

MEMOIRS

OF THE

NATIONAL ACADEMY OF SCIENCES

Volume XXI

THIRD MEMOIR

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON
1927

NATIONAL ACADEMY OF SCIENCES

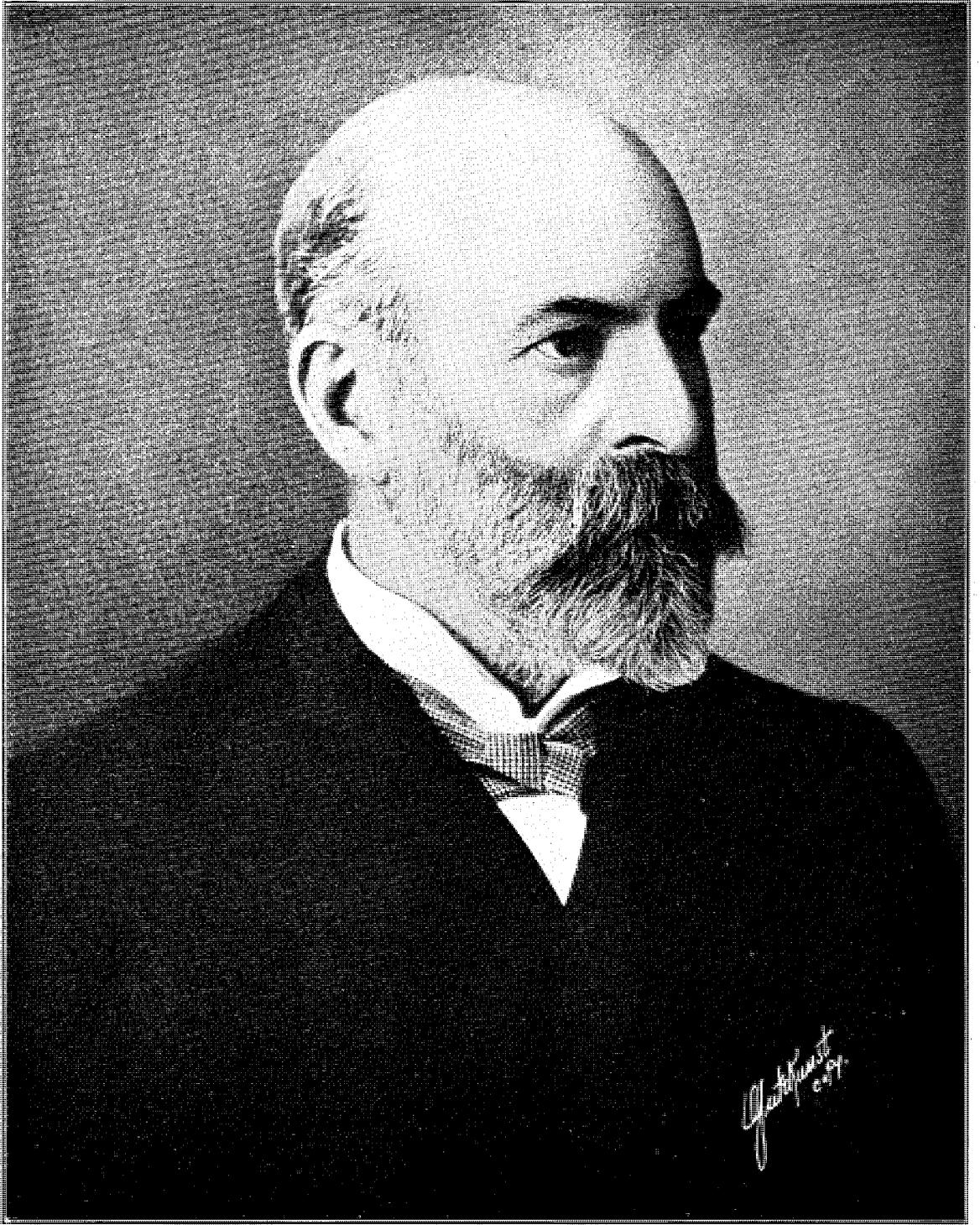
Volume XXI
THIRD MEMOIR

BIOGRAPHICAL MEMOIR JOHN CASPER BRANNER
1850-1922

BY

R. A. F. PENROSE, Jr.

PRESENTED TO THE ACADEMY AT THE ANNUAL MEETING, 1923



J. C. Branner

JOHN CASPER BRANNER

By R. A. F. PENROSE, Jr.¹

John Casper Branner was born at the town of New Market, Jefferson County, Tenn., on July 4, 1850. He was the son of Michael T. Branner and Elsie Baker Branner. His family were among the early settlers of the Shenandoah Valley of Virginia in the colonial days. They probably came originally from southern Germany or eastern Switzerland before the middle of the eighteenth century, and first settled in Pennsylvania. Somewhat later Casper Branner moved to Virginia, where in 1760 he received a grant of land in the Shenandoah Valley from Lord Fairfax, who had been given large estates in Virginia by Charles II.²

The family lived in this region until 1799, when Doctor Branner's great grandfather, Michael Branner, moved to Jefferson County, Tenn., and took up lands near the town of Dandridge on the Frenchbroad River. He became the progenitor of the Tennessee branch of the family, while his brother, John Branner, who remained in the Shenandoah Valley, became the progenitor of the Virginia branch of the family. Both branches have multiplied and have spread widely through many parts of the United States. Strong, active, and earnest people have been characteristic of the family, and many of them have occupied high positions in the communities in which they lived.

In the early childhood of Doctor Branner his family moved from New Market, Tenn., to the farms near Dandridge, owned by his father, some miles distant. At that time the country was sparsely settled, and books and schools were not numerous. The early education of Doctor Branner therefore was confined largely to local schools and to the reading of such books as were available. He attended the Maury Academy, about a mile from Dandridge, and later studied at what was known as the North Schoolhouse, at a school at Graham's Chapel, and still later he attended school at New Market.

Doctor Branner was naturally of an inquiring disposition, and in the scarcity of books he early developed a deep interest in the natural features of the country surrounding him. He thus rapidly became familiar with the character of the rocks and of the animals and flowers that were found in the neighborhood. This early bringing up in close contact with nature, followed later by an education in institutions of high learning, doubtless served to develop that remarkable originality and initiative which distinguished him in later life and which produced a man who became eminent among the scientists of his generation. In his early days he was intended for the ministry and was examined as to his qualifications for it, but he apparently never went further in this calling, having decided to devote himself to science.

In 1866 Doctor Branner went to Maryville College, situated near Knoxville, Tenn., where he remained for about two years. At this period the demoralization in the South which followed the Civil War reached even to Maryville College; the students became discontented and many of them left. Doctor Branner was then 18 years of age, and the new institution known as Cornell University had lately been established at Ithaca, N. Y. He was attracted by the possibilities for study there, and in 1869 went to what was known as the Ithaca Academy to prepare for the university, which he entered the next year.

At Cornell, Doctor Branner took up mostly scientific courses, particularly in geology, botany, zoology, and other branches of natural science. Here also he had the good fortune to meet Prof. Louis Agassiz and Dr. Charles F. Hartt, the latter then professor of geology, at

¹ The writer desires to express his sincere appreciation of the information given to him by Mrs. J. C. Branner in the preparation of this memoir. Such assistance has been always willingly granted and has greatly helped the writer in his description of the life work of Doctor Branner.

² See "Casper Branner of Virginia and his descendants," by J. C. Branner, Palo Alto, Calif., 1913; also "Address at the reunion of the descendants of Casper Branner of Virginia, held at the original homestead, near Forestville, Va., Aug. 30, 1918." Published in Shenandoah Valley, New Market, Va., Sept. 5, 1918. (The "New Market," Va., mentioned here should not be confused with the "New Market," Tenn., mentioned in the text of this memoir.—Author).

Cornell. Doctor Hartt had made several trips to Brazil in previous years and had published a valuable account of its geology. He finally decided to make another trip into that country and invited Doctor Branner to accompany him. Doctor Branner had not yet completed his university course, but was much pleased at this opportunity to visit what was then a somewhat remote region, and he sailed with Doctor Hartt from New York for Rio de Janeiro in September, 1874. In later years, on his return to the United States, he received the degree of B. S. from Cornell University.

The expedition to Brazil was of much interest and importance as the beginning of the first serious attempt to start systematic geologic work in that country; and it was greatly to the gratification of the two explorers that in the following year the Brazilian Government, under the Emperor Dom Pedro II, established a department to continue this work under the name of *Commissão Geologica do Imperio do Brazil*. This was due largely to the efforts of Doctor Hartt and Doctor Branner, assisted by Brazilian scientists and others interested in this work. The new department was under the Ministry of Agriculture, and Doctor Hartt was appointed director, with Doctor Branner as assistant. Orville A. Derby, Richard Rathbun, and E. F. Pacheco Jordão were also on the same survey. Work was begun in the spring of 1875.

Doctor Branner's first exploration in Brazil was largely in the coastal region of the State of Pernambuco and in the States of Sergipe and Alagoas, as well as on the island of Fernando de Noronha, off the coast of Brazil. Large collections of geologic materials were rapidly assembled at the headquarters of the *Commissão Geologica do Imperio do Brazil* in Rio de Janeiro, including many cretaceous fossils from Sergipe and Alagoas, and Doctor Branner did much work in systematizing and arranging them. Somewhat later Dr. Charles A. White also described some of the fossils.

In 1876 Doctor Branner returned to the United States, but went to Brazil again within a few months. The work of the *Commissão Geologica* was carried on until the next year, when it was discontinued by the Brazilian Government. Doctor Hartt died shortly afterwards. In later years other Government organizations were instituted for geologic research and Doctor Branner in some of his subsequent trips to Brazil worked in conjunction with them.

After the discontinuance of the first survey, however, Doctor Branner accepted a position as assistant to James E. Mills, a well-known American mining engineer engaged in operating gold mines in the State of Minas Geraes. In this work Doctor Branner rapidly became familiar with the older paleozoic rocks of the region and the occurrence of gold and other ores in them; but though the scientific results of the work were of much interest, the financial results were not equally satisfactory, and in 1880 he returned to New York.

