David Lyall (1817–1895): Botanical explorer of Antarctica, New Zealand, the Arctic and North America

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Early Life and Education

David Lyall, MD, RN, FLS, surgeon, botanical explorer and lifelong friend of Sir Joseph Hooker, was born in Auchenblae, Kincardineshire, Scotland on 1 June 1817, the eldest son of Charles Lyall, of Auchenblae and Elizabeth Callum (Desmond, 1994; Hooker, 1895a; Hooker, 1895b; *Cheltenham Examiner*, 1895; *The Times*, 1895). Charles Lyall was the co-owner of a mill and evidently had enough resources to fund his son's education. William Lyall[1], David's grandfather, was a tenant farmer in Wattieson and was known for his pioneering experiments in growing turnips, a crop which had been introduced to the area in 1756. It revolutionized farming practice in Scotland, since for the first time it provided winter fodder for cattle. Until then most cattle, except essential breeding stock, had to be slaughtered each autumn (Lindsay, 2008, p.249). Whether it was tales of his grand-father's farming experiments with the turnip which first stimulated David's interest in botany is matter of speculation, but it may have been so.

David Lyall attended the first three years of an Arts course at Marischal College, Aberdeen between 1831 and 1834 but did not go on to graduate at that time.[2] Instead, he studied for and was admitted as a Licentiate of the Royal College of Surgeons of Edinburgh, on 8 June 1838.[3] The licentiate had been put on a regular footing in 1815 and from then on

Figure 1. David Lyall, carte de visite photograph, by Maull & Polyblank, 1862. © Linnean Society.

candidates were examined in core subjects such as surgery, anatomy and pharmacy and once admitted as a Licentiate were qualified to practice surgery.[4] It was regarded at the time as a less expensive way of acquiring a medical qualification.

It was not until 31 July 1844 that the degree of MD was conferred on him, by King's College, Aberdeen, which was after he returned from the Ross Expedition of 1839-1843, described in detail below. Under regulations in force since 1840 the degree of MD could be awarded to a person who was a licentiate of RCS and had practised for at least five years. A further period of study was not required.[5]

One can only speculate as to the reason for this course of events. Perhaps, after having spent three years on an Arts degree, and a considerable amount of his father's money, and having found that his interest instead lay in medicine, he felt that he could not impose any longer on his father, and chose the less expensive method of gaining an initial medical qualification.

Hooker noted that, "as was not unfrequently the case with young Aberdonian medical men, he sought to improve his knowledge, and throw himself early on his own resources, by undertaking a voyage to Greenland as surgeon to a whaling ship." (Hooker, 1895a: 210). It is not entirely clear when this voyage took place, but it was evidently sometime between 1834, when Lyall left Marischal College, and his joining the Ross expedition in June 1839. Nevertheless, his initiative was soon to have its reward.

The Antarctic: the British Antarctic Expedition, 1839-1843

David Lyall entered the Royal Navy in 1839 and was immediately appointed, on 6 June, as assistant surgeon on HMS *Terror*, under Captain Francis Crozier (1796-1848), one of the two ships forming Sir James Clark Ross's Expedition to the Antarctic. Lyall's medical qualifications and the fact that he had already acquired experience in the Arctic must have made him an obvious choice. Joseph Dalton Hooker (later to be knighted) was assistant surgeon on the other ship of the expedition, HMS *Erebus*. Sir William Hooker, professor of botany at Glasgow University, had asked Ross to find a place on the expedition for his young son, Joseph, who had just taken his MD degree from Glasgow. Joseph was of course later to become even more famous than his father and one of the leading scientists of the nineteenth century. The voyage was to last four years (Ross, 1847).

The two young men became lifelong friends and collaborators. Both were aged only 22 when they set off on the voyage, the same age as Charles Darwin when he had set sail on HMS *Beagle* eight years earlier. Unlike Darwin, however, neither had parents whose fortunes were sufficient to fund their participation in a civilian capacity. Also unlike Darwin, they had both survived the rigours of a medical education at the time, which was not for the squeamish. Both had therefore joined the Royal Navy and had of necessity to combine their interest in natural history with their official duties as assistant surgeons. David Lyall's letters, written throughout his life, to Sir Joseph and Sir William Hooker are preserved at Kew, as are his herbaria, with duplicates in other collections.

The crews of both ships were all volunteers. HMS *Erebus* and *Terror* were warships and had been chosen because of their strong hulls, having been built as "bomb ships",

designed to fire heavy mortars, and they had also been reinforced at Chatham with extra beams and bulkheads and double copper bottoms. The ships were supplied with the latest equipment and provisions, including early tinned food, enough to last three years. It seems to have proved perfectly wholesome, since Ross recommended its use on all future naval expeditions (Ross, 1847: xxi-xx).

This famous voyage was the first scientific expedition to the Antarctic. The ships were the first to penetrate the Antarctic pack ice and to enter the "lagoon", later named the Ross Sea, and to encounter the "Great Ice Barrier", later renamed the Ross Ice Shelf. It was the only voyage to the region ever to be attempted by sail, before or since.

The ships set sail from Chatham in the autumn of 1839 and took a year to sail via Madeira, the Cape of Good Hope and Kerguelen Island to Hobart, Tasmania. From Hobart they proceeded to the Auckland Islands, and Campbell Island. On New Year's Day 1841 they crossed the Antarctic Circle for the first time. Three days later they encountered the pack ice. Ross had heard stories of a "lagoon" of open water beyond the ice in that area. When the ships reached the pack ice with the lagoon in the distance, Ross manoeuvred the ships repeatedly to strike the ice at the same point. This was in itself a remarkable feat of seamanship, given that the ships were powered only by sail. After a week of attempts, the ice broke and they sailed through into the lagoon, where no humans had ever been before. At the far end was the ice barrier itself. Ross estimated it at 180 to 200 feet high and it disappeared over the horizon in both directions. The ships sailed along it for some 300 miles. Ross discovered Victoria Land, McMurdo Sound, and two volcanoes, which he named after the ships: Mount Erebus, which,

Figure 2. New Year's Day, 1842, 66° 32´ S, 156° 28´ W. Watercolour by J. E. Davis.

