spare seismograph has been loaned to the U. S. Observatory at the Mare Island Navy Yard, on the condition that records and reports of earthquake shocks shall be sent to Mt. Hamilton. Several observers, mostly in the neighborhood of San Francisco, also kindly send reports. The collected results are published yearly by the U. S. Geological Survey.

METEOROLOGICAL INSTRUMENTS.

Meteorological observations are made three times daily. Monthly summaries are furnished to the U. S. Weather Bureau. The daily records of the self-recording instruments are filed for future reference.

The time-service has been conducted as heretofore.

MISCELLANEOUS OBSERVATIONS AND COMPUTATIONS.

The Leonid meteors were observed and chartered by several members of the Observatory staff in November, 1898. The results were sent to Harvard College Observatory for discussion in connection with other data.

The reduction of Professor Schaeberle's meridian observations has been in the hands of Mr. Aitken. During the year the Right Ascension and Mean Place reductions were completed, the separate observations made in each year were collated and the discrepancies removed. The Coast Survey stars were reduced to the epoch 1880, the observations of different years collected, and the final places checked by comparison with other catalogues. The Struve stars are now being reduced to the epoch 1880, and the entire work will be completed during the present year.

Two orbits and ephemerides for comet 1898, IX. (Perrine), were computed by Mr. Perrine.

Elements and ephemerides for comet, 1898, V. (Giacobini), and for comet, 1898, X. (Brooks), and elements for comet, 1899, a (Swift) were computed by Professor Hussey.

The definitive orbit of comet, 1896, III. (Swift), was computed by Mr. Aiken.

An orbit and ephemeris for comet, 1898, VIII. (Chase), were computed by Mr. Coddington and Mr. Palmer.

A computation of the definitive elements of comet, 1897, III. (Perrine), is being made by Mr. Palmer.

Orbits and ephemerides of the new asteroids (439) and (440), and ephemerides for most of the Watson asteroids, were computed by Mr. Coddington.

Two sets of elements for the planet Eros, and circular elements of the asteroids (439) and (440), were computed by Professor Hussey.

Announcements have been telegraphed to Harvard College Observatory, for distribution, at various times.

Measurements of the wave-lengths of lines in the spectre of third type stars, and of the positions of nebulæ on plates taken with the Crossley Reflector, have been made by Mr. Palmer.

A report on the Crocker Eclipse expedition to India is being prepared by Professor Campbell. * * *

James E. Keeler.

Lick Observatory.

THE EARLY PRESIDENTS OF THE AMERICAN ASSOCIATION.

II.

Among our honorary fellows is the name of one who was not only a founder* of the Association of American Geologists in 1840, but also a founder of our own Association,

* The following quotation concerning the formation of the Association of American Geologists is given in a sketch of Professor James Hall, accompanied by an engraved portrait on wood that appeared in the *Popular Science Monthly*, Vol. XXVI., p. 122, November, 1884: "The comparison of observations and interchange of views led to the opening of correspondence,

ISAAC LEA.

and until the meeting of the American Association in Boston last year, our senior past president. I refer, of course, to that Nestor of American geologists, James Hall. It was but natural that he should be called to preside over the meeting in the city of his chosen residence. The second Albany meeting was held late in August, in 1856, and must ever remain a memorable one in the annals of American science on account of the inauguration of the Dudley Observatory at that time. It is no purpose of mine to consider the unfortunate controversy that followed that event, involving as it did the names and reputation of four great presidents of our Association—Henry, Bache, Pierce and Gould, but no student of the history of American science can well ignore its existence.

HALL.

Hall was born of English parents in Hingham, Massachusetts, in September, 1811, and after the usual schooling was about to prepare himself for the medical profession, when in 1831 his interest turned toward natural science and he entered the Rensselaer School in Troy, where he was graduated in 1832. It was there that he came under the influence of Amos Eaton, and, like Torrey, profited by it. His connection with the Rensselaer Polytechnic Institute did not cease on graduation, for he was made an assistant, and later became professor of geology, which chair he retained until 1876, when he was made *emeritus*. Thus his loyalty to his *alma mater* continued for nearly seventy years, and was only severed by his death.*

