# Luitenant ter zee L. A. H. Lamie's account of the ice-drift and sinking of the *Varna* of the Dutch expedition of the First International Polar Year 1882–83 in the Kara Sea

## William Barr

Translated from: 'Rapport sur le voyage, l'hivernage et le retour de l'expédition'. In: M. Snellen and H. Ekama, *Rapport sur l'Expédition Polaire Néerlandaise qui a hiverné dans la Mer de Kara en 1882/83*, Utrecht: J. Van Boekhaven, 1810, pp. 26–55.

### **Translator's introduction**

The history of exploration of the Arctic is replete with accounts of expedition vessels which became unintentionally beset in the ice and drifted with the ice, in some cases for years, in some cases to be crushed, and in others to emerge relatively unscathed. The fate of their crews similarly varied enormously. One thinks of the ice-drift of De Long's USS *Jeannette* from near Ostrov Vrangelya (Wrangel Island) to north of the Novosibirskiye Ostrova (New Siberian Islands) in 1879–81<sup>1</sup>; the drift of Georgiy L'vovich Brusilov's *Svyataya Anna* from just west of Poluostrov Yamal (Yamal Peninsula) in the Kara Sea to an unknown fate somewhere northwest of Zemlya Frantsa-Iosifa (Franz Josef Land) in 1912–15<sup>2</sup>; the drift of Friedrich Hegemann's *Hansa* south along the southeast coast of Greenland in 1869–70<sup>3</sup>; the 812-day trans-polar drift of K. S. Badigin's *Georgiy Sedov* from the eastern Laptev Sea to the Greenland Sea in 1937–40<sup>4</sup>; the drift of Leopold McClintock's *Fox* south from Melville Bay for the full length of Baffin Bay to Davis Strait in 1857–8<sup>5</sup>; or the drift of De Haven's *Advance* and Griffin's *Rescue* north up Wellington Channel, then back south again, east out of Lancaster Sound and south through Baffin Bay over the winter of 1850–51.<sup>6</sup>

While the outcomes of the ice-drifts of these various ships varied enormously, from emerging relatively unscathed to being crushed with subsequent loss of life, what they all have in common is that one or more detailed accounts of their experiences have become widely distributed in one of Europe's major languages. But there is one further arctic ice-drift which has largely escaped the notice of arctic historians, namely that of the *Varna*, the expedition vessel of the Dutch expedition of the First International Polar Year, in the company of Andreas Peter Hovgaard's *Dijmphna* in the Kara Sea in the winter of 1882–83. The details of that drift and of the ultimate fates of their crews, in terms of drama, human endurance and resilience easily match those of the above-cited examples of arctic ice-drifts. Lamie's account does full justice to them.

<sup>&</sup>lt;sup>1</sup> De Long, *The voyage*; Guttridge, *Icebound*; Sides, In *the kingdom*.

<sup>&</sup>lt;sup>2</sup> Albanov, In the land; Al'banov, South, 2016.

<sup>&</sup>lt;sup>3</sup> Koldewey, K., *The German*; Hegemann, 'Journal'.

<sup>&</sup>lt;sup>4</sup> Badigin, Na korable; Buynitskiy, 812 dney.

<sup>4</sup> 

<sup>&</sup>lt;sup>5</sup> McClintock, *The voyage*.

<sup>&</sup>lt;sup>6</sup> Kane, The U.S. Grinnell; Carter, Searching.



Fig. 1. Professor Dr C. H. D. Buys Ballot, one of the original promoters of the First International Polar Year (Snellen, 1886).

Of the two individuals primarily responsible for the conception of the First International Polar Year of 1882–83, with its circumpolar ring of weather stations carrying out standardized, synchronized observations, one of them was Dutch. He was Professor Dr C. H. D. Buys Ballot, director of the Royal Dutch Meteorological Institute (Fig. 1). At the International Meteorological Congress in Leipzig in 1872 he proposed a scheme for filling in the gaps in the global network of meteorological stations in order to achieve a more complete picture of global weather patterns. Some of these stations, he argued, should be in the polar regions.<sup>7</sup> The other moving force behind the First International Polar Year was Leutnant Carl Weyprecht of the Austro-Hungarian Navy.<sup>8</sup> Co-leader of the Austro-Hungarian North Pole expedition of 1872–4 Weyprecht had wintered in the ice of the Barents Sea on board the ship *Tegetthoff* off the southeast coast of Zemlya Frantsa-Isofa.<sup>9</sup> Then, largely through his strength of character he had held the ship's crew together during the slow, arduous retreat south by

<sup>&</sup>lt;sup>7</sup> Snellen and Ekama, *Rapport*, p. 1.

<sup>&</sup>lt;sup>8</sup> Berger, Besser and Krause, Karl Weyprecht; Mazzoli, Carl Weyprecht.

<sup>&</sup>lt;sup>9</sup> Payer, New lands.

sledge and boat during the summer of 1874.<sup>10</sup> On the basis of these experiences, and being fully conversant with the history of previous polar exploration Weyprecht concluded that the time had come for a drastic change in the focus of polar expeditions. While there were still major gaps in the map of the Arctic, in Weyprecht's view the time for independent, uncoordinated expeditions aimed solely at geographical exploration and producing, at best, only limited scientific results, had passed. He was particularly unimpressed by the fact that polar expeditions were commonly seen as a sort of international steeple-chase, aimed primarily at reaching a higher latitude by a few kilometers and thereby conferring a dubious honour on the nation involved.<sup>11</sup> In Weyprecht's opinion 'Decisive scientific results can only be attained through a series of synchronous expeditions whose task it would be to distribute themselves over the arctic region and to obtain one year's series of observations according to the same method.'<sup>12</sup> He envisaged an international coordinating body to ensure optimal distribution of the stations and standardization of measurements. He proposed that the major effort should be directed towards meteorology, terrestrial magnetism and auroral studies since these were the areas where the greatest gaps existed.

Weyprecht was particularly fortunate in gaining the support of Graf Hans von Wilczek, who had earlier sponsored the *Tegetthof* expedition and who now provided his all-important influence as well as financial backing for implementation of Weyprecht's ambitious ideas. Weyprecht first presented these ideas in public at a meeting of the Austro-Hungarian Academy of Sciences in Vienna in 1875 and thereafter at the annual meeting of the Association of German Naturalists and Physicians in Graz in the fall of the same year.<sup>13</sup> Encouraged by the reactions of these bodies Weyprecht and Wilczek composed an even more detailed proposal which they presented to the International Meteorological Congress which met in Rome in 1879, and which gave Weyprecht's ideas its full support. Most importantly it created an International Meteorological Commission with a mandate to convene an International Polar Conference which was held in Hamburg in October 1879 and was chaired by Dr Georg von Neumayer, head of the German Naval Observatory. It was attended by representatives from Austria, Denmark, France, Germany, the Netherlands, Italy, Russia and Sweden.

Following this meeting Buy Ballot focused on convincing the Dutch government that the Netherlands should participate in the proposed program. He persuaded the Dutch Royal Academy of Sciences to strike a committee of four (he being one of the members) to investigate the possibility of achieving this. With the support of this committee on 3 July 1880 Buys Ballot submitted a proposal to the States General, but this initial attempt was unsuccessful, as were several more thereafter. But on 4 July 1881 the Minister of Water, Commerce and Industry agreed to recommend to the States General that they fund a proposed Dutch expedition to the tune of 30,000 guilders. This recommendation was approved on 23 December 1881 and meanwhile Buys Ballot concentrated on raising the remainder of the funds required in the private sector.

The response was very positive and widespread. Royal contributions were forthcoming from Prince Alexander, Prince and Princess Frederick, Princess Marianne, Prince Hendrik and the Duchess of Sachsen-Weimar. Several scholarly societies also contributed; they included the Royal Geographical Society, the Dutch Society for the sciences at Harlem, the Batavian Society for Experimental Philosophy in Rotterdam, the Utrecht Provincial Society for the Arts

<sup>&</sup>lt;sup>10</sup> Barr, 'The retreat'.

<sup>&</sup>lt;sup>11</sup> Baker, 'The First International Polar Year', p. 276.

<sup>&</sup>lt;sup>12</sup> Weyprecht, 'Scientific work', p. 20.

<sup>&</sup>lt;sup>13</sup> Baker, 'The First International Polar Year', p. 277.

and Sciences and the Taylor Society of Harlem. Fund-raising committees were set up in several cities, and soon significant contributions were flowing in.<sup>14</sup> The site selected for the Dutch station was Port Dickson<sup>15</sup> at the mouth of the Yenisey River. In part this was on the basis of the recommendation of the Swedish explorer A. E. Nordenskiöld, who following his visit on board *Pröven* in 1875<sup>16</sup> had found it to be a particularly well-sheltered anchorage, indeed "the best known haven on the whole north coast of Asia'.<sup>17</sup> Moreover it was well located in the circumpolar ring of stations which were ultimately occupied, between the two Russian stations – one on the west coast of Novaya Zemlya to the west and one on Ostrov Sagastyr' (Sagastyr' Island) in the Lena delta to the east.



Fig, 2. The Dutch expedition scientists (Snellen, 1886).

<sup>17</sup> Nordenskiöld, *The voyage*, p. 190.

<sup>&</sup>lt;sup>14</sup> Snellen and Ekama, *Rapport*, p. 2.

<sup>&</sup>lt;sup>15</sup> Now Dikson.

<sup>&</sup>lt;sup>16</sup> Kish, North-east passage, p. 124.

As finally assembled the expedition consisted of five scientists (Fig. 2) and a support staff of five. Leader was Dr Maurits Snellen who was responsible for magnetic and meteorological observations. Luitenant L. A. H. Lamie was seconded from the Navy as of 6 December 1881; he was in charge of astronomical and oceanographic studies and was in charge of equipment and also supervised the support staff. Dr H. Ekama, a physicist and astronomer from Leiden was in charge of studies of optical phenomena (aurora, parhelia, halos etc.). Dr J. Mar Ruys was appointed expedition biologist on 27 May 1882. And finally Dr H. J. Kremer was appointed medical officer on 24 June 1882.

Selection of the support staff was equally important. They included Svend Petersen as carpenter and blacksmith, and A. A. van Dolder as doctor's assistant and engineer for a steam launch which was being taken. The other three men were recruited from the Dutch Navy: J. de Brins as cook, baker, purser and steward; C. M. Beutler in charge of weapons and ammunition; and J. W. Stapper as stoker for the steam launch but also in charge of lamps and stoves and the duties of shoemaker. The timing and details of the programme of the First International Polar Year were formulated at a meeting of the International Polar Commission in St Petersburg on 1 August 1881.<sup>18</sup> It was agreed that the synchronous program of observations would run from the autumn of 1882 until the autumn of 1883. The main foci would be on meteorology, earth magnetism and auroral studies. All stations would operate on a standard time, namely that of Göttingen in Germany.

Ultimately 13 major stations were occupied, 12 being arranged in a fairly regularly spaced circumpolar ring in the northern hemisphere and two in the southern hemisphere. Those in the northern hemisphere were as follows: an American station at Point Barrow, Alaska; a British/Canadian station at Fort Rae, Northwest Territories; a German station at Kingua Fiord, Baffin Island; a second American station at Lady Franklin Bay, Ellesmere Island; a Danish station at Godthåb, Greenland; an Austrian station on Jan Mayen; a Swedish station at Kapp Thordsen, Spitsbergen; a Norwegian station at Bossekop, north Norway; a Finnish station at Sodankylä, Finland; a Russian station at Malyye Karmakuly, Novaya Zemlya; and a second Russian station on Ostrov Sagastyr' in the Lena delta. As mentioned above the Dutch had planned to operate a station at Dikson at the mouth of the Yenisey, but, as Lamie's article reveals in detail, due to circumstances the Dutch scientists never reached that location. In the southern hemisphere the French occupied a station at Bahia Orange, Isla Hoste, near Cabo de Hornos (Cape Horn), and the Germans a station at Royal Bay, South Georgia. Details of the establishment and operation of all these stations may be found in the study by Barr.<sup>19</sup>

### Acknowledgements

I am enormously grateful to a number of people who provided me with oral translations of materials in languages in which I have no competence. In particular I wish to thank the late Dr Walter Kupsch of Saskatoon for translating the Dutch material for me. I owe a similar debt of thanks to Mrs Bente Torjusen-West of Norwich, Vermont, and the late Mr Ole Hoeg-Hagen of Hanover, New Hampshire for providing a translation of Hovgaard's account of the voyage of the *Dijmphna*. I also wish to thank Mr Robin Poitras of the Department of Geography, University of Calgary for the excellent map.

<sup>&</sup>lt;sup>18</sup> Snellen, *Die Nederlandsche Pool-expeditie*, p. 8.

<sup>&</sup>lt;sup>19</sup> Barr, *The expeditions*.



Map of Varna's progress under power, the ice-drift, and the crew's sledge/and/boat retreat to land. (For the sake of clarity the ships' convoluted route before entering the Kara Sea has been omitted.

# REPORT ON THE VOYAGE, THE WINTERING AND THE EXPEDITION'S RETURN

by

### Luitenant L. A. H. Lamie<sup>20</sup>

As soon as Port Dickson had been assigned as the observation station of the Dutch Polar Expedition we investigated the best means for transporting the personnel and the materiel there.

The materials for the house, the observatories and the corridor would alone occupy a volume of more than 125 m<sup>3</sup>. Furthermore we would have to take 70 tons of coal for heating the house, provisions for two years, a range of instruments, furniture and everything necessary for a sojourn in the polar regions.

Overland transport to Yeniseysk then from there down the Yenisey to Port Dickson, would have been too difficult and too expensive and therefore we were looking for a vessel for transporting our expedition. Since 1875 more than one vessel had reached the mouths of the Ob' and the Yenisey, which gave us grounds for supposing that we had every chance of arriving there by way of a steamship.

Our initial attempts at chartering a vessel, both in this country and abroad, were unsuccessful; thanks to the kind cooperation of Baron Knoop and Mr. G. Albrecht, a member of the company Langesohns Witwe of Bremen, our luck changed. Right from the start they had expressed the keenest interest in our enterprise and showed themselves to be ready to assist us as much as they could. Baron Knoop, the owner of the steamship *Louise*, which sailed under the Russian flag and which had already made two successful voyages to the Yenisey, offered to transport free of charge all the members of our expedition with their instruments to Port Dickson.

*Louise* was already scheduled to make a voyage to the Yenisey that year but its entire capacity was taken up by cargo destined for Siberia so that we would have to have another vessel for transporting our materials. Lange Sohns Witwe & Cie offered us its excellent services and we succeeded in chartering the Norwegian wooden steamship *Varna*, built specifically for work in ice and classified Veritas first-class.<sup>21</sup> This vessel belonged to shipowner C. E. Smith of Christiania. Since *Varna* could provide the space for accommodating the personnel, and since it was desirable not to separate them from the expedition's materials it was decided that the entire Dutch expedition, and all its belongings would be embarked aboard this vessel. The only exception was the steam launch, which was housed on *Louise*'s deck and was taken aboard that vessel at Bremerhaven. It was then agreed that *Louise* and *Varna* would rendezvous at Hammerfest and would proceed in company from there to the Yenisey. This would allow us to take advantage of the experience of Captain Burmeister of the *Louise*, gained during his two successful voyages in the Kara Sea.

Here we will provide a list of the main details of the Varna and its dimensions:

<sup>&</sup>lt;sup>20</sup> Lamie, 'Rapport', pp. 26–55. None of the authors of the essays which make up Snellen and Ekama's account of the expedition (Snellen and Ekama, *Rapport*) is named, but one may deduce that Lamie is the author of this comprehensive account of the expedition by a process of eliminating those members of the expedition who are named by him.

<sup>&</sup>lt;sup>21</sup> At a cost of £2000 (Snellen and Ekama, *Rapport*, p. 2).

Gross tonnage	339.97 registered tons
Nett tonnage	249. 21 registered tons
Engine (screw), Woolf system	50 effective hp
Length between perpendiculars	131.7 feet
Beam	25 feet
Depth of hold	15.3 feet
Thickness of inner hull	6-8 inches
Thickness of outer hull	7-8 inches
Spacing of frames	12-14 inches
Thickness of keel	18 inches
Thickness of keelson	24 inches

The keel, the stem, most of the frames and the major components of the skeleton were of oak and the remainder of the timber was of pine. The hull, fore and aft, was full and the hull was armoured with iron plates along the waterline.

It appeared to us to be a very strongly built vessel, and was exactly large enough to handle the amount of coal required for the voyage out and back, in addition to the expedition's materials. This amount of coal, 154 tons, was loaded on 30 June 1882 as soon as *Varna* reached Amsterdam, under the command of Captain A. Knudsen. The 70 tons of coal for heating the house were then loaded. This coal was in bags, to facilitate unloading at our destination. The provisions and the expedition's baggage were then loaded aboard; the instruments were embarked last so that they could be unloaded first and so that we could keep a close watch on them

The expedition personnel went aboard on the morning of 5 July,<sup>22</sup> and we left Amsterdam.<sup>23</sup> Favoured by southerly winds we made rapid progress towards Norway so that we had that coast in sight on the 7<sup>th</sup> and entered the fjords that evening, within sight of the Hveddingsø lighthouse. Next day we reached Bergen where we stopped for a few hours, and then, having taken aboard a new pilot we continued our voyage to Trondheim. By 10 July we had reached Trondheim's roadstead and took advantage of the next high tide to enter that port, where *Varna* moored in the immediate vicinity of the house which had been built for the expedition.

Since the workshops of J. F. Kunig, who had built the house, were located close by, loading this large quantity of timber was completed very quickly. The frame and major components of the house had already been assembled, but were soon disassembled and loaded aboard. The majority of these pieces of timber were stowed in the hold, the remainder were placed on deck solidly secured with chains.<sup>24</sup>

We put to sea from Trondheim on 18 July and continued our voyage through the fjords to Hammerfest which we reached early on the morning of the 22<sup>nd</sup>.<sup>25</sup> There we took delivery of

<sup>&</sup>lt;sup>22</sup> Having made their way with difficulty through the crowds which thronged the quayside. As far as the outport of Ijmuiden *Varna* was preceded by the motor launch *Mercurius* on board which a band was playing. After farewell speeches at Ijmuiden *Varna* finally put to sea at 2.30 p.m. (Snellen, *De nederlandsche Pool-Expeditie*, p. 52).

speeches at Ijmuiden *Varna* finally put to sea at 2.30 p.m. (Snellen, *De nederlandsche Pool-Expeditie*, p. 52). <sup>23</sup> In the open sea the ship started rolling quite vigorously to the discomfiture of many of the expedition members who had little seagoing experience (Snellen, *De nederlandsche Pool-Expeditie*, p. 53).