Figure 3. Watering in the Pack. Watercolour by J. E. Davis.

remarkably, was erupting at the time, and Mount Terror. Other geographical features were named after other members of the expedition, in the Victorian manner, including Cape Hooker and the Lyall Islands (70° 45´ S, 167° 20´ E; Ross, 1847: 364; *Geographical Names of Antarctica* p. 199).

Although the expedition was to spend another two seasons in the Antarctic, they did not enter the Ross Sea again. The ships returned to Hobart in April 1841 for a major refit, giving Hooker and Lyall the opportunity to make botanical expeditions into the interior, and visiting Bay of Islands, New Zealand. The ships also spent winter months in Berkeley Sound, East Falkland.

The hazards of such a voyage at the time were immense. The ships encountered fierce gales and giant seas. At one point they collided and *Erebus* lost rigging and spars when it was driven into the face of a huge iceberg. When Ross, Crozier and a small party made a risky landing on Franklin Island in the Ross Sea Hooker was nearly crushed by a boat when he slipped on icy rocks.[6] A landing was also made on Possession Island. The voyage nevertheless also had its lighter moments. New Year's Day, 1842 was celebrated at 66° 32´ S, 156° 28´ W on an ice floe with games and a fancy dress ball. Both captains watched the spectacle seated on "thrones" carved out of the ice by the crews who also thoughtfully provided a bar for refreshments made from the same material. This incident and others were illustrated in watercolours by J. E. Davis, the second master of HMS *Terror*.[7]

Ross's greatest scientific achievement, and the expedition's main purpose, was mapping the earth's magnetic field in the southern hemisphere. He was also instructed by the

Admiralty to locate and reach, "if possible", the South Magnetic Pole, whose location had been calculated by Gauss.[8] Ross named Cape Gauss after the great German mathematician and scientist. The expedition reached within 160 miles of what was then calculated to be the magnetic pole, but was prevented again by ice from proceeding further.

Natural history does not seem to have been foremost in the minds of the members of the Admiralty when planning the expedition. That aspect seems to have been an initiative of Ross. Hooker and Lyall were to study the botany, and Robert McCormick (1800-1890), surgeon on *Terror*, the zoology. David Lyall may have developed an interest in botany during his medical studies, given the use of many medicinal plants at the time, but his interest was no doubt stimulated and encouraged by Hooker. Hooker had collected specimens of plants on the way out, via Madeira, Tenerife and Cape Verde (Desmond, 1999: 25-34).

Hooker and Lyall also went botanizing on Kerguelen Island, discovered in 1772 by the French navigator Yves-Joseph de Kerguélen-Trémarec. Today the small group of islands is part of the French Southern and Antarctic Lands (*Terres Australes et Antarctiques Françaises*) and a permanent base and scientific centre, Port-aux-Français, was established in 1950. At present there are about 80 people present in the summer and 40 during the winter.[9]

Lyall had the rare distinction of having a whole genus, *Lyallia,* named after him, by Hooker (Hooker, 1844-60, vol. 1: 548-49). Hooker noted in his *Flora Antarctica*:

> "This highly curious genus, coming from the most interesting island visited by the Antarctic Expedition, will serve to commemorate in some slight degree the important services rendered to Botany by my zealous friend and co-operator, Dr. Lyall, R.N." (Hooker, 1844: 60, vol. 1, p.549).

Charles Darwin, writing to Hooker in 1856, was less impressed and seems to have been in an irritable mood:

> "I enclose [an] old note of yours about Lyallia; it may refresh your memory: as for this plant and the Pringlea, I should think the Vestiges theory that they were converted algæ, was as good as any! Confound and exterminate them.–" (Darwin to Hooker, 13 July 1856)[10]

Exterminate? Darwin as a Dalek? Surely not. Hooker, in *Flora Antarctica,* commented that: "I have placed it [*Lyallia*] provisionally amongst the *Portula[ca]ceæ*, knowing no other order with which it has any equally direct affinity." A recent study by Wagstaff and Hennion, using DNA analysis, confirmed this and showed that *Lyallia* shares a common ancestor with the New Zealand genus *Hectorella*:

> "The monotypic genus *Lyallia* is endemic to the sub-Antarctic Îles Kerguelen. A close relationship with another monotypic taxon, the New Zealand endemic *Hectorella*, was proposed. They share a dense cushion growth habit with small coriaceous leaves that lack stipules. The solitary flowers are bicarpellate with two sepals, 4–5 petals, 3–5 stamens and a bifid style. The fruit is an indehiscent capsule with 1–5 seeds. The flowers of *Lyallia kerguelensis* are hermaphroditic with four petals and three stamens whereas the flowers of *Hectorella caespitosa* are female, male or hermaphroditic, with five petals and five stamens. *Lyallia kerguelensis* is rare on Kerguelen, whereas *Hectorella caespitosa* is confined to the South Island of New Zealand. Our phylogenetic analysis of *trn*K/*mat*K intergenic spacer and *rbc*L sequences provides evidence supporting a

close relationship between *Lyallia* and *Hectorella*. The two species form a well-supported clade that is nested within the Portulacaceae. Divergence estimates suggest they shared a common ancestor during the late Tertiary long after the fragmentation of Gondwana. Such relationships underscore the importance of transoceanic dispersal and extinctions for plant evolution in the Southern Hemisphere." (Wagstaff and Hennion, 2007)[11]

The authors agree with Applequist *et al*. (Applequist, Warren, Zimmer, and Nepokroeff, 2006) that the genetic distance between *Lyallia kerguelensis* and *Hectorella caespitosa* justifies the maintenance of two genera, as do their different reproductive characters. *L. kerguelensis* is the only species of the genus.

