NATIONAL ACADEMY OF SCIENCES
BIOGRAPHICAL MEMOIRS
PART OF VOLUME VIII

BIOGRAPHICAL MEMOIR

OF

HENRY MORTON

1836-1902

BY

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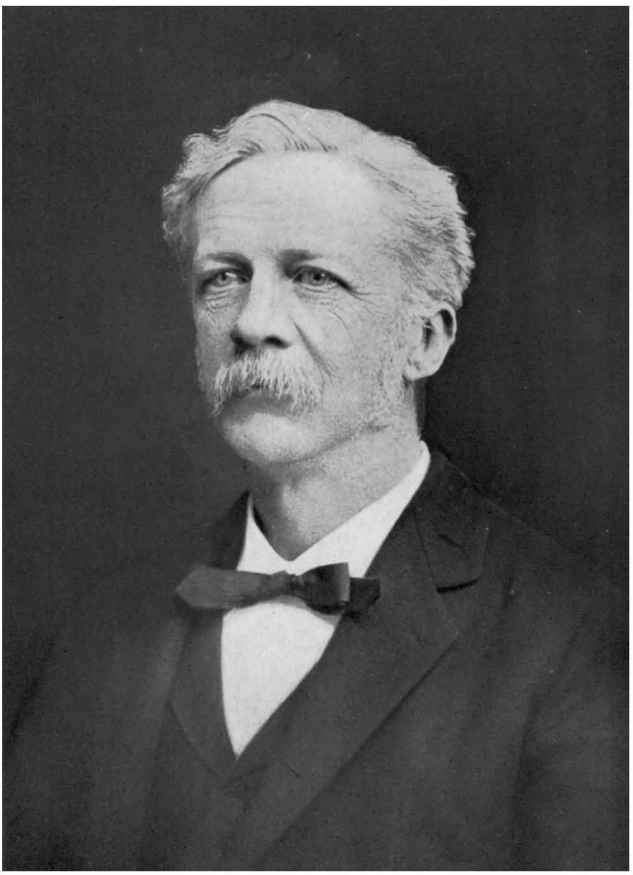
PRESENTED TO THE ACADEMY AT THE ANNUAL MEETING, 1914

CITY OF WASHINGTON
PUBLISHED BY THE NATIONAL ACADEMY OF SCIENCES
February, 1915



H. Henry Norton.

HENRY MORTON.

HENRY MORTON was born in the City of New York on the 11th day of December, 1836. He studied at the University of Pennsylvania, from which institution he was graduated (1857) in his twenty-first year.

It does not appear that science appealed strongly to Morton during his student days. Indeed, his interests chanced to be drawn in quite another direction. During his junior year a plaster cast of the Rosetta stone, of which at that time no translation had been completed, was presented to the Philomathean Society of the University.

Morton, in collaboration with other members of the society, undertook to make a translation; and, although he was without previous experience in such work, he made a complete rendering of the hieroglyphic text before the close of his senior year.

Not content with this achievement, exceptional, if not indeed unparalleled, in the annals of undergraduate activities in America, he illuminated his manuscript with appropriate and striking designs. These were much admired, and regret was expressed that it would not be possible, on account of the cost, to publish them in the original colors. Thereupon, although without any training as an engraver, he made with his own hands drawings on stone for the entire work, and an edition was printed and speedily sold.

Art, with which he was thus brought in touch in the illustration and illumination of his manuscript, and archeology, which became a real and live thing to him as he sought the interpretation of the hieroglyphics of the Rosetta stone, were to be subjects of intense and life-long interest; but neither drew Morton from the beaten track in his choice of a career. On the contrary, he began the study of law after graduation, and the introduction to what was to become his life work came quite fortuitously two years later.

His father, the Rev. Henry J. Morton, who was rector of St. James Church in Philadelphia, was also a member of the

governing board of the Episcopal Academy of that city, the school in which Henry Morton had been prepared for college.

In this school, in which there was no regular provision for the teaching of the physical sciences, Morton volunteered to give a series of lectures on chemistry and physics. The success of these lectures, which was immediate and striking, seems to have determined his career. So entertaining were they, and the illustrations so brilliant, that the little lecture-room was soon overcrowded, and a larger one was built to accommodate the audiences that gathered to hear him.

