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PETER FJÅGESUND

When Science Came to the Arctic

Constantine Phipps's expedition to Spitsbergen in 1773

ABSTRACT The article discusses Constantine Phipps's expedition to Spitsbergen in 1773 and the extent to which it may be regarded as introducing a new and scientific discourse with respect to the Arctic. Phipps appears to be the first Arctic explorer who comes to the region with a modern, scientific mind, and the first to fully reflect a scientific approach to it in the report he writes and publishes on his return. Thus, although the background of the expedition was political and strategic, he may be said to have pioneered a view of the Arctic as being above narrow, nationalist interests. Similarly, it is argued that Phipps's scientific approach paradoxically also heralds the aesthetic dimension of the Romantic period in the region. The article also compares Phipps's expedition with those of Captain Cook, which were taking place at the same time.

KEYWORDS Arctic, Spitsbergen, Svalbard, science, north, Constantine Phipps, Joseph Banks, eighteenth century

When Russia in August 2007 wanted to give the world an unequivocal and media-friendly message concerning its presence and strategic interests in the Arctic, the way in which it was staged and executed was hardly a coincidence. Planting a Russian flag from a submarine on the bottom of the sea bed, 4,200 metres under the North Pole, was a carefully orchestrated political and even military message packaged as a piece of daring and demanding scientific exploration. This powerful combination of science and politics is not confined to the recent past, however.

In the eighteenth century, before the invention of aeroplanes and before modern roads and railways made transport on land cheap and efficient, the sea provided, as it had always done, the primary means for large-scale logistic operations involving goods and people. The sea was, in other words, relatively more important than it is today, and mastering it and controlling it was, to put it simply, the key to power, a fact increasingly acknowledged and–figuratively speaking–taken on board by the British from the age of Henry VIII onwards (Hill (ed.) 2002: 28–31). Thus, the history of the British Navy is largely the history of the British nation, and vice versa. The sea, then, represented an important arena or frontier where nations would vie for a favourable position, and at the spearhead of this competition science would play an increasingly important role. The following is a discussion concerning one particular expedition, that of Constantine John Phipps (1744–1792) to Spitsbergen in 1773, which might serve as an example of an Arctic expedition representing a watershed in polar exploration, adding to the discovery of land and natural resources a new dimension, namely that of scientific investigation, and anticipating the expeditions of modern times, in which science plays a dominant role. As a result, it could also be seen as providing a new discourse or a new set of spectacles through which to view and comprehend the icy wastes.

In the middle and late eighteenth century there was especially one maritime problem that was crying for a solution, namely that of longitude. The problem was by no means a new one: "For lack of a practical method of determining longitude, every great captain in the Age of Exploration became lost at sea despite the best available charts and compasses" (Sobel 2005: 6), and in the centuries before Phipps, a series of potential solutions were introduced to the sea-faring community, many of them of a highly imaginative character.[1] Then, after the so-called Scilly Isles disaster in October 1707, where close to 2,000 men in four warships drowned as a result of a fatal navigational error, the pressure to solve the problem once and for all greatly increased. As a result, the Longitude Act was passed only seven years later, establishing the Board of Longitude, whose sole task was to devote itself to this particular question.

To start with, however, the Phipp's expedition was not especially concerned with longitude. After a period of intense British activity in the Arctic in the 1500s and early 1600s, during which the great objective was to find a passage to Asia, few efforts had been made in the following century and a half, especially in the direction of the Pole itself. In the course of this period, Europe had gone through major changes; most importantly, Britain had risen to becoming a major European power and was nurturing imperial ambitions which increasingly necessitated an access to the markets in the Far East. Such an access, and preferably an exclusive one via a northern—as opposed to a southern—route, would give invaluable advantages, and consequently the old search for a passage was revived, involving not just the traditional Northeast and Northwest passages, but also a possible route straight across the Pole. Thus, according to Phipps's own account, *A Voyage towards the North Pole Undertaken by His Majesty's Command 1773*, which was published in 1774, the object of the expedition was simply "to try how far navigation was practicable towards the North Pole" (Phipps 1774: 10).