A few months later, however, he again went to Brazil at the request of Thomas A. Edison, the inventor, to search for a vegetable fiber which would add strength to incandescent lights. Doctor Branner collected and tested many kinds of bamboo and other fibrous plants throughout Brazil and the neighboring countries of Argentina, Uruguay, and Paraguay, but only a few of them seemed to possess the necessary straight-grained length and hardness desired. Moreover, when occasionally he found a fiber which might partly answer the purpose it was either too difficult to obtain or too rare in its occurrence to use practically. Doctor Branner was a very persistent man and was not easily baffled; but though he traveled many thousands of miles in this search, he eventually concluded that the bamboos of Japan and China, already known to be suitable for the use in question, were usually cheaper and could be more readily obtained than those of South America. He returned to New York again in December, 1881.

In the following year he was commissioned by the United States Department of Agriculture to go to Brazil to study the culture of cotton there, and especially the nature of the insects injurious to the cotton plant, with a view to securing information which might be useful in combatting the destructive insect common in the cotton regions of the United States. Though this investigation was the main feature of the trip, yet he also collected much data on insects injurious to sugar cane, oranges, and other fruits and plants.

This work covered a large area of the country, and Doctor Branner and his assistant, Albert Koeble, were given every assistance by the Brazilian officials to facilitate their research.

They found that the same insect which did the greatest damage to cotton in the United States existed to a greater or less extent in all cotton-growing regions of Brazil, but that it was particularly abundant in certain districts. They made large collections, and in the spring of 1883 Doctor Branner returned to Washington and presented his results to the Department of Agriculture.

After this trip Doctor Branner temporarily ceased his frequent visits to Brazil and accepted an appointment on the Geological Survey of Pennsylvania to do topographic mapping in the Lackawanna Valley and neighboring country, one of the great anthracite and industrial regions of the United States. Prof. J. P. Lesley was director of the survey at that time, and his natural genius in topography was an inspiration to Doctor Branner in accomplishing similar work not only in Pennsylvania but subsequently in other regions. Doctor Branner also made careful observations on the glacial geology of northeastern Pennsylvania, comprising the southerly extension of the great glacial region in these parts, a subject of especial scientific interest to glacial geologists.

In the spring of 1885 Doctor Branner was elected professor of geology at Indiana University, Bloomington, Ind., and in the same year received the degree of Ph. D. from that institution. The president at that time was Dr. David Starr Jordan, noted scientist and one of the foremost ichthyologists in the world. Through his efforts and those of Doctor Branner the university became a center for special instruction and research. Doctor Branner, with his wide professional experience and his knowledge of remote regions, gave great effect to this movement, particularly in his work and instruction in geology, botany, and entomology; and he created a group of enthusiastic young students who later followed him to Arkansas and California. During part of this period he was also connected with the United States Geological Survey.

In the spring of 1887, Doctor Branner was appointed State geologist of Arkansas by Governor Hughes, a position which he accepted with leave of absence from Indiana University. One of the main reasons for the creation of the geological survey of Arkansas was the great excitement over the supposed existence of gold and silver in that State, especially in the Ouachita Mountains, which run westward from Hot Springs to what was then the border of Indian Territory, but which is now the border of Oklahoma.

Many companies capitalized at millions of dollars had been formed to work the alleged mines. A thorough investigation was made by Doctor Branner and his assistants, and they were eventually forced to the conclusion that the mines then known were valueless and the few which contained a little gold and silver carried them in such small quantities as to be insignificant. This announcement of the first work of the geological survey caused great indignation among many of those financially interested in promoting the mines; the State geologist was burned in effigy, and the governor of the State was asked to remove him from office. Doctor Branner, however, stood firm, for he knew that he was correct in his conclusions, and he ignored the bitter efforts to destroy his professional reputation. Governor Hughes also supported him, and the State legislature later indorsed his work and even increased the appropriation for continuing the survey. As time went on and the views of Doctor Branner were verified, the old antagonism was changed to a feeling of remarkable confidence and respect.

Doctor Branner carried on his active survey in Arkansas for about five years, though he continued the work periodically for many years afterwards. It was doubtless the greatest accomplishment of his life; and though accompanied with innumerable difficulties and most arduous work, the result was well worth his splendid efforts. Fourteen volumes were published, and several were prepared but not published on account of lack of funds. They cover the paleontology, stratigraphy, petrology, economic geology, and other natural features of the State. The mineral resources were carefully investigated and discussed throughout the survey reports, but the purely theoretic geology was never forgotten as the economic possibilities were unfolded. The survey was thus of great importance from both purely scientific and economic standpoints, and when Doctor Branner finally left Arkansas to go to Stanford University his departure was regretted by the whole community.

In some of his later trips to Arkansas after the survey closed he carried on geologic investigations previously unfinished and produced valuable results, some of which were described in various scientific journals and in the publications of scientific societies.

Much of the geologic work on the survey was done by Doctor Branner personally, and much of it was done under his supervision by geologists whom he had gathered about him from different parts of the country and by students who had followed him from Indiana University. A remarkable spirit of enthusiasm pervaded them all, and nothing manifested their loyalty to their chief more strikingly than when in 1907, many years after the survey had closed, the surviving members who had assisted Doctor Branner presented to him a portrait of himself as "an expression of their high regard and of their appreciation of his example and inspiration as a geologist and as a man." In replying to this presentation Doctor Branner said: "To every member of that former organization I feel strongly attached. A more loyal and more faithful body of men can not be found anywhere. As long as the survey lasted everyone exerted himself to the utmost to do honest scientific work and faithfully to serve the legitimate interest of the people of the State; and it is a great pleasure to know that our work in Arkansas is more highly thought of by the people of that State as time passes."

Doctor Branner was offered the professorship of geology at Stanford University in 1891, and resigned as State geologist of Arkansas and as professor of geology at Indiana University to accept the appointment. The new institution had just been founded and endowed by Senator and Mrs. Leland Stanford in memory of their son and only child, Leland Stanford, jr. The president of the university at that time was Dr. David Starr Jordan, with whom Doctor Branner had formerly been associated at Indiana University; and in California, just as in Indiana, these two men worked together and gathered about them a teaching staff of distinguished scholars from all parts of the United States. The result was that Stanford University rapidly became a recognized institution of advanced learning; in fact, it never went through the condition of slow development which has marked many educational institutions, but it jumped almost immediately to the first rank, and is to-day everywhere regarded with admiration and respect.

Doctor Branner entered upon his duties as professor at Stanford University in the winter of 1892, and for over a quarter of a century, both during his official connection with it and after his retirement, he was active in its development, displaying the same energy and force that he had shown in previous work in other fields. His influence with his students was of an intellectual character which was truly astonishing and which impressed all who came in contact with him. In 1899 Doctor Branner was made vice president, and in 1913 was made president, though he still retained his position as head of the department of geology. In December, 1915, he retired from the presidency, greatly to the regret of the trustees and faculties, and was made president emeritus of Stanford University. In spite of his retirement his interest in the welfare of the university was always manifest and always sought.

In addition to Doctor Branner's educational and administrative work at Stanford, he always maintained his active interest in Brazil, and in 1899 he made a trip to that country for the purpose of studying the immense ocean reefs lying off the coast of Pernambuco, and of distinguishing those composed of sandstone from those of coral origin, a work that had never been done before. Doctor Branner had been familiar with this region ever since his early days in Brazil with Doctor Hartt, but he had not had an opportunity to study it in detail until this trip. The research covered some 1,300 miles of coast line, and a large amount of new geologic information was secured.

Doctor Branner was so deeply interested in exploration in Brazil that every time he visited it he found new material or new districts which he desired to investigate on future trips. In 1907, therefore, he again returned to Brazil in order to study the geology of the black diamond districts of the State of Bahia and adjoining regions. His work covered vast areas, not only in Bahia but in the States of Alagoas and Sergipe. Many thousands of square miles were examined, and the general geology as well as the mineral resources were carefully observed. The

Brazilian Government had followed these explorations with much interest; and realizing their important bearing on the industrial resources of the country, they employed Roderic Crandall, Doctor Branner's assistant, to continue the work after the latter had left Brazil.

Doctor Branner returned to Stanford after about six months' absence, but before long his desire to revisit Brazil returned, and in 1911 he started with a new party for the purpose of making a study of the geology and biology of the Brazilian coast in the neighborhood of the mouth of the Amazon River. Particular attention was given to the study of sea life on both sides of the vast volume of fresh water poured out by that river, and especially to its effect on the marine migration which moves along the coast from the shores of Pernambuco toward the mouth of the Amazon. The haunts and habits of the larger snakes in Brazil were also studied in detail and several specimens of boa were secured. In spite of many difficulties, various new discoveries were made on this expedition, and a number of important papers on special subjects were published.

In consequence of the numerous trips of Doctor Branner to Brazil the world to-day owes to his indefatigable efforts much of its geologic and other scientific knowledge, not only of the eastern part of the country in the States of Pernambuco, Alagoas, Sergipe, Bahia, Minas Geraes, and Rio de Janeiro, where he did a large part of his work, but also of almost every other part. On some of his trips he worked in conjunction with Dr. Orville A. Derby, an American geologist who had been engaged in geologic work under the Brazilian Government and under the government of the State of São Paulo for many years. Doctor Branner was assisted on some of his trips by H. E. Williams, who had been with him on the geological survey of Arkansas, and by Roderic Crandall, who had gone to Brazil with him and who in later years continued work which Doctor Branner had begun. Others of his own countrymen were also on occasions associated with him.

Doctor Branner was on most cordial terms with the Brazilian geologists, many of whom had done excellent scientific work and were always glad to cooperate with him. Some of his work was done jointly with them, and the noted Brazilian geologist, Dr. Miguel Arrojado R. Lisboa, was among his particular friends. Even with the officials of the Empire of Brazil and of the United States of Brazil which followed it, he was on terms of intimate good fellowship, and nothing illustrates this better than the passage of resolutions of condolence at the time of his death by the Chamber of Deputies of the Brazilian Government.

