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THE LIFE AND WORK OF PROFESSOR J. W. GREGORY FRS (1864–1932). GEOLOGIST, WRITER AND EXPLORER. By Bernard Elgey Leake. 2011. London: The Geological Society (Memoir No. 34). 234 pp. Hardcover, £75.00, \$150.00.

In a book review in this journal, Sorkhabi (2006) asks: “What are scientific biographies for, anyway? Why should we care about the life, work and publications of dead scientists?” Among the answers that he provides is: “professional successes and life lessons of pioneer scientists encourage the younger generations. Nearly all of us who have become scientists have had role models and heroes who fascinated and drew us to science”. The subject of this meticulously researched, and immensely readable, biography could be viewed in many ways as just such a person.

John Walter Gregory (always known as ‘Jack’ by his family) was born in London in 1864, the son of a ‘middle class’ wool salesman. He was educated from the age of six, first at a boarding school which followed the Pestalozzian system, then at Stepney Grammar School, Bow, London. Following the death of his father from tuberculosis in 1876, he left school in 1878 to work first on a dairy farm and then, from 1880–1887, as a trainee wool sales clerk, the intention being that he would follow in his father’s profession. However, by at least 1883, he was also managing to pursue further studies at night-school and at weekends, attending classes at the City of London College, Birkbeck Institution, and the Royal School of Mines in London. A life-long teetotaler and non-smoker, gifted with an exceptional memory, he would study long into the night, fortunately being able to make-do with only four or five hours sleep, a facility he retained throughout his life. Having already had nearly six years part-time study (which included biology and geology), he matriculated at London University in 1886, passing examinations in English, Latin, French, German, history, geography, mathematics, physics and chemistry. Subsequently, he studied metallurgy, inorganic chemistry and mathematics (1886), physics and ‘advanced animal morphology’ (1887) and probably also botany, zoology, and physical geography, with geology at Birkbeck Institution, from which he eventually obtained a first-class BSc degree in geology in 1891. He was subsequently awarded a DSc from London University in 1893, based on work he had published before he had gained his BSc! A habitually rapid walker and later, cyclist, some of his holidays were spent in the European Alps where, in the course of examining the rocks, he climbed, and later learned to ski—he eventually became President of the Scottish Ski Club (1910–1913).

Having begun attending Geologists’ Association (GA) lectures and field excursions in 1882, Gregory joined the GA the following year. He was also early involved with the pioneering Universities’ Settlement, Toynbee Hall, in Whitechapel, in the East End of London. The Settlement was established in 1884 with the idea that it might provide the opportunity for graduates to work with the deprived in one of the poorer parts of London, giving educational and social opportunity. Gregory became Secretary of their Natural History Society. By 1885, he was writing articles on geology for *Hardwicke’s Science-Gossip*. In 1887, he successfully competed for one of two vacant appointments as an Assistant Keeper in the Geology Department of the ‘British Museum (Natural History)’, BM (NH), and from that point his career took off. He was elected a Fellow of the Geological Society in 1887 (sponsored by the vertebrate palaeontologist, Sir Arthur Smith Woodward (1864–1944), who also wrote for *Science-Gossip*, and under whom Gregory would later work at the BM (NH)), and of the Zoological Society of London in 1888.

Gregory’s initial field of study was mainly invertebrate palaeontology, working on echinoids and corals in the BM (NH) collections, although he also managed to pursue some petrological studies. By the 1890s, he was able to read literature in French, German, Italian and Russian—even publishing in 1893 a translation of the petrologist Franz Youlievich Loewinson-Lessing (1859–1939)’s *Tables for the Determination of Rock-forming Minerals* originally published in Russian two years previously. Gregory was also beginning to travel abroad in the course of his duties to visit museum collections. Then in October 1892 he was invited, at only

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four days notice, to join a 'privately-funded' expedition (which was, in fact, clandestinely sponsored by the British War Office), to British East Africa (present-day Kenya) as geologist and surveyor, just managing to catch up with the other members of the expedition *en route*, some nine days later in Aden. Unfortunately, the expedition proved to be a poorly-organised disaster, being abandoned by its leader, Lieutenant Charles Hyde Villiers (1862–1947), early in 1893, at a time when many of its members, including Gregory, were much weakened by attacks of malarial dysentery. (In fact, Villiers appears to have been abruptly transferred by the War Office to serve as *aide-de-camp* (principal personal adviser) to the diplomat, Sir Gerald Portal (1858–1894), on a mission to establish the Uganda Protectorate, but his absence did little to make life easier for the remaining members of the Kenyan expedition). Undaunted, still having seven months of his agreed period of leave from the BM (NH) to go, Gregory made good use of the abandoned remains of the expedition's stores to mount his own expedition from Mombasa to Lake Baringo, located to the north-west in what, as a result of his geological work, subsequently came to be known as the 'Rift Valley'. During the course of the expedition, which covered some 1650 mi (2,656 km) in a little under five months, he managed to undertake the first ascent of Mount Kenya, reaching its snowfields and spending five days at over 13,000 ft (3,962 m), although it was not possible to attain the summit. His account of the expedition, *The Great Rift Valley*, published in 1896, was found to be of sufficient continuing interest that it was reprinted in 1968. Returning to London in September 1893, he resumed work at the Museum on corals and echinoids, and began a long-term study of Bryozoa.

