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THOMAS WAYLAND VAUGHAN

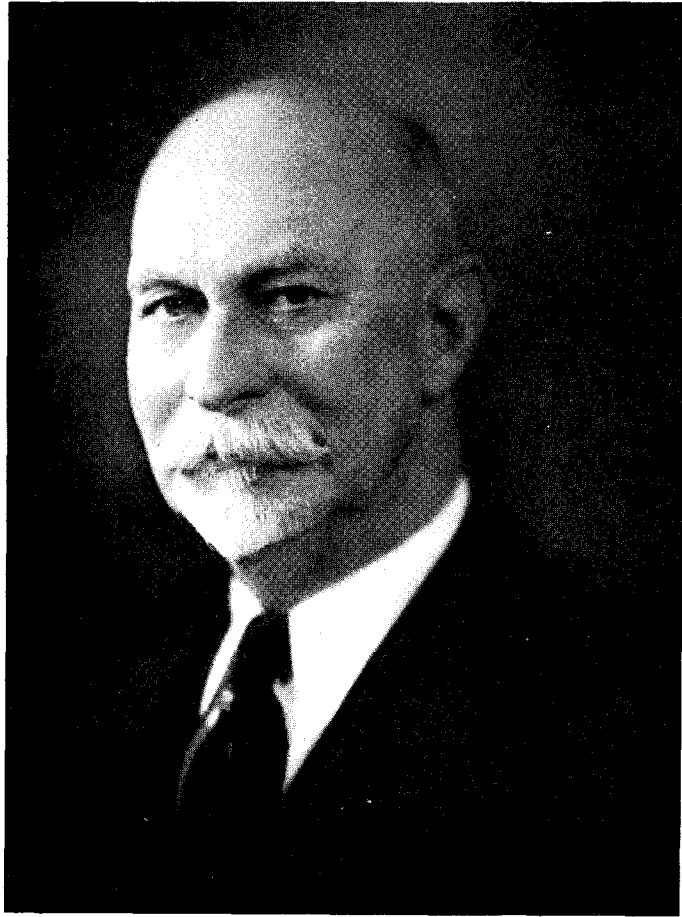
1870—1952

A Biographical Memoir by
THOMAS G. THOMPSON

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Biographical Memoir

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Rowland Vaughan

THOMAS WAYLAND VAUGHAN

September 20, 1870—January 16, 1952

BY THOMAS G. THOMPSON

A LONG AND DISTINGUISHED lifetime of devotion to science was brought to a close on January 16, 1952, by the passing of the eminent geologist and oceanographer, Thomas Wayland Vaughan.

Born in Jonesville, Texas, on September 20, 1870, Thomas Wayland was one of five children in the Vaughan family. His mother, born Annie R. Hope, was reared and educated in the traditions of the old South. His father was Dr. Samuel Floyd Vaughan, a country physician who, in the course of time, became a land owner of some magnitude. Dr. Samuel Vaughan was an ardent scholar and during his lifetime he assembled one of the finest libraries in his locality. He served as first president of the Harrison County Medical Society and was a member of the Texas Medical Association; the Tri-State Medical Society of Texas, Louisiana, and Arkansas; the American Medical Society, and the Texas Historical Society.

From earliest colonial times until the end of the Civil War, the family belonged to the land- and slave-owning class of southerners, and many of Thomas Wayland Vaughan's forebears were prominent in government or military affairs. Among his ancestors were Thomas Loving (1610-1665), surveyor general of Virginia and a member of the House of Burgesses for James City; John Nevil (1612-1664), who came from England in the "Ark and Dove" in 1634, and who settled in Maryland to become a member of the Council and the Assembly; and Sir Thomas Lunsford (1610-1653),

who came to Virginia in 1649. Vaughan's grandfather was a colonel in the Missouri State Militia, and had the distinction of serving twice in the Missouri State Legislature and later, after the Civil War, was twice a member of the Louisiana State Legislature.

