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HUNTERS AND GATHERERS IN THE INDUSTRIALISED WORLD

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Khaled Hakami

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ABSTRACT *Der Artikel stellt eine materialistische Forschungsstrategie zur Untersuchung historischer Prozesse des Wandels von Jäger- und Sammlergesellschaften bei ihrer Integration in die Industriegesellschaft vor. Zwei Aspekte werden diskutiert: 1) ein theoretisches Modell soziokultureller Systeme für die Kategorisierung von Phänomenen und 2) ein theoretisches Prinzip für die Identifizierung von Kausalverhältnissen. Illustriert wird der Ansatz mit einer Fallstudie über die Transformationen einer Inupiaq-Gemeinschaft in Alaska. Dabei werden unterschiedliche Aspekte des soziokulturellen Lebens angeschnitten, wie Population, Subsistenz, Technologie, soziale Organisation, Ökonomie und Politik. Der Fokus liegt auf der sich wandelnden Rolle der Ökonomie des Jagens und der damit verwandten Institutionen.*

Alberto Buela
alberto.buela@mailbox.org

SARAH-JANE DRESSCHER
Food Security in the High Arctic While Balancing the Demands of Commercial and Subsistence Hunting¹

ABSTRACT *Russian hunters-fishermen-tradesmen went to Svalbard during the 18th and the first half of the 19th century to hunt for marine mammals and fur bearing animals and were away from home for over a year. They were under considerable stress because of the need to be economically successful and to survive in the High Arctic. What were their food security strategies? How did they balance the subsistence hunt with the commercial hunt? In this article, data from different disciplines are used to analyse the food security strategies and explicate how they managed to balance the subsistence hunt with the commercial one in the High Arctic.*

KEYWORDS *High Arctic, subsistence hunt, commercial hunt, food security, Pomors*

1. Introduction

It is not easy to survive in the High Arctic, but the Russian hunters (Pomors) succeeded in living and working in the remote area of Svalbard for periods of 18 to 24 months during the 18th and the beginning of the 19th century. In Russia, these hunters lived in sedentary settlements with markets and trade routes to Moscow, England and the Netherlands. By going to Svalbard they could not fall back on the safety that a town with food markets had to offer. During the hunting expeditions to Sval-

bard, they depended on the food supplies, building materials, firewood, clothing, transportation and so on that they could bring with them. For fresh food supplies they relied on the available food resources on Svalbard. Nevertheless, apart from surviving in the High Arctic, they also needed to make a profit.

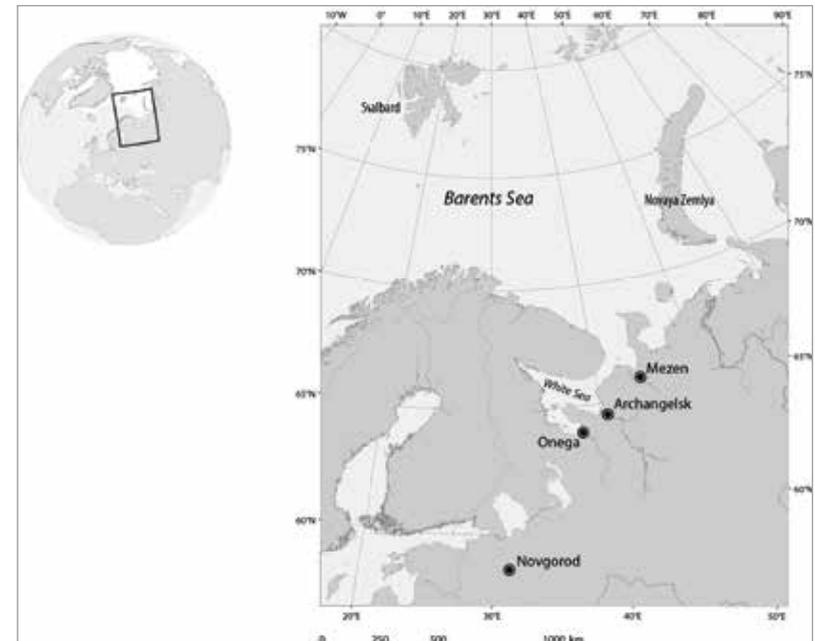
To secure their food supplies and minimise the risk of nutrition shortage in the High Arctic, and to be economically successful at the same time, they had to manage a delicate balance between subsistence needs and the commercial hunting schedule. They needed to survive the seasonal extremes and gain awareness of how to deal with these extremes. How can we reconstruct the hunting and food security strategies the Pomors employed to be successful? The Dutch whalers tried to winter on Svalbard in Smeerenburg during the winters of 1633 and 1634. The attempt in the winter of 1633 was a success, but during the winter of 1634 all the crew members died of cold and hunger. Dutch whalers even died from scurvy when they did not stay the entire winter. The skeleton remains of the Pomors found in Russekeila, Svalbard, did not show signs of scurvy (Christiansson et al. 1967). What, then, did the Pomors do differently? On the Russian sites, more reindeer bones were found than in the Dutch whaling stations, so they must have been hunting for their subsistence alongside the commercial hunt. It was quite unique to combine the commercial hunt with the subsistence hunt. Most of the furs that reached the European market from the 17th to 19th centuries, were hunted by indigenous hunter-gatherers in the circumpolar north. The French and English traded with Indian tribes in Canada and North America and the Russians demanded tribute from the Siberian hunter-gatherer tribes. The two hunting systems were joined by indigenous hunter-gatherers, but the commercial hunt accompanied the subsistence hunt. For the Pomors on Svalbard it was the other way around; they had a tradition of commercial hunting and trading and the subsistence hunt came alongside of the commercial hunt.

An interdisciplinary approach is used to get an understanding of how things played out on the ground. Historical, archaeological and ecological data is used to analyse the weak and strong points in the Pomors' food security strategies and to reconstruct how they balanced the commercial hunt with the subsistence hunt.

