HISTORY OF THE INDIANA UNIVERSITY
DEPARTMENT OF
GEOLOGICAL SCIENCES: 1840-1997

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INTRODUCTION

Study of the geological sciences at Indiana University has had a long and distinguished history. Beginning with the first lectures in 1840, the university has attracted and retained a series of outstanding teachers and research scientists who have consistently trained students to become able scientists in academics, government, and industry. The faculty and alumni of the Department of Geological Sciences can rightly be proud of their heritage at Indiana University. The department has fulfilled and continues to fulfill one of the roles of a state-supported institution--providing well-trained personnel to assist in the economic and educational advancement of the citizens of Indiana.

I first became interested in writing this history in 1995 when then Chair, John Hayes, telephoned me for a quick thumbnail sketch of Richard Owen, 30 minutes before he was to present our Owen Award to one of our distinguished alumni. I realized then that there was no source at hand that easily fulfilled this role. I told him what I could about Owen and then thought that I knew very little about geology at IU in the years prior to the long-extended reign of Edgar Roscoe Cumings as chair. This gave the impetus for this history.

I have placed somewhat more emphasis on earlier parts of our geologic history because I feel that these years are least well known and are more difficult to retrieve. As I approach the
modern era I feel that most readers will have fuller knowledge of our history. I have focused on the faculty in geology, the students—especially the early students—, and the areas of research and teaching that dominated the department during different times. I have deliberately omitted the general history of Indiana University as an institution except as it bears directly on geology because that topic has been treated exhaustively several times by IU historians. I have also not tried to fit the program at Indiana University into any sort of national educational themes in geology because I believe that subject is poorly understood.

It would have been impossible to write the first part of this history without the help and resources of the Indiana University Archives. Their knowledge of IU history and the sources that they hold that bear on that history were invaluable. For the last several decades of this century conversations with the older faculty members, now all emeritus, still living in Bloomington, were valuable.

This is an informal history. I have not documented the statements in this history. Had I done so, virtually every sentence would have ended in a footnote. Major sources of information, both published and unpublished are listed in the references at the end of the text.

Acknowledgments.—I am indebted to a good many people who have helped me in this project in a variety of ways. First, I owe gratitude to Philip Bantin, Brad Cook and Faye Mark of the
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THE NINETEENTH CENTURY

Beginnings

On October 6, 1840, the Board of Trustees of Indiana University resolved that mineralogy and geology be taught "if the time of Professors permits." While far from a resounding endorsement of the importance of these disciplines, it was a beginning. This pronouncement surely did not come out of the blue. There must have been a faculty recommendation or proposal that such a motion be entertained. This proposal could only have come from Reverend Theophilus Wylie, professor of natural
philosophy and cousin of Andrew Wylie, the university's first president. He was the only one of the university's six professors teaching any science courses at the time. Wylie presumably gave lectures on geology and mineralogy from time to time but there is little direct evidence to support this, not even in his extensive diaries. There are other indications, however, that Wylie might have given such lectures. For instance, an 1841 catalog of the university library lists a total of 660 volumes, including five on geology and two on fossils, as well as several abridged volumes of the Philosophical Transactions of the Royal Society. These books are arranged in the catalog under the general heading of "Physiconomy"—works that relate immediately to the material world—and secondarily under "Idiophysics"—all works relating to natural products. It is clear, therefore, that some literature was available to students to support geology lectures.

Secondly, Theophilus Wylie obviously knew some geology. In 1835, as a young man of 25, at the village of Manayunk (now Manayunk), in Pennsylvania, he recorded in his diary a field trip that he took where he saw mica slate, gneiss, some with garnets, soapstone and talc. He was accompanied on this excursion by Mr. Frazer, an attorney, who was in his "mineralogical" costume, complete with a highly polished mineralogical hammer. Sketches in the diary of this hammer show it with a hammer face on one end and a chisel edge on the other end.

