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WILLIAM HEALEY DALL

1845—1927

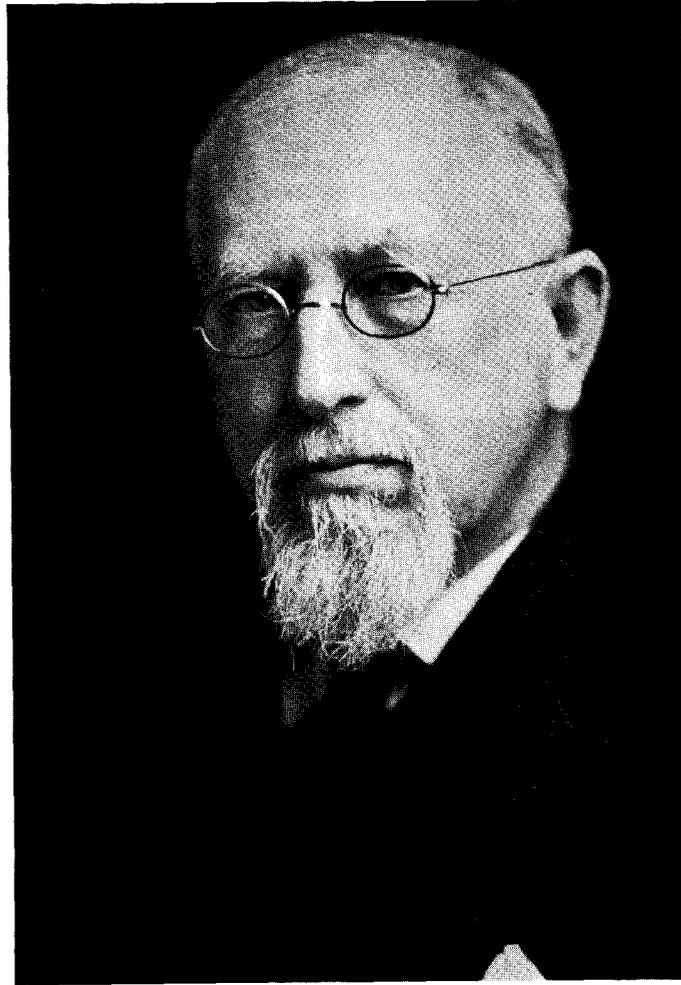
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*A Biographical Memoir by*  
W. P. WOODRING

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*Biographical Memoir*

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# WILLIAM HEALEY DALL

*August 21, 1845—March 27, 1927*

BY W. P. WOODRING

WILLIAM HEALEY DALL was one of those remarkable men who encompassed a wide range of human knowledge. When a hundred of his friends gathered at the Cosmos Club in 1915, for a dinner in honor of his fifty years of service to science, nine speakers paid tribute to him as Alaskan pioneer, anthropologist, coast pilot, malacologist, paleontologist, zoologist, nomenclaturist, poet, and man.

## ANCESTRAL BACKGROUND AND EARLY LIFE

William Dall, the earliest of Dall's paternal forebears in America, accompanied by his wife Eliza Bradford, left Scotland in the early 1740s and established in Baltimore a branch store of Heathcote & Dall, of Edinburgh. Another branch was started in Boston by a scion of the next generation. William Healey Dall (in the fourth generation), the eldest child of the Reverend Charles Henry Appleton Dall and Caroline Wells Healey, was born in Boston, August 21, 1845.

His father was a graduate of Harvard and Harvard Divinity School. After serving missions and churches in St. Louis, Baltimore, Portsmouth, Needham (Mass.), and Toronto, he sailed for India in 1855 as the first Unitarian missionary and teacher in India. There he remained, except for brief furloughs with his family at five-year intervals, until his death in 1886. His health was never robust. Dall described him as having "a mild, patient, lovable temperament, not without a good share of will power and persistence, but I never knew him to lose his temper or to speak harshly of anyone, however he

might have been injured." It is quite evident that Dall was fond of his father, who was interested in natural history and encouraged his son's awakening interest in that field. He introduced young Dall to Louis Agassiz, who invited him to visit the Museum of Comparative Zoology.