Not unexpectedly, there was also an element of national rivalry behind the decision. Several countries realised that the time was right for securing trade routes as well as distant markets and territories, and expeditions were organised in various directions. In 1768, James Cook (1728–1779)—not yet a captain—had begun his first voyage, but had sailed southwest into the Pacific, steering clear of Arctic waters. Also, he was not to return until 1771. Thus, when the French explorer Louis-Antoine de Bougainville (1729–1811) returned from his successful circumnavigation of the world in 1769, he clearly provided the French with an edge on the British. Furthermore, he had specific ideas about finding a northern route to the East. In August 1772, he wrote a detailed memorandum to the French Navy suggesting a voyage across the Pole. His proposal was turned down a month later, resulting in an as yet undocumented contact between Bougainville and the British (Savours 1984: 402–403). Another element was the Swiss geographer Samuel Engel (1702–1784), who in 1765 had published an important book in Lausanne on the possibility of reaching the North Pole. An enlarged German edition, which almost certainly attracted the interest of the British, was then published in 1772. From now on action was swift: by the end of the year discussions were under way, and as early as January 1773, the recently elected Vice President of the Royal Society, Daines Barrington (1727–1800), formally proposed an expedition. Barrington was, like Engel, a firm believer in an open polar sea, and in 1775 he published *The Probability of Reaching the North Pole*, a paper "read at the Meeting of the Royal Society, May 19, 1774", i.e. after Phipps's return (Barrington 1775: n. p.). In this paper, he claims credit for being "the unworthy proposer of the voyage towards the North Pole" (1), with a choice of adjective that was clearly more appropriate than he intended it to be; R. W. Phipps, a modern descendant of Constantine Phipps, characterises him as an "ignoramus" and an "amiable aristocratic British eccentric", his theories as "totally unsubstantiated", and goes on to quote the book *Farthest North*, edited by Clive Holland, which describes Barrington as "being remarkably dim-witted" (Phipps 2004: 390). Still, his arguments prior to the voyage had clearly convinced the Royal Society, indicating rather explicitly the extent to which scientific scepticism was still in its infancy, and the Society promptly wrote to the Earl of Sandwich, the First Lord of the Admiralty. He immediately took the proposal to King George III, who "was pleased to direct" that the expedition "should be immediately undertaken" (Phipps 1774: 10), and by April Phipps had been appointed and provided with two ships, the *Racehorse* and the *Carcass*.

In one sense, Britain was back to square one: the numerous expeditions in the 1500s and 1600s had not brought the question of a northern short-cut to Asia nearer to a solution, and so Phipps's task was essentially the same as that of his predecessors, i.e. to find a northern route to Asia. The main difference this time was that Phipps was instructed to take the bull by the horns, find an opening through the allegedly narrow rim of ice against which earlier expeditions had surrendered, and cut straight across the Pole (though he was instructed, in case he reached the Pole, to return immediately). It is hardly difficult to understand how intriguing the idea of an open and temperate polar sea must have been at a time when nobody knew what was behind the apparently perpetual barrier around 80° N. Nor is it difficult to understand the implications of a successful opening up of a new sea route to the East. It is hardly surprising, therefore, that an Act of Parliament was passed very soon after the Phipps expedition (1776) promising a reward of £5,000 for anyone reaching within one degree of the North Pole (Hayes 2003: 58).

