Benjamin Leigh Smith's second Arctic expedition: Svalbard and Jan Mayen, 1872

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ABSTRACT. In 1872, the British yachtsman and explorer Benjamin Leigh Smith led his second expedition to the Arctic. Seeking to further the impressive oceanographic and geographic research of his first expedition in the summer of the previous year, Leigh Smith first explored Jan Mayen and then sailed to Svalbard. There, after investigating Moffen, adverse ice conditions precluded effective continuation of the voyage and almost wrecked his research vessel, *Sampson*. During a brief meeting with Adolf Erik Nordenskiöld's Swedish polar expedition, a bond was formed between the two explorers with fortuitous benefits for the Swedish expedition the following year as it struggled to escape from the north coast of Svalbard. Leigh Smith was forced to make for England in September 1872, without sailing nearly as far to the north or east as during his first expedition. His 1872 experiences led him to reconsider his method for Arctic exploration, and consequently, for his third expedition in 1873, he decided to include a chartered steamer as his primary research vessel with *Sampson* relegated to the role of support vessel.

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Introduction

Benjamin Leigh Smith, an independently wealthy Cambridge educated explorer, undertook five private scientific expeditions to Svalbard and Zemlya Frantsa-Iosifa [Franz Josef Land] between 1871 and 1882 (Credland 1980: 127–128). His interest in the Arctic was apparently stimulated by contemporary private British tourism voyages such as those of Lord Dufferin (Dufferin and Ava 1857) and James Lamont (Lamont 1861). In addition, he sought to fill, with his own funds, a long gap in British government sponsored polar exploration. As H.C. Chermside wrote, with Leigh Smith's 1871 expedition to Svalbard, 'the old [British] zeal . . . for Arctic discovery has been maintained by the private enterprise of English yachtsmen' (Chermside no date [1873]). This echoed the contemporary feeling, as expressed in a newspaper article anticipating Leigh Smith's return from the Arctic in September 1872, in which the writer remarks 'that if no public expedition of great pretensions is being carried on here, at least the enterprise of one Englishman is on the alert' (*The Sussex Advertiser*: 3 September 1872).

Leigh Smith kept a journal of his 1871 voyage to Svalbard (Leigh Smith 1871) and asked members of his crews to keep journals of his other voyages, but he avoided any publication of his own. This he left to others (for example Wells 1876; Markham 1880; Chermside no date [1873]). These efforts were uneven at best. The most detailed account of the 1872 voyage is by John C. Wells, a Royal Naval Captain who had the duty of taking the scientific observations that were so prominent a part of the overall plan for the expedition. Wells' account was written for a general audience and offers constant and nonsensical shifts of time and place, randomly tacks on accounts of other expeditions and mixes the chronology of the 1872 expedition with little regard for continuity. His 350page volume agrees roughly with the chronology contained in Chermside's three page summary of the expedition but events and places are frequently confused. This is perhaps not surprising given the state of knowledge of the geography of Svalbard in the 19th century.

Leigh Smith's 1871 expedition led to numerous discoveries, but he did not have such good fortune in 1872. While his crew did catch many more seals than in 1871, unfavorable ice conditions caused alterations in his course and ice damaged *Sampson* so badly it was beached for repairs at Wijdeforden. These developments led Leigh Smith to reconsider the use of a sailing ship as a primary exploration vessel in the Arctic. As *Sampson* left Svalbard for its return to England, Leigh Smith encountered Adolf Erik Nordenskiöld's expedition attempting to reach Sjuøyane for an attempt on the North Pole the following year. This meeting had a profound influence on Leigh Smith's plans for 1873.

Background to the 1872 expedition

In the spring of 1872, Benjamin Leigh Smith was 44 years old and had, the previous summer, financed his first, and exemplary, private expedition to the Arctic. On board his sailing schooner/research vessel *Sampson*, with a crew of Norwegian sailors and sealers, Leigh Smith

had conducted a bathymetric survey of Vestfjorden in Svalbard, and added thirty-three new place names to the maps of Nordaustlandet while defining its eastern limits (Capelotti 2006).

But it was his recordings of deep-sea temperatures during that expedition that led Leigh Smith into scientific controversy. These data suggested a variance of as much as 12.8°C (9°F) between surface water temperatures and warmer currents 732m (400 fathoms) below the surface, 'a fact so extraordinary', according to Wells 'as to lead scientific men to assume that this, our assertion, is so contrary to the laws laid down by modern savans [sic], that they do not hesitate to declare that the statement we made was impossible to be received' (Wells 1876: 57). It was primarily for this reason, a search for new data to support the radical 1871 observations, Leigh Smith determined to sail *Sampson* once again into the Arctic (Fig. 1).

Leigh Smith had encountered other problems during the 1871 cruise. Only two of his all-Norwegian crew spoke any English and Leigh Smith's journal evinces no desire on his part to learn Norwegian. Wells put the crew selection down to a 'mistaken theory', an apparent belief that Norwegian whalers and sealers alone possessed the requisite knowledge to get a sailing vessel safely into and out of the Arctic. This, Wells writes, was an error, especially when *Sampson* encountered ice-free water north of Svalbard in 1871 and had a chance to reach the open polar ocean that he and many others believed lay just beyond the edge of the pack ice. But 'the superstitious fears of these curious people overcame every attempt to prosecute a voyage so well begun, and our friend [Leigh Smith] was most reluctantly compelled to relinquish an opportunity of sailing into the sea whose very existence is denied by some. . .' (Wells 1876: 58).

In this, however, Wells was in error, and not only because Leigh Smith would have discovered no great polynia had he been able to sail farther north. On the day of his farthest north, it was already 11 September, and late in the season, and Leigh Smith himself recorded in his journal that the seas at the edge of the polar pack ice were building dangerously. Fortunately for all on board, *Sampson* did not proceed further north as she probably would have been trapped and forced into an overwintering for which no one on board was prepared. Leigh Smith had already avoided a similar fate earlier in the expedition when *Sampson* had rounded northeast Svalbard (at a spot later named Kapp Leigh Smith) and he wisely decided against attempting a circumnavigation of the entire archipelago fearing the ship would be frozen in for the winter.

