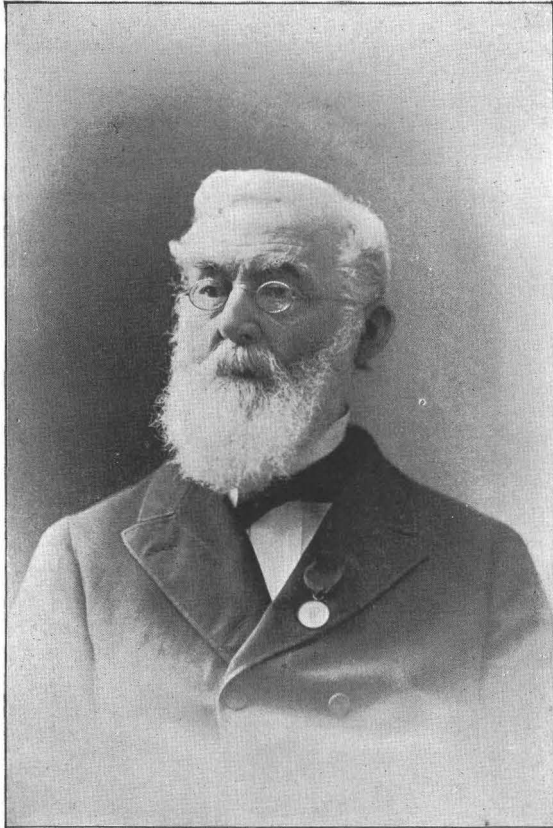


James Hall, 1847

*Sincerely yours
James Hall*



James Hall, 1891

*Sincerely yours
James Hall*

MEMOIR OF JAMES HALL

BY JOHN J. STEVENSON *

Professor James Hall, the first President of this Society, was born in Hingham, Massachusetts, September 12, 1811, and died in Echo Hill, Bethlehem, New Hampshire, August 7, 1898.

His father, James Hall, came from England, when only nineteen years old, to spend a year in travel through the United States. On the vessel he met a girl of his own age, Susan Dourdain, who, with her parents, was coming to reside in America. He married her soon after their arrival in Boston, and a rupture of friendly relations with his father followed, so that the young couple were compelled to make their way as best they might. Neither had been fitted by previous training for any such struggle, and poverty was always the lot of the family.

James Hall, the eldest son, was sent to the public school in Hingham, but lost much time, as his assistance was needed for support of the family. He succeeded, however, in obtaining private lessons in Latin and in securing books by doing, as he said, anything and everything. Nothing daunted him. When Silliman delivered the Lowell lectures in Boston, Hall attended them all, though on each occasion he had to walk from Hingham and back again.

His preparation for Rensselaer Institute having been completed, he hardly knew how, he went to Troy, where Eaton was imparting his own enthusiasm to nearly every pupil with whom he came into contact. It was soon discovered that the lad from Massachusetts had not merely a taste, but rather a passion, for natural history, and Eaton himself gained inspiration from him. Each summer was spent in fieldwork, under Eaton's direction, and often in company with Ebenezer Emmons, then an instructor in the Institute. Hall collected nearly nine hundred species of plants while a student and determined them. In geological excursions he reached as far south as the Coal Measures of the anthracite region, and had begun before his graduation that collection of fossil plants which afterwards proved so important.

* I am indebted to Mrs Thomas B. Bishop, of San Francisco, California, the daughter of Professor Hall, for information which has been used in preparing this memoir. The illustrations originally appeared in *Science*, and appear here through the courtesy of Professor J. M'K. Cattell, editor of that journal.

He received his degree in 1832. After a visit to the anthracite region of Pennsylvania he had still a little money in his pocket, with which he went to the Helderberg mountains, southwest from Albany, where he spent the summer in elaborating the section and in making collections. In September, when the money was almost gone, he returned on foot across the country to Troy to gather up his books, furniture, and collections, but without any definite notion as to what was to become of him or them. Until he reached his room in Troy the future had concerned him very little; the burdens of the present had sufficed; but as he sat there, with no plan for the future, the sense of absolute loneliness became so oppressive that he could not even pack.

