

MEMORIAL OF EDWARD SALISBURY DANA

WILLIAM E. FORD, *Yale University, New Haven, Conn.*

Edward Salisbury Dana, the Dean of American mineralogists, died on June sixteenth, 1935, at his home in New Haven. In order to appreciate properly his position and influence one must consider briefly the history of his family. The following dates are significant ones, not only in the family records, but in the annals of American science.



EDWARD S. DANA
1849-1935

BENJAMIN SILLIMAN

Born August 8, 1779.

Graduated from Yale in 1796.

Appointed Professor of Chemistry and Natural History at Yale in 1804.

Founded the *American Journal of Science* in 1818.

Died November 24, 1864, aged 85.

JAMES DWIGHT DANA

Born February 12, 1813.

Graduated from Yale in 1833.

Appointed Assistant in Chemistry at Yale in 1836.

Published *System of Mineralogy* in 1837.

Married Henrietta Frances Silliman, June 5, 1844.

Became an Editor of *American Journal of Science* in 1846.

Died April 14, 1895, aged 82.

EDWARD SALISBURY DANA

Born November 16, 1849.

Graduated from Yale in 1870.

Became an Editor of *American Journal of Science* in 1875.

Published *Textbook of Mineralogy* in 1877.

Published Sixth Edition, *System of Mineralogy* in 1892.

Died June 16, 1935, aged 85.

The above is without doubt a unique family record. For more than one hundred years these three men, grandfather, son and grandson, were leaders in American science, not only by their own contributions, but even more through their books and the Journal which they established and maintained. It is not necessary to enlarge upon these facts; the bare record is sufficiently eloquent.

It was natural that Edward Dana should on graduation from Yale turn his attention to science and in particular to mineralogy. He studied for two years under Professor George J. Brush of the Sheffield Scientific School and then went abroad where he worked for two years at Heidelberg and Vienna. At the latter place he studied with Tschermak, Lang and Schrauf. His stay there must have a most fruitful and pleasant one. He learned the methods of investigation in crystallography and crystal optics, fields in which most of his original investigations were to lie. He also made many friendships which were to endure through the years and which led him to help in the relief of the impoverished Vienna scientists in the dark years after the war. Many members of the Mineralogical Society of America answered Dana's appeals and know personally how he conducted this friendly work. It seems appropriate to record here in part the greeting sent to Dana by the Vienna Academy on his eightieth birthday.

"We recognize you as the master and leader of American mineralogists and we of Vienna may rightfully claim Edward S. Dana as one of ourselves. Since 1873 bonds of personal friendship have been formed between you and a number of physicists and mineralogists in Vienna. . . . With this circle of friends you have kept faith during one of the saddest times which Vienna and Austria have ever experienced. . . . We all think of you with lasting gratitude."

After his stay abroad Dana came back to New Haven and his work at Yale. He took there the M.A. degree in 1874 and the Ph.D. degree in 1876. While his teaching at Yale was largely in physics, at which he was most successful, his scientific investigations and writings were almost entirely concerned with mineralogy. His bibliography is a long one and cannot be given here but will be published shortly in the *Transactions of the Geological Society of America*. A few comments, however,

should be made upon it. He published in 1872 the first paper in America to deal with the investigation of a rock from the petrographic point of view. His doctor's thesis was on "The Trap Rocks of the Connecticut Valley" and was the first important petrographic memoir to be published here. The record shows that he published the results of investigations on a total of at least fifty-five different mineral species. In the sixth edition of the *System of Mineralogy* the crystallographic axial ratios of the following twenty species are credited to him; beryllonite, chondrodite, columbite, danburite, dickinsonite, eosphorite, fairfieldite, fillowite, herderite, hureaulite, monazite, pectolite, polianite, reddingite, samarskite, stibnite, triploidite, tyrolite, tysonite and willemite. He was in part responsible for the description of ten new species, namely dickinsonite, durdenite, eosphorite, eucryptite, fairfieldite, fillowite, lithiophilite, natrophilite, reddingite and triploidite.

From the above one can see that Dana's research was varied and of no inconsiderable amount. It was, however, through his books that he made his greatest contribution to mineralogical science. His first volume, which was published in 1877, was the *Textbook of Mineralogy*. A book of this type had been planned by his father but ill health intervened and he turned it over to Edward who was only twenty-eight when the book was published. (James Dwight Dana had published the first edition of "The *System*" when he was twenty-four!) The *Textbook* is still in active use, the second edition being published in 1898, the third in 1921, and the fourth in 1932.