As for the possibility of an open water polynia near the pole, it seems incredible that Wells still clung to this notion as late as the 1870s. The British antiquary Daines Barrington had suggested in the 1770s that a polar sea free of ice existed just beyond the ice barrier north of Spitsbergen, and numerous expeditions paid a heavy price testing its possibilities. Yet, as Holland (1994: 29–30) remarked, 'in matters concerning the North Pole, and especially the 'Open Polar Sea' beyond it, the ability of otherwise rational men to delude themselves was remarkable.' However, the theory still retained adherents late into the 19th century, including most prominently August Petermann, who had done so much to bring Leigh Smith's 1872 results to the world of geographic scholars (see, for example, Tammiksaar and others 1999: 238–239).

Further problems with the Norwegians presented themselves when *Sampson* returned to Tromsø in 1871. The crew had not done as much hunting as they would have liked while in Svalbard because they had not been told they would receive equal shares in any profits from the voyage. This, combined with knowledge of what they could have earned during an exemplary season for the herring fisheries around Tromsø, led the crew to balk at sailing with Leigh Smith all the way back to England. He was forced to end the cruise in northern Norway and find another way home. Determined to avoid similar confrontation in 1872, Leigh Smith signed on sailors from Hull, supplemented by Shetland islanders.

According to Wells, he was given two days to answer Leigh Smith's invitation to join him in the Arctic and to arrange the summer's plan for collecting oceanographic data in the form of soundings, dredging, ocean temperature readings, and measurements of currents. This suggests that Wells might not have been the first choice for the assignment. Yet he took to it with enthusiasm, and echoed Chermside's earlier lament about the state of official British polar exploration. 'For many years past the English Government has relaxed its efforts, and the lead is being taken by other nations, such as the Germans, Swedes, Norwegians, Russians, and Americans' (Wells 1876: 2).

Wells' main scientific task was clearly the deep-sea oceanographic research that Leigh Smith desired to support his surprising data from 1871. The strategy was to repeat the 1871 cruise as closely as possible, with *Sampson* attempting to sail further north toward the pole before retreating south and east around Kapp Leigh Smith and then the whole of Svalbard. But Leigh Smith appreciated that that no Arctic expedition could adhere to any strict timetable. As he noted in 1871, 'it is utterly impossible to form any definite plans before leaving as the winds prevailing from any quarter have a great influence on the ice in general' (Leigh Smith 1871). This approach, that seemingly made a virtue of necessity, nevertheless eluded most of the expeditions that voyaged into the Arctic in the 19th century, including the one Leigh Smith would meet north of Svalbard in 1872.

Early stages

The expedition left Hull on 13 May 1872 and ran directly into strong north winds that forced *Sampson* into Edinburgh for a day. The heavy seas delayed arrival at Lerwick in the Shetland Islands until 26 May, and

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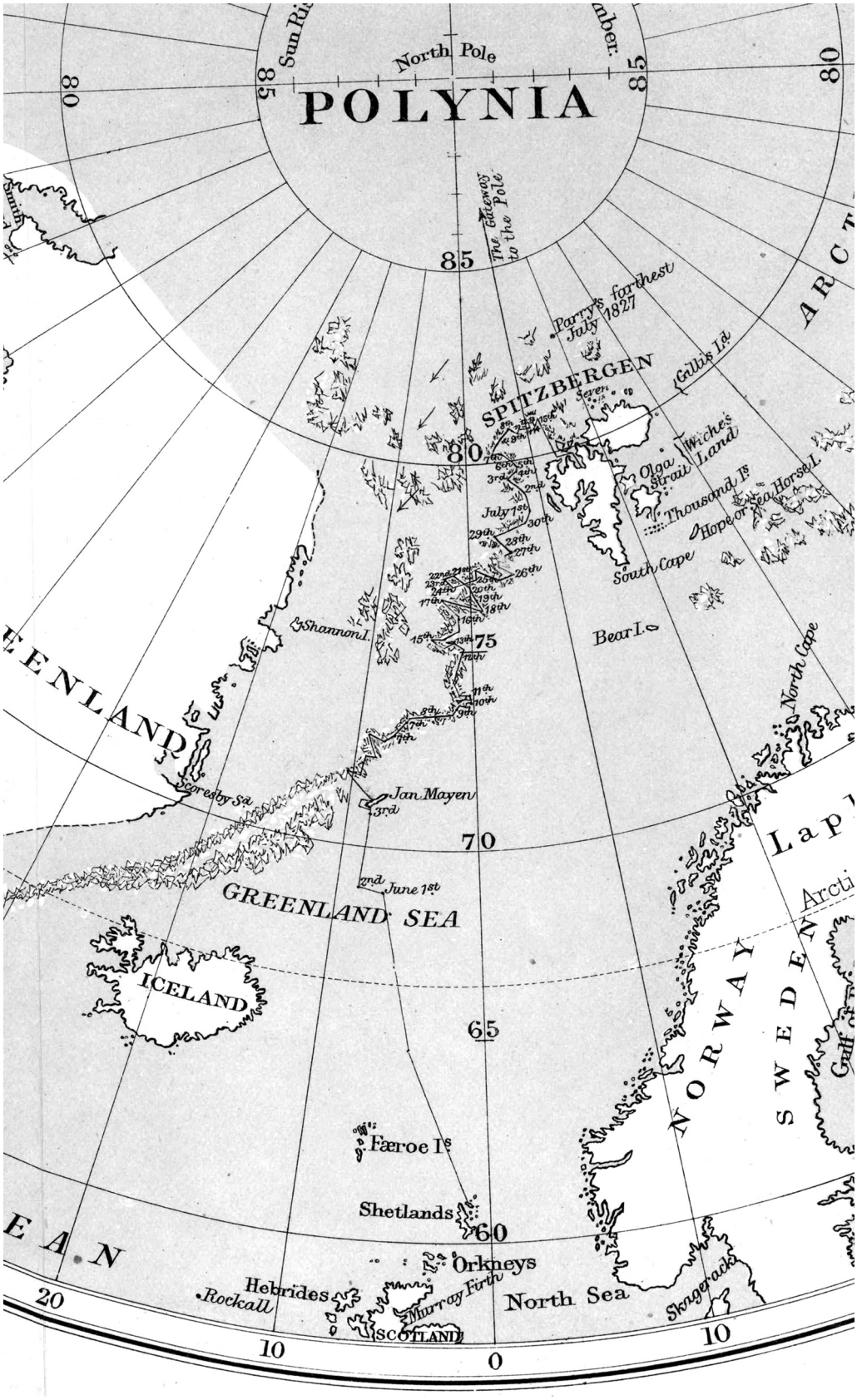