Just then Eaton passed along the hallway and, looking in at the door, said, "Hall, what are you doing?" "Packing my property," was the reply. "Where are you going?" The answer was frank, "I do not know." Eaton urged him to remain, and, when Hall said that he had no money, replied simply, "We can arrange that." The result was that Hall was made librarian, with board and lodging as his compensation. As the library was small, the room assigned for it was very small, but it sufficed to accommodate the library and the librarian for several months. Before the close of the year he was made assistant professor at \$600 a year and board, which gave him means for the prosecution of his work.

Eaton's attachment was very noteworthy. He brought his protégé to the attention of Stephen Van Rensselaer, the great patron of science, for whom Hall made explorations in Saint Lawrence county, his first systematic work in geology. This was done so well that when the State Geological Survey was organized, Van Rensselaer endeavored to obtain an independent appointment for Hall; but only four districts were made, and the best that could be secured was an appointment as assistant to Emmons, his colleague, who was thirteen years his senior.

There was little probability that this partnership would be pleasing to either, for each had done work in portions of the district and each held very positive views. Emmons in his annual report failed to make any reference to Hall or his work. Before the season of 1837 the state was redistricted, Mr Conrad withdrawing from the geological work to become the paleontologist. His district was taken by Mr Vanuxem, and Mr Hall succeeded to the fourth district, the level, uninteresting western portion of the state, which he was told was good enough for a young man of twenty-five. From that time his life was bound up in the official work for the state of New York, and after 1843 he was the survey. At the time of his appointment he was younger than any of his colleagues. Vanuxem had reached middle life, Emmons was thirty-eight, Conrad thirty-four, and Mather thirty-three; but some of them were still young

enough to feel the importance of their years and to make the youngest member of the corps repent his aggressiveness.

The work in the fourth district was performed with characteristic energy. The region was not the western New York of today; roads were less numerous and less carefully made; exposures were rare and poor. It was necessary to wade along streams for miles to gain fragments which were to be pieced into tentative sections; the people were suspicious, fearing some new scheme for increasing the taxes; but none of these things moved him; as in later years, difficulties only increased his determination. So his is the only one of the four final reports which deals broadly with the problems of the young science, and, though upon the contemned fourth district, it is the only one which has endured with authority and become a classic in geological literature.

While the survey was in progress, Professor Hall, with his colleague, Professor Mather, and some gentlemen in Philadelphia, became interested in the mineral region of southeastern Ohio, where a large area was secured in 1838. Professor Mather soon afterward became a resident of Ohio, though retaining his position on the New York survey, and the property was allotted to the several purchasers, about 2,000 acres falling to Professor Hall. It was practically wilderness land, but studies by Hildreth and Briggs had shown that it lay within the best mineral region of the state, and, as afterward was discovered, Professor Hall's share was the best of the whole. When the fieldwork of the New York survey had been completed, Professor Hall made a journey to the Mississippi valley, partly to see his property, partly to trace the New York formations, and partly to make purchases of mineral lands for some gentlemen in New York. The banking system was uncertain then, and it was necessary to carry the whole sum to be invested sewed into the lining of his clothes.

While on this journey he remained for a few days in the house of Mr Henry Newberry, at Cuyahoga Falls, Ohio, where he became acquainted with John S. Newberry, then a lad of nineteen, who had become an enthusiastic collector of Coal Measures plants from his father's coal mine. He was able to give valuable information to Professor Hall respecting the distribution of the principal beds near Cleveland, which aided materially in determining plans for the journey, while he received in return the generic names of the plants which he had collected. This brief association had its influence on the lives of both. More than once Dr Newberry spoke to me of Hall's extraordinary gentleness and attractiveness, while Professor Hall's face always brightened as he spoke of the guileless boy whom he met at Cuyahoga Falls.

Upon returning to Albany, Professor Hall found Mr Conrad in a de-

cided frame of mind. As paleontologist of the survey, he had found an accumulation of material that seemed too much for a lifetime. "To describe and figure the new species alone would require a great quarto volume with more than one hundred plates," was his moan. The prospect so terrified him that soon afterward he threw off the work and returned to Philadelphia. Mather was already in Ohio and Vanuxem had determined to retire to his farm. Hall and Emmons remained in Albany, desirous of retaining connection with state work that they might continue their studies. They were employed for a time in arranging the mass of material gathered during the survey work. While thus engaged, they discovered that the paleontology would prove even more important than Conrad had imagined. Each determined to be the paleontologist. The contest was hardly what might be termed friendly, but the outcome was that the paleontology was assigned to Hall, while Emmons was commissioned to write up the agriculture, and was appointed custodian or curator of the collections. But the new officials had hardly settled down to hard work when the legislature transferred the collections, or the cabinet of natural history, to the care of the Board of Regents of the University of the State of New York. The secretary of that board removed Doctor Emmons from the curatorship and thrust both of the geologists out of their quarters in the old State house. Soon afterward appropriations for the paleontology were cut off, except, curiously enough, those for the engraving, which were not opposed, but rather favored. At that time was begun a contest between Professor Hall and the board of regents which lasted for a number of years. When the executive officer of the board was changed the relations became friendly again, and so remained for many years.