1.1 Pomors – historical background

The colonisation of the Russian North by the Novgorod Republic started in the 11th century. Novgorod was the main fur-trading centre in Europe and was trying to maintain this position and was thus in search of hunting areas. In the 13th century the Slavic peasants from Novgorod started to settle down permanently in small settlements between the Finno-Ugric tribes (Lajus 2011). From the beginning of the colonisation of this area, the indigenous peoples were subjected to paying tribute. To secure their fur supplies the Novgorod Republic developed a system that was based on three elements: the boyars, the city governments and the peasants settling in the subjugated areas. The boyars collected land rent in the form of furs and the government demanded furs as tax payment (Hansen 1996).

The people who migrated to the White Sea area soon became known as Pomors and the region was called Pomorie (*Поморье*). The name Pomorie



Graph 1: Map of the White Sea with the most important settlements of the Pomors in the 18th century

Source: Frits Steenhuisen, Groningen Institute of Archaeology (GIA)

comes from the Russian word 'more' (*море*) and 'pomorie' (*поморье*) means 'along the seashore'. Little Pomorie (*Немного Поморье*) was the Arkhangelsk region around the White Sea, along the Dvina River and the surrounding regions (figure 1). This area was as big as modern France. Big Pomorie is twice the size of little Pomorie. This also includes the more northern and eastern areas and the extremely remote areas such as Novaya Zemlya (Crease/Shiltsev 2013). Pomorie belonged to the Novgorod Republic until it was annexed by Muscovy in 1478.

The life in Pomorie was harsh: the summers were short and the winters were long. In January the mean temperature dropped to -12°C and the shortest day of the winter was less than four hours long. Most of the year the rivers were frozen and the passage between the White Sea and the Barents Sea was blocked by sea ice for most of the year. In the spring the passage opened up and was navigable. In the autumn it was dangerous to sail the White Sea because of severe storms (Crease/Shiltsev 2013).

Because of the long winters, the growing season was very short in Pomorie and this area was therefore not suitable for agriculture. Since it was not possible to support themselves with agriculture, the Pomors started to combine the hunt for economic profits with the subsistence hunt for food. Fishing and marine mammal hunting became the foundation of their economy. The Slavic peasants were therefore not interested in large plots of land and instead claimed small plots along rivers, lakes and seashores where they had access to the fishing and marine mammal hunting grounds (Lajus 2011). Cereals remained a substantial part of the Pomor diet. Through the commercial hunt they obtained trade goods that they could sell, and with the money they could buy products like grain, dried plums and metal items. In Pomorie several trade routes came together. The trade relations with neighbouring Norway started in the Middle Ages. In the 16th century foreign trade in this part of Russia was limited to the Varanger fjord. The Russian market near Vardø was known as the Varanger or Karlebotn market. Here, Russian, Norwegian, Finnish, Swedish and Saami merchants met to exchange, buy and sell their merchandise (Schrader 1988).

The trade with foreign merchants in Arkhangelsk started after Richard Chancellor accidentally became stranded there while he was looking for the northeast passage to China in 1553. Arkhangelsk became Russia's main east-

erly seaport until the establishment of St. Petersburg in 1703. Tradesmen from England and the Netherlands came to Arkhangelsk with products such as gold, silver, jewellery, pearls, dishes, chandlery, pharmaceutical goods, Spanish and French wines, spices, raisins, figs, lemons, tea, sugar, wool and silk fabrics, writing paper, ink, needles and pins. These goods were traded for blubber, fish and fur, and were transported to Moscow. Between Arkhangelsk and Moscow a trade convoy flowed along a single road and was about 1000 km long. In the Pomorie region there was a lack of crops, but an abundance of fish and salt. Other products from Pomorie included lumber (pine), tar, soot, turpentine, rosin and flax. The Pomors traded these products for crops with regions further south, through the trade route with Moscow. Products that were imported to Pomorie from Moscow were grains, flour, flax seeds, industrial raw materials (hemp, flax), wheat, leather, potash, tar, pig bristles and furs. One sleigh of frozen fish from Pomorie would yield enough money to buy cereals for one or two families for the entire year (Crease/Shiltsev 2013).

The Pomorie region was a very remote and sparsely populated area. Until the 18th century the people in Pomorie lived far away from the control of the central government (first Novgorod and from 1478 Moscow). The inhabitants of Pomorie were not subjugated to slavery, as was the case for many peasants in the rest of Russia, but they had to pay several kinds of taxes. The Russian tsars needed the tax money to pay for the wars they were fighting, and tax systems were changed on several occasions by the governments in order to obtain more tax revenue. The people needed to pay poll taxes and taxes on trade goods. The tax on trade goods was one tenth of the cath. The tax inning was done by a range of administrative bodies, with the tsar's court at their centre. In Pomorie, monasteries played a major role in the tax inning (Hellie 2009; Kraikovski 2015; Crease/Shiltsev 2013).

During the 18th century a lot changed for people living in Pomorie. In 1682, Peter the Great became tsar and many reforms were introduced during his reign, until his death in 1725. In this period Muscovy was involved in the Great Northern War (1700-1721), St. Petersburg was founded (1703) and the Pomors started their hunting expeditions to Svalbard. Peter the Great tried to reform Russia after the European model. Many of these reforms must have had impact on the families living in Pomorie. In January 1704, Peter the Great decided with a degree that all the fisheries would become

state property. The next step was making sure the government had control over the shipping infrastructure in the country, by introducing a new tax system in March 1704. There was no legal framework uniting the whole range of maritime and marine harvesting activities in the country. The state had up to then worked with an abundance of local laws and rules. These reforms eventually resulted in August 1704 in monopolist rights in marine harvesting for companies that were sponsored by the government (Kraikovski 2010; Kraikovski 2015).

