THE FORERUNNERS OF THE ILLINOIS STATE ACADEMY OF SCIENCE

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Cyrus Thomas and the Beginnings of the Illinois Natural History Society—1857

In 1957 the Illinois State Academy of Science celebrated its fiftieth anniversary. That year also marked the one-hundredth anniversary of the Illinois Natural History Society, the first voluntary organization for the advancement of science to be founded in Illinois. The suggestion that such an organization be started was made in a letter from Cyrus Thomas of Carbondale to Charles E. Hovey, editor of *The Illinois Teacher*. Hovey read the letter at the Decatur meeting of the State Teachers Association in December, 1857. (1)

Cyrus Thomas may well be called the father of organized science in Illinois. He was, in 1857, a lawyer in Jackson County, and his avocation was the study of natural history, especially entomology. Born in Tennessee in 1825, Thomas attended the village school and the small academy in Jonesboro. Interested in natural history as he was, he planned to become a doctor, as were so many of the scientists of the period. The necessity of earning his living prevented him from attending medical college; instead he taught school while he prepared himself to be a lawyer. But so expert did he become as an entomologist that he later was appointed State Entomologist and Professor of Natural Science at Southern Illinois Normal University. He later turned to the study of anthropology and demonstrated that the mound builders of the Middle West were not a vanished race, but Indians in an earlier phase of their culture. In this work he was closely associated with John Wesley Powell in the Bureau of Ethnology in Washington. (2)

In his letter to Hovey, Thomas proposed that an "Illinois Natural History Society" be established for the purpose of "investigating and studying" the "Flora, Fauna, Geology and Mineralogy of Illinois." The Society was also to publish the results of its investigations and studies, and to establish a museum. The Illinois State Normal University, or the Normal School as it was commonly called, had been founded in 1857. Thomas said that it should be the headquarters of the Natural History Society, and that the museum and library should be located there. Thomas envisioned the Society as a strong educational force, and proposed that the Society museum send "suites" of specimens to all the colleges and universities in the state. The legislature was to be asked to order the deposit in the Society museum of geological specimens collected by Joseph G. Norwood, just dismissed as State Geologist. The Society was to meet an-

nually at the Normal School and the members were to make collections and send them to the museum. Members were also to keep a record of their natural history observations and report them to the Society. The Teachers Association voted to issue a call for an organizational meeting to found such a natural history society as Thomas proposed. (3)

Background Forces in the Founding of the Illinois Natural History Society—1857

In proposing the organization of a state natural history society, Cyrus Thomas was in tune with the times. An interest in natural history was in the air in Illinois in the 1850's, as it was throughout the United States. In many states there was an urge to develop natural resources, and the Illinois legislature had given voice to this urge when it had established the geological survey in 1851. (4) At the same time there was much interest in improving agriculture and it was believed that a knowledge of natural science would aid farmers. The Horticultural and Agricultural Societies of Illinois were founded in the 1850's. The suggestion that the Illinois Natural History Society be associated with the new Normal School was tied in with agricultural education. An article in *The Prairie Farmer* pointed out that the farmers had backed the founding of the Normal School by the state legislature in 1857 because the teaching of agriculture would be a part of the curriculum. And, it was commonly accepted that the teaching of scientific agriculture must be soundly based on a knowledge of botany, zoology, and mineralogy. In fact, the legislature prescribed that these subjects be taught at the Normal School.

Agricultural advocates expected that the Normal School would train teachers in the natural sciences so that they could go out and teach children the fundamentals necessary to further education in agriculture, either in school or informally through books and journals, and in meetings of county and state societies. (5) An anonymous writer calling himself "An Old Agricultural Editor," wrote in *The Prairie Farmer* that the Normal School was founded for farmers, and "was thrown to us like a bone to a dog, because we had been growling for an 'Industrial University'." (6) The Industrial University was a type of institution for teaching mechanical, engineering and agricultural subjects, and the state legislatures and the national Congress were being urged to found them. Among the leading advocates of the idea was Jonathan B. Turner of Jacksonville. In 1862 Congress did pass the Morrill Act providing for the land grant colleges, which were to be much like the industrial university advocated by Turner. In 1867 Illinois established her institution at Urbana-Champaign.

There were other evidences of an interest in natural science. The Chicago Academy of Sciences had been founded in 1856 through the leadership of young Robert Kennicott, an enthusiastic collector and student of Illinois wild life. (7) Just across the Mississippi, Dr. George Engelmann, a well-known botanist, had been the mainspring in organizing

the Academy of Science of St. Louis in the same year. (8)

Educators were also concerned with natural science because many of them believed that it should be a part of the school curriculum, not so much for practical purposes, although these would not be neglected, but that an acquaintance with the world of nature would arouse a feeling of wonder and respect for God the Creator. For example, the Illinois Teachers Association at its Decatur meeting in 1857 had as its principal speaker, Professor Edward L. Youmans, a popular lecturer and publicist for science, whose subject was "The Chemistry of the Sunbeam." The editor of *The Illinois Teacher* commented that his speech was "the grandest exhibition of the eternal harmonies that pervade and link together in indissoluble unity, the most familiar phenomena of nature with the most stupendous displays of the Divine Power and Glory . . . and contributed much toward leading the Association to the earnest consideration of the subject of natural science." (9) Even such a practical man as Cyrus Thomas held that one of the main reasons for studying natural history was that, through it, one could understand the "power and wisdom of the Creator," and that eventually one could "comprehend God's design for the cosmos."(10)

The Organizational Meeting of the Illinois Natural History Society—1858

It was in response to all of these influences that the Illinois Natural History Society was organized at Bloomington in the rooms of Illinois State Normal University in June, 1858. Jonathan B. Turner was elected chairman. Turner was a former teacher at Illinois College, interested in horticulture. He was an advocate of industrial and agricultural education and, therefore, was a supporter of the Normal School. He combined in himself all the ingredients that went into the making of the Society. (11) With Turner in the chair, President Hovey of Illinois State Normal University stated the reasons for calling the meeting, and read Thomas' letter. (President Hovey had been the editor of *The Illinois Teacher* until he was appointed to head the Normal School.) A few other persons spoke, making it clear that the purposes of the proposed organization would be "to concentrate and enlarge our researches in the study of the natural history of the state," and to found a museum at the Normal School. (12) Chairman Turner appointed a constitution drafting committee of Charles D. Wilber, a teacher at Normal; Daniel Wilkins, head of the Female Institute of Bloomington and a member of the Board of Education, the governing body of Normal University; (13) Dr. Frederick Brendel, a German 48er with a European education in medicine and the natural sciences, whose specialty was botany; (14) and Charles A. Bragdon, associate editor and publisher of *The Prairie Farmer*.

