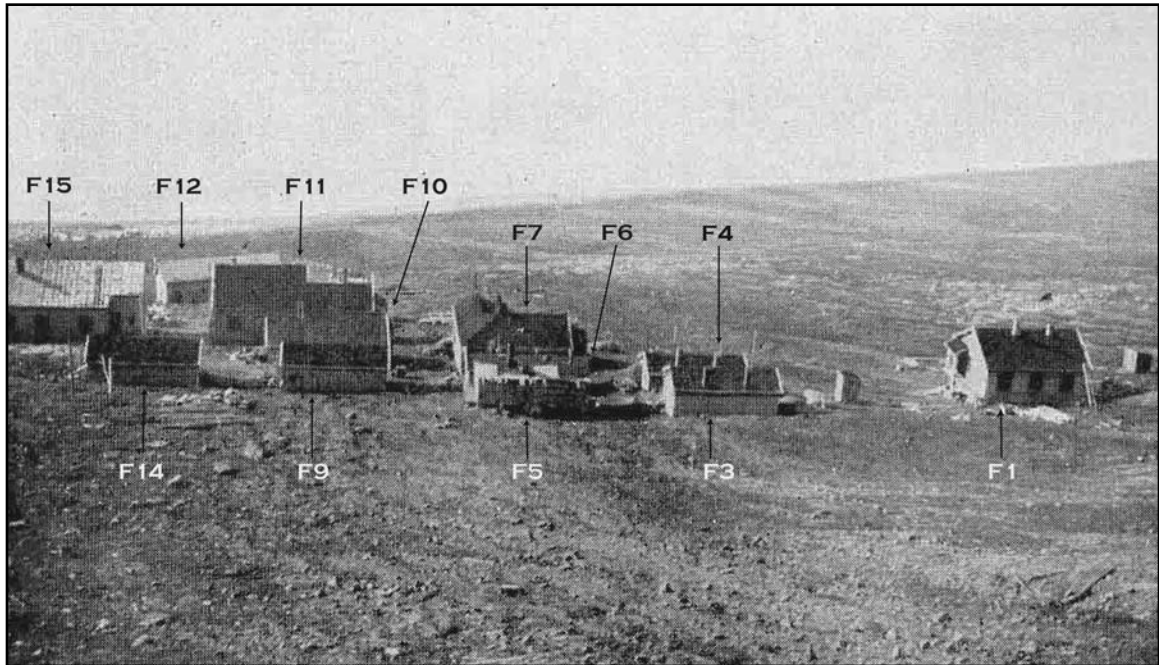


Fig. 4.28 1909 photograph annotated with feature numbers recorded August, 2004. Source: Brown 1920.

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Note also the photography of Anders Beer Wilse (1865-1949) whose images of Svalbard include Advent City during its period of operation. Some of these are reproduced in Johannessen, L J 1997.

Endnotes

1. Arlov, T B (1996), p 52
2. Johannessen, L J (1997), p 11, suggests that a fair amount of work already had been done by the Norwegian company before the English takeover.
3. Brown, R N Rudmose (1912), p 567
4. The National Archives, Kew, London, BT31/17239/8100 Agreement
5. The National Archives, Kew, London, BT31/17239/8100 Register of shareholders with additional information from Kelly's Directory, Sheffield, 1906
6. Cadell H M (1921), p 141
7. Cadell, H M (1921), describes the advantages and disadvantages of mining in the Arctic, implying that one of the great benefits is high productivity, in that miners who choose not to exert themselves risk dying of hypothermia.
8. Cadell H M (1921) p 141
9. Johannessen (1997) p 11

10. An excellent description of the working conditions at Advent City is provided in Johannessen, L J (1997), pp16-17
11. Arlov, T B (1996), p 58
12. Mention is made of debts owed to British consular officials by the company in a Foreign Office Memorandum of 20 June 1913 by G E P Hertslet. (The National Archives, Kew, London, F881/10276)
13. Dole, N H (1922) p 256. This work comments frequently on the inadequacies and failings of the English mine
14. The Mining Journal (1909), Volume LXXXV, pp 373-4
15. Dole, N H (1922), p 243
16. Brown, R N Rudmose (1919), p 204
17. The Mining Journal, 1913 Volume CIII, p1253
18. Brown (1912) p 567
19. Transactions of the Institution of Mining Engineers (1915), Vol. XLIX, p 814-5
20. Dole, N H (1922), p 256
21. Foreign Office Memorandum by G E P Hertslet, 8 August 1910 (The National Archives, Kew, London, F881/9813)
22. Johannessen, L J (1997), p 11
23. Brown, R N Rudmose (1912), p 568
24. Cadell, H M (1920), p 9
25. Documents recording the meeting on 3 October 1917 at which the company was wound up can be found in The National Archives, Kew London (BT31/17239/8100/36)
26. Johannessen, L J (1997) p 11 refers to a “provisional cable railway” constructed in 1904.
27. Johannessen L J (1997) p7 states there were 13 buildings at the time operations ceased in 1908
28. Johannessen (1997) p11
29. Foreign Office Memorandum by G E P Hertslet, 8 August 1910 (The National Archives, Kew, London, F881/9813)
30. Webber (1907) pp71-2
31. Gas World 4 February 1905 p188
32. Allen (1908) p 153
33. Gas World 6 May 1905 p782

34. Electrical Review 30 June 1905 p1440
35. Campbell Gas Engine Company (1910)
36. Gas World 4 February 1905 p188
37. Campbell Gas Engine Company (nd)
38. Gas World 6 May 1905 pp781-3
39. Tookey (1911) pp14, 26

The Surveys at Sassenfjorden, Colesbukta and Brucebyen

The purpose of the surveys was to locate and analyze symbols of occupation erected by the different actors of the Svalbard mining industry in the early 1900's. Previous research has shown that these symbols were of vital importance to the mining companies. They were part of strategies that often had double purposes. One was the obvious need to mark out land claimed for mining purposes. The other and closely related purpose was to create physical tools for foreign policy. They were part of "rituals of possession", both aimed at legitimizing claims of ownership and national interests in the no mans land.¹

The fieldwork was carried out in the form of pedestrian reconnaissance – walkovers of the coastal plains in search for surface indications of any historic structures and/or alterations of the landscape. The structures and artifacts found were positioned geographically and mapped with a Trimble GPS, and documented in drawings and photographs. The three areas surveyed were the south coast of Sassenfjorden, Colesbukta and Brucebyen (Figure 4.29).

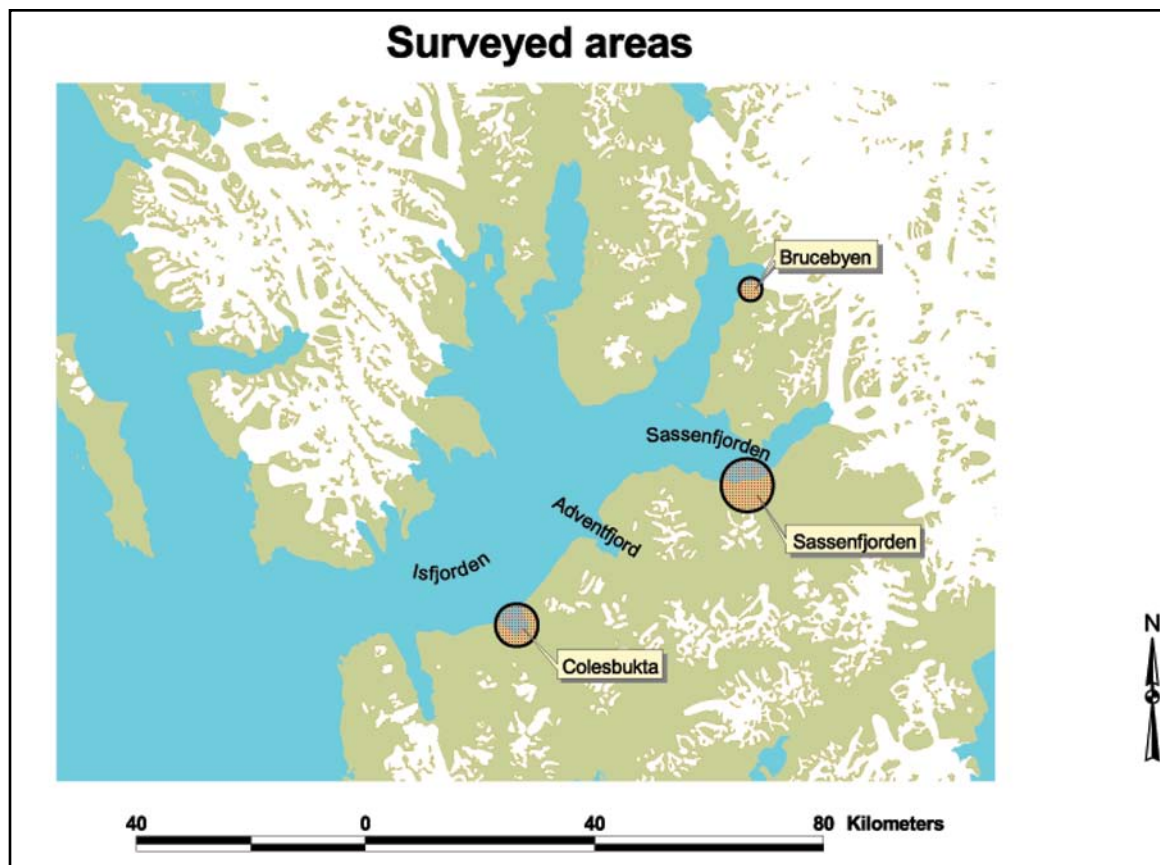


Fig. 4.29 Sites surveyed in the Sassenfjorden area. Map by Dag Avango.

The Sassenfjorden survey

Sassenfjorden (Sassen Bay) is one of the fiords extending east from Isfjorden on the main island of Västspetsbergen. The Arctic Coal Company claimed an area following the

southern coastline of Sassenfjorden, from De Geerdalen (De Geer valley) in the west to Sassendalen (Sassen valley) in the east, and then south to Adventdalen (Advent valley) (Figure 4.30).



Fig. 4.30 Arctic Coal Company claim map. Michigan Technological University Archives and Copper Country Historical Collections.

There is a cretaceous coal seam in the area, the same as in Advent City, outcropping in the mountainsides facing north towards Sassenfjorden. Therefore, all (known) Arctic Coal Company activities on this claim took place along the southern coastline of Sassenfjorden. The area surveyed is characterized by an open coastal plain of tundra, bordered by mountains in the south and glaciers further inland.

The purpose of the Sassenfjorden (Sassen Bay) survey was to locate and analyze symbols of occupation erected by The Arctic Coal Co in that area in 1906-1915. What kind of symbols did the American company use in order to claim Sassen Bay area? Which locations were used and why? Judging from Arctic Coal Company maps and managers' reports, we expected find signboards and a claim-hut in the area. Of special interest was the area close to the Sassenelva (Sassen River). The field group was transported by ship from Longyearbyen to Sveltihel (Starvation Point) on the southern coast of Sassen Bay. From there the group spread on a line and walked over the coastal plain, approximately 500 meters inland from the coastline, west towards the Sassen river. On the way back to Sveltihel the group searched the shoreline

The group found remains of three structures (Figure 4.31).

1. First was a pit with a ladder coming out of it, on the valley floor of the Sassen Valley (Figure 4.32). The structure and associated artifacts were documented. However, the function and historical context of the structure could not be determined.