Expelled from the State house, Professor Hall at once erected a building adjoining his residence, where his work was carried on until 1852, when he removed to a larger house. In 1857, after the state had begun appropriations for collecting fossils, he erected a very commodious brick building, in which the work was done until within a few years of his death. The first volume of the Paleontology was published in 1847 and made a notable impression, though the mechanical execution of the work, as well as the work itself, was far below the standard of later years. The second volume, published in 1852, was a great improvement upon the first, both in matter and manner, but prior to the appearance of the latter volume the state had abandoned further prosecution of the work. Its magnitude had not been foreseen at the beginning, but before the second volume was completed it was clear that the extent could hardly be foretold. This phase was emphasized so strongly by Professor Hall's chief opponent that frugal legislators were induced, in 1850, to cut off all

appropriations for current expenses and salaries, though for some reason which does not appear on the surface the engraving contract was cared for and a small appropriation was made for drawings.

The state abandoned the work, but Professor Hall did not. Confident that it would be resumed, he retained his assistants for a time and continued the collecting and drawing until 1855, paying practically the whole cost. Despairing then of any assistance from the state, he accepted the proposition, made years before, by Sir William E. Logan, that he go to Canada as paleontologist with the expectation of becoming head of the survey upon Sir William's retirement in the near future. But, during the five years, Professor Hall had exhausted his cash resources and had incurred obligations which were pressing. A considerable sum of money was needed to pay his debts and to take him to Canada.

There was nothing available except the Ohio land, which he had kept, not to be sold until advancing years should render him unable to work. He always maintained that the property would be very valuable before his sixtieth birthday; but the sale had to be made, and he accepted an offer of \$15,000, which enabled him to pay the obligations incurred to continue the work. Ten years afterward the property was valued at \$200,000. Had it not been for this sacrifice, the "Paleontology of the State of New York" would have been closed with the second volume, in 1852.

In 1855 the Honorable Elias Leavenworth, then recently elected Secretary of State, learned that Professor Hall had determined to go to Canada. Realizing that to abandon the work in its incomplete condition would be discreditable to the state, he urged Professor Hall to delay, and called a meeting at his house to consider the matter. That meeting was attended by Professor J. D. Dana, Professor Agassiz, Sir William E. Logan, Mr Blatchford, and, among others, by Dr Beck, then, as for many years previously, Secretary of the Board of Regents. At this conference a plan for continuing the work was prepared, Professor Hall consenting to remain in case the legislature confirmed the agreement. The influence of Mr Leavenworth and Mr Blatchford prevailed with the legislature, and Professor Hall remained to carry on the work for 43 years.

I have thought well to dwell somewhat in detail upon these matters. Professor Hall was severely criticised because of the long intervals between the appearance of his second, third, and fourth volumes. Much of the criticism was due, no doubt, to the ignorance of the critics, who appear to have imagined that drawings of fossils can be made as rapidly as sketches of scenery, and that the writing of descriptions involves no

more labor than the preparation of a report on a fire for a daily paper. The more intelligent criticism was due to ignorance of the conditions—that the state had abandoned the work, that the office staff had become broken, and that new hands as well as new minds had to be trained; that the work had, as it were, to be begun *de novo*. Even now it is not generally known that the great collections upon which much of the state paleontology is based were made by Professor Hall at his own expense prior to 1856 and very largely at his expense after 1866, the appropriations for collecting as such having continued practically only from 1856 to 1866.