Fig. 1. Chart of Leigh Smith's progress from England to Jan Mayen along the edge of the polar ice to Svalbard (from Wells 1873).

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'somewhat old' charts (Wells 1876: 67) forced the vessel to scrape her way through the narrow, rocky north entrance into the harbour. While the ship was re-supplied and more members added to the crew, Leigh Smith and Wells hiked in the driving rain to locate the ruins of the then 275 year old castle of Patrick Stewart at Scalloway.

Lerwick seemed a busy place to Wells. As *Sampson* was readied for departure, two hundred locals were in the process of emigrating to North America. The carpenter and four additional sailors from the Shetlands brought the total complement to seventeen, and Wells noted the 'formidable array of whaling and sealing weapons' (Wells 1876: 73) they would use to fill the forty-ton water tanks on board with seal and whale oil, and blubber for the return trip.

On 28 May, *Sampson* again put to sea and, accompanied by occasional fin and bottlenose whales, made for Jan Mayen. Leigh Smith seemed determined to avoid the main cause of the 'revolt' of his Norwegians in 1871, namely the failure to secure any real profit from the voyage. Wells noted that the crew busied itself with overhauling the whale boats, constructed of pine and sheathed in zinc to protect them from contact with the ice floes around which *Sampson* would be working. He watched them stow four whale lines of some 878m (960 yards) apiece in each boat, followed by lances and harpoons with fixed handles (for whaling) and detaching handles (for seals and walrus). At the bows of the boats were swivel guns for throwing a ten-pound harpoon.

On 3 June (Chermside no date [1873] puts the date at 5 June), *Sampson* anchored off Maria Muschbukta on the northwest coast of Jan Mayen (Fig. 2). Leigh Smith and one sailor went ashore to explore the area around the bay. He was the second British explorer to set foot on the island since William Scoresby, Jr., in August of 1817, and after Lord Dufferin who had briefly stepped ashore in 1856 (Dufferin and Ava 1857: 143). Wells and a sailor ascended the ridge to the north of the bay, gathering botanical specimens along the way.

Wells sought to reach the eastern slopes of the island, but snow-covered volcanic scoria and cinders made that

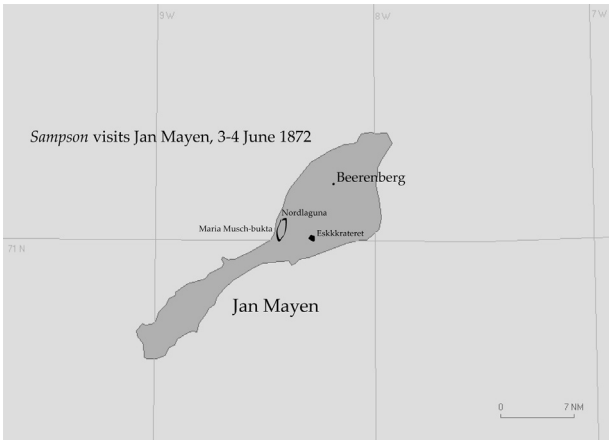

Fig. 2. *Sampson* at Jan Mayen.

impossible. He returned to the beach via the Nordlaguna, which was still ice-covered, and joined Leigh Smith in throwing stones at bird colonies nesting in a 'pyramidal rock [that] shot up into the air about 1,200 feet above us' (Wells 1876: 94), a reference to the appropriately described Fugleberget near Nordlaguna. The temperature of both air and water hovered around freezing point.

On the beach was a treasure-trove of flotsam and jetsam: glass floats from Norwegian herring fishermen; Siberian driftwood; masts of merchant ships; remnants of whale-boats 'everywhere lie shattered on these sands' (Wells 1876: 95). Like Scoresby (1820: 6), Wells noted the teredo-infested wood and concluded that it had drifted across the Arctic from some transpolar nation in which a warmer climate and higher water temperatures allowed for the existence of the wood-boring molluscs. These early indications of the trans-polar drift were identified by Wells as merely 'some ocean current' (Wells 1876: 96). The sailors gathered some of this wood in order to make coffee early the next morning and then, as Leigh Smith appreciated the exposed and dangerous nature of the anchorage, the men were brought on board quickly, the coffee and other supplies taken ashore testifying to Leigh Smith's preparations.

Five hours later, on 4 June, the bay was still calm, so Wells and Leigh Smith were again rowed ashore by two sailors. Leaving them to watch the small boat, Leigh Smith and Wells ascended the ridge once again until they could see the ocean to the south, as well as 'two craters marked upon the chart' (Wells 1876*:* 97). These were certainly the Vogt and Berna craters that had been explored by Georg Berna and Carl Vogt in 1861. James Wordie (1922: 185) made the case that Scoresby had originally explored Vogt Crater, and that Scoresby's name for it, Esk Crater (Eskkrateret), should have priority.

