

SCIENTIFIC WORK IN THE FALKLAND ISLANDS BY THE SCOTTISH NATIONAL ANTARCTIC EXPEDITION, 1903 & 1904

by

Phil Stone

The 1902-1904 Scottish National Antarctic Expedition (SNAE) is one of the least celebrated enterprises of the 'Heroic Era' of Antarctic exploration. Led by William Speirs Bruce (1867-1921) it set sail aboard *Scotia* on 2nd November 1902 from Troon on the Firth of Clyde, bound for the Weddell Sea and the South Orkney Islands. Port Stanley was reached on 6 January 1903, so beginning the first of the expedition's three visits to the Falkland Islands (Figure 1): 6-26 January 1903, 2-8 December 1903, and 30 January to 9 February 1904. The second and third of these visits took place during *Scotia*'s summer voyage from the South Orkneys to Buenos Aires to effect repairs and take on supplies, and her return journey to the South Orkneys to relieve the team that had been left there for the austral summer and then to continue the Weddell Sea explorations.



Figure 1. The Scottish National Antarctic Expedition's ship SY Scotia anchored in Stanley Harbour, 18 January 1903. Scott Polar Research Institute, Cambridge, image number P58/102/12, reproduced with permission.

The expedition's background, organisation, lack of 'official' British recognition and controversial transfer of the facilities established in the South Orkney Islands to the Government of Argentina have all been described and debated at length elsewhere (e.g. Bernstein 1985; Speak 1992, 2003; Swinney 2007; Dudeney & Walton 2011; Dudeney & Sheail 2014) and will not be recapitulated here. Suffice to say that the expedition was small and committed – but very short of money. Nevertheless, an ambitious programme of science and survey was planned with oceanography, marine biology and meteorology to the fore. Exploratory voyages were made into the Weddell Sea early in 1903 and 1904, during the late austral summer seasons, whilst for the 1903 austral winter an onshore base was established on the south coast of Laurie Island, in the South Orkney archipelago, in what was named Scotia Bay.

The overall impressions of the Falkland Islands recorded by the expedition members were generally positive, in marked contrast to those of some other contemporary travellers; perhaps the scenic similarity to the islands and northern coast of Scotland, reinforced by the aroma of peat smoke, generated feelings of homely familiarity amongst the Scots. Stanley was described (Pirie in Brown *et al.* 1906, p. 46) as 'one main street along the water front, and a couple of small streets behind' with mostly simple white wooded houses, these contrasting with "the most conspicuous building being the cathedral, with its spire still unfinished." Brown himself (1906, p. 198) was a little less complimentary: "Port Stanley [is] composed chiefly of wooded houses, with a few older stone crofts and a few newer and more pretentious brick houses, some the exact counterpart of London suburban villas ... the town is not imposing; and the spireless Gothic cathedral, planned on an ambitious scale, looks strangely out of place among its dwarfed and primitive surroundings." But to Brown, of greater interest than the streets of Stanley were the old hulks moored in the harbour, amongst them *Great Britain*; these were to prove a rich hunting ground for marine invertebrate specimens.

The expedition's scientific work in the Falkland Islands can be considered in the three broad categories of natural history, meteorology and geology. Bruce had intended that the scientific results of the expedition, including the Falkland Island observations, should be published in a series of reports. Volume 1 was to have been based on the ship's log as maintained by Bruce, and although *The Log of the 'Scotia' Expedition* was prepared by him for publication by 1911, a lack of funds prevented its appearance then. The text was not resurrected from obscurity until 1992, in an edition edited by Peter Speak, and this valuable source of information will be cited herein as Bruce (1992) despite the apparent anachronism that presents. However, six other volumes were issued between 1907 and 1920 covering aspects of physics (Volume 2, including meteorology and geomagnetism), botany (Volume 3) and zoology (Volumes 4-7). Volume 8 was to have included geology and glaciology but although parts of it reached proof stage, Bruce was left with insufficient funds for its

publication. The production costs of the zoology volumes had been mitigated by initial publication of many (but not all) of the individual scientific papers in the *Transactions of the Royal Society of Edinburgh* periodically between 1906 and 1912. Reprints were then included in the SNAE report series which significantly reduced typesetting expenses.

In addition to the scientific papers directly describing the SNAE work and collections, mostly written by specialists to whom the expedition's specimens were entrusted, Bruce solicited additional contributions that he thought complementary. So, for example, in Volume 4 of the *Scotia* report series, T. E. Salvesen (1914) described "The Whale Fisheries of the Falkland Islands and Dependencies". At the time of publication, the Salvesen Company had whaling stations on South Georgia (Leith Harbour) and on New Island in the Falklands. The New Island station had been established by the company in 1908 and the *Scotia* report describes three catchers as operating from it during the following years. However, soon after publication, in 1916, the New Island station closed and the Salvesen Company concentrated their whaling activities at South Georgia. The ten photographs accompanying Salvesen's paper include illustrations of whaling activities at both Leith Harbour and New Island.