As a result of his work in East Africa, in 1896 Gregory was invited by the geographer and mountaineer, Sir William Martin Conway (1856–1937), to participate in a three-month expedition to explore the interior of Spitzbergen (Svalbard), together with the geologist Edmund Garwood (1864–1949) and others. Despite the lack of sufficient rations and enduring the "dreadful terrain of icy swamps, deeply crevassed glaciers and gluey moraines, the torrents of cold rain which soaked them and the mud that flowed into their tents", man-hauling sledges, they managed to successfully traverse Spitzbergen for the first time, and Gregory and Garwood amassed a good collection of geological specimens for the BM (NH).

Following his return to the Museum, Gregory continued work on the classification of echinoids and corals from Egypt, western India and elsewhere. However, still only being in the position of a Second Class Assistant at the Museum, and realizing that the prospect of promotion to a more senior rank remained far-off, in 1899 he successfully applied for the position of the new Chair in Geology and Mineralogy at Melbourne University in Victoria, Australia. It so happened that at the time, the Royal Geographical Society (RGS) and Royal Society were laying plans for a National Antarctic Expedition, intended to take place in 1901 under Lieutenant Robert Falcon Scott (1868–1912) and just before leaving for Australia Gregory was offered the position of Scientific Leader of the expedition.

On arrival in Melbourne, Gregory must have been dismayed to discover that the Department of Geology "was almost non-existent, being largely confined to one room in the old museum building" and what specimens there were had largely been transferred to the new National Museum of Victoria. Despite these drawbacks, he soon began visiting mines and amassing specimens for the teaching collection, added facilities to make petrological thin-sections, instituted field excursions, and extended teaching to students in the Engineering School. Gregory continued planning for the National Antarctic Expedition but by early 1901 it had become clear to him that the RGS's determination to mount a 'race to the pole' would severely curtail the intended programme of geophysical, meteorological, and other work, and he resigned his post with the expedition in May that year. However, as the result of the recommendations he had been asked by the Victoria Government to make for the improvement of the practically moribund state Geological Survey, Gregory found himself appointed to the position of temporary Director of the Geological Survey of Mines and Water Supply Department for Victoria in November 1901. Because of his immense capacity for work, he managed to accomplish this additional duty without adversely affecting his teaching duties at the university,

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and he generously used the additional salary to try to further improve the Geology Department facilities.

So far as the general public were concerned, one of the most memorable events of his years in Australia was a largely self-financed geological expedition, undertaken in the summer heat of December 1901–January 1902, to Lake Eyre, located some 400 mi (644 km) north of Adelaide, in what Gregory (1906) immortalised as the ‘dead heart’ of the continent, in order to show his students how such field-trips should be planned and undertaken. Unfortunately, the adverse effect of the hot and dusty atmosphere of Melbourne on his wife’s health, together with the continuing lack of university facilities as a result of its dire financial straits, drove Gregory to seek an appointment back in Britain. He successfully applied for the position of the newly-established Chair of Geology at Glasgow University, to which, remarkably, as the result of testimonials from Sir Archibald Geikie (1835–1924) and Smith Woodward, he was appointed without interview in May 1904.

Gregory took up his position in Glasgow that November, initially as the sole member of staff, but from 1906 he was assisted by the excellent igneous petrologist, George Walter Tyrrell (1883–1961). Gregory’s duties also encompassed appointment as Honorary Curator in Geology at the Hunterian Museum of the University from 1904, for which his prior experience at the BM (NH) made him ideally suited, and to which was added the position of Honorary Keeper in Palaeontology in 1905. As a result, he was able to gradually build up both the collections (between 1904 and 1929, personally donating some 10,000 specimens) and the staffing to curate them.

The second half of Leake’s book covers Gregory’s years at Glasgow in detail, and it is interesting to read how geology was taught at this period, the syllabus benefiting from Gregory’s wide experience, particularly as regards economic and mining geology, and his emphasis on fieldwork. Such was his lecturing prowess that during his twenty-five years at Glasgow, his first-year classes gradually increased in size from fifteen to 400 students, and latterly even included those studying for a degree in theology! Nevertheless, his interest in foreign travel continued unabated, with visits to Southern Rhodesia (Zimbabwe) and South Africa in 1905; Scandinavia, 1907; Cyrenaica (Libya), 1908; Australia and Canada, 1909; Sweden, 1910; Dalmatia (Croatia), 1911; Benguela (Angola), 1912; Australia, 1914, returning via China, Mongolia and Russia; British East Africa, 1919; Burma, 1921; Eastern Chinese Tibet, 1922; Canada and the USA, 1924; Spain, 1926; France and Switzerland, 1928, 1929. Despite all this, he was active with his university duties, research and publication, plus work for bodies such as the British Association and the International Geological Congress. He was also a member of a Commission (1917–1919) which looked into the organization and teaching standards of the University of Calcutta (Kolkata), India, then the largest university in the world, as well as being President of the Geological Societies of Glasgow (1908–1911) and London (1928–1930). Following his retirement from Glasgow in 1929, he remained active in research, public lecturing and publishing, until he was tragically drowned in a whirlpool in the Pongo de Mainique on the Urubamba River, whilst on an expedition to northern Peru in 1932.