<sup>&</sup>lt;sup>24</sup> Some last-minute purchases such as kitchen utensils, fishing gear and skis were also made at Trondheim. Officers and scientists spent several evenings on social visits and especially enjoyed the hospitality of the Dutch consul, Lysholm and his wife; they also visited various nearby scenic spots including Larfoss Falls (ibid, p. 54) <sup>25</sup> Having crossed the Arctic Circle on the 19<sup>th</sup> (ibid, p. 55).

reindeer-skin clothing and sleeping-bags as well as 45 ton of coal to complete our supplies.<sup>26</sup> We also bought several necessary items, including a Russian boat.<sup>27</sup>

*Louise* arrived in the meantime<sup>28</sup> and having coaled, both vessels left Hammerfest on the afternoon of 28 July and having rounded Nordkyn<sup>29</sup> during the night, we headed east. On the following day we had news about ice conditions, having hailed the Norwegian yacht *Marie Sicilia*. We learned from her captain, who had taken a week to return from Novaya Zemlya, that the ice extended as far south as Kostin Shar.<sup>30</sup> We therefore headed a little further south, intending to close with the ice at around the 70<sup>th</sup> parallel.

On the evening of 31 July a drop in the surface water temperature alerted us that the ice could not be far away; in fact we encountered it at 1 a.m. at 70°N and 52°E.<sup>31</sup> This was one-year ice which the west winds, which had been prevailing, had combined into a compact mass. To the north of our vessel, as far as we could see the ice edge extended to the north-northwest; to the south that limit ran to SW<sup>1</sup>/<sub>4</sub>S; we thus appeared to be in a bay. The westerly winds had prevailed until the previous day; then the wind had swung into the south and was still blowing from that direction; the ice might thus have been pushed away from the Russian coast by the wind and we might perhaps attain Yugorskiy Shar<sup>32</sup> in that direction.

In order to confirm this we followed the ice edge south; a few hours later we met the Norwegian yacht *Lydiana* which was coming from that direction and had found an impenetrable mass of ice extending right to the Russian coast.

We then decided to follow the ice edge north and by noon on 1 August we had reached 70°34'N; 52°39'E. By 12.15 we found the ice more scattered; we ran into it, heading east-southeast and soon reached a large area completely free of ice.

We spotted Mys Chernyy (Cape Chernyy) on the coast of Novaya Zemlya to the northeast, by our estimation 14 miles away. We were already deluding ourselves that we would reach Karskiye Vorota<sup>33</sup> by this route, when we soon sighted ice ahead of us again, as well as another Norwegian yacht, towards which we immediately headed.

The captain of this vessel, the *Gode Hensigt* had found the passage towards Karskiye Vorota blocked by a mass of impenetrable ice abeam of the islands off Bukhta Sachanicha so that, for the moment there was nothing more to be done in that direction, and having discussed the matter together next morning, we decided to proceed north to Matochkin Shar<sup>34</sup> and to see if we could reach the Kara Sea by that route.

We steered northwest along the ice which separated us from the coast of Novaya Zemlya, until we found that coast completely free of ice, from the northern tip of Ostrov Mezhdusharskiy (Mezhdusharskiy Island) onwards. Further north there was no ice in sight so that we could continue our progress towards Matochkin Shar without hindrance, and we

<sup>29</sup> A peninsula just east of Nordkapp, in northern Norway.

<sup>&</sup>lt;sup>26</sup> Here officers and scientists again enjoyed the hospitality of the Dutch consul, in this case Mr. Robertson, and made excursions to nearby scenic spots (ibid, p. 56).

<sup>&</sup>lt;sup>27</sup> From here *Varna* was to be escorted by the steamer *Louise* under the command of Captain Burmeister, but that vessel had been delayed (ibid, p. 55).

<sup>&</sup>lt;sup>28</sup> On the evening of the 25<sup>th</sup> Snellen took the opportunity to make arrangements with Burmeister concerning the evacuation of the station from Dikson in the fall of 1883. If *Louise* had not reached there by 1 September the station personnel would head up the Yenisey in their own steam launch, and if they did not encounter *Louise* on the lower reaches of the river they would continue south to Krasnoyarsk (ibid, p. 56).

<sup>&</sup>lt;sup>30</sup> The strait separating the island of Ostrov Mezhdusharskiy from the mainland of Novaya Zemlya.

<sup>&</sup>lt;sup>31</sup> Northeast of Ostrov Kolguyev (Kolguyev Island).

<sup>&</sup>lt;sup>32</sup> The southernmost of the straits leading to the Kara Sea, between Ostrov Vaygach (Vaygach Island) and the mainland.

<sup>&</sup>lt;sup>33</sup> The strait, leading to the Kara Sea, between Ostrov Vaygach and the south island of Novaya Zemlya.

<sup>&</sup>lt;sup>34</sup> The spectacular fiord-like strait which bisects Novaya Zemlya.

dropped anchor there on the evening of 3 August. There we encountered the *Willem Barents*<sup>35</sup>, the British steamer, *Hope*<sup>36</sup> and three yachts, and anchored near them in Bukhta Ortodoksal'naya (Ortodoksal'niyakh Bay).

That same morning Hoffmann, *Willem Barents*'s commander, had encountered the shipwrecked crew of the *Eira* who had landed from their boats the previous night in foggy weather a little south of Mys Matochka (Cape Matochka). They learned that the *Hope*, which was lying at anchor a little further ahead in the bay, had been sent to rescue them and was ready to take them home.

Next morning, on board the *Louise* Snellen and I penetrated further into the strait while *Varna* remained astern to take aboard 20 tons of coal from *Hope*'s bunkers which Sir Allen Young, who no longer needed it, was kind enough to offer us.<sup>37</sup> About a mile east of Mys Narvalakh (Cape Narvalakh), the strait was closed by ice which was still attached to both shores. This ice was in a state of advanced disintegration; the various leads and polynyas visible among it seemed to indicate that it consisted of separate floes and that a steamship might be able to make its way through it; but when we got closer we could see that it consisted of an impenetrable mass as far as the eye could see. This is why we soon turned back and anchored off Chirakina that same evening.

As we passed the banks off Shchumilikha we were able to maintain a constant depth of 7 fathoms and as we headed a little further east where there is a deep channel we did not find any lesser depth, although we hugged the coast more closely. This deeper channel is not marked on the charts and since it is located almost in the middle of the channel and since at low tide the depth is not more than six feet in places, it is important for navigation to draw attention to this point.

In the evening we had a strong squall out of the west-northwest with heavy rain, followed by a violent storm.

*Louise* topped up her supplies of water and when we wanted to join *Varna* in the following morning we were prevented from doing so by fog. When the weather cleared a little we saw *Varna* heading towards us, as we had agreed in the event that *Louise* did not return, and came to anchor near us.

Captain Knudsen informed us that there was a fairly strong swell from the west in the entrance to the strait and this, in combination with the fog which reduced the visibility from time to time, persuaded us to wait for better conditions for getting under way. The weather cleared on the morning of 6 August and we emerged from the strait, heading west. *Willem Barents* and *Hope* had already left.<sup>38</sup>

We now intended to go to check the ice conditions off the southern straits again <sup>39</sup> and to wait there for a suitable occasion to penetrate via one of them into the Kara Sea. We therefore

<sup>&</sup>lt;sup>35</sup> A Dutch government arctic research vessel.

<sup>&</sup>lt;sup>36</sup> Commanded by Sir Allen Young and searching for the missing ship, *Eira*, under the command of Benjamin Leigh Smith. The latter vessel had sailed for Zemlya Frantsa-Iosifa the previous summer, but had been crushed and sank near Mys Flora (Cape Flora) on Ostrov Nortbruka (Northbrook Island). Having managed to salvage substantial quantities of provisions Leigh Smith and the crew had spent the winter relatively comfortably in a hut built on shore, and then had started south by boat on 21 June (Capelotti, *Shipwreck*, p. 203). *Hope* was a Peterhead whaler which Young had chartered; on the way north he had also bought a smaller vessel, *Martha* to act as a tender (Barr, 'Sir Allen Young', p. 33.). Also lying at the west entrance to Matochkin Shar was the ship, *Kara* in which Sir Henry Gore-Booth was also searching for the missing *Eira* expedition (Royal Geographical Society, 'Voyage...', pp. 688–9).

<sup>&</sup>lt;sup>37</sup> He also donated a sledge, which he no longer required, to the Dutch expedition (Snellen, *De Nederlandsche Pool-Expeditie*, p. 60).

<sup>&</sup>lt;sup>38</sup> With Benjamin Leigh Smith and Eira's crew on board Hope (Capelotti, Shipwreck, p. 212).

<sup>&</sup>lt;sup>39</sup> Karskiye Vorota and Yugorskiy Shar.

steered south along the coast, without the ice presenting the slightest obstacle. The fog, however, soon became very obstructive again and by six in the evening was so thick that initially the ships were following each other by means of the sound of their steam whistles and that later *Varna* was taken in tow by *Louise* to avoid becoming separated from her. On the following day we thus continued to make slow progress southward; the fog persisted and during the night of 7 August was accompanied by a violent storm and heavy rain.

On the morning of the 8<sup>th</sup> we hove-to to wait for the fog to dissipate, and we were confirmed in our opinion that we could not be very far from the ice when in the morning, a clearing allowed us to see the ice stretching from north to southwest. Then, for the first time we made use of the dredge<sup>40</sup>, and the occasion to do so occurred several more times during the following days.

According to our estimates at noon we were at 70°29'N; 52°48'E and entered the ice steering east and northeast hoping to find an open area near the coast of Novaya Zemlya. Soon the ice became thicker in that direction and we headed for a bank of clouds which we spotted to the southeast, indicative of open water in that direction. But there too thicker ice prevented us from making any progress and quite a strong swell from the northwest persuaded us to emerge from the ice by steering southwest, after which we continued our progress southwards parallelling the ice edge.

On the following night we were again forced to heave-to due to fog but when the weather cleared on the morning of the 9<sup>th</sup> we found the ice sufficiently loose to allow us to advance eastwards. We were then at 69°N; 52°7′E.; that day we made about 12 miles in the ice until finally, at 12.15 the fog prevented us from making further progress. The ice was quite similar to that which we had encountered during the previous year in these same waters on board *Willem Barents*. <sup>41</sup> It was last winter's ice and largely consisted of dirty-looking floes which had probably been covered by mud brought down by the Pechora River and which had been thrown onto the floes by the waves. We again saw floes drifting in different directions depending on their size and the depth of their draft, something which can be attributed only to submarine currents, and made our vessels very difficult to steer.

On the morning of the  $10^{\text{th}}$ , finding ourselves by dead reckoning at 69°44'N; 52° 41'E we made a further six miles to the east-northeast, where we again found the ice too compact, taking the thick fog into account, to make any further progress. We therefore moored our vessels together, as we did normally under these circumstances, to wait for better conditions.

When the sky cleared on the following morning we saw the sea covered with fairly close ice in every direction. Just as during the previous night new ice had formed between the floes and we tried to get back to the open sea steering southwest and west hoping that the wind, which continued to blow from the southeast, would give us a chance to reach our goal further south. It rained almost the entire day and in the afternoon the fog again condemned us to inactivity.

On 12 August we saw the sun again and from the mast-head were able to determine that the sea was open to the west at a distance of only a few miles. According to our noon sights we were at  $70^{\circ}15'30''$ N;  $53^{\circ}11'$ E, which revealed that we had drifted substantially north. We reached the edge of the pack during the day, and followed it southwestwards, although the fog obstructed us more than once.

On the next day we were able to steer southeast and, later, east. Only once did we have to run through a projecting strip of scattered ice while on the 14<sup>th</sup> we were able to continue our

<sup>&</sup>lt;sup>40</sup> To collect benthic fauna.

<sup>&</sup>lt;sup>41</sup> Under the command of H. van Broekhuizen and sponsored by the Comité voor de Ijszeevaart, *Willem Barents* had tried unsuccessfully to reach the Kara Sea in both 1880 and 1881, being blocked by ice each time. Lamie was the First Officer on both occasions (Holland, *Arctic exploration*, pp. 323; 327–8).

eastward progress through very scattered ice as long as the fog did not reduce the visibility. Thus by about noon we had reached a longitude of 54°58′E and an estimated latitude of 69°21′N.

Towards the end of the afternoon there was no more ice in sight to the south and we were able to steer northeast following the edge of the ice on the north. A violent northwesterly wind was blowing but in the lee of the ice the sea was so calm that we were able to continue without any danger to our deck cargo, although with the seas on our beam. We hove-to for a few hours during the night and continued our progress on the morning of the 15<sup>th</sup> amidst scattered ice so that we were soon within sight of the coast of Ostrov Vaygach and by noon we were at 69°53'N; 58°6'E. We hailed the *Gode Hensigt* for a second time and had a conversation with the captain. The latter informed us that on the previous day he had penetrated into the Karskiye Vorota as far as Ostrov Oleniy (Oleniy Island) but had found the strait closed, right in to the coast. A few days previously he had tried unsuccessfully to penetrate as far as Yugorskiy Shar and now intended to grasp the first chance to return to Norway.<sup>42</sup>

Seen from our present position the ice to the north and northwest was fairly close; towards the southeast it was more scattered and since there was a light southerly breeze blowing, one which later swung into the southeast, on the 16<sup>th</sup> we decided to first make an attempt to reach Yugorskiy Shar but shortly after noon we had to abandon this idea since the ice was too close to achieve this. We were then at 69° 55'N and the closest part of Ostrov Vaygach was six miles from our ship.

We were now hoping that the southeasterly or easterly wind would soon alter the ice conditions in our favour, but we were mistaken since during that period we had continual variable winds, which did not blow from the same direction for long enough and moreover were too weak to have much of an impact on the state of the ice.

On the 17<sup>th</sup> we made a reconnaissance towards Karskiye Vorota. We made our way without too much difficulty through the drift ice so that by noon we had reached 70°15'N and were thus at the entrance to that strait. We pushed a short way into it but repeatedly we had to struggle against eddies which made it very difficult to steer amidst ice which became increasingly close.

The wind was now blowing out of the southwest so that we would not have been able to make more than a mile of further progress without tempting danger. Further on, the ice in the strait was very compact and nowhere could we discern any open water on the horizon to the east.

We therefore decided to turn back. It was not without difficulty that we escaped from the eddies and in the evening moored both ships on the lee side of a large floe, which the east wind, which was freshening, would push eastward, along with us, if only slowly.

During the night, the wind having shifted, and the floe having swung with it, our vessels were now to windward of it and we were under threat of being beset in the ice which the wind was packing together; we therefore unmoored to remain in the shelter of the surrounding floes.

On the morning of the  $18^{\text{th}}$  we could see the ice north of us piling up increasingly against the coast of Ostrov Vaygach; for this reason we headed south until noon; and by then had reached  $70^{\circ}7$ 'N and were about eight miles from the coast.

Several times during these days of relative quiet we took advantage of the opportunity offered by large floes to exercise the expedition personnel at target shooting, especially those who had no experience of handling guns.<sup>43</sup>

<sup>&</sup>lt;sup>42</sup> Snellen took the opportunity to send mail home with him (Snellen, *De Nederlandsche Pool-Expeditie*, p. 62).

<sup>&</sup>lt;sup>43</sup> In anticipation of encountering polar bears.

On the 20<sup>th</sup> we again headed south to check the ice conditions, and had only to run through very scattered ice a few times before reaching completely open water stretching as far as the coast of Ostrov Vaygach. We were already deluding ourselves that we would find Yugorskiy Shar open when, around noon, we again spotted ice ahead.

We reached it at 1 p.m. when we were at the entrance to Yugorskiy Shar which was still totally inaccessible. The ice in the bay was completely close, presenting a continuous line through south to the west while near us to the south a number of large floes were aground on the sea bed.

We were now three miles west of Mys Greben (Cape Greben), but seeing that for the moment we could not enter Yugorskiy Shar we again headed northwest.<sup>44</sup>

On the 21st we were still hoping that the wind, blowing from the southeast would improve the ice conditions to the north; early next day we headed in that direction and this time penetrated further than previously into Karskiye Vorota so that the islands lying off the northwest point of Ostrov Vaygach bore S<sup>1</sup>/<sub>4</sub>SE. At this point the ice to the east was again close; we again made a little progress to the north but had turned back before noon without finding any opening, but renewed this attempt on the following morning.

The result did not meet our expectations, however, and we were almost discouraged by the gleam of the ice on the horizon to the east, which presaged nothing good with regard to the state of the Kara Sea.

We again moored to a floe and drifted quite rapidly with it to the southwest. Over the following days we continued to drift south with our floe along the west coast of Ostrov Vaygach and on the  $25^{\text{th}}$  again found ourselves at  $70^{\circ}$ N.

The wind was generally blowing from the north during those days and therefore when we tried to reach Karskiye Vorota we found the ice there much closer than ever so that we could not even reach the entrance to the strait and we decided to make a third attempt towards Yugorsksiy Shar.

The drift ice towards the south was fairly scattered so that towards evening we were within sight of the Russian mainland coast to the south of that strait. Next morning we steamed to the edge of the pack which was still blocking the entrance to the strait; the latter was covered with ice as far as the eye could see; at this point Mys Greben lay to the north, 4 miles away. After waiting a few hours in hope of seeing Samoyeds<sup>45</sup> who might perhaps visit us by travelling across the ice, at 9 o'clock we headed back north.

The 28<sup>th</sup> remained foggy throughout the day; on the 29<sup>th</sup> we were able to make a few miles of northward progress; a fresh breeze began blowing from the southeast which allowed us to hope that next day we would find the ice conditions in Karskiye Vorota improved.

If an attempt by that route failed we intended proceeding to Matochkin Shar and establishing our station there in the event that we could not reach the Kara Sea by that strait. Early on 30 August we again headed for Karskiye Vorota and reached its entrance at 8 a.m.

We continued to advance for a further two hours but finally the pack again became so heavy that it was judged prudent to heave-to and to moor the ships athwart each other.

A strong current was carrying us further into the strait along with the surrounding ice; from the mast-head we could see that the leads in the strait were not closing from which we could conclude that the Kara Sea must be fairly free of ice for this mass of ice to flow so rapidly into

<sup>&</sup>lt;sup>44</sup> Throughout this period there was considerable discussion as to potential plans if the two ships were unable to reach Dikson. Two possibilities were Malyye Karmakuly on the west coast of the south island of Novaya Zemlya (although it was rumoured that the Russians were planning to locate one of their stations for the International Polar Year there, as in fact they did), or else Mys Rozmyslov (Cape Rozmyslov) at the east end of Matochkin Shar, or further north on the east coast of Novaya Zemlya (Snellen, ibid, pp. 64–5).