The constitution reported by this committee was short and simple, providing for president, nine vice-presidents (one from each Congressional district, a device adopted from the Horticultural and Agricultural

Societies), secretary, treasurer, and general agent (an office found in the Teachers Association). The duty of the latter, as stated in the constitution, was "to visit the different portions of this and other states, make collections of specimens, attend to exchanges with various societies, establish a system of cooperation and labor to incite a general interest in the study of Natural History." The specimens thus collected were to be labeled and deposited in the museum at Normal University. Although nothing was said about it in the constitution, Wilber's salary was paid by Normal University, and his traveling expenses were covered by free transportation on the railroads. Any person might become a member of the Society if he had the favorable vote of a majority of the members, and if he paid one dollar as an entrance fee. Unaccountably no annual dues were provided for. (15)

On the recommendation of a nominating committee, the following officers were elected: Jonathan B. Turner, president; John A. Kennicott, Cook County, a farmer and a horticulturist active in state organizations and a frequent contributor to periodicals; A. R. Whitney, Lee County; Dr. S. S. Condon, Union County; Dr. Frederick Brendel, Peoria County; J. H. McChesney, geologist on the state geological survey; Dr. Bird, Kendall County; Dr. Samuel Adams, Professor of Chemistry, Geology, and Mineralogy at Illinois College, vice-presidents (only seven of the nine provided for in the constitution were elected); Dr. E. R. Roe, McLean County, physician, lecturer at Normal University on anatomy and physiology, and writer on natural history and educational subjects, treasurer; Charles E. Hovey, secretary; and Charles D. Wilber, general agent. (16)

Some supporters of the Society were not able to be present, but they wrote letters which gave information about what was expected of the Society. Dr. George Vasey (17) of McHenry County, botanist, urged that the Society prepare and distribute printed instructions for collecting and preserving plants, and for making reports to the Society. He stated that, if there were many people who knew how to gather information, soon there would be a great body of it available on the plants of Illinois. He went on to say that the Society might do something about producing an elementary botany book for the schools that would be based on the plants of the Middle West rather than upon those of the East, as were the books by Asa Gray and others. (18) From John Kennicott came an endorsement of the idea that the Society establish a museum from which sets of natural history objects could be sent to schools. He said, "The study of nature, of natural science in some shape, is the beginning and end of all practical education, and is intimately connected with every useful art and profession followed by man." (19) Cyrus Thomas wrote that he and his friends in Jackson County were collecting plants, and he hoped that the Society's museum at Normal would serve as a center for the exchange of specimens among people in various parts of the state. (20)

Addresses and Papers Delivered at the First Meeting—1858

As a climax to the first meeting of the Illinois Natural History Society, President Turner addressed the members, interested students, and townspeople, who were informed of the address by means of a printed handbill passed around to the houses in Bloomington. (21) Turner's topic was "Microscopic Insects," (22) and he spoke not only from the standpoint of an educator, but from that of the farmer and horticulturist, saying that insects, fungi, and plant diseases were a threat to the nation because they destroyed food and other products of the soil that were needed by the nation for its continuing growth and prosperity. He went on to point out that scientific knowledge was needed to meet this threat, declaring that there was a great opportunity for young men in the West who would study science, especially entomology, since "we need a score of the best minds of the country [state] under some central head, like this society, or the Normal University, provided with the best microscopes and other needed apparatus for collecting and examining a cabinet and specimens; and the whole country [state] marshalled under them. . . ." (23) Turner's address showed that he was up with the times, and that he was closely associated with the drive of horticulturists and farmers for state support for an entomologist such as was already being given in Eastern states. (24)

It is clear from Turner's speech, and from the comments of other members, that the twin scientific aims of the Society were to broaden and "liberalize" education and to be economically useful. Even the first object had the ulterior intent of arousing an appreciation of science as something that was useful. As Turner said, "We need not simply to name the beasts, but also to rule over them as did our great father Adam; and also all forms of matter." But he recognized that this could not be attained "until we know minutely their history, habits, and relations to other things and beings." (25) There was, of course, no fundamental incompatibility between the two purposes, and both were served by the Society. When the Illinois Natural History Society finally went out of existence it was succeeded by the Illinois State Natural History Museum and the Illinois State Laboratory of Natural History, the former to carry on science education, the latter to make science economically useful.

At this first meeting in 1858, the Society listened to two scientific papers, the first by Dr. Frederick Brendel, and the second by Charles D. Wilber. Wilber's paper, "The Corals of Iowa," was not printed, but Brendel's remarks, "Forests and Forest Trees," were given in full. (26) The Peoria physician and botanist first noted how, throughout history, forests had been important in the economic life of the people of Europe and Asia, and called attention to the intimate connection between vegetation, soil and climate. This was not an original idea, and he carefully cited articles in current literature to illustrate his point. He then turned to the trees of Illinois, pointing out that the forested area

was the southern one-third of the state and in the river bottoms of the northern prairie region, that most of the trees were deciduous, and the major part of these were the types that grow in river bottoms—sycamores, maples, oaks, and cottonwoods. In the whole state twenty-five families and forty-three genera were represented. Brendel soon moved away from this broad physiographical view of the Illinois forests, and took up the matter of classification and determination of species. The major part of his paper, therefore, was taxonomic, as were so many of the papers of American scientists of the time. While Brendel's paper and those of his fellows may be criticized for being dull and pedantic, yet, as Jonathan B. Turner said, collection, identification and classification were basic for any further scientific work. Although Brendel was drawn to the study of the ecology of forest trees (ecology was a term that would not be invented for several decades), he recognized the importance of taxonomy, and he was critical of much of the early identification and classification of American flora and silva done by Europeans, or in some cases by Americans, who worked in study and laboratory from dried specimens sent to them by collectors. He contended that only by associating the plant or tree with its habitat could a satisfactory classification be made. To disregard, or to be ignorant of, habitat details caused the naming of far more species than actually existed, and brought consequent confusion into botanical studies. Brendel was thus in the forefront of botanical scientists, because the great botanists of the period such as Asa Gray and George Engelmann went into the field as often as they could, and always insisted that their collectors submit habitat information with specimens. (27) To his paper, Brendel appended a check list of Illinois trees based on his own observations. (28)

Charles D. Wilber and the Early Activities of the Illinois Natural History Society—1858-1861

While the Illinois Natural History Society was in existence from 1858 to 1871, the years of its greatest activity were 1858 to 1861. It continued to meet during the Civil War, but not much was done. Efforts to revive it after the war met with little success. In one sense the parent devoured the child, because the museum at Normal became more important than the Society. Eventually the Society was dissolved and the Museum turned over to the state. The history of the Society, therefore, divides itself into two parts: before and after the Civil War. During the first part, cooperation and mutual assistance between the Society and Normal University prevailed. Annual meetings were held at the University in June during Commencement Week, or as it was called, Anniversary Week. In between meetings the activities of the Society were directed by the General Agent, Charles D. Wilber, Professor of Geology at Normal, and largely responsible for what success the Society had. Immediately after his appointment in 1858, he went on a tour of the state, securing from the railroads free transportation for himself and for the specimens he gath-

ered from collectors such as Brendel and Thomas. Since Wilber's salary was paid by Normal University, he was responsible to Charles E. Hovey, the president, and in a detailed report to him Wilber described his work. (29) His principal concern was to get the natural history survey of the state under way, and to accumulate material for the museum. He issued a circular giving directions for the study of natural history, and it was printed in both *The Illinois Teacher* (30) and *The Prairie Farmer*. (31). In it he said that since the object of the survey was "to make the study of Natural History accessible to everyone," it should "enlist the energies of every intelligent and enterprising teacher." He then gave detailed instructions for collecting and preserving natural history objects, adapted from a circular prepared by Robert E. Kennicott.