Other lecture engagements followed and Morton became, in a way, a local celebrity. In 1863 he was appointed to the professorship of chemistry in the Philadelphia Dental College; in 1864 he became the secretary of the Franklin Institute, and in 1867 the editor of the old and established journal of that society. In 1868 he accepted a professorship in chemistry at the University of Pennsylvania. In 1870, at the age of thirty-four, he was offered the first presidency of the Stevens Institute of Technology, which institution had been provided for by the will of Edwin A. Stevens, of Hoboken, who had died in 1868. This position Henry Morton held until his death, in 1902.

The period (1864-1870) during which he was secretary of the Franklin Institute was one of great and varied activity. To arouse public interest in the society, which had fallen into a comatose state, a series of public lectures was planned to be given by Morton in the Academy of Music. He undertook the precarious task with enthusiasm and met with immediate and remarkable success.

To adapt scientific demonstrations to the stage of a great theater and make them effective and entertaining, as well as accurate and instructive, demands other qualities besides that of knowledge of the subject and ordinary powers of exposition, but Morton was equal to the occasion. He developed the gifts of a skilled stage wright and artist in addition to those of a man of science. He selected his experiments with a view to the possibility of making them visible and effective to so large an audience and produced them with scenic effects calculated to appeal to the imagination.

The enthusiasm of the public which thronged the theater on these occasions was due in no small measure to the manner in which his effects were staged. To exhibit the phenomenon of the combustion of iron in oxygen, for example, a sword was burned by the lecturer standing at a high altar in the middle of the stage, with an appropriate background of storm clouds and high mountains.

In an address delivered at the time of the presentation of Morton's portrait to the Stevens Institute, Dr. Coleman Sellers gave the following interesting and graphic account of these public lectures. The passage is taken from the Morton Memorial Volume published by the Alumni Association of the Institute in 1905, a work to which the present writer is indebted for many facts concerning the subject of this biographical notice.

"At one of the first meetings of the managers of the Franklin Institute after Mr. Morton's appointment, it was suggested that an excellent means of interesting the public at large in the objects of the Institute would be a course of scientific lectures, delivered in some large hall.

"One of the managers was even so bold as to suggest the Opera House or Academy of Music, one of the largest auditoriums in the country, seating more than 3,500 persons. Others considered this too venturesome, but it was finally decided to leave this to Mr. Morton's decision.

"Deputed to communicate with Mr. Morton on this subject, I well remember the characteristic courage and enthusiasm with which he at once seized on the idea of making the so-far unparalleled experiment of devising and executing illustrations on such a scale as should render them impressive on so large a stage and to so vast an audience.

"All who came in contact with him were inspired with his confidence and enthusiasm (myself among the number), and the preparations were commenced at once.

"Some notices of these got abroad, and long before the date assigned for the lecture every seat in the house was sold; and so pressing was the demand that the Academy was engaged for another evening, a few days later, and, before the night of the first delivery arrived, every seat had been again sold for the repetition.

"There are occasions, even in the life of a scientific professor, which call for no small stock of moral courage, and the evening in which Mr. Morton for the first time walked forward upon a public stage in the face of an audience which crowded every seat and every inch of standing-room, with the consciousness that he was committed to the absolute necessity of a success by the arrangements for the repetition, was one of them.

"I was with him at the time, having undertaken the office of manager, to direct and superintend the work of his assistants behind the scenes; and I have not forgotten what were my own feelings.

"But when the curtain rose, he stepped forward with easy grace amid the enthusiastic applause which greeted his appearance, and began his lecture as calmly and collectedly as if he had done the same thing fifty times before.

"He told me afterward that he was so anxious about the success of his experiments that he had no room in his mind for personal embarrassment, or the nervous agitation often caused by facing a great audience.

"I need hardly say that the lecture throughout was a success. The clearness of the explanations and the novelty and beauty of the experiments held the audience in close attention for nearly two hours, and when Mr. Morton made his exit from the stage, amid applause even heartier than that which welcomed him, he carried with him a reputation as a scientific lecturer which I believe has never been equalled.

"During the following years similar lectures on related subjects were given by Mr. Morton in the same place. Some of their titles were the following: Reflection, Refraction, Sunlight, Moonlight, Eclipses, Fluorescence, and so on.