The delay in beginning to publish the volumes after the third was due to exceedingly wise forethought. The work was published fragmentarily, so that results were made available to workers everywhere almost as soon as they were obtained, but the volumes did not appear promptly. Had they appeared promptly, had each division been finished in order, the work could have been stopped at any time; but the drawing and engraving went on for several volumes simultaneously, so that at no time for a number of years was any volume very near completion, but so much work had been done on all that continuation was necessary in order to save what had been expended already. More than once this argument prevailed with an unwilling committee, and the appropriations were ordered. On one occasion a very prominent citizen of New York city told me that there was no longer any use in trying to head off Professor Hall, for "he keeps so far ahead in his work that out of mere shame it is necessary to keep him at it."

The great mass of his publications appeared after he had reached three score years, an age when most men feel that the burdens of life should be lessened. He kept himself young by persistent work, and when eighty-six years old his mind was keen, more ready to accept new ideas and to reject erroneous, though cherished opinions, than when he was but thirty years old.

Professor Hall's energies, however, were not confined to the work in New York. Forty-seven years ago he contributed three important chapters to Foster and Whitney's report on the Lake Superior region; fifty-three years ago he prepared a discussion for Fremont's report, and soon afterward another for Stansbury's. His share of the Mexican Boundary report, published more than forty years ago, occupied 100 quarto pages. In the early fifties he sent Meek and Hayden to the Black Hills region to make collections of vertebrates and invertebrates, thus initiating the great work done afterward in the far west by those explorers. He was state geologist of Iowa and afterward of Wisconsin, meeting in each case with the degree of success which usually attends

attempts to direct the survey of one commonwealth while residing in another, though he was able to publish important reports. He contributed an elaborate memoir to the Canada Survey publications. In later years his excursions into other states were confined to paleontological work, much of which was published jointly by himself and Professor R. P. Whitfield, the more important memoirs being those upon Ohio, Kentucky, and the Fortieth Parallel.

At the very outset of his career, when only 21 years old, he succeeded in determining the position of our Pennsylvania anthracites in the geological column. Eaton, in the second edition of his text-book, refers to proofs obtained at Carbondale by his pupils in 1832, showing the American coals, "bituminous and anasphalt," to be equivalent to those of Europe. The study of those fossils was by Hall, who made still further collections of coal plants, and determined 25 species. Eaton referred to this work in 1833 as the joint work of himself and Mr Hall. "It was the intention of Mr Hall and myself to have determined the names of all which had been determined by M. Brogniart, and to have given lithographic figures of the remainder, but we are prevented by other engagements."* At that time Hall was applying his knowledge of recent botany to paleobotany, so that he was enabled to give to Eaton the generalization which had escaped the Pennsylvania geologists, for, according to Lesley, even 3 years later, Taylor and others "drew a sharp distinction in age between Broad Top and Alleghany Mountain coal, and even Rogers expressed a doubt of their identity in an annual report."†

Professor Hall's influence upon American geology began with his reports. One must concede in all fairness that some of Professor Hall's friends in the earlier days gave him rather more credit for the New York state work than was properly his share, much more indeed than he ever claimed, the result being that in the minds of many he is thought to be entitled to the whole credit for the subdivision of the column. Conrad, Vanuxem, Eaton, and Emmons did good work; Conrad and Vanuxem on the survey did great work, which went far toward determining the section. Let us not fail to honor the men who were Hall's associates on that survey. Because they were not great in so many ways as Hall, they fall, as it were, deeply into shadow, and we are liable to overlook their excellence; the more so because nearly every one of them died before the younger generation of geologists were out of swaddling clothes, and to most of us they are but names.

Yet the credit for final, authoritative determination of the column must be given to Hall and to him alone. With the rest he had labored

* Amer. Jour. Science, vol. xxiii, p. 399.

† Second Geol. Surv. of Pennsylvania, Report A, p. 18.

to subdivide the column on physical grounds. The importance of paleontological confirmation was felt by all, and Conrad had tried to make the confirmation, but the examination of his list of fossils shows how defective his data were. The column thus divided was useful only for direct tracing and afforded nothing for general service. Professor Hall determined the fossils of each division, proved that the formations defined on physical grounds are practically coextensive with those defined on paleontological grounds, and so gave means for identification over broad areas. As this work was done within an offshore region, where changes in conditions were exceptionally numerous and positive, a too rigid application of the New York measuring line led at first to errors of correlation elsewhere; but those errors were inseparable from the times, when all the workers were self-trained and were becoming good geologists only by correcting their own errors.