Dall's mother was temperamentally at the opposite pole from his father. He wrote of her as "an ardent reformer, antislavery lecturer and transcendentalist." He evidently was fond of her, too, but stood a bit in awe of her, as did practically everybody else. Just before her marriage she was Vice-Principal of Miss English's School for Young Ladies in Georgetown, D. C. Her father, Mark Healey, was a successful Boston merchant and banker. Though he lost, and at least partly regained, a fortune several times, his wealth and influence had an effect on young Dall's career. He aided his promising grandson after the young man had chosen a scientific career instead of a business career.

During his father's long absence in India, Dall lived with his mother and younger sister near or in Boston. His mother supplemented the meager family income by writing, preaching, and lecturing. She was in the midst of the struggle for women's rights and other liberal movements. Dall remembered seeing Susan Anthony, Antoinette Blackwell, Anna Dickinson, William Lloyd Garrison, and Wendell Phillips in their home, and he remembered sitting on John Brown's knee. Mrs. Dall was a founder of the Social Science Association and received an LL.D. from Alfred University in 1877.

Dall attended private schools and entered the English High School in Boston with the class of 1863. In his last year, however, he left high school to take up work in zoology under Louis Agassiz and in anatomy under Jeffries Wyman. In his own words he was "a good scholar in languages, history, geography and other subjects, but very dull in algebra, though enjoying geometry, trigonometry and drawing. Mathematics of any kind was always extremely difficult for me and I collapsed entirely when it came to the binomial theorem." (Do high schools now offer a course in the binomial theorem?) His aptitude for trigonometry soon stood him in good stead.

During a visit to the farm of a friend, while still a schoolboy, he could not resist the temptation to try out a feed chopper in the barn. As a result of his curiosity, he neatly chopped off the greater part of three fingers on his left hand. When the Civil War broke out, he therefore was unacceptable as a volunteer in the army or as a midshipman at the Naval Academy. For a week in 1863, in his last year in high school, he served with a group of volunteers to guard the Watertown Arsenal, which was threatened during draft riots.

His schoolboy interest in natural history led him to browse in the library at home, where he found a copy of A. A. Gould's *A report on the Invertebrata of Massachusetts*, which deals principally with mollusks. Later he realized that that book had launched him on his life's career. He went to Dr. Gould, at the Boston Society of Natural History, with shells he could not identify. Gould sponsored him as a Student Member of the Society and encouraged him in other ways.

After leaving high school at the age of seventeen, he took a position on India Wharf as office boy with a small shipping firm engaged in the West African trade. The crews brought strange-looking shells that fascinated him. He was not very busy and spent part of his time copying books on shells he never expected to be able to buy. At that time his father encouraged him to consider the newly established tea plantations in Assam as a career. Because he would have an opportunity to collect natural history specimens, his training at the Museum of Comparative Zoology was expanded. Dall, however, finally decided against Assam and soon was thankful he had done so, for the ship on which he was to have sailed was destroyed by the Confederate raider "Alabama."

Acting on the advice of a friend of the family who lived in Chicago, in 1863 he moved to that rapidly growing city. Through the influence of his grandfather Healey, who had invested heavily in the Illinois Central Railroad, he was employed as a clerk in the land office of that company. Later he spent a field season in his first geological work: exploration for iron ore in northern Michigan. He doubtless was tempted by an offer, at the then handsome annual

salary of \$2,000 (a salary he did not reach until twenty years later) to prepare a report on a lead mine in Missouri, with the prospect of succeeding to the superintendency. As soon as he arrived in Chicago, however, he began to spend evenings at the museum of the Chicago Academy of Sciences and became acquainted with the Director, Robert Kennicott. On account of his experience in the Hudson Bay region as a collector for the Smithsonian Institution and on the recommendation of Spencer Fullerton Baird, who then was Assistant Secretary of the Smithsonian Institution, Kennicott was chosen as the Director of the Scientific Corps of the Western Union International Telegraph Expedition to explore Alaska (then Russian America) for an overland telegraph route through Alaska and Siberia to Europe. The Atlantic cable had broken and it was thought that no transatlantic cable would be satisfactory. Kennicott offered Dall a position as naturalist and Dall accepted.