Between 1708 and 1710 Arkhangelsk received its own governor, who was in charge of the 'Big' Pomorie. This meant a greater integration of Arkhangelsk into 'mainland' Russia, but it also meant more burdens and a military draft. To strengthen the army during the Great Northern War, Peter the Great began drafting more soldiers from each region, including from Pomorie. In 1715 Peter the Great issued another reform that had a big impact on the economy in Pomorie. He mandated that Pomors who set sail to sea for hunting had to switch to a new and larger kind of vessel called a *gukor* (in Dutch a *hoeker* and in English a *hooker*). They were given two years to complete the transition (Crease/Shiltsev 2013).

While all these political and economic changes were going on, the Pomors started organizing expeditions to Svalbard. Whether these changes were the reason to go so far away from home is still not clear. The motives for the Pomors to go to Svalbard were of economic nature and may also have been of political nature, but once they were out on the sea heading north they were at the mercy of the whims of the Arctic. As soon the sea and the rivers were ice-free in the spring, the hunters and fishermen left home with their vessels, sailing to the north. The Pomors had been exploring the White Sea, the Barents Sea and the Murmansk coast and sometimes went to Novaya Zemlya, the Kara Sea, the Arctic Ocean, in search for fish and sea mammals (Crease/Shiltsev 2013). In the 18th and first half of the 19th century they expanded their hunting territory, to Svalbard.

By the time the Pomors arrived on Svalbard, other European nations had been going there during the summer months to hunt for bowhead whales. From the early 17th century the Dutch, Danes, English and French established whaling stations on the shores of Svalbard to cook the blubber to oil. When the Pomors arrived on Svalbard, the whaling had decreased, and after 1770 the Dutch stopped whaling around Svalbard. The English

continued to do so, but at the beginning of the nineteenth century the bowhead whale was so scarce in the waters of Svalbard that the British also left. The whalers moved from Svalbard to the coasts of Greenland, especially to the Davis Strait. The whalers on Svalbard cooked the blubber on land and they erected summer settlements. There were attempts to winter on Svalbard, and the Dutch tried it in Smeerenburg, but without success (Arlov 1996). The whalers had no economic interest in the fur bearing animals that were living on Svalbard, so when the Pomors came they were the first to hunt for terrestrial animals on Svalbard for commercial benefits. Apart from the furs, the Russians also had an interest in walrus for its oil and ivory. As the passage to the White Sea was only open for a short period during the year, the Pomors wintered on Svalbard to have a longer and more profitable hunting season. During the summer they hunted walruses and in the winter they trapped polar foxes. The white winter pelt of the polar fox yielded more than the brown summer pelts. These expeditions lasted for over a year and only during the summer was there the possibility to return to their home towns in Pomorie or to get new food supplies. The rest of the year, these hunting parties had to manage on their own in this 'empty' tundra landscape, without indigenous people to teach them how to survive in the Arctic.

2. The expeditions to Svalbard

During the 18th and the first half of the 19th century, the Pomors expanded their hunting grounds with Grumant, as the Pomors called the Svalbard archipelago (74°–81° north latitude), to hunt marine mammals and polar foxes. These task groups were away from home for over a year (Jasinski 1991). Living and working in the High Arctic comes with a lot of risks. There are the obvious dangers such as cold, wild animals, fogs, drifting sea ice and invisible dangers such as the lack of nutrients. A well-known danger for European men working on Svalbard in these times was scurvy. As mentioned before, many Dutch whalers died from this disease. Research on Pomor skeletons that were found on Svalbard (Russekeila) show that these men did not die of scurvy. It is not known from what they did die of, but it was not from a lack of vitamin C (Christiansson et al. 1967).

The expeditions to Svalbard were organised from three different regions in Pomorie. The first was the region of Mezen. Here, families entered different economic niches needed for the organisation of the expeditions to Svalbard and passed these on to the next generation. There were family 'companies' that organised the expeditions to Svalbard, while others traded animal products such as blubber, tusks and fur, and a third group of families provided experienced hunters, skippers or students/beginners. In the second region, the Onega region, it was the Solovetsky monastery that organised the expeditions. The Solovetsky monastery owned parts of the settlements in the Onega region, and between 1730-1760 had at least one ship that was destined for Svalbard expeditions. After the secularisation in 1764, the monastery lost most of its lands and economic power, but it managed to keep organising the expeditions to Svalbard. The third region from where expeditions were organised was the vicinity of Arkhangelsk, including Kholmogory and the Kurostrovskaja Volost. The White Sea Company started organising expeditions from Arkhangelsk between 1803-1813 and they sent hunting parties to both Svalbard and Novaya Zemlya (Kraikovski et al. 2012; Kraikovski 2012).

The expeditions to Svalbard that departed from the Mezen region, northeast of the White Sea, were organised by different family households (Kraikovski 2012). In the 18th and 19th century a Russian household constituted the basic unit of economic and social organisation. The household was a unit of production and consumption as well as human reproduction. Until the 17th century households in Russia were usually small in size and simple in structure. In the second half of the 17th century the peasant households began to increase in size, the average number of peasants in a Siberian household being between six and eight members. The head of the household or patriarch was usually the eldest male, who had considerable authority over the other members. Women only headed the household in exceptional circumstances. The needs of a household took precedence over the needs of an individual. All the members of the household worked to produce and earn enough to support their households and pay the taxes. There were simple households that consisted of the nuclear family, i.e. a husband and wife and their young unmarried children. And there were complex households, with two or more married couples with their children and one or more other relatives. Most complex households

were paternal (parents and married sons) or fraternal (married brothers) (Moon 1999). Most hunters who went to Svalbard were relatively young or were widowed. The hunters that did have a family mostly had a small family that consisted of a wife and one or two children. Some of these hunters owned a house in the village, but others did not and lived with other members of the family. These hunters did not own a plot of land and did not participate in the peasant economy (Kraikovski et al. 2012).