"In these lectures Mr. Morton used not only numberless new devices for the production of striking illustrations of scientific phenomena, but also brought into play appliances of the stage, such as shifting scenery to aid in color effects, stage traps to bring apparatus into position when wanted, and endless other applications."*

In such work the "art of projection" is a prime factor, and the implements of this art were then but imperfectly developed. To this subject Morton gave much attention. In the Journal of the Franklin Institute he published a series of useful papers† dealing with such details as condensers and objectives, the generation of oxygen and hydrogen, and the best arrangement for vertical projection. The final result was the production of a lantern, which, for general scientific purposes, was far superior to anything then existing, and which was only superseded when the introduction of the right-angled arc lamp, a quarter of a century later, rendered a somewhat more compact form practicable.

During these busy years Morton worked for the rehabilitation of the Franklin Institute and, as its editor and frequent con-

* Morton Memorial Volume, Hoboken, N. J., 1905, p. 170.

† Journal of the Franklin Institute, vols. 53, 54, 55, 62, 63, etc.

tributor, for the reëstablishment upon a sound basis of the Journal of the Franklin Institute. In addition to these tasks, in both of which he was eminently successful, he fulfilled his duties as professor of chemistry.

In 1869 he led a party of Philadelphia observers to Iowa to take photographs of the solar eclipse of August of that year. The success of this expedition was largely due to his genius as an organizer, and although not an astronomer by training he was able to contribute to the discussion of the results, particularly in the matter of distinguishing between appearances due to the photographic process and the solar phenomena which it was the purpose of the investigation to record.

Knowledge of the properties and behavior of photographic plates was at that time even more imperfect than at the present day, and the results of such processes as halation, reversal, and the like were more frequently misleading. Morton indeed is said to have been the first to establish the spurious character of certain features already frequently observed in photographs of eclipses and hitherto misinterpreted.

When Morton went to Hoboken and assumed the directorship of the Stevens Institute of Technology, he gave himself to the organization and development of the newly opened school with all his wonted energy and intelligence. The technical school as we now know it did not exist. To the academic mind, at least, engineering at that time meant civil engineering, with mining as one of its branches. Mechanical engineering as a learned profession had scarcely begun to receive recognition.

College training, especially planned for the education of builders of machinery, with shop work and laboratory practice as important features in its curriculum, was something the usefulness of which was yet to be proven. Electrical engineering, before the day of dynamos, motors, electric light, electric traction, had not even a name. Thirteen years were still to elapse before electricians were strong enough to declare themselves and to start the Institute of Electrical Engineers.

In this pioneer work of building up a special school for professions just struggling into organized existence, Morton as head of the Stevens Institute took an important part. For

thirty years, during which invention and all that pertains to the mechanical aspects of civilization were growing at a pace unknown in the history of the world, it was his task to keep himself and his school abreast with the onward movement of the times. That matters administrative, technical, and industrial should utterly submerge him was only to be expected; it might almost be said to be inevitable. Then, too, the great city across the river demanded him. It called upon him for service in a thousand ways. On account of his keen mind and his unusual powers of exposition, he was much sought after as a witness in patent litigation involving scientific principles, and he soon became the foremost patent expert of his day.

He did not lose interest in pure science, however, nor immediately cease to contribute to its advancement. In 1871 appeared the first of a notable series of papers on fluorescence,* in the course of which the absorption bands and fluorescence bands in the spectra of anthracene and crysogene were described and the changes which occurred in solutions of these substances were noted. The remarkable character of the fluorescence spectra of the uranyl salts was also made a subject of investigation, and Morton was probably the first to recognize the displacement of the absorption bands of uranyl acetate when that substance passed from the solid into the solvent state.

Although as time went on his published work, for he was ever a prolific writer, took more and more the form of remarkably lucid and accurate accounts of the investigations of others, and although in later years his many-sidedness led him into fields of thought as remote from chemistry as were in an earlier day the egyptological investigations of Thomas Young from his proper field of optics, we may yet find continued evidence of his lively concern for everything of a scientific nature and of his being an inspirer of good work on the part of his faculty and students. Some of the very earliest work in the study of the wave forms of alternating electric currents, for example, was done at his suggestion and with his collaboration by the late B. F. Thomas,* afterwards Professor of Physics in

* Journal of the Franklin Institute, vols. 62, 63, 64; Chemical News, vol. 27.

* B. F. Thomas: Trans. Amer. Inst. Elec. Eng., vol. IX, 1902, p. 265.

Ohio State University, who was at the time a student at the Stevens Institute.

The varied intellectual and æsthetic gifts which in undergraduate days had led to the translation of the Rosetta stone, and to the decoration and illustration of the volume in which the results of that attempt were published, manifested themselves again in later years.