Seeing Beerenberg free of clouds, they ascended a part of the way to the top of the world's northernmost active volcano. From this point vantage they 'were rewarded by the discovery of a hitherto unnoticed crater, whose position we carefully noted' (Wells 1876*:* 98). This was either the Palffy Crater of the Austro-Hungarian expedition of the International Polar Year (1882–1883), or the unnamed 'old and much-eroded crater' noted by Wordie (1922: 187) in 1921 at an elevation of 610m (2,000ft) in a wide dry valley between the Vogt [Eskkrateret] and Berna craters.

After ten hours, they returned to the small boat and then to the ship. It was reluctantly decided that the lack of a suitable anchorage at Jan Mayen precluded a closer survey of the island. *Sampson* was soon beating her way north and west and before long reached the edge of the polar ice. Trending north-northeast along the edge of the pack, hunting began in earnest. As Wells occupied a series of ocean stations, the Shetlanders killed and processed two whales and 250 seals, a vast increase over *Sampson's* 1871 haul around Svalbard. It was enough, apparently, to satisfy the crew, who would receive 12.5p (2s 6d in the sterling currency of the day) for every ton of oil they

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1872.	Station.	Lat.	Long.	Depths in fathoms	Temperature. Air.	Surface.	Min.	Max.
June								
1.	1.	68° 52′ N.	6° 40′ W.	600	42°	37½°	30°	37½°
13.	2.	75° 6′ N.	2° 30′ W.	100	36	31	28	35
15.	3.	75° 7′ N.	3° 48′ W.	100	36	32	28	35
				50	..	31	29½	32½
17.	4.	76° 13′ N.	2° 22′ W.	100	34	31	29½	34
18.	5.	76° 3′ N.	0° 10′ E.	150	35	33	30½	40
				200	..	33	30½	48
19.	6.	76° 21′ N.	1° 5′ E.	150	35	32	30½	32
				250	..	32	30½	39½
20.	7.	76° 35′ N.	0° 3′ W.	6	34	33	30	33
				25	..	33	30	35
				150	..	33	30	39½
22.	8.	76° 41′ N.	2° 10′ W.	150	35	32	29½	39½
27.	9.	77° 18′ N.	5° 0′ E.	25	37	34½	32	34½
				250	..	34½	32	39
July								
1.	10.	78° 20′ N.	7° 2′ E.	6	36	36	33	36
			,,	600	..	36	33½	36½
6.	11.	79° 54′ N.	6° 34′ E.	6	35	34½	33	34½
				12	..	34½	33	35
				25	..	34½	33	37
				50	..	34½	33	37
				200	..	34½	33	40
				Bottom				
7.	12.	80° 4′ N.	5° 12′ E.	600	37	34½	31½	39
10.	13.	80° 23′ N.	9° 0′ E.	12	35	31	28	31
				50	..	31	28	31½
				Bottom				
12.	14.	80° 32′ N.	9° 50′ E.	600	36	31	28½	64

Fig. 3. Chart of ocean stations conducted by *Sampson* in 1872 (from Wells 1873).

returned to Hull (Wells 1876: 162). This is approximately £5.70 or US$11.50 in values of September 2007.

Deep–sea soundings by *Sampson* and *Eclipse*

On his 1871 voyage, between 26 June and 7 July of that year, *en route* from Tromsø to Svalbard, Leigh Smith had occupied seven ocean stations (Capelotti 2006: 4–5; Fig. 3). Using a Miller-Casella pressure-protected thermometer, Leigh Smith recorded a series of ocean temperatures at various depths, finding warmer temperatures the deeper he surveyed. These data, along with similar results obtained that same summer by the Austro-Hungarian polar expedition of Karl Weyprecht and Julius von Payer on board *Isbjornen*, were the first of many such recordings that would support the idea that a layer of comparatively warmer Arctic seawater existed between the surface and the bottom.

Leigh Smith had met both Weyprecht and Payer the previous summer, and they had come on board *Sampson* to dine with him. In the years that followed that June 1871 meeting in Tromsø, Weyprecht and Payer and Leigh Smith would be linked in the history of Arctic exploration. Weyprecht and Payer would discover Franz Josef Land the following summer and Leigh Smith would later extend the geographical limits of the islands. The expedition ships of both explorers would be wrecked in the newly found archipelago (Payer 1876).

For a week after the exploration of Jan Mayen, *Sampson* edged in and out of the polar pack while the Shetlanders slaughtered everything within reach of their harpoons. Then, Wells wrote, it was time 'to return again to the somewhat dry demands of scientific inquiry' (Wells 1876: 155). Trending northeast from Jan Mayen to northwest Spitsbergen, fourteen further ocean stations were occupied. This was twice the number as in 1871. Most of these soundings were taken between 183m and 366m (100 and 200 fathoms) and, like those of 1871, showed a slight but definite increase in the temperature of the ocean from the surface to depth. In addition to the single observation stations, at which temperature was recorded at a single depth, on 18 June Wells adopted a technique of recording temperatures at several depths at one station. This produced a result, at four out of six such stations, of a steady increase in ocean temperatures from the surface to the maximum depth, including the final station on 12 July that showed the extraordinary (and certainly false) temperature reading of 17.8°C (64°F) at 1097m (600 fathoms) off Amsterdamøya.

The first station, at a distance of some 315km (170 miles) from the polar pack, was no doubt a test of the sampling gear, as no further stations were occupied for two weeks. When the sampling commenced in earnest, *Sampson* was cruising at the edge of the pack ice. As *Sampson* manoeuvered into the ice, searching for a lead to the north, Wells had varying levels of success in his data collection. His notes from 15 June, that he only 'had time to sound in 50 fathoms' (91.4m) (Wells 1876*:* 188), suggests the challenge of deploying a single sampling wire from a sailing vessel surrounded by large floe ice.