<sup>&</sup>lt;sup>45</sup> Nentsy.

it. We were manoeuvring only to avoid floes which came too close and were hoping that once in the Kara Sea this mass of ice would break up and allow us free movement. We were sounding continually and finding a range of depths; at 7 p.m. the lead even revealed nine-anda-half fathoms and we saw a large grounded floe quite close to us. Steering north-northeast while moving a little off the coast we soon found greater depths; by 8 o'clock we had found 30 fathoms.

Towards evening we were still drifting further into the strait and we were hoping that by next morning we would be able to check ice conditions in the Kara Sea. A thick fog prevented this, however, until we were able to orient ourselves when the weather had finally cleared. We were in the Kara Sea near Mys Bolvanskiy (Cape Bolvanskiy) which we could see to the west-northwest, about two-and-a-half miles away.<sup>46</sup> The sea was ice-covered in every direction; it consisted especially of small, light floes of last winter's formation. We were not far from the coast; with the current which was carrying us south we were getting close to it so that before it grew dark we steered a little westwards to where the ice was more scattered.

The wind which had been blowing gently from the southeast while we were adrift in the strait was now northerly and was bringing rain which we considered to be a good omen that there was open water in that direction. Along the horizon in every direction we could see banks of cloud indicating the presence of water.

Next morning, having made our way through fairly heavy drift ice as we steered east and northeast we had to heave-to due to thick fog and wait until it dissipated.

Once the weather had cleared we again made a little progress to the northeast and east and then also spotted the Russian coast. During the following night we had a violent thunderstorm accompanied by rain. On 2 September the fog prevented us from making more than a couple of miles to the northeast, and on the third the weather was scarcely any better. We could see around us, it is true, but there was a violent west wind which made it very difficult to manoeuvre in the ice.

In the close ice in which we found ourselves, and among floes which were of different drafts and were driven by the wind at varying speeds, we often had to avoid a relatively small floe which was threatening the bow while we had just cleared a larger one which, with the vessel's slightest swing, was threatening to collide with the stern.

We therefore soon moored both ships to a large floe and allowed ourselves to drift slowly with it to the east. The noon latitude sighting was  $70^{\circ}4'N$ ; the current had thus still been carrying us southwards.

On the 4<sup>th</sup> we had a strong northeasterly wind which later swung into the north and brought heavy snow; we were able to navigate for a fairly short time but had to desist in the afternoon. We could see close ice from the mast-head in every direction and on the 5<sup>th</sup> we had to abandon any further progress. The ice of the floe to which we were moored was thicker than any ice we had seen previously; it was completely white in colour, as too was all the surrounding ice.

The weather was fair for several days but our vessels could not move since the ice was too close and any leads soon became covered with a thin skin of ice.

Initially our position changed very little, remaining at about 70°4'N and 60°55'E and so close to the Russian coast that we could no more expect to find a passage in that direction than in our immediate vicinity.

We thus remained beset in the ice for a week without our noticing any perceptible change in the surrounding ice; on the 11th some movement was observed especially towards

<sup>&</sup>lt;sup>46</sup> It was ironic that after all the unsuccessful efforts to reach the Kara Sea, the ships were carried there purely by the ice-drift through Karskiye Vorota.

the west. The wind had been blowing gently from the southeast in recent days, but was now out of the northwest.

On the following day the situation, as seen from the mast-head appeared even better; on the 13<sup>th</sup> our vessels were released from their prison and we were able to travel a few miles to the southwest and west. A lead formed and had soon attained a substantial width and, when night-fall forced us to heave-to allowed us to cherish the greatest hopes for the following day.

To the east and southeast there were no breaks in the ice and since it was too late in the season we had abandoned any hope of reaching Port Dickson and now wanted to try to establish our station in Yugorskiy Shar or in its vicinity.<sup>47</sup>

The wind swung into the south; we now had everything we could desire when we got under way early next morning, and we would have made rapid progress to the west if an opposing current had not seriously slowed us. The wind was still strengthening and impeded us badly when it swung into the southwest in the afternoon; moreover fog appeared and we again sighted much drift ice ahead. Ostrov Mestniy (Mestniy Island) was in sight, four miles to the southwest, when we again had to moor to a large floe and, to our great chagrin fond ourselves being pushed back east quite rapidly by the current and by a gale-force wind out of the west. During the night our ice anchors broke loose and the darkness made it difficult to moor our vessels again; towards morning we were surrounded by large floes which greatly delayed our departure on the 15<sup>th</sup>. It was not until 9 o'clock that we extricated ourselves from these floes and, as on the previous day, headed west but were again forced to stop in the afternoon. We again observed a strong east-flowing current and our observations gave our position as 69°47'N and 63°55'E.; we were then in a depth of 18 fathoms, abut 7 miles from the coast, beset in close ice which also prevented us from making any progress on the 17<sup>th</sup>. At 5 p.m. on that day we were pleasantly surprised to sight a steamship to the southwest; to judge by the speed with which it was approaching it had to be in open water, or at least among very little ice.<sup>48</sup>

We hoisted our flags and also fired some shots to attract its attention since we were extremely desirous of communicating with this ship. It approached closer and closer and before it got dark we were able to make out the Danish flag; we then guessed that the Danish expedition under the orders of Lieutenant Hovgaard must be on board.<sup>49</sup>

Since this steamship could not approach any closer than one-and-a-half miles<sup>50</sup> and since it stopped at the edge of the close ice surrounding us we decided early next morning to make every effort to force our way closer to it.

*Varna,* which was better equipped for tackling the ice, succeeded by ramming to make progress; *Louise* which attempted to follow in our wake soon found itself jammed between two large floes and had to remain immobile. We reached *Dimphna,* that being the vessel's name, at 8.30 on the morning of the 18<sup>th</sup>, and communicated with its commander, Lieutenant Hovgaard, who was also the head of the Danish expedition, and who revealed his further plans.

<sup>&</sup>lt;sup>47</sup> The settlement at Khabarovo on the north shore of the strait was seen as the optimal choice. (Snellen, *De Nederlandsche Pool-Expeditie*, p. 67).

<sup>&</sup>lt;sup>48</sup> Hovgaard, *Dijmphna-expeditionen*, p. 35.

<sup>&</sup>lt;sup>49</sup> Lt. Hovgaard was hoping to reach Mys Chelyuskina (Cape Chelyuskin), and planned to winter there and to explore north from there. Severnaya Zemlya had not yet been discovered, but while a member of Nordenskiöld's expedition on board *Vega* in 1878–9 he had seen barnacle geese flying in from the sea at Mys Chelyuskina (Nordenskiöld, *Voyage*, Vol. I, p. 343) and had deduced (correctly) that there must be land to the north. Hovgaard had first encountered ice off Ostrov Mezhdusharskiy on 7 August (Hovgaard, *Dijmphna-expeditionen*, p. 14) but had been prevented by ice from reaching the Kara Sea (via Yugorskiy Shar) until 16 September and was now heading east close to the Russian mainland (ibid, p. 32).

<sup>&</sup>lt;sup>50</sup> Hovgaard had resolved to stay out of the ice if at all possible but on hearing what he assumed were gun shots of distress from *Varna* and *Louise* had set aside this resolution and pushed north along a lead to within 5 km of the other two vessels (Ibid).

The ice conditions at this point were so favourable that we had every reason to be satisfied at our change of position, and we never suspected that this minor change of position might be the cause of our becoming beset in the ice.

Seen from *Dijmphna*'s mast-head, which was higher than *Varna*'s, the ice appeared to be extremely dispersed especially to the south-southeast so that it was decided that both ships should move closer to the land in that direction, but unfortunately there was a delay of several hours in implementing this plan. We were then at 69°55′N; 64°13′E.

Since Captain Knudsen did not have a complete set of signal flags he asked Lieutenant Hovgaard to signal to *Louise* that the sea was open to the southeast and that we were forced to proceed there; this signal was not understood by *Louise* however. It was 4 p.m. before the ships got under way; during that time the situation had not improved and soon *Dijmphna*, whose weak engine was not very effective against the ice, became jammed between floes and had to be rescued by *Varna*.<sup>51</sup>

Some time later *Dijmphna* was halted again. We were thus making little progress and since night was about to fall, we decided to moor both vessels to the ice and to continue our progress next morning.

During the night, however, we became beset among large floes coming from the northwest and since the temperature was -4°C young ice was soon welding them together into a solid mass which even *Varna* could not handle by the following day. The ice around us had become completely solid; to the southeast, astern of our ships and separated from us by just a few large floes there was a large polynya and beyond it one could see other areas of open water. The new ice was steadily increasing in thickness and all our efforts to free the ships failed, to the extent that our only hope was that a strong wind might perhaps disperse the ice again.

In fact on the 20<sup>th</sup> a strong wind arose out of the east and developed into a storm, the results of which were soon obvious. We again saw openings appearing in the ice some distance from our ship and a wide lead, running south, developed near *Louise*, allowing that ship to get free and to move away from us. Around our vessels, in the immediate vicinity there was no movement in the ice and the young ice there was becoming steadily thicker. On the 21st we spotted other openings from the mast-head and not far from us to the south there was a lead which, it appeared, should be easy to reach via the polynya astern of our vessels.

The east wind had pushed us to the west-northwest and the depth had increased from 26 to 50 fathoms. The temperature remained low and the young ice was already nine centimeters thick.

On 22 September, to our great delight we spotted *Louise* again as she approached to within a mile of us. If she had been able to reach the polynya astern of us she would probably have succeeded in breaking up the massive barrier of ice which separated us from it; but this was not the case and we had to content ourselves with communicating with that ship over the ice and were forced to consider ourselves lucky to have the opportunity to send our last news to the Netherlands, for that year at least.<sup>52</sup> The crews of both ships and the expedition personnel were actively engaged at sawing the young ice between the floes astern of us, while *Varna*'s punt was breaking the ice covering the polynya.

We succeeded in large part, but a large floe located immediately astern of *Varna* and which we were unable to remove by sawing, resulted in the fact that even with our ship going ahead and astern at full steam, we were unable to break through it. Had we been able to move

<sup>&</sup>lt;sup>51</sup> Ibid, p. 36.

<sup>&</sup>lt;sup>52</sup> The party of men who walked across from Louise reported that Burmeister would be glad to take any mail back to the Netherlands (Snellen, *De Nederlandsche Pool-Expeditie*, p. 70).

the ship a few meters to starboard we certainly would have managed to reach the polynya; but the ice on either side was much too compact to permit such a movement. In response to our request for assistance from *Louise* the latter ship signalled to us around noon that she could not help us any further; and to a signal which *Dijmphna* sent her asking for every possible assistance she replied "Heavy ice!" after which we saw *Louise* moving away towards the southeast and soon disappearing from sight.

We made several more efforts to remove the floes which had been sawn up, using a steam winch in order to open a channel astern, but in vain. The fate of *Dijmphna* and *Varna* was sealed; thereafter these vessels were condemned to inactivity and were beset in the pack of the Kara Sea (Fig. 3).



Fig. 3. Dijmphna (foreground) and Varna, shortly after they were beset in the ice, 23 September 1882 (Snellen, 1886).

While the Dutch expedition had seen its hopes of reaching Port Dickson or some other point on the coast vanishing, *Varna*'s crew had also lost any hope of returning to Norway that autumn and yet had undoubtedly been counting on doing so since, like us they had not expected ice conditions to be so unfavourable. Fortunately, in anticipation of spending a second winter at Port Dickson we had such large stocks of food and clothing, that soon after we became beset in the ice we were able to supply *Varna*'s crew with sufficient quantities of the latter item and when their provisions ran out, they received the same rations as the expedition personnel. The young ice which continued to form daily, welding the older floes together, soon covered the limited open areas which we could still see from the masthead. Soon, however, we realized that this was normally only a temporary development, since the former leads and polynyas would reappear, or else new ones would form due to movement of the ice floes.

Thus even throughout the winter, sometimes nearby and sometimes further away, we would see leads or polynyas appearing which presented a pleasant degree of variety to the eye in terms of their dark lines or surfaces amidst the vast extent of white ice surrounding us. On the other hand, however they were less welcome since they were the precursors of ice pressures.

The east wind of those first days was pushing us slowly northwest; the soundings by which we observed this movement soon revealed increasing depths. The latter diminished again when a light westerly breeze carried us east a little; this to-and-fro movement was continual. The ice field in which our vessels were beset was never completely motionless; it normally moved faster or slower depending on the wind strength and in a direction which soon made us realize that the wind was the main cause of these movements if not the only one.

Proof of the fact that there was a large amount of old ice in this part of the Kara Sea is that after our vessels became beset in the ice they changed their headings very little as they drifted. Thus, for example, according to the compass from 26 September until 6 October *Varna*'s heading was between NNW and NNW<sup>1</sup>/<sub>2</sub>W although we had travelled quite considerably during that time. During the days that followed the ship swung a little more but rarely more than half a point in 24 hours and usually much less.

However there must have been open areas further north, or at least places where the ice was much more scattered since otherwise one could not understand how our ice floe could have travelled so far in the Kara Sea during our wintering.

Initially we had no doubts that this was the case; we really thought that our drift would lead later to ice pressures but we believed that after the young ice had given way to places where such pressures would be felt and after it had acquired in other places sufficient strength to resist such pressures, the entire mass of ice surrounding us would settle down. This was especially what we were hoping for, since then we would be able to make all the observations specified in the expedition's programme, including the magnetic observations in their entirety since as long as we continued to move we would have to content ourselves with doing only part of them.

This hope never materialized, however, and we were moving constantly, as may be seen from the map appended to this work, where the dates indicate the positions of the ships.

We ascertained our positions by astronomical determinations of our latitude and longitude, and we have contented ourselves with recording on the map a few positions occupied during various months, the coordinates of which were determined by means of observations with an artificial horizon.

Since we had set off supposing that we stood a good chance of reaching Port Dickson and that if the ships were threatened by the ice in the Kara Sea this would not occur far from shore, we had taken only boats on board *Varna*, as too was the case on board *Louise*. If we had to abandon our ship we had two launches and a punt belonging to *Varna* and a punt belonging to the expedition.

We had not taken sledges but, taking advantage of an offer from Mr. Leigh Smith during our meeting with the *Hope* we had obtained a McClintock<sup>53</sup> sledge which could be used

<sup>&</sup>lt;sup>53</sup> On the basis of his experience at sledging during Captain Sir James Clark Ross's expedition in 1848–9, Francis Leopold McClintock designed a sledge which was used on the Royal Navy's subsequent searches for the missing Franklin expedition, namely those of Captain Horatio Austin's expedition of 1850–51, Captain Sir Edward Belcher's expedition of 1852–4 and McClintock's own expedition on board the *Fox* in 1857–9. It was of rather unusual design, in that rather than being horizontal almost throughout their length, with a short up-curve at front and rear, the runners formed a shallow inverted arc so that only a relatively short section of each runner was in contact with the snow/ice at any one time. The design and its advantages are described by Snellen and Ekama (*Rapport*, p.19) and illustrated in sketches in that work.

along with the launches in the event of a retreat, and which was very useful during the wintering.

When we were steaming in company with *Louise* we had already prepared everything necessary for the launches: food, clothing, ammunition, etc., but it was all stowed below deck because there was no room for it on deck because of the large quantity of timber stowed there. Early in October we judged it necessary to unload the greater part of the materials for our house, firstly to lighten the ship and to allow it to rise, and so that it could better withstand ice pressures, and also to enable us to use the forward hold for accommodation for the crew and to make the ship more suited for the wintering, for it had not been fitted out in anticipation of that. *Varna*'s deck was thus disencumbered and the provisions etc. required for the launches, were stowed there. The provisions were calculated for 22 men for 16 days.<sup>54</sup>

*Varna* had only two sets of davits and the two launches were slung from them, ready to be lowered onto the ice; the two punts were stowed on the ice near the ship and their hulls reinforced better to withstand being hauled across rough ice.

At the stern a hole was chopped in the ice to protect the screw and the rudder; a second hole was made at the site of the sea-cock<sup>55</sup>, and both openings were kept clear of the new ice each time it formed.

As soon as the deck cargo of timber had been unloaded the carpenters began the task of fitting a floor on the tween-decks beams in the forward hold above the coal which was located there. There they made two cabins, one of which was to accommodate *Varna*'s crew and our support personnel; the smaller one was for the scientists, the captain, the pilots and for provisions.<sup>56</sup> Our large supply of timber which was originally destined for the house at Port Dickson allowed us to tackle appropriately all these projects which were so desirable in the interests of everyone's health.

All this work occupied a great deal of time and if one adds to this the continuing work in the after hold, in part to relocate the coal which was moved below and stowed on the sides, in part to move the provisions and other essential items which filled all this part of the ship, we all had every reason to be grateful that we were not troubled by ice pressures, at least during the first few weeks. They did not keep us waiting however, for before the end of October we felt ice pressures in the immediate vicinity of the two ships.

*Dijmphna*'s starboard gangway was no more than 20 meters from *Varna*'s stern; she was separated from us by large blocks of old ice, whereas her bow made an angle of about one-

An example may be seen in the photo of a "dry run" for the over-ice retreat in May 1883 (Fig. 7). It also features in paintings from Captain Sir Edward Belcher's expedition of 1852–4 (Savours, *The search...*, between pp. 118 and 119) and from Captain Henry Kellett's expedition also of 1852–4 (Ibid, p. 265) and finally in an engraving from McClintock's own expedition (McClintock, *A narrative...*, between pp. 278 and 279). The link between McClintock's expedition and the Dutch expedition, was Sir Allen Young, who had been on board the *Fox* and had brought one or more McClintock sledges with him on his expedition on board *Hope*, aiming to rescue Benjamin Leigh Smith. N.B. It was he and not Leigh Smith who donated the McClintock sledge to Snellen. Leigh Smith did not bring any sledges south during his boat trip from Zemlya Frantsa-Iosifa (Capelotti, *Shipwreck*, p. 207) <sup>54</sup> It was also around this time, on 9 October, that a meteorological screen and a wind-vane were set up on the ice 30 meters ahead of the ship, and a full programme of weather observations began. The barometer was kept in *Varna*'s saloon and a snow gauge was set up near the screen. Up until this date Lamie had been maintaining a regular, if limited, schedule of observations on board the ship. But now five observers, standing four-hour watches were involved in a more ambitious programme. All the instruments were read on an hourly basis and snowfall amounts were recorded every three hours (Snellen and Ekama, *Rapport*, pp. 56–7).