Following the suggestions of Thomas and other members, Wilber made contacts with a number of men who were already carrying on some kind of natural history study or making collections. Among them was Dr. George Vasey of McHenry County, a young man who was born in England, came to the United States as a child, and grew up in New York, where his enthusiasm and talent for natural history attracted the attention of Asa Gray and John Torrey. He earned his M.D. degree and came west to McHenry County to practice. He did much botanizing, being especially attracted by the prairie grasses. His personal collection of these had importance to botanists because it contained so many specimens from the virgin prairie. He later became a professional botanist, being employed by the United States Department of Agriculture. He also arranged the large herbarium of the Smithsonian Institution so that it could be used by scientists. (32) From Vasey, Wilber obtained over a thousand specimens for the Society's museum. (33)

Robert Kennicott was another young man who assisted Wilber. Kennicott, the son of Dr. John Kennicott, the horticulturist and farmer of Northfield in Cook County, was born in New Orleans in 1835, but was brought to Illinois as a baby. Under his father's tutelage, he learned a great deal about the outdoors, and became an avid natural history collector. So much had he learned about the wild-life of the state that he was named to make a natural history survey of the just completed line of the Illinois Central Railroad. His success brought him to the attention of men in Chicago, and he inspired them to contribute money for the museum of the young Academy of Sciences. His accurate work attracted the interest of Spencer F. Baird, the Assistant Secretary of the Smithsonian Institution, and Kennicott was invited to come to Washington to go over the collections of the Smithsonian. Young Kennicott was at his best in the field. He made important collecting trips to Minnesota and to Canada as far north as the Yukon River. His knowledge of this country brought him a post on the party sent out by the Western Union Telegraph Company to survey a projected (but never built) line from the Pacific coast to Alaska, across Bering Strait to Siberia, and then to

western Europe. While on this job, Kennicott died in Alaska at the age of thirty-one. (34)

Others who collected material and contributed it to the Society museum were Dr. Brendel, Cyrus Thomas, Amos Worthen, the state geologist, and J. H. McChesney, his assistant. Others whose names only are known were E. S. Bond, Henry County; and Richard H. Holder, McLean County, both ornithological collectors; Samuel Bartley, a friend of Cyrus Thomas in Jackson County; Dr. E. R. Roe, McLean County; Judge Snyder, Belleville; Dr. Mead, Hancock County; and R. G. Oaks and Professor Sheldon of Kane County. (35)

Wilber also encouraged the founding of county natural history societies, but with what success is not known.

The Illinois Natural History Society Museum at Illinois State Normal University—1858-1862

One result of Wilber's years in the field was that at the meeting of the Natural History Society in 1860 "commissions" in the various branches of natural history were created so that men of like interests in different parts of the state might work together. (36) Wilber also opened negotiations for museum material with the geological surveys of the surrounding states, and contacted foreign missionaries and other persons in Europe and Asia. A start on a science reference library was also made. (37)

The upshot of all this volunteer work was the accumulation of 60,000 individual specimens by 1862, which, if they had had to be paid for, Wilber estimated would have cost $23,000. While the collection was being made, Normal University completed its main building in which two large halls with a combined area of 100 x 33 feet were set aside for the museum. The arrangement of the cases in this room was carefully planned by Richard H. Holder, the ornithologist and taxidermist of Bloomington, after he visited museums in Philadelphia, Boston, and Salem. At the front of the room were twelve large cases of "pure French glass" each four by eight feet and ten feet tall, in which Holder's and Bond's bird collections were arranged by families, each specimen standing stiffly on its wooden perch. Opposite the bird cases were those containing fossils from coal, some of them in quite large pieces. Here also were the fossils from the rock strata of the Carboniferous period. Back of these two sections were floor cases containing drawers for insects and plants. Along the walls were cases of fossils — shells, corals, sponges, etc., — and minerals, ores, and rocks, the former arranged by geological epochs and the latter according to the locality in which they were found. Also displayed on shelves were glass jars containing specimens of reptiles, fishes, and shell-fish preserved in alcohol. On the wall above the cases of geological specimens were the first four of what was to be a series of paintings illustrating the great epochs of geologic time. The artist was J. E. Bryant of Bloomington. (38)

The purpose of the museum, as Wilber saw it, was "simply to pre-

sent a type of all the species of [sic] existence in the various kingdoms of nature, ancient and modern, arranged according to the type or affinity of each group. It is a *human* attempt to represent, as far as possible, the *divine* idea of creation, by a real panorama of objects." (39) Wilber was an advocate of what was then the "modern" educational method of teaching by seeing and doing rather than by rote from textbooks, and he declared, "by the judicious use of this great collection, under proper regulations, students who attend this Institution [Normal University] from all parts of the State, can obtain a general survey of our material resources, and will learn one important fact at least, that our home facilities for education, the new, or reformed method of object lessons are unequalled." (40) From this array of the "medals of creation" the student would learn a pre-Darwinian view of nature: that God the Creator had successively brought into existence new forms of life to fit new conditions, each form more advanced than the preceding one, "until the culmination of the grand plan, in the advent of the human race." As the student viewed this progression upward, Wilber said, "ask him . . . if the works of God do not impress him with the higher conceptions of the wisdom, beneficence and accompanying presence of the great Creator." (41)

The value of the museum was so evident to Wilber that any persons who questioned it, he said, "belonged to a past epoch, and may be termed the fossils of society, who are labeled and laid away." (42)

But there *was* questioning of Wilber and the Natural History Society museum. It seems clear that he was so absorbed in the work of collecting and displaying natural history objects to create a museum for teaching purposes in what he considered the broad sense of making the student aware of God and His creation that the utilitarian purposes of the Society and the museum were neglected. When, for example, Wilber reported that the museum would display objects from Europe and other parts of the world, *The Prairie Farmer* said bluntly that it was more important that the museum have plants of Illinois than shells from the Sandwich Islands, because farmers would not benefit from such strange things. (43)

