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PRESERVED IN PEAT: A TRACE OF ELEPHANT SEALS IN THE FALKLANDS ISLANDS LANDSCAPE

by

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Peat is a ubiquitous feature of the Falkland Islands. Indeed, without peat as a fuel and building material the early settlement of the archipelago would have been impossible. Peat thickness reaches 10 m or more in some places, and its general accumulation began about 16 500 years ago. That is the calibrated age 'before present' (BP) – calculated from a radiocarbon age of about 13 500 years[1] – of the oldest, basal peat in both the Lake Sulivan area of West Falkland (Wilson *et al*. 2002) and in the 5 m sequence exposed in an actively eroding sea cliff close to Hooker's Point, east of Stanley, East Falkland (Scaife *et al*. 2019).

One of the earliest scientific comments on the Falkland Islands peat came from Charles Darwin who collected two samples, most probably at Port Louis (East Falkland), that are still held by the Sedgwick Museum, Cambridge: museum specimen number 112152 (Stone & Rushton 2013, appendix 2). Darwin's diary entry for 2 March 1833 (Keynes 1988, p. 147) reads:

> "East of basin [Port Louis careenage], peat above 12 feet thick resting on clay, & now eaten by sea … small bones are found in it like Rats – argument for original inhabitants."

Had Darwin observed bones himself he would almost certainly have collected some, but he didn't, so he was probably reporting a claim made by someone else; he doesn't appear to have considered the possibility that contemporary, 19th century rats might have been burrowing into the peat. Either way, no rat-like bones have subsequently been noted at Port Louis or anywhere else in the Falklands. However, there is one enigmatic accumulation of bird bones in peat on West Point Island that are thought to be over 5 000 years old (Adams & Woods 2016). Elsewhere elephant seal bones have been found deep in the coastal peat and although the seals have gone from most of their previous Falklands haunts, in some places their passing has been preserved in the landscape. This article focuses on one such locality, Motley Point in the south-east of Lafonia, where recent marine erosion has cut across an area once colonised by elephant seals and exposed the evidence of their former presence.[2]

The Falkland Islands lie towards the northern limit of the geographical range of the Southern Elephant Seal (*Mirounga leonina*) but supported a substantial population of these animals prior to the sealing depredations of the early 19th century. The seals were exploited for their oil as a profitable supplement to the early whaling industry (Figure 1) and by the mid-19th century the Falklands population had been decimated (Dickinson 2007; Strange 1972). Since then there has been a very slow and irregular recovery but still only one Falklands locality, Sea Lion Island, supports significant numbers of elephant seals. There, the estimated total population in 2019 was about 2 400 animals (Galimberti & Sanvito 2020).[3]

Figure 1. Sealers' try-pots at Pebble Island, West Falkland. These cauldrons were used to extract the oil from seal blubber.

Elephant seals are big, heavy animals – large males can be 5 m long and weigh 3 tons – and when ashore, particularly whilst moulting, congregate in close-packed pods (Figure 2). This combination of size and behaviour has major compacting and erosive effects, and areas behind favoured beaches become riddled with wet hollows, known as wallows, some of which may eventually become a couple of meters deep. It's not unknown for animals to become trapped and die in the deeper wallows. This is what appears to have happened at Motley Point.

The Motley Point elephant seal colony, along with many others in the Falkland Islands, was probably destroyed by the mid-19th century. Thereafter, the abandoned wallows were slowly filled with slumped peat and then overgrown to produce a rounded, hummocky ground surface. That in itself might not look particularly distinctive, but at Motley Point the old wallowed area has been eroded so that a low

shoreline cliff cuts across the surface depressions and shows that they were originally eroded through the surface peat layer and the underlying clay, with the deeper ones bottoming-out on bedrock (Figures 3 & 4) which now forms a flat, intertidal platform in front of the peat cliff.