Doctor Branner throughout his whole career naturally took a great interest in the subject of earthquakes, but this interest was much stimulated after the earthquake in California in April, 1906. Soon after that calamity he was appointed by Governor Pardee a member of the State Earthquake Investigation Commission of California. In addition to this commission one of the direct results of the calamity of 1906 was the formation of the Seismological Society of America, of which Doctor Branner was one of the charter members. He was president of the society from 1910 to 1914, and was chairman of the publication committee from 1911 to 1921. In 1915, when widely divergent opinions were being expressed regarding the questions of earthquakes and landslides as affecting the Panama Canal, Doctor Branner was appointed a member of a committee of 10 which was commissioned by the United States Government to visit the Canal Zone and investigate these matters.

Most of Doctor Branner's seismological work, however, was done in California and in more or less direct connection with the Seismological Society. He was extremely active in all these investigations and accomplished important results in collecting data which could be practically applied in the limitation, and in some cases the avoidance, of the destruction caused by earthquakes and by the disastrous fires which often follow them as a consequence of broken water pipes. His work in this field was one of those remarkable accomplishments resulting from purely geologic research that characterized many of his investigations in other subjects.

Prof. Sidney D. Townley, of Stanford University, who is himself a leader in seismological research, in writing of Doctor Branner's connection with the Seismological Society, says, in its Bulletin for March, 1922, that "In the death of Doctor Branner, the Seismological Society has lost one of its staunchest supporters. He gave liberally of his time, energy, and funds in support

of seismological projects; he was the founder of the society's Bulletin, and it was he who provided the ideas and the ideals, the manuscripts, and the funds for the successful continuance of this publication through a difficult period of 10 years; it was he who obtained a gift of \$5,000 for the society, and he who by never-tiring efforts trebled its membership; it was he who revived a nearly defunct society in 1910, and through 10 years of constant effort built up an organization of merit, worth, and usefulness."

After Doctor Branner had retired from the presidency of Stanford University he retained his home there and devoted much of his time to work on many scientific problems which his busy life had previously prevented him from finishing. During this period he completed a geological map of Brazil, which was published largely by the assistance of the Geological Society of America, and with the map he wrote explanatory texts both in English and in Portuguese. The great amount of geologic detail displayed over vast areas of country in this map is a mute but eloquent testimony to the research, the learning, and the untiring efforts of its author.

Doctor Branner was primarily a geologist, and his work covered a wide field in various branches of the earth sciences, including paleontology, stratigraphy, mineralogy, seismology, and economics; but he also accomplished important work in entomology, botany, and other branches of biology. He was one of the last of the old-time scientists who were learned in many branches of natural history, before the extreme specialization of modern times had made it necessary for a research worker to confine himself to narrow lines of scientific investigation.

In addition to his accomplishments as a scientist, he was a linguist of unusual ability, a remarkable educator, and a strong leader of men. As a linguist he was learned in both ancient and modern languages. Latin and Greek were thoroughly familiar to him; and in modern languages he was preeminently a scholar in Portuguese, in which he wrote a grammar for English-speaking people, a textbook of geology for the Brazilians, and an explanation of his geologic map of Brazil, as well as numerous geologic reports relating to that country. In his later years he translated from the Portuguese the History of the Origin and Establishment of the Inquisition in Portugal, by Alexandro Herculano. Other modern languages also came easily to him and assisted him greatly in his various travels.

Doctor Branner as an educator achieved remarkable success with the students who studied under him. His constant sympathy with them and his interest in their work did much to inspire that feeling of affection and loyalty preeminently observable in them. His forceful, fearless, and intensely intellectual personality, his wide experience in scientific research in many regions, his broad vision not only in his work but in his knowledge of men, gathered around him at Indiana University, on the Geological Survey of Arkansas, at Stanford University, and on numerous trips to Brazil, a group of followers which was truly wonderful, both in their numbers and in their professional success in later life. His students have spread over almost every part of the world, and an unusually large percentage of them have done honor to their instructor and chief. As he himself said in later years, in referring to certain honorary recognitions which he had received in his profession, the greatest honor of all is that which comes to one from having men "who have been his students doing good and honest work in every quarter of the globe."

Doctor Branner married, in 1883, Miss Susan D. Kennedy, of Oneida, N. Y., a graduate of Vassar College. They had three children, one a daughter, now married, and two sons. They all graduated from Stanford University; and his two sons and his son-in-law enlisted as volunteers in the American Army during the recent war with Germany. In a letter to the writer shortly afterwards Doctor Branner related how he also had tried to enlist but was not accepted on account of age. That never-failing spirit to face boldly and fearlessly whatever difficulties fell to his lot was with him to the last. He died on March 1, 1922, in his seventy-second year.

Doctor Branner was a member of numerous scientific societies and had in many cases received distinguished honors from them. He was a member of the National Academy of Sciences, the American Philosophical Society, the Geological Society of America (president, 1904), the Society of Economic Geologists; Seismological Society (president, 1910-1914); American

Institute of Mining Engineers; Washington Academy of Sciences; London Geological Society; Société Géologique de France; Société Belge de Géologie; Instituto Historico di São Paulo; Brazil Academy; Instituto Historico Geographico do Brazil; and many other scientific organizations, and a Fellow of the American Association for the Advancement of Science (secretary, section E, 1888-9; vice president, 1890; president, Pacific division, 1916; chairman Cordilleran section, 1913). He was also an associate editor of the Journal of Geology.

Among the many scholastic and honorary degrees received by Doctor Branner during his career may be mentioned: B. S., Cornell, 1882; Ph. D., Indiana, 1885; LL. D., Arkansas, 1897; Maryville, 1909; California, 1915; Sc.D., Chicago, 1916. In 1911 the Hayden medal award was conferred upon him by the Academy of Natural Sciences of Philadelphia in recognition of his personal contributions to the science of geology.

The remarkably wide sphere of subjects studied by Doctor Branner, and on which he wrote to a greater or less extent, is shown by the following bibliography, comprising over 370 titles, arranged chronologically:

PUBLICATIONS OF JOHN CASPER BRANNER

1884-1921

1884

- The course and growth of the fibro-vascular bundles in palms. Proceedings of the American Philosophical Society, April 18, 1884, Vol. XXI, pp. 459-483, 12 figs.
- The pororóca or bore of the Amazon. Science, Nov. 28, 1884, Vol. IV, pp. 488-492. Published as separate, with additional notes, 4 figs. Boston, 1885.
- Rock inscriptions in Brazil. American Naturalist, Dec., 1884, Vol. XVIII, pp. 1187-1192, 2 figs., 3 plates. The separates contain also pp. 1192a and 1192b.
- Preliminary report of observations upon insects injurious to cotton, orange, and sugar-cane in Brazil. U. S. Department of Agriculture, Division of Entomology, Bulletin No. 4, pp. 63-69. Washington, 1884. The same report reprinted as a separate, Boston, 1884.
- The Batrachichthys. Science, March 28, 1884, Vol. III, p. 376, 1 fig.
- Flexible sandstone. American Naturalist, Sept., 1884, Vol. XVIII, p. 927.
- Notes upon the glacial striae observed in Wyoming-Lackawanna region. Lackawanna Institute, Proceedings and Collections, 1884, Vol. I, pp. 19-27.

1885

- Inscrições em rochedos do Brazil. Translated by Dr. Joao Baptista Regueira Costa and published by the Instituto Archeologico e Geographico Pernambucano. 4 plates. Pernambuco, Brazil, 1885.
- Glaciation of the Lackawanna valley. Proceedings of the American Association for the Advancement of Science, August, 1885, Vol. XXXIV, pp. 212-214. Abstract, Science, 1885, Vol. VI, pp. 221-222.
- The reputation of the lantern-fly. American Naturalist, Sept., 1885, Vol. XIX, pp. 835-838, 1 fig.
- A Citiranabóia. Liberal Mineiro, Ouro Preto, Brazil, Dec. 19, 1885.
- Cotton in the Empire of Brazil; the antiquity, methods, and extent of its cultivation, together with statistics of exportation and home consumption. Department of Agriculture, Special Report No. 8, pp. 79. Washington, 1885.
- Cotton caterpillars in Brazil. Appendix V, pp. 49-54, of the Fourth Report of the U. S. Entomological Commission . . . on cotton worm and boll worm. Washington, 1885.
- Pororóca oder der Zeitstrom am Amazonas Das Ansland, Vol. 58, pp. 11-15, 1885. Zeitschrift fur Schule Geographie, Vol. VI, p. 201, 1885.

1886

- Glaciation of the Wyoming and Lackawanna valleys. Proceedings of the American Philosophical Society, Feb. 19, 1886, Vol. XXIII, pp. 337-357, 2 maps. Abstract, Science, 1886, Vol. VIII, p. 422.
- Geographical and geological exploration in Brazil. American Naturalist, August, 1886, Vol. XX, pp. 687-690.
- Notes upon a native Brazilian language. Proceedings of the American Association for the Advancement of Science, August, 1886, Vol. XXXV, pp. 329-330.
- The thickness of the ice in Northeastern Pennsylvania during the glacial epoch. American Journal of Science, Nov., 1886, Vol. CXXXII, pp. 362-366.
- Geological map of Indiana, colored according to the scheme of the International Congress of Geologists, 2 x 4. Indianapolis, 1886.
- Rough notes of lectures on Botany. Indiana University, 1886.

1887

- The railways of Brazil; reprinted from the Railway Age, July 8, 1887, Vol. XII, pp. 470-473, with notes and additions, 26 pages, 2 maps. Chicago, 1887.
- Annual report of the Geological Survey of Arkansas for 1887, 15 pages. Little Rock, 1887.
- Additional notes on the lantern-fly of Brazil. Transactions of the New York Academy of Science, Nov. 21, 1887. Vol. VII, pp. 66-68.
- Notes on the glacial striae observed in the Lackawanna-Wyoming region. Lackawanna Institute of History and Science, 1887, Vol. I, pp. 19-27. Scranton, 1887.
- Topographical map in ten-foot contours of a portion of the Lackawanna valley between Scranton and Carbondale, Lackawanna county, in the Northern Anthracite coal field; scale 1600' = 1". Preliminary topographical map, Lackawanna valley sheets, Nos. I and II. Annual Report of the Second Geological Survey of Pennsylvania, 1886. Harrisburg, 1887.