Although further additions were made to the museum, it did not expand greatly during the Civil War years. As Wilber reported to President Hovey:

> Hard as the work was, our progress was remarkable until the war broke out, which is death to Science and Art. But even amidst the smoke and carnage of the past eighteen months, we have *added many thousand* specimens to the collection; but the grand work must stop now, for a while at least, there are few to help—nearly every naturalist is in the army—there is no money, and the future is unpropitious indeed. (44)

Activities of the Illinois Natural History Society—1859-1862

While Wilber and his volunteer collectors built the museum, the Society itself continued to meet annually in Bloomington. In 1859 the constitution was revised by dropping the initiation fee and making annual dues two dollars. The office of General Agent was abolished, and the

new one of Superintendent was created for Wilber. The museum was put in charge of a curator, and Cyrus Thomas was named for the post, but since he lived at such a distance, the actual direction of the museum remained in Wilber's hands. The constitution also provided for an executive committee of five members, a necessity for a state-wide organization that had only one meeting a year. Jonathan Turner was re-elected president, although he was not present at the meeting, and nine vice-presidents and other officers were named: Dr. Edmund Andrews, Cook County, a member of the Chicago Academy of Sciences; A. M. Gow, Lee County; Frederick Brendel, Peoria County; J. H. McChesney, Sangamon County; B. G. Roots, Perry County; Ben Wiley, Union County; William Le Baron, Kane County; M. L. Dunlap, Champaign County; and Dr. E. R. Roe, McLean County. The secretary was S. B. Mead of Hancock County; treasurer, Dr. E. R. Roe; curator, Cyrus Thomas; superintendent, Charles D. Wilber; executive committee, Ira Moore, C. D. Wilber, Charles D. Bragdon, Dr. George Vasey, and Cyrus Thomas. (45)

Of the men assuming leadership for the first time, Andrews was a physician of Chicago, much interested in natural history, Dunlap was an orchardist, Root was an educator, Le Baron was a physician in Geneva and a student of entomology who later became State Entomologist, Moore was a teacher at the Normal University, (46) and nothing is known about Mead.

The Society agreed to call a meeting of scientists from the states bordering on Illinois so that there might be cooperation in surveying the natural history of the whole area, but there is no record that the meeting ever took place. The Society authorized the superintendent to arrange for an exhibit from the museum at the forthcoming state fair at Freeport, a task which was successfully accomplished by Wilber. The Society also decided that a catalog of plants and animals of Illinois be published, and these appeared in the transactions of the Society as noted below. The superintendent was instructed to work out a means of distributing natural history collections to the schools of the state. (47)

At the time of the next meeting in 1860, Wilber, just given the new title of Secretary, reported that there were 140 dues-paying members, although only thirty were actively engaged in the study of natural history, and that the former gave their support because they recognized the importance of the work of the Society. It was at this meeting that the active members were assigned to "commissions" so that the work of making a natural history survey might go forward. These were the commissions and their members:

Botany: Dr. George Vasey, Ringwood, McHenry County; E. Hall, Athens, Menard County; M. S. Bebb, Springfield; Dr. Frederick Brendel, Peoria; Dr. S. B. Mead, Augusta.

Geology and Mineralogy: C. D. Wilber, Bloomington; J. W. Foster, Chicago; Rev. O. D. W. White, Mt. Carroll; Dr. Oliver Everett, Dixon.

Paleontology: A. H. Worthen, Springfield; J. E. Reynolds, Springfield; Dr. M. Davis, Oswego, Kendall County; James Shaw, Mt. Carroll.

Conchology: J. W. Powell, Wheaton; Dr. Lucius Clark, Rockford; M. S. Bebb, Springfield; Dr. E. R. Roe, Bloomington; E. Hall, Athens.

Entomology: B. D. Walsh, Rock Island; Cyrus Thomas, Murphysboro; Dr. J. A. Sewall, Bloomington; Dr. William Le Baron, Geneva.
Herpetology: Robert Kennicott, Northfield; U. D. Eddy, Bloomington; J. Johnson, Vienna.
Ichthyology: Dr. Adams Nichols, Quincy; Dr. William H. Giddens, Hamilton; Dr. L. Watson, Quincy.
Mammalogy: William H. Gearhard, Murphysboro; Cyrus Thomas, Murphysboro.
Ornithology: R. H. Holder, Bloomington; Dr. J. W. Velie, Rock Island; A. M. Gow, Dixon.
Meteorolgy: E. Hall, Athens; Dr. Samuel Willard, Bloomington; Rev. W. W. Harsha, Dixon; James Shaw, Mt. Carroll.
Drawing and Painting: J. E. Bryant, Bloomington. (48)

This is probably a rather complete list of the active naturalists in Illinois in the middle of the nineteenth century. It has not been possible to identify each person, but the following men played a greater or lesser part either because of their work in the Natural History Society, the State Geological Survey, or because of their later work in their chosen fields: Vasey, Brendel, Wilber, Foster, Worthen, Powell, Roe, Walsh, Thomas, Sewall, Le Baron, Kennicott, Holder, Velie, and Gow.

Papers and Addresses Read to the Illinois Natural History Society—1860

As noted above, the Natural History Society's activities slowed down during the Civil War, and there is no official record after Wilber's report of 1862. In 1861 the Society received a charter from the legislature, (49) and Wilber continued to direct the museum until 1864. (50)

The practice of reading scientific papers established at the first meeting was continued. In 1859 papers were presented by Cyrus Thomas, "The Study of Natural History"; Frederick Brendel, "On Meteorology in Connection with Botanical Investigations"; George Vasey, "Mosses of Illinois"; Cyrus Thomas, "Orthoptera of Illinois"; and E. R. Roe, "Notes on the Great Drouth in '53 and '54." (51)

Thomas' first paper illustrated clearly his familiarity with the orthodox natural science theories and beliefs of the time. In the spirit of the German idealistic philosophy of nature (52) Thomas saw natural history, not as isolated facts and phenomena,

> but most admirably linked together and interwoven around the great central stem—Design—from which every root sends forth its culms. Consequently the more and more of this knowledge we acquire, the more we know of God's infinite power and wisdom; and the nearer we are approaching His eternal throne. And were it not that this wisdom is as limitless as space itself, we might hope that the great I AM has prepared inexhaustible fields of knowledge for us to explore that even eternity shall leave untouched.
>
> I believe the mind of man is capable of continued expansion, and that the day will come on this earth in which a single mind will be capable of grasping the entire "Cosmos", of which the lamented Humboldt could discern the shadowy outlines, but which he in vain attempted to point out to others. (53)

Thomas believed that science should be taught at all levels in the schools because it would discipline and enlarge the mind, prepare the student for future prosecution of the subject, show how the most practical use can be made of the knowledge gained, and instill in the student a love of science. In teaching Thomas advocated what was usual in his day, a progression in an orderly manner through the various branches of natural science, beginning with botany,

and using the natural system of classification as an outline. Thomas also made the point that it was not enough for students to read books, but that they must learn from the objects themselves in the field and in the museum. (54) Thomas was not an innovator, but he was well-informed about current science and science education.

