

MEMORIAL OF WILLIAM SHIRLEY BAYLEY

CLARENCE S. ROSS, *U. S. Geological Survey, Washington, D. C.*

William Shirley Bayley, fellow of the American Mineralogical Society and who had served the Society as councilor and president, died at the home of his daughter, Elizabeth Gillen, February 14, 1943.

Dr. Bayley continued active work at Urbana, Illinois, as business editor of *Economic Geology* until November 1942, although for some years his health had made it necessary for him to conserve his strength with the utmost care. In November 1942, failing strength led him to join his daughter at Glen Rock, New Jersey, where he spent his last months happily enjoying the company of her family. He was buried in Urbana, Illinois, where he had made his home for 35 years.

William Shirley Bayley was born November 10, 1861, in Baltimore, Maryland, the son of Robert P. and Emma (Downing) Bayley. He received his A.B. degree in 1883, and the Doctor of Philosophy degree in 1886, from Johns Hopkins University. On March 11, 1894, he was married to Lucie Jacobs of Bel Air, Maryland.

Dr. Bayley maintained his membership in the United States Geological Survey throughout his career; that is, from 1885 to the time of his death. He was professor of geology at Colby College from 1888 to 1904, at Lehigh University from 1904 to 1906, and was called to the University of Illinois in 1906. Here he was assistant professor, 1906–1909, associate professor from 1909 to 1913, and professor from 1913 to 1931, being head of the Department of Geology from 1928 to 1931, and Professor Emeritus 1931 to 1943. He was business editor of *Economic Geology* from its founding in 1905 until a few months before his death. He was an original fellow of the Geological Society of America, councilor, 1919 to 1921, vice president 1929 and 1937; member of the Society of Economic Geologists, councilor 1925 to 1927, vice president 1932; a fellow of the American Mineralogical Society, councilor 1931 to 1934, president 1936; member of the Illinois Academy of Sciences, president 1923; member of the Geological Society of Washington; a member of the American Association for the Advancement of Science; and fellow of the Chemische Gesellschaft; member of the Committee of the Crockerland Expedition, and chairman of the University of Illinois section; associate editor of *American Naturalist* 1886–1902; and reviewer for *Neues Jahrbuch für Mineralogie*, Berlin, 1890–1908. He was a member of Phi Beta Kappa, Sigma Xi, and Beta Theta Pi.

Dr. Bayley had the exceptional opportunity at Johns Hopkins University of working under two of America's most inspiring teachers, Ira



WILLIAM SHIRLEY BAYLEY
1861-1943

Remson in chemistry and George H. Williams in petrology. These associations led him to have a keen appreciation of the importance of a thorough knowledge of minerals and of chemistry in solving geologic problems; and he stressed these points not only in his own geologic work, but also in his teaching. The association with Williams, the father of American petrology, led him to become interested in the origins and genetic relationships of minerals and rocks, even at a time when only a description was the dominant interest of most workers in these sciences.

On July 1, 1885, Dr. Bayley began his work in the Lake Superior region—at first, as a volunteer assistant—for the United States Geological Survey, his work in the region continuing for the next 18 years. His interest in petrologic problems led him, in company with Williams, to begin a study of the rocks of Pigeon Point, Minnesota, a classical area in its bearing on the relative importance of differentiation and assimilation in the formation of igneous rocks.

The following summer Bayley and Williams determined that the schists at the Falls of the Menominee River were derived from “acidic and basic eruptives.” Later that summer Dr. Bayley traced the contact between the granite and the Animiké slates, being the first geologist to traverse the full length of the Mesabi Range. The following years were devoted largely to field work and the preparation of a report in joint authorship with Van Hise on the Marquette Iron Range which was published as *United States Geological Survey Monograph 28*. He also had a part in the preparation of *Monograph 36* on the Crystal Falls iron-bearing district. From 1895 to 1902 Dr. Bayley was engaged in field work in both the Menominee and Vermillion districts and in 1902 completed his report on the Menominee district which was published as *Monograph 48* in 1904.