Figure 4. *Lyallia kerguelensis*, marked "2", Kerguelen. Photograph, jardin. lautaret / Station Alpine Joseph Fourier.

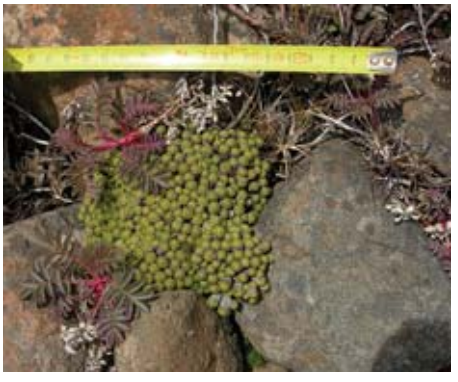

Figure 5. *Lyallia kerguelensis*. Photograph, Françoise Hennion, 2 January 2006, Île Australia, Îles Kerguelen.

Hooker wrote that David Lyall's conduct on the expedition was reported to the Admiralty "as meriting the highest commendation" and "to him were due many of the botanical results of the expedition" (Hooker, 1844: 60, 1: xii). He added that "he formed a most important herbarium, amounting to no less than 1,500 species" and that "during the five winter months of 1842 in Berkeley Sound [East Falkland], made a beautiful collection of algae" which formed "an important addition to Antarctic botany" (Hooker, 1844: 60, 2: 215).

The expedition returned to England on 4 September 1843 (Ross, 1847, vol. 2). Unfortunately, given his initial interest in botanical research, Ross never published the natural history findings of the voyage. On Ross's death, Hooker found the ruined remains of his (Hooker's) collection from the voyage in Ross's back garden (Baigent, 2008).

New Zealand: the Voyage of HMS *Acheron*, 1847-1851

After several routine appointments in the Mediterranean David Lyall had the opportunity to embark on his second voyage of botanical exploration. He had been promoted to surgeon on 4 July 1846 and in October 1847 he was appointed surgeon and naturalist on HMS *Acheron* under Captain (later Admiral) John Lort Stokes (1812-1885) on the expedition to survey New Zealand (Natusch, 1995; Glenn, 1950, Chapter 17).

Stokes had served under Robert FitzRoy on the *Beagle* in 1830 and again, from 1831 to 1836, during the time that Charles Darwin was on board as naturalist (Laughton,

Figure 6. *Lyallia kerguelensis*, Plate CXXII in Hooker's *Flora Antarctica* (1844-60). 1, a leaf; 2, bractae, peduncle, and fruit; 3, utriculus removed from the calyx; 4, vertical section of the same, showing the ripened and abortive seed; 5, seed and funiculus; 6, seed, with testa removed; 7, embryo (all magnified) (Hooker, 1844-60, pt. I, p.549).

2004b). HMS *Acheron* was an early steamship fitted with both sails and a steam engine and paddle wheels. The object of the voyage was to test the capabilities of the ship and to survey the coastline and flora of New Zealand. Hooker again wrote:

> "Here, devoting himself to the collection of the lower orders of plants especially, he amassed the most beautiful and extensive herbarium in these branches of botany which had ever been formed in the islands, besides making considerable discoveries in the phaenogamic plants, and collecting some that had only been previously gathered by Banks and Solander. Among his many important botanical discoveries in this survey was that of the monarch of all buttercups, the gigantic white-flowered *Ranunculus lyallii*, the only known species with peltate leaves, the 'water-lily' of the New Zealand shepherds." (Hooker, 1895a: 210).

When David Lyall first saw the plant and collected it, it was not in flower and he

Figure 7. HMS *Acheron*. Unknown artist.

was not able to identify it at that time. Hooker, writing in 1886, described how it was identified:

> "The first specimens of this remarkable plant, which is certainly the monarch of the genus, were procured in Milford Sound, on the west coast of the Southern Island of New Zealand, by Dr. Lyall, when accompanying Capt. Stokes in the surveying voyage of H.M.S. Acheron (1847-9); unfortunately they consisted of leaves only. These did not even suggest the natural family to which they belonged, and from their likeness to those of a gigantic *Hydrocotyle vulgaris* were not unnaturally supposed to be referable to an unknown umbelliferous plant. In 1860-1 it was rediscovered by Drs. Sinclair, R.N., and Haast (now Sir Julius Von Haast, F.R.S.), when travelling in the mountains on the eastern side of the Middle Island, in marshy places at elevations of 3000 to 4000 feet (it attains even 5000 in the Lake Ohou district)." (Hooker, 1886)

The specimen collected by David Lyall is held by the Royal Botanic Gardens, Kew and is shown in Figure 11 and does indeed consist only of leaves. The lettering at the bottom right indicates that the large leaf was collected at Milford Sound (then called Milford Haven). The lettering on the small seedling leaf reads 'Bligh Sound'. The *Acheron* was in Milford Sound and Bligh Sound in February 1851 (Natusch, 1995:154-58). Hooker goes on to quote a local botanist, J.B. Armstrong, of Christchurch, New Zealand, who described the plant at the time:

> "It is confined to the Middle Island, extending from Canterbury, where it grows at 2000 to 4000 feet elevation, to Otago, where its limits are 1000 and 3500 feet, and grows on mountain slopes below the snow-fields, where the ground is usually kept moist during the summer from the trickling downwards of the melting snow, and is shaded from the midday sun.

> These slopes are perfectly drained by masses of rock beneath, and are covered by peat. It also, however, occurs in sand, and even in shingle. On mountains facing the south Mr. Armstrong has seen it 'covering the ground for hundreds of acres with one huge sheet of pure white,' but it more commonly grows in patches of a score or thirty plants among straggling patches of Olearias, Veronicas, and other shrubs." (Hooker, 1886)

Hooker added that "the leaves attain a foot in diameter, and the flowers four inches; these vary from snow-white, the usual colour, to creamy and pink."