#### ALASKAN EXPLORER AND COASTAL SURVEYOR, 1865-84

In preparation for the forthcoming journey, Dall arrived in Washington March 11, 1865, for a brief visit at the Smithsonian Institution. On March 21 he and other members of the scientific corps sailed from New York on the Nicaraguan route to San Francisco, where the expedition was organized and outfitted. The Engineer-in-Chief and leader was Colonel C. S. Buckley, a retired Federal Army officer, who had been in charge of telegraph operations in the South during the Civil War. The expedition was organized on military lines, with uniforms and separate insignia for the different corps. Dall was commissioned a lieutenant in the Scientific Corps. In San Francisco he became acquainted with the group of scientists centered at the California Academy of Sciences, including William More Gabb, paleontologist of the Geological Survey of California, whose biographical memoir Dall eventually wrote. He also did his first collecting of marine animals in a region that was to hold his interest until the end of his life.

The bark "Golden Gate," with Dall as Acting Surgeon (at first

only for the land party, but later for the entire ship's company) and therefore excused from standing muster, sailed from San Francisco July 12, 1865, three months after the end of the Civil War. The ship put in at Sitka, Unga, and St. Michael, and then set out on its chief mission: a line of sounding and bottom-sampling across the shallow water of Bering Sea to Plover Bay in Siberia, for the route of the proposed short cable. Petropavlovska, in Kamchatka, was the last port of call and on November 30 the ship reached San Francisco. Dall made plankton hauls at sea and collected natural history specimens at the ports. Much of his time, however, was devoted to the preparation of charts.

During the second and much longer trip (July 9, 1866 to September 24, 1868), starting on the clipper "Nightingale," Dall wintered two seasons in Alaska: the first near St. Michael, where the temperature dropped to  $-68^{\circ}$  F, and the second between the Yukon and Norton Sound. Shortly after the party arrived at St. Michael, on Norton Sound, news arrived of the death of Kennicott four months earlier at Nulato on the Yukon. At that time, when Dall was twenty-one, Colonel Buckley appointed him to succeed Kennicott as Chief of the Scientific Corps and as Surgeon for the district between the Yukon and Bering Sea. Dall explored the region from Norton Sound and Norton Bay to the Yukon, and in the spring of 1867, accompanied by one companion, ascended the Yukon to Fort Yukon—the first American to reach that post from the sea. When he returned to St. Michael in July, 1867, he was greeted with the news that a second Atlantic cable was operating successfully and that the Alaskan-Siberian enterprise was abandoned. There also were rumors that the United States was negotiating with Russia for the purchase of Alaska. Dall requested and was granted permission to remain at his own expense to complete the work Kennicott had laid out for him: exploration of the lower Yukon and its delta. In February, 1868, at Nulato he learned that the treaty transferring sovereignty of Alaska had been signed almost a year earlier. He stayed on until August 9, when he embarked for San Francisco.

The trip back to New York and Boston was made by the Panama route. Washington was reached near the end of the year, December 2, 1868. With other young scientists Dall lived in one of the towers of the Smithsonian building and worked on his collections. The Smithsonian and the Boston Society of Natural History made small grants to support him during this work. A Boston publishing house also advanced \$400 for a book on Alaska. He received no more, for the firm went into bankruptcy after publication early in 1870 of *Alaska and Its Resources*. In that historically important book, which went through several editions, Dall described his observations and experiences during the 1866-68 trip and added what was known about the country. The map in the book was reissued on a larger scale the same year (but bears the date 1869) by the Coast Survey as No. 20 of its series.

Though his early work in Alaska resulted in contributions in archeology, ethnology, geology, paleontology, meteorology, hydrology, botany, and zoology, Dall's chief interest was in zoology, especially marine zoology and more specifically in mollusks and brachiopods. After Alaska became American territory, charting of the coastal waters fell within the jurisdiction of the Coast Survey (later Coast and Geodetic Survey). Capitalizing on his experience in Alaskan waters and seizing the opportunity to expand his Alaskan collections, Dall, through the influence of Baird, secured an appointment on the Coast Survey as Acting Assistant July 1, 1871. On July 13, shortly before his twenty-sixth birthday, he left for San Francisco to command as Chief of Party the schooner "Humboldt" on a surveying cruise along the Alaskan coast. At that time his grandfather Healey bought him an expensive English microscope, at a cost three and a fifth times Dall's monthly salary.