His real life-work, however, was in connection with the Geological Survey of New York, which was organized and divided into four divisions in 1836. Hall was made an assistant geologist and assigned to the second division under Ebenezer Emmons. A year later he was appointed one of the State geologists, and assigned to the charge of the fourth district. He began his explorations in the western part of the State, and from 1838 to 1841 prepared the annual reports of progress in the work of his district. His final report, issued in 1843, as Geology of New York, Part IV., contains, according to T. Sterry Hunt, a description "in a very complete and exhaustive manner the order and succession of the strata, their mineralogical and lithological characters, and the organic remains which they contain."†

Retaining the title of State Geologist, he was in 1843 given charge of the paleontological work of the State survey, and the results of his many years of study have been given to the world in the thirteen volumes of the Natural History of New York, which bear the subtitle of Paleontology. These volumes have received the well-deserved encomium of being "the most comprehensive work of the kind which any state or country in the world possesses." ‡

The first appropriation—$15,000—that was made for this work was with the understanding that it should be completed for that sum, but again and again as the work progressed Hall appealed to the legislature for additional funds for its completion, until in 1894, it was estimated that the entire

by a formal resolution of the New York Board, with other geologists, especially with those engaged in State surveys, of which several were then in progress. This correspondence led to an agreement for a meeting of geologists in Philadelphia in the spring of 1840, and this assemblage, of less than a score of persons, led to the organization of the Association of American Geologists, which, at a later period, on the occasion of its third meeting, added the term Naturalists; and, finally by expanding its title, it became the American Association for the Advancement of Science."

* Biographical Record of Rensselaer Polytechnic Institute.

† T. Sterry Hunt in the American Cylopædia, Vol. VIII., article James Hall.

‡ *New York Times*, August 9, 1898.

work had cost the State over $1,000,000. His comprehensive studies on the paleontology of New York naturally demanded researches beyond the limits of the State, and these he extended westward to the Rocky Mountains. It is now generally admitted that his investigations 'have served as the basis of all our knowledge of the geology of the Mississippi Basin.'*

In 1855 he was offered charge of the paleontology of the Geological Survey of Canada, with the promise of succeeding Sir William E. Logan as director on the retirement of the latter. When he was about to accept, promises of more liberal appropriations from the legislature of New York, and the influence of many leading American scientists, including Louis Agassiz and James D. Dana, led to his declining the offer, a decision which as the promises were never realized, he came to regard as 'the great mistake of his life.'†

The splendid work which he did in New York led to the request for his services elsewhere, and he was appointed to the charge of the Geological Survey in Iowa, in 1855, and to that of Wisconsin in 1857, preparing reports on both of these surveys. The paleontology of several government exploring expeditions was referred to him for discussion, notably that of Frémont, that of Stansbury, that of the Mexican Boundary Survey, and that of King's exploration of the fortieth parallel.

In 1866 the New York State Museum was reorganized, and Hall was made director, a place which he then held until 1893, retaining, however, until his death, the office of State Geologist. It was at our Buffalo meeting, in 1896, that special commemoration exercises were held in honor of the sixtieth anniversary of Hall's connection with the Geological Survey of the State of New York, and at that time papers were read descriptive of his work. W J McGee described him as the 'founder of stratigraphic geology and applied paleontology in America.'* Referring to Hall's study of the crystalline stratified rocks he also said: "It is not too much to say that the method was established by the New York Survey, and that it finds its best illustration in the classic fourth district; here it was that American stratigraphic geology was founded."†

It was also Hall, who, according to Hunt, "laid the grounds for a rational theory of, mountains, which must be regarded as one of the most important contributions to geological science."‡

He died in August, 1898, and the "monument of the man himself is builded in the rocks of New York, a monument more enduring than bronze or gold."§

Our Association is not local to the United States, but American, and at its tenth meeting it was decided to hold the gathering, in 1857, in Montreal, Canada. For president of that meeting Jacob Whitman Bailey was chosen, but early in the year he died, and the vice-president filled his place.

BAILEY.

Bailey was born in Auburn, Massachusetts, and, after a common school education, he entered the United States Military Academy, where he was graduated in 1832. He joined the artillery branch of the service, and for several years was stationed at various army posts. An early fondness for natural science was assiduously cultivated during these years, and he soon returned to West Point, where he was given charge of

* T. Sterry Hunt in the American Cyclopædia. See note 2, p. 20.