On 18 June, Wells recorded the largest temperature difference yet, when the thermometer recorded 0.55°C (33°F) at the surface compared to 8.9°C (48°F) at 200 fathoms (365.8m). On 20 June, he began to record his temperatures from beneath the lower surface of the ice (10.97m 6 fathoms down) and again the results were the same: colder surface waters were supplanted by increasingly warmer waters at depth. On 7 July, Wells dredged up an unusual species of starfish which he used to suggest that the warm waters were not of volcanic origin, a natural supposition given their cruising area near the volcanoes of Iceland and Jan Mayen.

By 10 July, with the crew 'required elsewhere '(Wells 1876: 190), Wells was forced to end the soundings. He and Leigh Smith made one final sounding, the anomalous data of 12 July. As for this almost absurdly high reading, Wells himself writes that it was 'remarkable' (Wells 1876: 191). He comments that Leigh Smith himself 'carefully registered' this station, checking the thermometer both before and after it was deployed overboard. Leigh Smith, apparently aware that this particular reading would raise eyebrows, had the thermometer checked after the cruise by its designer, L.P. Casella, who found it working properly.

Earlier in the year, Leigh Smith had given a similar set of deep-ocean sounding instruments to the Scottish whaler David Gray, captain of the Peterhead steam whaler *Eclipse*. It is a mark both of Leigh Smith's generosity and his scientific objectivity that he was willing to subsidise

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the collection of an independent series of ocean stations in the Arctic. Between 13 April and 3 July 1872, *Eclipse* made 9 stops to record oceanographic data using Leigh Smith's equipment. Wells added these to the 14 made by *Sampson* for a total of 23 ocean stations recorded by the two vessels in 1872. Most of the *Eclipse* soundings were made between 365.8m and 731.6m (200 and 400 fathoms), on a northeasterly line running from Greenland to Norway.

Gray's recordings on *Eclipse*, made when the vessel was as much as 145km (90 miles) inside the ice pack, showed the same trend as those recorded by Wells from *Sampson*. Deep-sea temperatures were higher than those at the surface. It was increasingly evident that a complex warm ocean current was at work in the high Arctic. Wells, himself, could not identify the source of this current, though he was mistakenly convinced it was not a northern extremity of the gulf stream, now known as the north Atlantic current or, even more northerly, the north Atlantic drift.

As the title of his book, *The Gateway to the polynia*, reveals, Wells thought it more than likely that there was a 'stream of warm water coming from the north' (Wells 1876: 186) that originated at or near the North Pole. Combined with Leigh Smith's 1871 observations of open water east of Nordaustlandet and north of Rossøya in Svalbard as well as his ocean stations south of Svalbard, with their suggestion of potential inversion layers of warmer polar waters, Wells clearly supported August Petermann's notion that the polar pack might surround an open sea at the pole.

If he was incorrect regarding the source of the warm deep-sea current, Wells was correct in assuming that further research would have several advantages. Not the least of these was a greater understanding of how ocean currents influenced the weather of northern Europe and more generally throughout the northern hemisphere. The specific research technique he suggested, that of an expedition of circumpolar navigation to collect not only soundings but also organisms by dredging Arctic waters, would soon be taken up by Leigh Smith in Franz Josef Land and by Fridtjof Nansen in the polar basin itself.

The archaeology of a whale skeleton on Moffen and retreat to Wijdeforden

For almost a month, from 23 June to 17 July, *Sampson* probed the edge of the ice field. The ship was beset twice, the first time for three days beginning on 23 June at 76° 42′N. Approaching Prins Karls Forland on 1 July, a heavy collision with submerged ice carried away the ship's false keel. On 6 July they were beset again at 80°18′N and for five days carried north with the ice to 80°30′N (Fig. 4). The harpooners often went ahead of the ship and shifted the ice aside manually, a technique Wells admired but thought best handled by a proper steam vessel. When the wind shifted around to the west and a lane of open water appeared, the expedition could finally break out to the north and east.