1888

- The so-called gold and silver mines of Arkansas; an official report to Governor S. P. Hughes. *Arkansas Gazette*, Little Rock, Aug., 1888. *Engineering and Mining Journal*, New York, Aug. 18, 1888.
- Notes on the fauna of the islands of Fernando de Noronha. *American Naturalist*, October, 1888, Vol. XXII, pp. 861-871, 2 figs.
- Notes on the Botocúdu and their ornaments. *Proceedings of the American Philosophical Society*, Nov. 16, 1888, Vol. XXVI, pp. 171-173, 10 figs.
- The Cretaceous and Tertiary geology of the Sergipe-Alagóas basin of Brazil. *Transactions of the American Philosophical Society*, 1888, Vol. XVI, pp. 369-434, 5 plates, 10 figs., 4to.
- Administrative report and introduction to Report upon Preliminary Examination of the "Geology of Western Central Arkansas." (Theodore B. Comstock, 320 pages.) *Annual Report of the Geological Survey of Arkansas for 1888*, Vol. I, pp. xv-xxxi. Little Rock, 1888.
- On the manufacture of Portland cement. Chapter XXIX of *Annual Report of the Geological Survey of Arkansas for 1888*, Vol. II, pp. 291-302. Little Rock, 1888.
- Introduction to "The Neozoic Geology of Southwestern Arkansas." (Robert T. Hill, 260 pages.) *Annual Report of the Geological Survey of Arkansas for 1888*, Vol. II, pp. xi-xiv. Little Rock, 1888.
- Introduction to "The Northern Limits of the Mesozoic Rocks in Arkansas." (O. P. Hay, 40 pages.) *Annual Report of the Geological Survey of Arkansas for 1888*, Vol. II, p. xiii. Little Rock, 1888.
- Preface to a Preliminary Report upon a Portion of the Coal Regions of Arkansas to "The Geology of the Coal Regions." (Arthur Winslow, 122 pages.) *Annual Report of the Geological Survey of Arkansas for 1888*, Vol. III, pp. vii-x. Little Rock, 1888.
- Glaciation: its relation to the Lackawanna-Wyoming valley. *Lackawanna Institute of History and Science*, Vol. I, pp. 3-18, 4 plates. Scranton (Pa.), 1888.
- Arkansas gold and silver mines; an official report to Governor S. P. Hughes in reply to certain charges. *Arkansas Democrat*, Oct. 18, 1888. *Engineering and Mining Journal*, Oct. 20, 1888, Vol. XLVI, pp. 325-327.
- The age and correlation of the Mesozoic rocks of the Sergipe-Alagóas basin of Brazil. *Proceedings of the American Association for the Advancement of Science*, 1888, Vol. XXXVII, pp. 187-188.

1889

- Arkansas State Weather Service. Appendix V of the *Annual Report of the Chief Signal Officer*, 1888, pp. 72-75. Washington, 1889.
- A preliminary statement of the distribution of coal over the area examined by the Geological Survey (of Arkansas). *Arkansas Gazette*, Little Rock, Feb., 13, 1889.
- The geology of Fernando de Noronha. *American Journal of Science*, Feb., 1889, Vol. XXXVII, pp. 145-161; map, 7 figs.
- The Convict-island of Brazil, Fernando de Noronha. *Popular Science Monthly*, May, 1889, Vol. XXXV, pp. 33-40.
- The age and correlation of the Mesozoic rocks of the Sergipe-Alagóas basin of Brazil. *Proceedings of the American Association for the Advancement of Science*, 1889, Vol. XXXVII, pp. 187-188.
- The age of the crystalline rocks of Arkansas. *Proceedings of the American Association for the Advancement of Science*, 1889, Vol. XXXVII, p. 188.
- (With R. N. Brackett.) The peridotite of Pike County, Arkansas. *American Journal of Science*, 1889, Vol. CXXXVIII, pp. 50-56, 1 fig., 1 plate. Reprinted in *Annual Report of the Geological Survey of Arkansas for 1890*, Vol. II, pp. 378-391, 1 fig., 1 plate. Abstract, *Proceedings of the American Association for the Advancement of Science*, 1889, Vol. XXXVII, pp. 188-189; *Neues Jahrbuch für Mineralogie*, 1893, pp. 500-501.
- Buildings of Fort Smith clay shales. *Brick, Tile and Pottery Gazette*, June, 1889, Vol. X, p. 114.
- Building-stones of Arkansas. *Stone*, Oct., 1889, Vol. II, pp. 92-93.
- Geology of Arkansas. Abstract of a lecture delivered at Pine Bluff, Arkansas. *Minutes of the State Teachers' Association of Arkansas*, pp. 34-38. Little Rock, 1889.
- Clays, Kaolins, and bauxites. *Annual Report of the Geological Survey of Arkansas for 1889*, Vol. I, about 300 pp. (not published).

1890

- Some of the mineral resources of Northwestern Arkansas. *Arkansas Gazette*, Little Rock, Jan. 12, 1890; *Arkansas Press*, Jan. 19, 1890.
- Professor Hartt in Brazil. *Cornell Magazine*, Ithaca, N. Y., Feb., 1890, Vol. II, pp. 186-192.
- The training of a geologist. *American Geologist*, March, 1890, Vol. V, pp. 147-160.
- The aeolian sandstone of Fernando de Noronha. *American Journal of Science*, April, 1890, Vol. CXXXIX, pp. 247-257, 8 figs.
- Geologia de Fernando de Noronha. No. 36 of the *Revista do Instituto Archeologico e Geographico Pernambucano*. Pernambuco, Brazil, 1890, pp. 20-21, 1 map, 7 figs.

The relations of the state and national geological surveys to each other, and to the geologists of the country. *American Geologist*, Nov., 1890, Vol. VI, pp. 295-309; *Science*, Aug. 29, 1890, Vol. XVI, pp. 120-123; *Proceedings of the American Association for the Advancement of Science*, 1891, Vol. XXXIX, pp. 219-237.

The pororóca, or bore, of the Amazon. *Popular Science Monthly*, Dec., 1890, Vol. XXXVIII, pp. 208-215.
Solar halos. *Science*, 1890, Vol. XV, p. 195.

1891

A preliminary report upon the bauxite deposits of Arkansas, with locations and analyses. *Arkansas Gazette*, Little Rock, Jan. 8, 1891; *Arkansas Press*, Jan. 12, 1891; *Biennial Report of the State Commissioner of Mines, Manufactures, and Agriculture for 1893-94*, pp. 119-126; *Biennial Report of the same for 1895-96*, pp. 105-112.

Bauxite in Arkansas. *American Geologist*, March, 1891, Vol. VII, pp. 181-183. *Science*, March 27, 1891, Vol. XVII, p. 171. *Engineering and Mining Journal* (N. Y.), 1891, Vol. LI, p. 114.

Introduction to "The Geology of Washington County." (Frederic W. Simonds, 154 pp.). *Annual Report of the Geological Survey of Arkansas for 1888*, Vol. IV, pp. xi-xiv. Little Rock, 1891.

(With F. V. Coville.) A list of the plants of Arkansas. *Annual Report of the Geological Survey of Arkansas for 1888*, Vol. IV, pp. 155-242. Little Rock, 1891.

Introduction to "Notes on the Botany of Arkansas." (F. V. Coville, 10 pp.) *Annual Report of the Geological Survey of Arkansas for 1888*, Vol. IV, pp. 155-156. Little Rock, 1891.

Preface to "The Geology of Crowley's Ridge." (R. Ellsworth Call, 283 pp.) *Annual Report of the Geological Survey of Arkansas for 1889*, Vol. II, pp. xi-xix. Little Rock, 1891. This volume also contains short articles on "The Relationship of the Pleistocene to the Pre-Pleistocene Formations of Crowley's Ridge and Adjacent Areas South of the Limit of Glaciation." (R. D. Salisbury, 24 pp.); on "Description of Fossil Woods and Lignites from Arkansas." (F. H. Knowlton, 19 pp.)

Preface to "Manganese: Its uses, Ores and Deposits." (R. A. F. Penrose, jr., 642 pp.) *Annual Report of the Geological Survey of Arkansas for 1890*, Vol. I, pp. xxiii-xxvii. Little Rock, 1891.

Preface to "The Igneous Rocks of Arkansas." (J. Francis Williams, 457 pp.) *Report of the Geological Survey of Arkansas*, Vol. II, pp. xi-xv. Little Rock, 1891. This volume also contains an article on "Tabulation of the Dikes of Igneous Rock of Arkansas." (J. F. Kemp and J. Francis Williams, 26 pp.)

Analyses of Hot Springs waters. *Report of the Superintendent of the Hot Springs Reservation to the Secretary of the Interior*, pp. 9-16. Washington, 1891.

David Starr Jordan, LL.D. (A biographical notice.) *The Delta Upsilon Quarterly*, New York, May, 1891, Vol. IX, pp. 195-198.

(With James Hall and F. French.) *Rapport de la séance du 31 Août, 1891, sur les gammes coloriations générales. V. Congrès Géologique International*, Washington, 1891, pp. 79-80.

(With Joseph LeConte and F. French.) *Rapport de la séance de clôture du 1^{er} Septembre relative a nomination d'une Commission internationale de bibliographie géologique. V. Congrès Géologique International*, Washington, 1891, pp. 81-89.

1892

The mineral waters of Arkansas. *Annual Report of the Geological Survey of Arkansas for 1891*, Vol. I, 144 pp., map. Little Rock, 1892.

The cotton industry in Brazil. *Popular Science Monthly*, 1892, Vol. XL, pp. 666-674.

The training of a geologist. Third edition, 19 pp., San Francisco, 1892.

Preface to "Whetstones and the Novaculites of Arkansas." (L. S. Griswold, 443 pp.) *Annual Report of the Geological Survey of Arkansas for 1890*, Vol. III, pp. xv-xviii. Little Rock, 1892. This volume also contains short articles on "Geological Age of the Graptolite Shales of Arkansas." (R. R. Gurley, 16 pp.); "New Species of Graptolites." (R. R. Gurley, 3 pp.); "The Geological Age of the Rocks of the Novaculite Area." (Charles S. Prosser, 5 pp.); "Notes on Lower Carboniferous Plants from the Ouachita Uplift." (Charles S. Prosser, 2 pp.)