<sup>&</sup>lt;sup>55</sup>Also known as the Kingston valve: a valve set in the hull whereby the sea water used to cool the engine is returned to the sea.

<sup>&</sup>lt;sup>56</sup> The latter cabin measured three meters by five meters. A table, benches and a stove occupied much of the floor area. At night the benches were converted into four bunks with the cushions taking the place of mattresses. Some mirrors and prints on the walls added a note of homeliness (Snellen, *De Nederlandsche Pool-Expeditie*, p. 76).

and-a-half points (17°) with that of our ship. Fig. 3 gives an idea of the relative positions of the ships.

A few blocks of thick ice separated the ships from the polynya which lay only about 50 meters from us and was now covered by a skin of young ice. We then entered a period of ice pressures.<sup>57</sup>

Meanwhile we had completed the accommodations for the crew and support personnel; our men benefitted from them as well as *Varna*'s crew; bunks had been built along the bulkheads and there remained a large area in the middle of the ship where they could move about. There still remained a large area in this same location for the fire-boxes which were also on this deck; the heat radiating out from them often made it unnecessary to light the stove which was located at the end of the cabin, so that coal consumption was reduced to a minimum. It is regrettable that the improvement which these measures introduced into the crew's lot was of such short duration and that they had to leave such pleasant accommodations on board to take refuge in tents on the ice.

During the summer we had always found water in abundance on the ice; the pools formed from the melting of the snow and of the upper layer of the ice always provided us with an abundant supply of this indispensable liquid, and even continued to do so for a good part of the autumn. Thus there was a pond of fresh water on the floe near the *Varna* on which the weather screen was located; it soon froze over as the temperature dropped, it is true, but one had only to chop a hole in this ice crust to obtain an abundant source of water. However this source finally ran dry and throughout the winter we could obtain water only by melting ice, an operation which was not the most convenient since one would have to go some distance from the ship to chop ice with an axe where it had not been contaminated. This was a major task for the cook but it forced him to take exercise in the fresh air, a specific remedy against scurvy, something he could not achieve on board in his galley.

Initially we also used snow as a source of drinking water but we soon realized that ice was preferable primarily because the water which one obtains from it is more pleasant as to taste and then because the same volume of ice produces more water than ice. If, however, one is forced to use snow for some reason, as may be the case during a wintering on land, it is recommended that one does not completely fill the container in which one is trying to melt it, but to add some more snow each time the initial amount has almost melted; by this process one will save a lot of time.

One cannot use just any sort of ice indiscriminately to produce drinking water; for example the ice which forms over the course of the winter is totally inappropriate, because of its high salt content, especially in the upper layers. The ice blocks in hummocks, however attractive they may appear because they can be easily broken into small pieces, should not be used for this purpose either. For that one must have old ice which has survived at least one summer and which, as a result has completely lost the salt which it once contained.

We had such large quantities of ice in our vicinity, however, that it was not difficult for the cook to make his choice when his ice-quarry was exhausted. Over the course of the winter, when we were on board *Dijmphna*, and the cooks of both ships were sharing the work, they were using exclusively a large mass of ancient ice in which they gradually hollowed-out a cave, which protected them if the weather was foul.

Once on board the ice was placed in barrels in the kitchen where the heat radiating from the fire-boxes soon melted it.

<sup>&</sup>lt;sup>57</sup> The first signs of ridging were observed on 14 October: pressure ridges up to two meters high consisting of jumbled blocks of young ice up to 23 cm thick (Snellen and Ekama, *Rapport*, p. 89).

No matter how calm the last days of October were, we realized that the ships' position was far from being favourable and that ice pressures might perhaps force us to abandon them.

Not knowing how much time we would have in such a situation to safeguard the provisions which we had stowed on deck, as a precaution we made a three-month depot of provisions on a large, thick floe off *Varna*'s starboard side which we christened San Salvador. Lieutenant Hovgaard was kind enough to let us have one of his McClintock sledges which gave us good service in transporting these provisions.

On the evening of 1 November our floe, which was already quite small, was again split by a crack. The ice opened up suddenly and we soon had in our immediate vicinity a lead which ran to port ahead of the ships and in some places was at least 200 meters wide. *Dijmphna*'s bow was only 100 meters from it; *Varna* was a little further away; thus our situation had not improved.

When the lead closed to starboard of our ship small hummocks were formed along the side of San Salvador although one could still reach it easily from our ships. From *Varna* which lay ahead to the west-northwest the distance to San Salvador to the north-northeast was no more than two cable-lengths. Lieutenant Hovgaard had the provisions which had been deposited a little earlier on the ice near the *Dijmphna* and which were no longer considered to be safe there, transported to San Salvador.

The wind which had recently been blowing gently from the east, swung into the southwest. Over the night of 2-3 November the lead partially closed and the young ice which during this short time had reached a thickness of a centimeter, was piled up against the edge of our floe off *Dijmphna*'s port side.

We were hoping that things would remain like this but the wind freshened and the large floes on the other side, which were still advancing, were continually breaking blocks of ice from our ice floe. This continued slowly throughout the entire day; our floe was steadily shrinking, new cracks were forming and by evening our position was more critical than it had ever been.

*Varna* received a shock; a crack had opened ahead of us only four meters from the bow. Everyone remained fully dressed and everything was ready for abandoning ship.

By stages calm was re-established and we were hoping that the ice pressures were going to cease but each time we were disappointed in this expectation; the hummocks were approaching closer and closer to *Dijmphna* and we could anticipate that it would be the first to succumb.

At midnight *Varna* received a shock much more violent than the first one; a crack appeared to port, running straight towards our bow and continuing athwartships at the level of the starboard gangway. From time to time calm returned but the ice renewed its work of destruction and we saw floes rising up immediately ahead of *Dijmphna*. We then began making preparations for leaving; a boat with sleeping bags and clothing, the sledge with the tent, a stove and other indispensable items were placed in safety for the time being on a large floe astern of *Varna*, where Lieutenant Hovgaard was also making similar preparations<sup>58</sup>.

Shortly afterwards the strong ice between the floes split; the ship's stern then received a violent shock and all the ice against our port side was broken up (Fig. 4). The provisions were then moved to the ice to starboard; everyone still on board assisted in this, but with the ice starting to break up on that side also I had to give the order to abandon ship. Fortunately a few moments of calm then ensued and we were able to renew our efforts; barrels and cases were thrown overboard; one of the latter was caught between the ship and a floe which had just disintegrated, but its contents were largely saved. All of this was hauled to a solid floe 20 meters away which was thus established as a provisions depot in short order.

<sup>&</sup>lt;sup>58</sup> Hovgaard, *Dijmphna-expeditionen*, p. 48.

We all assembled there and also transferred to it the depot which had been established on the ice and waited for a moment of calm to move to San Salvador with our boats, sledges and everything we could haul. Ahead of *Varna* and to starboard the ice pressures had already wrought havoc; cracks were opening under our feet and there wasn't a moment to lose. The sledges were pushed vigorously across the cracks; detached floes served as bridges, although sinking under the weight of the sledges. Two men fell into the water but scrambled out again so quickly that their clothes did not have time to become completely soaked. We reached our goal successfully and were able to wait for the end of the crisis on San Salvador.

The inner workings of the ice slackened gradually and as day dawned everything was so calm that some of us were able to go aboard to check the situation.



Fig. 4. Varna (left) and Dijmphna after the first severe bout of ice pressures, 6 November 1882 (Snellen 1886).

The hummocks had approached almost to *Dijmphna*'s port side but had not reached that ship which, as a result had not suffered the slightest damage. Unfortunately the same did not apply to *Varna*; on both sides the ice had been smashed up and pushed up against the hull; it had sustained a leak aft and three feet of water was found in the bilge near the pumps; it had also suffered greatly forward and the ice which had been pushed under the ship had raised it two feet forward and one-and-a-half feet aft. The engine had been displaced through a quarter turn; the propeller had probably received an impact which it had transmitted to the engine; a pintle had been torn out of one of the rudder gudgeons. The wood which we had stowed on the ice had, in part, been pushed under the ship; some planks had been raised upright by the blocks of ice; our entire surroundings had changed their appearance.

Especially to port appearances were terrifying; enormous blocks had been piled on top of each other; one very large block had been raised through a height of 15 feet by the irresistible ice pressures; the entire area, previously so level, was now completely impassable.

The floe on which the meteorological screen was located had not suffered greatly, indeed the latter had remained completely intact amidst the general destruction. *Varna* had swung through just a quarter of a point towards the north and was now oriented WNW<sup>1</sup>/<sub>4</sub>N.

After we had spent a little time on board a further movement in the surrounding ice forced us to return to San Salvador and when, a few hours later we repeated our visit, it was only for a few moments. The ice was still not at rest; the pressures could not be compared with those during the night but it was impossible to anticipate the results.

During the rest of the day we transported to San Salvador everything we had been unable to haul there during the night. We pitched the tents there which would provide us with shelter during the following nights and we slept in them.

The highest part of San Salvador had been selected for this camp. We had great confidence in this floe, but we would soon see that one should not have any illusions, even with regard to the thickest, strongest ice, and that one should always be ready to set off in search of another refuge in case of necessity.

Our expedition had at its disposal a tent large enough to accommodate all the personnel; *Varna*'s captain had had one made for his crew while the Danes had two tents each of which could hold eight men and two smaller ones, each for three men. The Danes could therefore accommodate their entire personnel, for a total of 20 men, and two of the Norwegians in addition.

During the following days the ice in our vicinity was still constantly moving; during the day, however, we could usually go aboard and work there; but before it got dark we would return to San Salvador, where we would spend the night and have breakfast.

On the very first day of our sojourn on San Salvador Lieutenant Hovgaard proposed to us that in the event that we were obliged to retreat across the ice, we should combine all our strength and resources, and should organize a major sledge expedition. Since Captain Knudsen did not have any sledges and since we had only the one which Mr. Leigh Smith had given us<sup>59</sup>, whereas Lieutenant Hovgaard who was fully equipped for sledge expeditions and possessed several sledges and, moreover had at his disposal eight dogs, we accepted his proposal and over the subsequent days took the necessary measures with one accord. Provisions, spare clothing etc. were taken proportionally, in supplying the Danes, the Dutch and the Norwegians, and were distributed among the various sledges.

For his part Captain Knudsen received two McClintock sledges from *Dijmphna* while we were able to add to our own sledge another sledge made of red deal which was allocated to us. This sledge was very heavy and not very strong, admittedly, but it rendered us great service during the following months when we had to relocate our depot.

<sup>&</sup>lt;sup>59</sup> In fact this sledge was donated by Sir Allen Young (Snellen, *De Nederlandsche Pool-expeditie*, p. 60).

Lieutenant Hovgaard would be using his John Rae sledges<sup>60</sup>; *Dijmphna* had four large and two small ones on board; two of that ship's sledges were also to be involved in the expedition. Throughout the rest of the winter all of this lay ready on the ice and was referred to as the mobile depot; we added provisions to provide for our support during the long winter night if the ships sank before a suitable time for our retreat arrived.

Lieutenant Hovgaard, who would be playing the major role in this expedition, both in terms of the materials and of the personnel mainly took charge of the distribution of food and organizing the expedition. However, since circumstances prevented this combined expedition from taking place and our expedition later undertook its retreat by sledge with *Varna*'s crew I shall give details of the food rations consumed and other details in my description of that retreat.

By 5 November the water in the bilges was five feet deep; we pumped it out both by hand pumps and with the pump used for feeding the boiler; we repeated this over the subsequent days. To find the leak in order to plug it we had to move aside some of the coal in the after hold as well as some of the provisions. We thus had plenty of work when we were on board. The rough ice which now separated us from the meteorological screen had soon been levelled using axes; the weather observations could thus be carried out regularly near the ship; they were continued during the night on San Salvador where Mr. Snellen had set up a temporary observatory.

The second night which we spent in the tents was less peaceful than the first one; around 1 a.m. we were wakened by one of the Norwegians who was on watch, shouting "Isen skruer" (The ice is screwing together.) and this was shouted in a tone which implied an imminent danger. Everyone got up; some people were arguing over their canvas boots, which taught them that they had to be better organized even in a tent on the ice since it could easily happen that a crack might open under them making an immediate departure essential.

However the danger was not threatening; hummocks were developing at another point against the edge of our floe; the ice moved away from San Salvador a little from the side where our tents were located, but it closed up again on the following night exerting quite strong pressures in our vicinity.

On the 8<sup>th</sup> the situation of the ships was such that we could again spend the night on board; thereafter some of the crews took turns to maintain a watch on San Salvador during the night. A signal was agreed upon in case assistance was needed to save the depot if it was threatened.

The ice now allowed us a few days of rest, and work on board could be continued regularly. The carpenters were swamped with work; they made a bulkhead at the stern to

<sup>&</sup>lt;sup>60</sup> A native of the Orkney Islands off the north coast of Scotland, John Rae was employed by the Hudson's Bay Company for his entire working career, initially for 13 years as a surgeon and trader at Moose Factory at the south end of James Bay. He is, however, better known as an arctic explorer, undertaking a total of five expeditions over the period 1846–54, either to survey different sections of the mainland coast of arctic North America, or to search for the missing Franklin expedition. By his own count he travelled a total of 6,555 miles on foot (in part on snowshoes) and 6,700 miles by boat. He surveyed a total of 1765 miles of previously unexplored coastline and the course of the River Quoich, Nunavut (Rae, *John Rae*, pp. 531–33). Unfortunately, I have been unable to find either in Rae's autobiography or anywhere else in his writings a description of the design of sledge which he used on his main sledge journeys. However, the John Rae sledges which Hovgaard had obtained appear to have been a type of toboggan; three thin, flexible planks, arranged side-by-side were joined by cross-pieces on their upper sides, lashed with sealskin lines, and curved upwards somewhat at the front. Iron-shod runners were also attached by sealskin lines to the under sides, but they raised the sledges only an insignificant height above the snow/ice surface (Snellen and Ekama, *Rapport*, p. 20). It is unlikely that Hovgaard obtained these sledges directly from John Rae, who had retired from the Hudson's Bay Company in 1856 (Ibid, p. 512), and certainly would not have had six sledges at his London home. In all probability Hovgaard obtained them from the Hudson's Bay Company.

prevent the inflow of water as much as possible after which they continued their work forward where they still had much to do. The large amount of ice which had been pushed under the vessel's stern made it very difficult to again make an opening around the rudder and the screw; when we reached them we discovered that one blade of the propeller was broken.

The weather was fair and the wind was generally light out of the southeast; on the 12<sup>th</sup> the wind swung into the southwest again and as was usually the case when it came from that quarter it soon freshened and made us fear that there would be further pressures. From the mast-head we could see plenty of open water especially to the north-northeast where it stretched as far as one could see; signs of water also appeared to the northeast and later to the southwest. A lead opened on this side of San Salvador so that the men on watch returning to the camp in the afternoon had to use a boat to get there.

Shortly afterwards we noticed on board that San Salvador was starting to move away to the west along with all the ice on the other side of the lead and was thus moving further and further from the ships.

Evening arrived and we soon took the decision that we should all move there so that, if this movement continued we would not have to waste any time next day in trying to move the depot back to the vicinity of the ships. First of all we had announced by a signal to the men on watch at the camp that we would be arriving. In the meantime night had fallen and since San Salvador had turned noticeably they indicated to us with a lamp the spot on the lead which was the most convenient for reaching them. This precaution was not superfluous since soon afterwards the lead closed abruptly and violent pressures developed in the vicinity of our camp so that we prepared to move further back if necessary. Large blocks of ice were detached from the sharp edge of our floe and piled on top of each other; lit by the aurora borealis they presented a spectacle both grandiose and imposing.

A profound silence followed; a couple of hours late we felt ice pressures even more violent than the first ones but fortunately they did not force us to abandon our position. Our rest was not disturbed for the rest of the night.

Next morning we could see that San Salvador had again moved eastwards and had swung around in the opposite direction to that of the day before. Our camp was therefore close to the ships which lay to the southwest, quarter of a mile away; the day before they had been half a mile to the southeast. The numerous openings in the ice which we had seen from the masthead had permitted this major shift. Only part of the crews were sent back aboard, while the rest remained to watch over the depots, although they were no longer threatened, however. Since it could be anticipated that the events of the past few days might easily be repeated and since the days were becoming steadily shorter so that the ice pressures might occur in the middle of the night, we judged it necessary to find a location for our depots closer to the ships. During the first ice pressures part of San Salvador had become separated from it; it measured about a hundred meters in diameter and lay off *Varna*'s beam, 500 meters from the ship. This floe displayed no fissures and appeared to us for the first time to be a secure place of refuge and we decided to transport our depots to it; this turned out to be not as easy as one might think from the relatively short distance.

The lead discussed earlier had reopened and had become covered with new ice during the night; the latter had split again and when we began transporting our mobile depot on the 14<sup>th</sup> we could move it by boats to close to its new location. Had we been able to continue to do so in this fashion we certainly would have been able to relocate San Salvador completely on the same day but the lead narrowed so much that the young ice on either side was preventing the boats from squeezing through yet at the same time was not thick enough to bear the sledges and boats. We then maintained a narrow channel towards the opposite side and gradually

transported most of the mobile depot using one of the punts and succeeded in reaching the new location before nightfall; this was now named Little San Salvador. All the remainder, as well as the permanent depot had to be left behind and it was not until 19 November that everything was again located in the vicinity of the ships. Moreover the days had become very short; at most there were only six hours of daylight; in addition more than once fog prevented us from taking advantage of it as we might have liked. However there was so much work to do, both on board and on the ice that the crews could always be employed in a useful fashion. Thus, for example the cases containing canned goods and some of the biscuit were opened and their contents placed in sacks which were all numbered.

Our goal in doing so was to reduce to a minimum the weight we would have to handle and also so that it would take up less space. It is true that the cans would suffer more while being transported but our men could keep damage to a minimum so that during our retreat in the following year their contents were still excellent. Most of the provisions which we consumed then had spent the entire winter on the ice and had been exposed to many shocks while being repeatedly transported from one place to another.

The numerous bags of coal which our expedition had at its disposal allowed us to give a fair number to the Danes. They were also employed during the retreat but several sacks became worn out during the repeated loading and unloading, especially those containing cans.