The paper prepared by Dr. Brendel was read by Wilber. It presented the results of Brendel's attempt to determine exactly how high the temperature of the atmosphere had to be to ripen seeds and bring plants to flower. The paper was concerned with methods of making meteorological observations to provide accurate time-interval readings, but of course his methods have been outdated because of the introduction of sensitive clock controlled recording devices. (55) It was not that Brendel's techniques or the results of his research were themselves important, but that the paper indicated that Brendel, with his European education and his contacts with other scientists outside of Illinois, had moved beyond a preoccupation with taxonomy to the study of plant physiology, and so was working in the direction already taken by the leaders of botanical research in eastern United States and in Europe.

In contrast, the papers by Vasey and Thomas were simply annotated lists of species of plants that had been collected and presented to the Society's museum.

Dr. Roe's paper was an interesting exercise in drawing conclusions from observed facts. Roe noticed that certain mollusks characteristic of rivers were found in prairie ponds. He concluded that the ponds had remained when a river, at some remote time, had disappeared during a drought. And now in an extreme dry spell the mollusks had all died when the ponds dried up. But Roe held that the mollusks had been in the ponds for a very long time because he found their shells as deep as five feet in the soil below the bottom of the dried up ponds. It was his conclusion that the "drouth of 1853-54 was greater than had ever occurred since the disappearance of the river that had supplied the ponds." (56)

Other papers were presented at the 1860 meeting. These may be divided into three categories: (1) Those that were taxonomic or descriptive: R. H. Holder, "Birds of Illinois, a Catalogue"; Oliver Everett, "Geological Section of Rock River"; Cyrus Thomas, "Insects of Illinois, with Catalogue of Coleoptera", and "Mammals of Illinois"; George Vasey, "Additions to the Flora of Illinois"; Benjamin D. Walsh, "Insects Injurious to Vegetation in Illinois." (2) Those concerned with some extraordinary natural phenomena: James Shaw, "The Great Tornado of 1860"; C. D. Wilber, "The Mastodon Giganteas [sic]"; Frederick Brendel, "The Water Lily." (3) Those that were on science education: Jonathan B. Turner, "Mind, Force and Matter"; A. M. Gow, "Natural History in Schools"; R. H. Holder, "Taxidermy"; J. H. Blodgett, "Object Lessons"; Cyrus Thomas, "Plan for a Natural History Survey"; C. D. Wilber, "Museum of the Illinois State Natural History Society." (57)

President Turner's address was

essentially inspirational and philosophical and he urged that the members of the Society, in the spirit of Baconian scientific method, keep open minds, gather information, classify it, and draw conclusions. Turner saw God as the Creator, but held that the creative process was a continuing one, and that man, as the highest expression of God's creativity, had the "power" to understand the "force" that created all "matter." (58) Gow's paper on natural history in the schools had been read first at a meeting of the Illinois Teachers Association, and in it he pointed out much the same things that Thomas and other writers did, that the child not only gained much useful information about nature, but that he developed his ability to observe accurately and draw conclusions. (59) In "Object Lessons", Blodgett expanded on the idea that had been first conceived by such European educators as Pestalozzi and Froebel, and widely accepted in the United States, that it was much better to teach from the object itself rather than from a textbook account. (60) Holder's paper on taxidermy was an illustrated description of the proper way to skin and stuff birds for display, (61) and Thomas' paper brought together ideas that had been scattered through his letters and other communications to the Society on the matter of conducting the natural history survey in Illinois. (62) Wilber's paper on the museum contained a description of the physical arrangements at Normal, and gave some information on the objectives he hoped would be realized to make the museum an educational medium. (63)

The group of papers on plants and animals in Illinois constituted the results of the attempt to survey the wild-life of Illinois, and to provide the information which it was believed would be useful to farmers.

The papers on natural phenomena were not the result of original research, but were concerned with matters of popular scientific interest. Wilber's paper went into detail on how and why the bones of an elephant-like animal, a creature associated with the tropical jungles, were found in Illinois. (64) The water lily, a curiosity among plants, was pictured by Brendel in a careful drawing, and the peculiar way in which it grew was described. (65) While there was nothing new in either paper, they were carefully written in proper scientific style. Also of much popular interest was Shaw's account of the great tornado of 1860 which had swept across northern Illinois and up into Michigan, doing much damage to property. The author not only described the effects of the storm, but took up the question of whether electricity in the atmosphere caused the storm, or whether the storm caused the electricity. Shaw reviewed the literature on storms from Franklin to Joseph Henry and James P. Espy, agreeing with the latter that electricity was the result of the storm. (66)

On the whole it was a group of high quality papers, demonstrating that Illinois scientists and teachers were industrious, careful observers, and abreast of the best thinking in their fields.

With the cessation of activity by the Natural History Society during the Civil War there was no further

publication, the natural history survey was dropped, and interest in the museum at Normal University declined.

John Wesley Powell and the End of the Illinois Natural History Society—1866-1871

But when the war ended scientific activity was resumed under the leadership of a new personality—John Wesley Powell. This man, destined for a distinguished career as explorer, geologist, and ethnologist, was born in New York in 1834, and was educated at Oberlin College in Ohio and at Illinois and Wheaton Colleges in Illinois. It was while he was a student at Wheaton that he began his study of the natural history of Illinois during summer trips by canoe on the Illinois, Ohio and Mississippi Rivers. (67) In 1859 he had contributed to the Society's natural history survey, and in 1860 he was appointed to the commission on conchology.

Powell saw service in the Civil War as a member of the Thirty-Third Volunteer Regiment, known as the Schoolmaster Regiment, and at the end of the conflict he came to Illinois Wesleyan University in Bloomington as Professor of Natural Science. He immediately became associated with the Natural History Society and, with other enthusiasts in Bloomington, organized a local chapter. (68) He also visited the Society's museum at Normal University, where he found things in a confused and disorganized state. With the departure of Wilber, there was no one responsible for maintaining the museum. In spite of the professed intention of the University to teach science, and the belief that the museum would make this possible, science courses had no secure or important place in the curriculum. Very few students took any work at all.