The ships were an important part of the expedition and ship-owners usually organised the expeditions and delivered the equipment needed for the expeditions (Kraikovski et al. 2012). To build a ship, timber was needed. The forest was state property and therefore belonged to the tsar. Special permission was needed to chop down trees (Kraikovski 2012, 2015). The preparations for the expeditions started in the autumn with making the ships ready to sail, and recruiting the hunting team. A traditional hunting team of men was called an *artel* and consisted of 12 to 20 men. A skipper, *kormschik*, who had two deputies, *polukormschik*, led the *artel*. Furthermore, there were two harpooners, *nososhniki*, and two assistants, *zabocheshniki*, who were responsible for the hunt. The rest of the *artel* consisted of oarsmen, *veselschiki*, and sometimes pupils came along. The amount of hunting parties that were sent to Svalbard fluctuated significantly. For instance, in 1786 two ships from Onega and 11 ships from Arkhangelsk (of which 6 were also destined for Novaya Zemlya) were listed. Two years later, in 1788, only four ships from Arkhangelsk were registered in the custom books and no ships from the other regions. However, it is believed that between 1784 and 1791, on average five to six ships annually departed for Svalbard from Arkhangelsk (Kraikovski et al. 2012).

The Svalbard archipelago consists of several mountainous islands. The biggest island is Spitsbergen and the other big islands are Nordauslandet and Edgeøya. The eastern islands and the eastern side of Spitsbergen are covered with large ice caps all year round. Fjords are cut deep into the land. The mountains in the west and the north are rugged and steep, while the mountains on east Spitsbergen are more rounded or plateau-shaped. Coastal plains occur mostly along the west coast of Spitsbergen (Dallmann 2015). The ice conditions along the west and the east side of Svalbard are very different. The West Spitsbergen current (part of the Gulf Stream) runs along the west side of Spitsbergen. This current carries

warmer and more saline water than the cold High Arctic current that runs along the east side of Svalbard. These two currents have significant influence over the local climate and winter ice distribution. The southern waters along the west coast are navigable for most part of the year, while the east coast was ice-bound for most part of the year. The sea ice along the east coast is at its maximum in March and it usually starts retreating around May or June. The minimum of the sea ice is in August/September (Dallmann 2015). There is no sunset from the end of April until the end of August, and from the end of October until February there is no sunrise. The mean temperature in the summer is around +5°C and in the winters around -12°C.

The climate on Svalbard is very mutable. In the summer snowstorms and ice drifts can occur, and in the winter the temperatures can drop to -40°C. Because of the different currents that pass by Svalbard, the climate on the west coast is milder than the climate on the east coast. Most of the Pomors' sites are located along the milder west coast of Spitsbergen. At the time the Pomors were occupying Svalbard, the Little Ice Age (from ca. 1300-1850) was still going on. The climate was cooler than it is today, the glaciers were growing, and the edges of the pack ice were more southerly. During the summer the pack ice was usually near the north coast of Svalbard (Hacquebord 1984).

The Pomors applied two different building techniques on Svalbard; the log cabin style and a drop log wall construction. As building material they either used driftwood or brought pre-fabricated log houses along with them. They also brought red bricks to build ovens inside the houses to cook on and to keep themselves warm. The floors were usually made from planks from shipwrecks and underneath the floors they used birch bark and wooden chips as insulation. At some sites (Kokerineset, Brøgger, Slettneset, Van Muyenbukta) remains of insulation walls were found. These were walls made out of cut sods outside the houses, in Russian these are called *zavalinka* (Hultgreen 2000). During the winter they used blubber lamps for lighting. During the winter months when they were spending a lot of time inside, the Pomors made shoes and mittens (Starkov 2011). They also played games like chess and played music. In Worcesterpynten, the neck of a string instrument was found (Chochorowski/Jasinski 1993). To keep track of the time, the Pomors used calendars. The calendars were

simple in construction. They marked all the week days with vertical lines and the Sundays with an oblique cross (Starkov 2011). Religion played a very important part in the lives of the Pomors on Svalbard, and on several sites religious relics were found. The Pomors were Old Believers, an offshoot of the Russian Orthodox Church (Starkov 2007). For navigation the Pomors placed prominent crosses in the landscape. These crosses were also used in the Kola Peninsula, Novaya Zemlya and Vaygach Island (Starkov 2008). On Svalbard, foundations for these crosses are usually found in the vicinities of the bigger hunting stations.

3. Food security strategies and balancing two hunting systems

Once the Pomors departed the ports of the White Sea they could not fall back on market towns for their food security. What choices did they make? What strategies did they apply to be able to manage a commercial hunting system alongside a subsistence hunting system, in order to be commercially successful and to secure their food supplies at the same time? The main task for these men was the commercial hunt. In order to support their families, pay taxes and to ensure that there was enough money to maintain the ships and organise following hunting expeditions, they needed blubber, furs and walrus tusks. Hunting in the High Arctic, whether it is for the subsistence or the commercial hunt, needs to be planned and organised. The walrus are migrating animals and therefore not present all year round on Svalbard, at least not in huge numbers. The white fur of the polar fox is only available in the cold winter months, but during the winter they are harder to trap, because they are scavengers and follow the trail of polar bears. The darkness and the cold also do not make it easier to work outside. The seasonal differences caused different opportunities in mobility between summer and winter. During the summer it was easier to travel over sea than over the swampy tundra, and during the winter it was possible to use sledges and skies. All these differences between the seasons had a major impact on the possibilities for both the commercial hunt and the subsistence hunt. In order to analyse their strategies it is important to have information on how big the task group was, how long they were planning to be away, how much and what kind of food they

brought, how big the pressure of the commercial hunt was, and what kind of food supplies were available on Svalbard.