During the period 1871-80, Dall commanded four cruises, as far west as the western end of the long arc of the Aleutian Islands and almost as far north as Point Barrow. Between the third and fourth cruises he was in Washington, again living in a Smithsonian tower, to work on Coast Survey reports and, on his own time, to continue

work on his zoological collections. Before leaving on the last cruise, he married Annette Whitney, a niece of Oscar Whitney, at whose house he took his meals. The young couple traveled together to San Francisco and on a commercial steamer to Sitka, where Dall took command of his Coast Survey ship and Mrs. Dall started back. At the end of 1880 they established a home in Washington.

A permanent appointment as Assistant on the Coast Survey went into effect January 12, 1881. The Coast Survey was an effective medium for obtaining zoological collections incidental to surveying and charting, but could not support work on the collections. Dall spent weekends, and whatever other time he could squeeze in, at the Smithsonian Institution studying his material. The Smithsonian had no funds to appoint a Curator of the national collection of mollusks and he gradually grew into an Honorary Curatorship. In the 1874 Smithsonian Annual Report—the first report in which collaborators are mentioned—he is listed as a Collaborator in Malacology. The designation as Honorary Curator first appeared in the 1881 Annual Report and he was so designated until his death. Except during his absence on the Coast Survey cruises, he was Curator in fact, if not in name, from 1869 until the appointment of Paul Bartsch as Curator in 1914, and much of the time he signed his name as Curator. In 1914 he was relieved of much paper work, but continued curatorial duties on some of the collections and continued to identify collections for many correspondents, principally on the Pacific coast.

On September 19, 1884, Dall resigned from the Coast Survey and the next day took the oath of office as Paleontologist in the U. S. Geological Survey. The Director of the Geological Survey at that time was John Wesley Powell.

#### MALACOLOGIST AND PALEONTOLOGIST, 1884-1927

Though Dall was a malacologist before he left the Coast Survey, his appointment on the Geological Survey for the first time gave him an opportunity to give full time to malacology and Cenozoic paleontology. The two careers went hand in hand. It is not generally

known, even by many of those familiar with his work, that during the years from 1884 until his retirement in 1925 he was on the staff of the Geological Survey. It is a tribute to the far-sighted policy of the Directors and Chief Geologists, under whom he served, that he was permitted to do so much work on Recent mollusks and brachiopods and thereby increase his usefulness and stature as a Cenozoic paleontologist. For many years he had the services of two exceptional Geological Survey assistants: Dr. J. C. McConnell (who held a medical degree) as illustrator and Frank Burns as collector. McConnell's pen and ink drawings have perhaps not been equaled and Burns was an extraordinarily good collector.

Early in his career as a paleontologist, Dall's attention was directed by Joseph Willcox, of Philadelphia, to the rich fossil fields of Florida that had been partly explored at an earlier date by Professor Angelo Heilprin, also of Philadelphia. The association with Willcox, who was Secretary of the Board of Trustees of the Wagner Free Institute of Science of Philadelphia, led to the appointment of Dall as Honorary Professor of Invertebrate Paleontology in that institution and to the publication, as volume 3 of its *Transactions*, of *Contributions to the Tertiary Fauna of Florida*, his most important paleontologic publication. It eventually ran to 1,654 quarto pages and 60 plates, issued in six parts from 1890 to 1903. At the beginning it was modest enough, as indicated by the subtitle, "With Especial Reference to the Miocene Silex-Beds of Tampa and the Pliocene Beds of the Caloosahatchie River." When Part 4 was issued in 1898, an addition to the subtitle showed its enlarged scope: "Including in Many Cases a Complete Revision of the Generic Groups Treated of and Their American Tertiary Species." By that time Dall had reached the pelecypods and ranged far afield, covering the Cenozoic of the southeastern and eastern states, the Caribbean region, and in part the Pacific coast. Synopses of several large families and superfamilies and some minor families, including treatment of the American Cenozoic and Recent species, were issued as separate publications before the description of the fossil species in the Wagner Institute monograph.