In addition, after coming to Indiana, Wylie announced in 1850 that small amounts of gold had been discovered in black
sands in the beds of rivulets in Brown, Greene, and Morgan counties. This letter was published in the *Journal of the Franklin Institute*. In 1841, he conducted experiments on specimens of "bituminous limestone" given to him. Heating the rock produced "naphtha" that could be collected in a retort. Others have assumed that he tested a specimen of the New Albany black shale, which is petroliferous, but Wylie undoubtedly knew the difference between limestone and shale, and some Indiana limestones do contain a petroliferous component. Wylie also published a short article in the *American Journal of Science* in 1859 on the discovery of the teeth and bones of an "Elephas," almost certainly a mastodon, along the White River.

The Reverend Robert Milligan, offered the first formal course in geology at Indiana University in 1853-54. The course was offered to juniors pursuing either the bachelor of arts or bachelor of science degree during their second (winter) term. It was a required course for all students as there were no elective offerings at that time. Milligan was professor of natural philosophy and chemistry. He was in his second year at IU, having been hired the year before (1852-1853) to replace Professor Charles Marshall who had resigned as professor of mathematics and civil engineering. After Milligan's first year Reverend Elisha Ballantine was hired to teach mathematics and civil engineering. Theophilus Wylie, had left the university for Miami University for two years, and Milligan was shifted to fill the post of natural philosophy and chemistry. He taught physics and
chemistry, as well as the single course in geology. Milligan left Indiana University after his second year because of family health reasons.

Instruction in 1853 was almost exclusively by lecture, formal laboratories being virtually nonexistent. Some materials surely were available, at least for demonstration, because the Board of Trustees accepted a gift of minerals from W. B. Williams in 1841. Lectures were for an hour, six days a week in the mornings at 9, 10, and 11 o'clock. Attendance was required, and absences were noticeable in view of the small student body. Faculty and students had the rest of the day free for their own pursuits. There were three terms in the academic year, corresponding approximately to the three quarters of many universities today. Prior to 1851, there were two terms, one from the first of November until end of March (winter term), and one from beginning of May until end of September (summer term). Thus, the months of April and October were holidays, perhaps to allow students from farms to return to their homes to help with planting in April and harvest in October.

The first lectures in geology were conducted in the First College Building, built in 1836, at what is now Seminary Square. This building burned in 1854 and the library and any geological collections were destroyed. The next year, classes were taught in the small and inadequate Seminary Building while a new, Second College Building was constructed. Geology classes were taught in that building until 1874, when Science Hall, which housed the
extensive Owen cabinet of geological, mineralogical, and paleontological specimens, was completed.

During the two years that Milligan was in residence at IU, there was an almost complete turnover in the small faculty. In 1851, President Andrew Wylie died. At the time of his death the faculty consisted of Henry Barnard, president-elect, who did not come to Bloomington; Daniel Read; Theophilus Wylie; Marshall; two law professors, David McDonald and William Otto; and the head of the preparatory (=high school) department, Douglas Campbell. The next year Barnard, Wylie, Marshall, McDonald, Otto, and Campbell all were gone. Only Read remained. The new faculty consisted of William Daily as the new president, Read, Milligan, Elisha Ballantine, James Hughes, and James Woodburn. The next year Theophilus Wylie returned from Miami University where he had taught for two years. This was the greatest turnover in the history of the faculty and this level was not approached again until David Starr Jordan left to become the first president of Stanford University and took most of the top faculty with him, including the professor of geology, John C. Branner.

The text for the sole geology course is listed as Hitchcock, which apparently was Edward Hitchcock's Outline of the Geology of the Globe and of the United States in Particular, published in Boston in 1853. Additional "Works of Reference" cited in the university bulletin for 1853 are: Charles Lyell's Principles of Geology; Lyell's Manual of Elementary Geology; David Ansted's Geology, Introductory, Descriptive, and Practical; the
Bridgewater Treatises on the Power, Wisdom and Goodness of God; and Dana's Manual of Mineralogy. In 1857 the course text was changed from Hitchcock to Samuel St. John's Elements of Geology.

Despite Milligan's brief stay at IU, his introduction of geology took hold. At least one course in geology has been offered at IU every year since Milligan's time.

After leaving IU Milligan later taught at Bethany College in West Virginia, then became president of Bacon College in Kentucky, later named Kentucky University and merged with Transylvania University. Milligan taught there and was head of the Kentucky Theological Seminary.

