THE BAKER COLLECTION OF FALKLAND ISLAND FOSSILS AT IMPERIAL COLLEGE, LONDON

by

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Between 1920 and 1922 Herbert Arthur Baker (1885-1954) carried out the first geological assessment of the Falkland Islands for minerals of economic importance. His scientific training at University and Imperial colleges, London, had been interrupted by service with both the Royal Flying Corps and the Royal Navy during the First World War, before he arrived in the Falklands to commence his survey on Christmas Day, 1920. His field explorations were carried out through most of two summers and the intervening winter, and it seems unlikely that he spent much time enjoying the comforts of Stanley, though on 28 June 1921 he did find time to entertain the Stanley Literary and Debating Society with "Musings of a Geologist".

Baker's principal objective was to assess the potential of the Falkland Islands for minerals of economic importance. At the time, the broad outline of the islands' geology had been determined, mainly through the efforts of two scientists accompanying Swedish expeditions to the south Atlantic region – J.G. Andersson and T.H. Halle. Baker set out to extend that understanding and to produce a comprehensive geological map through a series of horse-back traverses across the larger islands, supplemented by coastal boat-work. He was dependent on the goodwill of farm managers and shepherds for accommodation, provision of horses and the transport of specimens. Their support seems to have been unstinting; as Baker acknowledged in his final report, "*Station-managers and 'camp' shepherds alike willingly and gratuitously housed me and fed me for as long as I chose to stay with them, provided horses to meet my needs and either constituted themselves my guides or found others to act in that capacity.*"

Specimens presented a particular problem and again it was the cooperation of the Camp shepherds that was crucial, as explained in another part of the report: "*… as day succeeded day, the problem of how to dispose of one's specimens became pressing. Here the camp shepherds most obligingly assisted me. On my departure from a shepherd's house I would leave a load of specimens which the shepherd would convey to the farm headquarters at the settlement, there to await the next call of the steamer.*" In this way Baker was able to amass a considerable collection of geological specimens that were then shipped back to Imperial College, London, to await his return; at least 10 boxes were dispatched and many of the specimens remain in the Imperial College geological collection.

Once back home in London, Baker spent some time examining his geological specimens at Imperial College and completing his final report. He had collected a large number of fossils and some of these, fossil plants from Lafonia (George and Speedwell islands proved particularly productive), were immediately passed on to the acknowledged expert in the field, Professor A.C. Seward at The Natural History Museum. Seward subsequently published descriptions, naming a previously unknown species of petrified wood after its discoverer - *Dadoxylon bakeri*. These specimens (about 30 in total) remain in the Museum's collection where they are listed as a

donation from the Government of the Falkland Islands, 1922. Not all of the Lafonia fossil plants were passed on to Seward and some remain in the collection at Imperial College, albeit these are the less impressive examples. There are 11 specimens showing impressions of striated, *Calamites*-type plant stems, and 9 carrying *Glossopteris* leaf impressions. No examples of petrified wood, Seward's *D. bakeri*, remain in the Imperial College collection. The Lafonia plants are all from the younger part of the Falklands' rock succession, the Lafonia Group of Permian age, and are about 280 million years old.

The Imperial College collection also contains many examples of fossil shells from the older part of the succession, the 400 million-year-old Fox Bay Formation of the West Falkland Group, which is of Devonian age. The specimens have been grouped together by species and although collections from several different localities are represented, not all of the specimens can be confidently assigned to a precise geographical origin. Brachiopod shells and trilobite fragments from Pebble Island are contained in very distinctive calcareous nodules. A few slightly distorted brachiopod shells are probably from the Port Louis area of East Falkland. Most of the brachiopod specimens were probably collected in the Fox Bay area of West Falkland; the most impressive are the impressions of the large, robust shells of *Australospirifer*. Altogether, the Imperial College collection comprises more than 60 brachiopod specimens representing several different species, a similar number of fragmentary trilobite specimens, about 10 bivalves, 3 snails and 2 orthocones; a scattering of crinoid fragments is also present in some of the larger samples. A short time before Baker's work in the Falkland Islands, the Devonian fossils had been described comprehensively by John Clarke, Director of the New York State Museum. Hence Baker did not arrange for any further work to be done with his material and his report contains a faunal list derived from Clarke's account with a small number of additions.