Young Vaughan grew up in a home well supplied with excellent books, and he was given the utmost encouragement to read and study. His formal childhood education was in the local public schools in Texas and by private tutor. When he entered Tulane University as a freshman in 1885, Vaughan intended to prepare for the medical profession, but he became interested in the development of the knowledge of electricity and its practical applications and, as a consequence, he graduated in what Tulane at that time called "The Physical Science Course." In his later years Dr. Vaughan was an advocate of the principle of broad undergraduate curricula in preparation for later specialized studies. Illustrative of his own interest in philosophy and literature, as well as in the physical sciences, is the fact that although he received a Bachelor of Science degree in the physical science course, he wrote and read a paper on Oliver Goldsmith at the commencement exercises.

From September, 1889, until June, 1892, Vaughan was an instructor in physics and chemistry at Mount Lebanon, Louisiana, at an institution which would be comparable to a junior college of today. As an undergraduate he had become fascinated by the problems of evolution and the history of the earth, and before he was eighteen he experienced the thrill of making his first discovery of fossils—near his father's home in Texas. While Vaughan was at Mount Lebanon he studied the local flora and fauna, and in 1893 he published his first papers—on the land and fresh-water Mollusca and the trees of northwest Louisiana. It was during his stay at Mount Lebanon that he made his first extensive collection of fossils—the presence of mollusks and corals in a middle Eocene deposit stimulated Vaughan's thinking about the problems of organisms and environment and more particularly about the conditions under which marine organisms and sediments were deposited. In the summer of

1892, he served as an assistant to Dr. Otto Lerch, the State Geologist of Louisiana.

In 1892 Thomas Wayland Vaughan knew without hesitation that he wanted to be a paleontologist. He had taken a course in botany at Harvard in the summer of 1890, and in the autumn of 1892 he returned to Harvard. Feeling that he was weak in biology, he took all the lower division courses in biology, all the courses in paleontology, and several courses in geology. Harvard granted him a Bachelor of Arts degree in 1893 and a Master of Arts degree in 1894. He was registered as a nonresident student at Harvard for several years and in 1903 he received the degree of Doctor of Philosophy, his thesis being a comprehensive account of the Cenozoic corals of the United States, *Eocene and Oligocene Corals of the United States*.

In the years from 1894 to 1903, prior to receiving his doctorate, Wayland Vaughan served the U. S. Geological Survey as assistant geologist. In 1897 he was a delegate to the International Geological Congress in Russia, and was able to devote much time to the study of the collections of corals in European museums. It was during this time in Europe that he studied paleontology under Dr. Ritter J. A. van Zittel, and on this trip he made many lifelong friends, including Sir John Murray, who was of great influence in Vaughan's oceanographic work.

Between 1901 and 1923 Vaughan took part in geological investigations in two large areas, and published more than 100 papers as a result of his findings.

The first of these areas included the West Indies and the Panama Canal Zone. In 1901 Vaughan was a member of a party, under the direction of Dr. C. Willard Hayes, which made a geological reconnaissance of Cuba for the Military Governor, Major General Leonard Wood. Vaughan spent some time during 1911 in the Panama Canal Zone on behalf of the U. S. Geological Survey and the Smithsonian Institution; this work was done partly in cooperation with the Panama Canal Commission. Under the auspices of the Carnegie Institution of Washington in 1914, Vaughan made an expedition to

those West Indian islands that lie north of Guadalupe and west of Puerto Rico. From 1919 to 1921 he directed reconnaissance geological surveys of both the Dominican and the Haitian Republics. Most of the expense of these surveys was borne by the governments of the two republics concerned, but the work was done by the U. S. Geological Survey. In 1919, Vaughan made additional geological studies of the Virgin Islands and eastern Puerto Rico for the United States Navy.

The second of these areas included the Atlantic and the Gulf Coast Plains from Cape Cod to the Mexican Border. Investigations were made by the U. S. Geological Survey in cooperation with a number of the State Geological Surveys, with Vaughan in charge of the work from 1907 until 1923. From 1908 to 1915, under the auspices of the Department of Marine Biology of the Carnegie Institution of Washington, Vaughan investigated the corals, coral reefs, and associated phenomena in Florida and the Bahamas, and for a number of years he held the record for having published more papers on corals than any other person.