Meteorology

W. S. Bruce had a background in meteorology and was determined that the SNAE should maintain comprehensive records at the South Orkney Islands base. This was achieved, and to complement those data it was arranged that a parallel series should be taken in the Falkland Islands. At that time, the Cape Pembroke lighthouse (Figure 2) was permanently manned and part of the keepers' duties involved meteorological observation. Bruce had brought additional equipment to augment the Cape Pembroke capabilities, as described by Robert Cockburn Mossman (1870-1940) the expedition's senior meteorologist, in Volume 2 of the *Scotia* report series: "A number of new instruments, sent out by the Meteorological Office, were taken to Cape Pembroke Lighthouse, which was to serve as a base station during the time the '*Scotia*' was in the south. The observations were made every four hours by Mr John Pearce, principal lighthouse keeper and his assistant." In addition to the observations made at Cape Pembroke, the Governor, Mr (later Sir) William Grey-Wilson, was prevailed upon to install and maintain a sunshine recorder on the lawn of Government House.

The SNAE meteorological records were discussed at length by Mossman (1907) in volume 2 of the *Scotia* report series, wherein there is also a comprehensive tabulation of the Falkland Islands data for 1903 (pp 218-229) and 1904 (pp 231-243). Plate 3 (facing page 258) of the report includes a group photograph of men, presumably including expedition members, standing in front of the Cape Pembroke lighthouse

and its support buildings (see figure 2) accompanied by a woman and two small children, presumably the Pearce family. Somewhat immodestly, the caption identifies the location as the “Scottish Sub-Antarctic Meteorological Station”.



Figure 2. Cape Pembroke lighthouse shown in a photograph probably taken by W. S. Bruce in January 1903. Only the foundations of the foreground buildings survive today. Scott Polar Research Institute, Cambridge, image number P58/102/81, reproduced with permission.

The data obtained illustrated temperature, pressure, wind speed and direction, cloud cover, and amount of sunshine. As a sample, after combining the records for both 1903 and 1904, at Cape Pembroke February had the highest monthly mean temperature of 48.8° F (9.4° C), whilst July was the coldest month with a mean temperature of 35.4° F (1.8° C). The highest temperature recorded, 63° F (17.2° C),

occurred at 4 pm on February 1st in both years; the lowest temperature, 24° F (-4.5° C), was recorded at midnight on 31 July 1903 and 27 July 1904.

Mossman made only one visit to the Falkland Islands, 6-26 January 1903 during the initial journey south, and remained in the South Orkney Islands as leader of the team left there for the 1903-1904 austral summer whilst *Scotia* made her subsequent two visits to the Falklands. In the short time available to him in Stanley, Mossman's attempts to take geomagnetic measurements were unsuccessful, but he did note that "[a]t Port Stanley, Falkland Islands, enough wood and copper nails were taken [aboard *Scotia*] for the construction of a small hut, in the event of a wintering station being established." The wintering station was successfully established on Laurie Island in the South Orkneys where the hut was built and put to good use as a geomagnetic observatory.

Natural History

For Robert Neal Rudmose Brown (1879-1957), the SNAE botanist, the similarity of the Falklands to northern Scotland extended to the plant communities present. In an early description of the phenomenon of convergent evolution (in Brown *et al.* 1906, 196-197) he noted that "speaking generally, the flora of the Falklands, though it contains very few species identical to our Scottish ones, is strangely akin, especially to a non-critical eye. No doubt similar surroundings working upon different plants have brought about this kindred facies". Nevertheless, Brown was particularly fascinated by the strangeness of one Falkland Islands plant, the cushion-forming Balsam Bog (*Bolax gummifera*). He had undoubtedly hoped to make new discoveries amongst the Falklands flora, but in that he was disappointed. He wrote a comprehensive account of the SNAE botanical results, which was published in 1912 as Volume 3 of the *Scotia* expedition's scientific report series, wherein it is merely noted that in botanical terms "the Falklands have been well studied by various expeditions".

To the expedition's members the Falklands' birdlife looked equally promising for new discoveries, but again they were to be disappointed. Many birds were shot and their skins preserved and when the full analysis was completed they had collected 20 species represented by 65 skins; several other species had been observed but not successfully shot. However, when the results were summarised by L. N. G. Ramsay (1913) and included in the ornithology section of Volume 4 of the *Scotia* expedition's scientific report series he noted that of the species described, "[a]ll have been recorded as occurring in the Falklands by previous writers." Most of the bird skins recovered are still preserved in Edinburgh in the collection of The National Museum of Scotland (NMS).