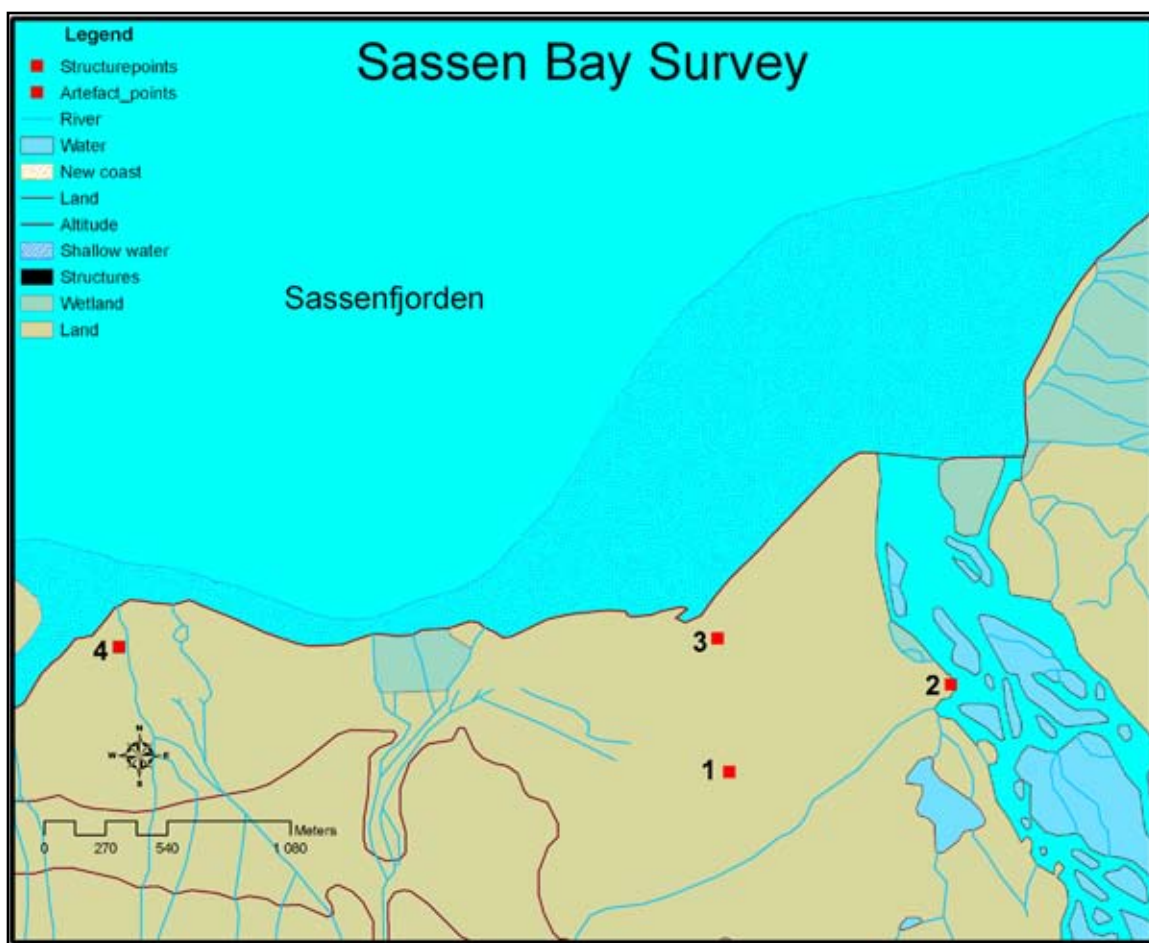


Fig. 4.31 Map of features in Sassen Bay. Map by Dag Avango.

2. There was a signboard on a small cape in the Sassenelva (Sassen River). No text or date was visible on the signboard (Figure 4.33).
3. Finally we found a hut foundation (Figure 4.34), probably the remains of a Russian Pomor hunting camp from the 18th century. A digital map was made, together with drawings and photographs. The Svalbard cultural heritage management has recorded the structure previously.



Fig. 4.32 Pit ladder. Photo by Dag Avango.



Fig. 4.33 Sign board. Photo by Dag Avango.



Fig. 4.34 Hut foundation. Photo by Dag Avango.

Only one of these finds seems to relate to the activities of The Arctic Coal Company: the signboard. Several observations suggest that this signboard can be the remains of an ACC signboard. First, the condition and construction of the signboard suggests it is early 20th century. It is made of wood, while most modern claim signboards on Svalbard are made of hard metal. There are clinched nails protruding through the boards that suggest that they were reused in this sign, perhaps from a multilayer application such as a door.

Second, the signboard is located on a spot which is clearly marked in the Arctic Coal Company map as the site of a “construction” (Figure 4.30). Moreover, this location fits with the description in an Arctic Coal Company report on claim markers in the Sassen Bay area, cited by Adolf Hoel: “a claim signboard erected on a point on the south-west side of the Sassenelva, located about 1,5 km up from its entrance in the Sassen Bay .”

Third, the location of the signboard fits into the historical context. When the Arctic Coal Company claimed the Sassen Bay tract, the Sassenelva was its eastern border . The other side of the river marked the western border of a large Scottish Spitsbergen Syndicate claim. Interpreted in that context, the spot where the sign is located would have been the most obvious place for the Arctic Coal Company to mark out its claim. It “guarded” the northeast corner of the Sassen Bay tract, on a raised prominent cape on the flat valley floor and therefore clearly visible both across the land and the fiord. It is the most obvious place to dominate the landscape and mark out the borders.

The team did not find the remains of the building(s) erected by the Arctic Coal Company during the survey, but there are several statements on where they were located, opening possibilities for surveys in the future. According to Hoel The Arctic Coal Company erected two houses on the south coast of Sassenfjorden: one on the east side of the district in 1906 and one at the west side in 1907.² This is confirmed by an internal report written by ACC general manager K L Gilson in 1907:

“Early in the season Mr. Longyear and I, on board the steamer “William D. Munroe” visited the property at Sassen Bay. The house at the east end of the property was found to be in good condition and all the tools still there. We made careful examination of the property, studying the geology, locating outcrops as far as possible, examining the slide rock for signs of coal, noting the water supply, and taking soundings to ascertain the depth of water for a possible harbour location. As soon as we could get men and supplies from Norway we sent lumber for a house, a boat, provisions, cooking utensils, mining tools etc., to this property and landed a party of men. They built a house at the west end of the property, and then proceeded to do the work which was laid out for them. They traced coal in the slide rock and located the vein along the mountain side. Several test pits were dug in the outcrops, and liberal samples of the coal were taken from each place. This work was carried on until the

cold weather made it necessary for the men to return to the main camp at Advent Bay.”³

No remains were found of the house that was erected in the east of the “Sassen Bay tract” during the survey. Nevertheless, it is worth noting that Gustav Rossnes recorded a hut



Fig. 4.35 SNSK claim marker. Photo by Dag Avango.

foundation on Sveltihel for the Svalbard cultural heritage management unit in 1987 (No 4, Figure 4.31).

Hunters had probably used this hut, since there were indications that the hut had been insulated with turf, a common trait for Norwegian hunter’s huts on Svalbard. It is, however, possible that the hut was originally built as a claim hut.⁴ In this context it is worth noting that the cape of Sveltihel is the most easterly landing spot for ships on the former Sassen Bay tract. Further investigations are needed to determine the history of this hut.

It is also worth noting that a claim board was found close to the hut foundation in 1987. The claim board notes the sale of The Arctic Coal Company properties to Store

Norske Spitsbergen Kulkompani A/S in 1916.⁵ A similar sign (Figure 4.35) was found in August 2004 by Dag Avango and Ulf Gustavsson on the coastline approximately 1 km east of the De Geerdalen, below a mountainside where The Arctic Coal Company reportedly dug test pits. This may suggest that the Store Norske put claim markers at former Arctic Coal Company activity areas after the sale in 1916.

Furthermore, Dag Avango, Ulf Gustavsson and Larry Mishkar found remains of a hut on the east side of De Geer dalen in Aug 2004 (not recorded). In the same area the remains of a peat covered hut with a boat serving as roof, was registered by Rossnes in 1987. Rossnes also found the remains of an older burnt down hut, 4 X 2 m (oriented in east-west direction) on the west side of Elveneset in the De Geer valley during the same survey (not recorded). These finds in an area indicated as the site of a claim hut in Arctic Coal Company reports (the west side hut), suggests that further surveys in the area might be worthwhile.

Discussion

The lack of remains from Arctic Coal Company prospecting activities during this survey indicates that further surveys are necessary to get a clear picture of ACC’s strategies for

claiming the Sassen Bay. The lack of remains also suggests that the Sassen Bay tract was not a priority in the American company's mining plans. This interpretation is strengthened by written sources. In 1910 The Arctic Coal Company general manager Gibson reports the following:

"[...] I learn from several sources that there is to be quite a point made of the size of our claims, as we have in all about five hundred square miles. I suggested when in Washington that I thought it would be best to drop the Sassen Bay tract and the Cape Boheman tract (both of which have been prospected and found entirely worthless as far as coal bearing measures go and to all intents and purposes have been abandoned by us, as we have had no men at either place for two years) and while Mr. Burrall agreed with me that we did not want them it was a question as to how we would discard them. Mr. Peirce at that time thought it best to make the claim as large as possible and advised against the dropping of any part of our claims."⁶

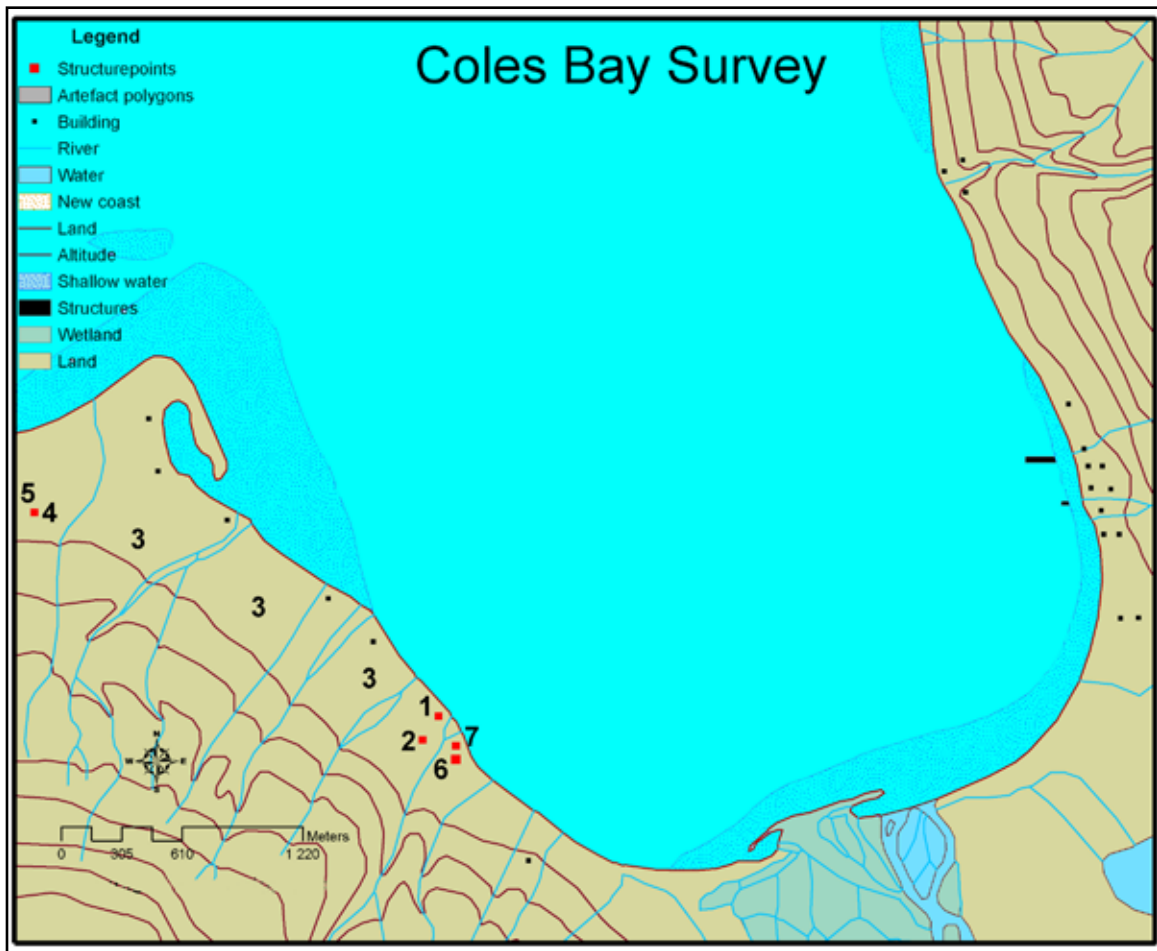


Fig. 4.36 Area of Colesbukta survey. Map by Dag Avango.