However, Phipps's expedition must have left London on 4 June with a considerably greater confidence than Arctic expeditions only a few years earlier. One point, which should not be underestimated, was the quality of the ships, which had been considerably strengthened to tackle the extreme conditions. Together with this, the provisions in terms of food and clothes were the very best available (Savours 1984: 404). But the expedition was also different in other essential respects. When the two ships sailed down the Thames they were not primarily armed with the latest in terms of weapons to defend themselves, or with goods to be sold to or bartered with potential primitive natives. Instead, they were armed with science. When Sir Martin Conway, in his history of Spitsbergen, claims that this was "the first purely geographical Arctic expedition" and "in intention, a purely scientific mission" (quoted in Savours 1984: 405), it is only partly true, because the intention or ultimate objective was obviously political, strategic and commercial more than scientific. Still, the fact remains that science played an overwhelmingly important role during the expedition. It also marked the beginning of a new era, in which highly specialised science became an indispensable tool and a key factor in the fierce competition between different nations. Finally, it demonstrates the importance of scientific as well as political networks, how they interacted, how they were partly separate and partly the same, and how they thus illustrate new constellations of power and influence in society. In short, it could be seen as a stage in the development of the modern world.

Constantine Phipps was himself a typical representative of these new networks within Establishment circles, combining a number of functions and interests. A man of the sea from an early age, he became a lieutenant at the age of eighteen, and later a captain. He was the owner of a library on nautical books that "was famous and considered to be the best in England",[2] and while continuing his naval career, he was also a Member of Parliament and of the Royal Society. Patrick O'Brian simply calls him "a capital astronomer and mathematician" (41), and A. M. Lysaght claims he "had a great knowledge of the higher branches of astronomy and mathematics" (Lysaght 1971: 62). Still, contacts are essential, and there seems to be little doubt that one man in particular helped promote Phipps's career. At Eton in the late 1750s, he had been a fellow student of Joseph Banks (1743–1820), a wealthy young landowner from Lincolnshire, who was soon to become Britain's most prominent botanist. As early as 1766, Phipps and Banks had gone to Newfoundland and Labrador together for botanical studies in Britain's new territories acquired as a result of the Treaty of Paris three years earlier (O'Brian 1997: 40), and in this way Phipps also acquired a considerable knowledge of natural history, which today would be called "biology." Furthermore, Banks did not just have a hand in the appointment of Phipps for the polar expedition; he also provided him with a long list of "desiderata," i.e. botanical and zoological specimens that Banks wanted him to bring back to England (Lysaght 1971: 256–259). Phipps consequently combined naval expertise with a considerable knowledge of scientific matters.

Another central and highly interesting figure in this network of scientists is Israel Lyons (1739–1775), who was appointed astronomer of the expedition and thus had overall responsibility for the scientific activities on board the two vessels. Lyons, whose career is discussed in detail in an article by Lynn B. Glyn, stands out among this group of Establishment figures, because as a Jew of humble origins, he was excluded from an academic position at Cambridge, where he lived, as well as membership in the Royal Society. Having published a mathematical treatise at the age of nineteen and a botanical work at twenty-four (Glyn 2002: 275), he eventually became connected with the Board of Longitude. Once again, the influential Joseph Banks was probably pulling the strings: while Banks was still a student at Oxford in 1764 and desired to be taught botany, which was not offered by the university, Lyons "rode over [...] and gave a successful course of lectures," thus establishing a relationship with Banks that would soon prove profitable (Glyn 2002: 285). Only a year later, Lyons acquired a position as an assistant to the new Astronomer Royal, Nevil Maskelyne (1732–1811), which meant that he also worked in close contact with the Royal Society. The surgeon on the expedition was Dr. Charles Irving, who had constructed an apparatus for distilling fresh water from the sea, which with "repeated trials gave us the most satisfactory proof of its utility: the water produced from it was perfectly free from salt, and wholesome, being used for boiling the ship's provisions" (Phipps 1774: 28).