There was no expectation of discovering new mammals, but even those already known proved elusive. With the elephant seal having been hunted to the brink of extinction, and in keeping with the philosophy of the time, the expedition's zoologists were keen to kill one of the few survivors for their collection whilst they still had the chance. Perhaps fortunately, no elephant seals were to be found, but a male sea lion was shot during a visit to the Tussock Islands in Port William. The carcass was only recovered with great difficulty, but eventually, after the expedition's return to Scotland, the skin was presented in 1905 to what is now The National Museum of Scotland, in Edinburgh, where it was stuffed and mounted for exhibition (Figure 3); the mounted specimen is still held by the museum but is no longer fit for display. The unfortunate animal's skull and skeleton followed the skin into the museum's collection some years later. Bruce (1913) gave the measurements of the sea lion (it weighed about 1200 lbs so was large by present-day standards if that figure is correct) and illustrated aspects of its skull in contributions included in Volume 4 of the *Scotia* expedition's scientific report series.



Photo by Ronald Warr

Figure 3. The sea-lion shot on Tussock Island, Port William, as prepared for exhibition in Edinburgh and now held by The National Museum of Scotland. From Bruce, W. S. (1913), Transactions of the Royal Society of Edinburgh, Volume 49, 567-577, reproduced with permission.

The marine environment proved a more fruitful source of new discoveries. The shores of Port Stanley Harbour were scoured for specimens, with the abandoned hulks yielding a rich haul of invertebrates, whilst traps and trawls were employed there and in Port William. The specimens acquired supplemented the more extensive collections made by the expedition further to the south and were described along with the Antarctic material in a series of specialist papers published first in *Transactions of the Royal Society of Edinburgh* at intervals between 1906 and 1912. The Falkland Islands fauna included a profusion of molluscs, sponges, jellyfish, sea squirts, hydroids and much more; several hitherto unknown species were identified. It is noteworthy that when describing the molluscs, Melvill & Standen (1908) commented that “the occurrence of sundry British and North European individuals in the Falkland Islands – perhaps brought there adventitiously – is, to some extent, a new feature of the fauna.” This would have been one of the earliest recognitions of invasive species in the Falklands’ marine environment. The fish traps also provided new species, for example *Notothenia trigramma* (Figure 4) as formally defined by Regan (1913): one of the delights of his paper is the series of beautiful hand-drawn illustrations. Most of the SNAE’s fish and marine invertebrate specimens are still preserved in Edinburgh in the collections of The National Museum of Scotland.

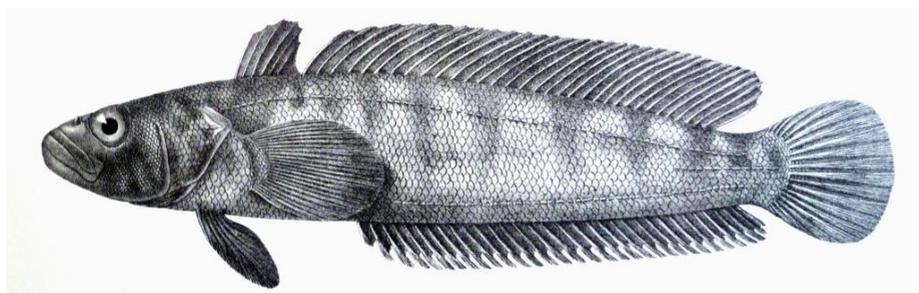


Figure 4. A new species of fish, *Notothenia trigramma*, described from specimens collected in Stanley Harbour and Port William. From Regan, C. T. (1913) *Transactions of the Royal Society of Edinburgh*, Volume 49, 229-292, Plate 6, reproduced with permission.

Geology

During the progress of the SNAE, geology and palaeontology were the responsibility of James Hunter Harvey Pirie (1879-1965), a medical doctor who was also the expedition’s surgeon. Pirie took his role seriously, describing himself in his subsequent geological reports as “Geologist and Surgeon, Scottish National Antarctic Expedition”. However, like Mossman, he made only one visit to the Falkland Islands, 6-26 January 1903 during the initial journey south, and remained in the South

Orkney Islands as a member of the team left there for the 1903-1904 austral summer. During his one visit, Pirie examined the rocks and landscape in the environs of Stanley and although no formal report was published, his notebook documenting the observations that he made survives within the W. S. Bruce archive held by the NMS: they have not hitherto been recounted. He records collecting six rock specimens but they are not present amongst the SNAE geological specimens now held by the museum. Pirie's notebook records excursions around Stanley; on 7 January 1903 from the north shore of Stanley Harbour across to the Murrell River, on 12 January west to Mount William, and on 16 January south from Stanley to Port Harriet, whilst on 17 January he landed on each side of The Narrows at the entrance to Stanley Harbour. In addition, on 13 January, he was able to examine the fresh rock exposures newly created at the site of the Admiralty coaling depot at the north side of the harbour. This locality proved important as the clean rock surfaces allowed him to resolve some initial confusion between a tectonic cleavage and sedimentary current bedding (Figure 5).