Thus, the Sassen Bay tract was regarded as worthless from an economical point of view, but useful from a political perspective. Mr. Pierce, the American ambassador in Norway at the time, suggested that the Sassen Bay and Cape Boheman tracts should be defended in order to manifest the American presence in the archipelago during the negotiations on the Svalbard question in Kristiania in 1910.⁷ The signboard on the river plain of the Sas-

sen valley can thus be interpreted as a part of the political defense system of The Arctic Coal Company industrial enterprise.

The Colesbukta survey

The Colesbukta (Coles Bay) is located on the southern coastline of Isfjorden, on the main island of Västspetsbergen (Figure 4.29). An open coastal plain, often wet, bordered by lower gently sloping mountains, surrounds the bay. In the center of the bay the Coleselva (Coles River) delta is located, dividing the bay into an eastern and a western part (Figure 4.36). The coal seams in the area belong to the Tertiary strata, the same as in Longyear valley, but at Coles Bay the seams are situated below sea level.

Historical background

Colesbukta has been the scene of various mining and exploration activities from the beginning of the 20th century up until today. It was first claimed by The Arctic Coal Company in 1905, as the Ayer & Longyear tract No 2. The ACC kept the claim until 1916, when it was sold to the Store Norske Spitsbergen Kulkompani A/S (Store Norske), who maintained its claim to the area until the regulation of conflicting land claims following the Svalbard treaty of 1920.

In the years following the ACC's claim of the area, parts of the Coles Bay was also claimed by other companies: the "A/S Kulspids" in 1909, and by the "Stavanger Spitsbergen Expeditionen 1912". The last mentioned company sold the west part of the bay to the Russian "A/S De Russiske Kulfelter Green Harbour" in 1914, they in turn sold it to M. Lewin & Co in 1925.

The eastern part of the bay was claimed by the Russian Rusanov expedition in 1912, starting off a conflict with The Arctic Coal Company and later with the Store Norske. A Russian company was formed in 1913 to develop the claim for coalmining (The Grumant A. G. Agafeloff & Co) and in the following years it built a house and conducted exploratory mining in the area. In 1920 the project was taken over by the Anglo-Russian Grumant Company (a Russian-British joint venture), who established a coalmining community (the Grumant City) in the nearby Grumant Valley, to the east of Colesbukta (Appendix C, Figure 4). In the early 1930's the claim was taken over by the Soviet Trust Arktikugol, who built a mining community and a shipping harbor at the Colesbukta, connected to the Grumant City by a railway line and a tunnel. The Soviet settlements in Colesbukta and Grumant City were closed in the beginning of the 1960s. The area is still owned by the Russian Trust Arktikugol and the company holds plans to re-open the mine in the coming years (Appendix C, Figures 1 & 2).

The Survey

The purpose of the Colesbukta survey was to locate and analyze symbols of occupation maintained by mining companies active in the area from 1906 until today. A special effort

was made to find remains from ACC activities (1905-1916). What kinds of symbols were used in order to claim the Coles Bay area? Which locations were used and why?

From literature, ACC maps and managers' reports, we expected that we would find claim-huts, mining-pits and possibly remains from signboards. Historic maps and photographs were brought into the field, to help identifying remains. Two areas were chosen for the survey; the area between Coleselva and Kap Laila on the west side of Coleselva, and the area between Coleselva and the tunnel entrance to Grumant City on the east side of the bay (Figure 4.36).



Fig. 4.37 Barge remnants. Photo by Dag Avango.

The survey group traveled by Zodiacs from Longyearbyen to the entrance of a creek coming down from Fossil-dalen on the west side of Colesbukta. From there the group spread on a line approx 500 meters wide from the coastline and walked over the coastal plain, northeast towards Kap Laila and then returned the same way.



Fig. 4.38 Log-lined pit. Photo by Dag Avango.

The second leg of the survey was done by two separate groups starting off at the pier in the Russian Colesbukta settlement – one walking north towards the Grumant City tunnel entrance and the Rusanov hut, one walking south towards Coleselva. Shortly after the groups started off, the Coleselva group was approached by a polar bear. Therefore, the groups returned to the starting point at the pier. When the polar bear continued its approach, it was decided to leave the area for safety reasons. Thus, there were no results from the second leg of the survey.



Fig. 4.39 Pipes from Russian drilling rigs. Photo by Dag

There have been several previous



Fig. 4.40 Road connecting Barentsburg to Colesbukta. Photo by Dag Avango.



Fig. 4.41 Sledge found on road. Photo by Dag Avango.



Fig. 4.42 Old telephone line. Photo by Dag Avango.

surveys of the area – by Susan Barr in 1981, Dag Nævestad in 1986, Gustav Rossnes in 1988 and Geir Stormbringer et al in the summer of 2000. Geir Stormbringer's survey covers a larger area than the one surveyed in August 2004.⁸ Therefore, Stormbringer's maps are published in Appendix C. References to the feature numbers in Stormbringer's report is provided for each feature mapped during the 2004 survey.

The following industrially related historical remains were found and documented in Aug 2004 (Figure 4.36):

1. There is a building and remains of two barges, located close to where the creek from Fossildalen enters Colesbukta (Figure 4.37; see also Stormbringer's map in Appendix C, Figure 3). The site apparently served two functions: primarily as a mining exploration site, secondarily as a boat repair yard. The building has been a workshop of a simple framework construction with shed roof and vertical panelling. A workbench is still preserved at the western wall, with traces of a larger fuel stove or a forge in the middle of the floor. This indicates that the building was used as a smithy. On the ground there are traces of slipways and three anchoring systems (poles set into the ground) for tackles when hauling boats and cargo up on the beach. Around the wrecks of the barges and in some other areas near the shoreline there are layers of sawdust and chips after the working of wood.

2. There is also a log-lined pit located on the coastal plain in the vicinity of the house in Feature 1; this was previously registered by G Rossnes in 1988 and Stormbringer in 2000 (Figure 4.38). It is likely that the pit is the result of coal prospecting. There is at least one claim hut in the vicinity and the coal seam in the area is located below sea level, thus



Fig. 4.43 Foundation of a hut. Photo by Dag Avango.

requiring either a test pit or a drilling hole to be investigated. Remains of Russian drilling rigs at Kap Laila gives further support to this interpretation (Figure 4.39). There are, however, different possible interpretations on the function of the pit.⁹

3. There are wheel tracks or a road connecting the Russian Barentsburg and Colesbukta settlements (Figure 4.40). The road was most likely opened when Trust Arktikugol built the Colesbukta settlement and probably fell out of use after mining operations there were closed in 1961. Fresh traces of heavy vehicles also suggest that the road has been in use quite recently.



Fig. 4.44 Standing hut. Photo by Dag Avango.

4. There was a sledge along the Barentsburg-Colesbukta wheel track. Several artifacts were found in the sledge; tools, a tin bottle with Russian text and drilling pipes (Figure 4.41).

5. There are remnants of a telephone line connecting the Russian Barentsburg and Colesbukta settlements (Figure 4.42).

6. Foundation of a hut (Figure 4.43). Stormbringer registered the foundation previously in 2000.¹⁰ The origin and function of the hut cannot be determined without further studies of maps and written sources.¹¹ It is, however, worth noting that the foundation sits in

the vicinity of a fresh water stream and right next to one of the best landing spots in the Colesbukta area; a favorable place for a hunter to erect a hut, but also a strategic position for a mining company to build a claim hut.

7. There is a standing hut (Figure 4.44) some 30 meters from the foundation mentioned previously (number 6).

It seems likely that this building was erected by the “Stavanger Spitsbergen-expeditionen 1912” during an expedition in 1919 and later taken over by M. Lewin & Co. In 1924-1925 Jacob Hersleb Horneman and Anna Gauslaa Horneman overwintered in the hut, at that time belonging to M. Lewin & Co.¹²

Summary

The remains documented during the Colesbukta survey mirror two important aspects of the industrial history of the Colesbukta. First, it reflects the challenges of mining in an Arctic environment without previously established infrastructures. The road and the telephone line reflects the ambitions of the Trust Arktikugol to connect its Barentsburg and Colesbukta industrial sites into one integrated industrial area from the early 1930's until the closure of Colesbukta/Grumant City in 1961. The fresh prints of vehicle(s) on the road also mirrors Trust Arktikugols current ambitions to do the same, namely connecting the Barentsburg settlement and its planned new coal mine at Colesbukta. If the Russian company is allowed to do that, the settlement at Barentsburg can be used as a base for the new coal mine, and save the costs and efforts of building a new settlement at Colesbukta.

Second, the industrial remains in Colesbukta reflect the stiff competition over this area between different mining companies in the first decades of the 20th century. The choice of location for the claim hut(s) (No 6 & 7), most likely had both practical and symbolical purposes. They were built at one of the best landing spots in the Colesbukta, right next to the only fresh water source suitable for drinking in the vicinity. By maintaining claim huts at such a site, the mining companies symbolically controlled the Colesbukta; the site was a key to the bay.

The huts not only marked claims of ownership to natural resources, but also manifested the presence and national interest of the mining companies' nations of origin. Thus, the huts, studied in their physical setting in the landscape, reveal an important aspect of the early 20th century struggle over the natural resources and political status of Svalbard.

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Sysselmannen Svalbard, 2001).

9. Ibid.

10. Ibid.

11. It has been suggested that the foundation is the remains of The Arctic Coal Co claim hut located in the Colesbukta (Dag Avango, *Sveagruvan: Svensk gruvhantering mellan industri, diplomati och geovetenskap*). However, Gunnar Holmsen indicates that the hut used by The Arctic Coal Co was situated on the eastern side of the Coles Bay (Gunnar Holmsen, "Spitsbergens natur og historie," *Svalbardminner* 21 (1911): 52f). This is strengthened by recent finds of a hut foundation on the east side of Coleselva, by heritage consultant Per Kyrre Reymert and Prof Vadim Starkov. Reportedly, this site fits well with this location and the landscape visible in the historic photography of The Arctic Coal Co claim hut.

12. Gustav Rossnes, Befaringsrapport Kulturminneregistrering Hollenderbukta-Colesbukta (Longyearbyen: Sysselmannen, Svalbard, 1988), 13.09.88.

Brucebyen survey

Brucebyen (Bruce City) is situated on a large peninsula called Bünsow land, at the eastern side of Billefjorden, near the mouth of Adolfbukta (Figures 1.1 and 4.45). A 1-2 km wide coastal plain characterize its surroundings, as does the giant Nordenskiöld glacier to the northeast of the settlement (Figure 4.45). East of the plain, there is a steep mountain ridge, blocking access to the inland. The coal seam in the area belongs to the Carboniferous strata and is mostly located below sea level.