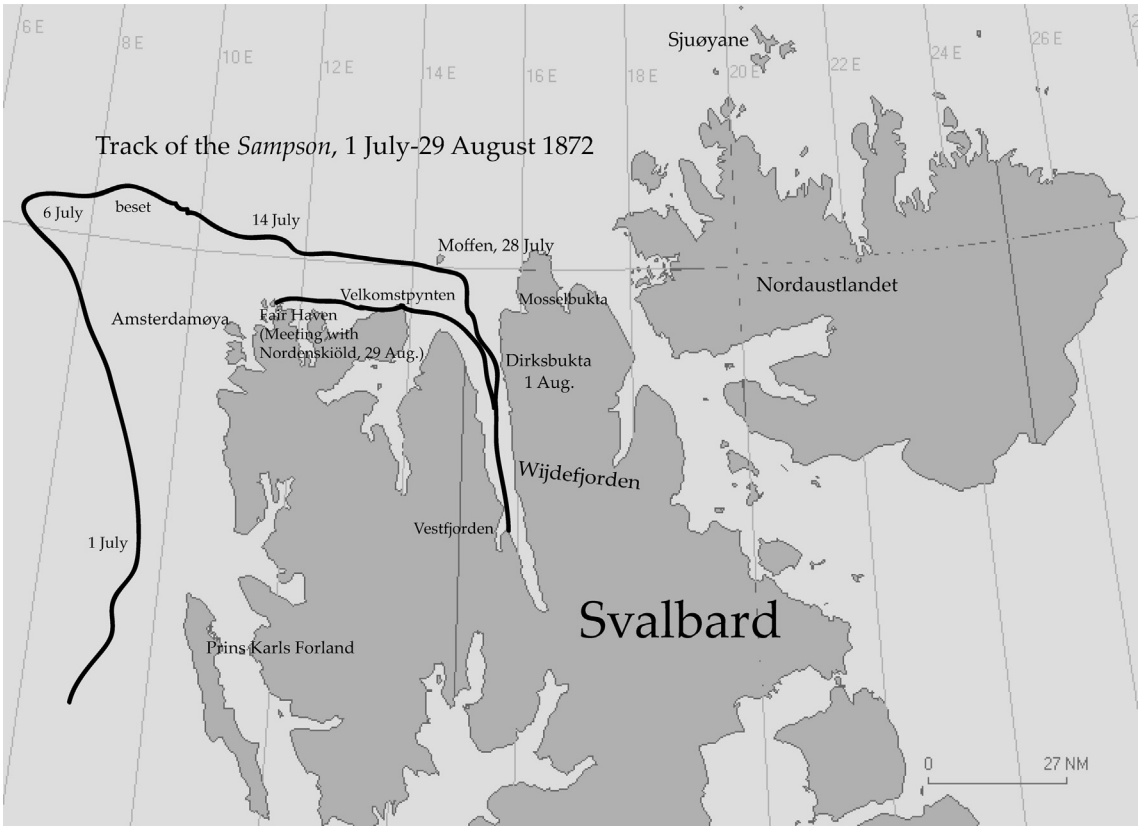

Fig. 4. Track of Sampson 1 July to 29 August 1872.

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Leigh Smith hoped to stop at the circular, lagoon-centered Moffen. From there he would seek out the Swedish expedition under Adolf Nordenskiöld, thought to be constructing an advance base somewhere in Sjuøyane for an expedition to the pole the following spring. Wells was convinced that had *Sampson* possessed steam-power the previous year, when it sailed to 81° 25′ 00″N (just short of the 81° 42′N north of Svalbard achieved by Nordenskjöld's *Sofia* in 1868), she could have punched through to the open sea he thought lay just beyond. But the lack of steam and 'the superstitious fears of the Norwegian captain and crew', had prevented what 1872's 'English crew. . .without the least fear of failure' (Wells 1876: 196) would certainly achieve.

Sighting Moffen on 28 July, one of the small boats was lowered. The crew rowed ashore only with great difficulty, as the low-lying island was lost to their line of sight twice causing detours of eight miles amongst the scattered ice floes. The single break shown on Wells' chart on the northern side of the circular island he placed instead on its western shore. In the meantime the fog lifted and *Sampson* called back the shore party.

After a few days of hunting walrus, Wells and Leigh Smith returned to Moffen, this time to its eastern shore, where Wells claims that they collected specimens of Terek sandpipers (*Xena cinerea*), and stepped across a slaughterhouse of walrus remains from previous hunting expeditions. Such a find of a Terek sandpiper 'would still today be regarded as a first-class rarity to Svalbard' (M. Forsberg, personal communication, 12 October 2007) and this, along with Wells' later claim to have found snow geese in Svalbard, is not considered credible.

Wells wrote that they then spied an enormous skull of a whale, partially embedded in the shingle and far away from the water's edge. Approaching, they saw that it was in fact an entire skeleton, the other bones gradually disappearing into the shingle, flotsam and jetsam that wind, current and ice had accumulated along the berm. The fact that the skeleton was intact would indicate that this was the skeleton of an animal that had beached naturally, and had then been raised as a result of isostatic uplift, rather than an animal killed by whalers. The entire archipelago is rising steadily due to the removal of the weight of ice sheet that covered it during the Pleistocene (Blake 1961; Olsson and Blake 1862).

A sketch of the whale in Wells' account gives fantastic dimensions to the skeleton and to the non–existent steep, volcanic crater–like slopes to the island itself (Fig. 5). Upon closer examination, Wells and Leigh Smith saw that the skull was covered with inscriptions 'recording the many visits to the spot by Norwegian and other whalers' (Wells 1876: 204). These notations would almost certainly have included the names of these vessels and the years of their visits to the island.

Such an artifact constituted a unique glimpse into the archaeology of sea mammal hunting around Svalbard in general and into the natural and human history of the unique and now protected microenvironment of Moffen itself. It recalls Melville's description in *Moby Dick* of a large whale skeleton used as a temple on the fictional island of Tranque. Melville also refers to Scoresby's measurements of Greenland whales and even the 'Leviathanic Museum . . . in Hull, England' [now Hull Maritime Museum] (Melville 1992: 491) from which port *Sampson* had sailed.

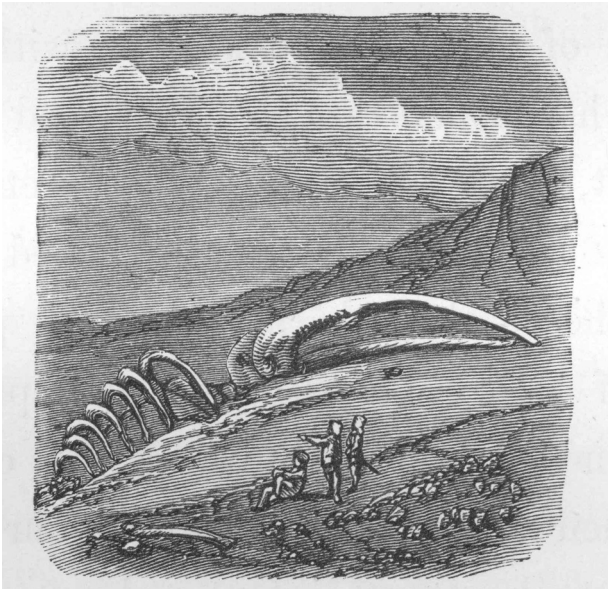

Fig. 5. The Moffen whale skeleton (from Wells 1873).