Lyall also found *Olearia lyallii* in the Aukland Islands and the Snares. Sir Joseph Hooker named a number of plants for him, including the white-flowered lacebark *Hoheria lyallii*, *Parahebe lyallii*, the alpine *Celmisia lyallii,* and *Viola lyallii* (Glenn, 1950: 120; Metcalf, 1996: 8).

Desmond writes that:

> "Hooker could never have tackled this first published account of the New Zealand flora without access to the specimens of more than thirty botanists and collectors. One notable collector, David Lyall the naturalist on an official survey of New Zealand in 1847, had been assistant surgeon on HMS Terror. Hooker dedicated this Flora to his former colleague and two other distinguished collectors – William Colenso[12] and Andrew Sinclair."[13] (Desmond, 1999: 204)

Figure 8 (above). *Ranunculus lyallii*. Hooker Valley, Mount Cook National Park, with Lake Tekapo. © Fraser Gunn, 2008.

Figure 9 (right). Peltate leaves of *Ranunculus lyallia,* Arthur's Pass, New Zealand, 17 November 2006.

Figure 10. HMS *Acheron* in Milford Sound, 1851; watercolour by Frederick John Owen Evans (1815-1885), hydrographer to the expedition. © National Library of New Zealand. The *Acheron* is in the distance, dwarfed by the towering mountains of The Narrows in Milford Sound. A large Maori war canoe is in the right foreground. The watercolour was bequeathed to the library by Miss Marjorie Samson, granddaughter of Admiral John Lort Stokes, 1961.

Desmond adds that Hooker's view was that not many new species of flowering plants would be discovered in New Zealand and that collectors could be more profitably engaged in seeking fungi, mosses and other cryptograms. As noted above, Hooker had remarked that it was this "lower order of plants" which had been the focus of much of David Lyall's botanical work in New Zealand. Whether this was at Hooker's suggestion, or a particular interest of David Lyall himself, is unclear. Certainly, as has also been mentioned, Lyall had collected algae in Berkeley Sound on the Ross expedition and collected it later in his career, on the Belcher expedition, discussed below.

David Lyall also provided one of the earliest descriptions of the green New Zealand parrot, the kakapo, *Strigops habroptilus,* mentioning in an article published in 1852 that: "The Kakapo lives in holes under the roots of trees, and is also occasionally found under shelving rocks." (Lyall, 1852)

Figure 11. *Ranunculus lyallii* Hook. f., collected by David Lyall, Milford Sound, New Zealand, 1851. © Royal Botanic Gardens, Kew.

Figure 12. Tab. 6888. *Ranunculus Lyalli*. Curtis's *Botanical Magazine*, Vol. 112, 1886. Drawn by Matilda Smith and lithographed by J. N. Fitch.

The parrot is unique in being the heaviest of the parrots, being nocturnal or semi-nocturnal and for being flightless, or virtually so. Interestingly, David Lyall did observe the bird making a brief glide:

> "The only occasion in which the Kakapo was seen to fly was when it got up one of these hollow trees and was driven to an exit higher up. The flight was very short, the wings

Figure 13. Print from *Birds of New Zealand* by Walter Lawry Buller, 1873.

being scarcely moved; and the bird alighted on a tree at a lower level than the place from whence it had come, but soon got higher up by climbing, using its tail to assist it." (Lyall, 1852)

Since "flight" implies the ability either to take off under its own power, or to sustain powered level flight, or both, "flightless" seems an apt description. Although David Lyall did not apparently observe them, the kakapo is also noted for its unique breeding habits. The male clears a bowl-shaped depression in the ground and, having settled in it, inflates an air sac in its thorax and emits a low frequency booming sound which can carry for several kilometres across valleys, announcing to any females in the area that he is ready to mate. After 20 or 30 booms they then make a high-pitched metallic call, or "ching" sound. The cycle is repeated for several hours at a time.

The Maori name comes from "kaka", parrot, and "po", night[14], suggesting its nocturnal habits. Sir David Attenborough, in his series, *The Life of Birds,* memorably captured it on film (Attenborough, 2000). At the time David Lyall wrote the kakapo was still found occasionally in the mountain areas of North Island and in South Island "it is still found in considerable numbers, inhabiting dry spurs of hills or flats near banks of rivers". However, he noted that its numbers had been greatly depleted by introduced species, especially dogs, cats, rats and stoats. By 1995 the kakapo was on the verge of extinction with only 50 known individuals surviving.[15] After the failure of some early recovery attempts, in 1998 the New Zealand Department of Conservation set up a Recovery Programme involving the removal of the remaining kakapo to two islands from which introduced predator species had been eradicated, and the numbers have now increased to 90 on the reserved islands. There are plans to establish colonies on other predator-free islands.

The *Acheron* was paid off in Sydney at the end of 1851, worked for a time for the New South Wales Government and ended her days in the service of a Sydney merchant (Natusch, 1995: 170). David Lyall arrived back in England in 1852. Stokes had a plan to publish an account of the voyage, but none was ever produced. When the New Zealand writer Sheila Natusch was researching her book, *The Cruise of the Acheron,* she found a manuscript in the Hocken Library, University of Otago, Dunedin, which

appeared to be an account of the voyage, but which unfortunately started at page 115. The first half was missing. However, she obtained a microfilm of holdings in National Maritime Museum, Greenwich and was able to identify the first half of the manuscript, entitled "The Voyage of the Acheron", which ends at page 114, in their holdings (Natusch, 1995: 15-20).[16] We are indebted to her for this discovery which provides a complete account of one of the most important voyages of discovery in New Zealand history. She also found that the manuscript, although long attributed to Stokes, was not only in the handwriting of George Albert Hansard, a civilian clerk on the *Acheron*, but was almost certainly Hansard's own work. She based her own book mainly on the complete manuscript.