Upon Milligan's departure, Theophilus Wylie became the professor of natural philosophy and chemistry for 1855 and, since the geology course continued to be listed in the University Bulletin, Wylie presumably taught the course from 1855 until the arrive of Richard Owen in 1864. Immediately after Wylie's return from Miami University, he had been assigned to teach classical languages and literature, but he resumed his old post in natural philosophy when Milligan left. In 1854-55 a single geology course was offered only in the "scientific course" during the second (winter) term of the senior, rather than the junior, year. At this time there were two courses of study offered—the classical course and the scientific course. The difference was primarily in the number of classes of classical languages that were taken.

THE ARRIVAL OF RICHARD OWEN

Although Richard Owen was mentioned for the first time as a
faculty member in the 1861 bulletin, he was not present in Bloomington and did not act as a faculty member. He was cited as Richard Owen, M.D., State Geologist, with a footnote, "*Ex officio member of the faculty by a recent act of the legislature." This same legislative act also instructed the State Geologist to collect duplicate samples of minerals and fossils with one set to be deposited with the university. Whether or not this was ever done is unclear. At the time of the legislative act Owen had just finished the report on the second geological survey of Indiana, conducted by him in 1859-60 and published in 1862. He began this survey with his older brother, David Dale Owen, named as State Geologist, but David Dale was entirely occupied with completing a large federal survey. Richard became State Geologist and head of the survey upon his brother's death from malaria in 1860. At the same time Owen was made a lieutenant colonel in the 15th Indiana Volunteers upon outbreak of the Civil War. He fought at the battles of Fort Donelson and Vicksburg. He became a colonel in the 60th Indiana, and during the winter of 1861-62, he was in command of the prison camp in Indianapolis, with 4,000 Confederate captives from Fort Donelson. In 1913, he was memorialized by the Confederate veterans for his humane treatment of them and bronze busts of Owen in Indianapolis and in the Indiana Memorial Union on the IU campus record this honor. In 1863, he resigned his commission to take up the faculty position offered to him by Indiana University. He was to begin this new appointment on January 1, 1864.
Richard Owen's geological report on Indiana in 1859-60 has been criticized as being too "flowery," and Owen has been labelled incompetent and a poet-naturalist by Merrill in 1906 (see References). This characterization is manifestly unfair and a result of Merrill's pedantic view of scientific writing. Owen wrote about the occurrence of gold in Indiana, was the first person to mention the well-known geodes of southern Indiana, devoted extensive space to the coal deposits of southwestern Indiana and to the various mineral springs. In his report he discussed bog iron ore, the drainage of Kankakee marsh, the physical geography of the state, and the chemistry of soils, all of which have obvious economic impact on the citizens of the state.

After Richard Owen joined the faculty as professor of natural history and chemistry in 1864, Theophilus Wylie became the professor of Greek and Latin.

In the 1864 bulletin, under heading "Apparatus and Cabinet" is the following statement (p. 28):

"To aid in the lectures on Natural Sciences, Prof. Owen has brought an extensive collection of minerals, fossils, as well as charts, diagrams, and maps. Besides the general collection one room will be fitted up especially to facilitate an intimate acquaintance with the geology of Indiana, by exhibiting the various rocks of the State in their correct relative position on a large table which will allow about a foot and a half
square for each county. For phytopenontology is also aided by a hortus siccus (sic, siccus, a herbarium), especially of the ferns, conifers, and leaves of forest trees, and a large diagram with comparative synopsis of ancient and modern vegetation. Besides the usual adjuncts for geological surveys, such as dinometers, compasses, Locke's level and the like there are aneroid barometers and a sextant. For physical geography Prof. Guyot's maps have recently been purchased."

I believe that dinometer is a likely typographical error for clinometer, the typesetter mistaking a closely spaced c and l for a d. Search of several early catalogs of scientific instruments has revealed no trace of a dinometer. Apparently the large table had an outline map of the State of Indiana with all counties shown and a hand specimen from each county. This clearly was the result of the earlier Owen geological surveys of the state.