3.1 Food supplies from Russia

The Russian government kept a close eye on shipping activities, especially the long-distance trips. If a ship was not carrying commercial cargo, it still had to ask permission to depart. A system of administrative bodies was set up to control the tax inking. This body of control resulted in detailed custom books. Not only did they register the amount of trade goods that were brought back to collect taxes, they also noted how much food an expedition took on a journey to Svalbard. When they returned they needed to account for the amount of food they had used. The government tried to combat illegal cereal trade with Norway and kept custom books to record everything that left Russia and everything that was brought into Russia (Kraikovski 2012, 2015). Alexei Kraikovski (a Russian Historian affiliated

	poods (1 pood = 16,38 kg)	kg	kcal/100 g	kcal
rye flour	570	9336,6	274	25582284
barley flour	76	1244,88	298	3709742,4
barley groats	90	1474,2	298	4393116
oatmeal	50	819	367	3005730
millets	7	114,66	321	368058,6
peas	6	98,28	98	96314,4
dried cod	50	819	71	581490
smelt fish	15	245,7	71 ^a	174447
butter	21	343,98	746	2566090,8
vegetable oil	2	32,76	875 ^b	286650
	887	14529,06		40.763.923,20

Table 1: Amount of food that was taken on a hunting expedition with 19 men to Svalbard in 1787

Source: Arkhangelsk State Archives of Ancient Statements RGADA, Moscow. Coll. 126I. Inv. 6. F. 886. P. 94-95. The kcal values are obtained from <http://www.calorielijst.nl/> on 1.4.2015 (Voort 2015)

to the European University of St. Petersburg) did archival research on the custom books of the years 1785, 1787, 1789 and 1790 and found very useful information. He retrieved information on the amount of trade goods the Pomors brought back from Svalbard and on the amount of food the Pomors registered for bringing along on these long expeditions. For this research he provided a food list of an expedition that departed for Svalbard in 1787 with a crew of 19 men. This list consists of mostly cereal products like rye flour, barley, oatmeal, and millet. They also took dried fish, peas, butter and vegetable oil along (table 1).

When a grown man in a moderate climate does not do hard labour, his calorific intake is at least 2500 kcal per day. These men were doing hard labour in a cold climate, so their bodies were in need of more kcal than a modern western European office worker. As well as energy, the human body is in need of other essential nutrients like vitamins (B12, D, K, C, E, A, B6), minerals (magnesium, calcium, sodium chloride) protein, carbohydrates and water (Truswell 2002).

Based on the products and the amount listed in table 1, it was possible to roughly calculate the amount of energy (kcal) they had at their disposal on a daily basis. Expeditions lasted for 17-18 months and sometimes even two years (Jasinski 1991). If the expedition lasted 18 months the crewmembers could consume 3922 kcal per day and if it lasted two years, with the same amount of food they would have had 2939 kcal per person per day. They probably stored a certain amount of food just in case they got stuck in the ice and the expedition lasted longer than anticipated. There is also the possibility that they illegally sold some of their food supplies and also some of their Svalbard catches in Norway, before returning to Russia.

Looking at table 1 it is seen that cereals formed the biggest food group they took from Russia. Cereals lack vitamin C and vitamin B12. They are, however, an important source of protein, carbohydrates, minerals (such as calcium and iron) and most of the other B vitamins. The nutritional value of cereals varies per type and the way the cereals are processed is also of influence on the nutritional value. Cereals, together with the butter and vegetable oil, formed an important source of energy. Peas are high in carbohydrate and dietary fibre, low in fat and contain proteins, vitamins and minerals. They were also called 'poor men's meat' (Allman-Farinelli 2002).

Kraikovski et al. (2012) and Jasinski (1991) both mention in their articles that the Pomors also brought cloudberry (*Rubus chamaemorus*) to Svalbard. According to Jasinski (1991) they prepared sour milk in barrels and added cloudberry, this drink was called *starka*. They took it as an anti-scorbutic drink for the winter months. On the excavation of Kokerineset, plum stones were found. In the custom books there is no mention of fruits. It could be that they did not have to declare this food group to the customs, or that the expedition in the particular years that were being studied by Kraikovski did not bring any fruits to Svalbard.

According to the list of food that was obtained from the custom books, the diet the Pomors took to Svalbard was insufficient. It lacked salt and vitamins of a sufficient amount and needed to be supplemented for the men to return home healthy. Vitamin C, in particular, must have represented a problem. The human body cannot store vitamin C, and after four or five months of being deprived of vitamin C, scurvy occurs. A vitamin C deficiency is historically endemic to the northern and temperate climates at the end of winter. Vitamin C is abundant in fresh fruit and vegetables and in small amounts in uncooked meat and intestines (Ortner/Theobald 2000). So, if the Pomors indeed brought the cloudberry it is possible that they had knowledge of scurvy and knew how to prevent themselves from getting it. However, there is no information on the amount of *starka* they were bringing and whether this was enough to keep the entire crew from scurvy.

3.2 Food resources available on Svalbard

The composition of animal bone can tell a lot about the diet and site use of people in the past. Many Pomor sites on Svalbard have been excavated. Unfortunately, there was not much interest in the issue of animal bone in the past. In 2007 and 2008 a team of Russian and Dutch archaeologists, from the Institute of Archaeology of the Russian Academy of Sciences and the Arctic Centre of the University of Groningen, conducted excavations on a Pomor site called Kokerineset. The settlement was built on a terrace and consisted of the remains of two Pomor log houses surrounded by a drainage ditch. Behind the houses on the brim of the terrace they found nine graves and remnants of several crosses. Based on the stratigraphy, it is believed that one of the houses is of a slightly older age. This log

house was built directly on the tundra. The other log house is positioned higher in the landscape and there is evidence that underneath this log house gravel from the beach was used for elevation. This area can be very damp when the snow is melting in spring/summer. Unfortunately, there was no permission granted to excavate the entire site. Several trenches were set out in a crosswise pattern laid out over the remnants of the log houses, in order to get an impression of the site and the distribution of the find material. During these excavations all the animal bones were collected and registered and were later identified in terms of animal species. The results of these excavations are very important in getting an understanding of how the Pomors combined the subsistence and commercial hunts.

Based on the historical records, we assume that the main target of the hunts was the walrus. Products from this animal yielded the most on the markets. We also know that they hunted reindeer. Based on the amount of money one reindeer produced, it is likely that the main reason they were killed was for food supplies.