Before looking more closely at the Phipps expedition, however, it is necessary to place it more precisely in relationship to another parallel event at the time, namely James Cook's Second Voyage. As mentioned earlier, Cook had returned from his first circumnavigation in July 1771, i.e. about eighteen months before the initiative for the Phipps expedition was taken. An important contributor to the success of the first voyage was the omnipresent Joseph Banks, who served as the expedition's botanist and who registered a large number of new botanical specimens. A year later, in July 1772, Cook set out on his second voyage, from which he returned in July 1775. This means that the entire Phipps expedition, the planning as well as the actual execution of it, took place at a time when there was still no news of Cook's second voyage. This is worth noting, because both Cook and Phipps found themselves playing roles in a scientific competition—one of the most nerve-wracking chapters in the history of modern science. At the centre of this competition was the problem already mentioned—that of longitude. At the time, there were two men representing rival approaches to finding a solution, and both contestants were eagerly vying for the £20,000 prize offered by the Board of Longitude. One theory was represented by the Astronomer Royal, Nevil Maskelyne, who believed in the so-called lunar distance method, whose complex calculations were based on Maskelyne's *Nautical Almanac* (later known as the *Astronomical Ephemeris*), which was first published in 1766 (Quill 1966: 240). This is precisely the work Lyons was contributing to. The other approach was John Harrison's chronometer. Harrison (1693–1776), a Yorkshire carpenter, was a natural genius who had produced his first pendulum clock—made almost entirely of wood—in 1713 (Quill 1966: 16), but who since 1730 had been working on a clock or chronometer that had the extreme precision needed for keeping accurate Greenwich time at sea and thus for calculating a ship's longitude. This required an instrument that was completely impervious not only to the ship's movements, but also to major climatic variations. By 1760, Harrison had produced his fourth prototype, the so-called H4, for which—five years later—he was granted half the prize money. But the race was not over; the Board of Longitude, heavily influenced by Maskelyne himself, kept demanding more and more taxing tests, and when Cook set out on his second voyage in 1772 he was given a copy of H4 built by Larcum Kendall (1721–1795) and instructed to subject it to the most rigorous test imaginable, i.e. another circumnavigation, which would also involve a visit to the polar regions (Quill 1966: 186). However, in June 1773 no-one knew where Captain Cook was, whether he was still alive, or whether the chronometer was at the bottom of the sea. Consequently, the Phipps expedition provided an alternative opportunity for stringent testing, and the Board of Longitude therefore provided Phipps with "two watch machines for keeping the longitude by difference of time; one constructed by Mr. Kendall, on Mr. Harrison's principles; the other by Mr. Arnold" (Phipps 1774: 13–14). Thus, Phipps found himself responsible for an experiment with new spearhead technology which might potentially revolutionise navigation at sea and have a huge impact on a trade that was quickly assuming global dimensions. The seriousness of the experiment is underlined by the extremely detailed instructions given by the Board of Longitude with regard to who would have keys to the boxes in which the chronometers were kept, how the winding of them and the reading of data should be performed with a certain number of witnesses present, and so on (Savours 1984: 410).

But that was not all; in relative terms, the *Carcass* and the *Racehorse* were essentially equipped like modern research vessels, packed with the best scientific equipment money could buy. This included, among a wide range of instruments, a sextant, which had been invented by John Bird as recently as 1757, and which was an improvement on the octant; a Dollond telescope; a marine barometer; six thermometers and two dipping needles, the latter measuring the angle between the earth's surface and the direction of the magnetic field. In addition, Phipps's report contains a number of detailed illustrations of the instruments on board, including a pendulum, "to ascertain the exact distance between the center of motion and center of oscillation of a pendulum to vibrate seconds at London" (153), and about thirty pages of text describing with impressive precision the various experiments performed with it.

A major part of the report is devoted to these instruments and their function, and in comparison with expedition reports from only a couple of decades earlier, that of Phipps is in a category of its own. Furthermore, the author comes across as a kind of scientific *homo ludens*, who with childish abandon and curiosity seeks to find out what information the various instruments can yield, as in the following observations. The first is from 15 June 1773:

> By an observation at eight in the morning, the longitude of the ship was by the watch 0° 39' W: Dip 74° 52'. At half past ten in the morning, the longitude, from several observations of the sun and moon, was 0° 17' W; at noon being in latitude 60° 19' 8", by observation, I took the distance between the two ships, by the Megameter; and from that base

> determined the position of Hangcliff, which had never before been ascertained, though it is a very remarkable point, and frequently made by ships. According to these observations it is in latitude 60° 9', and longitude 0° 56' 30" W. In the Appendix I shall give an account of the manner of taking surveys by this instrument, which I believe never to have been practised before. (Phipps 1774: 25–26.)