Preface to "The Iron Deposits of Arkansas." (R. A. F. Penrose, jr., 153 pp.) *Annual Report of the Geological Survey of Arkansas for 1892*, Vol. I, p. xi. Little Rock, 1892.

Introductions to papers in "Miscellaneous Reports." *Geological Survey of Arkansas for 1891*, Vol. II. Little Rock, 1892.

Introduction to "Final Report on the Coal Regions of Arkansas." (Arthur Winslow.) *Annual Report of the Geological Survey of Arkansas, 1892*, Vol. III. (Not published.)

Introduction to "The Lower Coal Measures of Arkansas." (J. H. Means and G. H. Ashley.) *Geological Survey of Arkansas for 1892*, Vol. IV. (Not published.)

1893

The lip and ear ornaments of the *Botoécidus*. *Popular Science Monthly*, Oct., 1893, Vol. XLIII, pp. 753-757, 5 figs.

The supposed glaciation of Brazil. *Journal of Geology*, Chicago, Vol. I, pp. 753-772, illustrated.

Preface to "Marbles and Other Limestones." (T. C. Hopkins, 443 pages.) *Annual Report of the Geological Survey of Arkansas for 1890*, Vol. IV, pp. xvii-xxi. Little Rock, 1893.

- Observations upon the erosion in the hydrographic basin of the Arkansas River above Little Rock. Wilder Quarter-Century Book, pp. 325-337. Ithaca, N. Y., 1893. Also separate, Ithaca, N. Y., 1893.
- The coal fields of Arkansas. Mineral Resources of the United States for 1892, pp. 303-306, 1 fig. Washington, 1893.
- Proverbs from the Portuguese. The Overland Monthly (San Francisco), May, 1893. Second series, Vol. XXI, pp. 501-503.
- A geologica cretacea e terciaria da bacia do Brazil Sergipe-Alagoas: Tradução de Garcia Muniz, 170 pages, Aracajú, 1893. (Portuguese edition of the Cretaceous and Tertiary geology of the Sergipe-Alagoas Basin without illustrations.)

1894

- Elevations in the State of Arkansas. Annual Report of the Geological Survey of Arkansas for 1891, Vol. II, pp. 77-152, 2 figs. Little Rock, 1894.
- Observations upon the erosion in the hydrographic basin of the Arkansas River above Little Rock, Annual Report of the Geological Survey of Arkansas for 1891. Vol. II, pp. 153-166. Little Rock, 1894.
- Magnetic observations and meridian monuments established in Arkansas. Annual Report of the Geological Survey of Arkansas for 1891, Vol. II, pp. 167-176, 10 figs. Little Rock, 1894.
- Introduction to "Preliminary List of the Mollusca of Arkansas." (F. A. Sampson, 17 pp.) Annual Report of the Geological Survey of Arkansas for 1891, Vol. II, pp. 179-180. Little Rock, 1894.
- Introduction to "Catalogue of the Fishes of Arkansas." (Seth E. Meek, 35 pp.) Annual Report of the Geological Survey of Arkansas for 1891, Vol. II, pp. 216-220. Little Rock, 1894.
- Bibliography of the geology of Arkansas. Annual Report of the Geological Survey of Arkansas for 1891, Vol. II, pp. 319-340. Little Rock, 1894.
- Introduction to and translation of the political constitutions of Brazil. The Convention Manual of the Sixth New York State Constitutional Convention, 1894. Part 2, Vol. III, Constitution of the Empire, pp. 57-105. Constitution of the United States of Brazil, pp. 107-138. Albany, 1894.
- Preface to "The Tertiary Geology of Southern Arkansas." (Gilbert D. Harris, 207 pp.) Annual Report of the Geological Survey of Arkansas for 1892, Vol. II, pp. xiii-xiv. Little Rock, 1894.
- Report on road-making materials in Arkansas. U. S. Department of Agriculture, Office of Road Inquiry, Bulletin No. 4, Washington, 1894. Fourth Biennial Report of the Bureau of Mines, Manufactures and Agriculture (of Arkansas) for 1895-96, pp. 90-101. Little Rock, 1896. Also in Fifth Biennial Report of that Bureau for 1897-98, pp. 131-141.
- The geological surveys of Arkansas. Journal of Geology, Chicago, Vol. II, pp. 826-836.
- The education of a naturalist. Commencement address at Leland Stanford Jr. University, May, 1894. Daily Palo Alto, May 30, 1894. Stanford University, 1894.
- Os grés de eolios de Fernando de Noronha. Instituto Archeologico e Geographico Pernambucano, 8 figs. Pernambuco, Brazil, 1894.
- Introduction to "Preliminary List of the Myriapoda of Arkansas." (C. H. Bollman, 11 pp.) Annual Report of the Geological Survey of Arkansas for 1891, Vol. II, p. 202. Little Rock, 1894.
- Preface to "The Geology of Dallas County." (C. E. Siebenthal, 42 pp.) Annual Report of the Geological Survey of Arkansas for 1891, Vol. II, p. 278. Little Rock, 1894.
- "The Geology of Benton County," by Frederic W. Simonds and T. C. Hopkins, 75 pp. Annual Report of the Geological Survey of Arkansas for 1891, Vol. II. Little Rock, 1894. (J. C. Branner, Director.) Introduction missing.

1895

- (With John F. Newsom.) Syllabus of lectures on economic geology. Palo Alto, May, 1895, p. 282.
- (With John H. Means.) Great mountain railways. The Chautauqua, July, 1895, pp. 426-433.
- Report upon the condition of the Geological Survey of Arkansas. Appendix to the Biennial Message of Governor Wm. M. Fishback to the General Assembly of the State of Arkansas, 1895, pp. 26-33.
- Decomposition of rocks in Brazil. Bulletin of the Geological Society of America, 1895, Vol. VII, pp. 255-314. Plates.

1896

- Our trade with South America. The Argonaut, San Francisco, Jan. 13, 1896.
- Decomposition of rocks in Brazil. Bulletin of the Geological Society of America, 1895-96, Vol. VII, pp. 255-314, 5 plates, 6 figs.
- Thickness of the Paleozoic sediments in Arkansas. American Journal of Science, New Haven, Sept., 1896, Vol. II, pp. 229-236, 8 figs.
- Bibliography of clays and the ceramic arts. Bulletin 143 of the U. S. Geological Survey, 114 pp. Washington, 1896.
- Review of "The Soil, by F. H. King." Journal of Geology, Chicago, Vol. IV, p. 243.
- The decomposition of rocks in Brazil. Editorial in Journal of Geology, Chicago, Vol. IV, pp. 630-631.
- On the size of geologic publications. Editorial in Journal of Geology, Chicago, Vol. IV, pp. 214-217.
- A supposta glaciação do Brazil. Revista Brasileira, April, 1896. Vol. VI, pp. 49-55, pp. 106-113. Rio de Janeiro, Brazil, 1896.

- The study of Science. (Part of a lecture delivered at the Mount Tamalpais Military Academy.) *Overland Monthly*, San Francisco, Oct., 1896, Educational Department, pp. 26-30.
- Abstract of "Oldest Fossiliferous Beds of the Amazon Region, by F. Katzer." *Journal of Geology*, Vol. IV, pp. 975-976. Chicago, 1896.
- Review of the proceedings of the Indiana Academy of Sciences, geological subjects. *Journal of Geology*, Vol. IV, p. 981. Chicago, 1896.
- A preliminary report upon the bauxite deposits of Arkansas, with locations and analyses. Biennial Report State Commissioner of Mines, Manufactures and Agriculture for 1895-96, pp. 105-112.
- Report on road-making materials of Arkansas. Fourth Biennial Report, Bureau of Mines, Manufactures and Agriculture (of Arkansas) for 1895-96. 1896, pp. 90-101.

1897

- Note on "O fim da criação, pelo Visconde do Rio Grande." *Revista Brasileira*, Aug., 1897, pp. 254-255, Rio de Janeiro, Brazil; also in *Anuario do Rio Grande do Sul* para o anno de 1898, pp. 261-265. Porto Alegre (Brazil), 1897.
- Bacteria and the decomposition of rocks. *American Journal of Science*, 1897, Vol. CLIII, pp. 438-442, and as separate; abstract *Neues Jahrbuch für Mineralogie*, 1899, Vol. II, Referate, 84.
- The bauxite deposits of Arkansas. *Journal of Geology*, April-May, 1897, Vol. V, pp. 263-289, 2 plates, 2 figs. Also as separate with 10 pp. additional matter, Chicago, 1897.
- (With J. F. Newsom.) The Red River and Clinton monoclines. *American Geologist*, July, 1897, Vol. XX, pp. 1-13, 1 map and 3 figs.; and separate.
- Protection for American colleges. *The Nation*, New York, May 27, 1897, p. 395.
- The introduction of new terms in geology. *Science*, June 11, 1897, Vol. V, pp. 912-913; *Science*, July 23, 1897, Vol. VI, pp. 133-134.
- Mineral Wealth of Arkansas. *Engineering and Mining Journal*, Aug. 7, 1897, p. 153.
- Geology in its relations to topography. Proceedings of the American Society of Civil Engineers, Oct., 1897, Vol. XXIII, No. 8, pp. 473-495; 1 plate, 16 figs.
- Introduction to Ashley's "Geology of the Paleozoic Area of Arkansas South of the Novaculite Region." Proceedings of the American Philosophical Society, 1897, Vol. XXXVI, pp. 217-220.
- The former extension of the Appalachians across Mississippi, Louisiana, and Texas. *American Journal of Science*, Nov., 1897, Vol. CLIV, pp. 357-371, 2 figs. Abstract in Report of the British Association for the Advancement of Science, Toronto meeting, 1897, pp. 643-644; *Annales de Géographie*, 7me Année, Sept. 15, 1898, pp. 245-246; *Nature*, Nov. 18, 1897, Vol. LVII, p. 70; *Journal of Geology*, Oct.-Nov., 1897, Vol. V, pp. 750-760.
- On the reporting of values to land owners by the State Geologist of Arkansas. *Hot Springs News*, July 12, 1897.
- Review of "The Bedford Oolitic Limestone of Indiana. By T. C. Hopkins and C. E. Siebenthal, in 21st Annual Report State Geologist of Indiana." *Journal of Geology*, July-Aug., 1897, Vol. V, pp. 529-531.
- The lost coal report of the Arkansas survey. Letter of Aug. 21, 1897. *Batesville Guard*, Sept. 3, 1897.
- Review of the "Unpublished Reports of the Comissão Geologica do Brazil," Published in the *Boletim do Museu Paraense*. *Journal of Geology*, Oct.-Nov., 1897, Vol. V, pp. 756-757.
- Review of Katzer's "Devonian fauna of the Rio Maceurú," published in the *Boletim do Museu Paraense*. *Journal of Geology*, Vol. V, pp. 757-758. Chicago, 1897.
- The phosphate deposits of Arkansas. *Colliery Guardian*, Vol. 73, 1897, pp. 65-66.