† Biographical Record of Rensselaer Polytechnic Institute.

* SCIENCE, New Series, Vol. IV., p. 706.

† Idem, p. 702.

‡ American Cyclopædia, Vol. VIII. See note 2, p. 20.

§ Benjamin K. Emerson in SCIENCE, Vol. IV., p. 717.

the chemistry, mineralogy, and geology, and later became professor of these branches, an appointment which he then held until his early death.

Bailey was one of the very first in this country to apply the microscope to the study of minute forms of life, and his work on infusorial fossils and the algæ gained for him a high place among contemporary scientists. He was a pioneer on the examination of the deep-sea soundings made by the United States Coast Survey, and his report on that subject is given in one of the early volumes of the Smithsonian Contributions to Knowledge. This series of publications also contains his papers on terrestrial microscopical organisms. His name is associated with many improvements in the construction of the microscope, and the indicator devised by him is one of his most valuable contributions to science.

He died too soon, but not until his work had 'won the approval of naturalists throughout the world.'*

The vacancy created by the death of President Bailey was filled by Alexis Caswell, who was the first vice-president of the Association. It is a matter of record that "he sustained the credit of his country on a foreign soil by his dignified presence and his manly eloquence to the great satisfaction of his associates." †

CASWELL.

Caswell was born in Taunton, Massachusetts, in 1799, and his ancestors were among the first settlers in that place. His paternal grandmother was a direct descendant of Peregrine White, who was born on the Mayflower in 1620. He was graduated at Brown University in 1822, standing first in his class, and then passed to Columbian University in Washington, where for five years he taught both the classics and mathematics. It was in Washington that he made his special studies in theology under the direction of Dr. William Staughton, President of the University.

In 1827, having resigned his chair, he became pastor of the Baptist congregation in Halifax, Nova Scotia, but a year later he relinquished that charge to return to Providence on an invitation from the First Baptist Church there. The chair of mathematics and natural philosophy in Brown becoming vacant, it was at once tendered him, and promptly accepted. For thirty-five years he continued in charge of the scientific instruction in the college of his choice, and then after a few years' rest he was chosen its president, which place he held until 1872, when, on the fiftieth anniversary of his graduation, he resigned.

It was the development of the various departments of science in Brown University that gave Caswell his high reputation among his contemporaries, but he had other claims that were also worthy of recognition. During the winter of 1858–59 he delivered four popular lectures on Astronomy before the Smithsonian Institution that were deemed of such importance as to warrant their insertion in the annual report of that year. His contributions to the young science of meteorology were of permanent value. Beginning with the year 1831, he instituted a series of observations in Providence which he continued until 1868, that were "precise as regards temperature and pressure; and including also much information on winds, clouds, moisture, rain, storms, the aurora," etc.*

I have spoken of his career as a teacher, and I have referred to his contributions to science. In closing this brief sketch it must be added that he was prominent in many walks of life, taking ever an active interest

*Smithsonian Report for 1857, p. 74.

†Memorial of Alexis Caswell, D.D., LL.D., with an engraved portrait on steel, p. 29, being a reprint of the Memoir by Joseph Lovering, presented before the American Academy of Arts and Sciences.

*Joseph Lovering in Memoir, p. 27.

in the welfare of his fellowmen. "In every charitable movement he was foremost with practical advice and generous aid."*

"Few men have filled more eminent positions in the walks of learning and science, and few pass away more cherished in scholarly remembrance than Alexis Caswell."†

WYMAN.

The twelfth meeting of our Association was held in Baltimore, and over that gathering Jeffries Wyman, of Boston, was chosen to preside, but when the time for the meeting came Wyman was unfortunately absent in South America. John E. Holbrook, of Charleston, South Carolina, the vice-president, was likewise unable to be present, and the duties of presiding again fell upon the competent shoulders of Caswell.

Wyman‡ was born in Chelmsford, Massachusetts, in 1814. He was the son of a physician, and after graduating from Harvard in 1833, followed in the footsteps of his ancestors, and with his brother, who still lives, studied medicine, both taking their degrees in 1837. Boston became his home, and several minor appointments came to him, notably, a course of lectures on comparative anatomy at the Lowell Institute, with the proceeds of which he visited Europe, where for two years he studied anatomy under the best masters both in Paris and London.