Five days later:

> I founded with a very heavy lead the depth of 780 fathom, without getting ground; and by a thermometer invented by lord Charles Cavendish for this purpose, found the temperature of the water at that depth to be 26° of Fahrenheit's thermometer; the temperature of the air being 48° ½. (Phipps 1774: 27.)

On 16 July, he makes another observation which is remarkable for its precision:

> On the 16th [of July 1773], at noon, the weather was remarkably fine and clear. The thermometer in the shade being at 49°, when exposed to the sun rose in a few minutes to 89½, and remained so for some time, till a small breeze springing up, made it to fall 10° almost instantly. The weather at this time was rather hot; so that I imagine, if a thermometer was to be graduated according to the feelings of people in these latitudes, the point of temperature would be about the 44th degree of Fahrenheit's scale. From this island I took a survey, to ascertain the situation of all the points and openings, and the height of the most remarkable mountains: the longest base the island would afford was only 618 feet, which I determined by a cross base, as well as actual measurement, and found the results not to differ above three feet. To try how far the accuracy of this survey might be depended upon, I took in a boat, with a small Hadley's sextant, the angles between seven objects, which intersected exactly when laid down upon the plan. I had a farther proof of its accuracy some days after, by taking the bearings of Vogel Sang and Hacluyt's Head Land in one, which corresponded exactly with their position on my chart. (Phipps 1774: 46.)

And on 18 August, the crew having with an almost superhuman effort managed to free the ship from being caught in the ice, he seems almost reluctantly to conclude his experiments before returning to England:

> Completed the observations. Calm all day. During our stay, I again set up the pendulum, but was not so fortunate as before, never having been able to get an observation of a revolution of the sun, or even equal altitudes for the time. We had an opportunity of determining the refrac-

> tion at midnight, which answered within a few seconds to the calculation in Dr. Bradley's table, allowing for the barometer and thermometer. (Phipps 1774: 69.)

Observations described with this kind of vocabulary and this level of scientific precision would have been unthinkable only a few years earlier. Perhaps it is the inclusion of half degrees that most clearly demonstrates a new and sophisticated approach, but it should also be noted that Phipps describes, almost in passing, mathematical operations that clearly require a considerable theoretical knowledge from a naval captain. In the passage from 16 July, for instance, he shows an awareness of the fact that the sense of heat and cold is relative rather than absolute, thus anticipating a phenomenon that scientists a hundred and fifty years later would call the Wind Chill Factor. And the entry from 18 August indicates an understanding of how refraction is influenced by the changes in atmospheric pressure and temperature. Still, it was Lyons and not Phipps who was responsible for the scientific experiments on board, and not unexpectedly, the former was also provided with an extremely detailed and demanding list of instructions to be performed during the voyage, all of which are reproduced in Ann Savours' article about the expedition (Savours 1984: 423–424). Also, according to Glyn, Maskelyne's notebooks contain a series of questions relating to the voyage, and from the perspective of history of science, the form of these notes are perhaps as interesting as their content:

> Currents, their strength & direction? Driftwood, what kind of wood, is it wormeaten, whence comes it? Does the salt-water ever freeze? Is the ice found in the sea perfectly fresh? Fogs, where & when do they prevail most? [...] Mountains of ice & floating ice ought to be distinguished from one another. Q: Velocity & direction—whence comes it? Are either or both salt? (Quoted in Glyn 2002: 295.)