Figure 2. Elephant seals at Iris Bay, South Georgia. Huge numbers of elephant seals were taken from South Georgia from the late 18th century until the end of commercial sealing in 1964. The 20th century records confirm the killing of 260, 950 animals between 1909 and 1964 (Dickinson 2007, Appendix 5).

As confirmation, in the deepest of the exposed wallows, a basal layer of bones confirms the fate of some of the animals (Figures 4 & 5). These were probably from the pre-sealing population, although it's possible that sealers were unable to recover the carcasses of animals that they had shot and instead abandoned them in the wallows.

Figure 3. The low cliff eroded across the hummocky area at Motley Point, East Falkland, showing a cross-section of two wallows cut down through the peat and the underlying pale-coloured sediment. In the foreground a thin veneer of shingle rests on a horizontal rock platform. The picture shows the SW coast of the Motley Point peninsula, close to Triste Point.

Figure 4. The left-hand wallow shown in Figure 3, illustrating the base cutting down through the underlying sediment. An accumulation of seal bones can be seen at the base of the wallow, adjacent to the spade. No bones were seen in the right-hand wallow from Figure 3.

Figure 5. A detail of the bone accumulation seen in Figure 4, with a large tooth set in a jaw-bone emerging from the peat. The hammer handle is 28 cm long.

The peat layer at Motley Point is relatively thin and this may have helped preservation of the site as the underlying clay and bedrock provide a clear and firm base to the 'fossil' wallows. Where the coastal peat is much thicker it might be difficult to identify old wallowed areas, although of course the seals may have avoided beaches backed by the higher peat cliffs, preferring to haul out on the more accessible, firmer ground where the peat was thinner. But even at Motley Point there may be evidence for additional, cryptic wallows. It comes from the radiocarbon dating of two samples of the basal peat layer, collected about 20 m apart, from areas that did not appear to have been disturbed (Stone *et al*. 2003). Despite their proximity and apparent correlation, one sample gave a calibrated age of about 11 400 years BP whilst the other gave a calibrated age of about 5 400 years BP. The difference might arise from the younger age having been derived from reworked peat that had filled an original wallow which had not eroded into the clay layer underlying the peat, and which was therefore not recognised.

The coastal erosion that has exposed the evidence at Motley Point is active at many points around the Falkland Islands and, as Darwin observed, peat is being "now eaten by sea". When peat began to form, towards the end of the last ice age, the relative sea level was much lower and so low-lying coastal land, with its growing peat cover, was more extensive. As the sea has encroached during the post-glacial millennia the peat

has been eroded back and in places is now covered by beach deposits. This leads to some curious landscape features. For example, at Salinas Beach (3 km west of Goose Green) a low ramp cut in peat at high water mark is usually draped in seaweed (Figure 6), whilst in the intertidal zone a network of desiccation cracks in exposed peat surfaces has been filled with pebbles and shell fragments (Figure 7). This unusual style of 'patterned ground' is similar to examples described from other parts of the Falklands (Wilson 1995; Wilson & Edwards 2004) albeit they are from areas well above sea level where erosion has exposed bare peat surfaces. Another example of the intertidal patterning can be seen at The Sandbed, Ruggles Bay on the west coast of Lafonia, but there the desiccation cracks in the peat are filled with maerl (calcified seaweed) sand. Additional examples of the 'terrestrial' forms described by Wilson and Edwards occur along the south coast of the Cape Pembroke peninsula, east of Stanley.

Figure 6. The low ramp cut in peat at the high-water line in Salinas Beach, at the head of Brenton Loch, East Falkland. Peat underlies the beach shingle to the left and even at low water there is still at least 30 cm of peat underlying the beach.