In 1843 he returned to Boston and soon was appointed to the chair of anatomy and physiology in Hampden-Sidney College, in Richmond, Virginia. The duties of this appointment called him from Boston during the winter and spring months only, and so offered a pleasant change from the rigors of the severer weather in Boston. Five years later he was called to succeed the celebrated John C. Warren in the Hersey chair of anatomy in Harvard Medical College, a congenial post, which he filled with honor until his death.

It would require more knowledge than I possess to properly present to you abstracts of the magnificent memoirs on comparative anatomy that came from the pen of this leader in science. That task, fortunately for the world, has been performed by one who studied with him, and to the memoir presented before the National Academy of Sciences* by Packard, I beg to refer you for that full and adequate treatment which Wyman's work deserves. Two quotations may, however, be given to indicate their value. His study on the gorilla, according to Gray, 'assured his position among the higher comparative anatomists.'† His paper on the bull frog was described as the 'clearest introduction to the most complex of animal structures.'‡

So great was his knowledge of anatomy that a single sentence from Oliver Wendell Holmes sums up fully his remarkable ability to develop a structure from a single bone.

"In a memorial trial [he says] his evidence relating to the bones which had been submitted to great heat is of singular excellence as testimony, and his restoration of fragments is a masterpiece of accuracy and skill."§

Wyman was a man of delicate constitution, and as he advanced in years it became his settled custom to spend the winters in Florida. It was in that land of flowers that he began his archeological work by

New York Tribune, Jan. 9, 1877.

†*Taunton Gazette*, January 9, 1877.

‡ Biographical Memoirs of the National Academy of Sciences, Washington, 1886. Vol. II., p. 75. Jeffries Wyman, by A. S. Packard. See also *Popular Science Monthly*, Vol. VI., p. 355, where an engraved portrait on wood is given; also see Anniversary Memoirs of the Boston Society of Natural History, Boston, 1880, where a lithograph portrait is given.

* Biographical Memoirs, Vol. II., p. 77.

† Idem, p. 97.

‡ Jeffries Wyman, Memorial Meeting of the Boston Society of Natural History, October 7, 1874, p. 24.

§ Biographical Memoirs, p. 95.

the examination of the shell heaps, then little known, but now recognized as existing at many places along our Atlantic coast. These he studied with much interest and prepared reports on them which were published by the Peabody Museum in Cambridge. Of this institution he was one of the founders and its first curator. His successor and the second curator of that institution, I need hardly add, is President Putnam.

For the meeting in the year 1859 the City of Springfield, Massachusetts, was chosen, and to preside over that gathering Stephen Alexander, of Princeton, was selected by his colleagues.

ALEXANDER.

Alexander was born in Schenectady, New York, in 1806. As a boy he was slender and delicate, fond rather of books than of outdoor sports, and being an excellent student, he was given a college education. He was graduated at Union in 1824 with high honor, although only eighteen years of age. For several years he taught, and then made astronomical observations in Albany, the results of which were communicated to the Albany Academy.

In a sketch * by his successor at Princeton, the inference is made clear that the marriage of his sister in 1830, to Joseph Henry, had much to do with the shaping of his scientific career, for he followed Henry to Princeton in 1832, and then entered the Theological Seminary as a student.

His scientific work was entirely connected with astronomy, and, beginning with 1834, he observed most of the solar eclipses visible in the United States. In 1860 he was made chief of the party that went to Labrador under the auspices of the United States Coast Survey to observe the eclipse of that year, and again, in 1869, he was a leader of the observation party sent to Ottumwa, Iowa. He was associated with Henry in his thermopile observations on sun spots in 1845, as well as in other astrophysical researches, and, to quote from Young:

"He observed four transits of Mercury, and in December, 1892, he closed the record of more than fifty years by a careful and satisfactory observation of the transit of Venus." *

It would be too much to claim that Alexander was a great scientist, but fifty-three years of earnest devotion to his professional duties, added to his valuable contributions to the science of his choice, is a career worthy of high honors. It was well said of him at the time of his death, in 1883, that "American astronomy to-day owes much to his life and labors." †

The unwritten law of alternating the succession in the presidential chair from a representative of the physical sciences to one devoted to natural science received an emphatic demonstration in the selection of Isaac Lea as the successor of Alexander. The searcher for truth in the remote distance of far-away skies gave place to the patient student of fresh-water shells.