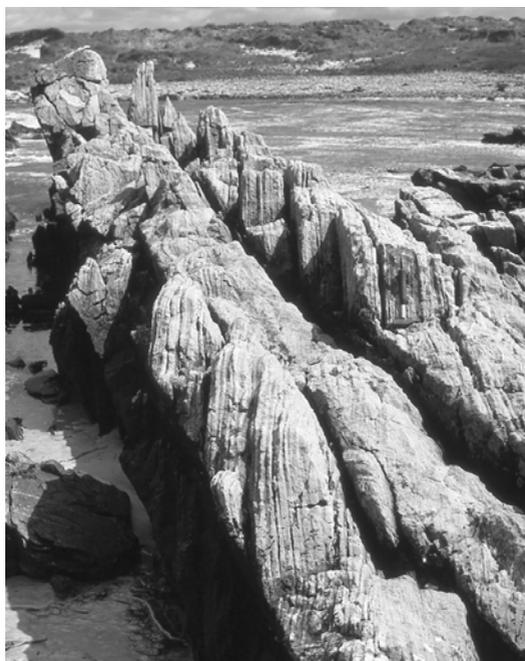


Figure 5. Tabular current bedding in the Port Stanley Formation quartzite near Cape Pembroke. Despite the prominence of the near-vertical, current bedding planes, these are internal features of the main quartzite beds which are inclined from top left to bottom right. Pirie initially confused the main bedding with a tectonic fabric.

Overall, Pirie noted the dominance of hard white quartzite (which he likened to rocks he had seen around the island of Jura, western Scotland) but with the local interlayering of laminae of black carbonaceous mudstone; these are the characteristic lithologies of what is now known as the Port Stanley Formation (Aldiss & Edwards 1999). The rock beds were everywhere inclined, commonly near-vertical, and in places folded about horizontal, east-west hinges (Figure 6). This east-west trend then, he observed, determined the orientation of the coastal inlets and principal hill ridges. And at the coast, particularly towards Port Harriet, he was intrigued by the way in which banks of beach pebbles cut off low-lying lagoons from the sea in many of the small bays – a feature that we would now associate with a change in sea level.



Figure 6. The style of the tight fold hinges affecting the Port Stanley Formation quartzite beds that were observed by Pirie to the north and south of Stanley. These examples of a syncline (left) and anticline (right) occur near Rookery Bay to the south-east of the town.

Other geological notes reported hearsay information. When told of the lake at the summit of Mount Adam (West Falkland) Pirie speculated that it might be a crater lake, implying an extinct volcano – the feature is now recognised as a glacial cirque. From the Governor, Pirie learnt of the “slabs of graphite which are used as pencils” that occurred at Port Sussex (East Falkland), and that pebbles of banded agate were found on the beaches of Pebble Island (West Falkland).

Elsewhere amongst the Bruce archive papers, a single loose sheet in Pirie's handwriting describes, in pencil, two unusual rock specimens produced by the Governor. One, a cluster of cubic iron pyrite crystals, came with no locality details; the other, "[g]ot near Stanley, to the south", seems most likely to have been a mica-schist but contained minerals which optimistically "had been thought might possibly be gold." Pirie was able to quash that idea but also realised that the lithology was out-of-place in the Falklands and noted that it might be an "erratic of human introduction". A possible source of which he was unaware would be the glacially deposited Fitzroy Tillite Formation which crops out to the south-west of Stanley at the head of Port Harriet. In that case the Governor's rock would have been a true glacial erratic, albeit one deposited 300 million years ago.

The stone runs

Inevitably, the Falklands landscape phenomena that most excited Pirie's interest were the stone runs, for which he used the term "stone rivers". He visited those at the head of Hearnden Water, to the north of Port Stanley, and on the flanks of Mount William, farther west. His description of the large quartzite blocks was accurate enough; they were lichen-covered with the corners slightly rounded, and although "heaped together quite confusedly" still presented an overall top surface with only a very gentle inclination. In respect of the latter feature Pirie quoted Darwin's observation that the slope was "one up which a mail coach would easily go full tilt". He appears not to have seen or been told of the spectacular, parallel boulder stripes developed at some of the stone runs.

It was the accumulation of the boulders on relatively gentle slopes that Pirie found most puzzling, writing "I cannot conceive how the stones can have rolled down into their present position from the slopes as they are now." Accordingly, he speculated that the blocks might have simply arisen from the *in situ* weathering of the quartzite beds, with the resulting 'stone river' moving downhill intermittently during wet winters. Conversely, he noted that vegetation was encroaching on the boulders and forming 'islands' in some places (with balsam bog acting as a pioneer) implying that they were static (Figure 7). His notebook description thus concludes that "[t]here must be a perpetual struggle going on between the vegetation trying to cover over the river & the river moving & destroying the vegetation." It would be another few years after Pirie's visit before the origin of the stone runs as a periglacial phenomenon began to be appreciated – and few would claim that they are fully understood even today.



Figure 7. An 'island' of vegetation colonising a stone run near Mount Challenger. As observed closer to Stanley by Pirie, a pioneering mound of balsam bog has, in its turn, been colonised by diddle dee.