The work of Wayland Vaughan on corals and coral reefs will be long remembered; he gathered and published much information about existing and fossil reefs, and he was fully aware of the dangers of generalizing on the theory of reef origins. To him, each reef structure was to be studied as a separate entity. Although he contributed no revolutionary ideas on reef origin, his definitive work has been helpful to all students of coral reefs. No one realized more than Vaughan the difficulty in classifying corals, and he once told a student, "If you continue studying corals, you will either become famous or lose your mind!" Vaughan became the unquestioned authority on the Mesozoic, Cenozoic, and Recent corals of the United States, eastern Mexico, the West Indies, and Panama. His contribution in 1907, *The Recent Madreporaria of the Hawaiian Islands and Laysan*, is still the only comprehensive study of the corals of this archipelago, and his 1918 monograph on the Indo-Pacific reef corals is the next landmark after Dana's pioneer work in 1846.

At a comparatively late date, at the age of fifty-four, Dr. Vaughan turned to another major field of endeavor—the study of the Larger Foraminifera. Aware of the difficulties in this field of study, he was modestly conscious of the importance of his own work and that of his students. Some of his friends affectionately recall his comment to the GSA editors, “There’s no need to send my manuscripts on Larger Foraminifera to anyone except Storrs Cole; likewise, it’s no use to send Cole’s manuscripts to anyone except me—no one else would understand them!” Dr. Vaughan not only brilliantly laid the foundation for modern research on the Larger Foraminifera, but also stimulated and trained others to carry on the work.

The third major contribution made to science by this talented worker was in the field of oceanography. Beginning with his studies on the ecology of marine organisms when he was still in his teens, and continuing under the influence of Sir John Murray, Vaughan’s interest spread to marine sediments and sedimentary processes and finally to physical and chemical oceanography. He culminated his work in oceanography by serving for twelve years as Director of the Scripps Institution of Oceanography at La Jolla, California, developing the Institution to its present position as an outstanding center of oceanographic research and graduate study. Much of his oceanographic work is intimately connected with his activities with four major committees, on which he served for a considerable period of time.

The first of these committees was the Committee on Sedimentation, formed in 1919 with the assistance of several geological colleagues and organized under the Division of Geology and Geography of the National Research Council. He was chairman of this committee until 1923, when he was succeeded by Professor W. H. Twenhofel of the University of Wisconsin. As a result of the efforts of this committee, not only was a great deal of research on both ancient and modern sediments stimulated, but now courses in sedimentation are given in most of the principal universities of the country. Major contributions of this committee included the preparation of a large

volume entitled *Treatise on Sedimentation* by Professor Twenhofel, and a color chart for the description of sediments prepared by M. I. Goldman and others.

Another committee organized under the Division of Geology and Geography of the National Research Council was the Committee on Sound Sounding and Oceanographic Thermographs. Organized in 1922 and changed in 1926 to the Committee on Submarine Configuration and Oceanic Circulation, this committee was disbanded in 1932, but throughout its entire life Vaughan served as its chairman. The reports of this committee became comprehensive accounts of current oceanographic activities throughout the world.

At the third Pan-Pacific Congress, held in Tokyo in 1926, the International Committee on the Oceanography of the Pacific was formed with Dr. Vaughan as its chairman. This committee not only enormously stimulated oceanographic research in the Pacific, but it became a medium whereby the different oceanographic organizations of the Pacific Basin could coordinate their efforts. The record of accomplishments of this committee, between the time of the Pacific Science Congress held in Java in 1929 and that held in Vancouver and Victoria in 1933, has been cited as an example of the usefulness of the Pacific Science Association. Vaughan served as chairman of this committee for ten years.

The fourth committee to which Vaughan gave much of his attention was the Committee on Oceanography in the National Academy of Sciences. This committee was appointed by the President of the Academy in 1927. It originally consisted of Frank R. Lillie as Chairman; William Bowie; E. G. Conklin; B. M. Duggar; J. C. Merriam; and T. W. Vaughan. It was largely through the efforts of this committee that much of the oceanographic work done in the past quarter of a century in the United States was stimulated or brought into being. The Woods Hole Oceanographic Institution and the Oceanographic Laboratories at the University of Washington came into existence as a result of the efforts of this committee, and the Scripps Institution of Oceanography at La Jolla was greatly helped by its

activities and recommendations. In 1932 Vaughan was commissioned by this committee to make a tour of the oceanographic institutions around the world in order to prepare a report on the international aspects of oceanography, the purpose of the journey being to supplement information which he had already prepared. Vaughan's report, *The International Aspects of Oceanography*, appeared in book form in 1937 and stressed the importance of international cooperation in oceanographic research. It provided a complete census of existing oceanographic institutions, both those of international character and those of national scope.