LEA.‡

Born in Wilmington, Delaware, in 1792, Lea was early influenced towards a fondness for natural history by his mother, who was devoted to botany. At the age of fifteen the boy was sent to Philadelphia to enter mercantile business, and there met Lardner Vanuxem, the future geologist. The young men spent their leisure in long walks, in which they collected minerals and studied the geological features of the vicinity.

* Biographical Memoirs of the National Academy of Sciences, Washington, 1886, Vol. II., p. 249. Stephen Alexander, by Charles A. Young.

* Biographical Memoirs, p. 254.

† Idem, p. 259.

‡ A Portrait of Isaac Lea is published as a frontispiece.

Then they learned of the Academy of Natural Sciences, and the influences of that institution which had been exerted for so much good among the young men in Philadelphia, was extended to them. Membership was accorded to them in 1815, and two years later Lea presented his first paper before that body.

His interest in mineralogy gradually extended to geology, and especially to paleontology, through which he acquired a special fondness for fresh-water and land shells, to the study of which he devoted first his leisure from business and then all of his time. The unios were specially attractive to him, and his first conchological paper, published in 1827, was a description of six new species of that genus.

From this beginning grew his many papers on that particular mollusk until his separate articles collected under the title 'Observations on the Genus Unio,' 1827–1874, formed thirteen quarto volumes, containing two hundred and eighty plates. Besides the foregoing, he wrote many papers on new species of the Strepomatidæ, Colimaceæ and other forms, indeed, it has been computed that nearly two thousand new species were described by him, of which nearly one-half were unios. His entire bibliography includes almost three hundred titles.

To the few specimens originally collected for study were soon added others that were sent to him from all over the world, and his cabinet, unique of its kind in the world as far as the unios were concerned, was bequeathed by him to the United States National Museum. As a memorial to him it fills the large hall of the Smithsonian Institution, and to students the fruits of his years of devotion to science are ever available, thus carrying out in a practical way the injunction of Smithson's bequest to found an institution for 'the increase and diffusion of knowledge.'

Lea's first love of minerals also followed him through life, and he formed a valuable collection of gem stones. These, like his larger cabinet, have found a permanent home in the National Museum. His special interest in connection with gems was concerning inclusions in crystals, and upon this subject he contributed a number of valuable papers.

The Academy of Philadelphia chose him as its president, in 1858, and two years later he became president of our Association. He lived until 1886, and continued his interest in science until the last. One of the features of the Philadelphia meeting of 1884 was the reception given by Lea to the visiting scientists, both from our own Association and from the British Association, at his summer home.

The long struggle of cruel warfare between the North and the South prevented any meeting of our Association for five years subsequent to the gathering in Newport, and so it was not until 1866 that the members of the American Association were reunited in a meeting held in Buffalo. It was a happy coincidence that for that occasion a president had been chosen in 1860, who at that time was one of the most famous of southern scientists, and who, in consequence of the fortunes of war, turned his steps northward to win even greater laurels as president of Columbia University. I refer, of course to Frederick Augustus Porter Barnard, the selection of whom did credit alike to the men of science, whether from the north or from the south.

BARNARD.

Barnard was born in Sheffield, Massachusetts, in 1809, and his ancestors settled in New England early in its history.* As a

* See Memoirs of Frederick A. P. Barnard, D.D., LL.D., tenth president of Columbia College, by John Fulton, New York, 1896. Also *Popular Science Monthly*, Vol. XI., p. 100, and *Scientific American*, Vol. LVIII., p. 327, May 25, 1889, both of which contain portraits.

boy he learned the printer's art, but not to the neglect of his studies, for he was graduated at Yale in 1828, standing second in his class. At once he began his work as a teacher in the Hartford grammar school, and also took up in Hartford the study of law under Jonathan Edwards. Two years later he returned to New Haven and was made a tutor of mathematics. At that time a severe illness produced a temporary deafness, and as that affliction was hereditary in his family, it led him to retire from Yale and to turn his attention to the education of the deaf and dumb, accepting first a call in an institution in Hartford, and in 1832 to one in New York City.