As a result of the great expansion of his work on the pelecypods (or lamellibranchs), Dall was obliged to study the suprageneric categories from family to order rank and proposed a new classification, outlined in 1889 and fully published in 1895, in Part 3 of the Wagner Institute publication. As a malacologist he considered the taxonomic value of the gills, suggested by Lankester in 1884 as a feature of high taxonomic importance, but rejected them on the grounds of what he thought were inconsistencies. His experience as a paleontologist led him to rely on shell features, principally the hinge, for his three orders: Prionodesmacea, Anomalodesmacea, and Teleodesmacea. He placed the Anomalodesmacea between the other two, presumably because some of the families in that order have a nacreous shell, which he considered to be a primitive feature, although the order includes the septibranchs, anatomically the most profoundly modified pelecypods. Dall's classification quite justly commanded respect. For many years it was used by American and other non-European malacologists and paleontologists, generally without consideration of its merits and defects. It stands in marked contrast to the anatomical classification proposed at the same time (1889, and modified in 1906) by the great anatomist Pelseneer.

To several generations of American beginners in paleontology Dall was best known for his classification of the pelecypods. He wrote the chapter on that class in Eastman's *Text-book of Paleontology*, based on Zittel's *Grundzüge der Paleontologie* (first edition, 1900; second edition, 1913).

It is significant that when Part 4 of the Wagner Institute monograph was published, the part of the original subtitle referring to the fossiliferous strata at Tampa, Florida (now the Tampa limestone), was changed from "Miocene Silex-Beds of Tampa" to "Silex Beds of Tampa." By that time Dall was convinced the strata at Tampa are of Oligocene age. Moreover, he went much further and assigned to the Oligocene the then-known Miocene of the Caribbean region and fossiliferous strata in Florida, now considered of late early Miocene and middle Miocene age. He stuck to his decision despite European criticism.

Dall continued to work and publish on molluscan Cenozoic paleontology until the end of his career. Field trips in the southeastern states and Oregon were interspersed with laboratory work. The work in Oregon, much of which was integrated with J. S. Diller's field projects, resulted in publication of Professional Paper 59 of the Geological Survey's series, on the Miocene of Astoria and Coos Bay (1909), which is more comprehensive than indicated by the title. One of his last paleontologic papers was on an interesting Pliocene fresh-water fauna from Idaho that includes genera found in the Neogene deposits of southeastern Europe.

In the meantime he produced a steady stream of malacological publications. He was entrusted with the deep-water mollusks and brachiopods dredged during the 1877-80 cruises of the Coast Survey ship "Blake" in the Gulf of Mexico and the Caribbean Sea. Preliminary reports were issued in 1880 and 1881, while he was still on the Coast Survey, and the final reports in 1886 and 1889. The report on the deep-water mollusks and brachiopods dredged by the Fish Commission ship "Albatross" in the eastern Pacific Ocean in 1904-05, published in 1908, closely matches the "Blake" reports. In collaboration with C. T. Simpson, Dall described the marine mollusks of Puerto Rico in 1901. Throughout his career Dall was especially interested in the mollusks of the eastern Pacific Ocean from Alaska to Peru, most of all from Alaska to southern California. Until a few years ago his *Summary of the Marine Shellbearing Mollusks of the Northwest Coast of America from San Diego, California, to the Polar Sea* (1921) was the source book for malacologists on the Pacific coast. Unfortunately a considerable number of his species from that region still are unillustrated and malacologists on the Pacific coast are unable to identify them unless they have an opportunity to examine the types.

For many years Dall also was interested in Recent brachiopods. His chief publications in that field are listed at the end of this memoir.

With his own funds Dall purchased in 1875 a card file prepared by Gérard Paul Deshayes. It covers with reasonable completeness eight-

eenth- and (with his own additions) nineteenth-century molluscan literature and runs to about 150,000 cards. He gradually built up, also by purchase with his own funds and by exchange of his publications, an extensive library, which at the time of his death was one of the three best libraries on mollusks in America, and he kept it in immaculate order. In 1902 it was turned over to the Division of Mollusks of the U. S. National Museum, but it remained in his office. On account of his early interest in Alaska he also acquired a library of Alaskana, which is rich in early publications and includes numerous scrapbooks filled with newspaper and other clippings.

In 1883 he raised funds to purchase the collection of some 25,000 specimens of eastern Atlantic and Mediterranean mollusks assembled by John Gwyn Jeffreys, including the specimens illustrated in Jeffreys' *British Conchology*. That collection is the nucleus of the present eastern Atlantic collection in the National Museum's Division of Mollusks.