The Arctic: the Belcher Expedition in search of Sir John Franklin, 1852-1854

On his return to England, David Lyall volunteered for and was appointed surgeon and naturalist on HMS *Assistance* in the expedition of (later Admiral) Sir Edward Belcher (1799-1877), in search of Sir John Franklin's ill-fated expedition to the Arctic (*The Times*, 1895). Franklin's expedition had disappeared while trying to find the North West Passage. Because of their fine service on the Ross expedition, the same ships, HMS *Erebus* and *Terror,* had been chosen for Franklin's expedition, although for the Franklin voyage they had been fitted with steam engines and screw propellers. Captain Crozier, who had commanded HMS *Terror* on the Ross Expedition, had again commanded *Terror* in the Franklin voyage. He had in fact taken command of the Franklin expedition after the death of its leader and is presumed to have died later with the remaining members. Several graves were discovered in 1984 and 1986, (Beattie, 1987) but neither Crozier's body, nor that of Franklin, has been found.[17] Loyalty to his old commanding officer, and concern over his fate, no doubt explains why David Lyall volunteered for the Belcher expedition. Furthermore, the officers of the Ross expedition had met Franklin in Hobart, Tasmania when he was lieutenant governor (Ross, 1847, vol. 1: xxiv, 118).

David Lyall was appointed acting lieutenant in charge of the sledge party and senior medical officer of the Belcher expedition. He was also appointed superintending surgeon on the *North Star,* the supply ship to which the crews of the other ships of the Belcher expedition had retreated. Belcher ordered the other ships, which were stuck in pack ice, to be abandoned. At the time it was standard practice for a captain who lost a ship to face a court martial, which resulted in Belcher being reprimanded. It was considered by the Admiralty that his abandonment of the ships had been unduly hasty, a judgment somewhat strengthened by the fact that one of the ships, HMS *Resolute*, later floated free and was picked up by an American whaler. David Lyall gave evidence at Belcher's court martial and stated that in his opinion the insufficient supplies of preserved meat would have had a serious effect on the health of the crews if they had been compelled to spend another winter on the ice (*The Times*, 1854).

There is an extraordinary sequel to the story of HMS *Resolute*. The ship was purchased by the U.S. Congress and returned to the United Kingdom in 1856 as a token of friendship. The ship resumed service in the Royal Navy until 1879 when it was broken up. Its timbers were used to make a desk which was presented by Queen Victoria to President Rutherford B. Hayes in 1880. Known as "The Resolute Desk", it

was used in the Oval Office notably by President Franklin D. Roosevelt, President Kennedy and other presidents since and is currently used by President Obama.[18]

Belcher was known to be a difficult man and was not well suited to command, especially in such conditions (Laughton, 2004a). He sailed into areas of heavy ice partly because he ignored the advice of experienced Arctic navigators. On the other hand, his motive in abandoning the ships was the safety and survival of the crews. Despite the loss of the ships, the expedition was not a total failure. Belcher correctly identified the direction Franklin and the survivors took after they abandoned their ships, as being to the south. He rescued various crew members from the earlier Collinson expedition, and a number of scientific experiments were carried out, observations were made of the characteristics and patterns of the Arctic ice floes, and of weather conditions and the geology in the region.

Part of the scientific success of the voyage must also be attributed to the efforts of David Lyall. He made important collections of plants from Disko Bay, the Whale Fish Islands and Cape York, on the coast of Greenland, and in Lancaster Sound, Beechey Island, Wellington Channel and Northumberland Sound in the Polar Islands (Hooker, 1857: 115). This scientific work was carried out in addition to his other onerous duties as surgeon. His botanical work may also, of course, have been a welcome distraction. Hooker published a list of the plants in the *Journal of the Linnean Society* (Hooker, 1857). Hooker commented that "exclusive of Greenland, this is far the largest herbarium ever formed in the American Polar Islands, and exceeds the sum of those of all previous expeditions in the same regions; but, as was to have been expected, no novelties rewarded his labours" (Hooker 1895a: 211). Oswald von Heer (1809-1883), the Swiss geologist and naturalist, wrote an account of the fossil plants collected by David Lyall in Greenland (von Heer, 1862).[19] Lyall Point in the north west of Bathurst Island was named for him in recognition of his efforts (Markham, 1875: 29). The *North Star* returned safely to England in September 1854. He was awarded the Arctic Medal in 1857 (PRO ADM 171/9).

North America: The Boundary Commission of 1857-1862

David Lyall's next appointment was in 1855 under Captain Seymour in HMS *Pembroke*. (Anon., *c*.1873) He served throughout the Baltic campaign and he was present at the bombardment of Sveaborg (Suomenlinna), a military fort outside Helsinki which was occupied by Russia at the time. The *Pembroke* is also recorded as having visited North America and the West Indies at that time, the crew being discharged in August 1856.[20] He was awarded the Baltic Medal in 1856 (PRO ADM 171/21).

After a brief spell at Devonport from October 1856 until November 1857 on the books of HMS *Royal William*, he was commissioned as surgeon and naturalist, on HMS *Plumper* and later HMS *Hecate* under Capt. (later Admiral Sir George) Richards, of the Commission which had been appointed by the Foreign Office, under Col. Sir John Hawkins, RE, to delimit the sea boundary between Canada and the United States in the Pacific Ocean. In 1858 David Lyall's services were transferred to the Land Boundary Commission, surveying the boundary between British Columbia and the United States from the Gulf of Georgia to the Rocky Mountains. A rare personal memoir of David Lyall is found in the report of Lieutenant Samuel Anderson of the

Figure 14 (left). *Larix lyallii*. North Cascades, Washington, USA. August, 2003. © Bud Kovalchik Photography. Figure 15 (right). *Larix lyallii*, cone. North Cascades, Washington, USA. © Bud Kovalchik Photography.

Royal Engineers, who mentioned in his report of 28 March 1860 that:

> "our surgeon Dr Lyall, Royal Navy of Aberdeen, who is a most experienced man. In addition to having been in every ordinary portion of the world, he has been on an Arctic expedition and on an Antarctic expedition and though not a very talkative man, we get curious yarns from him at times." (Lindsay, 2008: 256-57)

It is a great pity, especially for biographers, that neither Anderson nor David Lyall himself ever committed his "curious yarns" to paper.