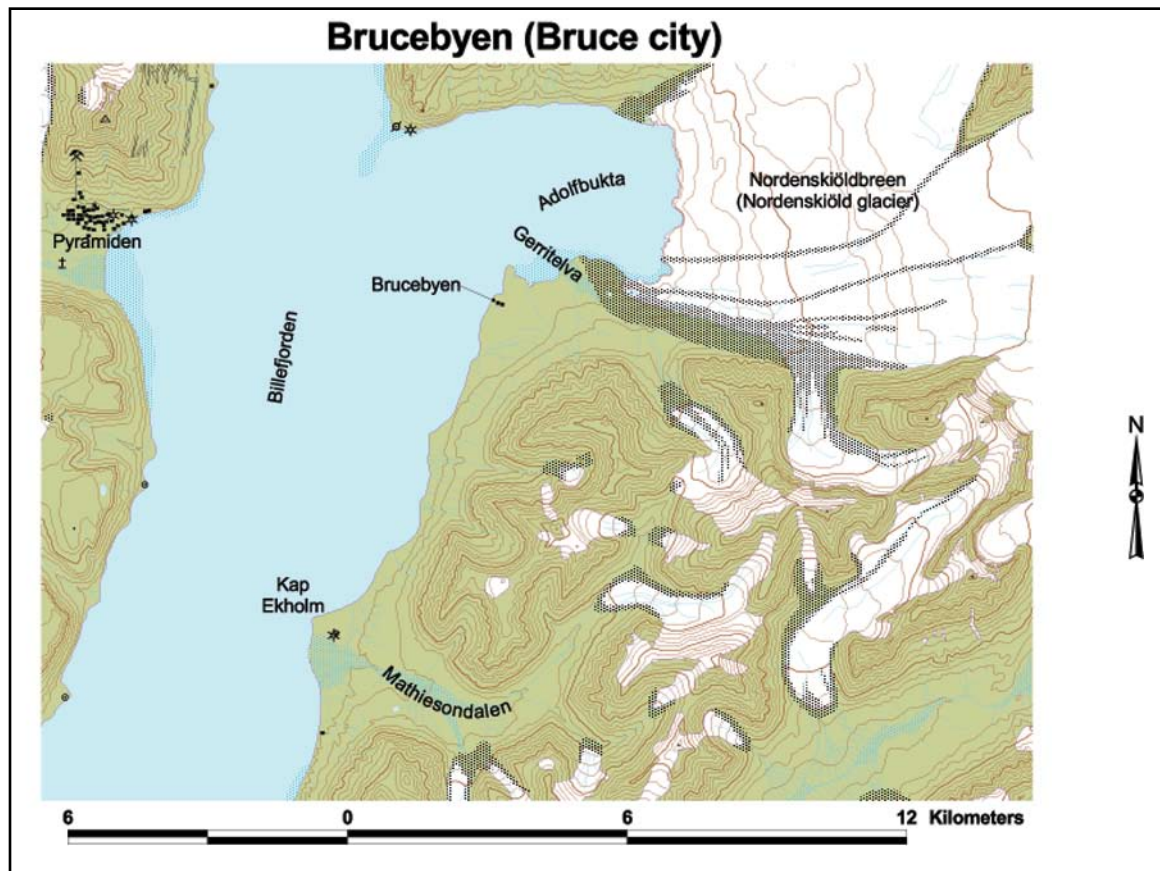


Fig. 4.45 Brucebyen and surrounding area. Map by Dag Avango.

Historical background

Brucebyen was built by The Scottish Spitsbergen Syndicate (SSS), a Scottish mining company formed in 1909. The SSS was first and foremost a prospecting company, exploring natural resources and selling claims to actors willing to invest in mining. The SSS claimed vast expanses of land on both the east and the west sides of the archipelago.

The company's activities were concentrated in two areas: Prins Karls Forland and Bünsow land, where Brucebyen is located. The SSS claimed the Bünsow land in 1909, but in the years prior to the First World War their activities on the peninsula were limited and during the war came to a halt. Brucebyen was built in 1919 as a part of a big campaign launched by the company on Svalbard after the war.

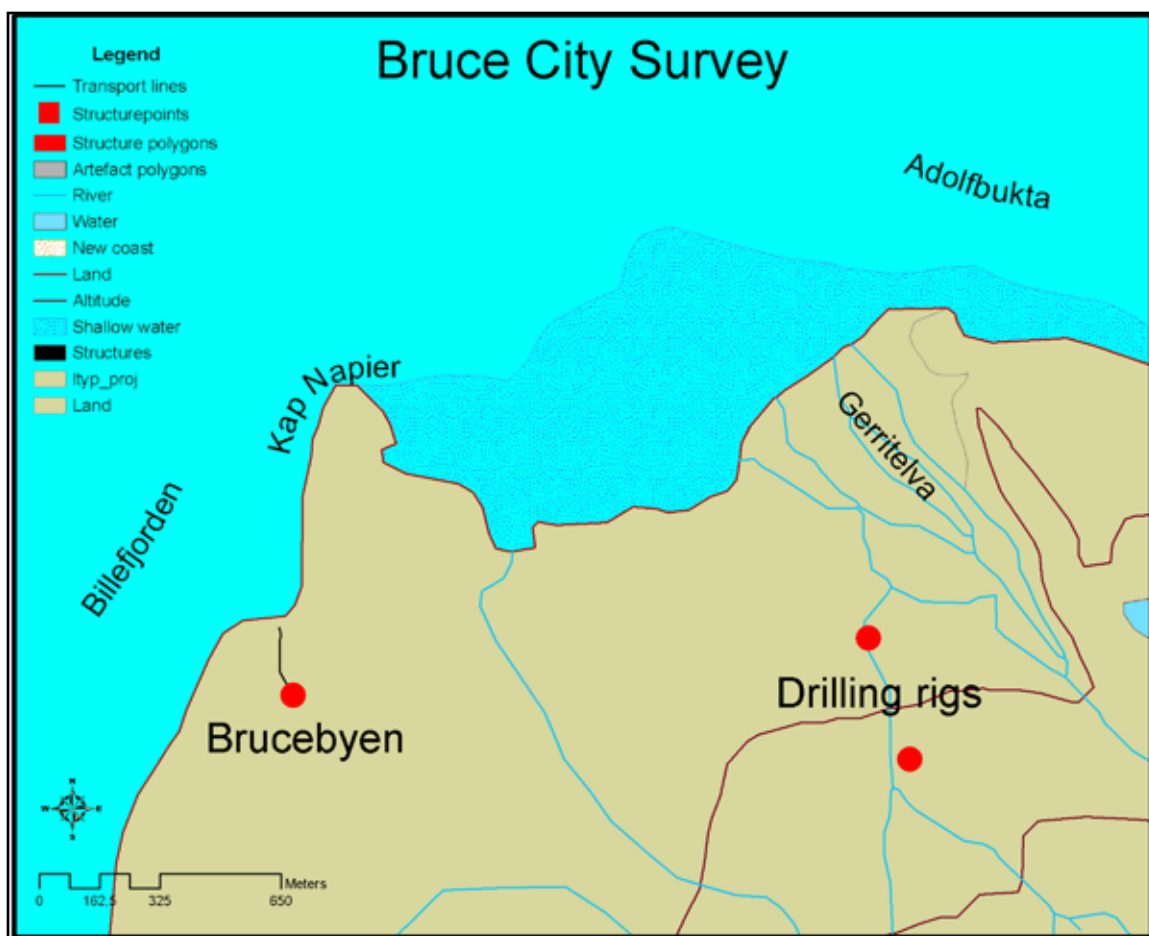


Fig.4.46 Map of features at Brucebyen. Map by Dag Avango.

The first two houses in Brucebyen were erected the summer of 1919, and were equipped with fixed beds, and tables and chairs. Extensive geological investigations were made with drilling machinery, south and north-east of the settlement, on the coast 1.5 km south of Brucebyen and around the river Gerritelva to the northeast (Figure 4.46). However, despite reaching considerable depths, no coal seams were found.¹

In 1920, SSS sent another large expedition to Svalbard, with Brucebyen as one of the targets. Twelve tons of equipment was unloaded at Brucebyen, including new and more powerful drilling equipment. Drilling was continued at Gerritelva, and this time coal seams were found: in one of the holes 2.13 meters thick coal/coal shale at 78 meters depth and 1 meter thick coal at 91 meters. Drillings were also made south of Brucebyen, east of Kap Ekholm in the Mathiessondalen (Figure 4.45) and on the north side of Adolfbukta. In the autumn of 1920, the SSS estimated the coalfield south of Adolfbukta to contain approximately 90 million tons of “half-anthracite coal”, good for producing coke, in a favorable position for mining.²

Brucebyen was visited again by the SSS in 1921, but the extent and nature of the company’s activities are not covered in Hoels historic account. In the following years (1922,

1923 and 1924) the SSS stopped briefly at the site for inspections. Towards the end of the 1920's The Scottish Spitsbergen Syndicate lost interest in its coalfields on Svalbard and dismantled their activities there.³

Brucebyen has been used all through the 20th century by hunters and scientists, a famous one being the The Oxford University Arctic Expedition to Spitsbergen 1933. This expedition used Brucebyen as a base for research on Ny-Friesland, on the east side of Wijdefjorden and on Dicksonland.⁴

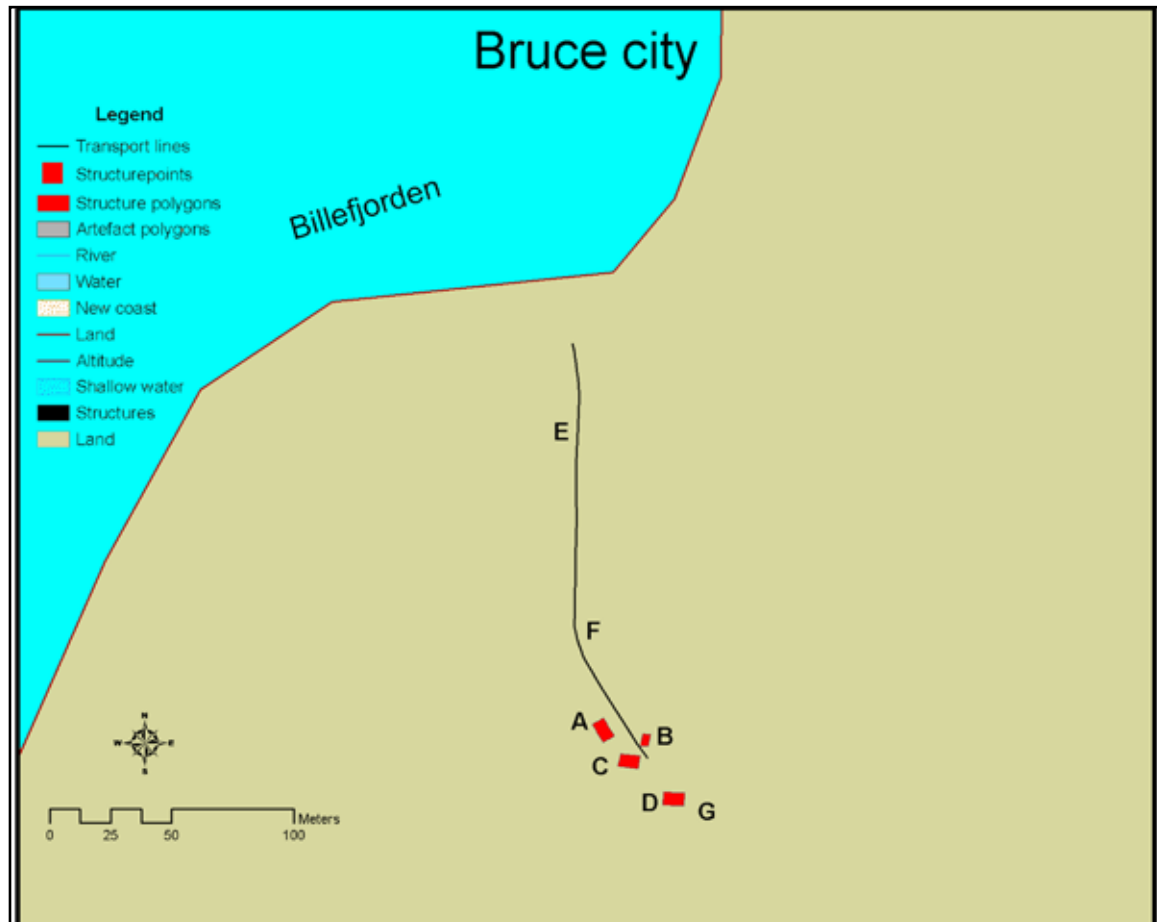


Fig. 4.47 Map of Brucebyen. A, B, C and D represents the four houses of the camp. On the east side of building D, there is a pile of drilling pipes (G). F represents the position of the mining cart in August 2004. Map: SWE-DARCTIC2004 team.

The survey

The purpose of the Brucebyen (Bruce City) survey was to make a superficial recording of the site for comparison with prospecting camps/claim huts of other mining companies, and to provide a basis for planning future fieldwork at the site. Our principal question was: what activities can be traced through the remains in the landscape and what do they tell about the purpose of the camp?