Clearly, there are practical reasons for these questions: Maskelyne was as aware as everyone else involved in the expedition that it was essential to leave no stone unturned in the attempt to find indications of a navigable route across the Pole, and consequently any small clue might prove significant. Still, there is at the same time an almost feverish intensity in the Astronomer Royal's curiosity to know, to gather information, to systematise it and to draw new scientific conclusions. From a Scandinavian perspective, this is particularly interesting, since the towering figure of Carl Linnaeus (1707–1778) played a central role in the development of this new approach to knowledge, by which virtually all information concerning the natural world and its manifold phenomena was ordered, catalogued and labelled. As Mary

Louise Pratt comments in *Imperial Eyes. Travel Writing and Transculturation*, the main ambition of natural history at the time was to impose a sense of order:

> The eighteenth-century classificatory systems created the task of locating every species on the planet, extracting it from its particular, arbitrary surroundings (the chaos), and placing it in its appropriate spot in the system (the order book, collection, or garden) with its new written, secular European name. Linnaeus himself took credit for adding 8,000 new items to the corpus during his lifetime. [...] The (lettered, male, European) eye that held the system could familiarize ("naturalize") new sites/sights immediately upon contact, by incorporating them into the language of the system. (Pratt 1992: 31.)

And the connection between the Phipps expedition and Linnaeus is quite direct: the latter's disciple in Uppsala, Daniel Carl Solander (1733–1782), had been sent to London in 1760 as a representative and promoter of the new scientific regime, and had quickly become a prominent member of the British scientific Establishment, acquiring a position at the newly founded British Museum as early as 1763. In the following year he became acquainted with Joseph Banks, another enthusiastic Linnean (as was, incidentally, also Israel Lyons), with whom he gradually developed a "close friendship" (O'Brian 1997: 37–38), and like Banks, he also took part in Cook's first voyage. The search for a solution to the problem of longitude could also be directly compared to the Linnean system: the grid created by latitude and longitude would yield units of information small enough to be manageable and beyond doubt, enabling—for the first time in history—a captain always to know his position with absolute certainty.

A final example of the almost obsessively scientific focus on the voyage to Spitsbergen is provided by an incident from soon after the publication of Phipps's official report. In the very same year, 1774, a small, fifteen-page booklet was published by the Reverend Samuel Horsley (1733–1806). As a typical educated man of the period, Horsley was not only a man of the Church, but also a very competent mathematician and a member of the Royal Society. He had also played "an active role in drawing up the instructions for the voyage" (Glyn 2002: 298). The booklet was entitled *Remarks on the Observations Made in the Late Voyage towards the North Pole, for Determining the Acceleration of the Pendulum, in Latitude 79° 50′*. The introduction is a study in polite phrases, between the lines of which the reader can sense that something is brewing:

> Mathematicians are no less indebted to you than mariners, for the attention which you have given to every object of scientific enquiry, though but remotely connected with nautical art, which that singular voyage presented. I have perused with particular attention the account of the observations of the going of the pendulum in latitude 79° 50' and shall give you my remarks without apology, which it would be the highest injustice to you not to suppose unnecessary, after the pains you have bestowed upon the observation, and the minuteness and fidelity with which you have detailed all the circumstances of it, as well as the steps of the subsequent calculations. (Horsley 1774: 3–4.)

Horsley then quickly goes into a complicated scientific discussion whose content is of no interest apart from the fact that it shows how advanced and sophisticated science had become. What it amounts to is making Phipps aware of a minor miscalculation:

> For the exact agreement which you think you find between the gain of the pendulum as resulting from the comparison with the watch, and as deduced from the observation of the sun's return to the vertical wire of the equatorial telescope, is imaginary. The appearance of agreement arises entirely from an error in the computation of the retardation of the sun's return. (Horsley 1774, quoted in Glyn 2002: 298.)