Conrad was the first in our country to make extended study of Paleozoic fossils, but he soon abandoned the work. For a long time Professor Hall had the field so thoroughly to himself that he came to regard it as his own. For more than half a score of years he resented with great energy and no little acerbity any intrusion upon his domain. His great knowledge of forms, necessarily far beyond that of any other American student, rendered him not sufficiently tolerant of opposing opinions, and too frequently his criticisms had a scornful tone, which secured to him as an inalienable possession the implacable hatred of some of his contemporaries. But the systematic revision of his own work, begun almost two-thirds of a century ago, made its defects so manifest to him as absolutely to change his disposition toward fellow-students in paleontology. As the years went by ill-will toward scientific men who, as he believed, had done him injustice, disappeared; he sought friendship and cooperation where before he had repelled both. There were men for whom to the last he entertained certainly no affection. To have been indifferent toward them would have required him to be either more or less than man, and he was neither.

Professor Hall's thorough method of investigation was all his own, and the laboratory on the Albany hill was a training school for American paleontologists. One after another of his assistants having begun with him at the alphabet of the work went out to hew a special path for himself and to make American science respected. When we think of Meek, White, Whitfield, Walcott, Beecher, and Clarke, we think of American paleontology, for those men have given most of the literature on invertebrate paleontology, aside from that published by Hall himself. He impressed himself upon his assistants while he cultivated in them powers which he did not possess himself. He was a great teacher, for

though we can not fail to see his impress in the method of every man who ever labored with him, yet we find the individuality of every man unchanged, so that his independent work is characteristically his own.

As a mere collector, Professor Hall could hardly be surpassed. He knew no duplicates; no two specimens of any species seemed precisely alike. He was one of the first to maintain the danger of mere species-making, and to insist on the gathering of abundant material. When he collected, he collected all there was. He believed in thorough work, whether in collecting or in studying. His first collection, on which was based much of his published work, went to the American Museum of Natural History in New York city, and much of the money obtained for it was expended in gathering another collection of immense bulk.

There is danger of forgetting that Professor Hall was preeminently a geologist. His quartos on the New York paleontology are his monument, and the casual observer is liable to see in him a biologist rather than a geologist; but until his later years he was a geologist. His studies were from the standpoint of one seeking to determine relations between the physical and biological conditions in order to solve problems of correlation. The great problems of geology, not those of biology, were uppermost in his mind until less than twenty years ago. His presidential address to the American Association for the Advancement of Science, in 1857, was so far in advance of the time as to be thought not merely absurd but mystical; yet today it is recognized as one of the most important contributions to one of the most difficult problems in physical geology. Even in his later years, when biological problems had assumed their proper importance for him, he would have resented an intimation that he was any less of geologist than before. When he succeeded in rehabilitating the New York survey, the economic side was not forgotten, and the annual reports presented to the legislature have been of late years as useful from the economic as from the scientific standpoint.

Professor Hall's work received recognition at home and abroad. He was foreign member of the London Geological Society, vice-president of the French Geological Society, correspondent of the Institute, foreign member of the Lincei, and of many other societies and academies. He had received the Wollaston medal and had been decorated by several monarchs. He was vice-president of the Geological Congresses at Paris and Bologna and honorary president of that at Washington. He was a charter member of the National Academy of Sciences and was president of the American Association in 1856. He received the degree of LL. D. from Hamilton College in 1863 and from McGill University in 1884.

As a youth, Professor Hall must have been merry and inclined to cast

care to the winds. The old daguerreotype, reproduced here, suggests such a disposition, and Dr Newberry's description of him as a young man of sunny temperament, a delightful and absolutely irresistible companion, is such as one knowing him well in his later days would imagine. The contrast between the countenance of the young man at 35 and that of the old man at four score tells the story of a life filled with conflict. Burdens came early, but they belonged to the normal struggles of a New England youth, and had no effect except perhaps to make him more self-centered. Intimate association in the formative period with men like Eaton and Emmons, the incarnation of dogmatism, must have increased and confirmed a similar tendency in him, but could not have affected his disposition. Had matters run smoothly for half a score of years after the close of the survey, his life might have been an easier one; but he learned almost at once that a friend is a vain thing to lean upon, and soon afterward he was plunged into official conflicts, which lasted in one way or another until within three years of his death.

