

# Proceedings of the Iowa Academy of Science

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Volume 4 | Annual Issue

Article 4

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1896

## Memorial of Charles Wachsmuth

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### Recommended Citation

(1896) "Memorial of Charles Wachsmuth," *Proceedings of the Iowa Academy of Science*, 4(1), 13-16.  
Available at: <https://scholarworks.uni.edu/pias/vol4/iss1/4>

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two pieces of wood evidently hermetically sealed and which contained sheets of birch bark bearing aboriginal hieroglyphs.

The committee appointed to prepare a memorial in honor of Dr. Charles Wachsmuth and consisting of Prof. Samuel Calvin and Dr. Charles R. Keyes, presented the following sketch, prepared by the long time friend and former co-laborer of Dr. Wachsmuth, Dr. Charles R. Keyes. The plate for the portrait was kindly loaned by Mr. Charles Aldrich, of the historical department.

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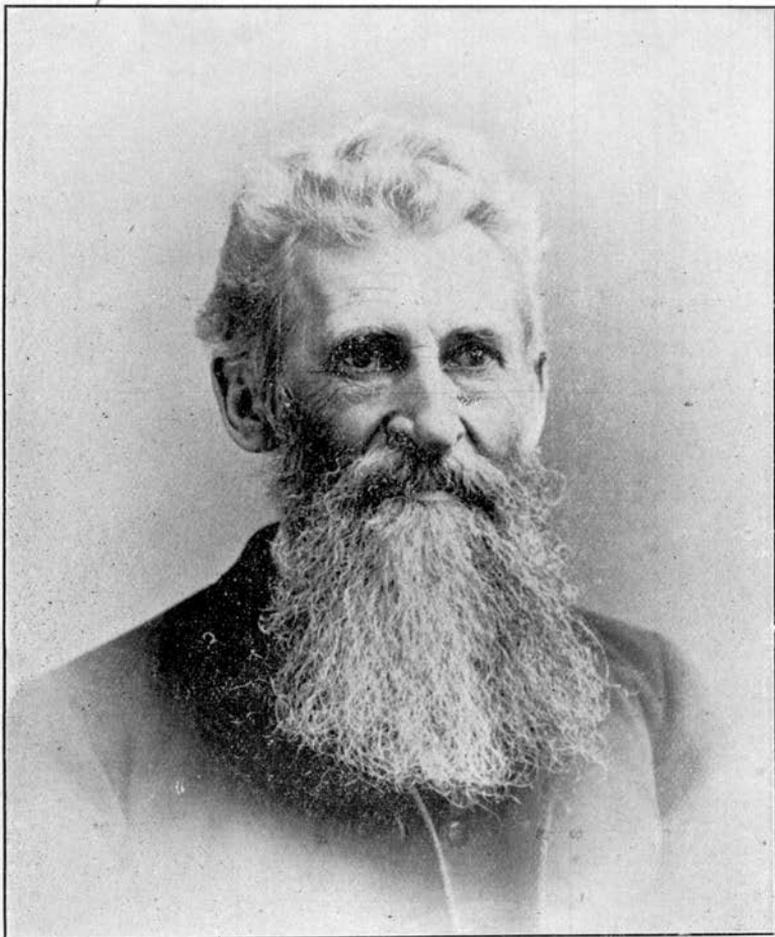
#### MEMORIAL OF CHARLES WACHSMUTH.

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Since our last annual gathering the Academy has lost one of its most illustrious and honored members, the state one of its most distinguished citizens and American science one of its most indefatigable workers. By the death of Charles Wachsmuth an epoch in the history of Iowa science closes. To those of you who were intimately acquainted with our departed friend and associate no words that we can utter will seem extravagant. Yet it appears befitting at this time, especially for the consideration of those of you who were not so fortunate as to come in frequent contact with him, to give some estimate of his personality and worth.

Charles Wachsmuth was born September 13, 1829, in the city of Hannover, Germany. He was the only son of a lawyer of considerable reputation who was a member, in 1848, of the German parliament of Frankfurt. From early childhood he was always in feeble health. It was the wish of his father that he should study law, and he was accordingly sent at an early age to the high school of his native place to receive a classical education; but to his father's great grief and his own, he was obliged, at the age of sixteen, to give up all studies on account of failing health, and on the advice of the attending physician to enter a mercantile career.