In 1837 he was invited to the University of Alabama, where he filled, first the chair of mathematics and natural philosophy, and later that of chemistry and natural history, remaining in Tuscaloosa until 1854. It was said of him, at that time, that he was "the best at whatever he attempted to do; he could turn the best sonnet, write the best love story, take the best daguerreotype picture, charm the most women, catch the most trout, and calculate the most undoubted almanac."* As further evidence of his versatility it may be mentioned that he edited two newspapers of opposite political opinions. It was also while in Tuscaloosa that he delivered his famous Fourth of July oration, beginning "No just cause for a dissolution of the Union in any thing that has hitherto happened; but the Union is the only security for Southern rights." While it enraged his colleagues greatly, "this oration, read in every part of the State, as it was within a week, presented the northern cause in an entirely new light in Alabama, and checked the rising spirit of rebellion for many years."†

* Appleton's Annual Cyclopædia, Vol. XIV., p. 73. This was given me originally by Mrs. Barnard.

† Clipping from *The New York Tribune*, probably of July 6, 1886.

In 1854 he accepted a call to the chair of mathematics, natural philosophy and civil engineering in the University of Mississippi, of which institution he became president in 1856, and chancellor in 1858. When the Civil War closed the doors of that University he declined office under the Confederate government and came north. For a time he was connected with the United States Naval Observatory, and also with the United States Coast Survey, but the vacant chair of physics in Columbia College attracted him, and the trustees of that institution were wise in taking advantage of their opportunity to offer him the higher honor of the presidency of Columbia College, a place from which President King had just resigned.

Newberry, who for so long was closely associated with him, in an admirable address, in which he presented a summary of Barnard's career as an educator, said of the growth of Columbia during his presidency:

"He made there a noble and an honorable record. Every one of the steps of progress was either conceived or earnestly advocated by him and owed its achievement to his support. He was not only a participant, but a leader in every forward movement."*

In conclusion let me quote the lines that his friends Whittier wrote of him:

Rich, from life-long search
Of truth, within thy academic porch
Thou sittest now, lord of a realm of fact,
Thy servitors the sciences exact;
Still listening with thy hand on Nature's keys.
To hear the Samian's spheral harmonies
And rhythm of law.

As I approach that period in the history of our Association during which it has been my privilege to know personally the men who were our leaders, the pleasure of pre-

* John S. Newberry. Necrology Report of the University Convention of the State of New York. (Reprint.)

paring this address increases. Barnard was president of Columbia during my undergraduate course there, and perhaps the last time that I saw him was on the occasion of the meeting of the American Association in New York, 1887. Another meeting was yet to come and go, and then Barnard too was called away to join the silent majority.

In that admirable address with which he welcomed the Association to Columbia he reviewed the labors of his many distinguished predecessors in the Association, saying in conclusion:

> All these have gone to their rest, many of them full of years, all of them full of honors. Others have risen to fill their places, no less earnest, no less capable, and destined to be no less illustrious.*

NEWBERRY.

Among all of these there is none of whom I am prouder on this occasion and in this place to express my love and honor for than John Strong Newberry, of whom it was so well said:

> He is a geologist—keen of eye, stout of limb, with a due sense of the value of detail, but with a breadth of vision that keeps detail in due subordination.†

Newberry‡ was born in Windsor, Connecticut, towards the close of the year 1822. He was of early New England ancestry, and was specially proud of the fact that his grandfather was an officer in the American army during the war of the Revolution. The boy was barely two years old when his parents moved to Ohio and Cuyahoga Falls became his home. He was educated at Western Reserve College, and received his doctor's degree from the Cleveland Medical College in 1848, after which he spent two years in special study abroad.

