

Archibald Geikie (1835–1924): A Pioneer Scottish Geologist, Teacher, and Writer

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Figure 1. Archibald Geikie as a young geologist in Edinburgh. (Photo courtesy of the British Geological Survey, probably taken in the mid-1860s.)

EARLY LIFE AND EDUCATION

Archibald Geikie was born into a middle-class family in Edinburgh in 1835. He was the eldest child of James Stuart Geikie (1811–1883), a chemist and musician, and Isabella Laing Thom (1808–1895), daughter of a captain in the merchant marines. The family was to welcome seven other children during the following seventeen years. His father owned a perfume shop and was also a church musician and later a music critic for *The Statesman*. He took his son to concerts in Edinburgh, which gave Geikie a taste for music.

Geikie entered Mr. Black's School at age seven and proved to be an outstanding student, and in 1845, he matriculated at the Edinburgh High School (now the Royal High School), which James Hutton had attended. Geikie enjoyed studying Latin and Greek classics as well as natural history and geology. His passion for geology was stimulated by finding Carboniferous fossils during Saturday trips south of Edinburgh. Later he recalled that he was impressed by the fact that the sedimentary rocks contained fossils of plants and animals never seen by humans. The rich geology of Scotland indeed attracted many minds, including Geikie's younger brother James Murdoch Geikie (1839–1915), who also became a geologist.

At age 15, Geikie apprenticed in a law office as preparation for a banking career. He found the legal work boring and left it two

years later, but there he learned how to write reports. Meanwhile, he read every geology book he could find, including John Playfair's *Illustrations of the Huttonian Theory*, Henry de la Beche's *Geological Manual*, Charles Lyell's *Principles of Geology*, and Hugh Miller's *The Old Red Sandstone*.

BECOMING A GEOLOGIST

In the summer of 1851, while the Great Exhibition in London was attracting so many people, Geikie decided instead to visit the Island of Arran in the Clyde estuary and study its geology, aided by a brief report by Andrew Ramsay of the British Geological Survey. Geikie came back with a report titled "Three weeks in Arran by a young geologist," published that year in the *Edinburgh News*. This report impressed Hugh Miller so much that the renowned geologist invited its young author to discuss geology over a cup of tea. Miller became Geikie's first mentor. In this period, Geikie became acquainted with local scientists and privately studied chemistry, mineralogy, and geology under Scottish naturalists, such as George Wilson, Robert Chambers, John Fleming, James Forbes, and Andrew Ramsay—to whom he confessed his desire to join the Geological Survey.

In 1853, Geikie visited the islands of Skye and Pabba off the coast of Scotland and reported his observations of rich geology, including finds of Liassic fossils. Hugh Miller arranged for him to exhibit these fossil finds at the Royal Physical Society's meeting that year—his first presentation at a professional gathering. Geikie's reports of Skye and Pabba were published in 1858 in *Quarterly Journal of Geological Society of London* and *Proceedings of the Royal Physical Society of Edinburgh*, respectively. Recently, Betterton (2019) has provided the unpublished reports of Geikie's early fieldwork, which demonstrate the literary, scientific, and painting skills of the young geologist.

In 1854, Geikie entered the University of Edinburgh but had to leave without graduation due to family financial problems resulting from Geikie's younger brother William's involvement in 1855 of stabbing a man. Shortly thereafter, when Sir Roderick Murchison, the director-general of the Geological Survey of Great Britain, asked Miller to introduce a young geologist to map the East Lothian district (a project begun by John Ramsay), Miller at once recommended Geikie. Thus, at age 20, Geikie began working at the Geological Survey, just a year after he had left the university.

Geikie's excellent fieldwork at the Survey as well as his first major publication in 1858, *The Story of a Boulder or Gleanings from the Note-book of a Field Geologist*, impressed Murchison, who became Geikie's second and most powerful mentor. When a separate branch of the Geological Survey for Scotland was founded in 1867, Murchison nominated Geikie (at age 32!) to become its director. Murchison also established a chair for professor of geology and mineralogy in 1871 at the University of Edinburgh and appointed Geikie the first professor. (Geikie held

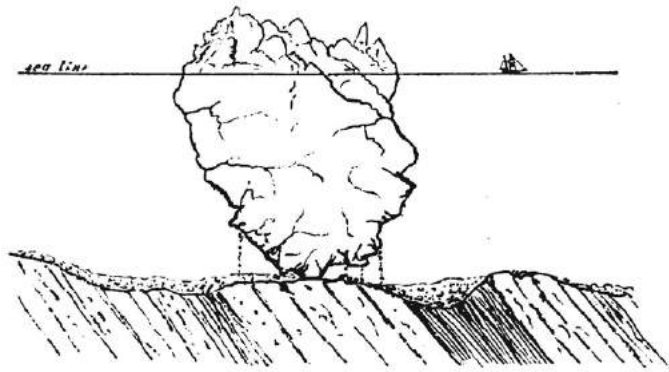


Figure 2. Iceberg grating along the sea-bottom and depositing mud and boulders—drawing by Geikie in his first book, *The Story of a Boulder* (London, Macmillan, 1858). Note the ship for scale.

both these positions until 1881.) Also in 1871, Geikie married Anna Alice Gabrielle Pignatel (1852–1918), a French-born musician (with an English mother and French father). The couple had four children: Lucy, Roderick, Elsie, and Gabrielle.