In 1852 the young Hannoverian came to America, having been sent to New York as an agent of a Hamburg shipping house, in which capacity he served for a period of over two years. Severe illness compelled him to leave the sea coast, and upon the advice of friends he settled in Burlington. In 1855 Mr. Wachsmuth was married, and in the same year embarked on his own account. The dry, western country did not bring about the expected improvement in health, and his physician advised that as much time as possible should be spent in the open air, suggesting that the collecting of fossils, which abounded in the rocks of the neighborhood, would soon provide an incentive for sufficient exercise. It did not take long for him to develop into an enthusiastic collector, so that days at a time were spent in quarries and ravines around the city, his wife often looking after the store. The new mode of life at once produced a wonderful improvement of health. In the course of a few years a fine collection of crinoids had been brought together. It reached such dimensions that it attracted



Yours very truly  
Charles Wachsmuth

the attention of eastern scientists. Prof. Louis Agassiz came to see it on his lecturing trip to the west, and Meek and Worthen asked the loan of specimens for description in the geological reports of Illinois, which were then being prepared.

In 1865 Mr. Wachsmuth closed out his business and, accompanied by his wife, made a trip to Europe. On his way he visited Cambridge, upon invitation of Professor Agassiz, and saw the large collections in the Museum of Comparative Zoology. Until then he had seen very few crinoids aside from those found at Burlington. His delight knew no bounds as he studied in Cambridge the fossil crinoids from other localities, and a number of specimens of living types. In Europe all sorts of invertebrate fossils were collected and visits made to the principal museums. When England was reached it was a great surprise to find that the reputation of the Burlington collection had already preceded him.

On returning to Burlington, after an absence of almost a year, Mr. Wachsmuth resolved to devote the rest of his life to scientific pursuits, and to direct his whole attention to crinoids. Living far from scientific centers, and not having access to literature, he had to depend for study largely upon his own specimens. This, however, proved afterwards an advantage, rather than a drawback, for independent thought and original research.

It was in 1873 that Professor Agassiz, on his return from the Pacific coast, paid a second visit to Burlington. He was greatly surprised at the enormous growth of the collection since he had last seen it, and, struck by the beauty and perfection of the specimens, he intimated that he was anxious to procure the collection for Cambridge, at the same time expressing a desire to have Mr. Wachsmuth go with it and take charge of all the crinoids in the museum. The negotiations were soon completed, and a few months later Mr. Wachsmuth was installed in the Museum of Comparative Zoology as an assistant. It was Professor Agassiz who induced the new assistant to publish the results of his observations under his own name, on the ground that he was doing a great injustice to himself by placing them in the hands of others. The position, which was held until the death of Professor Agassiz, gave ample opportunity for Mr. Wachsmuth to become fully acquainted with the literature on the crinoids, and it was here that the foundation of the later great work was laid.

After the death of Agassiz a second trip to Europe and a visit to the Orient, was made. On returning in 1874 Mr. Wachsmuth had not a single specimen in his possession. However, it took only a few years to make up another collection that was larger and much superior to the first. A year or two later he made the acquaintance of Mr. Frank Springer, then a young lawyer of Burlington, and an enthusiastic student of the natural sciences; a warm friendship soon sprung up between them. They studied together, and from 1878 the results of their researches were published under joint authorship. In the following years the collections increased rapidly by extensive purchases. From a trip to Europe Mr. Springer brought home a fine selection of Dudley crinoids, embracing nearly all of the species of that locality, and a large assortment of the Carboniferous species of England and Ireland. Among his acquisitions were also rare forms from Belgium, a majority of the Eifel species, fine specimens from Russia and Bohemia, and a large amount of material from the Mesozoic and later formations. The collection was enlarged further by extensive

exchanges with collectors in this country and Europe, and by having collectors in the field. Liberal purchases for the library were made, and when work was commenced on the monograph, nearly the whole crinoidal literature, from the time of J. S. Miller to date, was at hand. By examining the titles of their publications it will be noticed that Wachsmuth and Springer took very little pride in describing new species, their attention being directed mainly to the morphology, with a view to classification, and to the revision of the work of the earlier writers. As the work of the monograph was nearing completion, Prof. Alexander Agassiz, the present director of the Museum of Comparative Zoology, offered to publish it, in the best style possible, as one of the memoirs of the museum, and in this series it now appears, a model of typographic art.