Leake quotes the palaeobotanist Albert Charles Seward (1863–1951), recalling Gregory as a man “who was able in the interests of original research to utilize every spare moment, and to find spare moments which for other men did not exist” and it was this single-mindedness of purpose and dedication which, together with his need for so little sleep, enabled him to produce at least 396 sole-authored publications, plus forty jointly-written works, during his career. Although the majority of his publications were under twenty pages in length, twenty-four ranged from 116 to 542 pages, and his palaeontological works alone totalled over 2,000 pages (data from Appendices 1 and 2). Although the vast majority of his writings were concerned with geological topics, he also wrote on geography and geomorphology, botany, zoology, archaeology, socio-economics, anthropology and racial matters, human migration and the problems of white labour in tropical agriculture. It is probable that additional, unsigned, articles also exist as, following his marriage in 1895, he also wrote many book reviews and articles on current affairs for the popular press as a source of additional income.

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Covering such a vast range of interests, it was inevitable that some of his geological studies were of a pioneering nature and relatively superficial. In consequence, his views were not always correct, for example: (1) From at least 1898, Gregory followed the Tetrahedral Theory of the distribution of oceans and continents (Green 1875, 1887), espoused by the English businessman, eventual member of the Hawaiian Government, and amateur geologist, William Lothian Green (1819–1890). This attributed the present-day distribution of the oceans and continents to the Earth being a shrunken spheroid, slightly flattened on four broadly equi-triangular faces and thus somewhat resembling a tetrahedron. Both Green and Gregory believed that these faces provided the depressions in which the oceans lie, thereby ensuring that the locations of the continental masses and oceans are essentially opposed. Gregory's long-held belief in these ideas subsequently prevented him from subscribing to Alfred Wegener (1880–1930)'s theory of continental drift, which Gregory first encountered when he reviewed (Gregory 1923) the third (1922) edition of Wegener's *Die Entstehung der Kontinente und Ozeane* (*The Origin of the Continents and Oceans*). (2) His belief that most metallic ores resulted from their being carried upwards in ascending plutonic waters before their deposition in veins (Gregory 1902). (3) His opinions that the boulder clay in the Pleistocene glacial deposits of Britain and Ireland was a glacio-marine deposit formed by deposition from melting icebergs, and that the shape of drumlins was attributable to post-glacial (wind) erosion (Gregory 1925, 1926). On the other hand, Gregory (1896) correctly recognised both that the African Rift Valley formed as a result of a period of early uplift followed by downward block faulting accompanied by volcanism; and that the presence of gold in the 'Banket' conglomerates of the Witwatersrand, South Africa, resulted from the fluid mobilisation of detrital gold in the original marine placer deposits and its subsequent re-deposition *in-situ* (Gregory 1907).

The book ends with a short chapter on a few of Gregory's more notable students, an overall assessment of the man and his achievements, and the two Appendices which list his books, monographs, and other publications. It is well illustrated throughout, with ninety-one grey-tone and black-and-white figures, of which thirty-four are portraits of Gregory and other persons mentioned in the text, nine are route maps, and three are in colour (including two landscapes from Australia and New Zealand, painted by his wife, Audrey, who was an artist). The clarity of one figure (19.4 on p. 170), showing the present observed and modelled movement directions and velocities of the crust in the Himalayas (from Meade 2007), would have been much improved had it too been in colour. The text is set in double columns occupying a total area of 25.3 by 19 cm and is largely 10-point (3.5 mm) in size, but long quotations appear to be set in 7-point (2.2 mm) font, which some may well find hard to read. The details of individual works cited in each chapter are given at their ends, this means that there is some repetition of Gregory's own works as they also appear in the Appendices. The index appears to be quite comprehensive. A curious echo of the fact that the Geological Society's *Memoirs* are usually multi-author works is that details of the author's name, institution and e-mail address, together with the book's title, publisher, and the chapter pagination are repeated at the foot of the first page of *each* chapter, which seems a little unnecessary. Another minor irritant, which must, I suspect, have been an editorial decision, is that units of length *etc.* are almost always given in Metric units, rather than as Imperial units (which must have been used in Gregory's time) together with their Metric equivalents, although exceptions do occur (*e.g.* p. 164).

In conclusion, the book is a fascinating and engaging read—a study of the life of a most remarkable man, in which, in addition to all aspects of his professional career, his personality and home life are also illuminated, and it is evidently the product of a great amount of painstaking biographical research. The author is to be congratulated on a fine piece of work. Nevertheless, I fear that, through no fault of the author's, the book's high publication price will probably restrict its sales largely to institutional libraries rather than to individuals. Even if you have to rely on borrowing a copy from your university library, do try to read it. You won't regret doing so.

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Richard J. Howarth, Department of Earth Sciences, University College London, Gower Street,
London WC1E 6BT, UK
r.howarth@ucl.ac.uk.