As with the fossil plants, the brachiopod and trilobite specimens remaining in the Imperial College collection are not the best of the examples collected by Baker. The most striking of the fossils – 12 trilobites, 30 brachiopods, 5 bivalves and 8 snails – he donated to The Natural History Museum, where they remain, but curiously not until 1931 by which time he had joined the London Teaching Service. During the intervening period, 1922-1930, Baker had returned to overseas postings, firstly with the Grenada Education Department in the West Indies and secondly as Director of the Geological Survey of Newfoundland, Canada. Unfortunately, whilst the Museum's specimens are catalogued as having been donated by Dr H.A. Baker, and some of the individual specimen cards carry the same information, one of the trilobites and most of the brachiopods are labelled as having been donated by Dr J. Baker.

Of the rock samples collected by Baker, he was particularly interested in those representative of the oldest, metamorphic rocks in the islands, the 1000 million-year-old Cape Meredith Complex on West Falkland. These were the first examples to be recovered and studied in any detail. Although the Complex had been discovered in 1902 by J.G. Andersson during the Swedish South Polar Expedition, specimens collected then had been lost when the expedition's ship was crushed by ice and sank in the Weddell Sea – as described by Peter Wilson in the 2004 issue of *Falkland Island Journal*. Sadly, Baker's Cape Meredith specimens have suffered a similar if less dramatic fate and are no longer part of the Imperial College collection, their former presence indicated only by surviving index cards. This is particularly

unfortunate considering the effort that Baker put into collecting them. In a letter dated 21 June 1921, to Sir Wyndham Dunstan, Director of the Imperial Institute, he describes the specimens *"… which I secured with difficulty by climbing down the cliffs, a hundred feet or so, at the imminent risk of my neck"*.

Baker had some hope that the Cape Meredith Complex rocks would prove of economic interest, referring in the letter to Sir Wydham Dunstan to *"… a yellow metallic mineral which may be gold, but which I fear is not."* His fear proved well-founded and his mission to discover economically important minerals in the Falklands ended in failure. This disappointment, coupled with the arduous and difficult circumstances of his surveying, is reflected most tellingly in the preliminary draft of his final report, a copy of which is held by the Falkland Island Archive. One passage that did not make it into the final "official" version complains that *"The visible rocks tell the unfortunate geologist nothing fresh, and his common lot is to ride and ride, in driving rain, or shrieking wind, or both, hoping to light upon a rock-exposure in the banks of some uncharted 'arroyo'."*

Baker's geological work was thorough and comprehensive. His interpretation noted the close similarity of the Falklands rock succession with that in the Cape Province of South Africa and, building on this correlation, he adopted the radical and highly controversial idea of continental drift, then only recently proposed. His geological map was not superseded until 1972. His fossil specimens held by Imperial College, London, provided a valuable resource that complements the material deposited in The Natural History Museum.

Acknowledgements

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Captions for illustrations

These illustrations of *Dadoxylon bakeri* (19-22) were first published by Prof. A.C. Seward in the *Quarterly Journal of the Geological Society*, volume 79 for 1923. All are sections of petrified wood discovered by Baker in Lafonia. On the original page, measuring 13 cm x 21 cm, number 19 is x210, numbers 20-22 are x50, number 23 is a leaf impression (*Gangamopteris*) 7 cm long.

Two ventral valves of the brachiopod *Australospirifer*, probably from Fox Bay; the shell has dissolved away, leaving internal moulds, showing internal features such as the diductor muscle scars seen on the "beak" of the specimen on the right. The Falkland Islands five pence piece is 18 mm in diameter. BGS photograph P584095, specimen held by Imperial College, London.

The brachiopod *Orbiculoidea*, from Pebble Island. Part and counterpart of a dorsal valve in a concretion. The left-hand specimen shows the slightly elevated umbo, or center of growth of the shell; the right-hand specimen shows marginal striations at the posterior edge (top of picture). The shell material is composed of thin laminae that adhere to each of the part and counterpart. The Falkland Islands five pence piece is 18 mm in diameter. BGS photograph P584096, specimen held by Imperial College, London.