In addition, Dr. Vaughan organized in 1940 a subcommittee of the ecology of marine organisms as a part of the Committee on Geological Research of the National Academy of Sciences. Later this became the Committee on Marine Ecology as Related to Paleontology, and one of its major aims was to prepare a treatise on ecology, with emphasis on geological interpretation. Because of his failing eyesight, Dr. Vaughan resigned from the Committee a few months before his death. The Committee published, in two volumes, a *Treatise on Marine Ecology and Paleontology*, as part of the memoir series of the Geological Society of America. Volume 2, *Paleoecology*, was distributed in March, 1957, and Volume 1 later the same year. That the Committee recognized the importance of Vaughan's work is indicated by the dedication of both volumes of the *Treatise* to Dr. Vaughan.

About 1922, prior to the retirement of Dr. W. E. Ritter, who was then director of the Scripps Institution for Biological Research, the administrative officers of the University of California decided to convert the Scripps Institution from biological research to oceanographic research. Vaughan was offered the directorship of the Institution in the spring of 1923, and he accepted and assumed office as Director of the Institution on February 1, 1924. Shortly thereafter the name of the Institution was changed to the Scripps Institution of Oceanography and, largely through the efforts of Vaughan, Scripps has become one of the outstanding oceanographic organizations in

the world. Vaughan instituted a program in dynamic and physical oceanography which has been considerably expanded through the years, and he also initiated programs in various aspects of chemical and geological oceanography. The program in biology was continued and augmented. During Vaughan's directorship at Scripps, not only was the oceanographic research expanded, but many additions were made to the physical plant of the Institution.

Dr. Vaughan was a delegate from the United States to the first six Pan-Pacific Science Congresses: Honolulu, 1920; Melbourne and Sydney, Australia, 1923; Japan, 1926; Java, 1929; Vancouver and Victoria, 1933; and San Francisco, 1936. Among his active associations were: Delta Tau Delta; National Academy of Sciences; Sigma Xi; American Academy of Arts and Sciences (fellow); American Philosophical Society; American Association for Advancement of Sciences (president, Pacific division 1930-31); Geological Society of America (president, Cordilleran section, 1923, president, 1939); Association of American Geographers; Paleontological Society (president, 1923); American Meteorological Society (fellow); California Academy of Sciences; San Diego Natural History Society (president, 1925); Seismological Society of America; American Geophysical Union (chairman, Section on oceanography, 1926-28); Geological Society of Washington (president, 1915); Ecological Society; Society for Experimental Biology and Medicine; Academy of Natural Sciences of Philadelphia; Italian Royal Geographical Society; Royal Science Society in the Netherlands Indies; Zoological Society of London; Linnean Society (foreign member); Geological Society of London.

During the course of his busy and productive career, Wayland Vaughan found satisfaction in pursuing at least three avocations—the study of comparative religions, of old Teutonic legends, and of oriental art. He became so fond of Japanese customs and art that in his sixties he mastered the Japanese language and was in much demand as a lecturer on oriental art. In 1933, Emperor Hirohito honored him in private audience and presented him with a beautiful

cloisonné vase as a token of the love and esteem for Dr. Vaughan in the hearts of Japanese scientists.

In 1936, at the time of his automatic retirement as Director of the Scripps Institution at the age of sixty-five, Dr. Vaughan chose to resume his paleontological studies at the U. S. National Museum in Washington. Here he pursued his systematic research on the Larger Foraminifera and other studies.

After a severe attack of pneumonia in 1947, the eyesight of this outstanding scientist became permanently impaired. The partial blindness ended his own scientific work, but he retained a keen interest in the scientific work of others, and in the workers themselves. During this difficult time of adjusting to a life in which he was unable to read or study, Dr. Vaughan arranged to listen for two or more hours each day to friends and students who read to him the scientific literature which he himself had done so much to enrich. He had a phenomenal memory and thus was able to keep in touch with his special fields of interest.