1898

- Geology in its relation to topography (with discussion). Proceedings of the American Society of Civil Engineers, June, 1898, Vol. XXXIX, pp. 53-95, 2 plates, 16 figs.
- (With O. A. Derby.) On the origin of certain siliceous rocks. *Journal of Geology*, May-June, 1898, Vol. VI, pp. 366-371. Abstract *Neues Jahrbuch für Mineralogie*, 1900, Vol. I, p. 408.
- A geologist's impression (of the Grand Canyon of the Colorado, and Black Crater, Flagstaff, Arizona). *Land of Sunshine Magazine*, Aug., 1898, Vol. IX, pp. 149-152, illustrated.
- The Spanish University of Salamanca. *San Francisco Chronicle*, July 17, 1898, p. 12, illustrated. *Maryville College Monthly* for 1898, Maryville, Tenn.
- Syllabus of elementary geology. 300 pp., 18 plates and 51 figs. Stanford University, 1898.
- Review of "Earth Sculpture, by James Geikie. The Science Series, G. P. Putnam's Sons, New York, 1898." *Science*, Dec. 30, new series, Vol. VIII, pp. 957-959.
- Report on road-making materials in Arkansas. Fifth Biennial Report, Bureau of Mines, Manufactures and Agriculture (Arkansas). 1897-1898, pp. 131-141.

1899

- Some old French place names in the State of Arkansas. *Modern Language Notes*, Feb., 1899. Vol. XIV, No. 2, pp. 65-80. (Johns Hopkins University, Baltimore, Md.)

- Review of "Volcanoes (Science series), by T. G. Bonney." San Francisco Chronicle, March 19, 1899.
- The recent ascent of Itambé. National Geographic Magazine, Vol. X, p. 183. Washington, 1899.
- Notes upon the São Paulo sheet of the Comissão Geographica e Geologica de São Paulo, published in the Revista Brasileira, Rio de Janeiro, 1899. Vol. XIX, pp. 111-114; republished in the Cidade de Santos, Santos, Brazil. Jan. 10, 1900.
- The São Paulo sheet of the topographic survey of São Paulo, Brazil. Journal of Geology, Vol. VII, pp. 788-789. Chicago, 1899.
- (With C. E. Gilman.) The stone reef at the mouth of Rio Grande do Norte. American Geologist, Dec., 1899, Vol. XXIV, pp. 342-344, 2 figs.
- Note upon "The Upper Silurian fauna of the Rio Trombetas, State of Pará, Brazil, and Devonian mollusca of the State of Pará, Brazil, by John M. Clarke." Archivos do Museu Nacional, Vol. X, pp. 1-48, 49-174. Journal of Geology, Nov.-Dec., 1899, Vol. VII, pp. 813-814.

1900

- A Recife de pedra na foz do Rio Grande do Norte. Por J. C. Branner e C. E. Gilman. Traduzido por Dr. Alfredo de Carvalho. Revista do Rio Grande do Norte, 1900, Nos. 1, 2, Natal, Jan. e Fev., 1900, pp. 267-271.
- Gold in Brazil. Mineral Industry for 1899, Vol. VIII, p. 281. New York, 1900.
- Diamonds in Brazil. Mineral Industry for 1899, Vol. VIII, pp. 221-222. New York, 1900.
- Ants as geologic agents in the tropics. Journal of Geology, Chicago, Feb.-March, 1900, Vol. VIII, pp. 151-153, 3 figs.
- (With J. F. Newsom.) Syllabus of economic geology, second edition, 368+viii pp., 141 figs. Stanford University, 1900. (March 15th.)
- South America. Encyclopædia Britannica. 10th edition. Supplement, 1902. (Article written in 1900.)
- Review of "A Preliminary Report on the Geology of Louisiana. By G. D. Harris and A. C. Veatch." Journal of Geology, Chicago, April-May, 1900, Vol. VIII, pp. 277-279.
- Two characteristic geologic sections on the northeast coast of Brazil. Proceedings of the Washington Academy of Science, Aug. 20, 1900, Vol. II, pp. 185-201, 3 plates, 5 figs.
- The origin of the beach cusps. Journal of Geology, Chicago, Sept.-Oct., 1900, Vol. VIII, pp. 481-484, 3 figs.
- The zinc and lead region of North Arkansas. Annual Report of the Geological Survey of Arkansas, Vol. V, 395+xiv pp., 38 page plates, 92 figures in the text, and geologic atlas of 7 sheets. Little Rock, December, 1900. Reviewed by C. R. Keyes, Journal of Geology, Chicago, Vol. IX, pp. 634-636.
- O mappa topographico do Estado de São Paulo. Revista Brasileira, Vol. XIX, pp. 111-114, 1899. Republished in the Cidade de Santos, Santos, Brazil, Jan. 10, 1900.
- Results of the Branner-Agassiz expedition to Brazil, Vol. IV. Two characteristic geologic sections on northeast coast of Brazil. Proceedings of the Washington Academy of Sciences, Aug. 20, 1900, Vol. 2, pp. 185-201.

1901

- Review of "A record of the geology of Texas, etc. By F. W. Simonds." Journal of Geology, Chicago, Vol. IX, p. 91.
- Review of "Géologie et minéralogie appliquées. Par Henri Charpentier. Paris, 1900." Journal of Geology, Feb.-Mar., 1901, Vol. IX, pp. 198-199.
- Os recifes de grés do Rio Formoso (Brazil). Revista do Instituto Archeologico e Geographico Pernambucano, No. 54, pp. 131-136, illustrated. Pernambuco, 1901.
- The origin of travertine falls. Science, Aug. 2, 1901, Vol. XIV, pp. 184-185.
- The zinc and lead deposits of North Arkansas. Transactions of the American Institute of Mining Engineers, 27 illustrations, 32 pages, Vol. XXXI, pp. 572-603. Republished in Lead and Zinc News of St. Louis, Mo., Vol. II, Nov. 4, 1901, pp. 4-6; Nov. 11, 1901, pp. 4-6; Nov. 18, 1901, pp. 4-6; Nov. 25, 1901, pp. 4-5. Republished in Arkansas Democrat (semi-weekly). Little Rock, Ark., Nov. 24, 1901; Dec. 8, 1901; Dec. 22, 1901; Dec. 29, 1901. Abstract: Engineering and Mining Journal, New York, Nov. 30, 1901, pp. 718-719, 1 fig.
- Editorial upon giant ripples. Journal of Geology, Chicago, Sept.-Oct., 1901, Vol. IX, pp. 535-536.
- The phosphate rocks of North Arkansas. Arkansas Democrat, Little Rock, Ark., Nov. 3, 1901. Harrison Times, Jan. 18, 1902.
- Apontamentos sobre a fauna das Ilhas de Fernando de Noronha. Publicação do Instituto Archeologico e Geographico Pernambucano. 14 pp., 2 figs.; 8vo. Pernambuco, 1901.
- The oil-bearing shales of the coast of Brazil. 1900. Transactions of the American Institute of Mining Engineers, 1901, Vol. XXX, pp. 537-554.

1902

- Depressions and elevations of the southern archipelagoes of Chile. By Francisco Vidal Gormaz. From the Revista Nueva of Santiago de Chile, 1901. Translation and introduction by J. C. Branner. Scottish Geographical Magazine, Edinburgh, Scotland, January, 1902, Vol. XVIII, pp. 14-24, 1 map. Edinburgh, 1902.

- Notes upon the surface geology of Rio Grande do Sul, Brazil. By James E. Mills. Edited from his letters by J. C. Branner. *American Geologist*, February, 1902, Vol. XXIX, pp. 126-127.
- The occurrence of fossil remains of mammals in the interior of the States of Pernambuco and Alagoas, Brazil. *American Journal of Science*, Feb., 1902, Vol. CLXIII, pp. 133-137; 1 map, 1 half-tone plate.
- Geology of the northeast coast of Brazil. *Bulletin of the Geological Society of America*, Rochester, Vol. XIII, pp. 41-98, 16 figs., 9 plates.
- The palm trees of Brazil. *Popular Science Monthly*, New York, Vol. LX, pp. 386-412, 25 figs.
- Discussion of Eric Hedburg's paper on "The Missouri and Arkansas Zinc Region." *Transactions of the American Institute of Mining Engineers*, Vol. XXXI, pp. 1013-1014.
- (With J. F. Newsom.) The phosphate rocks of Arkansas. *Bulletin 74, Arkansas Agricultural Experiment Station*, Professor R. L. Bennett, Director, pp. 59-123. Fayetteville, Ark., Sept., 1902. 23 figures in text; 15 analyses.
- Review of "The Scenery of England and the Causes to which it is due. By the Right Hon. Lord Avebury. New York. The Macmillan Co., 1902." *San Francisco Chronicle*, April 6, 1902.
- Review of the "History of Geology and Paleontology. By Karl von Zittel. London and New York, 1902." *San Francisco Chronicle*, May 11, 1902.
- Review of "The Earth's Beginning. By Sir Robert Stawell Ball. Appleton & Co., 1902." *San Francisco Chronicle*, June 22, 1902.
- Syllabus of a course of lectures on elementary geology. Second edition, 370 pp., 109 figs., 25 plates. Stanford University, 1902.
- The Carnegie Institution. *Science*, New York, Oct. 3, 1902, New series, Vol. XVI, pp. 527-528.
- South America. *Encyclopædia Britannica*. 10th ed. Supplement. London, 1902, pp. 365-370.