In total, 2,147 animal bones were collected in and around the Pomor houses of Kokerineset. In this article the focus will be on the main targets: reindeer, walrus and Arctic fox. At the site, bones of seals, birds and fish were also found. The bones of the small animals were too fragmented to identify by species and were not found in large quantities.

More than half of the animal bones were identified as reindeer bones (1,325 fragments, or 61.7 per cent). Bones from the entire skeleton were found; this indicates that they brought the entire animal to the site and processed it in the settlement. Since the walrus is such a big animal, it is argumentative that they brought back only the parts of this animal that were profitable, and therefore it is logical the amount of walrus bone in a Pomor settlement is low. As the site has not been completely excavated, the animal bone data are not quantitatively sufficient, and it is therefore not possible to make any statements on the amount of reindeer that were processed at the Kokerineset site. Most of the bones showed cut marks and many were cracked open, to extract the bone marrow. The bone marrow of a reindeer is high in fat and in protein (Yesner 2000). There were also indications on antler remains that they were used as hooks. This indicates that they used the entire animal. Based on the historical documents, it is

estimated that they killed an average of 55 reindeer per expedition. This is based on the amount of reindeer skins they brought back. It is conceivable that they also used reindeer skins for winter clothing during their expeditions and within the houses for extra warmth. Taking this in mind, they might have killed even more reindeer than the average of 55.

It is plausible that the presence of reindeer was a very important factor in the decision to settle down (Hultgreen 2000). Kokerineset is located in a tundra landscape that is suitable for reindeer and during the excavations several grazing reindeer were spotted around in the area.

There are seven reindeer subspecies in the Polar Regions; the Svalbard reindeer (*Rangifer tarandus platyrhynchus*) is one of them and is endemic to Spitsbergen. The Svalbard reindeer experiences almost no predation, but has to cope with an extreme and variable environment (Solberg et al. 2001). They are, unlike most other reindeer, sedentary and live in small groups of two or three animals. Because they are loyal to their area, they do not undertake long seasonal migrations and they are not nomadic during the season. Individual females have their own daily routine in small seasonal home ranges. Also, because they are sedentary and do not travel long distances, they have low energetic demands (Tyler/Øritsland 1989). The Svalbard reindeer prefer non-glaciated areas of the Archipelago. Inlands there are hardly any reindeer. They eat almost every type of vegetation, with a few exceptions. The hardest part of the year is just before the summer starts. In this period it can thaw, but also freeze again. This process of thawing and freezing again prevents the reindeer from reaching their food supplies; many reindeer die at this time of year from exhaustion (De Bie et al. 1977; Solberg et al. 2001). Since the Svalbard reindeer do not migrate, it is quite easy to find them, but because of this behaviour there is also a high risk of the entire population dying in a valley, especially in a year when there is also lot thawing and freezing at the end of winter.

Scurvygrass (*Cochlearia officinalis* or *C. groenlandica*) (high in vitamin C), fungi and eggs also have high nutritional value, but are not available the entire year. Archaeologically it is hard to find evidence for the consumption of fungi and scurvygrass. During the excavation of Kokerineset some eggshells were found. Eggs contain calcium, vitamin A and protein.

3.3 The pressure of the commercial hunt

The reason the Pomors went to Svalbard was the commercial hunt for marine mammals and fur bearing animals. The Svalbard shipping represented 1 per cent of all shipping in the Russian North (Kraikovski et al. 2012). The custom books show that the walrus was the most profitable animal for the Pomors, and this animal was their main target. The by-products of one walrus yielded 26-27 roubles on the market. The tusks, together with the skin, provided 10 per cent and the other 90 per cent was accounted for by the blubber. The bearded seal yielded 12 roubles (94 per cent for the blubber), the fur of an Arctic fox yielded 4.35 roubles, and reindeer skin yielded 1.5 roubles. To get an understanding of whether the income of a Svalbard hunter was sufficient, we can compare it with the income of Murmansk fishermen. There were relatively high-paid and low-paid fishermen. The Svalbard hunters could also be divided into high- and low-paid hunters. The high-paid fishermen got between 6 – 9 roubles per month and the high-paid hunter 3.4 – 6.1 roubles per month. The low paid fishermen received 2.6 – 5 roubles per month and the low-paid hunters received 2.26 – 5.5 roubles per month. The Svalbard hunters were not paid better than the Murmansk fishermen. Only the skippers could earn more money by going to Svalbard; they earned between 9.3 – 20.7 roubles, while a skipper on Kildin Island received 9.2 – 10.6 roubles per month. Considering the dangers of going to Svalbard, it is understandable that hunting on Svalbard was of interest to only a small segment of the population of the Russian North (Kraikovski 2012).

It was not traditional to eat the meat of sea mammals, but the by-products were very valuable. The skin of a walrus was made into rope and shoe soles, and the ivory tusks of walruses were valuable. Sealskins were used for leather, but the most important by-product was blubber oil. In the past, blubber was used for many purposes, such as in the paint industry, textile and leather processing, the soap industry, as a lubricant, and most of all as lamp oil. The blubber competed on the European with vegetable oil from line seed, rape, olive oil and groundnuts. It also competed with cod-liver oil, a major export product of Norway since the Middle Ages (Drivenes/Jølle 2006).