In 1903 Dr. Bayley began his studies of the geology of the highlands of New Jersey and assisted in the preparation of the Passaic and Raritan Folios. Later he made a detailed report on the iron mines of the state for the New Jersey State Geological Survey.

In 1909 he had a part in the study of the Llano-Burnet region of Texas.

In 1917 Dr. Bayley began studies of the kaolin deposits for the North Carolina Geological Survey. Later, in cooperation between the North Carolina, Tennessee, and United States Geological Surveys, he made a detailed study of the iron ores of the region. Papers were published on the magnetite ores, the brown hematites, and the rutile-magnetite ores, and in particular on the magnetite ores of the Cranberry area. In 1927 he made a detailed study of the Tate Quadrangle of Georgia, an area significant for its wide variety of crystalline rocks and for the marbles for which it is famous.

Geologic problems involving crystalline rocks, the Lake Superior and other iron ores, and their related problems on which Dr. Bayley worked for so many years, provided the background for his teaching in mineralogy, crystallography, petrology, and economic and engineering geology, the subjects in which he specialized. However, Dr. Bayley's own experience and broad interests led him to insist on a thorough training in the fundamental sciences for his students. This applied not only to students in geology, but also to those in chemistry, engineering, and especially to those in ceramic engineering. Indeed he made very real contributions to the ceramic industry, for many ceramic engineers who make effective use of petrographic methods owe much to his teaching. These teaching interests led to the preparation of text books in mineralogy, crystallography, and petrology.

At Colby College and later at the University of Illinois, Dr. Bayley was zealous in the maintenance of the highest standards, never being content with less than the best from himself, from fellow faculty members, or from his students. He served on many important committees where his unflagging labors contributed materially to the best interests of the University and the State.

Dr. Bayley's high ideals as a scientist and as a teacher were respected by all who knew him, and were only equaled by the breadth and loyalty of his friendships. His friendship with his students was particularly close, for although they had the utmost respect for him as an inspiring teacher, it is as a friend and counselor that they particularly cherish his memory.

BIBLIOGRAPHY

1. [Notes on] mineralogy and petrography: *Am. Naturalist*, **20-36** (1886-1902).
2. Notes of microscopical examinations of rocks from the Thunder Bay silver district [Ont.]: *Canada Geol. Surv., Ann. Rept.* **3**, 115-122 (1888).
3. On some peculiarly spotted rocks from Pigeon Point, Minn.: *Am. Jour. Sci.*, Series 3, **35**, 388-393 (1888).
4. Synopsis of Rosenbusch's new scheme for the classification of massive rocks: *Am. Naturalist*, **22**, 207-217, 295-305 (1888).
5. A quartz keratophyre from Pigeon Point and Irving's augite syenites: *Am. Jour. Sci.*, Series 3, **37**, 54-63 (1889).
6. (and King, F. P.) Catalogue of the Maine geological collection with a brief outline history of the two surveys of the State: *Colby Univ. Geol. Dept.*, 32 pp. Waterville, Me. (1890).
7. The origin of the soda-granite and quartz-keratophyre of Pigeon Point [Minn.]: *Am. Jour. Sci.*, Series 3, **39**, 273-280 (1890).
8. Elcolite-syenite of Litchfield, Me., and Hawes' hornblende syenite from Red Hill, N. H.: *Bull. Geol. Soc. Am.*, **3**, 231-252, map (1892).
9. Notes on the petrography and geology of the Akeley Lake region in northeastern Minnesota: *Minn. Geol. Surv., Ann. Rept.* **19**, 193-210 (1892).
10. A fulgurite from Waterville, Maine: *Am. Jour. Sci.*, Series 3, **43**, 327-328 (1892).