Before transporting our depots to Little San Salvador we had searched in the vicinity for sites which might serve as places to which we might retreat, in the event that we were threatened there. Our attention had been caught by a large floe about 300 meters astern of the ships which had resisted the ice pressures up until then, and another one off *Dijmphna*'s port side beyond the hummocks which had formed there on 3 November. This latter was even better situated and closer than Little San Salvador; its ice was also thicker. It was decided to transport the depots there as soon as a route had been created across the hummocks. Mr. Snellen also wanted to build a house there which was to carry the Robinson anemometer and the wind-vane and which we would use for our scientific work. This floe was named New Holland and did not disappoint us in this respect.

When one has good axes and pickaxes one can open up a practicable route for sledges and boats through hummocks which are not too high quite quickly. The pieces which are chopped from projecting parts can be used to fill the holes between the hummocks; one can reduce them to small fragments with a single blow and one soon attains a practicable route. Usually one can negotiate a difficult spot with sledges if one takes the effort to wield the axe for a few minutes instead of hauling the sledges through one after the other, if indeed it is even possible, at the cost of great effort, not to mention the fact that in the latter case the materials will suffer from the ruggedness of the ice.

A route to New Holland was soon complete and on 20 November we transported both depots there in just a few hours. The work was finished by around noon, when we saw the sun above the horizon for the last time in 1882. A long winter night lasting two months was beginning, but thanks to our relatively low latitude we had a few hours of twilight each day throughout that period, which were very useful for our work on the ice.

We then enjoyed a period of relative calm; we noticed no movements in the ice in our immediate vicinity at least during the first few weeks; as a result the ice had time to become consolidated to form a very resistant mass, as the temperature was still dropping. We were also hoping that the ice piled up around and beneath the *Varna* would serve as a buffer against any new pressures. The hole which had been made at the stern allowed us to see downwards at the enormous blocks which were wedged together there. We tried in vain to clear the ice completely from around the propeller; as a result we could turn it only a very little.

However one did not need to go very far from the ships to observe new pressures in the ice; thus San Salvador was still moving and each time we visited it we noticed new signs of havoc, new hummocks and cracks which criss-crossed even the thickest ice.

On the 26<sup>th</sup> we were threatened by a more immediate danger; the ice opened up 300 meters from *Varna*; a new lead formed there but fortunately closed again without being followed by any pressures.

On board the room which was to be used as our bedroom and the one for the provisions were finally completed. While in the interests of our health it was desirable that we no longer used *Varna*'s small cabin for resting and meeting, it was indispensable for stowing part of our foodstuffs which would suffer excessively from cold astern. The beer and wine had become frozen; the former was no longer drinkable, but the taste of the wine, once thawed, was just as good as if nothing had happened to it. A few bottles had broken, but in most cases the cork had moved only slightly so that once the wine had thawed one need only to drive it back in a little. The lemon juice had become solid; once thawed it had lost a little of its strength but we had so much of this article that we did not need to reduce the ration. Canned foods in tin cans, both meats and vegetables, were also partly frozen but their taste did not suffer from this even when, as happened later, they were exposed in the open air to temperatures from 30° to 47° C below zero.

Since *Varna* was certainly not organized for wintering, but simply for transporting our expedition to Port Dickson, initially there was no suitable location for conveniently storing foodstuffs and therefore we had been unable to protect our potatoes from the cold over the long term. However we were eating new potatoes until the end of December; their taste became a little sweet towards the end but we still preferred them to dried, canned potatoes, although the latter were excellent of their type.

The provisions store-room which we had had partitioned off was located between our quarters and those of the crew, and since both the latter were always heated the foodstuffs located there initially were protected from freezing.

The high quality of our provisions and the great variety in the menu meant that all the members of the expedition were very satisfied with the food. This also applied to *Varna*'s crew, who shared our meals from November onwards; this seemed to exercise a favourable influence on the appearance of several of them.

For lighting we used so-called "safety" paraffin, produced by Mr. Bleuland van Oort of Voorburg near The Hague; we burned it in lamps equipped with so-called "sunshine" burners which M. Viermeijer of Amsterdam had donated. Lighting therefore left nothing to be desired which was a great advantage during the nights which were becoming increasingly long. The paraffin, which had to be kept on deck, remained liquid down to about -30°C; at any lower temperature it started to become syrupy.

Since daylight could penetrate into our cabin only by way of a few small windows forward and since, moreover, they were covered by a thick layer of ice, the time soon arrived when, even at noon one could no longer see well enough to read or write. However we never left the lamps burning all day; they were extinguished at 11 a.m. and were not lit again until 2 o'clock; thus one might say that one found oneself forced to leave the ship during the period when it was sufficiently light outside to move about in the open air, something that our doctor judged to be indispensable for our health.

The crew members always had enough to do on the ice; as to ourselves our work outside was limited in general to the meteorological observations when we were on watch, or astronomical or auroral observations which lasted only a short time. It was only when the depots had to be moved that everyone, from first to last, had to harness himself in a hauling belt to haul the boats and sledges etc.

When the crew members were not strong enough to tackle all the work they had to do out on the ice the members of the Expedition were always prepared to give them a hand, and it was thus that we often obtained the exercise in the open air which is so beneficial and which we could obtain otherwise only by taking a walk.

When one takes into consideration the roughness of the ice and the numerous obstacles presented by deep snow, taking a walk often required a great deal of effort.

Our large supply of coal allowed us to heat all the living quarters appropriately. On board we were troubled by heat rather than by cold and we often had to open the portholes. Since the cold air which entered could not contain all the water vapour inside the ship, a frostsmoke would form which had the appearance of very fine snow.

Since a watertight bulkhead had been made at the stern the ship was no longer making as much water as previously; however the inflow was still more than we had hoped; it appeared that it was still flowing along the joints between the frames and the planking; we therefore had to pump it out every day using the auxiliary pump for filling the boiler. But this cost us quite a lot of coal and since we were hoping that *Varna* would get free in the following summer and that we could return south on board this vessel, we couldn't squander it.

The manual pumps which were located aft could no longer be used there because of the cold; they were moved to the engine-room where the temperature was always so high from the heat of the stove that the water no longer froze in the pumps. Thereafter we no longer used the steam pump but pumped the water out twice per day using the manual pumps.

During late November and early December the lumber and materials for the house on New Holland were transported there while the carpenters were shaping the heavy beams which were to be used for it. Although a great deal of lumber had been lost during the first ice pressures what remained was more than sufficient for what we wanted to make with it.

In general the weather remained fair, and the temperature gradually dropped to -40°C. We were drifting very slowly and *Varna* remained continually oriented NW½W from 17 November until 9 December. Throughout an entire week we even thought that we hadn't moved at all, something which made us again hope that our position was finally going to become stable. Over the course of the month of December however the situation radically changed completely and led to the second violent bout of pressure which, as we will see later, led to *Varna* being wrecked.<sup>61</sup>

On the  $7^{th}$  the beams of the house were set up and we could start erecting it; three carpenters from the *Dijmphna* helped with this work.<sup>62</sup>

<sup>&</sup>lt;sup>61</sup> The members of the Dutch expedition, as per custom, celebrated St. Nicholas Day on 5 December, and invited the Norwegians and Danes to join in their celebration. Gifts were opened on St. Nicholas Eve, accompanied by refreshments and a great deal of merriment (Hovgaard, *Dijmphna-expeditionen*, p. 71.).

<sup>&</sup>lt;sup>62</sup> Petersen was in overall charge. The design of the building would now be referred to as an A-frame, i.e. a triangular prism lying on its side, with the sides of the triangle six meters long and the length of the prism eight meters (See Fig. 5). The floor of the "second storey" was at a height of 2.7 meters. As completed on 8 January 1883 the ground floor included a zoological laboratory for Ruys, studies for Lamie and Snellen, a workshop and a communal area. The upstairs, reached by a ladder and trap-door was used for storing things such as fur clothing and sleeping bags (Snellen, *De Nederlandsche Pool-expeditie*, p. 109).



Fig. 5. The refuge house on New Holland and the meteorological screen, 16 January 1883 (Snellen 1886).

On the following day with a fresh breeze from the west-southwest a crack appeared a little beyond the hummocks off *Dijmphna*'s port side; it separated us from New Holland and passed within just 30 meters of the house. Since the ice opened by just half a meter and closed again later we could still communicate with our new refuge, and we hurried to transport there the supply of coal which was to be used for heating as well as everything still necessary for completing the house.

The Danish expedition was also extremely interested in our house since if the ships were sunk but New Holland was spared we would all have found shelter there and would have waited for a suitable moment to start the trip south. It was for this reason that Lieutenant Hovgaard had a stove transported there and invariably placed his carpenters at our disposal to help in the construction. We made good progress over the next few days but before the house was complete further pressures forced us to interrupt the work more than once.

On the 12<sup>th</sup> some cracks appeared in New Holland and in its vicinity and we couldn't dare to entrust our mobile depot to that floe any longer; since Little San Salvador was more secure for the moment, it took only half an hour to transport it to there again. The permanent depot was then considered to be an adjunct to the house and since the latter could not be moved at all, we left this depot on New Holland in the hope that this floe would not shrink any further.

The ice remained quiet for some time; however we heard the timbers of our ship cracking more than once, as was also observed several times on board *Dijmphna*. However we observed no movements in the ice which had been pushed under *Varna*; perhaps it was distant ice pressures, the effects of which we were experiencing.

On the 14<sup>th</sup> there was a violent southwesterly wind; the night had begun when *Dijmphna* received a shock and the ice beyond the new crack began to move eastwards with respect to the ships. New Holland was involved in this movement and the house, remaining visible served as a survey stake for following this ice movement. The ice moved through four

points of the compass  $(45^\circ)$  and then by the same amount in the opposite direction during the night, after the wind had swung into the west-southwest. Fortunately, during this movement the edge of the ice off *Dijmphna*'s port side was only slightly broached.

On the following evening the same circumstances occurred in almost the same proportions as to the wind, as on the day before. We were always ready to abandon the ship and went to bed fully dressed. Our soundings revealed that we were drifting towards the northeast; the depth diminishing steadily and on the 16<sup>th</sup> decreased from 49 to 23 fathoms. The wind had been blowing violently out of the southwest especially during the night and this made the snow which accompanied it even more disagreeable; as a result the observer had great difficulty in finding the meteorological screen and this snow would have been an additional obstacle if we had had to abandon the ships. However the ice still had enough space to drift and no pressures were felt. The house moved away from the ships by double the previous distance; the intervening space was covered with more ice, especially collapsed hummocks.

Just as on 3 November it would appear that *Dijmphna* ought to be the first victim if the ice pressures were renewed. To port, it is true, the rampart of hummocks remained but astern the ship was separated from open water by just 20 meters of fairly light ice. There we got away with just a few new cracks and when it became calm again over the next few days and the dropping temperature consolidated the ice around us we were relieved that everything had turned out so well. Our joy was of brief duration, however. On the 19<sup>th</sup> the wind freshened again and swung into the northeast; whereas it was in the south that the ice had been the focus of our attention, we now saw a large expanse of water opening to the north and east, such as we had not seen for a long time.

By evening the wind had swung into the northwest and most of the leads closed up; next day they had all disappeared without causing any violent pressures. On the 20<sup>th</sup> the southwest wind was blowing again and was pushing us farther to the northeast. In the evening the ice suddenly opened to starboard from *Varna* to form a crack only a few meters away; a lead 20 meters wide then opened; a further crack formed, even closer and when night fell accompanied by a snow storm which obscured our view our position was far from enviable. Since communication with the meteorological screen might be interrupted at any moment and since, above all we had to take care not to become separated, the meteorological observations were temporarily suspended.

We were holding ourselves ready to abandon ship and would not have hesitated very long to do so when shortly after midnight *Varna* rose by at least a foot to port with a shock, and a crack appeared in the ice immediately ahead of our bow. Taking into consideration the opening to starboard, the ship might be detached from its ice-bed and then the ice which had been pushed beneath the hull would again rise violently, which might have prevented us from retreating from the ship and might have proved fatal. We took refuge on board *Dijmphna* which, for the moment, offered a more secure haven, and waited for dawn which allowed us to check the state of the ice in our vicinity next morning.<sup>63</sup>

Between Little San Salvador, where the depot was now located, and the ships an opening had formed and then closed and a barrier of hummocks had risen in its place. Thus the floe had moved closer and then moved away to the west; chunks had become detached from its edges but the ice beneath the depot had remained intact.

<sup>&</sup>lt;sup>63</sup> A possibly misconstrued report of this development was probably the source of later reports in Dutch and Danish newspapers (*Handelsblad*, 18 December 1883; *Dagbladet*, 18 December 1883) to the effect that Hovgaard had saved the Dutch expedition (Snellen, 'Historique', p. 3.). Snellen maintained that since on 29 December the personnel of both ships took temporary refuge in the Dutch house on New Holland, it could equally be argued that the Dutch had saved the Danes (Ibid, p. 4)

Some new cracks in the vicinity of *Varna* were again threatening our position and this at a time when we had twilight only from 10 o'clock until 2 o'clock whereas during the other twenty hours we were in darkness. But let's not exaggerate, during those days we often had beautiful moonlight and magnificent aurora borealis which compensated to some degree for our lack of sunlight. We then had a few days of relative calm but it was the calm before the storm.

On the evening of 23 December *Varna* received a shock; the ice closed up to starboard of the ship and at the same time opened up off *Dympnha*'s port side. Things remained like this for a moment and we again had a few hours of respite which we spent in our beds, fully dressed.

At 5 a.m. we had a more violent shock than ever; everyone leaped out of bed and rushed on deck. A crack had appeared in the ice running from ahead of *Dijmphna* straight towards our stern and then across towards our starboard side; to port our vessel had become separated from its bed of ice.

There was no time to lose. We were still in contact with the ice to starboard; we took advantage of this to abandon ship immediately and we made our way to the large floe astern of *Dijmphna* which had served as our refuge more than once. The ice in which *Varna* lay moved away so that the last men to leave the ship had to jump across the gap which had formed. Our punt which lay at the edge of the crack was moved to safety near *Dijmphna*; on board the latter too they were preparing to leave her to save the depot and soon we were all on our way towards the latter with two punts and a small sledge.

This was not the most enjoyable journey; the distance was short, admittedly, but it was difficult to negotiate the rough ice in the dark. When we were crossing the hummocks with one of our punts the ice opened up a little and the blocks of ice dropped beneath our feet but since the punt provided a support, we reached the other side safely. However it took quite some time before we could negotiate this difficult point; one should not be surprised at this when one thinks that there was a consumptive<sup>64</sup> among *Varna*'s crew who collapsed and who had to be carried across this moving ice. We finally got across this difficult obstacle and brought the sledges and boats together at what appeared to be the best location for the moment.

A few cracks criss-crossed our refuge, which was already quite small, and the ice surrounding *Varna* was threatening to advance and to crush it completely.

Hummocks were forming on both sides of our floe yet there were still moments of calm which allowed us the leisure to cast a glance towards our ships. The dark shape of *Varna* was coming closer; it rose majestically, pushed up by the ice then dropped again; *Dijmphna* remained in place; it seemed once again to have been spared by the ice pressures. Along a crack right behind us we saw the ice on each side rise into the air; new cracks followed one another, even under the depot we could continually hear cracks beneath our feet and for an hour we were continually occupied in moving sledges and boats, always looking for a more secure site as one's present site was threatened. Under other circumstances each party took care of its own sledges and boats but now everyone concentrated on the place where they were needed most; some cracks still allowed us some time but others opened suddenly and threatened to engulf our materials. The ice appeared to be less restless towards the southeast and we looked in that direction in case we were forced to abandon our present position. But everything calmed down and towards the dawning twilight we transported the depot to a secure spot.

As soon as circumstances allowed we returned to the ships to check what state they were in and soon saw that in *Varna*'s case the ice pressures of November had been a trifle

<sup>&</sup>lt;sup>64</sup> Suffering from tuberculosis. This was the bosun's mate, Nielsen.

compared to these latest ones (Fig. 6). The sternpost and the rudder had been smashed and had disappeared between blocks of ice; the planks of the hull beneath the stern had been pulled apart. The ship had turned through seven points (78°) and heeled eight degrees to starboard; aft it had been raised by one foot and by two feet forward. Once on board we could see that there was a major leak beneath the engine room; water was gushing in violently and had already arisen above the fire-boxes. The engine had been displaced to starboard, its upper part by about two inches; the deck beams above the engine had been displaced more. The floe on which the meteorological screen stood had again become smaller in size and was now to port, right against the bow. The screen had again been spared, as too had the tripod for the magnetic theodolite which had remained upright on a small chunk of ice, a marvellous sight in the midst of the general destruction.



Fig. 6. Varna and Dijmphna after the second severe bout of ice pressures, 21 January 1883. Some of the lumber stowed on the ice has been heaved into a vertical position by ice movements (Snellen, 1886).

The lumber still lying on the ice had been scattered to the northeast; we spotted some more beams 500 metres away.

A large floe which previously had been some distance from *Dijmphna* was now located off to starboard and giant blocks of ice had piled on top of each other. The ice to port as well as the solid floe astern had survived well; if the crack had formed a few meters further aft *Dijmphna* would also have been engulfed in the ice movement and would have succumbed under the pressures. Once again this ship had been spared as if by a miracle. The ships now lay almost at right angles to each other; *Varna*'s stern now lay a little astern of *Dijmphna*. The distance from stern to stern was now 38 meters. One can get an idea of the change in *Varna*'s position by comparing Figure 4 with Figure 6. The photo from which the second plate was made was taken on 21 January 1883, and thus a fairly long time after the catastrophe and thus shows the situation after the changes in the ships' positions which occurred during that interval. Figure 6 would make one think that the stern of the vessel was completely buried

beneath the ice; this is due to the limited distance and the low position of the camera with regard to the ship. The masts to the right of the photo are *Dijmphna*'s; off to the side one can see several beams intended for the house at Port Dickson and one can judge as to the movement of the ice to some degree from the position which they occupy. To the left the dark, triangular shape reveals the peak of our house on New Holland over the hummocks, with the meteorological screen beside it. To the left, almost beneath *Varna*'s davits lies the Danes' weather screen, but, like ours it is right in the background.

The ice had calmed down and allowed us to remain on board during the limited hours of twilight; but we had to be on our guard since if the ice supporting *Varna* were to move apart it is likely that the ship would soon sink.

We immediately manned the manual pumps; we wanted to pump out enough water to clear the boiler fire-boxes and to continue to do so using the steam pump but our efforts were in vain – the water continued to rise at three inches per hour. When evening arrived we would not have been justified in staying on board any longer; we therefore readily accepted Lieutenant Hovgaard's offer for us all to move aboard *Dijmphna*, and we abandoned the ship which had become so dear to us and on board which each of us had experienced his shares of the joys and sorrows of life in the Arctic.