He also was a superb curator. When the Division of Mollusks for the first time had adequate quarters, on completion in 1911 of the New National Museum Building (now Smithsonian's Natural History Building), the collections were housed in cases, drawers, and "half-unit" trays he had designed. He also designed the system of fitted cardboard trays, vials, and printed labels of standard size and quality still in effective use. The eastern Pacific, western Atlantic, and Japanese collections, all of which were under his personal care, were kept in first-class order.

#### ACHIEVEMENTS AND HONORS

Dall was one of the leading malacologists and paleontologists of his day and in the field of Cenozoic molluscan paleontology no American paleontologist has approached his stature. His work touched every aspect of malacology: marine, fresh-water, and land mollusks. Though he dealt chiefly with marine mollusks, his 1896 essay on insular land-shell faunas was a pioneer venture in a fascinating field. His reports on the "Blake" and "Albatross" mollusks

still are the most exhaustive on the deep-water mollusks of the western Atlantic and eastern Pacific Oceans. He made the mollusks of Alaskan waters, with their great array of neptuneid and buccinid gastropods, practically his own province. Almost half (47 percent) of the some 2,000 species and subspecies of mollusks from Alaska to southern California known in 1921 bear his name, or his name as senior author. His reports on Recent brachiopods are the only extensive American publications on the Recent species of that phylum and he assembled the best American collection.

The monumental *Contributions to the Tertiary Fauna of Florida* is the most important American publication on Cenozoic molluscan paleontology and an indispensable starting point for any work on American Cenozoic molluscan faunas. One of the achievements in that publication was the describing or recording of 639 species from the Caloosahatchie marl of Florida, the largest and most distinctive Pliocene marine fauna in the Americas. Since then the number of species in that extraordinary fauna has been increased to about 800.

In his lifetime Dall described, or was senior author in the description of, 354 genera and subgenera and 3,959 species and subspecies, as shown in the following tabulation:

	<i>Genera and Subgenera</i>	<i>Species and Subspecies</i>
Mollusks		
Recent	240	2,387
Fossil	96	1,505
Brachiopods		
Recent	18	58
Fossil	...	7
Other, fossil	...	2
	—	—
Total	354	3,959

How could one man do so much? Dall was able to do it through the great clarity of his mind, his innate orderliness, and steady work. He instinctively—or so it seemed—organized his work in the most effective way.

He was awarded three honorary degrees: A.M., Wesleyan University; Sc.D., University of Pennsylvania; LL.D., George Washington University; and was the recipient of the Gold Medal of the Wagner Free Institute of Science. In addition to the Honorary Professorship at the Wagner Institute and the Honorary Curatorship at the U. S. National Museum, he was Honorary Curator of Mollusks of the Bernice P. Bishop Museum from 1899 to 1915. He was a member of the National Academy of Sciences, the American Philosophical Society, and the American Academy of Arts and Sciences, and also of numerous other American and foreign societies and academies. Though he was not a member of an American geological society, on account of his achievements in paleontology he was a Foreign Correspondent of the Geological Society of London. Twice he was a vice-president of the American Association for the Advancement of Science, for the Sections of Biology and Anthropology. He was a founder of the Philosophical Society of Washington and the Biological Society of Washington and served both societies as president.

Dall's fruitful life came to a close March 27, 1927. Mrs. Dall died November 10, 1943. Three children survived their parents: Charles Whitney Dall, Marcus Healey Dall, and Marian Dall.

#### PERSONAL RECOLLECTIONS

Brief biographies of Dall have been written by some of his contemporaries, but nearly all his contemporaries are now dead and it is too late for more extended accounts of Dall as a man.

During the last eight years of his life, it was my good fortune to work across the hall from him, but to a novice he was a fabulous tradition rather than a man. Nevertheless, he was readily accessible, no matter how absorbing the work on which he was engaged, and I took full advantage of his great store of knowledge. He was not easy on his preparator and clerk, as he expected from them the same orderliness that came naturally to him. He arrived promptly at his office, always carried his lunch, and left promptly. The summer

months, when Washington is not exactly a summer resort, were spent in New Hampshire, where he was engaged in writing manuscripts and other tasks. He never was hurried or harassed. I saw him really angry only once, but then I was thankful I was not involved in the source of his irritation. He was almost always writing and smoking a long-stemmed German pipe.