The fossil collection

Although none of the expedition's formal reports make any reference to geological work in the Falkland Islands, one of the independent scientific publications arising from the expedition, by Newton (1906), dealt with a collection of Devonian fossils. Mostly comprising brachiopods and crinoids found in sandstone now included within

the Fox Bay Formation (Aldiss & Edwards 1999), it had been presented to the SNAE by the Governor of the Falkland Islands, Mr (later Sir) William Grey-Wilson, during the expedition's third visit. Pirie was not present, having remained in the South Orkneys for the austral summer, and makes no reference to the fossils in any of his surviving geological notes. E. T. Newton was not a member of the SNAE, but from 1865 until his retirement in 1905 was a palaeontologist with the Geological Survey of Great Britain. He was based in London, but may well have received the fossils via the Survey's Edinburgh office where Bruce and Pirie had scientific connections.

The Governor's fossil collection is now held in Edinburgh by the NMS (specimen numbers 1954.3.30 to 70). From it, Newton (1906) described 6 brachiopod taxa, abundant crinoid columnals and two fragments of trilobite pleurae, all contained in "buff-coloured micaceous sandstone". Of the brachiopods, five had been previously described by Morris & Sharpe (1846) from the collection made around Port Louis by Darwin (1846) during the voyage of HMS *Beagle* (1831-1836) but one, denoted *Cryptonella baini* by Newton (see Table 1 for modern nomenclature), was a new discovery. Newton records "two fragments of trilobite pleurae, characterised by exceedingly coarse pitting", but in the NMS collection only one specimen (1954.3.63) is identified as a trilobite and the fossil fragment is small (10 mm x 2 mm) and ambiguous. Overall, the fossil assemblage is characteristic of the regional, Early Devonian 'Malvinokaffric' fauna which is also well represented in South Africa and South America. In the Falkland Islands it is an established feature of the Fox Bay Formation, West Falkland Group (Aldiss & Edwards 1999).

Nomenclature used by Newton (1906)	Modern nomenclature after Cocks as cited in Aldiss & Edwards (1999)
<i>Spirifera antarctica</i>	<i>Australospirifer hawkinsii</i>
<i>Leptocoelia flabellites</i>	<i>Australocoelia palmata</i>
<i>Chonetes falklandica</i>	<i>Pleurochonetes falklandicus</i>
<i>Orthotetes</i> sp. aff. <i>O. sullivanii</i>	<i>Schellwienella sullivanii</i>
<i>Cryptonella baini</i>	<i>Pleurothyrella falklandica</i>
<i>Orbiculoidea baini</i>	<i>Orbiculoidea falklandensis</i>

Table 1. The Falkland Islands fossil brachiopod species identified by Newton (1906) and the modern nomenclature that is currently used to describe them

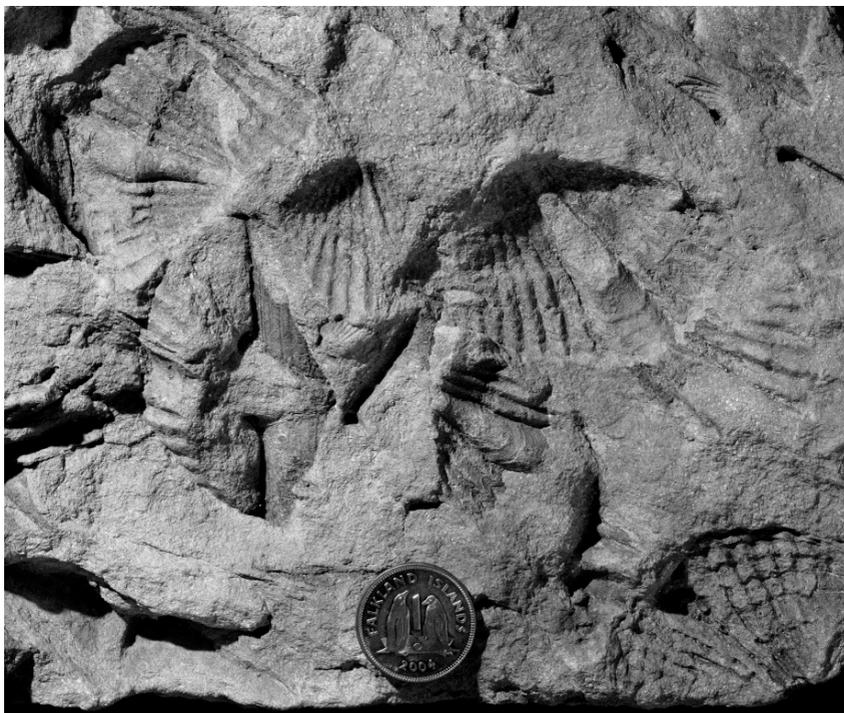
Newton noted that the brachiopod collection came from 'Port Louis South'. By that he probably meant the south shore of Port Louis Harbour, the innermost part of Berkeley Sound, rather than the Port Louis settlement on the north shore and whence came Darwin's collection and most of the other Falkland Island fossils then known (Stone & Rushton 2012). Given the distribution of fossiliferous units and lithologies