The fundamental feature of his character was childlike simplicity united to self-confidence and indomitable energy. Simplicity kept him from concealment of his purposes and self-confidence kept him from seeking easy modes of accomplishing them. Knowing what he wanted, he took a direct line, with little regard for anybody or anything which might be in the way to oppose. In early days the Albany officials did not understand him, believing his frankness to be but the cover for craftiness. He deceived his opponents by always telling the truth, something strange to politicians; but in time they came to understand him well, and strong men sought combat simply to measure strength, as in gladiatorial contests of olden time. Almost invariably he was victorious, but victory was often worse than defeat, for it converted into life-long enemies men who before had been merely indifferent, and so it came about that, as a leading senator once said, "eternal vigilance is the price of Professor Hall's position." He held his place for almost two-thirds of a century through no favor of man, but solely because he refused to be displaced. His influence over governors, comptrollers, secretaries, and legislators was lost for little more than five years during the long period from 1843 to 1898. In bitter contest for years with a bureau of the state government and at times with prominent officials, he was pestered again and again with committees appointed too often not to investigate, but to condemn. With few exceptions, those committees appointed to curse returned to bless. Indeed, as Judge Draper once said, it is probable that Professor Hall drove more investigation committees up the stump than did any other man or group of men in our time.

Absolutely ignorant of the art of lobbying, unwilling or unable to conciliate an adversary, possessing pronounced political principles which he never concealed, this man by sheer force of will compelled men to rise superior to all party calls; so that throughout his career there were men of all shades of political opinion, inside and outside of the legislature, who held the preservation of his work to be a matter of supreme necessity for the welfare of the state.

But contests such as these, beginning in his early manhood, did not leave him unscarred. Surrounded by men hating him for his success, harassed by men anxious to reap the harvest which he had sowed, his life became one continuous anxiety. In later years his political and official foes were reinforced by others, who seemed to feel that he had done injustice to the world by living too long and thereby securing more than his share of profit. It is not strange that he was often stern and forbidding, carrying into scientific disputes the manner which was his wont when dealing with official adversaries; but it was easy to find the man if only one would, for in personal relations he gave his confidence as freely and affectionately as a child.

Take him all in all, Professor Hall was a great man. His excellencies were towering, his faults glaring. Transparent as crystal, his course was frank, open, and his word as good as a bond. His friends would do anything for him; his enemies would do anything against him. No one knowing him remained indifferent. For a friend he would sacrifice his own interests at any time. He was every read to crush an enemy in the abstract, but the enemy in the concrete, if needing assistance, could find no readier helper than he. Years of bitter aspersion were forgotten more than once when a slanderer became needy, and Professor Hall was quick to risk his own in rendering aid. He knew well how to distinguish between friend and flatterer. The wounds of a friend were never resented. He never desired his friends, in proof of friendship, to share in his enmities. He was a manly man, with a single aim throughout his life. Like a sturdy knight of medieval times, he kept his face toward the goal, turning neither to the right nor to the left—one of the grandest and most picturesque figures in the history of our science.

As he lived, so he died, self-reliant to the last. In 1897, at Saint Petersburg, he said that he intended to send his likeness to me in a gold frame, but not at once, as it would seem too much like the last farewell. During the winter of 1897-1898 he had several severe attacks of vertigo, and in the spring he wrote that there were evidences of giving way, such as to convince him that the work might not go on much longer. In July he must have felt that the end was approaching, for he sent the likeness on the plate of gold just as he left Albany for Echo Hill.

Though in good spirits and apparently in reasonably good physical condition when leaving Albany, he was stricken by vertigo soon after arriving at the hotel. This attack left him so enfeebled that the local physician urged his return to Albany. He refused, preferring to remain where he was and to await the end, which was likely to come suddenly. His letters gave no intimation of the conditions, but were written as calmly as though life were but beginning. Affairs of the survey received his attention in detail, and a long letter respecting them was written only two days before his death, when he was confined to his bed.

The end came as he appears to have expected. On Sunday afternoon, August 7, a servant carried a cup of beef tea to him and placed it near his bed. As she left the room she heard a crash, and, returning, found him lying on the floor beside the bed, dead. The effort to take the cup from the chair had brought on cerebral apoplexy, causing immediate and painless death. He lies buried in Albany, New York.

In 1843 Professor Hall married Susan, daughter of John Aiken, a lawyer of Troy, New York. She died April 25, 1895. Four children, two daughters and two sons, survive him