After months of work we had succeeded in making *Varna* suitable for our wintering; we had enjoyed it for such a short time! The ship was nothing more than a wreck, the prey of the ice on which it was resting!

We took with us as many of the first essentials as we could on board *Dijmphna*, where everybody did his utmost to assist us and to welcome us hospitably.<sup>65</sup>

There were no changes noticeable in New Holland; the house still lay in the same direction and would have served as a refuge for everyone if *Dijmphna* were lost. On the 23<sup>rd</sup> and also during the night of the ice pressures the wind had blown strongly but only from the west-southwest; we therefore attributed those ice pressures to the shallowness of the sea in the vicinity of Mys Vengan (Cape Vengan), near to which we had been pushed by our constant northward drift. Our ice plain had perhaps encountered the edges of these shoals or else had come into contact with ice which was grounded on them.

We had barely moved aboard *Dijmphna* when we were again driven on deck; a block of ice lying against the starboard side became unbalanced and fell with a loud crash; but calm was renewed and we spent the night quietly in armchairs.

Measures to accommodate us all as well as possible were taken immediately; naturally it took quite a long time before it was possible to prepare beds for the 22 additional men on board this ship, which was already quite small. Initially the ice in the vicinity remained so restless that we had to remain fully dressed, however, and ready to race on deck at the first alert so that a chaise longue would have been more than sufficient for spending the night.

We frequently went to see the *Varna*; the ship's equilibrium still appeared to be far from becoming stable. The water was still rising in the hold; the vessel was listing less but the stern was slowly sinking.

<sup>&</sup>lt;sup>65</sup> Christmas was celebrated as festively as possible, given the circumstances. The addition of the 22 Dutch and Norwegians to *Dijmphna*'s complement of 20 made for somewhat cramped quarters (Hovgaard, *Dijmphna-expeditionen*, p. 70). The saloon, designed for six officers and scientists, now had to accommodate 12 for meals, which resulted in a degree of upheaval and confusion, partly due to linguistic difficulties. Hovgaard's party included one Italian, Alberto De Rensis (Zavatti, *L'Italia*, pp. 127–133) while Knudsen represented Norway. Few of the Dutch or Danish scientists knew the language of the other group, and hence French was generally the lingua franca (Snellen, *De Nederlandsche Pool-expeditie*, p. 107).

We took advantage of the following days to place in safety anything which might still be useful; the instruments were all stowed on board *Dijmphna*, as were our beds, our clothes and as much provisions as that vessel could hold. Shortly afterwards *Varna*'s stern was also full of water and we had to fish for the remaining provisions; since most of them were in tin cans they had not suffered at all while everything located in our provisions room, including our supply of wine could be saved. As soon as *Dijmphna* could not contain anything more several food depots were established on the ice.

The first few days passed fairly quietly but we had more than one reason for being extremely anxious; a new crack which had formed 70 meters ahead of *Dijmphna*, opened on the 26<sup>th</sup> and formed a lead 150 meters wide; it closed again during the night without producing any strong pressures but opened again repeatedly and was continually threatening our position. As a result we always had to be prepared to abandon the ship, and for this reason sometimes we would find ourselves assembling on the deck six times in the same day for that reason. On the 27<sup>th</sup> we noticed movement in the ice more than once and once again the depot had to be moved to a safer place; this time we chose a floe about 200 meters astern of the ships. But we couldn't leave it there for long; on the following day a crack appeared only a short distance away and extending as far as *Dijmphna*'s rudder which was thus threatened. We left the ship and before it got dark had just time to move the depot to New Holland where we all spent the night in the house. It was still not completely finished, it is true, but provided better shelter than the tents. Everyone found a place on the floor in their sleeping bags in such a way that we did not even need to use the upper floor. We certainly would have found some space there if, in the event that *Dijmphna* was lost the house became inhabited over the long term.<sup>66</sup>

Around midnight some of us went to check the situation around *Dijmphna* and found that the newly formed lead had widened by a couple of meters; at the same time the ice on the starboard side had moved away so that the ship was in an open basin. We moored it with cables and ice anchors against the ice to port and returned to New Holland, not without feeling anxious about *Dijmphna* which, if the ice closed up again violently, ran a great risk of suffering the same fate as *Varna*. Fortunately the ice remained quiet in its new configuration and the space that had opened became covered with new ice for the rest of the winter. The temperature was now so low that the skin of ice which had formed could already bear a man's weight by the following morning. During that same night there was also some movement in the ice near *Varna*, the stern of which dropped by 18 inches along with its ice-bed.

This is how the year ended and nobody knew what the new year might bring; but each day was a gain since it brought us close to the time when the sun would reappear and in summer would give us the light which we had missed so much in winter.<sup>67</sup>

For some time there were further alarms from time to time; sometimes we would hear ice pressures in the distance; sometimes we would notice some movement in the ice closer to us, but all of this became steadily less frequent and the ice supporting *Varna* soon formed a

<sup>&</sup>lt;sup>66</sup> The Dutch expedition members and *Varna*'s crew lived on board *Dijmphna* permanently from this point onwards, the house on New Holland being used purely for scientific purposes and as a refuge when and if necessary (Barr, *The expeditions*, p. 241).

<sup>&</sup>lt;sup>67</sup> To make up for the rather subdued celebration at Christmas on New Year's Eve a determined effort was made to compensate for this. *Dijmphna* was illuminated with numerous paper lanterns, while flaming torches and bonfires lit up the surrounding chaotic pressure ice. At midnight the New Year was ushered in with numerous toasts and speeches and a great deal of merriment and dancing (Snellen, *De Nederlandsche Pool-expeditie*, pp. 103–4; Hovgaard, *Dijmphna-expeditionen*, p.71).

Thereafter various important anniversaries were appropriately celebrated with torchlit parades and plenty of alcohol: King Wilhelm II's birthday on 19 February, King Christian's birthday on 8 April, and even the birthday of King Umberto of April (for De Rensis's benefit) on 14 March (Snellen, *De Nederlandsche Poolexpeditie*, pp. 111 and 117).

solid mass. In early January the lead opened once again 70 meters from *Dijmphna* but this was the last time that it gave us any concern; it did not close completely and the young ice which formed on it survived until summer when the heat of the sun melted it. Thus in our immediate vicinity we obtained a level area which extended to close to New Holland and which became the preferred area for strolling.

Our accommodations on board *Dijmphna* were now ready and on 8 January we were again able to sleep in a bed, a luxury of which we had been deprived since 23 December. The ice movements were no longer such as to worry us; it was only on the 14<sup>th</sup> that the ship received a shock but it had no troublesome consequences.

While it may be tedious to read the description of these repeated ice pressures which had been harassing us up until now, it was even more painful to experience them and to make all this effort to achieve a result which might be rendered pointless on the following day. The period of calm which now followed was a true source of relief for all of us; the ice pressures became less frequent and left the ships and the ice which separated them from New Holland in peace. I can now be brief in my descriptions of the ice during the months which followed.

Over the course of the month of January Lieutenant Hovgaard judged it to be desirable to distribute the provisions for our retreat among several floes and to keep the boats, the sledges, along with tents, ammunition and cooking equipment near the ships. The latest ice pressures had even split floes such as Little San Salvador and we could see cracks lengthening across New Holland; thus there wasn't a single floe in which one could place one's trust completely. In dividing up our provisions we would have a greater chance of saving enough of the two depots to be able to mount our retreat in case there were further pressures. Eight depots were therefore established around the ships and they remained out on the ice until sometime in April. Thereafter they were not left on the ice; they were placed on Dijmphna's deck ready to be loaded into the five boats with which we would mount our retreat should the occasion arise. While in winter the sledges had been our primary means of travel and the two boats accessories, as summer approached the reverse was true. Dijmphna's three boats and Varna's two, to which would be added the Rae sledges, would be used for the retreat. On 21 January the sun was again above the horizon at noon; a bank of clouds to the south prevented us from seeing it however and revealed its presence only around its edges in a glow of yellowish gold. On the 22<sup>nd</sup> it appeared in all its splendour and allowed us to enjoy its beneficent light longer each day.<sup>68</sup> One could not feel its warmth yet; this was the coldest period of our wintering and a few days later the temperature attained its minimum of -47.2°C. This did not displease us, however; on the one hand the cold did not trouble us; on the other hand it increasingly cemented the shattered ice together to produce a solid mass which made our position more secure and resulted in the Varna staying on the surface until summer. We were still extracting items of general usefulness from the ship, including a large quantity of coal which was stowed aboard Dijmphna. During the coldest days a layer of new ice 12 cm thick formed on the surface of open water areas; a thick layer of ice also formed in Varna where the water inside the ship was 11 feet deep aft, and greatly hampered the work.

Whereas in January and early February our latitude changed very little and we were moving only a little closer to the Yamal coast, to within 20 miles, in late February and early March we experienced a repetition of our movements in December and were pushed rapidly northeastwards by strong southwesterly winds. This did not lead to any noticeable change in the state of the ice in our vicinity, however.

<sup>&</sup>lt;sup>68</sup> Hovgaard, *Dijmphna-expeditionen*, p. 72. At noon the Danes climbed *Dijmphna*'s rigging while the Dutch clambered on to the roof of the house at New Holland to get the first glimpse of the sun (Snellen, *De Nederlandsche Pool-expeditie*, p 111).

This drift was repeated in April and on the 18<sup>th</sup> we reached our northernmost point at a latitude of 71°45′3″N while the longitude which I had observed on the previous day was also the most easterly during our wintering. Thereafter northerly and easterly winds became more frequent and we were pushed back towards the south and west.<sup>69</sup>

The fine weather which prevailed in spring and the calm conditions which reigned in the ice surrounding us allowed us to take longer and longer walks in the vicinity.

In early April Lieutenant Hovgaard took a walk towards the east but was stopped by a new lead about four miles from the ships.<sup>70</sup> Not far from there he had a tent pitched with a sleeping bag, guns, ammunition and some food for anybody who might want to go hunting in that direction. This site, which became known as Oscar's Rest, was often visited and since those going there often used Rae sledges pulled by dogs the route was soon well marked so that on later excursions towards the east we too would first go to Oscar's Rest which became our first stopping place. Thus in early May Dr. Kremer and I twice made reconnaissance trips in that direction, the first as far as 10 miles and the second 14 miles from the ship.

On the first occasion we covered the four miles to Oscar's Rest in one-and-a-half hours; further east the ice wsa quite manageable but we didn't want to go too far in the same direction and each time we chose a new direction which did not diverge too much.

The lead mentioned earlier had closed to produce new hummocks; further on we passed many more newly formed hummocks or narrow leads covered with a thin skin of ice which clearly were newly formed. We noticed that almost all of them were aligned from northnortheast to south-southwest, and thus almost parallel to the Yamal coast.

At the point at which we turned back we discovered a spectacle of destruction such as we had not seen previously. Over a large area giant blocks of ice, some of which were 1.5 meters high had been pushed up by ice pressures to form a barrier which was completely impassable. We could easily have continued our excursion by deviating to the right or left but we were not prepared to do so. On the second occasion we had a small sledge consisting of two skis joined by cross-pieces, sleeping bags and a stove and we pushed on for another four miles to the east-southeast where a lead 100 meters wide blocked our path.

We spent the night in the sleeping-bags which even without a tent and at a temperature of -12°C provided sufficient shelter.

We noticed many fox and bear tracks and therefore kept our guns at the ready but we did not see the animals themselves.

We saw the midnight sun for the first time on 10 May; the temperature remained quite low, however, rising above zero only rarely.<sup>71</sup> Over the course of that month the snow started to melt to produce pools of fresh water, initially near the *Dijmphna* and the house where the

<sup>&</sup>lt;sup>69</sup> This change in the drift direction represented an amazing stroke of luck. In 1912 *Svyataya Anna*, the ship of Leytenant Georgiy L'vovich. Brusilov's expedition, beset in similar fashion in the Kara Sea while attempting a transit of the Northeast Passage, would drift north throughout the winter of 1912–13, and the summer of 1913, until, caught in the Transarctic Drift, it headed west north of Zemlya Frantsa-Iosifa. Ultimately of 11 men who left the ship to trek south to land only two would survive; the ultimate fate of the ship and of Rusanov and the other 13 crew members (including one woman), is unknown (Albanov, *In the land; South*; Barr, 'South').

<sup>&</sup>lt;sup>70</sup> Accompanied by Lieutenant Olsen and one seaman, Hovgaard undertook this little excursion on 10 April (Snellen, *De Nederlandsche Pool-expeditie*, p. 117).

<sup>&</sup>lt;sup>71</sup> On a sadder note, shortly afterwards, on 14 May the only death on the expedition occurred. Varna's bosun'smate, Nielsen, aged 55, died of a respiratory complaint, probably tuberculosis. His funeral involved a procession across the ice, the singing of a Norwegian hymn and a short eulogy by Captain Knudsen before the coffin was slid down through a hole in the ice (Snellen, *De Nederlandsche Pool-expeditie*, pp. 126–7).

Nielsen's was the only serious illness with which Dr. Kremer had to contend. He recorded not a single symptom of scurvy and ascribed this to the regular consumption of cloudberries, *Rubus chamaemorus*, and lemon juice (Ibid, p. 130).

blackened surface absorbed the sun's rays more effectively, but soon also at other locations lying lower than elsewhere where water from the hummocks or other raised areas flowed together.<sup>72</sup>



Fig. 7. Dutch and Norwegian party prepared for a 'trial-run' at sledging to land, 19 May 1883. Note the design of the 'McClintock sledge' in foreground (Snellen 1886).

*Varna* was still supported by the ice which had been pushed beneath it and Captain Knudsen had already made several attempts to keep the ship afloat after the ice opened up. Part of the cargo had been unloaded and using timber still available from our expedition pontoons were installed under the stern, but to achieve some success by this method one would have needed such a vast supply of lumber that the attempt was soon abandoned. In addition to the two manual pumps Captain Knudsen had two more made which were driven by windmills<sup>73</sup> and on 22 June a last attempt was made to pump out enough water to emplace a pontoon. For 16 hours the crews of both ships and the members of the expedition pumped non-stop but without success; the water was flowing in as fast as it was pumped out.

Thereafter *Varna* was abandoned; it was waiting only for the moment when the ice withdrew its support for it to sink into the depths.

<sup>&</sup>lt;sup>72</sup> On 19 May the expedition members and *Varna*'s crew practiced getting organized for a sledge trip to the nearest land, including stowing sledges and pitching a tent. See Fig.7.

<sup>&</sup>lt;sup>73</sup> There were two windmills (Fig. 8). Strangely Lamie makes no mention of the building of these windmills, an operation which must have kept the engineers busy for quite some time.



Fig. 8. The attempt at pumping the water out of Varna using wind-mills, 22 June 1883, two days before the ship sank (Snellen, 1886).

It was only on 11 July that the ice around the ships started moving. There was a strong wind blowing and the lead ahead of *Dijmphna*, on which the ice had melted completely, closed, whereby enormous blocks of ice were piled up along its sides and the pressure even made the ice directly ahead of *Dijmphna*'s bow rise. At the same time the lead which had formed astern in December and which had become covered with young ice, opened again. The ice to starboard also moved away by several meters; it moved back slowly, however, but nevertheless exerted such enormous pressures on *Dijmphna* that it produced folds in the tightly stretched carpet in our cabin. A crack separated a large block of ice from the ship's port side.

Numbers of old cracks reopened and some new ones formed, one of them abeam of *Varna* to port, opposite the main mast; the ship moved astern several meters from its ice-bed but the ice ahead of the crack supported it for a few more days.

*Dijmphna* had been pushed astern a little but the propeller and the rudder had survived intact.

Over the following days the ice opened and closed a little on several occasions but without causing *Dijmphna* to move away from *Varna*. On the 15<sup>th</sup> *Dijmphna* suffered violent pressure again and was rammed with such force against the ice to port that the large block of ice which had become separated from it a few days earlier was pushed back against the hull.

*Varna*'s stern was dropping by a few centimeters every day but a few more days would pass before it sank.

At 8.30 a.m. on the 24<sup>th</sup> we were at breakfast when somebody shouted from the deck "*Varna* is sinking" and everyone rushed on deck. The stern had suddenly dropped with a jolt, but then the movement slowed, but it was visibly sinking more and more. The ice under the

bow held up right to the end and prevented a sternwards movement which might have been fatal for *Dijmphna*. Finally the water reached the after hatchway and the ship began sinking more rapidly; *Varna* moved astern by a few meters and a few moments later disappeared vertically into the depths of the sea. Its main mast grazed the floe lying immediately to starboard of *Dijmphna* but did not touch that ship; a few chunks of ice surged back up, the floes rocked a little then everything soon quietened down as if nothing had happened.

We were at 71°4.8'N; 62°51.6'E; the depth was  $73\frac{1}{2}$  fathoms.

Long before this we had agreed with Lieutenant Hovgaard that if *Dijmphna* got free before 1 August he would try to land the Dutch expedition at a suitable location on the Yamal coast, in order to place us in a position to make observations on land for some time. All the necessary objects, including lumber for a magnetic observatory were already on board and the necessary provisions had been prepared.

The summer was flying by, however, and I was starting to doubt that it would be possible to implement this plan, and already over the course of July we began to make preparations for retreating across the ice using boats and sledges; I was wanting to make proposals to Mr. Snellen to this effect by the end of the month.

More than once Captain Knudsen and *Varna*'s crew had expressed their desire to accompany us and towards that goal had long since constructed two small Norwegian sledges.

With the death of boatswain's-mate Nielsen in May the Norwegian crew now amounted to eleven men; if one adds to this the ten members of our expedition we totalled 21 men, all in good health and keen to undertake the journey across the ice.

On 14 July we assembled everything we needed on New Holland and distributed it among the boats and the sledges. We launched the boats in order to assure ourselves that they could handle the loads which would be assigned to them. We had at our disposal our expedition's punt, *Varna*'s two boats and one punt, the expedition's two sledges and the two Norwegian sledges mentioned earlier. There was thus one sledge for each boat, the load of which was proportional to the number of men who would be pulling it, while we took care to divide up the foodstuffs in such a way that each party could continue separately in the event that the boats became separated.

Since we thought that even in the worst scenario we would not need more than two months to reach Khabarovo, the Samoyed village on Yugorskiy Shar, the provisions which we were to take with us were calculated roughly to last that length of time. They are listed below as well as the individual rations:

135 kg of Dutch canned meat at 0.43 kg per head per day, to last for 15 days

140 kg of Australian canned meat at 0.43 kg per head per day, to last for 15.5 days

2202 kg of corned beef at 0.50 kg per man per day, to last for 19 days

90 kg of smoked bacon at 0.40 kg per man per day, to last for 10.5 days

630 kg of biscuit at 0.50 kg per man per day, to last for 60 days

90 kg of canned butter at 0.07 kg per man per day, to last for 61 days

33 kg of sugar at 0.025 kg per man per day, to last for 62 days

17 kg of tea at 0.013 kg per man per day, to last for 62 days

25 liters of gin (consumption to depend on circumstances)

120 meat and vegetable tablets; carnepura for soup.