Based on the previously mentioned archival research which Kraikovski (2012) conducted, it was possible to estimate how many animals

the hunters needed to kill to make an expedition profitable in the years between 1785 and 1790. For these years he has recorded how much money (roubles) was delivered per product per year. First, it was calculated how much money an average expedition could yield, to get to some kind of an average. Once there was an average, it was possible to calculate back the total amount of animals per species they had to kill to raise the average amount of money needed to be profitable. In table 2 it is seen that 83,6 per cent of the income came from walrus and was followed by the Arctic fox, with 9,6 per cent. However, more interesting is the average amount of 272 animals that were hunted in one year by a crew of Pomor hunters. In the four months that the walrus was present in the archipelago of Svalbard they had to kill and process around 94 walruses.

	rouble	%	rouble per animal	Average amount of animals that had been killed
walrus	2920,55	83,6	27	94
arctic fox	336,06	9,6	4,35	77
polar bear	53,06	1,5	12,5	4
reindeer	82,18	2,4	1,5	55
seal	26,72	0,8	12	42
eider down	73,67	2,1		
	3492,24	100		272

Table 2: Number of animals killed per expedition, 1785-1790
 Source: Kraikovski 2012 (table 5). Based on the income of the different products and the amount that the different species yield, a calculation is made as to the average number of animals killed per expedition (Dresscher 2015: 129, Tab.1).

At Kokerineset, only 151 fragments of walrus bones were collected. They were all skull fragments that showed remnants of severe slashing. There is no evidence of the hunters bringing other walrus parts to the settlement. A walrus in the water is a very dangerous animal, in contrast to a walrus resting on haul-out on land or ice. The animals are big and heavy and because of their weight not mobile on the land. The hunters approached

the haul-outs in small boats, *karbasses*. By killing the animals nearest to the shoreline, they made it impossible for the other animals to flee into the sea. This way they could kill many animals in a short time (Stora 1987; Kraikovski 2012). After a mass slaughter had taken place, walruses did not come back to these places (Conway 1906). Old haul-outs on Svalbard can still be recognized by the enormous amount of walrus bone scattered all over the kill site. The animals were processed at the place where they were killed. The only archaeological evidence that is found of the walrus hunt in the settlement are some fragments of skulls and remnants of barrels that they probably used to ship the blubber in.

Walruses (*Odobenus rosmarus*) are bottom feeders and are primarily found in areas of relative shallow waters. They are seen in fjords lying on fjord ice and on sandy haul-outs. There are no known haul-outs deep within the major fjords of the west coast of Svalbard. Walruses are migrating animals, and the Svalbard population migrates between Svalbard and Franz Josef Land. The population of walruses is biggest in July and August and in the autumn the population shrinks. In November/December there are very few. In the period of January to March there have not been any observations of walruses on Svalbard (Gjertz/Wiig 1994; Blix 2005). Judging from the behaviour of the walruses, the summer was the best time to hunt them.

Only seven Arctic fox bones were found at the Kokerineset site. This is an interesting fact. From the historical documents we know they were bringing back the white winter skins of Arctic Foxes, with an average of 77 per expedition. Based on the lack of fox bones and the historical information that the white winter furs yield far more than the brown summer furs, this gives us a lot of information about the hunting and settlement strategies. The lack of bones from the polar fox in the settlement of Kokerineset has probably something to do with the different functions of dwellings Pomors used on Svalbard. On Svalbard two types of Pomor dwellings have been found, log houses built on terraces and small huts built on the beaches. Most of the huts that were built on the beaches have been lost due to wave activity. In the past, scholars believed that the differences in settlements could be explained chronologically. The first expeditions built their settlements on the beaches and in a later period, when they had more knowledge of the land, they erected settlements higher on the

terraces where they were protected from the influences of the sea (Starkov 1991; Chochorowski/Jasinki 1993). However, the difference between the locations of the settlements can also be explained by function. The bigger settlements, the main stations, were used the entire year round, but especially during the summer. The small hunting huts, the outposts, on the beaches were used during the winter for the fox trapping on the sea ice (Hultgreen 2000; Hultgreen 2005). Kokerineset consisted of two huts and was built on a terrace, and is considered a main station that was mainly used during the summer months. This explains why there are so few fox bones found in the settlement of Kokerineset.

The Arctic fox (*Alopex lagopus*) is an opportunistic predator as well as a scavenger. In most parts of the Arctic the Arctic foxes feed on lemmings, but on Svalbard there are no lemmings. During the winter, the carcasses of whales and seals left by polar bears are crucial for their survival. From February to March many reindeer die of hunger and then the reindeer carcasses are abundant for the foxes. In the spring and summer they feed on seabirds (Blix 2005). The pelt of a fox is most profitable between the autumn moult (September-October) and the spring moult (April-May). There is also the rare blue Arctic fox that stays blue-grey all year long (Blix 2005). The Arctic fox is territorial: in the summer they prefer valley slopes with rugged terrain (Eide et al. 2001) and in the winter they scavenge on the sea ice (Prestrud 1992).

4. How were the two hunting system executed alongside each other?

From the historical and archaeological data, we know which animals the Pomors hunted, and from the ecological data we know in which season the various animals were available. In the summer the Pomors were under great pressure to ensure the economic success of the expedition. To meet the economic targets, they needed to kill and process an average of 94 walruses and 42 seals during the summer. In the winter, when it was completely dark, they had to go on the sea ice to trap an average of 77 Arctic foxes and kill four polar bears. Next to this high economic pressure,

they needed to take care of themselves by making sure their diet was sufficient in nutrients. On Svalbard there are not many edible plants, but there is scurvygrass and fungi. In the historical documents and in the archaeological remains there is no evidence that the Pomors collected these food resources, but these resources provide a relative easy way to supplement a diet with vitamin C. Another source of vital nutrition came from fresh meat, intestines, animal blood, the contents of the reindeer stomach, and bone marrow (Yesner 2000).