Then settling in Cleveland he began the practice of medicine, but his love for natural science was greater than his fondness for his profession, and in 1855 he accepted an appointment in the United States Army as assistant surgeon. From that time until 1861 he served both in his professional capacity and as a geologist to exploring parties. At first under Williamson who was sent to examine the country between San Francisco and the Columbia River; then under Ives in his exploration of the Colorado River; and finally under Macomb with the expedition sent to study the San Juan and upper Colorado rivers. On the material gathered during each of these expeditions he prepared valuable scientific reports, which were published by the government. In these volumes will be found pioneer work of great value, much of which has been lost sight of on account of the greater development of the same territory by subsequent expeditions. In an appreciative sketch of him by Kemp, his successor at Columbia, that appeared at the time of his death, I find this statement:

> His determinations of strata in the west, although based on the hasty itineraries of exploring parties, have been very generally corroborated by later and more deliberate work.*

His wonderful 'ability to grasp as by intuition the bearings of many widely separated facts,'† would have gained even greater renown for his early work in the west, had not the civil war intervened.

From 1861 to 1866 Newberry was secretary of the Western Department of the United States Sanitary Commission with

* Proceedings, American Association for the Advancement of Science, Vol. XXXVI., p. 342.

† Address made at the presentation to Newberry of the Murchison medal in 1888, by the Geological Society of London. He was the first American geologist to receive that honor.

‡ See sketch in *Popular Science Monthly*, Vol. IX., p. 490, August, 1876, with an engraved portrait on wood, and also *Scientific American*, December 31, 1891, with half-tone portrait.

* In Memorium. Professor John Strong Newberry, *School of Mines Quarterly*, Vol. XIV., p. 90, January, 1893, with two engraved portraits on steel.

† Idem, p. 99.

supervision of all the operations of that body in the valley of the Mississippi. He organized the comprehensive work of the commission in the large section that was entrusted to his care, and during its life expended more than $800,000 in money, besides distributing hospital stores that were valued at more than $5,000,000. The whole story of that wonderful achievement, its development, and its completion was told by himself in his report of the commission in the valley of the Mississippi that was published in 1871.

With the return of peace came a new interest in the development of our institutions of learning, and conspicuous among the newer experiments was the then recently organized School of Mines of Columbia College. It was the first institution of its kind in the United States, and its success was yet to be determined. Newberry was called to the charge of the department of geology in the new school, and, with a faith in its ultimate success that never faltered, he accepted the trust. With the same genius for organization that was shown by his development of the work of the Sanitary Commission, he began the planning of courses of study. Alone he gave instruction in botany, zoology, geology, lithology, paleontology and economic geology, and a quarter of a century later left to the world as his best and greatest memorial a magnificently equipped department of the special branches taught by him not excelled by any similar educational institution in this country. Nor was this all. He created a museum of over 100,000 specimens, principally collected by himself, which served to illustrate his lectures on geology and economic geology. It contains "the best representatives of the mineral resources of the United States to be found anywhere, as well as many unique and remarkable fossils." *

* This is his own description taken from a personal letter written to me in 1888.

Kemp calls it 'a monument to his memory,' and adds:

Its wealth of fossil fish and fossil plants makes it unique and famous among geological museums.*

In 1869 he became State geologist of Ohio, and for many years he regularly spent his summers in the field, while the accumulated material was digested during the winter months in the laboratory in New York, yielding the nine large volumes of reports published by Ohio. The unwillingness of the State Legislature to permit the completion of the work as originally intended was the great grief of his closing years, and marked the beginning of his end.

It is a pleasure to remember that during the last years of his life he received the fossil plants and fishes from the United States Geological Survey to report on, and so returned to the study of those forms which, as a boy, he loved to collect in the coal deposits of eastern Ohio.

He was rich in those accumulated experiences that we call wisdom. He was a friend, faithful and true, as those who knew him can testify. He is gone, but his influence cannot die. It will live forever to 'reach through nature, moulding men.'

American astronomers hold a high place in the history of the development of their chosen science, and among those in our country who have made the study of the heavens their chief life-work, first place must unquestionably be given to Benjamin Apthorp Gould for his splendid achievements. In his time he ranked as the greatest of our astronomers, and our Association honored itself in choosing him to preside over the meeting held in Chicago in 1868.

MARCUS BENJAMIN.
U. S. NATIONAL MUSEUM.

(*To be continued.*)

THE BEST MOVEMENT FOR HANDWRITING.

IT is by no means certain that the ordinary writing movement, as taught in the

* *School of Mines Quarterly*, Vol. XIV., p. 99.