Unfortunately, Wells, who earlier used four pages to describe a fly in his cabin, expends less than a paragraph on this extraordinary phenomenon. He did not record the names or arrival dates of a single vessel carved into the whalebone. Perhaps because of its size, Leigh Smith did not recover it as he did with so many other specimens on his five Arctic expeditions. No such artifact has been recorded in the extensive scrimshaw collections of the maritime museum in Hull (A. Credland, personal communication, 1 October 2007). Even though such bones (especially the jaws, which were used as archways throughout the British Isles) had been a staple return of the Hull fisheries, by 1872 the industry had been in decline for some time (Credland 2004).

Leaving Moffen to continue pursuit of walrus, *Sampson* was again pinned down by ice and her keel further damaged. After failed attempts at sea to remove the broken timber, the vessel began to take on water. *Sampson* pulled alongside a vessel Wells identified as the whaler *Norsel Jack* from Tromsø. Its skipper advised Leigh Smith to run to Gråhuken and beach the ship for repairs in Wijdeforden. It was a place Leigh Smith knew from the previous summer. Then, *Sampson* had paused in the fjord to find fresh meat and water and Leigh Smith had surveyed the area before the return journey to Norway.

Reaching Wijdefjorden on 1 August 1872, with *Sampson's* pumps working overtime, the ship stopped briefly in Dirksbukta (Wells called it Albert Dirke's Bay. It is actually named after a Dutch whaling skipper Aldert

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Dirksz (see Norsk Polarinstitutt 1991: 112)). This is a small bay now long closed off by sanding up and called Dirksodden. *Sampson* then anchored off an uncharted island Wells called Gilles Island. This latter was an unfortunate name, as it had already caused centuries of confusion in Svalbard (Capelotti 2006: 3–4).

While the crew rowed ashore in search of a suitable area to beach the ship, Wells and Leigh Smith explored the surrounding area. Wells was alternately enthralled by 'this charming coast-scene' and depressed by the 'vast mountain sides ... destitute of green places [and the] melancholy and solitary plains'. As with other expeditions on the verge of collapse, the bleak surroundings combined with their inability to keep their ship afloat led the men to begin 'to inquire with ourselves into the enigma of human existence' (Wells 1876: 216–217). Freed from the comforts as well as the constraints of civilisation, Wells wrote that their 'health was at its best: we breathed more freely; we enjoyed everything' (Wells 1876: 218).

Final attempt to reach the polynia and meeting with A.E. Nordenskiöld

On the third day in Wijdefjorden, *Sampson* was brought close ashore on high tide and beached. But the source of the leak could not be located. Sealskin coated with tar and oakum was nailed over the likeliest spot, and the ship pushed back into the fjord.

By the seventh day of August, with the ship still stuck in the northward-drifting ice, Wells and Leigh Smith rowed ashore at another unmarked spot to inspect a small wooden hut they had spotted. This measured some 3.65m by 2.43m (12 ft by 8 ft). This is perhaps the hut at Elvetangen on the west side of Wijdefjorden about five miles from Dirksbukta and recently marked for restoration by Norwegian cultural authorities (Dahle 2000: 74). Wells described it as having a fireplace of clay and rough stones, with two rough stone benches for furniture. Outside the door stood a cross marked with an inscription in Russian and the name and date of the last inhabitant. Recounting that whaling and sealing crews had often made use of such structures for survival after a shipwreck, Wells wrote that he and Leigh Smith 'were careful not to injure [the huts they visited in Wijdefjorden], never knowing how soon they may be required for the reception of some fellow-seaman' (Wells 1876: 227). It is one of the rare examples of an expedition of the period *not* pilfering a site in the Arctic.

In the eighteen days *Sampson* drifted amongst the ice of Wijdefjorden, Leigh Smith and Wells were rowed ashore several times and managed to shoot thirty-six reindeer. On 11 August, they hiked to a body of water near Dirksbukta Wells called Salmon Lake, a fairly large body of water today called Lakssjøen. Looking forward to an afternoon fly-fishing, they were much disappointed to find the lake frozen over, a clear indication of the advancing season.

On 13 August, despite a leaky ship and the approaching autumn, Leigh Smith held a council and took a decision to make one more try for the north. That afternoon they killed a single beluga whale, then watched two Norwegian sloops trap and kill 78 more by using nets fastened between their vessels and the shore. A few days later, Wells and a Shetlander named Magnus made an eight-hour climb to the top of a peak that gave out a view spanning Wijdefjorden and Isfjorden. If this account is accurate, the ice must have carried *Sampson* deep into Wijdefjorden where it perhaps took refuge in Vestfjorden, the only place from where such a hike and view would have been possible.

Freed at last from Wijdefjorden on 18 August, *Sampson* made a final and brief attempt to force her way to the north. Before long, ice streaming from the northeast forced the ship to take refuge behind Velkomspynten, where the anchor was broken. *Sampson* was soon joined by three more fishing sloops and two steam vessels, all seeking shelter from the worsening conditions. Further attempts to hold the ship in position resulted in one of the small boats capsizing.

On 24 August, *Sampson* reached across Raudfjorden and then, on 29 August, Fair Haven, where the ship stopped in Fuglefjorden. There, Leigh Smith found the steamer *Polhem* the vessel of Adolf Erik Nordenskiöld and his Swedish polar expedition. Wells described the expedition leader as 'a very pleasant man advanced in life' (Wells 1876: 303) although Nordenskiöld, at 39, was five years younger than Leigh Smith. Both were from prominent, educated and wealthy families, and no doubt enjoyed a common social status.

Leigh Smith received Nordenskiöld and others from *Polhem* on board *Sampson* 'with great kindness', and next day himself visited *Polhem* (Leslie 1879: 190). Nordenskiöld was waiting for a re-supply of coal from two support ships, the *Gladan* and the *Onkel Adam*, that had yet to make their appearance, and Wells noted that Nordenskiöld's planned starting point in Sjuøyane was still a long way off and it was late in the season.