Owen continued to teach all sciences and one course in geology until his retirement in 1879. In 1865, he was also professor of modern languages, and the bulletin for the next year states that, on request, Owen would give instruction in German, French, and Spanish.

During his first summer as a professor and while the Civil War continued, in the summer of 1864, Owen went on a speaking tour of southern Indiana counties, extolling the value of higher education—an obvious effort on the part of the university to
educate the lay public about the university and probably to encourage enrollment at IU. IU's enrollment had suffered considerably because of the war effort and Owen's status as a noted veteran of the war made him especially effective in recruiting. One of Owen's points in his speeches was that newly expanded museum collections allowed the university to "educate through the eye," in half the time required on the exclusively oral lecture system.

In 1868, the university science offerings were expanded and Wylie and Owen began sharing the science teaching load. Wylie was elected professor of natural philosophy (physics), but not chemistry. Owen was appointed professor of natural sciences and chemistry. Wylie's ancient language classes were taken over by two new professors, one for Latin and one for Greek. In the sophomore year, courses in natural history and botany were taught in the first term and physiology in the second term. (Recall that Owen held a medical degree.) Physical geography was taught for the first time, by Owen, in the third term of the sophomore year. Meteorological instruments were added to the cabinet, undoubtedly in conjunction with the physical geography course.

In 1868 the organization of the university changed. There was a Department of Literature, Science and the Arts; a Department of Law; and a Department of Modern Languages. These would conform to a college of arts and sciences and a school of law today. The single geology course was listed under the first department.
Under Apparatus and Cabinet the 1868 bulletin stated that the extensive philosophical, geological, and mineralogical cabinet of the late David Dale Owen, Richard Owen's older brother, containing over 85,000 specimens, had been purchased by the Trustees and was now in Bloomington. What the bulletin does not say is that the collection was still in boxes in storage because there was no space to unpack it or display it.

When David Dale Owen died in 1861, he left an estate for his family that was quite meager except for the extensive geological collections he had accumulated over the years. He valued the collection at $50,000 and it was undoubtedly, by far, the largest private geological collection in the United States at that time. The only other assets left by David Dale were his house and laboratory in New Harmony. The "granary" in New Harmony where he had housed facilities for his federal and various state geological surveys had already been sold as a woolen factory. David Dale's son asked his uncle Richard to sell the collection for the welfare of the family. Richard wrote to the governor twice offering the collection for sale and stating that it might go to Bloomington, Indianapolis, or to a normal school. The state eventually purchased the collection for $20,000 and in 1870 it was packed into four boxcars, and shipped to Bloomington by rail. It arrived March 23, 1870 and was stored in the Dunn building for three to four years until a new building could be completed. For a more detailed discussion of the Owen collection see Kimberling (1996) in References.
The next year, in the 1871 bulletin, it was stated that a suitable new science building would be erected so that the Owen collection can be used and displayed.

The university was re-organized in 1873, with a new Collegiate Department, the forerunner of the present college of arts and sciences. Owen and Wylie were professors in that department and geology was a required class in both the classical and scientific courses.

In 1872, Owen was offered the first presidency of Purdue University. He accepted this position, but never functioned as president, because after waiting for two years for organization of the new school, he resigned and remained at Bloomington. If Owen had become president of Purdue he proposed to introduce a curriculum in natural history that included general geology, economic geology, paleontology, paleobotany, and mineralogy. In his 1967 paper (see References) Melhorn, a Purdue professor, states that if this program, ambitious for its time, had been put into place, Purdue today could look backward on a long history of fruitful research and successful graduates in geology rather than the low status it held in this area for many years.

By 1874, Edward T. Cox was State Geologist and ex officio faculty member, although Cox never taught at IU. This was a pro forma citation required by the State General Assembly. The university's two scientists moved into the new Science Hall in 1874. The Owen collection was by then on display, and the university had purchased the entire collection of fossil casts
made by Professor Ward (later the Ward Natural Science Establishment) that were on display at the Indianapolis Exposition of 1873. The 1874 bulletin states that the Ward collection included "admirable illustrations of many extinct animals, some very rare". The cases for both the Owen and Ward collections were made of maple and black walnut and were dust and insect proof.