within the outcrop of Fox Bay Formation, the southern shore of Port Louis Harbour is a perfectly feasible source; but the acquisition of the fossils was not that straightforward. The only specific record of the presentation comes from *The Log of the Scotia Expedition*, (Bruce 1992, p. 206) wherein part of the entry for 3rd February 1904 tells that “[t]he Governor today gave us a number of slabs of sandstone containing brachiopod fossils. The stone has been brought for additions to his house.” Governor Grey-Wilson was well-known for improvements to Government House, and although his ambitious project ran well over-budget and had to be curtailed, Johnson & Hall (2008) noted that it is to him that “subsequent governors owe their conservatory, their billiard room and (perhaps more important) their central heating.”

Bruce did not record (or was not told) where the stone was brought from, but Port Louis Harbour would be the closest convenient source of the sandstone, a much more tractable building material than the hard Devonian quartzite that crops out around Stanley. Aldiss & Edwards (1999, p. 119) note that “[s]tone lintels and mullions used in the construction of Government House are said to have come from sandstone of the Fox Bay Formation in the Port Louis area, in at least one instance including the casts of marine invertebrate fossils.” The slight deformation of the brachiopods seen in several of the SNAE specimens (Figure 8) is a typical feature around Port Louis Harbour but is not much developed elsewhere. Overland transport at that time of such bulky material would have been very difficult and the building stone presumably arrived by sea.

That the SNAE fossils were scavenged from building rubble explains their relatively poor condition. Confirmation of the source also lays to rest the slightly scurrilous proposal that they might have been stolen property. During 1902, only a few months ahead of the *Scotia* expedition’s first visit, the geologist Johan Gunnar Andersson spent time in the Falklands whilst waiting to rendezvous with the ship (*Antarctic*) supporting a Swedish South Polar Expedition. He made several significant palaeontological discoveries, particularly in West Falkland, but many of his specimens were subsequently lost when the *Antarctic* was crushed in pack ice and sank, forcing Andersson and his companions to over-winter in the Antarctic under very difficult circumstances (Nordenskjöld & Andersson, 1905). They were rescued in early November 1903, the good news reaching the Scots when they arrived in Stanley in December of that year. Subsequently, Andersson (1907) complained that “some cases with collections from Port Louis, which had been deposited in Port Stanley, were broken up during our prolonged absence in the South and many of the specimens were carried away.” The coincidence of dates led Stone & Rushton (2012) to speculate that perhaps the fossils acquired by the SNAE were in fact those ‘lost’ contemporaneously by the Swedish expedition, but that possibility can now be ruled out. When Andersson and his colleagues were rescued they were taken directly back to Argentina and thence travelled back to Europe. The recovery to Sweden of the

fossils left in Stanley would therefore have been protracted and left entirely in the hands of others, allowing ample opportunity for mishaps.



*Figure 8. Devonian brachiopod fossils in Fox Bay Formation sandstone originally from 'Port Louis South' and now held by The National Museum of Scotland. The brachiopods were originally figured by Newton (1905) as *Spirifera antarctica* but are now assigned to *Australospirifer hawkinsii* (Table 2). Note the slight distortion of some of the fossil shell impressions. The coin has a diameter of 2 cm. NMS specimen number 1954.3.31 photographed by Bill Crichton.*

One additional fossil specimen was also acquired by the SNAE, again as a gift. On 2nd February 1904, the day before the Governor's visit, Bruce recorded in his log that "Mr A. E. Felton of Hope Island [now known as West Point Island] came aboard with a collection of rocks, soils and fossil wood from his farm." Only one item from Felton's collection is now held by the NMS; a large slab (in two pieces) of yellowish brown, micaceous sandstone, rather water worn but covered in the impressions of crinoid columnals (Stone & Rushton 2007, figure 4 therein). Newton (1906) noted this fossiliferous slab in a postscript to his main discussion of the brachiopod fossils but did not directly link the two faunas to the same stratigraphical level, although

similar crinoid casts accompany some of the Port Louis brachiopod specimens. Felton's material is now also assigned to the Lower Devonian Fox Bay Formation.

Buenos Aires and the price of coal

When Bruce brought *Scotia* to the Falkland Islands in December 1903 he took a huge gamble. He had left a team of six on Laurie Island for the austral summer, and they would have to be relieved. But *Scotia* needed repairs, coal was in short supply and the expedition lacked the funds to pay for either. Bruce was probably hoping that in Stanley he would receive news either from his backers in Scotland that more money was available or from the Governor that the British Government was prepared to help. In both respects he was disappointed. Perhaps in desperation, Bruce sailed for Buenos Aires aboard the *SS Orissa* on 8 December 1903, leaving *Scotia* to follow slowly under sail. The expedition nearly ended in disaster when she ran aground on a sandbank in the River Plate estuary and was fortunate to be refloated, but *Scotia* finally docked safely in Buenos Aires on Christmas Eve, 1903.