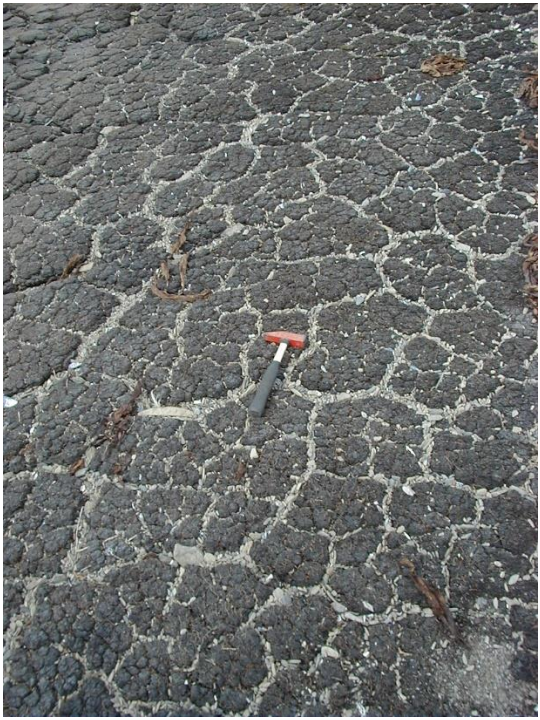

Figure 7. Desiccation cracks in the Salinas Beach peat that have been filled by small pebbles and shell fragments. The hammer handle is 28 cm long.

A continued rise in sea level will be an inevitable effect of current climatic changes. Coastal erosion around the Falkland Islands will likely increase, but in the process some other unusual effects or well-hidden features may be revealed. It would be interesting to know if evidence of an elephant seal colony appears at any other Falklands site as it experiences similar erosion to that affecting Motley Point.

Notes

1.Ages derived from analyses of carbon isotopes in organic material depend on the decay of the radioactive isotope ^{14}C and are quoted as a 'radiocarbon age'. The radiocarbon years do not have a direct, linear correlation with calendar years and a mathematical adjustment needs to be made to create the calendar-equivalent 'calibrated age' which is then quoted in 'years before present' (BP). To ensure a consistent baseline, the 'present' is always taken as 1950 CE. There is always a degree of uncertainty and ages derived from ^{14}C dating are formally declared either as a numerical range or as a single figure followed by a plus or minus (±) error range,

usually calculated to one or two standard deviations expressed as 1 or 2 sigma (σ). For example, the full dataset for the Hooker's Point locality: radiocarbon age 13630±140 years BP±1σ, calibrated age range (2σ) 16923–16055 years BP (Scaife *et al*. 2019).

2. It may not be a coincidence that the Motley Point peninsula is included within the Seal Cove Camp. Seal Cove itself forms the NE margin of the peninsula and lies about 9 km north of Motley Point. Of course, it is uncertain whether the name celebrates elephant seals or fur seals, or maybe even sea lions. When describing a visit to Seal Cove in 1902, the Swedish explorer J. G. Andersson suggested that sea lions might be present on the offshore Seal Island, but he made no mention of elephant seals (Nordenskjöld & Andersson 1905, p. 326).

3. Tens of thousands of elephant seals were probably killed on the Falkland Islands during the early 19th century. Despite this great reduction in the population, sufficient elephant seals remained in a few localities for small numbers to be killed throughout the second half of the 19th century and into the early 20th century, often in association with attempts to revive an oil industry exploiting sea lions. These attempts were mostly short-lived and commercially unsuccessful and ceased in the 1950s; their records contain no mention of Motley Point (Dickinson 2007). Thereafter, it is difficult to find historical population assessments that are mutually comparable, but any recovery in elephant seal numbers seems to have stalled in the last decade of the 20th century. Dickinson (2007, p. 165) gives a figure of 6 000 as the total Falkland Islands population of breeding females in 1992 reducing to only 600 in 2002, with Sea Lion Island hosting most of the animals at both periods. But the Sea Lion Island colony seems to have expanded slightly in more recent years, growing from 465 breeding females in 1995 to 605 in 2019 (Galimberti & Sanvito, 2020).

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