Figure 4.48. The four buildings at Brucebyen, seen from the east. In the background Billefjorden is visible. Photo by Dag Avango.



Figure 4.49. Building A from west (left) and from east (right). Photos by Dag Avango.

Brucebyen consists of four buildings (A, B, C and D in Figure 4.47), standing some 200 meters from the shoreline on the tundra (Figure 4.48). Two of these houses were erected in 1919. It is not yet known which ones were built in 1919 or when the other two were built.

Building A is a prefabricated wooden house with horizontal siding. The building measures approximately 8 meters by 5 meters. The building's specific function within the camp is unknown.



Figure 4.50. Building B from west (left) and from east (right). Photos by Dag Avango.

Building C is the smallest in the camp, a prefabricated wooden house with horizontal siding. The building measures 3.5 by 5 meters. Its function within the camp is unknown.



Figure 4.51. Building C from west (left) and from east (right). Photos by Dag Avango.

Building C is another wooden house with horizontal siding. The building is used by the governor and had been renovated recently in July of 1982.⁵ A comparison with the other houses of Brucebyen reveals that all of the siding of the building has been replaced. The building measures 8 meters by 5 meters. The original function of the house within the camp is unknown.



Figure 4.52. Building D from west (left) and from east (right). On the east end of the building (left photo), there is a large pile of drilling gear. Photos by Dag Avango.

Building D is another prefabricated wooden house with horizontal siding. The building measures 8.6 meters by 5.3 meters; its specific function within the camp is unknown. Behind building D there is a pile of drilling pipes and other hardware (G in Figure 4.47).



Figure 4.53. Railway tracks connecting the camp to Billefjorden. Photos by Dag Avango



The houses are connected to the beach by a narrow gauge (45 cm) railway track (E in Figure 4.47), 250 meters long. On the tracks, a cart was still standing (F in Figure 4.47 and Figure 4.53). The tracks slope down off the terrace to the foreshore, as seen in the righthand photo.



Figure 4.54. Machinery house and drilling tower, northeast of Brucebyen. Photos by Dag Avango.

Approx 1.7 km to the northeast from the camp, close to Gerritelva, there is a shed for drilling machinery and a drilling tower (H in Figure 4.47 and Figure 4.54). The drilling equipment is most likely the remains of SSS drilling operations in the summers of 1919 and 1920.



Figure 4.55. Drilling pipe at drilling site I, from east (left) and west (right). On the right photograph drilling site H is visible in the background. Photos by Dag Avango.

A second drilling site is found in the bed of a drainage feature approximately 200 meters to the north-west from drilling tower H (I in Figure 4.47, Figures 4.55 and 4.56). The drilling equipment is most likely additional remains of SSS drilling operations in the summers of 1919 and 1920.



Figure 4.56. Parts of drilling rig at drilling site I. On the right photo the text "NO.1 PLANT" is visible. The same text is painted on the machinery house and boxes of equipment at drilling site H. Photos by Dag Avango.

Discussion

The houses, drilling machinery and the drilling sites bear witness to relatively large investments in time and money from the Scottish Spitsbergen Syndicate at the site. The effort can be compared to the relatively modest investments made by other companies claiming the Bünsow land at the time. One example is the Swedish mining company "AB Spetsbergens svenska kolfält" who claimed the peninsula between 1910 and 1925. The company was aware of the coal seams below surface, but considered drillings to be far too expensive.

The remains of Brucebyen thus suggest that its purpose was first and foremost economical. The investments at the site are a reflection of the fact that the SSS was not primarily interested in mining, but in selling their claims to mining companies. Thus, the drilling

equipment and the “hard data” on the coal seams, can be interpreted as part of a strategy to attract buyers. The above-mentioned Swedish mining company did not have to invest in drilling, because they did not intend to sell the Bünsow land, and the area was not a priority in their mining plans.⁶

The remains of Bruce City does, however, also suggest that the camp was a part of the battle for control over the coal resources of Svalbard, and of the negotiation process concerning the future national status of the archipelago. SSS and the Swedish AB Spetsbergens Svenska Kolfält fought out a long conflict over the control of the Bünsow land from 1911 and into the 1920's; from 1917 this involved the aid of the ministries of foreign affairs in Sweden and Britain. Before the First World War, the Swedish mining company had more substantial activities on the peninsula than the SSS and thus potentially a stronger claim to the land. After the war, the SSS activities at Brucebyen (and elsewhere on the Bünsow land) changed that situation in favor of the Scottish company. In 1925 the Swedish company gave in. Thus the Brucebyen camp helped protect the SSS investments on Bünsow land.⁷

The conflict also had political implications. The Board of The Scottish Spitsbergen Syndicate were strong advocates of making Svalbard a part of Great Britain.⁸ A major argument for this was the great size of the British claims; claims protected symbolically by sites like Brucebyen through the international praxis of “effective occupation”.⁹ According to Adolf Hoel the SSS themselves claimed 12.5 % of the archipelago in 1919.¹⁰ Interpreted in that context, Bruce City can be viewed as a physical resource for the SSS Board, in its efforts to convince the British government to make Svalbard a part of Britain (a strategy that failed).

When comparing Brucebyen with the claim marking activities of The Arctic Coal Company at Sassenfjorden and Colesbukta, the efforts made by the SSS stand out as much more substantial. The differences open up the possibilities for comparative research; how can we explain the differences between different actors when symbolically claiming land? Are they a reflection of differing cultural interpretations of what constitutes a legitimate claim?

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Chapter 5

Analysis of Process

This chapter introduces the pedagogy of the Svalbard Field Project in 2004, and analyzes how and to what degree the project was a success in terms of learning outcomes. It focuses upon the practices stressed during the course, and assesses their successes and shortcomings, if any, through a look at post-course participant reflections. We begin with a review of the principles of learning stressed during the course.

The philosophies and practices of the course were clearly defined.

Dr. Marie Nisser laid these out explicitly and repeatedly: to bring together young researchers; to build new intellectual networks; to promote joint learning among researchers of different ages, experiences and nationalities; to build, share and exchange knowledge; to build, refine, and spread appropriate methods and theories regarding industrial historical field research; to demonstrate results of such research; and to initiate individual research interests to pursue in the future. The major features of the learning experience during the 2004 Svalbard project championed the notions of personal responsibility and shared commitment.

Personal responsibility and commitment to contribution/participation over the short- and long-term were the keynote features of the course. Participants were asked repeatedly to make public declaration of their ideas and to pursue ways collectively that they could be achieved. The assumption of the inherent strength of team practice and collective learning was another essential orientation. The eventual outcomes of the course were seen to be chained together and ambitious. Another assumption of the course was that everyone had something to contribute, not simply to learn but to amplify learning due to interaction and synergy.

Our learning and teaching approaches were ecumenical.

This is to say that learning took place in multiple ways and using a variety of data and inputs, including: background reading prior to the course; formal tutorials and seminars; prepared paper presentations; formal and informal discussion; guided field excursions; intensive field data collection; field recordation (creation of new knowledge) at five localities; and participant reflection. The practice of learning took place across generations and nationalities, with younger researchers introducing new data collection techniques to older ones in some cases, and with students teaching other students in others. The age-old practice of the experienced teaching the novice also occurred.

Our learning and teaching conditions were challenging and rewarding.

Although we are all students in many senses, the ratio of experienced to less experienced people during the course was very healthy: roughly two younger students for each more experienced practitioner. The ratio of experienced to student status resembled an art tutorial or a master class rather than a typical field course. Most instruction was one-on-one and optimal for hands-on learning, a benefit to learning the intricacies of new technologies for data collection. The use of English as the language of instruction was challenging for some but problematic only for the Americans and the Russians, who did find some common language in German. Attitude problems could be but a word away; it was very easy to fail to understand someone else's meaning when English was being relied upon. Nuance in meaning is not always reliable among practiced speakers much less those with six different national orientations. Finally, the course time schedule, which allowed only a two-hour late start on one morning of the course, was very rigorous, particularly on days with overcast and cold conditions.

We conducted structured exercises in the field.

The goal of these exercises was to develop the ability to recognize, organize, and record field observations of the material record of industry. Here are some examples of these exercises. To begin, the students were asked, using nothing but an active observing mind and a sketchpad, to walk over the site of Old Longyear City and make an impressionistic map. They were to identify on the map what appeared to be the site's significant visible features. These features were to be sketched on a map and labeled well enough so that a participant could recall what was seen and where it was located. Participants worked in groups or alone to accomplish this exercise. Most accomplished it in two hours' time.

At the close of this exercise, the participants collectively described and generalized about the features revealed by the walkover. In effect, a collective, impressionistic map of the site was produced by reflecting upon these observations.

The next field task was to subdivide the site into 5-6 sub-areas and assign a mixed team of 3-4 people to each. The teams were to create a detailed sketch map of the structures and features in each area and put a pin flag in the NE corner of the feature. Each feature was assigned a number. The participants then produced measured (tape) sketches of each feature to scale, using graph paper and feature forms. Each feature was then plotted using total station or GPS technologies, with most participants taking part in each technology activity. Participants then photographed each feature under the tutelage of a professional photographer. These basic procedures were taught first at Old Longyear City and then deployed at four additional sites or survey areas.

We pledged active commitment to the goals and outcomes of the research.

Developing ideas and commitment from participants re: short and long-term study and ways to contribute to research as a result of the course was encouraged throughout the course. A sample of eight participant research ideas is presented in brief below. Most

participants identified individual interests to pursue, and discussed means by which funding could be sought to carry them out.

Participant #1: a study of the complexity of the industrialization/tourism transition in small communities; an overview of Svalbard tourism, past/present/future, and its connection with industrial heritage.

Participant #2: a thesis project featuring GIS techniques with an emphasis on public and web presentation.

Participant #3: the study and practice of rephotography of historic shots to provide landscape-scale comparisons and record of change; studying the efficacy of journalistic approaches to gain support for scientific inquiry and preservation efforts.

Participant #4: a study to draw comparisons with American coal mining in archival accounts in the USA; conducting interview studies to understand how to satisfy visitor/tourist curiosity about historic industrial remains.

Participant #5: a holistic study of physical geology, the history of science, and industrial archaeology to begin to understand mining company motivations, prospection and planning.

Participant #6: a study of the environmental impacts of mining particular to Svalbard; a study to determine best practices in presenting the multinational history of Svalbard to individual countries for the purposes of financial support.

Participant #7: research that leads to building Industrial Archaeology programs in Norwegian universities and in the consciousness of Norwegian practitioners; research to understand national strategies of mining, including mythologies.

Participant #8: study and presentation of mining societies as historical/cultural heritage (how to use it without destroying it).

Learning:

Our poll of student participants is the best way to convey our accomplishments and our shortcomings.

Eight student and participant post-course commentaries were combined and compared. The students were asked to reflect on several topics, including personal objectives in taking part in the field course, positive outcomes and learning opportunities within the course, and critical suggestions/improvements for future field endeavors. As might be expected, there was a substantial overlap in both positive and critical commentary, and there were a few instances of contradiction as well.