To an intimate circle Henry Morton was known not merely as the head of Stevens Institute, an engineer, and a writer on technical subjects; nor merely as a generous donor who from time to time turned over to the Institute a considerable portion of his large earnings for the endowment of chairs and the erection of buildings. They knew him as a student of biblical criticism, an archeologist, a writer of verse, and as an artist and a lover of art. Indeed, it was maintained by competent judges in these widely different fields that had he chosen to devote himself to any one of them he would have taken high rank.

In the words of one of his intimate friends, Thomas A. Janvier, his personality has been vividly characterized in the following passages:*

"In my twenty years' friendship with Dr. Morton I saw many of his many sides, and in all of them there were both edification and charm. But oftenest—because of his keenly sympathetic intuitions which made him adapt himself to the mental capacities, and even to the mental incapacities, of his friends—our talks were of literary matters, and of his own lighter activities (as they were by contrast with the varied very serious activities of his highly useful life) in literary ways.

"His habit, in common with many hard thinkers, was to seek mental relaxation in story-reading: a little laughing at his own liking for vivid fiction; but rarely failing to make his excursions into romance of value to others by a running fire of commentary in which his wit and his critical acuteness had full play. As a critic he was admirable; precisely because he had high literary standards, and because he lived up to those standards in his own literary work. In literature, as in science, he got his results by direct experiment; and the soundness of his knowledge and his ability to apply it were shown in the strength and clearness of his prose, and still more markedly in his polished, smoothly-flowing verse. With him poetry was a natural form of expression. As was to be expected from one of his kindly temperament and lively humor,

* Morton Memorial Volume, p. 190.

he was peculiarly happy in his verses of occasion. But he sounded also a deeper note. In such poems as "The Discontented Island"—a most delicate fantasy, treated with serious purpose and a greater tenderness—he dealt with the deep principles of human nature; and his work of this order, it is interesting to observe, was informed by an imaginative quality that, in a way, was a by-product of the powerful imagination which was a necessary part of his equipment as a creative scientist.

"It is to be regretted that so few of his poems have been published. For himself, he was content with the agreeable recreation that he found in writing them; and with the further pleasure that he found—and gave—by printing one now and then in a dainty pamphlet, illustrated in accordance with his own suggestions, for circulation among his immediate friends. Sometimes, and that was the best of all, he would read one to a few of us gathered of an evening in his library—a room so filled with characteristic belongings that it absolutely was a part of himself. The reading rarely was of set purpose. Something in our casual talk would suggest it; or there would be on an easel a fresh lot of illustrations for one of his booklets, and we would ask for the poem to which they belonged. And then we would have our reading—the charm of the poem increased by the charm of his voice—in quite an accidental way.

"Indeed, it was because everything went easily and a little by chance in those evenings, that they were so delightful. Their only constant and certain quantities were a great friendliness and a flow of brilliant talk, that sometimes held seriously to a single topic the whole evening through, and that sometimes played with a dozen topics in an hour. In those givings and takings of thought he was equally good as a leader or as a listener, and I cannot remember an occasion on which any subject was broached about which he was not deeply and accurately informed. At the end of our talks he left us always the better for his wisdom or his wit: and yet his method was such that, for the moment, we would have the feeling that he was merely refreshing knowledge that we possessed and had suffered to grow rusty, or that his keen comments and lively sallies of fancy were what we were about to say ourselves.

"The charm of those evenings—and it was the same charm that made all who came in touch with him better and happier—was his strong, warm sympathy in the doings and in the hopes of his fellow-men. His manifestation of that sympathy was not careless or fitful.

"The considerate purpose of his life was to add to the happiness of other lives. He believed, and he realized his belief, that only on the lines of reciprocal helpful kindness can the approach to universal happiness be made. Here, in his own words, is the statement of his creed:

> "'None are alone;
> Each hand in hand with each
> Is traveling toward the fair sublime unknown,

Forget thy little self. One moment turn
Thine eyes upon the universe and learn
That thou, and with thee all created things,
Are fellow-architects,
Each one of whom erects
In part, from out this present heaven and earth,
New earths, new heavens of surpassing worth,
Lovely beyond thy best imaginings.

Oh, weary, weeping heart, then turn
From vain repinings at thy state!
With thy vast brotherhood of nature learn
Ever to work and wait.
And rest assured of this, Oh, soul of mine,
Thy essence is eternal and divine,
And shall not share its mortal garment's fate.'"