All mineralogists will agree that Dana's greatest contribution to mineralogy and the one upon which his fame securely rests was the publication in 1892 of the sixth edition of the *System of Mineralogy*. The fifth edition had been published in 1868. There was, therefore, an interval of twenty-four years between the two editions. This period was one of active mineralogical research and a great amount of new data had accumulated during it. The sixth edition was therefore in great part a new book. Further it was in all essentials the work of one man. Dana enlisted clerical help in the recalculation of the crystal angles and in the re-drawing of the crystal figures and of course had advice and assistance from a great many mineralogists the world over, but the entire direction and a very large part of the actual work was his alone. It probably took him about ten years, but during this time he was actively engaged in college teaching and administration, and in his duties as an editor of the *American Journal of Science*. It was a very great burden that he carried in that period and it is not surprising that when it was over his health was impaired, and during the subsequent years his activities had to be much curtailed.

The sixth edition was remarkable in many ways. Its accuracy has astonished all who have used it. There were so many chances for errors and misprints and so few have ever been found. The judgment shown was so keen and well-balanced that mineralogists have frequently referred to it as the "mineralogists' bible." A study of the material included in the paragraph headed **REF.** at the end of the descriptions of species will show clearly how Dana balanced conflicting ideas and formed his conclusions concerning contradictory data. In many instances he published here the results of his own investigations which had not been printed elsewhere; two instances being the crystallographic data for pectolite and willemite. Considerable material was also supplied by other investigators in advance of publication elsewhere. Unquestionably this book, even today more than forty years after its publication, remains the most important contribution to mineralogical science that has come from America.

The *American Journal of Science* is the oldest scientific magazine in the country. Established by Silliman in 1818, the journal was edited and financially maintained by him and the two Danas until 1926, a period of one hundred and eight years. Edward Dana was its directing force for upward of forty years, and in fact continued an active interest in its affairs until his death. As an editor he made his second most important contribution to American science.

Fortunately many American mineralogists at one time or another came into personal contact with Dana. They were familiar with his great charm, his unflinching good humor, his modesty and his delight in being able to offer assistance. He was the most delightful and entertaining companion, full of a quiet humor and ready with an appropriate story or reminiscence. Until very recently he was physically vigorous and delighted in long walks and climbs both about New Haven and among the hills of Mount Desert Island where he had his summer home. For years he was accustomed to ride about the streets of New Haven on a bicycle, and only relinquished the habit when his family protested that his age and the increase in motor traffic made the practice too dangerous. He probably owned an overcoat but the present writer cannot recall ever having seen him wear one. His only concession to winter weather was the occasional wearing of a light sweater under the coat of his suit. With his death Yale and New Haven have lost one of the last of the old-time gentleman scholars who contributed so largely to their fame.

Many honors came his way. We cannot do better here than to quote the concluding paragraph of Professor Schuchert's memoir.¹

¹ *Am. Jour. Sci.*, vol. 30, p. 161, 1935.

“His election as corresponding member of the Vienna Reichsanstalt came in 1874, and this same year he was elected to the Sociedad Mexicana de Historia Natural. At the age of thirty-four, he was placed on the roster of honorary members of the ancient Mineralogical Society of St. Petersburg. Acclaim in his own country came also in that year, with his election to the National Academy of Sciences, the greatest honor that can be given to an American scientist. At his death, he was the second oldest member, the oldest one having been elected in 1883. He was also an honorary member of the American Academy of Arts and Sciences (Boston), the American Philosophical Society (Philadelphia), the Geological Society of America, and the Physical Society of America; a foreign member (1894) of the Geological Society, London (corresponding member 1888); and a member of the Edinburgh Geological Society, the Mineralogical Society of Great Britain, the Philosophical Society (Cambridge), and the Vienna Academy. He was honored at the 300th anniversary of the University of Dublin. In 1925, the Mineralogical Society of America elected him Honorary President for life; in 1934 the Mineralogical Club of New York City made him an honorary life member, and the American Museum of Natural History gave him the same distinction. The Yale Corporation, meeting on the day of his death, passed a resolution of which the following are the closing words: ‘Foremost American mineralogist of his time, he brought to himself and to the University widespread recognition in the world of science’.”