1903

- Geologia de Pernambuco. Traduzido do Bulletin of the Geological Society of America, Vol. XIII. Par Alfredo de Carvalho. *Revista do Instituto Archeologico e Geographico Pernambucano*, Vol. X, No. 58, pp. 381-402; No. 59, pp. 507-525. 1903.
- Da occurencia de restos de mamiferos fosseis no interior dos Estados de Pernambuco e Alagoas. Traduzido do *American Journal of Science*, Vol. XIII. Par Alfredo de Carvalho. *Revista do Instituto Archeologico e Geographico Pernambucano*, Vol. X, pp. 219-224. 1903.
- Notes on the geology of the Hawaiian Islands. *American Journal of Science*, Oct., 1903, Vol. XVI, pp. 301-316.
- Topographic feature of the hanging valleys of the Yosemite. *Journal of Geology*, 1903, Vol. XI, pp. 547-553.
- From school to college. San Jose. Muirson and Wright, 1903. 21 pp.
- Is the peak of Fernando de Noronha a volcanic plug like that of Mount Pelée? Illustrated. *American Journal of Science*, Dec., 1903, Vol. XVI, pp. 442-444.
- A bibliography of the geology, mineralogy, and paleontology of Brazil. *Archivos do Museu Nacional do Rio de Janeiro*, 1903. Vol. XII, pp. 197-309.
- Review of "Ensayo de una bibliografia histórica i Geográfica de Chile. Par Nicolas Anriqua R. i L. Ignacio Silva. A." *Journal of Geology*, Vol. X, p. 921. 1903.
- The necessity of common roads in the zinc region of north Arkansas. *The Lead and Zinc News*, St. Louis, 1903. Vol. V, 3 pp.
- The coal lands of western Arkansas. *Fort Smith Daily News Record*, Aug., 1903.

1904

- Memoir of James E. Mills (with bibliography). *Proceedings of the 15th Annual Meeting of the Geological Society of America*, 1902-03. Reprint from *Bulletin of the Geological Society of America*, 1903-04, Vol. XIV, pp. 512-517.
- Notas para a geologica do Rio Grande do Norte. Traduzidas pelo Alfredo de Carvalho. *Revista do Instituto Historico e Geographico do Rio Grande do Norte*, Vol. II, pp. 239-248. 1904.
- Outline of the genealogy of the first four generations of the Branner family in Virginia. Reprint from "Shenandoah Valley," New Market, Virginia, Dec. 1, 1904. Also separate.
- Science in the South: An Address before the University of Tennessee. *University of Tennessee Index*, Fifth series, 1904. Vol. I, 14 pp.
- The stone reefs of Brazil, their geological and geographical relations, with a chapter on the coral reefs. *Bulletin of Harvard College Museum of Comparative Zoology*. May, 1904, Vol. XLIV, 285 pp.
- Review of "Grundzuge der Geologie des unteren Amazonas gebietes, by F. Katzer." *Journal of Geology*, 1904, Vol. XII, p. 278.
- Geology in its relation to topography, in "The Field Practice of Railway Location, by Willard Beahan." (Engineering News Publishing Company), Chapter V, pp. 116-141. New York, 1904.
- Does poverty help or hinder a young man? Address to the students of Maryville College. *Maryville College*, No. 6, 1904, pp. 9-10.

1905

- From school to college. Stanford University Press, 1905. No. II, 18 pp.
- From school to college. Stanford University, 1905. Address to the students of Stanford University, Sept. 6, 1905. No. III, 23 pp.
- Extract from letter to Dr. Paulo Pessoa on Notilops Brama. *Jornal do Commercio*, April 7, 1905.
- Natural mounds of "Hog Wallows." *Science*, March, 1905, Vol. XXI, pp. 514-516.
- Omission of titles of addresses on scientific subjects. *Nature*, Sept., 1905, Vol. LXXII, p. 534.
- Stone reefs on the northeast coast of Brazil. Presidential Address before the Geological Society of America. *Bulletin of the Geological Society of America*, Jan., 1905, Vol. XVI, pp. 1-12.
- Translation of "The geology of the diamond and carbonado washings of Bahia, Brazil, by O. A. Derby." *Economic Geology*, Nov.-Dec., 1905, Vol. I, pp. 134-142.
- Abstracts of "Géosynclinaux et regions a tremblements de terre." Par F. de Montessus de Ballore. *Bulletin of Société Belge de Géologie*, Vol. XVIII, 1905, pp. 243-267. *Journal of Geology*, 1905, Vol. XIII, pp. 462-464.
- Introduction to the "Miocene foraminifera of California." By Rufus M. Bagg, jr. United States Geological Survey, Bulletin No. 268, 1905.

1906

- Review of Becker and Day's "Linear force of growing crystals." *Journal of Geology*, 1906, Vol. XIV, pp. 162-164.
- Review of "A register of national bibliography. By W. P. Courtney." *Journal of Geology*, 1906, Vol. XIV, p. 254.
- Movements on the fault line. *Daily Palo Alto Times*, May 1, 1906.
- Address delivered on the 100th Anniversary of the founding of Maury Academy at Dandridge, Tennessee, May, 1906. Knoxville, 1906, 18 pp.
- The San Francisco earthquake from the geologists point of view. *The Pacific Monthly*, June, 1906.
- Geology and the earthquake. *Out West*, June, 1906, pp. 513-518.
- The surface features of the State of Arkansas. University Publishing Company, N. Y., 1906, 16 pp.
- Review of "Geology. By T. C. Chamberlin and R. D. Salisbury." *Science*, 1906, Vol. XXIV, pp. 462-465.
- The relations of the drainage of the Santa Clara valley, California, to that of the Pájaro river. Abstract of a paper read before the Geological Section of the American Association for the Advancement of Science, at the Ithaca meeting. *Science*, 1906, Vol. XXIV, pp. 369-370.
- Diamantina, Brazil. A letter. *Engineering and Mining Journal*, 1906, Vol. LXXXII, p. 747.
- Correspondence relating to the survey of the coal fields of Arkansas. *Science*, 1906, Vol. XXIV, pp. 532-537.
- The policy of the U. S. Geological Survey and its bearing upon science and education. *Science*, 1906, Vol. XXIV, pp. 722-728.
- The university training of engineers in economic geology. *Economic Geology*, 1905-06, Vol. I, pp. 289-294.
- Bibliography of clays and the ceramic arts. Second edition. American Ceramic Society, Columbus, Ohio, 1906. 451 pp.
- Geologia elementar preparada con referencia especial aos estudantes brasileiros. Rio de Janeiro, 1906. 305 pp.
- Review of "Les tremblements de terre et les systemes de deformation tetraedrique de l'écorce terrestre. Par F. de Montessus de Ballore." *Anales de Géographie*, 1906, Vol. XV. *Journal of Geology*, 1906, Vol. XIV, pp. 161-162.
- Portions of the report of the State earthquake commission upon "The California earthquake of April 18, 1906." Carnegie Institution, Publication No. 87. Washington, 1908.
- Isoseimals: Distribution of apparent intensity. Report of the State Earthquake Investigation Commission on the California Earthquake of April 18, 1906. Vol. I, p. 255.

1907

- A drainage peculiarity of the Santa Clara valley affecting fresh water faunas. *Journal of Geology*, Jan.-Feb., 1907, Vol. XV, pp. 1-10. Map.
- Geology and the earthquake. *The California Earthquake of 1906*. Edited by David Starr Jordan, 1907. pp. 63-77.
- Earthquake of the 18th. *Sierra Educational News and Book Review*, March, 1907. Vol. III, 12 pp.
- The New Geological Survey of Brazil. *Science*, March, 1907, Vol. XXV, pp. 510-513.
- Geology in its relation to topography. Third edition of the article in Beahan's "Field Practice of Railway Location." First edition, 1904, pp. 115-141. 1907.
- Uma mina salgada. The salting of the São Cyriaco mine in Minas Geraes. *Jornal de Commercio*, Rio de Janeiro, Aug. 20, 1907.

1908

- Annie Law and Fannie Law Andrews. *Maryville College Monthly*, Dec., 1908. Vol. XI, pp. 61-68.
- Bibliography of the geology of Brazil. *Bulletin of the Geological Society of America*, 1908. 19 pp.
- The Bogoslaf Islands. *Science*, 1908, Vol. XXVIII, p. 480.
- The clays of Arkansas. U. S. Geological Survey, Bulletin No. 351, 1908. 247 pp.