Mr. Wachsmuth was at one time vice-president of this society. He was also a fellow of the American Association for the Advancement of Science, of the Geological Society of America, and of the Davenport Academy of Sciences. He was a corresponding member of the Philadelphia Academy of Natural Sciences, and a member of the Imperial Society of Natural Sciences, of Moscow, Russia. For many years he carried on an extensive and intimate correspondence with leading scientists of this country and Europe. That which passed between Dr. P. Herbert Carpenter, the most eminent European authority on Echinoderms, and Mr. Wachsmuth during the past ten years would alone fill a large volume.

For many years Mr. Wachsmuth was in delicate health and was obliged to spend the winter seasons in the South. The early spring was usually passed in the mountains of Alabama, Tennessee and Kentucky, where immense collections of both crinoids and blastoids were brought together. On all of these trips he was accompanied by his faithful wife, who is, herself an excellent and indefatigable collector.

The sudden demise of our associate took place on February 7, 1896.

Although rarely able to be present at the meetings of our Academy no member took greater interest in its deliberations nor had greater solicitude for its welfare and progress.

From early childhood Mr. Wachsmuth possessed a frail constitution which continually threatened to give away, yet he withstood the inroads of an organic disease long enough to nearly complete the allotted span of human life, of three score years and ten. During the last three years his health gradually failed, until for several months previous to the end, herculean efforts were necessary to enable him to work even for a short time each day. His last illness covered only a few days, and even the iron will, which had so often before overcome a long-standing ailment, finally had to give up to the physically weak heart. To within a day of his demise, with a zeal that is begotten only for love of the sublime, he continued to apply himself to the finishing stages of the crowning glory of his life—the Monograph of the Fossil Crinoids. The first half only was written and the final proofs of this part were barely read when the angel of death beckoned him. The triumphant joy of beholding the completed structure of a noble life's work was not his lot. Deprivation of what he held dearest took the place of conquering satisfaction, in the very hour of victory.

Few outside of the little circle of workers directly interested in the rather limited field of investigation can appreciate the great importance and originality of Mr. Wachsmuth's work. Compared with the extent of

the great field of science itself the results may seem small; measured by the standard of individual achievement the outcome is stupendous. In the special department of knowledge which he represented no one person has done more to raise it to the high place that it now occupies.

Wachsmuth belonged to that illustrious school of naturalists which Louis Agassiz founded in this country. His main efforts were entirely along the lines of inquiry pointed out by the Swiss savant. It was the establishment, upon a morphological basis, of a rational classification of a group of organisms. The group chosen was the crinoids, or sea lilies, a class of animals which is now all but extinct, but which in ages past was one of the most abundant forms of life. Most of the material was fossil and the difficulties surrounding the investigation were such as to students of living animals would be insurmountable. Although the work was far from finished at the time of his demise the main and most important features of the scheme were fully established and the Wachsmuth classification of crinoids has been adopted the world over.

In the *Monograph of the Fossil Crinoids*, which is a huge quarto of 800 pages in two parts and an atlas of eighty plates, is contained the mature reflections of thirty years' continuous thought and reflection. Twenty years ago, when at Cambridge with Agassiz, the foundations of his life's work were laid. In a little paper "On the Internal and External Structures of Paleozoic Crinoids," published in 1877, was stated the essential propositions on which rested all subsequent work. The ancient crinoids were divided into three primary groups, the separation being based chiefly upon the structure of the tegmen.

The effects of Wachsmuth's work has been completely to revolutionize the ideas which prevailed concerning the crinoids and to place the whole systematic arrangement of the groups upon an enduring basis. The stages in the development of those changes are easily traced in the various publications which were issued from time to time and culminated in the monumental monograph.

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## THE STATE QUARRY LIMESTONE.

BY SAMUEL CALVIN.

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At the state quarries, or North Bend quarries, in sections 5 and 8 of Penn township, Johnson county, Iowa, there is a body of limestone of Devonian age, possessing marked characteristics which set it off sharply from the rest of the Devonian in the upper Mississippi valley. The formation has a thickness of about forty feet. At present there is some uncertainty as to its exact taxonomic relations.

On fresh fracture the state quarry rock is light gray in color. In texture it varies somewhat in different beds, but