During this time he formed a large herbarium of North American species, many of them new to science (Lyall, 1863). This included *Larix lyallii*, a subalpine larch from the Cascade Mountains, British Columbia, and *Anemone lyallii*, the little mountain anemone, also known as Lyall's anemone, *Calochortus lyallii* (Lyall's mariposa lily) and many others.[21] He introduced several of these species into Britain for the first time.

The herbarium was of such importance that Sir William Hooker made representations which resulted in David Lyall being carried on the books of HMS *Fishguard* at Woolwich, from April 1862 to August 1862, ostensibly as staff surgeon[22] but in reality on leave and based at Kew (Anon. *c.*1873.) in order to arrange, report and distribute his collections of plants (Lyall, 1864).

William Harvey, professor of botany at Trinity College Dublin, examined and reported on Lyall's collection of algae in Vancouver (Harvey, 1862). Harvey identified some new species among the collection, naming *Rhodomela lyallii* and *Proionitis lyallii* in his honour (Harvey, 1862: 158).

In November Lyall was granted a further six months leave to complete the project. Sir Joseph Hooker commented that the publication:

Figure 16. *Astragalus lentiginosus* var. *lentiginosus*. Collected by David Lyall. Oregon Boundary Commission, July, 1860. © Royal Botanic Gardens, Kew.

> "contains an excellent botanical account of the regions traversed, from the sea to 8000 feet alt. of the Rocky Mountains, where the various zones of vegetation in British Columbia are for the first time indicated and scientifically portrayed." (Hooker, 1895: 211)

Lyall's herbarium is still held at Kew. In November 1862 he was elected a Fellow of the Linnean Society.

In 1866 David Lyall married Frances Anne Rowe, daughter of Dr Rowe of Haverfordwest. She was then 28 and he was 49.[23]

After he completed his work at Kew, David Lyall was appointed surgeon to Pembroke Dockyard, which at the time was a permanent appointment, but when the regulations of the dockyard were changed in 1868, he accepted home appointments on HMS *Trincomalee* at West Hartlepool and HMS *Dædalus* at Bristol. While at Pembroke Dock he was visited by Hooker but it seems to have been a social visit as he had probably completed arranging his collections from North America by that time.[24]

Retirement in Cheltenham

On 7 May 1873 he was appointed Deputy Inspector-General of Hospitals and Fleets shortly before he retired in the same year. His last official duty was his appointment in December 1874 to assist the Arctic Committee in storing and victualling the expedition of 1875-76 (Markham, 1875: 29). From 1878 until his death he lived in Cheltenham at what was then No 1 Priory Parade, and is now No. 24 London Road.[25]

Figure 17. David Lyall's house from 1878 to 1895, 24 London Road, Cheltenham. Photograph by the author, March, 2009.

Figure 18. David Lyall's gravestone, Cheltenham cemetery. Photograph by the author, March, 2009.

David Lyall died in Cheltenham on 25 February 1895, aged 77. He had survived his wife by some three years but had never fully recovered from her death and a broken arm he sustained some time before his death (Hooker, 1895: 209). He was interred in Cheltenham Cemetery on 2 March 1895. A fine headstone is still there.[26] In 1911 Sir Joseph Hooker sent a portrait of David Lyall to an exhibition on the Antarctic which took place in Edinburgh (Huxley, 1918: 477).

David and Frances Lyall had three children, Frances Elizabeth Lyall[27], Charles George Lyall,[28] and William Hooker Lyall, Sir William Hooker's godson.[29] Charles attended Cheltenham College and was commissioned into the army in 1892. He served in the Nile campaign of 1898 and was present at the Battle of Khartoum. He also served in the South African War. He retired from the Lincolnshire Regiment in 1907 with the rank of captain, entering the reserve. He was called up again for service in the First World War, and was killed in action in 1914 (*Gloucestershire Echo*, 1915).[30]

Conclusion

Until recently the fullest account of Dr David Lyall's life and work was Hooker's obituary of 1895. Apart from occasional entries in works of reference, his work is better known and recognized in New Zealand and North America than it is in the land of his birth. Even the entry for Sir Joseph Hooker in the *Oxford Dictionary of National Biography* makes no mention of him. The relative obscurity into which his memory has sunk since his death is due no doubt to the fact that he was mainly a botanical collector rather than a writer of scientific papers. He was also apparently of a taciturn nature and in retirement he never wrote memoirs of his extraordinarily eventful life. However, his botanical collecting was on an heroic scale, comparable to that of his friend Hooker. Ann Lindsay's chapter on him in her recent book, *Seeds of Blood and Beauty: Scottish plant explorers* (2005, revised edition 2008) is a welcome contribution to the otherwise sparse literature. This article will also, it is hoped, contribute to the recognition of his proper place among the great botanical collectors of the world and bring his contribution to the attention of an audience which shares a commitment to the study of the great diversity of plant life throughout the world. The epitaph on his

gravestone is a reworking of Tennyson's lines on the memorial to Sir John Franklin in Westminster Abbey (Tennyson, 1899: 2.888):[31]

> Not here: the cold earth has thy bones, but thou,
> Heroic Sailor Soul
> Art passing on thine happier voyage now
> Towards no earthly pole.