Dr. Vaughan was a man of average stature, about five feet nine inches in height, and weighed about 160 pounds. In his younger days his hair was dark, but before he was thirty he was bald. His keen eyes were gray-blue, and he affected a beard, reddish-brown in his younger days, but white as he became older. He was characterized by a certain brusqueness of manner which never concealed his innate good humor and sociable nature. Vaughan was strong-willed, but he was always open to evidence suggesting that his often strong opinions might be changed. A meticulous worker himself, he set great store on accuracy in all things. He was known for his ruthless criticism of manuscripts and never hesitated to express himself forcefully. Many of his fellow workers will remember the apprehension with which they awaited his comments on a manuscript—many papers had to be completely rewritten to meet his exacting standards, and great was an author's pleasure when a paper received Dr. Vaughan's approval.

A famous host, Wayland Vaughan thoroughly enjoyed social

occasions and the company of his friends. Even after his partial blindness, he attended special affairs at the Cosmos Club and the National Academy of Sciences.

Mrs. Vaughan, nee Dorothy Quincy Upham, shared her husband's rich and active life from the time of their marriage in 1909 to her sudden death in 1949. Their daughter, Caroline Ely, became Mrs. James H. Fortune, Jr.

Wayland Vaughan was a prodigious worker, and his talents were such that he was able to publish nearly four hundred titles, many of outstanding importance. This he did while carrying on his administrative work with distinction, and while his versatile mind found interest in his avocations and in community and international affairs. He was the organizing secretary of the National Society of Fine Arts in Washington, D. C., and he was a founder and charter member of the American Federation of Arts.

Such a man rightfully received many honors, among them the Agassiz Medal for oceanography, and the Mary Clark Thompson medal for geology and paleontology, both awarded by the National Academy of Sciences; and the Penrose Medal of the Geological Society of America. The Japanese Government awarded him the Order of the Rising Sun, Third Class. The Universities of California and British Columbia honored him by conferring LL. D. degrees, and Tulane University awarded an honorary D. Sc. to its distinguished alumnus in 1944. A final honor in the closing year of his life was a symbol of the impact of his life on the development of modern oceanography—with impressive ceremonies, the Scripps Institution dedicated its newest and finest building to Thomas Wayland Vaughan.

Vaughan's long life of accomplishment is an example of the dedication of a brilliant and versatile mind to science in its broadest aspect. In oceanography, in geology, in paleontology, his death on January 16, 1952, left a gap not soon to be filled. Almost sixty of his eighty-one years were devoted to a career of inspired research, and one of his major accomplishments was his foresight in training

others to carry on work that he had started. Throughout his career he not only did a great deal of work with others, but he had the ability to stimulate others to do work in which he took no direct part.

No memorial can do justice to the outstanding scientific accomplishment and tremendous productivity of Dr. Vaughan. Perhaps the most fitting summary of his philosophy was a statement in his speech of acceptance at the presentation of the Penrose Medal in 1946. President Bowen of the Geological Society of America had made the statement, "Thomas Wayland Vaughan: Student of the sea; you have plumbed its depths; you have conned its shallows and its flats; especially you have observed the living beings that dwell in its quiet expanses, or again, near its rocky shores. You have projected your findings into the past and have thus been able to write for us the story of ancient seas and their denizens . . . in a splendid chronicle." Dr. Vaughan's own humble words of reply ring out as a challenge to those who follow: "To have helped is the most that any one may hope for—the work has barely begun!"