Bruce had arrived on 15th December and would have been much relieved to discover that some additional funds were indeed available from his Scottish supporters. With the backing of Francisco Moreno, director of the *Museo de la Plata*, he was also welcomed generously by the Argentine government, which allowed free access to naval dry-dock facilities. Importantly, coal and other necessary supplies could be purchased at much lower cost than had been possible in Stanley (where only mutton and whisky were reported to be cheaper). Throughout their stay in Buenos Aires, Bruce and his crew were fêted as celebrities (Figure 9) so were probably quite relieved to escape southward on 21 January 1904, heading back to Stanley for their third visit to the Falkland Islands. Also on board was a three-man Argentine team for, in the absence of a British commitment, Bruce had negotiated the transfer of the Laurie Island base to the *Oficina Meteorológica Argentina* so that his meteorological initiative would be maintained.

The third visit of *Scotia* to Port Stanley lasted ten days, during which the fossil collection described previously was presented by Governor Grey-Wilson and additional natural history specimens were obtained, some as gifts from Stanley residents: "Mr Thomson gave a collection of birds' eggs, Miss Blyth presented some shells, Mr Coulson Jnr of Cape Pembroke lighthouse gave some birds and other animals picked up at the lighthouse." On 9 February 1904 the SNAE left Stanley for the last time and later that month relieved the team that had been left to work on Laurie Island. The Scottish base became the Argentine Antarctic station *Orcadas* and has operated as such ever since.

In later years, Bruce became increasingly embittered at the lack of support and recognition accorded to the SNAE by the British Antarctic Establishment. Despite the expedition's friendly reception in Stanley, that bitterness came to cloud his memories of the Falkland Islands such that he would later write (Swinney 2007):

"I had to take *Scotia* herself to Buenos Aires where I got coal at half the price and regret very much that owing to this I was driven out of a British Colony and forced to refit in a foreign country." (Letter from Bruce to Sir Thomas Holdich, 15 March 1910. Edinburgh University Library GEN1646 24/14).

Given the full circumstances, Bruce's complaint seems a little partial, but it does prompt an interesting counterfactual speculation. Might the geopolitical situation in the South Atlantic have developed differently had coal been cheap in Stanley?

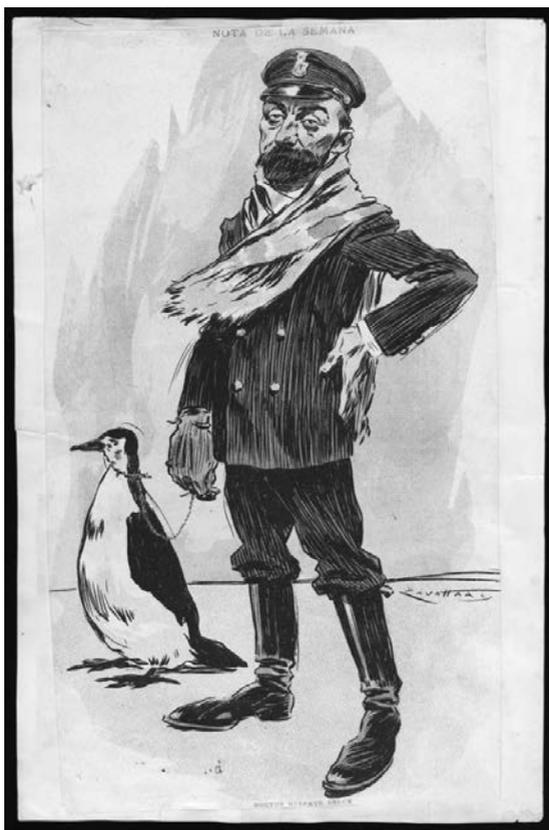


Figure 9. A cartoon of William Speirs Bruce published in the Buenos Aires magazine *El Gladiador*, Number 110, January 1904. From an original held by the Centre for Research Collections, Edinburgh University Library.

Acknowledgements

I am particularly grateful to Yves Candela and Elsa Cox for their assistance in locating SNAE specimens in The National Museum of Scotland collections, and to the staff of the NMS research library for facilitating access to Pirie's notebooks. My thanks are also due to Brian McIntyre (British Geological Survey, Edinburgh) for his skilful assistance in the preparation of photographic images. The paper is published by permission of the Executive Director, British Geological Survey (NERC).

Bibliography

Aldiss, D. T. & Edwards, E. J. 1999. The Geology of the Falkland Islands. *British Geological Survey Technical Report*, WC/99/10. 135 pp.

Andersson, J. G. 1907. Contributions to the geology of the Falkland Islands. *Wissenschaftliche Ergebnisse der Schwedischen Sudpolar-expedition 1901-1903*, **3** (Lief. 2), 38 pp.