This last article was, properly speaking a luxury item but it was so popular that I gladly assigned it the limited amount of space that it would occupy. Finally we were also to take 90 liters of alcohol for our stoves; the consumption was thus estimated at 1½ liters per day. All the canned goods were taken from the provisions of the Dutch expedition; the biscuit was largely

from the supplies we had brought from the Netherlands; the rest came from Varna or Dijmphna.

We had only one stove but it was enough for 16 men and since Lieutenant Hovgaard had been so kind as to let us have one of his, designed for three men but which could suffice for five, we really had no problem. In lieu of sleeping bags the ten reindeer-skin coats were assigned to the expedition members while we let the Norwegians have our seaman's jerseys and our reindeer skin boots. For each person we held in reserve a small bundle of clothes containing a flannel shirt, woolen underwear and a pair of woolen socks.

We also took the expedition's five hunting rifles, with ammunition, namely 25 ball cartridges and 50 shot cartridges, and three guns and ammunition belonging to the Norwegians as well as the essential magnetic and astronomical instruments, the main results of the expedition and all the necessary equipment for the boats.

During the last days of July there was little change in the state of the ice around the *Dijmphna* and hence I proposed to Mr. Snellen that we should set off on 1 August. My main reasons were that we had no guarantee that *Dijmphna* would be able to get free, and the fact that the season was getting late. With each day of delay we were getting close to the time when the open water between the floes, of which we could still take advantage, would become covered with ice too thick to tackle in the boats, yet too thin to bear the weight of the boats and the loaded sledges.

Captain Knudsen and Haugen, the ice pilot, were consulted at my request and were unanimous that it was time for us to leave. Mr. Snellen came to the same decision; then Captain Knudsen and I undertook to lead the retreat and everyone prepared to set off.

All items of value which we had to abandon were taken aboard the *Dijmphna* by Lieutenant Hovgaard, with a view to taking them back to Europe in the event that his vessel was still seaworthy after becoming free of the ice.

On August 1 we took our leave of our Danish friends and left New Holland at 10 a.m. (Fig. 9). The start of the journey was less than propitious, for we had scarcely started when the sledge which Mr. Leigh Smith<sup>74</sup> had donated suffered an accident; repairing it would certainly have delayed us by half a day but we took advantage of Lieutenant Hovgaard's offer to exchange it for one of his McClintock sledges and were able to continue our journey immediately.

The course we had selected was south (magnetic) and thus almost in the direction of Khabarovo, in the hope that the northerly winds which we could still expect would push us south and would help us in negotiating the pack.

Shortly before we had inspected the ice in that direction up to six miles from *Dijmphna*, and had found it quite favourable. Therefore, having launched the boats we began by following a lead near New Holland, heading for a beacon which we had set up a few days earlier at the start of a stretch of level ice which would serve our purpose. Having crossed it we were still not tired, it is true, but it was 7 p.m. and guided by the experience we had gained during sledging races we did not want to demand too much of the crew right at the start. We therefore set up camp only three miles from *Dijmphna*; it presented a totally different appearance from our winter camps; then we had been using tents, but now it would be too wet to lie on the ice in a tent; we therefore spent the night in the boats, each rigged with a tent, and each accommodating its crew.

The personnel were divided up as follows:

The expedition punt: In command, Lieutenant Lamie (E); Mr. Snellen (E); pilot Beutler (E); stoker Stapper (E); carpenter Pedersen (E).

<sup>&</sup>lt;sup>74</sup> Lamie's mistake; in fact it was a gift from Sir Allen Young of the *Hope*.

*Varna*'s large boat. In command Captain Knudsen; Mr. Ekama (E); engineer Van Dolder (E); engineer Eriksen; carpenter Bredersen; cook Andersen; stoker Christoffelsen.

*Varna*'s small boat. In command first pilot Knudsen; Mr. Ruys (E); engineer Fransen; cook De Bruin (E) seaman Balser.

*Varna*'s punt. In command ice pilot Haugen; Mr. Kremer (E); second pilot Thoresen; stoker Halversen.

The letter "E" after the names identifies members of our expedition.

Our punt had *Dijmphna*'s McClintock sledge; the captain's boat that of the expedition; while the two Norwegian sledges were assigned to the two other boats. The load on each of the sledges was proportional to the size of the boat's crew.



Fig. 9. The Dutch/Norwegian party about to start on the boat-and-sledge journey to land, 1 August 1883 (Snellen, 1886).

In the evening only essential items were kept on the sledges; everything else was securely attached so that in the event of an alarm during the night the sledges could be immediately reloaded if necessary. There was always a man on watch during the night.

On 2 August we had to travel only a short distance to take advantage of a lead which ran straight in our direction so that we could cover the first three quarters of a mile by rowing. We then had a few difficult stretches to negotiate, but we encountered enough stretches of open water that we advanced a total of four miles that day.

On the 3<sup>rd</sup> we were very lucky for we had to haul the boats and sledges across the ice only twice, and then just for short distances. The great advantage of travelling by water is immediately obvious when one considers that when rowing a boat one has one's entire luggage with one, whereas on the ice, one first has to haul the boats empty then retrace one's steps to

fetch the sledges; so that, in that case one has to cover the same route three times. However open water was preferable only when it extended for a considerable distance in the desired direction or nearly so; if we found leads of limited extent between two floes or ice fields they represented more trouble than they were worth and hauling everything across the ice was preferable. However one should not get the idea that these stretches of open water were very extensive; we often had to move aside large floes which obstructed our passage using a boathook, otherwise we would have covered a distance at least five times greater.

Until then the fog had prevented me from taking an observation to determine our position; on the  $3^{rd}$  the sky was clear and I found our latitude to be  $71^{\circ}10.8$ 'N and our longitude  $62^{\circ}29.4$ ' E whereas our last observation before leaving *Dijmphna* had been  $71^{\circ}9$ 'N;  $62^{\circ}41$ 'E. Thus despite our southward progress we had in fact retrogressed northward. We could still see *Dijmphna* to the north at a distance estimated at 10 miles. Thus the entire pack must have been pushed considerably to the north and also a little to the east.

This was far from encouraging, especially when one thinks that we had had almost continually a northeast wind which, one would have hoped, should have produced a drift to the southwest. But we refused to be discouraged since the ice conditions were steadily improving and soon perhaps we would be making such good progress that a counter current of a few miles per day would be immaterial.

On the 4<sup>th</sup> too we encountered many leads; they were aligned a little to the east of our course but we took advantage of them nonetheless. We had to haul the boats on to the ice only once, and were able to launch them again immediately. However by noon we had reached a latitude of only 70°10.3'N and a longitude of 62°19' which indicated a drift to the northwest. The weather was exceptionally fair and clear and in the morning we had spotted the *Dijmphna* for the last time; since the 3rd it seemed to have become displaced a little to the east with respect to our house. In the afternoon I had just negotiated a narrow opening between two ice fields in the punt when it started to close which meant that we again had to unload the three other boats and haul them across the ice.

More than once we had to hurry through narrow passages which were visibly closing; the first boat would then warn the others to hurry; this measure was often used when the ice was perfectly motionless in order to encourage the rowers to move more quickly.

Soon some members of the crew were struck by incipient snow-blindness, but thanks to our doctor's good care and the appropriate use of coloured goggles, this did not oblige us to stop.

Next day the ice conditions were much worse; we had a succession of small polynyas between which we had to haul across the ice each time, so that the boats had to be hauled out and launched seven times. This always led to a great loss of time; if there were enough room for all of us to haul-out together, everything would proceed quite quickly but usually there was not enough room and each boat had to be hauled out in turn. We would then wait for each other and take advantage of the time to reconnoitre the conditions ahead. We advanced only three-and-a-half miles that day but our latitude at noon was 71°8′N; thus the northward drift appeared to be much less.

We camped on the southern edge of the largest polynya we had encountered thus far and we went to sleep full of pleasant anticipation for the following day. Unfortunately during the night the ice closed up to the extent that by morning the polynya had disappeared almost completely; we launched the boats however and tried to make our way south by pushing aside some floes which had squeezed together, but without success. The going across the ice appeared so difficult that we found it better to wait until the ice loosened again a little. We made trips in several directions and climbed a large number of hummocks to determine our position as well as possible but, as far as the fog allowed us to judge the ice conditions were very difficult. We therefore spent the whole day living in hope. Fortunately our latitude had again become a little more southerly while our longitude of 61°32′ indicated a strong westward drift; there was a good breeze blowing out of the north-northeast.

Although there was no change in the ice conditions next day we decided not to wait any longer and opted to make every effort to continue our progress across the ice.

It was an extremely tiring day; we were generally travelling across very rough, old ice; only here and there would we encounter a level surface of new ice, and we had to launch the boats nine time just to row very short distances. However, despite all our efforts we covered no more than one-and-a-half miles and to make matters worse one of the Norwegian sledges broke down but fortunately could be repaired.

The following days were no better; moreover the fog prevailed almost continually and we could select better going only in clear weather; however we still covered a further two miles per day in the right direction.

The ice was little different from that in the vicinity of *Dijmphna*; for the most part we were encountering old floes sometimes broken into small pieces and separated by leads which interfered with progress across the ice but which were too narrow for us to be able to use the boats. When we reached such a spot we had to unload and reload everything and it would take us hours to cover a distance of 100 meters. This was the worst going we had encountered and yet, as we advanced we encountered it more and more. The old ice was generally very rough and put our boats and sledges to a severe test; we progressed across it slowly, but safely. Surfaces covered with new ice were preferable when they stretched for a long distance unbroken, but this was starting to become very rare; in many places numerous ponds and leads made them impassable.

Fortunately the snow had almost completely disappeared from the surface of the ice and the hummocks had become levelled off to the point that we barely noticed these obstacles which had been so troublesome in winter.

The McClintock sledges were perfectly satisfactory; they were longer than the Norwegian sledges and therefore their loads did not need to be as high as on the latter. The latter, moreover, being made of red pine, required more care and were less strongly built than the former. When we had to haul the boats across the ice the launches had an advantage over the punts; they rested entirely on their keels so that the men, arranged on both sides held them in balance and could haul them along without too much difficulty. The punts, by contrast, presented a much larger area of contact to the ice and hauling them required greater efforts, but since they did not need to be supported on either side, one could apply one's strength in the most efficient manner by using hauling-belts. In the water the punts had the advantage that one could make progress in them in openings where underwater ice projections made the launches impracticable but especially that one could haul them out of the water more easily; two men could handle them. It was especially when the edges of the ice were vertical that it was difficult to haul out the large boats.

We had been very lucky in the distribution of our manpower and almost never needed to wait for each other except when only one party could advance at a time.

Here is how we divided our day. We usually got up at 5.30 a.m.; by then the cook was already busy making tea which we found delicious, and which we enjoyed with a piece of biscuit and butter, having first washed in ice-cold water. The furs were stowed away and the tents folded then everything was lashed securely on the sledges, unless we were launching the boats immediately. Once we were ready we would get under way until 11.30; then we would

take a rest, distribute some brandy and have some biscuit with bacon. We had soon abandoned the formal menu for the expedition, by reducing the ration of canned meat so that it would also suffice for the ten days for which bacon had been prescribed. The supply of the latter was then spread out over 60 days which came to the same thing, but the apportionment was much better; this little bit of bacon at noon was a real treat.

We set off at again at 1 o'clock and continued travelling until six or seven in the evening, when we would camp. We would then have dinner, consisting of canned meat, bread, butter, hot tea; three times per week we would have bouillon. Then we would normally mount a reconnaissance to the south, after which we would go to bed in the boats; the boards of the latter were far from soft, it is true, but nevertheless gave our tired limbs the rest which they needed.

On the  $10^{\text{th}}$  I was again able to determine our latitude which, to everyone's great joy was  $70^{\circ}51'$ N; thus since the  $6^{\text{th}}$  we had advanced south by a distance double that which we had covered across the ice. Thus we were now drifting in the right direction and were rapidly approaching the east coast of Ostrov Vaygach. I could not determine our longitude, but next day I found it to be  $61^{\circ}3.7'$ E. We had had westerly winds for a couple of days but they were not strong enough to disperse the ice as much as we would have desired.

On the 11<sup>th</sup> the ice appeared to be more level; old floes were rare and the ice was more broken up than in the past few days. The boats stayed in the water all day but we continually had to make our way by pushing floes aside sometimes at the cost of great efforts. Often we would see large chunks of ice turning over or surging to the surface very close to us. These were floes which during the winter had been pushed under other floes by the ice pressures. Fortunately none of these floes collided with our boats, which would have been a real calamity.

Not a day passed that one or other of us fell into the water, but assistance was always close by. After the individual had been pulled out of the water his clothes were wrung out and after some of them were replaced by dry clothes, he would soon get warm again by working. We had wet feet almost constantly; the heavy usage to which we subjected our oiled leather boots meant that we could not expect them to remain completely waterproof indefinitely; but during the day movement kept our feet warm and at night our stockings dried quite well in our fur boots.

We had a bad day on the 12<sup>th</sup>; on the 13<sup>th</sup> things were a little better in that we did not encounter such bad going as during the first few days. The rain was also a great inconvenience; we were therefore forced to remain sitting in the boats, protected from the rain by the tents, admittedly, but not from the cold which one felt more than the much lower temperatures in winter when we were able to keep moving.

When we camped on the evening of the 14<sup>th</sup> the appearance of the ice to the south was worse than anything we had encountered thus far. It was only with difficulty that we were able to reconnoitre the conditions for half a mile from our camp; we found only shattered old ice, consisting of small floes jammed against each other. It would have been pointless to try to negotiate them with the sledges and boats and therefore on the 15<sup>th</sup> we deviated by about 45° to the east from our preferred direction and managed to cover half a mile that day which we had to consider a great success given the circumstances.

Our observations over the past few days had revealed that our pack was again drifting to the west so that we were increasingly approaching Karskiye Vorota which we would gladly have tried to avoid, but our poor progress across the ice did not permit this.

On the 16<sup>th</sup> there was a very strong wind out of the northeast; it was combined with rain; having covered half a mile we had to camp, and remained inactive for the rest of the day. Although I had sufficient confidence in my chronometer to conclude, in combination with our

last observed latitude that we could not be far from Ostrov Vaygach we were all agreeably surprised when at 8 p.m. we sighted land again. We could see it to the southeast about 12 miles away; it was the high island north of Mys Voronov (Cape Voronov). We went to bed, looking forward to the next day.

The wind swung into the north and there was some movement in the surrounding ice. During the night, at 1 a.m., the small floe on which we were camped came into collision with a larger one and split in two. The crack ran right under our camp and initially widened, but not so rapidly that we could not transfer from one side to the other, everything that had become separated from our camp; we then moved with all our belongings to the large floe which had been the cause of this accident.

We could see that we had made substantial progress parallel to the land and we were being forcibly pushed into the Karskiye Vorota. Early next morning we continued on our way to the southeast true, but with greater difficulties than ever. The sea was very rough; sometimes the floes would move apart by a few meters; sometimes they would surge together with such force that their edges would crumple, forming small hummocks. We had to combine all our strength, transporting all our belongings, piece by piece from one floe to the other, sometimes across moving hummocks, or else manoeuvering the boats through openings which might close again at any moment.

We took a rest at noon on an old, dirty floe which was criss-crossed by several cracks and one angle of which was broken off and raised by two meters while we were there. At 5 o'clock our situation improved greatly in that we reached a large, thick floe which offered us a safe refuge for the moment. It was a little early for us to stop but the small floes all around us were so restless and moreover the going further to the southeast was so bad that we judged it to be safest not to leave our floe as long as the current continued to push it towards land. Next morning we all had grounds for rejoicing in our decision, for not only our floe but all the ice around us had changed direction through 180° during the night so that if we had continued traveling, we would have lost ground instead of advancing. We rested throughout the entire day on the 18<sup>th</sup>; the weather was foggy; the sun started shining however, which did a lot of good to our wet furs and allowed me to determine our latitude and longitude. The former was 70°27'14"N and the latter 58°30'45"E.

Soundings revealed depths of 9 to 15 fathoms and we were being slowly pushed towards the south-southeast. Each time the fog dissipated a little we took a sounding and found that between 8 a.m. and midnight with respect to our floe the large, high island north of Mys Voronov had changed position by only three quarters of a point in the same direction, whereas we had approached closer and closer to it.

At the position where Ostrov Oleniy (Oleniy Island) ought to be located according to Russian and other maps, we could not find an island whereas we could see several of them two or three miles further east, all of them very low, as well as those located northwest of Mys Voronov. The island exceeding all the others in size and height, near the north coast of Ostrov Vaygach, is the one lying straight north of Mys Voronov. As one approaches from the Kara Sea it presents the appearance of a high peninsula and we realized our error only as we got closer.

As already mentioned this was the first land we sighted, long before we could make out the much lower north coast of Ostrov Vaygach.

While we were on our large floe we could see that all the ice in the vicinity was moving; while here hummocks were sinking, there we detected ice pressures, but these did not trouble our floe which was slowly carrying us towards our goal.

On the morning of the 19<sup>th</sup> we noticed that since midnight we had moved away a little from the large island and that the current was carrying us more to the west. Fortunately the ice was quieter and therefore we didn't hesitate for a moment but decided to make every effort to reach the closest land. This was a small island which was now roughly in the direction of the large one.

We were again obliged to transport all our belongings from floe to floe, over short distances each time, in order to be able to combine all our efforts at difficult spots. At times we took advantage of the fortuitous meeting of two floes to transfer from one to the other, but it often happened that they separated again before we had all made the crossing. This tiring work continued until noon but observations revealed that we had not moved away from the land. The observed latitude was 70°25′28″N; the large island bore SE½S and the north point of the land projecting between Mys Voronov and Mys Bolvanskiy (Cape Bolvanskiy) E¼S true, while a sounding revealed a depth of 13 fathoms. The weather had become so clear that beyond that point we could make out a further five low islands, the northernmost of which bore ENE½E; these are the same ones mentioned earlier and which we had already spotted on the previous day.

In the afternoon we were luckier; we launched the boats and now found the ice so scattered that we were able to drag them through openings between floes which were covered with brash ice; soon we could even make progress by rowing.