11. A fibrous intergrowth of augite and plagioclase, resembling a reaction rim, in a Minnesota gabbro: *Am. Jour. Sci.*, Series 3, **43**, 515–520 (1892).
12. Striated garnet from Buckfield, Maine: *Am. Jour. Sci.*, Series 3, **44**, 79–80 (1892).
13. The eruptive and sedimentary rocks on Pigeon Point, Minn., and their contact phenomena: *U. S. Geol. Surv., Bull.* **109**, 121 pp., maps (1893).
14. The basic massive rocks of the Lake Superior region: *Jour. Geol.*, **1**, 433–456, 587–596, 688–716 (1893); **2**, 814–825 (1894); **3**, 1–20 (1895).
15. Actinolite-magnetite schists from the Mesabi iron range, in northeastern Minnesota: *Am. Jour. Sci.*, Series 3, **46**, 176–180 (1893).
16. The classification and naming of igneous rocks: *Science*, **21**, 87–88 (1893).
17. Spherulitic volcanics at North Haven, Maine: *Bull. Geol. Soc. America*, **6**, 474–476 (1895); abstract, *Science*, n. s., **1**, 65 (1895).
18. The peripheral phases of the great gabbro mass of northeastern Minnesota [abstract]: *Science*, n. s., **1**, 65 (1895).
19. (with Van Hise, C. R.) Preliminary report on the Marquette iron-bearing district of Michigan, with a chapter on the Republic Trough, by H. L. Smyth: *U. S. Geol. Surv., Ann. Rept.* **15**, 477–650, maps (1895).
20. (with Van Hise, C. R.) The Marquette iron-bearing district of Michigan: *U. S. Geol. Surv., Monograph* **28**, 608 pp. with atlas of 13 sheets (1897).
21. Chapter on The Sturgeon River tongue [Mich.]: *U. S. Geol. Surv., Monograph* **36**, 458–487 (1899); *U. S. Geol. Surv., Ann. Rept.* **19**, pt. 3, 146–151 (1899).
22. The geological features of the Menominee iron district of Michigan [abstract]: *Proc. Am. Assoc. Adv. Sci.*, **49**, 189–190 (1900); *Science*, n. s., **12**, 992–993 (1900).
23. (with Van Hise, C. R.) Description of the Menominee quadrangle Michigan: *U. S. Geol. Surv., Geol. Atlas, Menominee folio* **62**, 13, pp., maps (1900).
24. The Menominee iron-bearing district of Michigan: *U. S. Geol. Surv., Monograph* **46**, 513 pp., maps (1904).
25. [Notes on water resources of] Maine: *U. S. Geol. Surv., Water Sup. Paper* **102**, 27–55 (1904).
26. [Underground waters of] Maine: *U. S. Geol. Surv., Water Sup. Paper* **114**, 41–56 (1905).
27. Note on the occurrence of graphite schist in Tuxedo Park, New York: *Econ. Geology*, **3**, 535–536 (1908).
28. The American Association for the Advancement of Science; Section E, Geology and Geography [meeting in Chicago, December 30, 1907]: *Science*, n. s., **27**, 721–733 (1908).
29. (with Darton, N. H.) Description of the Passaic quadrangle, New Jersey-New York: *U. S. Geol. Surv., Geol. Atlas, Folio* **157**, 27 pp (1908).
30. Preliminary account of the geology of the Highlands in New Jersey: *Ill. Univ. Bull.* **6**, No. 17, Univ. Studies 3, No. 2, 5–19 (1909); abstract, *Science*, n. s., **27**, 722–723 (1908).
31. Records of deep wells in southern Maine: *U. S. Geol. Survey, Water Sup. Paper* **223**, 238–257 (1909).
32. Elementary Crystallography, being part one of general mineralogy: xii, 241 pp., New York (1910).
33. Iron mines and mining in New Jersey: *New Jersey Geol. Surv., Final Rept.* **7**, 512 pp., map (1910).
34. A peculiar hematite ore on the tract of the Durham mine, Durham, Pennsylvania: *Econ. Geology*, **7**, 179–184 (1912).
35. (and Salisbury, R. D., and Kimmel, H. B.) Description of the Raritan quadrangle, New Jersey: *U. S. Geol. Surv., Geol. Atlas, Raritan Folio* **191**, 32 pp. incl. maps (1914; abstract, *Jour. Wash. Acad. Sci.*, **4**, 371 (1914)).