Based on the cut marks and the extraction of the bone marrow, the reindeer was probably the most important target in the subsistence hunt. The Svalbard reindeer is not a migrating animal and remains in the same valleys for the entire year. This means that the reindeer was available for the entire year in limited areas, but at the end of the winter the reindeers themselves almost died of starvation, so not much meat would have come of them at this time of the year. If the Pomors stayed for many years in the same settlement, they ran the risk of eradicating the reindeer in the vicinity. Table 3 is a schematic representation of the seasonal activities of the Pomors during a hunting expedition on Svalbard. This schedule shows that the summer was the busy period. Apart from the fox trapping during

<i>season</i>	<i>activities</i>	<i>location</i>
summer	hunting walrus and seal, collecting scurvy grass and mushrooms, maintenance/ building of huts	coastline, sea, inland, tundra
autumn	hunting reindeer/seal storing food	inlands/coastline
winter	arctic fox trapping, polar bear hunt shoe, mittens and comb making	coastline
spring	seal, fish, reindeer maintenance ships	coastline, sea, and inland
summer	walrus hunt, reindeer hunt, preparing for the journey home	coastline, sea, inland, tundra

Table 3: A schematic overview of the activities the Pomors conducted during an expedition on Svalbard

Source: Own elaboration

the winter, the Pomors spend a lot of time inside. There is evidence that they performed crafts like shoe-making, and making mittens and combs to keep themselves busy.

5. Conclusion

From the beginning of the colonisation of Pomorie, the Slavic peasants that were settling down around the White Sea, also called the Pomors, were able to adapt themselves to a way of living in a remote northern area. They established a new economy that was based on hunting and fishing for commercial benefits. They learned to interpret the changes of the seasons and act on them. Grains remained a major part of their diet and they traded fish, blubber, furs and ivory for grains and metal items. The Pomors started their hunting expeditions to Svalbard when Russia was under the reign of Peter the Great (1682-1725) and continued these expeditions until the second half of the 19th century. These expeditions lasted for over a year. The Pomors needed to work and live in an even more remote area.

Historical, archaeological and ecological data is used to understand the food security strategies the Pomors applied and to reconstruct how they managed to balance the subsistence hunt with the commercial hunt. So what were the food security strategies in the High Arctic? From the archival research, combined with the archaeological research, it can be concluded that the Pomors did not depend on one single source of food. They brought dried food stocks (mainly cereals) from Russia and they hunted for reindeer for their own subsistence, possibly also fishing and gathering scurvygrass. Based on the absence of evidence for scurvy on the skeletons of Russekeila it can cautiously be concluded that the Pomors were aware of the dangers of vitamin C deficiency. Whether it was the fresh meat (including the intestines and the blood), scurvygrass or the cloudberrries that kept them from scurvy, or the combination, cannot be proven.

How did they balance the subsistence hunt with the commercial hunt? The answer to this question has to do with the way they handled food security and the way they anticipated on the ecology of animals and the seasonal changes. The summers were a challenge, and in this time of

the year the commercial hunt was under a lot of pressure. They needed to find and kill enough walrus to make the expedition economically successful. At the same time, the Pomors needed to build or repair the huts. Because of the food supplies they brought from Russia, they did not have to concentrate on the subsistence hunt, and only the scurvygrass and the fungi needed to be collected at this time of the year. In the autumn the walrus population on Svalbard decreased and the Pomors needed to prepare themselves for the winter. This was also the best time of the year to hunt for reindeers, as their fur is thick and they have a lot of body fat as a reserve for the winter.

Even though the Pomors could depend on the food supplies brought from Russia and had the ability to hunt reindeer for food supplies, they still had the challenge to survive the winter. They were confronted with the energetic calorific demands of the hunt, the uncertainty of finding enough reindeer, and the weakness of reindeer at the end of the winter. Other highly nutritional food resources such as scurvygrass, fungi and eggs were also not available in the winter.

It can be concluded that the Pomors had the knowledge and flexibility to turn to hunting and fishing for their own subsistence. The solid basis of food imported from Russia made sure the Pomors could spend most of their time on commercial hunting

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ABSTRACT *Russische Jäger-Fischer-Händler zogen während des 18. und in der ersten Hälfte des 19. Jahrhunderts zur Jagd von Meeressäuge- und Pelztieren nach Svalbard und blieben ihrer Heimat oft über ein Jahr fern. Sie standen unter hohem ökonomischen Erfolgsdruck und mussten unter den extremen Verhältnissen der Arktis überleben. Welche Strategien der Ernährungssicherung können wir am Beispiel dieser Händler erkennen? In welchem Verhältnis betrieben sie die Jagd einerseits zur Sicherung der Subsistenz und andererseits zum Verkauf? Im Artikel werden die Erkenntnisse aus unterschiedlichen Disziplinen zusammengeführt und vor dem Hintergrund der Frage analysiert, welche Rolle subsistenzorientierte und kommerzielle Jagd in der Arktis spielte.*

Sarah-Jane Dresscher
 Institute of Archaeology/Arctic Center, University of Groningen
 s.dresscher@rug.nl

MAYO BUENAFE-ZE, TESSA MINTER, WILMA G. TELAN
Against Mining and the Need for Mining: Conundrums of the Agta from the Northeastern Philippines

ABSTRACT *Extractive industries promise to bring prosperity to indigenous communities in order to obtain their consent to operate. While many of these promises are left unfulfilled, mining operations adversely impact these communities' natural and social environments. We document how the Philippine Agta resist mining, but also attempt to reclaim the benefits they were promised by the mining company. By elaborating the complexities of implementing compensation mechanisms, we also bring to light their problematic underlying logic. Drawing on the concept of equivalence (Li 2011), this leads us to question the validity of the assumption that long-term environmental and social impacts can be compensated for by short-term material benefits.*

KEYWORDS *Mining compensation, hunter-gatherers, indigenous peoples' rights, Agta, Philippines*

1. 'Daga ket biag' (land is life)

This phrase was famously declared by Macli'ing Dulag, a *papangat* (village elder or peacemaker) of the Butbut village from Kalinga province in Northern Luzon, Philippines, who helped lead the Bontok and Kalinga peoples to oppose the building of a dam along the Chico River on their ancestral lands in 1975 (Salvador-Amores 2011). He expounded on the adamant belief of most indigenous peoples – that one cannot own something that would outlive you (i.e. land), and that one must defend the land as one would defend one's own life (Morales 2012). Indigenous peoples' relationship to land is inextricably linked to their livelihood, customs, and