A Personal Note: Researching David Lyall

My father, Donald Lyall was born in Wick, Caithness in 1898. He served on the Western Front in the First World War, and the army of occupation after the end of the war, after which he moved to London where he met and married my mother, Margaret Bailie, in 1928. He took a BSc (Econ.) degree at LSE and became an accountant. My two brothers, David and Thomas, were born in London, but after the family home was damaged in the Blitz, my father's firm transferred the family to Cheltenham, where I was born in 1942. I was brought up and went to school there, unaware, as was the rest of the family, of the details of the connection with David Lyall, FLS, or the fact that he had retired to Cheltenham, and indeed was buried in Cheltenham Cemetery. My father died in Cheltenham in 1949, when I was six years old. My mother had mentioned to us on one or two occasions that my father had told her that there had been a Lyall who had been to Antarctica and that there was an island there called Lyall Island. I thought little more of this, as a child, and did not look into the story until many years later. In 1987, my brothers and I, while on holiday in Scotland, went to visit our uncle Cathel in Monifieth, near Dundee, and for some reason the story re-emerged. My uncle then said that the Lyall who had visited Antarctica had the same name as his father, our grandfather, David Lyall (1869-1933), that our grandfather had met his namesake at some time and that they were related, although exactly how is unclear. I was keen to learn more, but the only other detail my uncle remembered was that David Lyall, FLS, had promised to give my grandfather his gold watch, but never did! I only mention this as it gives credence to the belief that they were related. From their relative dates, it would seem that the surgeon and naturalist may have been quite old at the time, and perhaps forgot. My grandfather would only have been 26 at the time David Lyall (1817-1895), FLS, died. My uncle took us to Auchenblae cemetery where there are gravestones of the naturalist's family. David Lyall's father, Charles, was born in Auchenblae in 1773, and Charles's father, William, died there in May 1794, so the naturalist and my grandfather cannot have been closely related. However, I decided to concentrate on the life of the naturalist and his contribution to science, rather than on family history.

When I got back to London I decided to see what I could find about the David Lyall of the story. In the Library of the Natural History Museum (then the British Library, Natural History) I came across Desmond's *Dictionary of British and Irish Botanists & Horticulturalists* and was excited to see that David Lyall had retired to Cheltenham, although it should have been no real surprise, since Cheltenham was then, and remained for many years afterwards, one of the towns to which members of the services retired.

I could hardly wait to get back to Cheltenham and pursue the story. I had the date of David Lyall's death from Sir Joseph Hooker's obituary and a helpful librarian in the Cheltenham Public Library not only turned up the obituary in the *Cheltenham Examiner* of 1895, but also mentioned that Cheltenham Cemetery had opened by that time and I might try there to see if there was a grave. It seemed rather a long shot, as he might have been buried in a number of parish churchyards, but it was worth a try. I drove round there the next day and was delighted to find that they still had a record card for David Lyall and soon located his headstone. It was indeed strange and moving to see his headstone which had been there all those years, and presumably unvisited. Research into a street directory of the time produced his address during his retirement, No. 1, Priory Parade (*Cheltenham and District Post Office Directory, 1883-84*: 208). I found, after a trip to the Municipal Offices, that it had been renamed, and the house re-numbered, as 24 London Road, and later took the above photograph of the house, which is part of a Regency terrace and is still a private residence.

When back in London, I paid a visit to the Linnean Society and Ms Gina Douglas produced the *carte de visite* photograph made on his becoming a Fellow, reproduced in Figure 1 above. The experience stimulated my interest in natural history, which is certainly that of an amateur, and in the Society, which in 2001 welcomed me as a Fellow, without, I have to say, any discernable merit on my part. My own career has been as an academic lawyer, teaching and writing on law. In my early career I taught at the University of Dar es Salaam, Tanzania, and since 1980 at University College Dublin, from which I retired in 2007. If I have any merit relative to the work of the Society it is in the area of historical biography. I have published, *inter alia*, a number of lives in the new *Oxford Dictionary of National Biography* and the Selden Society volume for 2008. The present article is an attempt to repay, in part at least, the kindness and friendliness, especially on the part of Gina Douglas, David Pescod and the late Dr John Marsden, with which they welcomed me to the Society.

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Additional References to Illustrations

Figure 4. [http://www.flickr.com/search/?q=lyallia&w=all], photograph uploaded, September 17, 2007, site visited 9 February 2009.

Figure 9. Wikipedia, photograph by Velela. [http://en.wikipedia.org/wiki/File: Ranunculus_lyallii_foliage.jpg], visited 8 February 2009. The photograph is made available under the Creative Commons Attribution and Share Alike licence (CC-BY-SA).

Figure 13. Wikipedia: [http://en.wikipedia.org/wiki/Kakapo], visited 9 February 2009.

Notes

1. (1734-1794), according to gravestones in Auchenblae churchyard.
2. Information supplied by the University of Aberdeen.
3. Information supplied by the Royal College of Surgeons of Edinburgh.
4. Ibid.
5. Information supplied by the University of Aberdeen.
6. For a popular and lavishly illustrated account of the voyage, see *Antarctica: Great Stories from the Frozen Continent* (Reader's Digest, Surrey Hills, New South Wales, 1988), pp. 110-115.
7. The watercolours are held by the Scott Polar Research Institute, Cambridge University.
8. It was not an easy task and, in any case, since the magnetic pole wanders about over time. Ross calculated the magnetic pole at that time to be at 70° 5´ S, 154° 8´ E, only 2° 30´ south from Gauss's calculation. It was not located again until 1909, by Sir T. W. E. David of Shackleton's Expedition, who located it then at 72° 25´ S, 155° 16´ E.
9. Information supplied by Dr Françoise Hennion, University of Rennes.
10. Darwin to Hooker, 13 July 1856, Letter 1924, *The Darwin Correspondence Project*, online, [http://www.darwinproject.ac.uk/darwinletters/calendar/entry-1924.html], visited 5 February 2009.
11. See also Hennion, 1992.
12. William Colenso (1811-99), missionary printer and naturalist. In 1841, during the visits of the ships of Ross's Expedition, he accompanied Hooker on many botanical excursions and afterwards carried on a correspondence with him extending over 50 years. He was present at the signing of the Treaty of Waitangi, and his pamphlet, *The Signing of the Treaty of Waitangi* (1880) gives the best existing eye-witness account of that event. He was elected FRS in 1866: Mackay, 1990; *Te Ara, The Encyclopaedia of New Zealand*, [http://www.teara.govt.nz/], visited 18 February 2009.
13. Andrew Sinclair (1794-1861), surgeon and naturalist. Sinclair became a surgeon in 1829, and in 1834 was attached to HMS *Sulphur* on a surveying expedition to the South

American coast, under the command of Captain Frederick William Beechey and afterwards of Sir Edward Belcher. He spent some weeks in New Zealand in 1841 with Hooker. In 1843 he accompanied Captain Robert FitzRoy as private secretary, when FitzRoy became governor of New Zealand. On 6 January 1844 Sinclair was made colonial secretary in New Zealand, and he served as such until the establishment of parliamentary government in May 1856. He was elected FLS in 1857. He collected material in New Zealand in 1858 for a supplement to J. D. Hooker's *Flora*: Boulger, 2004.