36. The pre-Cambrian sedimentary rocks in the highlands of New Jersey: *Internat. Geol. Cong. XII* (1913), *Compt. rend.*, 325-334, includ. maps (1914).
 37. Minerals and Rocks; the elements of mineralogy and lithology for the use of students in general geology: 227 pp. New York (1915).
 38. Descriptive Mineralogy: 542 pp. New York (1917).
 39. (with Grout F. F.) Abstract with discussion of Adirondack anorthosite by William John Miller: *Bull. Geol. Soc. Am.*, **29**, 399-462, map (1918).
 40. Kaolin in North Carolina, with a brief note on hydromica: *Econ. Geology*, **15**, no. 3, 236-246 April-May (1920).
 41. The magnetitic ores of North Carolina—their origin: *Econ. Geology*, **10**, no. 2, 142-152 1 pl., March (1921).
 42. Magnetites of North Carolina; their origin [abstract with discussion by T. L. Watson]: *Bull. Geol. Soc. Am.*, **32**, no. 1, 64-65 March 31 (1921).
 43. A magnetite-marble ore at Lansing, North Carolina: *Jour. Elisha Mitchell Sci. Soc.*, **37**, nos. 3-4, 138-152, 4 pls., March (1922).
 44. (by Ries, Heinrich, and others) High-grade clays of the eastern United States, with notes on some western clays: *U. S. Geol. Survey, Bull.* **708**, 314 pp., 38 figs., 30 pls. (1922).
 45. General features of the brown hematite ores of western North Carolina: *U. S. Geol. Survey, Bull.* **735**, 157-208, 10 figs., 3 pls. incl. map (October 17, 1922).
 46. General features of the magnetite ores of western North Carolina and eastern Tennessee: *U. S. Geol. Survey, Bull.* **735**, 209-270, 6 figs. (December 8, 1922).
 47. The magnetic iron ores of east Tennessee and western North Carolina: *Tennessee, Div. of Geology, Bull.* **29**, 252 pp., 28 figs., 23 pls. (1923).
 48. Studying mines with a microscope: *Trans. Illinois State Acad. Sci.*, **16**, 27-28 (1923).
 49. The occurrence of rutile in the titaniferous magnetites of western North Carolina and eastern Tennessee: *Econ. Geology*, **18**, no. 4, 382-392, 1 pl. (June-July, 1923).
 50. The kaolins of North Carolina: *North Carolina Geol. and Econ. Survey, Bull.* **29**, 132 pp., 14 figs., 2 pls. incl. map (1925).
 51. Deposits of brown iron ores (brown hematite) in western North Carolina: *North Carolina Geol. and Econ. Survey, Bull.* **31**, 76 pp., 11 figs., 9 pls. incl. map (1925).
 52. Contributions of Hopkins to geology: *Johns Hopkins Univ. Studies in Geology*, **8**, 9-24 (1927).
 53. Geology of the Tate quadrangle, Georgia: *Georgia Geol. Survey, Bull.* **43**, 170 pp., 2 figs., 22 pls., 2 maps (1928).
 54. Guide to the Study of Nonmetallic Mineral Products (except building stones). 530 pp. New York, Henry Holt & Co. (1930).
 55. Memorial of Samuel Washington McCallie (1856-1933): *Proc. Geol. Soc. Am.*, 1933, 227-243 (June 1934).
 56. Pre-Cambrian geology and mineral resources of the Delaware Water Gap and Easton quadrangles, New Jersey and Pennsylvania: *U. S. Geol. Survey, Bull.* **920**, v, 98 pp., 5 pls. incl. geol. map, 4 figs. incl. index and geol. sketch maps (1941).
- In addition many book reviews written by W. S. Bayley were published in *Economic Geology*.