It is not immediately clear why Horsley chose to publish a separate booklet about this miscalculation,[3] but what emerges from Glyn's summary of the incident is that it produced a rather heated exchange of letters and that despite the relative insignificance of the error, it quickly became a question of honour for Phipps himself, who called it a "monstrous blunder" (Glyn 2002: 298). As a result, Lyons was made to carry the blame, which he immediately accepted. The incident, however, again serves to illustrate a totally new discourse, which makes scientific accuracy a matter of the utmost importance, which has a direct bearing on social relations and prestige, and which it would probably be difficult to find examples of only a few years earlier. It is perhaps even typical of this change that the whole objective of the Phipps expedition more or less drowned in a discussion about a minute calculating error: 1773 was the worst summer for ice in living memory, and so after weeks of running against the solid wall of ice at the northern tip of Spitsbergen, Phipps eventually returned with nothing gained, at least in terms of discovering a passage across the Pole.

Although Cook's voyages were undoubtedly scientific missions which collected invaluable material,[4] they are perhaps more famous for geographical discovery and cartographical advances with relatively direct political and commercial implications. Phipps's voyage, on the other hand, hitting relentlessly against a solid wall of ice, was in a sense a complete failure in terms of discovering new land or a new passage to Asia, and this is probably the reason why his account and the numerous tables and illustrations of mechanical instruments leave such a powerful impression of the expedition as an almost pure-bred scientific venture. Passages such as the ones quoted above may seem almost comical when compared to the apparently meagre results from the expedition, at least on the surface. Nevertheless, the phrase "paradigm shift" may not be an overstatement when describing the expedition, because this shift took place both in terms of new political tools and in terms of language and terminology.

From now on it was obvious to everyone–politicians and scientists alike –that science had become an indispensable tool in the pursuit of political profit. Science, in other words, acquired political leverage through a general realisation that it possessed the key to change and progress. The innumerable tiny measurements and experiments might seem insignificant and even laughable for an explorer of the old school, who was used to rather more tangible evidence, but people in central positions understood that they were necessary steps that would eventually provide huge rewards—the faster and sooner, the better.

In terms of language, too, a change had taken place. Phipps's expedition had come about largely because of international competition in the field of science. This competition, though remaining fundamentally political, strategic and commercial in nature, was couched in the new and different discourse of science. Furthermore, science was by its very nature a free and open pursuit that ignored national borders. As a consequence, the more down-to-earth national interests became less clearly expressed, at least on the face of things. Instead, they had to be read between the lines and introduced in a jargon that was apparently objective and disinterested. It goes without saying that the older generation, unaccustomed to and ignorant of the new knowledge and the new vocabulary, must have had a sense of belonging to an old order. Perhaps even the second clash mentioned above between Samuel Horsley and Joseph Banks provides an illustration of this point: after the Revolution, Banks—even at a time of war with France—had retained close contacts with French scientific colleagues, and was honoured with a membership in the highly prestigious *Institut National* in Paris. Horsley, incapable of distinguishing between science and national interests, found Banks's grateful letter of acceptance to the Institut "replete with statements which are a compound of servility, disloyalty and falsehood, sentiments which ought never to be conceived by an English heart" (quoted in O'Brian 1997: 268).

Customs and attitudes to life at sea also changed. For instance, when

Albert Markham discusses the Phipps expedition in his book *Northward Ho!*, he comments particularly on the fact that in all accounts of expeditions from the seventeenth century there is a consistent reflection of a faith in the Almighty, whereas there is no indication in the logs and journals from the Phipps expedition that divine service was ever performed during the voyage (Markham 1879: 78–79).[5] It is as if the new scientific approach rather suddenly applies to all aspects of life, thus gradually replacing an old perception of the natural world—including the awe-inspiring Arctic—as a place of forces beyond human control with the idea that nature can be mastered by human knowledge and subjected to rational, identifiable laws. And with this new-won self-confidence, the perception of the Arctic similarly begins to change. Less than twenty years after Edmund Burke's treatise on various concepts of beauty, the philosophical category of the sublime is able, to some extent guided by the hand of science, to provide the Arctic and the polar regions in general with a new and *aesthetic* dimension that will characterise it up to the present age. From Phipps's day onwards, the polar landscape is not just awesome and merciless—a white underworld; it also carries a terrifying beauty. Paradoxically, Phipps, with his cool and rational instrumentalism, heralds the advent of the haunting and mysterious Romantic Arctic landscape idea of the late eighteenth and the nineteenth centuries.