As President David Felmley said in reviewing the course of study, "It is a question whether the faculty or board [Board of Education, the governing body of the University] were fully persuaded of the real value of the studies. They were postponed to the latter part of the course. Chemistry preceded the others in the belief that it would solve the problems of animal and vegetable physiology. Zoology was put at the end of the senior year; later it was an elective; some years it was not taught at all." (69) The deplorable lack of instruction in science is even more clearly recognized when it is realized that only a small number of students ever became seniors. In 1862, for example, out of 506 students in attendance since the founding of the school, only twenty-six completed the three-year course and received diplomas, and most students attended for only one year. (70)

The neglect of the museum alarmed Powell and his associates in Bloomington. At the meeting of the Illinois Natural History Society in June 1866, Powell proposed that the Society consult with the Board of Education about obtaining funds for the support of the museum, and until further arrangements could be made, Dr. Joseph A. Sewall, Professor of Natural Science at Normal, would have charge of it. Sewall, who had an M. D. from Harvard University and had studied science with Asa Gray and Louis Agassiz,

was appointed to the faculty in 1860. (71) Since displays had been disarranged and some things stolen, Sewall was to open the museum to the public only on Fridays, and even then all the cases were to be "firmly closed." (72) Powell and Drs. Roe, Stennet, and Parke were directed to contact the Board of Education, and Powell, acting for this committee, drew up an appeal for financial assistance to the Society for the maintenance of the museum. In it he pointed out that this aid was necessary if the Society was to carry out its aims, which he listed as (1) to promote original research in natural science, (2) to make a natural history survey of the state, (3) to supply schools and colleges with natural history specimens for teaching purposes, and (4) to build and maintain a central museum at Normal. (73)

Before continuing with Powell's career, it may be noted that, while these four aims had been the objectives of the Natural History Society from its beginning, the earlier emphasis on the importance of natural science in teaching agriculture was absent. The interest of the farmers had shifted in nine years to the implementation of the Morrill Act, which had passed Congress in 1862, and the Illinois Industrial University was opened at Urbana-Champaign in 1867. The horticulturalists who had supported the farmers in boosting the Natural History Society had now turned their attention to a drive for the establishment of the office of State Entomologist, and this, too, was done in 1867. (74) This left only the Normal University as a possible backer of the Society and Powell's appeal was based wholly on the idea that natural history was a major concern of an educational institution.

Powell explained to the Board that the objectives of the Society could not be achieved, and that the museum could not be useful to the University, unless a full-time general commissioner and curator was appointed, and he estimated that $2500 annually would be required — $1000 for museum expenses and $1500 for the salary of the curator—and that, even so, success would only be achieved if the members of the Society would continue to give of their time and talents to do the necessary field work, "prompted by their love of research and their desire to spread a knowledge of the natural sciences among the people." Powell went on to say that the necessary funds should be provided by the state legislature and that "the barest statement of the objects and requirements of the Society [was] the best argument that [could] be urged in favor of legislative aid." This was not a new venture, he said, because generally in Europe, scientific societies were given financial support by government, and in the United States there was also a precedent in the contributions made by Congress to the Smithsonian Institution. And, finally, he pointed out that "the appropriation asked for is but a trivial thing compared with the amount of labor to be done, the educational interests to be subserved, and the good to be done to the whole people of the State." (75) With full support of the members of the Board of Education, Powell went to Springfield to lobby for his proposal, and

he was successful. The legislature appropriated the $2500 for which Powell asked, and placed it in the hands of the Board of Education, giving it the authority to appoint a curator in consultation with the directors of the Natural History Society. (76) As might have been expected, Powell was immediately appointed curator by the Board of Education and the directors of the Society. (77)

From this moment the Illinois Natural History Society ceased utterly to be an effective organization for advancing scientific investigation or science education in Illinois. While the Society nominally owned the natural history objects in the museum, the cases and furnishing belonged to Normal University, and while the Society's directors were to be consulted on the appointment of a curator, the governing body of the University, since it held the purse strings, did in fact determine who that man would be and what policies and programs he would carry out in the name of the Society.

John Wesley Powell immediately used his position and his influence with the Board of Education for his own purposes, and those purposes had only slight connection with the purposes pursued by the Natural History Society since its founding—the fostering of science in Illinois. Powell's purpose was his plan for an exploring and collecting trip to the Rocky Mountains. It was not that Powell was in any way dishonest, or that he was not sincerely devoted to science, or that he did not make important contributions to science through his explorations. He was honest, he was a dedicated scientist, and his trips to the Rockies and the Colorado River region yielded valuable scientific information. But none of these had anything to do with science in Illinois. (78)

Powell, although a fine teacher in the classroom, preferred traveling and field work, the spectacular and exciting side of the life of the scientist. He was able to convince the Board of Education that Normal University would serve the interests of science in Illinois by spending $500 of the $1000 appropriated by the legislature for the museum to finance Powell's first exploring trip to the Rocky Mountain region. He also secured funds from the new Illinois Industrial University (soon to be renamed the University of Illinois) and the Chicago Academy of Sciences. The railroads promised free transportation, and the United States Army agreed to provide some equipment and supplies, as well as a military escort. The students and others who went along as naturalists or laborers paid a part of their own expenses. (79)

Powell was very successful in collecting large quantities of natural history and ethnological material, and by January, 1868, boxes and barrels of specimens cluttered the halls and rooms at Normal awaiting preparation and labeling. Powell needed this large amount of material, not only to fulfill his promises to Normal, but to his other sponsors as well. (80) When Powell himself returned to Bloomington, he hired four assistants to unpack and arrange the material, and by June, 1868, he was able to show the members of the Board of Education a large number of additions to the museum. This,

plus the considerable fame Powell won through his lectures and newspaper articles, brought the Board to agree to support a second expedition, this time to the Colorado River country, including the Grand Canyon. (81)

Once again a great amount of material was shipped back to the Society's museum and by 1870, when it was finally arranged, the museum was so overcrowded that the Board was considering a plan drawn up by Powell, Vasey, Sewall and A. H. Thompson (superintendent of schools in Bloomington and a member of one of Powell's expeditions) for a two story fireproof building.(82) But the Natural History Society itself played little part in these activities, although it did meet occasionally with Dr. George Vasey as president and Powell as secretary. (83) The future of the almost moribund Natural History Society was thoroughly canvassed at the 1869 meeting, and it was agreed that the Society should divest itself of its museum and go out of existence. (84) The matter was brought to a head in 1871 when the legislature attached to its appropriation of $2500 for the museum, the provision that the Society should transfer to the state its claim to the cases and exhibits. The transfer was authorized at a meeting of the Society held in Bloomington, June 22, 1871, and the Board took legal ownership of the museum. (85) The Illinois Natural History Society went out of existence.