## ACKNOWLEDGMENTS

Dall left an immense store of memorabilia which could not be digested for this biographical memoir but could be utilized for a full-scale biography. I have done no more than skim a few of thirty-six journals, extending from January 1, 1865 to February 12, 1927, principally for the purpose of verifying dates and movements. The journals covering the early Alaskan explorations are important historical documents. Those dealing with the second Western Union trip include charming sketches, some of which were redrawn by an artist for *Alaska and Its Resources*. Letterpress copies of his letters, written between August 17, 1885 and February 10, 1927, are bound in fifty-eight letterbooks. Sampling indicates there are 11,000 letters. Log books contain entries on the receipt and disposition of collections from October 7, 1893 to January 23, 1925. All this material is in long-hand. H. A. Rehder, Curator of the Division of Mollusks in the U. S. National Museum, who is familiar with these documents in the files of the division and with Dall's work, has been very helpful. He also supplied the photograph accompanying this memoir.

I have drawn heavily on Dall's brief memorandum to the Academy's Committee on Biographical Memoirs, dated August 31, 1917; on a typed copy of a much longer "Memorandum for my grandchildren," written in September, 1926; and on a "Historical sketch of the Division of Mollusks, U. S. National Museum," prepared by Dall in 1906.

Barbara A. Bedette counted the genera and species Dall described, principally from cards that he made out or that were typed under his supervision. She also computed the percentage of Dall's species in

the eastern Pacific molluscan fauna from Alaska to southern California, and estimated the number of letters. My wife, Josephine J. Woodring, helped in scanning journals. Most of all I am indebted to the bibliography published by Paul Bartsch, H. A. Rehder, and Miss B. E. Shields, without which the sorting out of the principal contributions would have been a formidable task.

## KEY TO ABBREVIATIONS

- Acad. Nat. Sci. Phila. Proc.=Academy of Natural Sciences of Philadelphia, Proceedings  
 Am. Jour. Conch.=American Journal of Conchology  
 Am. Jour. Sci.=American Journal of Science  
 Ann. Lyc. Nat. Hist.=Annals of the Lyceum of Natural History  
 Biol. Soc. Washington Proc.=Biological Society of Washington, Proceedings  
 Bur. Ethnology Ann. Rept.=Smithsonian Institution, Bureau of American Ethnology, Annual Report  
 Calif. Acad. Sci. Proc.=California Academy of Sciences, Proceedings  
 Contr. North Am. Ethnology=Smithsonian Institution, Contributions to North American Ethnology  
 Mus. Comp. Zool. Bull.=Museum of Comparative Zoology, Bulletin  
 Nat. Acad. Sci. Biog. Mem.=National Academy of Sciences, Biographical Memoirs  
 Smithsonian Contr. Knowledge=Smithsonian Contributions to Knowledge  
 Smithsonian Misc. Coll.=Smithsonian Miscellaneous Collections  
 U. S. Coast Geod. Survey=United States Coast and Geodetic Survey  
 U. S. Fish Comm. Bull.=United States Fish Commission, Bulletin  
 U. S. Geol. Survey Ann. Rept.=United States Geological Survey, Annual Report  
 U. S. Geol. Survey Bull.=United States Geological Survey, Bulletin  
 U. S. Geol. Survey Prof. Paper=United States Geological Survey, Professional Paper  
 U. S. Nat. Mus. Bull.=United States National Museum, Bulletin  
 U. S. Nat. Mus. Proc.=United States National Museum, Proceedings  
 Wagner Free Inst. Sci. Phila. Trans.=Wagner Free Institute of Science of Philadelphia, Transactions

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Dall was a prodigious writer. A complete bibliography was published in *A Bibliography and Short Biographical Sketch of William Healey Dall*, by Paul Bartsch, H. A. Rehder, and B. E. Shields (Smithsonian Misc. Coll., vol. 104, no. 15, 96 pp., 1946). This bibliography lists a little more than 1,600 items, comprising everything that was printed, including poems, other literary compositions, and letters to the editors of newspapers. Almost half of the items may be classified as scientific papers. Only the principal contributions to science are included in the following selected bibliography. They represent a wide range of subjects. Cenozoic and Recent mollusks, Recent brachiopods, Recent cetaceans, geology, ethnology, archeology, meteorology, hydrology, and biographies.

1869

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