Table 1. Positive outcomes and opportunities

Interaction with international colleagues and people of other cultures and experiences
Comparing and refining research questions together
Well-defined aims
Attempt to spread, expand and refine ideas
Opportunity to build a network of support
Getting a global multidimensional impression of the site at Old Longyear City
Trips to other localities for comparison and practice
Photographic instruction
Learning practical field skills i.e. how to see larger features, not simply artefacts, GPS practice
Learning to appreciate Industrial Archaeology as a discipline
Experiencing the Arctic: history & environment
Opportunities, including evenings, to share views on the project
Learning new, practical realities about working in a demanding field context
The practice of data integration - multiple contexts, sources, levels of accuracy

Table 2. Critical assessment and suggestions for improvement

Greater prior exposure to the idea of personal research commitment
More students who are dedicated to projects such as this
More preparation on the part of the organizers prior to field portion of course
Uncertainty about who was in charge
Lack of clarity about procedures (drawing was commonly mentioned); provide data collection standardization
More interaction with non-English speakers/more international dialogue
Clarity of language
Follow-through on all goals laid out by Dr. M. Nisser
Preliminary information too broad; too redundant
Further and constant reference to field research questions while in the field; review (daily) key objectives
More photographic instruction (add an expert)
Frustration during pace of fieldwork expressed by those who were experienced
Better integration between experienced and inexperienced workers (drawing and measuring)
More (and earlier) distribution of information, including logistics/costs/physical activities
Concentration in one area of ACC/LC resulted in lack of view of the whole
Need more time for everyone to rotate through all technologies – some people did not have enough introductory time with either GPS or total station technologies
Need more time for overall discussion (day-to-day) of observations and conclusions
Leadership clarification and risk assessments of individual areas of site survey
Replace Zodiac travel with more formidable craft for distant travel

Conclusions

New Networks

Our networking outcomes were positive beyond our plan. We met four other archaeologists while in the field; all Norwegian archaeologists willing to share and to contribute to more research on Svalbard. Participants were able to conduct very positive interactions with Sysselmannen representatives both during the course and afterward, including positive contact with new cultural heritage specialist for Svalbard. Institutional opportunities are expanding as well. At least six people will pursue archival records in their respective countries. Fundraising efforts and grant writing are underway in the United States (Fulbright program and the National Science Foundation in the USA) and elsewhere. Dr. L. Hacquebord is pursuing research monies from sources in the Netherlands and with the European Science Foundation, to pursue a study into large-scale extractive industrial activities in an arctic no-mans land during 1600-1940. In addition it is probable that two or more thesis proposals will be developed by students as a result of the 2004 course.

Our field time generated complex new data at five localities

These data are the subject of Chapters Three and Four and are the best evidence of the efficacy and success of the 2004 field course. The successful and strategic ability of the group to work as a team and to utilize lessons to approach new field situations was most clearly realized at Advent City, a complex site that was mapped and recorded in detail in a single day. After four days' practice, we were able to efficiently and (in some ways) elegantly accomplish complex field tasks.

Summary of Some Issues in the field

Balancing the needs of learning with the needs of data collection was a problem in some settings. We ultimately had to use people's core knowledge and strengths in order to get actual field data completed in the few field days available to the team. While most students were introduced to the two digital technologies, we relied heavily on experienced participants to take GPS data, and equally heavily on experienced participants to take total station data, and others to take written data logs as well as sketch and measure. Some spent too much time watching others take data rather than learn to do it themselves.

Learning to observe and collect meaningful data solely by visual assessment and field reconnaissance was a frustration for some students, because they were a bit impatient and wanted to go directly to the documents, particularly the maps and photographs, and quickly establish a one-to-one link between visible features and actual buildings and structures as depicted in contemporary documents. While this is a fine practice for some settings, the overall needs of a field researcher demand the patience to read the ground as it is presenting itself, rather than to interpret it solely by reference to the photos and texts.

We need to expand contacts with additional students. It is a regret that there were no

Russian students in the 2004 course. According to Dr. V. Starkov it is the case that English language skills are just not as developed in Russia as in Western Europe. In the cities things are better - but it is not the same in smaller towns or provinces, and widespread English skills are just not the case for all university students. This holds them back as far as participation. In addition, Industrial Archaeology as a distinct subdiscipline of archaeology is not fully recognized in Russia today, hence it is difficult to recruit among archaeology students.

Relying too heavily on high technology data collection methods might have been a big issue, but when digital data were lost, an obstacle (resisting traditional data collection methods) became an opportunity (inevitably, machine data can be corrupted but humanly-observed and recorded data can survive - one must know how to collect them).

Conclusions

The 2004 International Field Course in Arctic Industrial Heritage was an unqualified success. The teaching component of the project met and exceeded our expectations, with integrated multinational groups of students gaining new insights into the recognition and documentation of cultural resources in an Arctic environment. They visited remarkable sites, learned about different methods of recording, used surveying instruments, global positioning receivers and both film and digital cameras. Furthermore, they interacted closely with colleagues from other nations in the process.

Our team made relatively detailed records of a wide range of cultural heritage resources, including both sites that were well known and some that were not previously known to heritage professionals. The full results of the survey and documentation work will be filed with the Governor's cultural heritage office on Svalbard for their use. In the process of the survey work, we also recognized the high potential for additional resources, such as claim markers and huts, to be found in areas as yet unexamined at this level of intensity.

The 2004 survey provides new comparative data for evaluating national approaches to the establishment of mining settlements in the Arctic. Contemporary writers such as Hoel and Dole refer to differing approaches taken by different national and corporate interests in mining development, but their discussions tend to focus on managerial differences, not substantive differences in structures, layout, and engineering, or on the lives of the workers and managers who actually operated these facilities. Our emerging database of detailed site plans and artifacts will allow researchers to make more fine-grained assessments of the differences practiced, the technologies employed, and the commitments made by the companies that established these facilities. Traditional archaeological approaches, such as artifact collection and even excavation, might add further direct evidence about the foodways and material conditions of life that obtained within these settlements. Such investigations should offer new insights into the relationships between foreign capital and corporations using local or regional work forces to operate extractive industries in this polar environment.

This initial foray into international cooperation in industrial archaeology has sparked a continuing effort dubbed LASHIPA (Large Scale Historic Industrial Exploitation of Polar Areas). The core group of researchers has been augmented with the addition of new partners and plans for continued research activities are underway, with headquarters at the Arctic Centre, University of Groningen. In particular, this group aims to participate in the upcoming International Polar Year (see <http://www.lashipa.nl>) for up to date information).

Appendix A

Gruvhantering i Arktis

Ansökan om medel till ett internationellt seminarium och fältstudier på Svalbard i augusti 2004.

Medel sökes för att arrangera ett internationellt seminarium i Longyearbyen följt av en forskarkurs i fält på Svalbard. Ett planeringsmöte är tänkt att äga rum i Stockholm i mars 2004. Syftet är att etablera en internationell forskningssamverkan kring gruvindustrins framväxt, dess växt, förändring och industriella arv i Arktis.

I seminarium och fältstudier skall seniora forskare och doktorander deltaga för att få till stånd ett mångnationellt och mångdisciplinärt forskningsprojekt kring gruvhanteringen på Svalbard. Forskarkursen i fält syftar till att göra deltagarna förtrogna med förhållandena i Arktis, att översiktligt dokumentera olika gruvsamhällen, att diskutera forskningens mål och innehåll samt komma överens om teoretiska ramar och metoder för en fördjupad forskning. En rapport kring fältstudierna utarbetas.

Efter fältkursens avslutande skall de deltagande forskargrupperna från varje land fördjupa forskningen kring sina länders gruvindustriella satsningar på Svalbard. På hemmaplan skall de bearbeta ett omfattande arkivmaterial som finns i respektive land.

En målsättning med projektet är att bryta de nationella ramverken för forskningen och bedriva den i ett internationellt komparativt perspektiv. För den fortsatta forskningssamverkan och samordning, som krävs för att huvudprojektet skall kunna slutföras och avkastat resultat i en gemensam publikation, avser vi att söka medel ur internationella fonder.

Forskningen skall fokusera på teknik och industrietableringar, arbetsförhållanden och samhällsutveckling i ett internationellt komparativt perspektiv. Nära relaterad till dessa forskningsfrågor är frågan om gruvindustrins roll som utrikespolitiskt verktyg i en internationellt omtvistad region. En viktig uppgift i de planerade fältstudierna 2004 kring gruvindustrins anläggningar på Svalbard blir att diskutera industriarvets roll i den pågående debatten om miljö och kulturmiljö, om nationellt ansvar och om nationella rättigheter.

För den svenska forskningsdelen i detta tänkta internationella samarbete kommer en mer omfattande ansökan att utarbetas.

Uppläggningsen av detta projekt har diskuterats med professor Anders Karlqvist och fil.dr. Dick Hedberg, Polarforskningskommittén och Polarforskningssekretariatet som uttalat sitt stöd för projekt. Vetenskapsakademien har genom fil.dr. Urban Wråkberg förklarat sig beredd att förvalta ett eventuellt anslag.

Bakgrund

År 1997 tog polarforskningssekretariatet initiativ till ett kulturvetenskapligt program inför 100-års minnet av Salomon August Andrées ödesdigra expedition mot Nordpolen. Programmet innehöll flera, olika förslag till en bredare forskning kring olika aktiviteter på Svalbard. Ett projekt syftade till att ge bild av Andrée och den svenska polarforskningen under 1800-talet. Bland övriga delprojekt är det värt att i detta sammanhang nämna följande:

- Resursutnyttjande på Svalbard – valfångst och kol
- Industriminnesforskning i polartrakterna
- Det nordliga rummets betydelse för de nordiska ländernas självbild.

Inledningen till den forskning som skulle initieras inom ramen för det kulturvetenskapliga programmet var en expedition till Svalbard sommaren 1997 där ett tiotal forskare från olika discipliner deltog för att på plats bedriva översiktliga fältstudier och samtidigt diskutera de olika delprojekten.

Under de sex år som förflutit har flera forskningsprojekt kommit igång och avkastat resultat i form av avhandlingskapitel, publikationer, seminarier och annan forskningsrelaterad verksamhet. Flera expeditioner har genomförts på Svalbard. Ett nätverk av polarforskare inom det kulturvetenskapliga området har byggts upp och en internationell samverkan kring industrialiseringen av Svalbard håller på att ta form. Medan de geo- och naturvetenskapliga forskningsexpeditionerna till Svalbard alltsedan sent 1800-tal blivit föremål för omfattande forskningsinsatser har den dramatiska och politiskt laddade industrialiseringen av Svalbard ännu inte blivit föremål för motsvarande uppmärksamhet. Det är nu angeläget att rikta blickarna mot detta forskningsfält och att göra det i ett internationellt komparativt perspektiv.

Vid Enheten för industriminnesforskning, avdelningen för Teknik- och Vetenskapshistoria vid KTH, har ett deltagande i det kulturvetenskapliga programmet inneburit att Dag Avango inom ramen för det av Riksbankens Jubileumsfond finansierade VTI-projektet arbetat med en avhandling om den svenska satsningen på kolbrytning på Svalbard: Svea-gruvan 1917-1925. Dag Avango går nu in i ett slutskede med sin avhandling. Ett slutseminarium kommer att hållas i februari/mars och disputationen är planerad att äga rum i början av hösten 2004.

Vid flera tillfällen har Dag Avango och undertecknad, tillsammans med fil. dr Urban Wråkberg, forskningsledare för svenskt program för kulturvetenskaplig polarforskning vid KVA och andra forskare haft möjlighet att bedriva fältstudier i gruvsamhällen på Svalbard. Vid några tillfällen har även högskolelektor Kenneth Awebro deltagit. Under dessa fältstudier har det alltmer framstått som utomordentligt angeläget att initiera en internationell forskningssamverkan kring gruvindustrin och dess historia på Svalbard.

Utgångspunkter

Den arktiska regionen är och har varit föremål för en internationell maktkamp där kontrollen över naturresurser liksom strategiska och utrikespolitiska intressen, nationella prestigefrågor och miljöfrågor har stått på spel. På ögruppen Svalbard har svenska, norska, holländska, brittiska, amerikanska och ryska aktörer inom gruvhantering, polarforskning och statsmakt under 1900-talet varit inblandade i denna maktkamp. Man kan tentativt urskilja tre delvis överlappande arenor där aktiviteterna ägt rum.

På den mest framträdande arenan har den naturvetenskapliga polarforskningen agerat för att kartlägga ögruppen och uppnå nya vetenskapliga resultat. Den har samtidigt varit ett centralt instrument i kampen om att vinna inflytande över ögruppen. Genom polarforskarernas kartläggning av såväl geografi som geologi, flora och fauna har också ett nationellt intresse i regionen mutats in och manifesterats. Denna vetenskapligt orienterade polarforskning har inte endast lämnat avtryck i form ny kunskap och publikationer, utan även satt även sina spår i landskapet, bland annat i form av forskningsstationer.