A humorous note about the unpacking and setting up of the Owen collection appeared in the student newspaper, the Indiana Student, December 15, 1873: "Prof. Hill, with the valuable aid of our fellow student, Mr. Trueblood, is giving the Museum the proper shape. It is to be regretted, however, that Mr. T's health is failing under the futile attempt to pronounce all the paleontological names. He gloats over the conquest of Colossochelys and Plesiosaurus dolichodeirus."

In the year 1875, there was a profound change in the course offerings in geology. For the first time, more than one course in geology was given. In the third term of junior year, both mineralogy and lithological geology were offered. Stratigraphical geology was given in the first term of senior year, and paleontology was offered in the second term as an elective along with Greek, French, or German. This is the first evidence of elective courses at the university. In the scientific course, dynamical geology was required in the third term. Thus, all students in the Collegiate Department received at least three
courses in geology. The course offerings of 1875 would still constitute the core of a geology major today.

In the museum were Ward casts of Megatherium, Glyptodon, and Colossochelys and the Wirtemberg Ichthyosaurus was valued at $1,000, and was thought to be the largest ever found. There were also fossil turtles from Nebraska, the Megalonyx from Henderson, Kentucky, and a slab from St. Louis, Missouri containing eight large echini (Melonechinus). The mineral collection was especially rich in metallic ores.

In 1875 the geology classes are offered in a Department of Natural Science for the first time. The first geology course was devoted to knowledge of minerals and to an "intimate acquaintance with the lithological characters of rocks." The second term consisted of study of the general features of the earth's structure as stratigraphically arranged. The third term was spent in becoming "more thoroughly familiar with fossils as enabling us thereby to determine the relative ages of the history of rock masses." The dynamical course investigated the causes, i.e., sedimentation, erosion, volcanos, and earthquakes, that had given to the earth its present form and appearance.

When Owen was teaching one of the above classes in 1877, an amusing incident occurred that was reported by the Indiana Student (Clark, 1970-77, v. 1, p. 133). It seems an Italian organ grinder and performing bear strolled across campus. Owen sent a student out with some money for the man and to ask him to perform
for Owen's class, which assembled on the steps. Professor Ballantine's Greek class joined them. The performance was suddenly interrupted by the self-important and pompous president of the time, Lemuel Moss, who ordered man and bear off the grounds. Owen refused refund of his money. The newspaper reported: "The two minstrels wended their way out of the campus, the students scared, yet angry, sneaked off to their recitations, Professor Ballentine & the Greek class suddenly became absorbed in Herodotus. Dr. Moss, having broken up the picnic went back to his Vatican & left Dr. Owen provoked, embarrassed, & grieved, standing on the steps contemplating the unfortunate end of the amusement he had planned for the students."

As Owen approached retirement the number of geology classes that he taught gradually decreased. In 1878 he taught only two courses and his final year of teaching was in 1879. He was 69 years old at the time and he returned to New Harmony. He was responsible for greatly expanding the geological class offerings and for bringing to the university an outstanding museum.

In addition to Owen's work at the university he found time to undertake other responsibilities. He did geological surveys as a consultant in parts of New Mexico and Arizona, as well as parts of North Carolina and Tennessee. While he was a professor he published four papers on geology, the first in 1852. The first scholarly publication by a faculty member at IU was by Daniel Kirkwood on astronomy in 1850. Owen was one of the first two
faculty members to publish the results of scholarly research. Many of the other faculty members did not engage in original research, and what publishing they did was mainly sermons or speeches.

After Owen retired, he was much more active in publication, producing a total of 14 titles from 1879 to 1889. He died in 1890 at age 80 from accidentally ingesting embalming fluid from a bottle that he believed contained medicine. His later works were largely in the field of seismology and earthquakes.

The Jordan-Branner Years

In 1880, David Starr Jordan was elected Professor of Natural Sciences to replace Richard Owen. Although Jordan had been on leave for part of the academic year, he was a lecturer in comparative anatomy in the Medical Department prior to this appointment. It is not clear who may have taught any geology courses between the time Owen retired in 1879 and Jordan took over duties in natural history in 1880. At any rate, the courses listed as being offered were the same as in prior years.