Nordenskiöld had already been warned a week earlier by the captain of a Norwegian steam-powered fishing vessel about the ice conditions north and east of Fair Haven (Kish 1973: 101). Leigh Smith and Wells added to this warning from their recent experiences in Wijdefjorden (Leslie 1879). Nordenskiöld ignored the advice and ordered his convoy to sail northeastward anyway. Wells thought that even if the Swede was successful in reaching his planned jumping off point on Parryøya, he still faced an immense amount of work to prepare his base camp.

Wells noted that Nordenskiöld had several prefabricated structures and boats that would require considerable effort to assemble if the expedition could find suitable ice-free ground for them in the area of their intended base. 'We noticed the materials for three of these huts—a dwelling consisting of four sleeping-rooms, fourteen feet by thirteen; a long room for the men, twenty-two by fourteen; a central room nineteen by twenty-two; and a

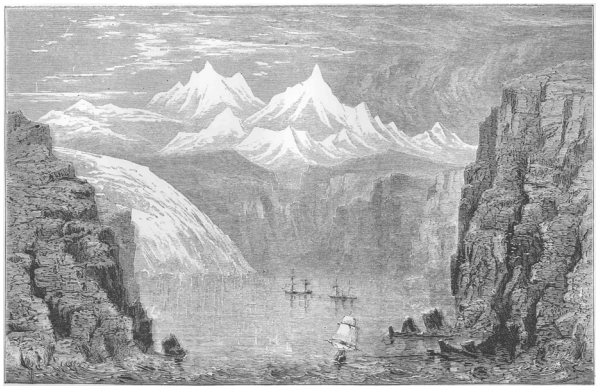

Fig. 6. *Sampson* parting from Nordenskiöld's expedition (from Wells 1873).

kitchen twenty-two by sixteen. . . [The boats] were light and exceedingly strong, double in structure: one portion was made of the fine wood of the willow, the second layer of ash. . . The journey was to be commenced on the first of April, 1873, and the provisions were sufficient to last until the first of July, by which time they hope to have accomplished this long meditated journey to the northern Pole of the earth' (Wells 1876: 304–305).

Wells seemed satisfied by Nordenskiöld's plan to use reindeer driven by Laplanders to pull the boats north, since the expedition could kill and eat the deer as they showed signs of exhaustion, and then take to boats to make the final distance across the open sea he was convinced they would find close to the pole. As he reviewed Nordenskiöld's plans, with their clear echo of Parry's 1827 polar expedition, Wells repeated his belief that a steamship was the only effective way to reach the pole. And if such a vessel were caught in the ice, Wells argued, it would merely 'drift south, at the rate of about six miles each day' (Wells: 1876: 324) until it returned to the 'gateway to the polynia' north of Svalbard.

The two explorers parted on 30 August, but not before Leigh Smith had promised Nordenskiöld that he would return to Svalbard early the following summer and visit the Swedish base for news of their polar expedition (Fig. 6). Soon thereafter, Nordenskiöld sailed east and discovered that he was not able to penetrate further than Mosselbukta, where *Sampson* had recently called. There, all three ships of the Swedish expedition were caught by surprise and frozen in for the winter. Instead of a crew of fewer than 24 and a single vessel, Nordenskiöld was suddenly faced with feeding 67 people from three ships over a Svalbard winter. The following June, his plight ignored by his own government and with all but one of his reindeer escaped, Nordenskiöld would find himself very glad of Leigh Smith's promise.

As for Leigh Smith, his somewhat disappointing summer concluded with visits to Kongsfjorden to collect specimens of marble, Grønfjorden to collect fossils, and Prins Karls Foreland for some dredging work. Then the expedition sailed for England. *Sampson* arrived at Hull on 26 September.

Aftermath

In 1873, heeding the lessons of the summer of 1872, Leigh Smith chartered James Lamont's Arctic steamer *Diana*, and with *Sampson* in reserve attempted to round Svalbard and survey Kong Karls Land. But even with the addition of a powerful steamer he was stopped and forced to turn back by ice at Kapp Platen. He did, however, fulfill his promise to Nordenskiöld, relieving his expedition at Mosselbukta in mid-June and probably saving the lives of many of the Swede's crew. For this he would be decorated, in 1874, with the knighthood of the Order of the Polar Star by King Oscar II of Sweden.

Leigh Smith's experiences with the shifting ice conditions north of Svalbard, as well as his apparent desire to see how far north he could force a properly equipped screw steamer, probably were factors considered in the design and construction of *Eira*. Between 1880 and 1882, Leigh Smith would take this 38.1m (125ft) screw barquentine on two pioneering expeditions to Franz Josef Land, then recently discovered by Weyprecht and Payer's Austro-Hungarian *Tegetthoff* expedition of 1872–1874. *Eira* would be wrecked near Mys Flora [Cape Flora] in the summer of 1881. The escape of the crew of *Eira* from the Arctic in small boats the following spring ranks high in the list of great polar survival stories.

Conclusions

Leigh Smith returned from Svalbard in the autumn of 1872 without having sailed nearly as far to the north and east as during his first expedition. However, the brief meeting with Adolf Erik Nordenskiöld had formed a strong bond between the two men, a bond that led Leigh Smith to seek out the Swedish expedition as soon as he returned to the north coast of Svalbard in June 1873. In addition, in 1872, Leigh Smith had continued his series of deep-ocean temperature recordings, which along with the work of the Austro-Hungarian expeditions of Weyprecht and Payer, laid the basis for high latitude oceanography.

Finally, his continual discussions with Wells on the merits of using a steam vessel for polar exploration had a profound influence on his future thinking as he began to formulate plans for a new expedition to Svalbard in 1873 and, later, with regard to the construction of his own steam research vessel *Eira*. His return to Svalbard in 1873 with such a vessel, *Diana*, and with *Sampson* in reserve, allowed Leigh Smith the luxury of continuing his oceanographic field research even while providing support to Nordenskiöld's polar expedition.

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