In the thirteen years since its founding, and especially during the first three years, the Society had performed a most valuable service. As the pioneer effort at a voluntary association for the promotion of science education and research, it laid the foundations for the Illinois State Academy of Science, the Illinois Natural History Survey, and, to some extent, for the Illinois State Museum. It had strengthened the work of the professional, semiprofessional and amateur scientists, and had provided a center for their cooperation. (86) But it did not succeed permanently in reaching its own objectives for the following reasons: (1) the lack of money to maintain either the natural history survey or the museum, (2) the disruptive influence of the Civil War, and (3) the coming of John Wesley Powell to the curatorship of the museum, the clash of his personal interests with those of the Society, and the disregard of the latter for what he and the Board of Education considered to be more significant.

Stephen A. Forbes and the High School and College Association of Natural History—1878-1882

There was a second scientific organization that had its center at Normal University, although it was much more limited in its objectives than the Illinois Natural History Society. This was the High School and College Association of Natural History, organized in 1878 and existing until 1882. It was started by the enterprise of Stephen A. Forbes, the new curator of the natural history museum, who succeeded Powell after Sewall filled the post briefly.

Forbes was born in Illinois in 1844 and was mostly self-educated, although he spent a year or two at

Beloit Academy and at Rush Medical College in Chicago. As was true of most natural scientists, he had been interested in natural history from his boyhood, and when he left Rush without graduating, he taught school and continued to study and write about it. Forbes had a distinguished career as a scientist in the employment of the state of Illinois. Starting as the head of the museum at Normal, he became director of the State Laboratory of Natural History and State Entomologist, and continued as director of the Illinois Natural History Survey when that organization took over all state research concerned with natural history. He was Professor of Zoology at Normal, and after 1885, when the state activities in natural science were moved to Urbana, he held the same post at the University of Illinois. He earned a Ph.D. degree from Indiana University in 1884 by submitting a thesis and taking an examination. After a long and productive career, characterized by skill in administration and high scholarship, he died in 1930. (87)

The appointment of Forbes at Normal came at just the time that the legislature passed a law requiring that natural science be taught in the elementary schools, and teachers were required to demonstrate their proficiency in the subject in order to hold certificates. (88) As Forbes said, "Many of the teachers finding a difficult and unfamiliar labor precipitated upon them, having but scant facilities for preparation and little knowing how to use what they had at hand, were eager to avail themselves of all offered aid." (89) In the rush to qualify, teachers boned up on the subject from what books were at hand, regardless of their authority; examiners often no better informed than the teachers, set standards for certification. Since it was known that the museum at Normal had in the past supplied materials to teachers, there was now an increased demand for suites of rocks and minerals, herbaria, and zoological cabinets. Forbes was embarrased by these requests because he did not have enough material to pass around. The museum had never been in a position to give carefully organized teaching exhibits, although that had always been its aim. Most often it had just sent out whatever duplicates it could spare.

To remedy this situation and get enough proper material, Forbes first tried to get school authorities and teachers themselves to gather quantities of natural history objects and send them to him. He promised that he would select, arrange, and label proper teaching units and send them out to cooperating schools. Although there was only a small response to his offer, it was enough to encourage him to take another step. As he reported, "In the autumn of 1873 . . ., it was determined to attempt the organization of a new society of natural history, which would have for its leading purpose the supply of practical working collections to the schools, through the labors of the teachers themselves." (90) At the State Teachers Association meeting at Bloomington in December, 1873, Forbes met with a group and formed the School and College Association of Natural History of the State of Illinois. A constitution was

adopted, and President Richard Edwards of Normal University was elected president, and Forbes, secretary and curator. The constitution stated that the rather limited purpose of the society was that of carrying out the plan of cooperative collection of natural history teaching materials, just as Forbes had proposed. (91) For a year or two work went on, not on as large a scale as Forbes would have liked, but he thought the effort most worthwhile for those who did collect material, because they depended less on textbooks in their teaching and more on the objects themselves. The organization also provided a forum in which teachers could discuss their common problems. (92)

The State Natural History Society of Illinois — 1878-1885

Through the Association, and in other ways, enough interest in natural history was aroused for Forbes to organize, in 1875, a summer school on the pattern of the school at Penikese Island conducted by Louis Agassiz, the Harvard University naturalist and exponent of the philosophy of learning about nature in the field rather than from books. (93)

At a second summer school in 1878, the students were so enthusiastic that they founded an "Agassiz Society" and appointed a "committee of correspondence" to arouse state-wide interest. (94) The result was an organization meeting in the Springfield office of Amos H. Worthen, the State Geologist, on December 12, 1878, and a full-scale meeting at the Palmer House in Chicago on January 16, 1879, where forty persons were in attendance and fourteen more sent messages of support. Worthen was elected president and Forbes secretary; a name was selected—The State Natural History Society of Illinois—and a constitution was adopted. (95) This document was very brief, saying little about the purposes of the new organization except that "its field of observation and research shall comprise Geology, Archeology, and Biology in all its departments." An initial membership fee of three dollars, and annual dues of one dollar were to be collected. The real control of the organization was in the hands of an executive committee "who were to act on all matters referred to it by the Society." (96) By the end of 1879 there were sixty-six members, ten of whom were professional scientists—teachers in colleges and in the employment of the state. These men were J. D. Conley, Blackburn College; Thomas J. Burrill, University of Illinois; Selem H. Peabody, University of Illinois; Rev. Francis X. Shulak, St. Ignatius College; E. S. Bastin, University of Chicago; Professor J. Lindahl, Augustana College; Prof. Oliver Marcy, Northwestern University; A. H. Worthen, State Geological Survey; Cyrus Thomas, State Entomologist; and S. A. Forbes, State Laboratory of Natural History. (97)

As Forbes said, "this was the period of the return to nature in the study of science," so field trips were regular features of the semiannual meetings of the State Natural History Society. At the second meeting there was a program of papers. The first field trip was in 1879 with three groups—geological, with Worthen as

the leader; botanical, with Burrill; and zoological, with Forbes—all hiking for sixteen miles along the Illinois River from Ottawa to Peru. In other years field trips were held at Lake George in Indiana, and at Fountain Bluff and Grand Tower, Warsaw, and Peoria, on the Illinois River. Those attending were pleased with the trips, "but more for fellowship than permanent scientific value." (98) Meetings at which papers were read were held at Bloomington, Springfield, Peoria, Urbana, and Jacksonville. In 1881, at the Springfield meeting, where the sessions were held in the Supreme Court Room, a Mr. McAdams "described ancient agricultural instruments of stone from mounds in Missouri and Ohio" and exhibited "carbonized corn." The discussion which followed was "quite extended." A paper on artesian wells read at the same session was continued in the afternoon, and then Professor Burrill of the University of Illinois talked about bacteria ferments. (99)

A year later the meeting was at the University of Illinois and a number of papers were given, many of them by members of the staff of the University or of the Natural History Laboratory. None of the papers were outstanding original contributions to science, but they all indicated that that much study and thinking about the problems of natural science was going on, and that the University was the chief center of such activity in the state. Here is a list of the papers and their authors:

"Recent Microscopy," T. J. Burrill, U. of I.
"Prehistoric Remains in Southeastern Missouri," F. S. Earle, Cobden.
"The Fossil Tracks of the Connecticut Valley," Don Carlos Taft, U. of I.
"The Army Worm in 1881," F. M. Webster, Waterman.
"The Organs of the Sixth Sense of Blind Fishes," S. A. Forbes, U. of I.
"Primitive Religion in America," Mr. McAdams, Jerseyville.
"The Rock System of the Northwest," Edwin Evans, Streator.
"Sciences in the Public Schools," C. W. Rolfe, U. of I.
"The Great Cahokia Mound of Madison County," Mr. McAdams, Jerseyville.
"Some Vegetable Poisons," T. J. Burrill, U. of I.
"The First Food of the Whitefish," S. A. Forbes, U. of I.
"The Blue Process of Copying by Photography," N. C. Ricker, U. of I.
"The Life History of the Jelly Fish," James A. Armstrong, Champaign.
"The Subterranean Waters of the Northwest," Edwin Evans, Streator.
"Field Work on Parasitic Fungi," A. B. Seymour, State Laboratory of Natural History.
"Zoological Notes from a Field Book of a Naturalist," Cyrus W. Butler, State Laboratory of Natural History. (100)

From this high point at Urbana, interest in the State Natural History Society declined, and attendance at meetings fell off so that, after the Jacksonville meeting in 1885, the organization was disbanded. As Forbes pointed out, there were too few professional scientists to maintain the program of giving papers inasmuch as it had been decided not to broaden the membership to admit physical scientists, and no publication was undertaken. The Society existed almost altogether for the fellowship that came from the field trips, and the information gained from the scientific papers read by a few members. (101)

In spite of three promising attempts, the permanent organization of the scientists of Illinois had to wait until the Illinois State Academy of Science was founded in 1907, when all the objectives of the former organizations were made a part of the latter's two-fold program: the

education of school children to appreciate and understand the world of nature, and the encouragement of original research by advanced students and mature scientists.

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8 Henry M. Whelpley, "A Sketch of the History of the Academy," Academy of Science of St. Louis, *Transactions*, XVI (1906), xxiii-xxiv; Ralph S. Bates, *Scientific Societies in the United States*, 2nd edition (New York, 1958), 48-52.

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75 Superintendent of Public Instruction, *Biennial Report for 1864-66* (1867), 233-35; Lindsay G. Morris, John Wesley Powell, Scientist and Educator, M. S. Thesis (Education), Illinois State Normal University, 1947, 36-39.
76 State of Illinois, 25th General Assembly, *Public Laws* (1867), 21.
77 Morris, John Wesley Powell, Scientist and Educator, 40; Board of Education, *Proceedings* (1867), 1, 8.
78 Darrah, *Powell of the Colorado*, 80; Marshall, *Grandest of Enterprises*, 118-29. Professor Marshall is very critical of Powell's conduct, conveying the idea that Powell was self-seeking and used the Natural History Society and Normal University to promote his own interests. Darrah, *Powell of the Colorado*, 80, and Wallace E. Stegner, *Beyond the Hundredth Meridian*, 18, both admit that Powell sought the job because he was ambitious, and because he was offered larger opportunities at Normal. After he got the job as curator he saw how he could use his position for the advancement of science through making field trips, and, as leader of the expeditions, he would advance his own scientific reputation, but neither Stegner nor Darrah feel that he was self-seeking, although Stegner does say Powell was "politician and promoter, . . . superimposed on the natural scientist" (18). Morris, in his Master's thesis, John Wesley Powell, Scientist and Educator, dwells upon Powell, the good teacher and resourceful leader of field trips.
79 Darrah, *Powell of the Colorado*, 81-82.
80 Marshall, *Grandest of Enterprises*, 125.
81 *Ibid.*, 124-25; Bloomington *Daily Pantagraph*, January 25, 1868.
82 Marshall, *Grandest of Enterprises*, 127; Board of Education, *Proceedings* (1870), 6.
83 Bloomington *Daily Pantagraph*, January 10, 1868.
84 *Ibid.*, November 27, 1869.
85 Superintendent of Public Instruction, *Biennial Report, 1874-76* (1877), 324; Marshall, *Grandest of Enterprises*, 128.
86 Stephen A. Forbes, who succeeded Powell as head of the museum at Normal, makes these points, but adds a third: that it gave Powell a start on his career. Forbes, "A History of the Former State Natural History Societies of Illinois," Illinois State Academy of Science, *Transactions*, I (1908), 23.
87 Harlow B. Mills, "From 1858 to 1958," *loc. cit.*, 95. The most comprehensive biographical sketch is L. O. Howard's, "Biographical Memoir of Stephen Alfred Forbes, 1844-1930," National Academy of Science, *Biographical Memoirs*, XV (1932), 1-54.
88 Stephen A. Forbes to President Richard Edwards, Superintendent of Public Instruction, *Biennial Report, 1872-74* (1875), 143.
89 *Ibid.*, 144.
90 *Ibid.*, 145.
91 *Ibid.*, 146-47. A report of this meeting was published in *The Poplar Science Monthly*, V (1874), 128.
92 Stephen A. Forbes to President Richard Edwards, *loc. cit.*, 147-50.
93 Forbes, "A History of the Former State Natural History Societies of Illinois," Illinois State Academy of Science, *Transactions*, I (1908), 24.
94 *Constitution and Record of Organization of the State Natural History Society of Illinois* (Bloomington, 1879), 3. In 1875 had been formed the Agassiz Association, a national organization with local

and state branches, whose purpose was to encourage natural history interest among students and teachers. See Bates, *Scientific Societies in the United States*, 110. There is no evidence that the Illinois group was ever affiliated with the national organization.

95 *Constitution and Record of Organization of the State Natural History Society of Illinois*. Other officers were T. J. Burrill, Champaign, and H. M. Bannister, Chicago, vice-presidents; Homer M. Hibbard, Chicago, treasurer. S. H. Peabody, Champaign, and Cyrus Thomas, Carbondale, with the officers, constituted the executive committee.

96 *Ibid.*, 2.

97 Forbes, "A History of the Former Natural History Societies of Illinois," Illinois State Academy of Science, *Transactions*, I (1908), 28; *Constitution and Record of Organization of the State Natural History Society of Illinois*, 4.

98 Forbes, "A History of the Former Natural History Societies of Illinois," Illinois State Academy of Science, *Transactions*, I (1908), 26.

99 Newspaper clipping, source not given, in Illinois State Academy of Science Letter File, 1926-28, in Illinois State Museum office.

100 Forbes, "A History of the Former Natural History Societies of Illinois," Illinois State Academy of Science, *Transactions*, I (1908), 26.

101 *Ibid.*, 28-29.

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