Bernstein, R. E. 1985. The Scottish National Antarctic Expedition 1902-04. *Polar Record*, **22**, 379-392.

Brown, R. N. R. 1912. The problems of Antarctic plant life. *Report on the Scientific Results of the Voyage of SY Scotia during the years 1902, 1903 and 1904*, **3**, Botany, 3-20.

Brown, R. N. R., Mossman, R. C. & Pirie, J. H. H. 1906. *The Voyage of the "Scotia"*. William Blackwood & Sons, Edinburgh & London. 375 pp.

Bruce, W. S. (editor). 1907-1920. *Report on the Scientific Results of the Voyage of SY Scotia during the years 1902, 1903 and 1904*, **2-7**. Scottish Oceanographical Laboratory, Edinburgh.

Bruce, W.S. 1913. Measurements and weights of Antarctic seals taken by the Scottish National Antarctic Expedition. *Transactions of the Royal Society of Edinburgh*, **49**, 567-577. Also included in 'Scotia' Reports, **4**, 163-173.

Bruce, W. S. 1992. In: Speak, P. (ed.) *The Log of the Scotia Expedition, 1902-04*. Edinburgh University Press.

Darwin, C.R. 1846. On the geology of the Falkland Islands. *Quarterly Journal of the Geological Society of London*, **2**, 267-274.

- Dudenev, J. R. & Sheail, J. 2014. William Speirs Bruce and the Polar Medal: myth and reality. *The Polar Journal*, doi.org/10.1080/2154896X.2014.913915.
- Dudenev, J. R. & Walton, D. W. H. 2011. From *Scotia* to ‘Operation Tabarin’: developing British policy for Antarctica. *Polar Record*, 48 (for 2012), 342-360. doi:10.1017/S0032247411000520 1
- Johnson, S. & Hall, H. 2008. Grey-Wilson, Sir William (1852-1926). In: Tatham, D (ed.). *The Dictionary of Falklands Biography*. Published by the Editor, Ledbury. 252-253.
- Melvill, J. C. & Standen, R. 1908. The Marine Mollusca of the Scottish National Antarctic Expedition. *Transactions of the Royal Society of Edinburgh*, **46**, 119-157. Also included in ‘*Scotia*’ Reports, **5**, 89-127.
- Morris, J. & Sharpe, D. 1846. Description of eight species of brachiopodous shells from the Palaeozoic rocks of the Falkland Islands. *Quarterly Journal of the Geological Society of London*, **2**, 274–278.
- Mossman, R. C. 1907. Meteorological observations made at Cape Pembroke, Falkland Islands. *Report on the Scientific Results of the Voyage of SY Scotia during the years 1902, 1903 and 1904*, **2**, Physics, 217-229.
- Newton, E. T. 1906. Notes on fossils from the Falkland Islands brought home by the Scottish National Antarctic Expedition in 1904. *Proceedings of the Royal Physical Society of Edinburgh*, **16**, 248-257.
- Nordenskjöld, O. & Andersson, J. G. 1905. *Antarctica or Two years amongst the ice of the South Pole*. Hurst and Blackett, London. 608 pp.
- Ramsay, L. N. G. 1913. Ornithology, Section 3 – The Falkland Islands. *Report on the Scientific Results of the Voyage of SY Scotia during the years 1902, 1903 and 1904*, **4** (2), Zoology, 211-214.
- Regan, C. T. 1913. The Antarctic fishes of the Scottish National Antarctic Expedition. *Transactions of the Royal Society of Edinburgh*, **49**, 229-292. Also included in ‘*Scotia*’ Reports, **4** (2), 311-374.
- Salvesen, T. E. 1914. The Whale Fisheries of the Falkland Islands and Dependencies. *Report on the Scientific Results of the Voyage of SY Scotia during the years 1902, 1903 and 1904*, **4** (2), Zoology, 479-486.

Speak, P. 1992. William Speirs Bruce and the Scottish National Antarctic Expedition. *Scottish Geographical Magazine*, **108**, 138-148.

Speak, P. 2003. *William Speirs Bruce - Polar Explorer and Scottish Nationalist*. National Museums of Scotland Publishing. Edinburgh. 144 pp.

Stone, P. & Rushton, A. W. A. 2007. Fossil collections from the Falkland Islands, 1833-1904: the *Beagle*, *Erebus & Terror*, *Challenger* and *Scotia* expeditions. *Falkland Islands Journal*, **9** (1), 124-133.

Stone, P. & Rushton, A. W. A. 2012. The pedigree and influence of fossil collections from the Falkland Islands: From Charles Darwin to continental drift. *Proceedings of the Geologists' Association*, **123**, 520–532.

Swinney, G. N. 2007. The Scottish National Antarctic Expedition (1902-04) and the Founding of Base Orcadas. *Scottish Geographical Journal*, **123**, 48-67.

Dr P Stone
British Geological Survey
The Lyell Centre, Edinburgh EH14 4AP