Prospektering och gruvdrift blev en ny arena åren kring sekelskiftet 1900. Initiativtagarna bakom den internationella våg av gruvetableringar, som då inleddes, hade två syften. Dels handlade det om att etablera en vinstgivande industri, dels att skapa verktyg i ett politiskt maktspel. Det särpräglade med gruvindustrin på Svalbard är dess dubbla funktion av produktionsanläggning och politiskt redskap under 1900-talet. För att ge tydlighet åt detta resonemang kan den svenska gruvsatsningen i Sveagruvan 1917-1925 anföras som exempel. Sverige hade ett reellt intresse av att starta kolproduktion i Svalbard och därvid frigöra sig från sitt beroende av importerat kol för en stadigt ökande industriell konsumtion av kol i början av 1900-talet. Samtidigt blev det viktigt för Sverige att behålla en viss kontroll över Arktis efter unionsupplösningen 1905. Det handlade således både om industriutveckling och politik. De svenska satsningarna lämnade i likhet med de utländska inmutningarna och gruvinvesteringarna tydliga spår i landskapet.

Förutsättningarna för gruvdriften på Svalbard har förändrats genom industrinedläggningar, internationella avtal, ett förändrat politiskt världsläge och skiftande ekonomiska konjunkturer. Redan under förra hälften av 1900-talet valde gruvintressenter från ett flertal länder att avveckla sitt engagemang i det arktiska gruvdriften och dra sig tillbaka. För andra länder blev fortsatt gruvdrift ett medel att hålla sig kvar på Svalbard. Till dem hör det forna Sovjet. Ryssland kan i kraft av sin gruvdrift fortsätta att bevaka sina intressen i den arktiska regionen, trots att den ryska kolbrytningen visar kraftiga förlustsiffror. Även för Norge har ett upprätthållande av gruvdriften, på mer eller mindre olönsamma villkor, varit en möjlighet att få ett befolkningsunderlag som kan motivera den infrastruktur som behövs för ett permanent boende på Svalbard.

Än idag finns det således en dubbelhet i motiven för att upprätthålla driften i de norska och ryska gruvorna på Svalbard. Gruvindustrin har också i ett tidigt skede manifesterat sin betydelse genom att lämna påtagliga fysiska bevis från sin verksamhet och dessa spår i landskapet på Svalbard finns ännu kvar. Längs ögruppens strandlinjer och bergssidor

syns lämningarna av hus, gruvinstallationer och inmutningsskyltar. De utgör symboler för ett skede som historiskt sett haft en avgörande betydelse för kontroll över inmutade områden och nationella anspråk.

Ett starkt argument för att studera gruvor och gruvsamhällen på Svalbard är de nationella skillnaderna i teknisk utrustning, i bebyggelse och social organisering som så tydligt kommer till uttryck i de fysiska lämningarna. Dessa skillnader är en viktig utgångspunkt för den internationella jämförelse vi vill göra. Tack vara det arktiska klimatet och obenägenheten att riva installationer i samband med gruvnedläggningar finns spåren kvar av den tidigare gruvdriften och utgör idag ett källmaterial av omistligt värde eftersom skriftliga dokument ofta saknas i arkiven..

Samhällen som de ryska gruvorterna Barentsburg och Pyramiden och de norska gruvorterna Ny Ålesund och Sveagruvan visar stora olikheter i planering, bebyggelse och social organisation. I de ryska gruvorna har det inte enbart handlat om att åstadkomma en rationell gruvdrift utan också att bygga upp ett samhälle av manifest karaktär för de övervintrande gruvarbetarna och deras familjer. Den hierarkiska ordning som speglas i de ryska gruvsamhällena saknar sin motsvarighet i de norska gruvorterna. En följdfråga blir då given. Vilken roll spelar fysisk planering för social organisation och levnadsvillkor?

En tredje arena är den som domineras av diskussionen om det förflutna och dess roll för Svalbard. Ögruppens historia har gjorts till en del av kampen om inflytande på ögruppen. På Svalbard har kulturarvet, med industriminnena som en viktig del, intagit en särställning i den retorik som använts för att hävda ett nationellt företräde på ögruppen. Kulturarvet har ofta tolkats och diskuterats i termer av vem som varit först och störst. Bakom denna diskurs framträder även syften att legitimera nuet och skapa framtiden. För att förstå hur maktförhållandena i Arktis har upprättats och upprätthållits är det därför av central betydelse att analysera hur tolkningarna av regionens historia har skapats, etablerats och använts i ett internationellt komparativt perspektiv – såväl inom historieskrivningen som inom kulturmiljövården.

Industriminnena på Svalbard utgör därutöver också en del av en växande miljödebatt i den arktiska regionen. Inte minst som ett resultat av den snabbt växande vildmarksturismen pågår en kamp om tolkningsföreträden – vad är miljöförstöring och vad är kulturarv? Samtidigt är miljöfrågorna kring gruvindustrin och dess lämningar en del av den internationella kampen om politiskt inflytande.

Ett internationellt forskningsprojekt med fokus på de några av de frågor kring gruvindustrins etablering och fortsatta utveckling på Svalbard har generell betydelse för vår förståelse av vetenskap, industrialisering och historieskrivning i internationellt omstridda områden, liksom för industriarvets roll i en tid av växande globalt miljömedvetande.

Förberedande forskarmöte i Stockholm, mars 2004

Ett förberedande möte planeras äga rum i Stockholm under tre dagar för att diskutera

seminariets uppläggning, fältstudiernas genomförande och den framtida forskningens innehåll. I detta möte deltar en ansvarig senior forskare från varje land förutom de svenska arrangörerna.

Den planerade forskarkursen 2004

Den planerade forskarkursen med ett inledande seminarium i Longyearbyen är tänkt att äga rum under 10 dagar i augusti 2004. Avsikten är att samla forskare från Norge, Sverige, Holland, Ryssland, Storbritannien och U.S.A. för att arbeta fram gemensamma utgångspunkter i teorier och metoder för en forskning kring gruvindustrin – såväl med sikte på dess etablering, växt och politiska roll på Svalbard historiskt som på aktuell gruvdrift och på lämningar efter nedlagd drift.

Skillnader i tekniska installationer och samhällsuppbyggnad illustrerar tydligt de skillnader som funnits och finns i samhällsorganisation och politisk maktstruktur. Det är emellertid svårt att tolka och beskriva dessa skillnader över tid utan tillgång till arkivmaterial som belyser förhållanden i äldre tid. Detta arkivmaterial finns och förvaras i de nationella arkiven. De forskare som är bäst lämpade att bearbeta det materialet är de forskare som kan arbeta på hemmaplan.

Vår avsikt är därför – som inledningsvis beskrivits – att ett antal seniora forskare från de ovan nämnda länderna skall deltaga i detta fältarbete. Varje senior forskare medför en eller två presumptiva doktorander, vilka efter fältkursens avslutande skall fördjupa forskningen kring respektive lands industrisatsningar på Svalbard. Ny forskning kring industriell utveckling på Svalbard initieras, ett nätverk av unga forskare byggs upp och ny kunskap om industrialiseringen av Svalbard erhålles. Denna kunskap kommer samtidigt att bli värdefull som underlag för framtida överväganden och beslut om omistliga industriarv på ögruppen, liksom för norska men även internationella ställningstaganden rörande en strategisk och ur miljösynpunkt känslig region.

För svensk del är avsikten att utarbeta en mer omfattande forskningsansökan efter fältkursens och seminariets slutförande med sikte på ett forskningsprojekt med en postdoc och en doktorand som utförare av denna forskning..

Kortfattad presentation av kontaktade forskare och deras intressen i projektet.

Vadim Starkov, Prof., Dr

Head of the Arctic Archaeology Department, Institute of Archaeology, Russian Academy of Sciences

Professor Starkov betraktas allmänt som den internationellt ledande experten på rysk fångstverksamhet på Svalbard – de s.k. Pomorerna. Starkov bedrivit fältforskning på Svalbard under de senaste årtiondena och har idag för avsikt att bredda sitt arkeologiska forskningsfält till att inkludera fler aspekter av den ryska historien på ögruppen – i detta fall den ryska kolbrytningen.

Louwrens Hacquebord, Prof. dr.

Arctic Centre, Groningen Institute of Archaeology, University of Groningen

Professor Hacquebord har under de senaste årtiondena bedrivit såväl fältkurser som arkeologiska utgrävningar på Svalbard. Hans specialområde är 1600-talets valfångstperiod på Svalbard och i den arktiska regionen. Hacquebords polarhistoriska forskning har även behandlat samspelet mellan holländsk polarforskning och gruvdrift på Svalbard.

Louwrens Hacquebord har ett särskilt intresse av att forska kring det holländska Barentsburg.

<http://www.let.rug.nl/arctic/>

Patrick E. Martin, Prof.

Director of Graduate Studies in Industrial Archaeology, Michigan Technological University

Professor Martin företräder den ledande institutionen för industriminnesforskning (industrial archaeology) i U.S.A.. Prof Martin har bland annat studerat resursutnyttjande och gruvdrift i amerikanska Arktis. Martins forskningsintressen på Svalbard består i The Arctic Coal Co's pionjärinsatser för industrialiseringen av ögruppen. Vid Michigan Technological University's arkiv finns huvuddelen av The Arctic Coal Co's unika arkiv bevarat.

<http://www.industrialarchaeology.net>

Gustav Rossnes, Förste konsulent,

Riksantikvaren, Oslo

Gustav Rossnes har det övergripande ansvaret för tekniska och industriella kulturminnen i Norge. Han har även en stor förtrogenhet med dokumentation av valfångstens anläggningar och gruvindustrins lämningar i Arktis. Dessutom är han engagerad i Riksantikvarens högskole- och universitetssatsning som skall leda till en bachelor i kulturminnesförvaltning och vara etablerad innan 2005.

Miles Oglethorpe, Dr

The Royal Commission on the Ancient and Historical Monuments of Scotland, (RCAHMS). Styrelseledamot av TICCIIH (The Industrial Committee for the Conservation of the Industrial Heritage) och där ansvarig för den sektion som har att lista de mest framstående gruvanläggningarna runt om i världen. (Ännu ej säker som deltagare)

Urban Wråkberg, fil.dr.

Forskningsledare för svenskt program för kulturvetenskaplig polarforskning vid KVA. Ansvarig för de hittillsvarande kulturvetenskapliga expeditionerna till Svalbard.

Marie Nisser, Prof.

Enheten för Industriminnesforskning, Avd.för Teknik- och Vetenskapshistoria, KTH. Undertecknad har deltagit i det kulturvetenskapliga programmet sedan 1997 och är huvudhandledare för Dag Avango.

Dag Avango

Doktorand, Enheten för Industriminnesforskning, Avdelningen för Teknik- och Vetens-

kapshistoria, Kungliga Tekniska Högskolan

Dag Avango är industriminnesforskare med bakgrund som arkeolog. Avango slutsriver för närvarande sin doktorsavhandling rörande svensk gruvdrift på Svalbard och dess samspel med geovetenskaplig polarforskning och utrikespolitik.

Ulf Gustavsson

Fil kand, Historia, Luleå Tekniska Universitet

Ulf Gustavsson önskar genomgå forskarutbildning inom ämnesområdet industriminnesforskning och har under 2002 bedrivit studier vid universitetet i Longyearbyen för fördjupa sina kunskaper om Svalbard. I det planerade seminariet och fältkursen i augusti 2004 är det önskvärt att Gustavsson får möjlighet att delta som kursdeltagare och inhämta empiri till den planerade forskningen.

Förberedande forskarmöte i Stockholm, mars 2004

Deltagare: de ovan nämnda personerna: Starkov, Hacquebord, Martin, Rossnes, ev. Oglethorpe, Wråkberg, Avango och Nisser.

Syfte: att detaljplanera seminarium och fältstudier och att diskutera presumptiva forskningsprojekt.

Seminariet och fältkursens uppläggning

Dag 1: Överlevnadskurs för seminarie- och fältkursdeltagare. Ett obligatoriskt moment för deltagare i fältkursen. Plats Longyearbyen.