LeConte's Elements of Geology was the listed text for the beginning course. Shortly after Jordan arrived, it is announced in the bulletin that seniors electing geology would take occasional excursions and field work in the spring term. This was the first mention of field trips or field studies in geology at IU. The same bulletin states that special advantages were offered to postgraduates in systematic zoology, comparative anatomy, and in paleontology, thus reflecting Jordan's research interests and
his emphasis on education beyond the bachelors degree level.

The Robert Woods Notebook

It is difficult to gain insight into the content of geology courses at IU in the nineteenth century. One outstanding exception to this rule is a notebook preserved in the IU Archives written in 1880 by Robert Woods, a student, in which he assembled notes on 31 lectures on geology by David Starr Jordan.

The notebook contains notes for 31 lectures, 10 on mineralogy, 12 on historical geology (actually mainly paleontology), and nine labelled Geology but consisting mainly of what we would call historical geology today. The notebook is 93 pages long.

The first sentence of the first lecture says that "Geology is the study of minerals". This was incorrectly written down by Woods or else Jordan misspoke as it is clear that Mineralogy should replace Geology. A mineral is defined as any object in nature that has not been organized by light and that is homogeneous. Either this sentence means that all life is ultimately dependent on sunlight, or else Woods mistook "light" for "life". He goes on to say that "Air is a mixture of two minerals", an idea not in accord with modern ideas, but gasses are included later in a classification of different kinds of minerals.

The second lecture gives mineral characteristics, from shape and luster to cleavage, odor, and taste. The third lecture gives
classes of minerals and then individual classes are discussed in more detail in the following seven lectures: carbons, spars, quartz, silicates, and various sorts of metallic ores and gemstones. Origins are discussed and important localities worldwide are mentioned.

As noted above, the 12 lectures headed Historical Geology, mainly consist of the classification and organization of animal life, both living and fossil. It is thus a short course in paleontology. The first part of the first lecture is recorded: "The animals now living on the earth are the lineal descendants of those living in the past geological ages. The bulk of the animals now living differ very little from their ancestors. They come down direct without any material changes. The structure of animals as we come down to the present age is different from those of the preceding age, and more complex, but yet they clearly are lineal descendants. In every age we find animals whose ancestry cannot be traced." While this passage is evolutionary in tone, it does not bring up any aspects of Darwin's The Origin of Species. Jordan divided the animal kingdom into five "branches", which we would call phyla today. They were: vertebrates; articulate (arthropods mainly); mollusks (including some worms and the molluscoïds—brachiopods, bryozoa, and tunicates); radiates (coelenterates and echinoderms); and protozoa (or first animals), which include sponges, infusoria, rhizopods, gregarines, and monera. Wood's notebook states that the monera consist of "dabs of jelly floating in water. They feed
by running together and absorbing each other. In some parts of
the ocean the bottom is covered with these microscopic animals as
to make it slimy [apparently oceanic ooze]. The lowest and
simplest is called Bathybius. Wood's notes continue: "Gregarines
are wormlets. No organism but a little nucleus or spot. Found as
parasites in false hair. One-celled animals."
Wood's notebook then records Jordan's discussion of each branch
in some detail, accompanied by numerous sketches. With regard to
the water-to-air transition of the vertebrates the notebook says:
"The Ganoids [primitive fishes] form a sort of connecting link
between fishes and reptiles. Before larger fishes came into power
[ganoids] held high carnival on the earth". Wood's notes later
state that labyrinthodonts are a kind of frog which lived in the
coal measures and [are] now extinct". With regard to birds and
reptiles, the notebook says: "Birds. Ordinary and saururans.
Saururans had long tail like alligator and had quills in rings
and [word unclear] teeth. Heads were like alligators. They had
feathers. Connecting link between birds and reptiles. Head and
tail like reptile and the body covered with feathers. Could not
fly". This apparently is a reference to Archaeopteryx but that
name is not used.