In the early 1770s, a number of countries were very much aware of the strategic significance of the Arctic regions. Despite having suffered major defeats and lost huge territories during the Seven Years' War (1756–1763) and through the Treaty of Paris, France was not on the defensive. In 1771, the explorer Marquis Verdun de la Crenne, for instance, visited Iceland and charted parts of the island's coastline (Freminville 1819: 85), and two years later, Louis-Antoine de Bougainville, whose role in the build-up to the Phipps expedition has been discussed above, conducted an expedition to Spitsbergen paralleling that of Phipps (Markham 1879: 101). Similarly, the Dutch were active in the northern fisheries, reaping huge harvests: according to William Scoresby (Jr.), in the 1771 season alone, 121 Dutch ships produced 14,320 barrels of oil from 500 whales (Scoresby 1969: vol. 2, 79). Still, there was no doubt that Britain had by now emerged as the world's leading nation, whose most powerful instrument, the Royal Navy, was effectively in control of the seas. In addition, the Hudson's Bay Company provided a strong British presence in present-day northern Canada. Thus it was one of its representatives, the young Samuel Hearne, who from 1770 to 1772 explored the Northwest Territories and eventually reached the Arctic Ocean (McGhee 2005: 204–215).

The Phipps expedition and its attempt to open a new gateway to the

East in the following year were therefore very much a demonstration of British political ambitions in the north. But it was also a demonstration of a new awareness that science was an essential key to success in the political arena, and a demonstration of an impressive collaboration between representatives from such different camps as the Government (not least the King), the Navy and the Royal Society. Admittedly, the men behind the venture were all—with the exception of Israel Lyons—members of a small and closely-knit elite; it is interesting to note that both Phipps himself and Joseph Banks belonged to the landed gentry, which still—but only for a time—represented the backbone of British society and recruited men with the cultural and financial capital necessary to bring the world forward. Thus, on the one hand, the combination of science and political power structures was something of a novelty 250 years ago; on the other hand, since then this fundamental recipe for change has perhaps not been altered very much at all, as is apparent in the present situation in the Arctic. Today, too, there is an intense and renewed awareness of the significance of the region; a range of countries have jumped on the bandwagon; and there is a complex interweaving of political and scientific interests. There is, however, one new element that makes today's exploration of the polar regions radically different from that of the 1770s: the exploitation of natural resources is only going to be possible in close collaboration with networks of scientists which are truly global rather than national, and whose function and responsibility are just as much to help protect the region as to exploit it. One may argue that traditionally, science has allowed itself to be used as a means of conquering and exploiting a passive natural world, but that role is definitely changing. This means, one may hope, that something amounting to yet another paradigm shift is actually taking place, and that there is reason for optimism despite climate change, ice melting and polar bears struggling to survive in a changing environment.

NOTES

1 For a survey, see Sobel 2005, ch. 1.

2 Lysaght 1971: 62, quoted in Savours 1984: 407.

3 There is no doubt, however, that he was hot-tempered: a decade later he made "a remarkably violent attack" upon Joseph Banks, who was then President of the Royal Society, and he made yet another in 1802. Both of the attacks were personally rather than scientifically motivated (O'Brian 1997: 209, 268).

4 O'Brian's biography of Joseph Banks (O'Brian 1997) offers numerous examples of the intensity of the latter's search, even at the risk of his own life, to register hitherto unknown plants and animals.

5 Typically, Patrick O'Brian comments similarly concerning Joseph Bank's journal from

the first Cook expedition. Having been in serious distress, the *Endeavour* was manoeuvred into a bay that provided a perfect place for repairs, and Banks calls the finding of the harbour "'almost providential'." According to O'Brian, "these words and others on the next page are almost his only references to a higher power" (135).

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