14. Oxford English Dictionary, "kakapo".
15. See the New Zealand Kakapo Recovery Programme web site: [http://www.kakaporecovery. org.nz/].
16. National Maritime Museum, STK/23 A & B.
17. An expedition in 1986 led by Owen Beattie of the University of Alberta found intact graves on Beechey Island in the North West Territories. The bodies were perfectly preserved in the permafrost: *The Times*, London, 26 September 1986. Two years earlier a similarly preserved body was found in the same area.
18. The British had demanded the return of HMS *Resolute*, but gave up the claim on learning the ship had arrived in New London, Connecticut. HMS *Resolute* was purchased by the U.S. Congress, refitted and sent to Queen Victoria as a good will token in 1856. In 1879 the ship was decommissioned and broken up. Two desks were made from the timbers. One was presented to President Rutherford B. Hayes in 1880 as a gift to the United States. President Franklin D. Roosevelt had the desk modified with a panel door installed in the kneehole, to conceal his disability, but did not live to use it with the panel installed. President Eisenhower did not use it in the Oval Office, but on his election, President Kennedy, who had served in the US Navy in World War II asked Mrs Kennedy to find a desk with a naval association. Mrs Jacqueline Kennedy found the desk in the White House and restored it to the Oval Office. President Kennedy used it throughout his presidency. It featured in a famous photograph in 1962 with his son, JFK Jnr., peeking through the panel door as the President worked at the desk. It was used in the Oval Office by Presidents Carter, Reagan, Clinton and George W. Bush. It is currently used by President Obama: photograph, see [http://blogs.abcnews.com/photos/]. At some point the brass plate on the back of the desk was moved to the front, i.e. the President's side, since it is visible on the JFK photograph, but is on the front in later photographs from President Reagan onwards: see the unofficial "White House Museum" web site: [http://www.whitehousemuseum.org/furnishings/resolute-desk.htm]. For a fictionalized account, see Matthews, 2007. The other desk, a small writing desk, was made on the instructions of Queen Victoria and has a similar inscription to that on the desk presented to the U.S. President. It was made by Messrs. Morant, Boyd and Blandford and was sent to Windsor in November 1880. It is still in the collection, but is currently on loan to the Royal Naval Museum, Portsmouth: information received from the Registrar, Royal Archives, Windsor Castle, letter, 12 March 2009. Copies of the "Resolute" desk and its counterpart, made for the film, featured recently in a fanciful adventure film, *National Treasure II: Book of Secrets* (2007). On his recent visit to Washington, the Prime Minister, Gordon Brown, presented President Obama with a framed commissioning paper of HMS *Resolute*, and a penholder carved from timbers of HMS *Gannet*, the sister ship to HMS *Resolute*.
19. Unfortunately, the copy of von Heer's article listed in the catalogue of the Royal Botanic Gardens, Kew is missing at the present time.

20. Ibid.
21. *Calochortus lyallii* (Lyall's mariposa lily, Cats-ear, Lyall's Star Tulip), *Penstemon lyallii* (Lyall's Beardtongue, Lyall's Penstemon), *Astragalus lyallii* (Lyall's milk-vetch), *Saxifraga lyallii* (Red-stemmed Saxifrage, Lyall's Saxifrage), *Haplopappus (Tonestus) lyallii* (Lyall's goldenweed), *Arabis lyallii* (Lyall's rockcress), *Angelica lyallii* (*Angelica arguta*) (Lyall's Angelica), *Cardamine cordifolia* (Heartleaf bittercress, Lyall's bittercress). *Carex lyallii* (Lyall, 1863: 140, 143) (Raynolds' sedge) was later renamed *Carex raynoldsii*.
22. He was promoted to staff surgeon on 17 November 1861: *The Navy List,* 1870.
23. The gravestone in Cheltenham cemetery (see below) records that she died on 22 December 1892, aged 54.
24. Hooker to Darwin, 3 November 1866, Letter 5266, *The Darwin Correspondence Project*, online [http://www.darwinproject.ac.uk/darwinletters/calendar/entry-5266.html].
25. Renumbering certificate A 588, Municipal Offices, Cheltenham.
26. Borough of Cheltenham Cemetery, grave No. 19797.
27. Born in Pembroke in 1869: 1881 census.
28. Born in Hartlepool 28 February 1871 (*Gloucestershire Echo*, 1915); birth certificate, 1871 March, K-Z p. 317, vol. 10a p. 189.
29. Born in Notting Hill in 1876: 1881 census.
30. Commonwealth War Graves web site: [http://www.cwgc.org/search/casualty_details.aspx? casualty=856453], visited 10 February 2009. His date of death is given as 18 October 1914 and he is commemorated on the Le Touret Memorial to the Missing. The *Gloucestershire Echo*, 1915 states that he was buried by his regiment at La Cliqueterie Farm, Herties, France. It is not uncommon for the graves of those buried after a battle subsequently to be lost. His name appears on the roll of honour in Cheltenham College. He left a widow, Marjorie Lyall, of The Laurels, Alton Rd., Roehampton, London (Commonwealth War Graves).
31. Tennyson's original lines are: "Not here! the white North has thy bones; and thou,/Heroic sailor-soul,/Art passing on thine happier voyage now/Toward no earthly pole". Tennyson was Franklin's nephew by marriage.