Around 4 o'clock we passed a reef on which a large number of floes had grounded; at one point we found only 3 feet of water. This reef lay northeast true and about two miles from the small island towards which we were heading.

We reached it at 6 p.m. and everyone was ecstatic to tread on terra firma again, convinced that our return to the inhabited world was now just a matter of time. Mr. Snellen cordially congratulated us on the success we had achieved and named this location of our first landing Buys Ballot Island in honor of the great scholar who had been the promoter of this expedition. This island is not marked on the maps; it is very small, as too is another one lying 1 kilometer further to the ENE. It is oblong in shape, 270 m long, 30 to 70 m wide and 16 m high, its long axis is aligned to the southeast. We spent the night there and next day were prevented from continuing our voyage by fog; this gave us enough time to build a cairn in which we left a brief account of our adventures.

The weather cleared up around noon and we found the latitude of the western point to be 70°23'32"N which agrees perfectly with the point one obtains by plotting on the map from Mr. A. Rosenthal's expedition of 1871 the surveys we have made of the islands near Mys Voronov and the angle between the latter and Mys Bolvanskiy. This map appears to be the best as regards the respective positions of My Voronov and the islands, but differs considerably from the other extant maps with regard to longitude. Since for three weeks my chronometer had often been subjected to shocks during transport, I do not dare to make any pronouncements in this regard; I shall say only that according to my observations, following a correction which I later made to my chronometer at Hammerfest on 5 September, the longitude of Mys Voronov is 58°33'15"E.

We left Ostrov Buys Ballot at 12.30 p.m. and in general found the ice so scattered that we were able to row between the floes; but to the east of the island it was more close-packed and several times we had to push floes aside with the boat-hook; we managed to get through, however, and at 5 o'clock reached Ostrov Vaygach a little to the east of Mys Voronov.<sup>75</sup>

<sup>&</sup>lt;sup>75</sup> There were large quantities of driftwood where they landed and they were soon enjoying a roaring fire, and then as they strolled across the tundra they revelled in the sight of the first plants and flowers which they had seen in over a year (Snellen, *De Nederlandsche Pool-expeditie*, p. 145).

The ice near the coast was completely navigable and during a walk we took around the cape we could see open sea to the west, to the extent that we thought that the boats would suffice from here onwards. But since we might still encounter a few bands of ice we did not dare to abandon our sledges, except for the two Norwegian sledges; the others were taken apart and as far as possible were stowed in the boats so that we might use them in case of need.

Our provisions which had already been greatly reduced, were stowed as well as possible. Next morning we rounded the cape under oars and then ran along the east shore of Dolgaya Bukhta (Dolgaya Bay). The ice was very scattered and would have allowed us easy passage if the ice which had formed during the night and was one centimeter thick, had not impeded our progress. We soon reached open water in the bay and therefore we were greatly disappointed to find ourselves prevented from continuing our progress by heavy weather rolling in from the northeast and forcing us to camp on this side.

To the southwest we spotted the northwest point of Ostrov Vaygach, but to reach it we had to negotiate a band of ice in the western part of the bay.

The wind rose to a storm and persisted throughout the day on the  $22^{nd}$  so that it would have been unforgivable to attempt the crossing in quite heavily laden boats; moreover we were so abundantly provided with all necessities that we could not even think of attempting such a hazardous endeavor. The northeast wind drove all the ice in the bay out to sea but a large amount was left stranded between the northwest point of Ostrov Vaygach and the offlying islands. In the evening the wind dropped and early on the  $23^{rd}$  we were presented with a good opportunity to continue our voyage. We soon reached the northwest point but we were thwarted for some time by the numerous reefs and eddies there and therefore we had reason to feel pleased for having waited for calm conditions for tackling these difficulties. Along the west coast of Ostrov Vaygach we were very lucky; initially we were still seeing a few scattered floes but soon we reached a totally ice-free sea; perhaps the strong northeast winds had contributed to this. We made rapid progress under sail and oar and when we landed for our noon meal I found the latitude was  $70^{\circ}4'8''N$ .

Throughout these past few days we had found an abundance of driftwood and therefore no longer needed to be economical with our alcohol; this is why we made bouillon every day, to everyone's great delight. From time to time hunting produced something for the pot; in a word we had an abundance of everything; everyone was in good health, content and happy. We spent the night a little to the north of Lyamchina Bukhta (Lyamchina Bay), which we crossed on the 24<sup>th</sup>, favoured by a light westerly breeze, and that evening we reached Mys Muken (Cape Muken), not suspecting that this was the last place where we would camp.

By noon on the 25<sup>th</sup> we were a little east of Mys Greben and on our way to Khabarovo when we spotted two steamships heading west through the scattered ice off the entrance to Yugorskiy Shar. As we learned later they were the *Nordenskiøld*, Captain Johannesen and the *Obi*, Captain Weide, which were coming back from the Kara Sea, in the southern part of which they had spent three weeks with the *Louise*, the same vessel which had accompanied us at the start of our voyage on board *Varna*. Just as we had found ourselves the previous year they were prevented by the unfavourable ice conditions from reaching the Yenisey, the destination of both vessels.

It was certainly a heartening sight for us, yet we felt so little need to be rescued that we did not immediately head for these vessels which, we thought, would not easily escape us, and we went ashore to determine the latitude of Mys Greben, which we found to be 69°39'N. We had barely landed when we saw both ships heading for the strait again, and sent one of our boats to try to reach them and to learn whether they had any news for us. Shortly afterwards,

having climbed to a high point we also sighted a third vessel, the *Louise*, which had run aground a little further east and had signaled the two other ships to ask for their assistance.<sup>76</sup>

Our boat first reached the *Obi* which took it in tow as far as the *Louise*, where we received letters and newspapers addressed to us. Captain Johannesen had also learned what had just happened, and *Obi* and *Nordenskiøld* again ran out of the strait to take us all aboard.

It was 4 p.m. when we all went aboard the *Nordenskiøld* where we were welcomed in a fashion which none of us will ever forget. When we reached the *Louise* on board the *Nordenskiøld* that evening, the former had just been refloated.<sup>77</sup> There too we received a very warm welcome on the part of Captain Dallmann and enjoyed very agreeable company until late into the night.

We had much to tell each other; we also spoke about our further plans. The captains were ready to render us every possible service, and would have taken us aboard for however long their voyages might still last. The only thing which they would very much have liked to do, but which duty prevented them from doing, was to take us back to Norway immediately. For they still had to make every effort to reach the Yenisey, and now that this was impossible via the southern part of the Kara Sea they wanted to try further north.

We therefore decided to start negotiations next day with the captain of a Norwegian yacht lying at Khabarovo, and was on the point of leaving. These negotiations had started when *Louise* lost her propeller in the ice.<sup>78</sup>

Finding himself obliged to have his ship towed by the *Nordenskiøld* as far as Hammerfest Captain Dallmann made us the kind offer of taking us aboard to that destination.

The *Obi* was sent ahead to Vardø so that when we reached Hammerfest on 1 September we immediately learned about the great joy that the news that we had returned safe and sound had cause back home.<sup>79</sup> A few days later we continued our voyage towards the Netherlands, grateful for everything that our compatriots had done to try to find us.<sup>80</sup>

<sup>&</sup>lt;sup>76</sup> And which they had last seen on 22 September 1882. Now under the command of Captain Eduard Dallmann and once again bound for the Yenisey, *Louise* had emerged into the Kara Sea from Yugorskiy Shar on 31 July, but encountering heavy ice had spent three weeks either beset in the ice, or making minimal progress. Dallmann had then tried to run back west through Yugorskiy Shar, but now found it choked with ice. *Louise* again became beset and was pushed ashore by the ice at Mys Perkov (Cape Perkov) on Ostrov Vaygach (Barr, Krause and Pawlik, 'Chukchi Sea', p. 16).

<sup>&</sup>lt;sup>77</sup> By heaving on ice anchors and by going full astern at high tide. She had received no apparent damage to the hull, although the rudder was slightly bent (Barr, Krause and Pawlik, 'Chukchi Sea' p. 16.)

<sup>&</sup>lt;sup>78</sup> When the screw came in contact with a tough ice tongue the propeller shaft sheered just outside the sternpost and the entire screw went to the bottom (Barr, Krause and Pawlik, 'Chukchi Sea', p. 16).

<sup>&</sup>lt;sup>79</sup> Snellen and his men again enjoyed the hospitality of the Dutch consul, Robertson, and for the first time in weeks they were able to wash, shave and generally spruce themselves up (Snellen, *De Nederlandsche Pool-expeditie*, p. 150). Also in Hammerfest they were delighted to meet the personnel of the Swedish International Polar Year station, led by Dr Nils Ekholm, also on their way home from the station they had occupied at Kapp Thordsen on Isfjorden on Spitsbergen (Ekholm, *Observations*). Both groups travelled south to Trondheim and from there (by train) to Christiania (now Oslo). From there the Dutchmen's progress was like a triumphal parade, via Copenhagen, Hamburg, Bremen, Amersfoort, Hilversum to Utrecht, where Bus Ballot gave them an emotional welcome. The expedition was formally disbanded on 29 September with a celebratory dinner at the Tivoli, complete with flags, decorations and triumphal arches (Snellen, *De Nederlandsche Pool-expeditie*, pp. 151–2). <sup>80</sup> At Hammerfest they encountered the vessel *Ellida*, which Buys Ballot had dispatched to search for the *Varna*. Another vessel, *Georgiy* had already sailed from Arkhangel'sk on the same mission, while the Dutch research vessel, *Willem Barents*, had also been instructed to look out for the missing expedition (Snellen, *De Nederlandsche Pool-expeditie*, pp. 150).

#### Appendix: The fate of the *Dijmphna* and her personnel<sup>81</sup>

It is somewhat ironic that only three days before Varna's men were enjoying their festive dinner at the Tivoli in Utrecht, on 26 September Dijmphna was finally working her way free of the ice in the western entrance to Karskiye Vorota. The day after Varna's people had left the ship at the beginning of August, a slackening of the ice had tempted Hovgaard to raise steam and to get under way. But fate was against him; after just a few minutes the propeller struck a tough ice tongue and the propeller shaft broke. It had sheered just forward of the hub of the propeller. While there were four spare propeller blades and a spare shaft on board, there was no spare hub.<sup>82</sup> Of necessity therefore Hovgaard was forced to contemplate trying to sail his ship out of the ice once it slackened sufficiently. After protracted contemplation of the problem in mid-August the engineer, Lithonius, reported that he thought he might be able to jury-rig a new hub; Hovgaard approved of the idea and Lithonius set to work. By 31 August the new hub was completed and the four spare blades were bolted to it. The next task was to trim the ship down by the head, thus raising the stern so that the end of the shaft was accessible. This was achieved by moving cargo from the after hold to the fore deck and main deck while coal from amidships was piled on the fo'c'slehead and on the ice. Two long, massive beams were lashed athwartships, their ends extending well out over the ice; two boats we hung from them and filled with water to lower the bow even more and to increase the ship's stability. And to lower the bow further, barrels of water were hung from the bowsprit. The result was that the stern was raised sufficiently to give the engineers access to the end of the propeller shaft. In this position the ship was dangerously unstable, and since the weather looked quite threatening lines were run from the mizzen masthead to ice anchors on either side to try to increase the ship's stability. These various operations took 30 hours of continuous work. After a further 12 hours Lithonius and his men had removed the old shaft and replaced it with a new one, complete with the new propeller. After a further 20 hours of the backbreaking job of restowing cargo and coal in their usual places, the ship's normal trim had been re-established. The men had just had time to get cleaned up when, on the evening of 3 September a severe northerly gale gave rise to heavy ice movements which only a day earlier would certainly have sunk the ship. On the morning of the 5<sup>th</sup> the engine was started and the new propeller functioned perfectly well.

Weeks of frustration followed; still beset in the ice although with leads and polynyas all around, *Dijmphna* drifted steadily closer to Ostrov Vaygach. By 9 September there was nothing but scattered ice in sight, but the ship was still solidly embedded in the great mass of rafted ice in which she had spent the entire winter. Her crew hacked and chopped at this ice for days, and finally, on 14 September *Dijmphna* got free. After only an hour's steaming, however, disaster struck again; one of the main pistons in the engine broke and the ship was again reduced to the status of a sailing ship. Then followed a tedious period of short spells of sailing alternating with periods of ice-drift. Finally land was sighted to the south-southwest on 19 September; this was Mys Bolvanskiy on Ostrov Vaygach. But then, powerless in the ice drift the ship started to be carried northwest across Karskiye Vorota to within sight of Novaya Zemlya. Ultimately *Dijmphna* reached open water at 5 am on 26 September. Rounding the north end of Ostrov Kolguyev on 5 October she dropped anchor at Vardø at noon on the 10<sup>th</sup>.<sup>83</sup> There she went into dry-dock and the broken piston was replaced. Putting to sea again on the 22<sup>nd</sup> she reached Tromsø on 3 November.<sup>84</sup>

<sup>&</sup>lt;sup>81</sup> Hovgaard, *Dijmphna-expeditionen*, pp. 89-97.

<sup>82</sup> Ibid, p. 90.

<sup>&</sup>lt;sup>83</sup> Hovgaard, *Dijmphna-expeditionen*, p. 97.

<sup>&</sup>lt;sup>84</sup> Ibid.

### References

Albanov, V. A., In the land of white death, New York, 2000.

—, South. To Zemlya Frantsa-Iosifa, Moscow, 2016.

Badigin, K. S., *Na korable "Georgiy Sedov" cherez Ledovityy okean. Zapiski kapitana,* Moscow 1941.

Baker, F. W. G., 'The First International Polar Year, 1882–1883,' *Polar Record*, 21, 1982, pp. 275–86.

Barr, W., 'South to Zemlya Frantsa Iosifa! The cruise of *Svyataya Anna* and Al'banov's sledge journey,' *Canadian Slavonic Papers*, 17, 1975, pp. 567–95.

-, The expeditions of the First International Polar Year 1882–83, Calgary, 2008.

—, 'The retreat from Zemlya Frantsa-Iosifa [Franz Josef Land], the diary of Lieutenant Carl Weyprecht of the Austro-Hungarian north pole expedition, 20 May–3 September 1874', *Polar Record*, 47, 2011, pp. 97–125.

—, 'Sir Allen Young and his Arctic voyages on board Pandora, 1875 and 1876,' *The Journal of the Hakluyt Society*, February 2019.

—, R. Krause and P.-M. Pawlik, 'Chukchi Sea, Southern Ocean, Kara Sea: the polar voyages of Captain Edward Dallmann, whaler, trader, explorer 1830–1896,' *Polar Record*, 40 (212), 2004, pp. 1–18.

Berger, F., B. P. Besser and R. A. Krause, *Carl Weyprecht (1838–1881), Seeheld, Polarforscher, Geophysiker*, Vienna, 2008.

Buynitskiy, V. Kh., 812 dney v dreyfuyushchikh l'dakh, Moscow/Leningrad, 1945.

Capelotti, P. J., Shipwreck at Cape Flora. The expeditions of Benjamin Leigh Smith, England's forgotten arctic explorer, Calgary, 2013.

Carter, R. R., *Searching for the Franklin expedition. The arctic journal of Robert Rudolph Carter*, Annapolis MD, 1998.

Credland, A. G., 'Benjamin Leigh Smith: a forgotten pioneer,' *Polar Record*, 20 (125), 1980, pp. 127–46.

De Long, G.W., *The voyage of the Jeannette, The ship and ice journals of George W. De Long... 1879–1881*, Boston, 1884.

Ekholm, N., Observations faites au Cap Thordsen, Spitzberg par l'expédition suédoise, Stockholm, 1887.

Guttridge, L. F., *Icebound; the Jeannette expedition's quest for the North Pole*, Shrewsbury, 1988.

Hegeman, F., 'Journal of Captain Friedrich Hegemann's ship *Hansa* during the German expedition to East Greenland, 1869–70,' *Polar Geography and Geology*, 17, 1993, pp. 264–329.

Holland, C., Arctic exploration and development, c. 500 B.C. to 1915, an Encyclopedia, New York and London, 1994.

Hovgaard, A. P., Dijmphna-expeditionen, 1882-1883, København, 1884.

Kane, E. K., *The U.S. Grinnell expedition in search of Sir John Franklin; a personal narrative*, London, 1854.

Kish, G., North-east passage. Adolf Erik Nordenskiöld, his life and times, Amsterdam, 1973.

Koldewey, K., *The German Arctic Expedition of 1869–70 and narrative of the wreck of the "Hansa" in the ice*, London, 1874.

Lamie, L. A. H., 'Rapport. sur le voyage, l'hivernage et le retour de l'expédition,' in M. Snellen and H. Ekama, eds, *Rapport sur l'Expédition Polaire Néerlandaise qui a hiverné dans la Mer de Kara en 1882/83*, Utrecht 1910, pp. 226–55.

Mazzoli, E., *Carl Weyprecht and the International Polar Years ... heralding a new age of scientific discovery*, Triest, 2013.

McClintock, F. L., *The voyage of the 'Fox' in the arctic seas. A narrative of the discovery of the fate of Sir John Franklin and his companions,* London, 1859.

Nordenskiöld, A. E., The voyage of the Vega round Asia and Europe, London, 1881.

Payer, J., New lands within the Arctic Circle. Narrative of the discoveries of the arctic ship Tegetthoff in the years 1872–1874, London, 1876.

Rae, J. John Rae. Arctic explorer. The unfinished autobiography. Edmonton, 2018.

Royal Geographical Society, 'Voyage of the "Kara" and other Arctic expeditions,' *Royal Geographical Society Proceedings*, New Series 4, 1882, pp. 688–9.

Savours, A., The search for the North West Passage, London, 1999.

Sides, H., *In the kingdom of ice. The great and terrible polar voyage of the USS Jeannette,* New York, 2014

Snellen, M., De Nederlandsche pool-expeditie 1882–1883, Utrecht, 1886.

--, 'Historique de l'expédition', in M. Snellen and H. Ekama, eds, *Rapport sur l'Expédition Polaire Néerlandaise qui a hiverné dans la Mer de Kara en 1882/83*, Utrecht 1910, pp. 1–6.

—, and H. Ekama, eds, *Rapport sur l'Expédition Polaire Néerlandaise qui a hiverné dans la Mer de Kara en 1882/83*, Utrecht, 1910.

Weyprecht, K., 'Scientific work of the Second Austro-Hungarian Polar Expedition, 1872–4,' *Journal of the Royal Geographical Society*, 45, 1875, pp. 19–33.

Zavatti, S., L'Italia e le regioni polari, Ancona, 1981.