The third section, Geology, begins with the origin of life
and the Eozoic or Archean. Notes from the second lecture state:
"Spontaneous Generation. Life was created. Some naturalists have
supposed that the lowest forms of animal life were produced by
chemical action. Either they came from some inorganic matter by
some natural law, or they did not. If they did spring from dead
matter by a natural law, we can by striking the proper means,
etc., develop them again. Bastain made many experiments with
fluids. Subjected some fluid to great heat, while hot sealed it
air tight in glass vessels and let stand a year. On opening
Infusoria were found. Tyndall repeated experiments and found
Infusoria except when trial was done on high cold mountains."
Jordan concluded that this theory was "no good", and passed on to
other subjects. The notes end with discussion of the Cretaceous
and chalks. Apparently Jordan ran out of time before he could get
to the Cenozoic—a feature of many historical geology courses
even today.

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The next year, 1881, Jordan had an assistant in the
Department of Natural Sciences, Charles S. Gilbert, who was
primarily a fish zoologist and who received the first PhD granted
at IU. Jordan continued to teach the geology courses, which are
included along with zoology and botany in the Department of
Natural Science. In 1882 mineralogy is an elective in the junior
year in the science course and dynamical geology and paleontology
are required in the senior year. Field trips and postgraduate
studies are again cited. This bulletin also sets forth an outline
of a systematic plan of study for post-graduate degrees for the
Master of Arts and Doctor of Philosophy degrees. This is the
first such notice by the University.

In 1883 the field work is spelled out more clearly. An
excursion in May is required. It is expected to visit the Falls of the Cumberland River in Kentucky and walk thence to Mammoth Cave for field studies along the way, a distance of about 110 miles, as the crow flies. The next year, in 1884, Jordan was elected President of the University and his term began in January, 1885. His election met with strong protest because he was the first president who was not an ordained minister.

During Jordan's tenure as a professor he organized and led what were termed Indiana University Summer Tramps. These were walking tours. The first ones were in the eastern United States but by 1881 they were conducted in Europe. In 1881 34 people took part in a tour that lasted 100 days and cost approximately $400. Geology was clearly an important scientific aspect of these tours. The 1881 tour included walks in England, Holland, Germany, Switzerland, Italy and France. An extensive tour of 400 miles was made in the Alps. The stronger walkers climbed some of the highest peaks, including the Matterhorn. A large collection of marine animals was made at Venice and Genoa for the University Museum. Jordan had four assistants on the tramp.

The 1882 tour would leave Indianapolis on June 15 and cover much the same ground as the 1881 tramp. Apparently Jordan did not go on this trip as C. E. Emmerich of Indianapolis High School is listed as the leader. The tour for 1883 was being planned for Switzerland, Norway and Spain. It was while on this trip in the summer of 1883 that Jordan learned of the disastrous fire in Science Hall.
The years 1883-1884 were momentous ones for the University. Science Hall, only 10 years old, and housing the large and famous Owen cabinet, was struck by lightning during a storm on July 12, 1883 and burned to the ground, destroying the museum and almost all of the famous Owen collections. The fire seemed to have started in Theophilus Wylie's office in the building. He had a telephone line into the building and the lightning may have followed that.

With regard to the fire, the next bulletin, printed shortly after the fire, in 1884, has a report by Joseph Swain, acting curator of the Museum, stating that four cases of fossils, about 700 specimens were saved, as were four cases of minerals, about 600 specimens, including the finest crystals. The skeleton of *Megalonyx Jeffersoni*, from Henderson, KY, perhaps the best-known specimen in the cabinet, was also saved. The specimen, consisting of 69 individual bones, had been described in detail by Leidy (1855). Cope and Wortman (1884) gave a cursory mention of the specimen just after the fire. The specimen was also seen and described by Hay (1912). The Ward casts, with one exception, were all destroyed.

In 1887, President David Starr Jordan arranged for surviving fossils collected by David Dale Owen on his federally sponsored surveys to be transferred to the United States National Museum. The collection included 22 type specimens and 327 other specimens, all from David Dale Owen's surveys in the upper Mississippi River valley. There is no mention of fossils from