Dag 2 och 3: Seminarium Historisk presentation, introduktion till teorier och fältarbetsmetoder. Plats: universitetet i Longyearbyen.

Dag 4 och 5: Fältstudier av lämningar efter gruvanläggningar i Longyearbyen och Advent City.

Dag 6 och 7: Fältstudier i Barentsburg.

Dag 8, 9 och 10: Fältstudier i Pyramiden och Bruce city.

Förväntade resultat

Fältarbetsrapport

Lic- och doktorsavhandlingar

Postdoc-projekt

Appendix B

Project Description

The archipelago of Svalbard is a group of islands formerly known as Spitsbergen, administered under the Norwegian flag since shortly after the end of the First World War. Exploited by hunters and whalers for several centuries, Svalbard attracted the attention of entrepreneurs interested in mineral exploitation around the turn of the last century. One notable pioneer in the development of coalmines on Svalbard was an American mining promoter named John M. Longyear. With his partner Frederic Ayer, Longyear explored the coal seams centered on the Icefjord area and established a company called Arctic Coal in order to establish commercial coal mines. Applying capital and engineering know-how, Longyear and his company developed a significant enterprise, with extensive underground workings, aerial ropeways to transport the product from mine to harbor, mechanized loading systems and docks, a steamship line for transportation and a settlement to house the workforce. Swedish, Norwegian, English and Russian companies adopted the Arctic Coal Company (ACC) model, installing similar arrangements of facilities and equipment in several locations. Arctic Coal was only modestly successful in business and economic terms, facing harsh environmental conditions, rocky labor relations, and a relatively hostile relationship with the Norwegian government. After 11 years of operation, ACC sold out to Store Norske, the Norwegian company that continues to mine coal on Svalbard to this day.

Current IA interest in the site relates to interesting adaptations ACC made to pursue coal mining in arctic conditions, including their use of aerial ropeways. The physical remains of the early facilities are well preserved and are significant elements of the modern landscape, especially in the vicinity of Longyearbyen, the principal town of Svalbard, named after JM Longyear. There is little public interpretation of these cultural heritage resources besides the excellent local museum. The remains present a great opportunity to teach modern visitors about the historical development of the place. In addition to the physical remains, there are significant documentary resources in archival repositories in the US and Scandinavia. Some ACC records were deposited in the Norwegian regional archives in Tromsø, while many other records reside at Michigan Technological University, formerly the Michigan School of Mines, where Longyear had close ties and two of the ACC Supervising Engineers studied.

The proposed project will dovetail with an ongoing activity generated by Professor Marie Nisser of the Department of the History of Science and Technology, Royal Institute of Technology, Stockholm, and Urban Wråkberg of the Royal Swedish Academy of Science. Nisser and her Ph.D. student Dag Avango have both visited Michigan Tech for research collaboration, and Patrick Martin, P.I. on this project, has made two short visits to Stockholm. For the past several years, these colleagues have pursued research focused on scientific and industrial activities on Svalbard. The KTH group has concentrated on coal mining sites, especially the Svea Mine, founded by Swedish interests, while Wråkberg

has focused on sites related to scientific work, such as the balloon launching sites and weather stations established during early scientific expeditions. Both Swedish scholars have recognized the value of collaborative work, and have successfully proposed a joint training mission for August of 2004. Funded from the Swedish Tercentenary Fund, this grant of approximately \$25,000 will support a Teacher's Planning Session in March, and will help to support up to 20 students and faculty to work in at least two Svalbard locations for 10 days in August. The idea is to bring together a collaborative group from Sweden, Norway, Great Britain, Holland, Russia, and the United States, the primary nations with historical interests in Svalbard. This group will combine efforts to begin documenting key industrial heritage sites, especially in the Icefjord area, to train students in the appropriate techniques of documentation, and to discuss theoretical approaches to the study and conservation of industrial heritage resources in the Arctic.

This international cooperation is essential for several reasons. First, each of the cooperating nations has access to unique resources, both historical and technical, to contribute to the overall goals. For instance, we only recently learned that the Michigan Tech Archives contains documents relevant to studies of Svalbard, and made those documents available to our Swedish colleagues through supported research and lecturing visits. Russian and Norwegian colleagues have access to logistical resources on Svalbard that are not generally available to international researchers, such as housing and transportation sources. Second, this collaboration will help to create a network of interaction to connect universities and government conservation bodies in novel ways to promote best practices for training and research on these otherwise neglected site types. Finally, the synergy developed by bringing a diverse group together on a common theme should generate new research questions and approaches that are not necessarily developed in isolation. We feel strongly that this collaboration will lead to a future, larger project.

We propose to use National Science Foundation Small Grants for Exploratory Research support to allow US students and faculty to fully participate in the planned 2004 research expedition. We will apply NSF funds to travel and subsistence costs for the team and support for appropriate equipment to contribute to the international training and research project. We intend to take two faculty and up to four graduate students from the Industrial Archaeology Program at Michigan Tech to Svalbard for 10 days in August. The Tercentenary Fund grant will cover travel expenses for one faculty member to Stockholm for the Teachers' Planning Session and accommodations on Svalbard for some portion of the expedition. We anticipate that the Royal Academy of Sciences will also contribute to logistical costs on Svalbard, especially vicinity travel and equipment such as protective weapons; the details remain to be settled.

The schedule for the ten-day program on Svalbard follows:

Days 1 and 2, personal safety training, introduction to Svalbard history, discussion of approaches to recording industrial heritage resources in Arctic environments.

Days 3 through 6, field visits throughout Longyear City and Advent City, recording selected features by means of measured drawings, photographs, and GPS maps

Days 7 through 10, field visits to Russian mining settlements at Barentsburg and/or Pyra-

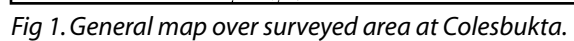
miden, recording selected features by means of drawings, photographs, and GPS maps.

Expected Outcomes

Following the field study phase of this project, the principal faculty participants will generate a report and will propose a series of follow-up activities, such as expanded historical and archaeological research projects. In particular, we will begin development of an extensive GIS database for the cultural resources in the Icefjord region. Integrating field data and historical data, we will build a system that will link historical photographs with map data to illustrate the industrial landscape and allow a viewer to appreciate the complex relationships between natural and cultural features. For instance, the Longyear Valley contains ruins of several mines, developed at different times, by different interests, with sometimes overlapping elements. There are the mine openings themselves, the aerial ropeways, the housing and office units, as well as cultural features such as cemeteries. Viewed in the present, there is no simple way to separate these landscape features or appreciate the developmental sequence of establishment and abandonment. Taking a GIS/landscape approach allows us to separate and re-aggregate these disparate elements for both analytical and interpretive purposes. This approach is increasingly used in Industrial Heritage studies, where networks of sites with complex histories and intimate connections with natural environmental features require the broad, integrative perspective offered by a landscape view. Exposing students to this approach is a key result of the proposed project, and will be the focus of proposals and publications to follow.

In addition to the technical experience and data collection that will result from this expedition, we anticipate other results that are perhaps less tangible, but no less significant. This international collaboration should serve to expand exchange of ideas, of students, and of research faculty among a group of otherwise unconnected scholars. We expect this to be only one of a set of interactions to occur among European and North American institutions and individuals that are actively developing the interdisciplinary field of Industrial Archaeology. Reciprocal visits have already begun between faculty and students of KTH and Michigan Tech; additional visits will certainly follow. As the singular institution offering focused graduate education in Industrial Archaeology in the US, Michigan Tech has proposed expanding our offerings to include a Ph.D. in Industrial Heritage and Archaeology. Building on our existing relationships with Scandinavian institutions will enhance the strength of the proposed degree program. One Ph.D. dissertation is nearly complete at KTH and we anticipate that at least two MS theses and at least one Ph.D. dissertation on Svalbard will be produced from Michigan Tech in coming years. The project complements work we have been doing with the National Park Service on mining sites such as Kennecott, the Bremner District, and Coal Creek in Alaska, building a base of experience and expertise in Arctic IA. Furthermore, we expect that this interaction will foster additional work focused directly upon Svalbard, a remarkable laboratory for the study of human activities in the Arctic in the past and in the present.

Stormbringer, Geir, A. *Rapport arkeologiske registreringer Isfjordens sørside sesongen 2000*. Sande: Sysselmannen Svalbard, 2001.



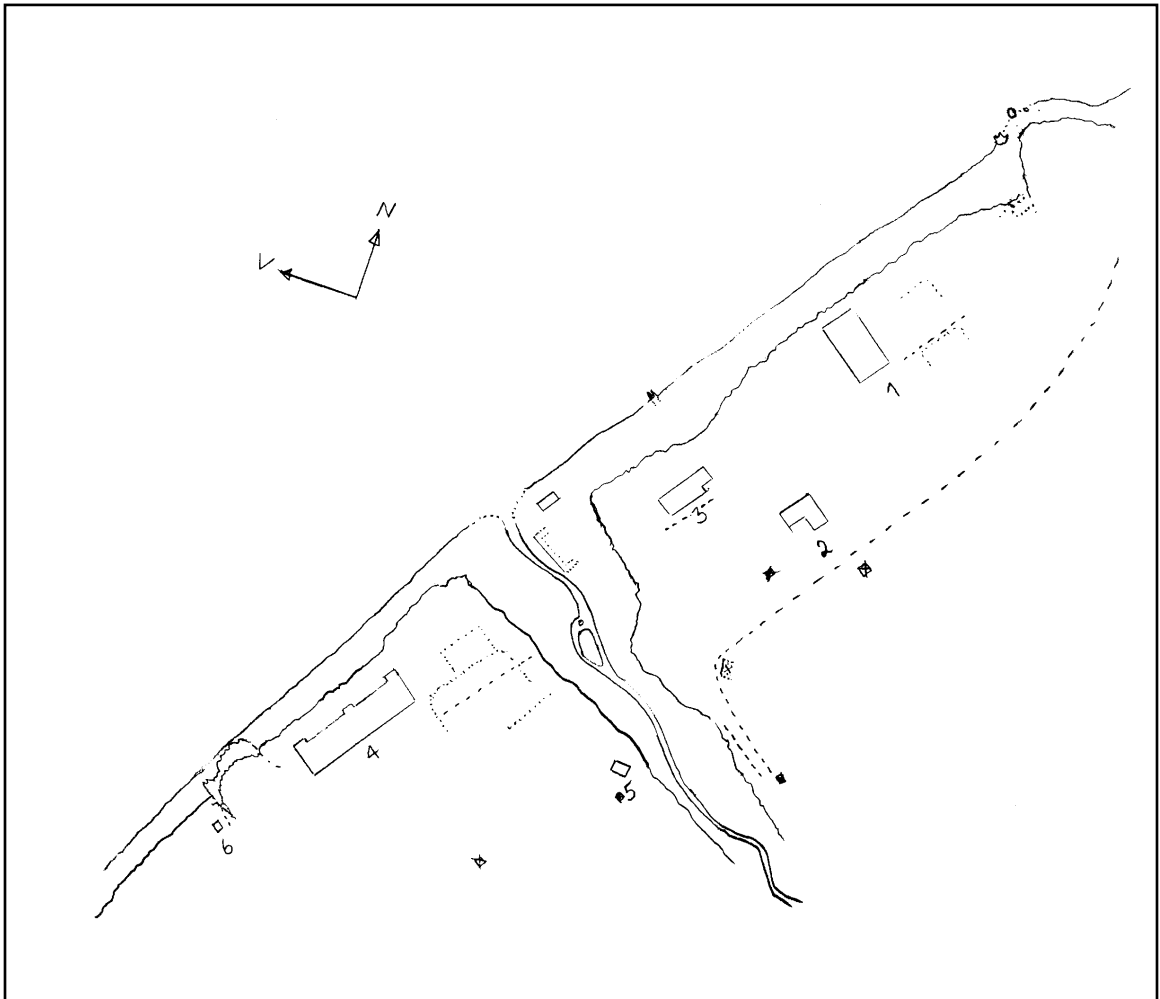


Fig 4. Remains of Grumant city. Connected via railway to the Colesbukta settlement.