MANY-FOLD CONTRIBUTIONS

Geikie is reputed for his pioneering mapping of various parts of Scotland. In 1865, at age 30, he published *The Scenery of Scotland Viewed in Connection to Its Physical Geology* (360 pages) to accompany the geological map of Scotland (with Murchison). This seminal work was expanded to 540 pages in its third edition in 1901. Geikie's mapping of Scotland was not without blunders, however. In *The Highlands Controversy*, Oldroyd (1990) has shown how the simple Silurian mapping of a large part of the Scottish Highlands by the aging Murchison and his young protégé Geikie in 1860 turned out to be inaccurate, because the region was structurally complex and metamorphosed as revealed by the field mapping of Charles Lapworth in the 1880s. Geikie acknowledged his error much later, in 1907.

Geikie investigated volcanic terrains on British islands and attempted to understand the processes of volcanic eruptions. He particularly tried to categorize volcanic rock records based on their processes and in relation to specific igneous structures—vents, craters, fissures, dikes, plateaus basalts, and so forth. His two-volume treatises, *The Ancient Volcanoes of Britain*, published in 1897, summarized his 25-year work in this field.

Geikie made significant contributions to the study of glacial terrains, drifts, erratic boulders, and ice ages in Scotland, documented in his 1863 monograph, *On the Phenomena of the Glacial Drift of Scotland*. He pioneered the idea that rivers and glaciers were the main agents of denudation and sculpturing of landforms. To observe these phenomena first-hand in an active erosional setting, Geikie journeyed to Utah, Wyoming, and Yellowstone in 1879 (Sorkhabi, 2019).

TEACHER AND WRITER

Geikie was a popular teacher. At the end of each geology course, he would take students on a 10-day field trip. Geikie's classes included women students as well. His textbooks, especially *Textbook of Geology* (first published in 1882, with a fourth edition in 1905), were widely used in the UK and the USA. Geikie was also a prolific and influential popularizer of geology. He wrote a large number of essays explaining geologic features to the public; many



Figure 3. Geikie's landscape painting of Boulder Canyon, Colorado, USA, during his visit to the American West in 1879 (courtesy of Haslemere Educational Museum; for more artwork by Geikie, go to <http://www.haslemere-museum.org.uk/databases/geikiewebproject/geikie.php>).

of these essays are collected in *Geological Sketches at Home and Abroad* (1882) and *Landscape in History and Other Essays* (1898). His skills in landscape painting made his publications and reports more attractive. Cutter (1974) compiled Geikie's publications, listing 246 reports, articles, biographies, reviews, and books.

In 1881, Geikie resigned from Edinburgh University. In 1882, the Survey transferred him to London, where he succeeded Sir Andrew Ramsay as director-general of the Geological Survey of the UK as well as director of the Museum of Practical Geology. He retained these positions until his retirement in 1901.

Geikie corresponded with and met with many leading geologists of his day in the UK and overseas. Aside from two dozen obituaries published in *Nature* and book-length memoirs of Edward Forbes (1861), Sir Roderick Murchison (1875), Sir Andrew Ramsay (1895), and John Mitchell (1918), Geikie also delivered a series of lectures on *The Founders of Geology* at Johns Hopkins University in 1897, in which he summarized Hutton's principle of uniformitarianism in the famous maxim "the present is the key to the past" (Geikie, 1905, p. 299)

LATER LIFE

Geikie served as president of the Geological Society (London) from 1890 to 1892 and was reelected for a second term (1906–1908) to preside over the centenary celebrations of the Geological Society in 1907. Geikie was also closely associated with the Royal Society in London. He served as its secretary (1903–1908) and president (1908–1913)—the only geologist to serve as the president to this date.

Although not a college graduate, Archibald Geikie received honorary doctorates from 15 universities in Britain and continental Europe and several reputed scientific awards, including the Murchison Medal (1881) and Wollaston Medal (1895) of the Geological Society, and the Royal Medal of the Royal Society (1896). He was knighted by Queen Victoria in 1891, became a Knighted Commander of the Order of the Bath in 1907, and received the Order of Merit from Edward VII in 1913.

The most tragic event in Geikie's life was probably the early death of his only son Roderick who was killed in 1910 (aged 36) in an accident on the underground railway in London.

In 1913, Geikie went to live in his new house at Haslemere, Surrey. He collaborated with the Haslemere Educational (formerly Natural History) Museum, where his papers and collections are archived (Betterton et al., 2019). Geikie's autobiography, *A Long Life's Work*, was published in 1924, the same year he died. In his long and productive life, Archibald Geikie had mastered several fields of geology, working with his geologist's hammer as well as with his pen, ink, and field book.

REFERENCES CITED

Betterton, J., 2019, Unpublished manuscripts of Archibald Geikie, in Betterton, J., Craig, J., Mendum, J.R., Neller, R., and Tanner, J., eds., Aspects of the

Life and Works of Archibald Geikie: Geological Society, London, Special Publication 480, p. 255–316, <https://doi.org/10.1144/SP480.17>.
 Betterton, J., Craig, J., Mendum, J.R., Neller, R., and Tanner, J., eds., 2019, Aspects of the Life and Works of Archibald Geikie: Geological Society, London, Special Publication 480, 406 p.
 Cutter, E., 1974, Sir Archibald Geikie: A bibliography: Journal of the Society of Bibliography of Natural History, v. 7, p. 1–18, <https://doi.org/10.3366/jsbnh.1974.7.1.1>.
 Geikie, A., 1905, Founders of Geology, second edition: London, Macmillan, 498 p.
 Geikie, A., 1924, A Long Life's Work: An Autobiography: London, Macmillan, 438 p.
 Oldroyd, D.R., 1990, The Highlands Controversy: Chicago, Chicago University Press, 448 p.
 Sorkhabi, R., 2019, Sir Archibald Geikie: The North American connections, in Betterton, J., Craig, J., Mendum, J.R., Neller, R., and Tanner, J., eds., Aspects of the Life and Works of Archibald Geikie: Geological Society, London, Special Publication 480, p. 113–138, <https://doi.org/10.1144/SP480.12>.

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