KEY TO ABBREVIATIONS

- Acad. Nat. Sci. Phila. Proc.=Academy of Natural Sciences of Philadelphia Proceedings
 Ala. Geol. Surv. Bull.=Alabama Geological Survey Bulletin
 Amer. Assoc. Adv. Sci.=American Association for the Advancement of Science
 Amer. Assoc. Petrol. Geol. Bull.=American Association of Petroleum Geologists Bulletin
 Amer. Geogr. Soc. Bull.=American Geographical Society Bulletin
 Amer. Geol.=American Geologist
 Amer. Geophys. Union Trans.=American Geophysical Union Transactions
 Amer. Jour. Sci.=American Journal of Science
 Amer. Meteor. Soc. Bull.=American Meteorological Society Bulletin
 Amer. Nat.=American Naturalist
 Ann. Mag. Nat. Hist.=Annals and Magazine of Natural History
 Assoc. d'Océanogr. Phys.=Association d'Océanographie Physique
 Assoc. Amer. Geogr. Ann.=Association of American Geographers Annals
 Biol. Soc. Wash. Proc.=Biological Society of Washington Proceedings
 Bur. Econ. Geol. Texas=Bureau of Economic Geology of Texas
 Calif. Acad. Sci. Mem.=California Academy of Sciences Memoirs
 Calif. Jour. Develop.=California Journal of Development
 Calif. Mo.=California Monthly
 Carnegie Inst. Wash. Publ.=Carnegie Institution of Washington Publications
 Carnegie Inst. Wash. Year Book=Carnegie Institution of Washington Year Book
 Cong. Geol. Internat. Comptes Rend.=Congrès Géologique International Comptes Rendus
 Div. Geol. Geogr. Nat. Res. Counc.=Division of Geology and Geography of the National Research Council
 Ecol. Mon.=Ecological Monographs
 Eng. Min. Jour.=Engineering and Mining Journal
 Fla. Geol. Surv. Ann. Rept.=Florida Geological Survey Annual Report
 Geogr. Rev.=Geographical Review
 Geol. Mag.=Geological Magazine
 Geol. Soc. Amer. Bull.=Geological Society of America Bulletin
 Geol. Surv. Ga. Bull.=Geological Survey of Georgia Bulletin
 Johns Hopkins Univ. Circ.=Johns Hopkins University Circular
 Jour. Geol.=Journal of Geology
 Jour. Paleon.=Journal of Paleontology
 Md. Geol. Surv.=Maryland Geological Survey
 Mem. Nat. Acad. Sci.=Memoirs of the National Academy of Sciences
 Mus. Comp. Zool. Bull.=Museum of Comparative Zoology of Harvard University Bulletin

- Nat. Res. Counc. Bull.=National Research Council Bulletin
 New Zealand Inst. Trans.=New Zealand Institute Transactions
 Pac. Sci. Cong.=Pacific Science Congress
 Pan-Pac. Sci. Conf. Proc.=Pan-Pacific Scientific Conference Proceedings
 Phila. Acad. Nat. Sci. Proc.=Philadelphia Academy of Natural Sciences Proceedings
 Pop. Sci. Mo.=Popular Science Monthly
 Proc. Internat. Zool. Cong.=Proceedings of the International Zoological Congress
 Proc. Nat. Acad. Sci.=Proceedings of the National Academy of Sciences
 Quart. Jour. Geol. Soc.=Quarterly Journal of the Geological Society
 Sci. Mo.=Scientific Monthly
 Smithsonian Inst. Ann. Rept.=Smithsonian Institution Annual Report
 Smithsonian Inst. Misc. Coll.=Smithsonian Institution Miscellaneous Collections
 Southern Med. Jour.=Southern Medical Journal
 U. S. Fish Comm. Bull.=United States Fish Commission Bulletin
 U. S. Geol. Surv. Ann. Rept.=United States Geological Survey Annual Report
 U. S. Geol. Surv. Bull.=United States Geological Survey Bulletin
 U. S. Geol. Surv. Prof. Papers=United States Geological Survey Professional Papers
 U. S. Nat. Mus. Bull.=United States National Museum Bulletin
 U. S. Nat. Mus. Proc.=United States National Museum Proceedings
 U. S. Naval Med. Bull.=United States Naval Medical Bulletin
 Univ. Calif. Publ. Dept. Geol. Bull.=University of California Publications, Department of Geology Bulletin
 Verhandl. Ozeanogeographischen Konferenz, gesellsch. Erdk. Berlin=Verhandlungen der Ozeanogeographischen Konferenz, Gesellschaft für Erdkunde
 Wash. Acad. Sci. Jour.=Washington Academy of Sciences Journal

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