- (With A. C. Lawson, G. K. Gilbert, H. F. Reid, etc.) The California earthquake of April 18, 1906. Report of the State Earthquake Investigation Commission. Carnegie Institution, Publication No. 87, 1908. Vol. I, pp. 104-111; 255-279; 281-284; 287-290; 292-299; 306-309; 311-313; 316-319; etc.
- (With David Starr Jordan.) The cretaceous fishes of Ceara, Brazil. Smithsonian Miscellaneous Collections, 1908. Vol. LII, Part I, pp. 1-29.
- The geography of Bahia. Boletim da sociedade geographica de Rio de Janeiro, 1908.
- Lista de altitudes no estado da Bahia. Ministerio de Viação e Obras Publicas. Rio de Janeiro, 1908.
- Loyalty: An address to the students of Stanford University, Sept. 8, 1908. The Stanford Alumnus, 1908, pp. 9-13. Popular Science Monthly, Dec., 1908, Vol. LXXIII, pp. 549-553.
- Manganese deposits of Morro da Mina, Brazil. Engineering and Mining Journal, Dec. 1908, Vol. LXXXVI, pp. 1196-1197.
- Ralatorio sobre a geologia dos estados da Bahia, Sergipe e Alagôas. Report to the Brazilian Secretary of Public Works. Rio de Janeiro, 1908.
- Syllabus of a course of lectures on elementary geology. Third edition. Stanford University, 1908. 434 pp.
- The Delos Arnold collection of natural history specimens. Science, 1908, Vol. XXVIII, pp. 717-718.
- Ibid. Popular Science Monthly, 1908, Vol. LXXIII, pp. 549-553.
- The United States Geological Survey. Letter signed "Geologist." Engineering and Mining Journal, 1908, Vol. LXXXVI, p. 1066.
- (With R. Crandall and H. E. Williams.) Mappa de parte dos Estados da Bahia, Pernambuco, Piahy e dos Estados de Sergipe e Alagôas. Escala 1:2,000,000. 1908. Reproduzido pela Inspectoria de Obras contra as Seccas. Ministerio de Viação e Obras Publicas. 1908.
- 1909
- Bibliography of the geology of the State of Arkansas. Geological Survey of Arkansas, 1909, Annual Report, pp. 97-164.
- Bibliography of the geology, mineralogy and paleontology of Brazil. Bulletin of the Geological Society of America, Feb., 1909, Vol. XX, pp. 1-132.
- The economic geology of the diamond-bearing highlands of the interior of the State of Bahia, Brazil. Engineering and Mining Journal, May 15 and 22, 1909, Vol. LXXXVII, pp. 981-987; 1031-1033. Also published as a separate, New York, 1909.
- Review of "Los temblores en Chile, by M. R. Machado." Journal of Geology, Sept.-Oct., 1909, Vol. XVII, pp. 586-587.
- (With R. Crandall.) O problema das seccas do Norte do Brazil. Boletim do Ministerio da Industria, Viação e Obras Publicas. Rio de Janeiro. No. I, pp. 83-110. 1909.
- Some facts and corrections regarding the diamond region of Arkansas. Engineering and Mining Journal, Feb., 1909, Vol. LXXXVII, pp. 371-372.
- Relatorio preliminar sobre os resultados das exploracoes no interior do Estado da Bahia, apresentado ao Exmo. Sr. Dr. Jose Marcellino de Souza, D. C., Governador do Estado da Bahia, 17 de Julho de 1909. Rio de Janeiro. Published in Boletim da Directoria da Agriculture, Viação e Obras Publicas do Estado da Bahia. pp. 105-108. 1909.
- (With J. F. Newsom and Ralph Arnold.) Santa Cruz folio, California. United States Geological Survey, Folio 163, 1909.
- 1910
- A brief grammar of the Portuguese language, with exercises and vocabularies. (Henry Holt & Company). 1910. 268 pp.
- Review of "A college text-book of geology. By T. C. Chamberlin and R. D. Salisbury." Science, Jan., 1910, Vol. XXXI, pp. 146-147.
- Education for economic efficiency. Proceedings of the Thirteenth Conference for Education in the South. 1910. pp. 196-209.
- The geology and topography of the Serra de Jacobina, State of Bahia, Brazil. American Journal of Science, Dec., 1910, Vol. XXX, pp. 385-392.
- Geology of the coast of the State of Alagôas, Brazil. Annals of the Carnegie Museum, 1910, Vol. VII, Part I, pp. 5-22. Illustrated plates.
- The geology of the Serra do Mulato, State of Bahia, Brazil. American Journal of Science, Oct., 1910, Vol. XXX, pp. 256-263.
- Slates of Arkansas. By A. H. Purdue, with a bibliography of the geology of Arkansas by J. C. Branner. Geological Survey of Arkansas, 1910. 170 pp. Illustrated maps.
- The tombador escarpment in the State of Bahia, Brazil. American Journal of Science, Nov. 1910, Vol. XXX, pp. 335-343.
- Outline of the geology of the black diamond region of Bahia, Brazil. Proceedings of the Australian Association for the Advancement of Science, Section C, 1910, Vol. XII, pp. 324-328.
- The luminosity of termites. Science, 1910, Vol. XXXI, pp. 24-25.
- Earthquakes in Brazil. Journal of Geology, 1910, Vol. XVIII, pp. 327-335.

Geologic work of ants in tropical America. *Bulletin of the Geological Society of America*, 1910, Vol. XXI, pp. 449-490. Same condensed. *Annual Report of the Smithsonian Institution*, 1911, pp. 303-333. Illustrated, 1 plate.

1911

The aggraded limestone plains of the interior of Bahia and the climatic changes suggested by them. *Bulletin of the Geological Society of America*, May, 1911, Vol. XXII, pp. 187-206.

Comparison of the effects of the earthquakes of Mendoza, Valparaiso, Kingston, and San Francisco. *Bulletin of the Seismological Society of America*, 1911, Vol. I, pp. 23-27.

The minerals associated with diamonds and carbonados in the State of Bahia, Brazil. *American Journal of Science*, June, 1911, Vol. XXXI, pp. 480-490.

Methods of geologic investigation and publication. *Economic Geology*, Jan.-Feb., 1911, Vol. VI, pp. 73-75. South America. *Encyclopædia Britannica*, Eleventh edition, 1911. Vol. XXV, pp. 485-489.

Suggested organization for seismological work on the Pacific Coast. *Bulletin of the Seismological Society of America*, March, 1911, Vol. I, pp. 5-8.

(With J. F. Newsom.) *Syllabus of a course of lectures on economic geology*. Third edition. Stanford University, 1911. 503 pp.

Reviews of seismological literature. *Bulletin of the Seismological Society of America*, 1911, Vol. I, pp. 23-27.

Impressions regarding the relations of surface geology to intensity in the Mendoza, Valparaiso, Kingston, and San Francisco earthquakes. Stanford University. *Bulletin of the Seismological Society of America*, 1911, Vol. I, pp. 38-43.

The geography of northeastern Bahia. *Geographical Journal (Royal Geographical Society)*, 1911, Vol. XXXVIII, pp. 139-152; 256-269.

Miguel A. Lisboa and Eugene Hussak. Translated from the Portuguese by J. C. Branner. *Journal do Commercio*, Rio de Janeiro, Oct. 7, 1911.

1912

The boundaries and area of the Niles cone. The future water supply of San Francisco. Oct., 1912. pp. 257-259.

An early discovery of fuller's earth in Arkansas. *Transactions of the American Institute of Mining Engineers*, 1912, Vol. LXVII, pp. 747-750.

Earthquakes in Brazil. *Bulletin of the Seismological Society of America*, June, 1912, Vol. II, pp. 105-117.

Erroneous geological conclusions on the formation of Livermore Valley. The future water supply of San Francisco. By the Spring Valley Water Company, 1912. pp. 232-232a.

A hydrocarbon found in the diamond and carbonado district of Bahia, Brazil. *American Journal of Science*, Jan., 1912, Vol. CLXXXIII, pp. 25-26.

Portuguese as well as Spanish. *Springfield Republican*, Oct. 3, 1912.

Report on the geology of Livermore Valley. The future water supply of San Francisco. The Spring Valley Water Company, Oct., 1912. pp. 203-222.

Syllabus of a course of lectures on elementary geology. Fourth edition. Stanford University, 1912. 462 pp.

Eugene Hussak. Translation of an article by Miguel A. Lisboa. *Journal of Geology*, 1912, Vol. XX, pp. 148-157.

Reviews and notes on seismology published in *Bulletin of the Seismological Society of America*, 1912, Vol. II,

Geologic work of ants in tropical America. *Report of the Smithsonian Institution*, 1911. 1912. pp. 303-333.

Report on the geology of the proposed Hetch Hetchy aqueduct line for the water supply of San Francisco, made to John R. Freeman, July 11, 13, 20, 1912. *J. R. Freeman's Report*. pp. 110-111; 124-126.

1913

Address before the Instituto Historico e Geographico Brasileiro at Rio de Janeiro. *Jornal do Commercio*, Rio de Janeiro, June 10, 1913. *Diario Official*, June 20, 1913.

As areias do Rio Grande do Sul. *Anuario do Estado do Rio Grande do Sul para O anno de 1913*. Porto Alegre, pp. 294-296, 1913.

Chancellor Jordan and President Branner. *Sequoia*, Sept., 1913. pp. 23-28.

Casper Branner of Virginia and his descendants. Privately printed, Stanford University, July, 1913. 476 pp.

An early discovery of fuller's earth in Arkansas. *Transactions of the American Institute of Mining Engineers*, 1913, Vol. XLIII, pp. 520-523.

Earthquakes and structural engineering. *Bulletin of the Seismological Society of America*, 1913, Vol. III, pp. 1-5.

The estancia beds of Bahia, Sergipe, and Alagôas, Brazil. *American Journal of Science*, June, 1913.

The estancia beds of Bahia, Sergipe, and Alagôas, Brazil. *Papers of the Stanford expedition to Brazil in 1911*, Vol. I, pp. 35-48. Reprint from *American Journal of Science*, June, 1913, Vol. XXXV, pp. 619-632.

The fluting and pitting of granites in the tropics. *Proceedings of the American Philosophical Society*, 1913, Vol. LII, pp. 163-286. *Papers of the Stanford University expedition to Brazil in 1911*, Vol. I, pp. 1-30. Stanford University, 1914.

- A inspectoria de obras contra as Seccas. *Jornal do Commercio*, Rio de Janeiro, July 15, 1913.
- Os fosséis devonianos do Paraná. *Jornal do Commercio*, Rio de Janeiro, June 14, 1913.
- Review of "The Flowing Road. By Casper Whitney." *Science*, June 24, 1913, Vol. XXIV, pp. 151-152.
- Inaugural address. Trustees series, 1913. No. XXIV. Stanford University.
- William Russel Dudley: An address delivered at the memorial services held in the University chapel. Dudley Memorial volume, Stanford University, 1913. pp. 7-10.
- The word "selva" in geographic literature. *Science*, 1913, Vol. XXXVIII, pp. 155-156.
- The influence of wind on the accumulation of oil-bearing rocks. *Bulletin of the Geological Society of America*, 1913, Vol. XXIV, pp. 94-95.

1914

- Annual report of the president of the university for the 23d academic year ending July 31, 1914. Stanford University, 1914.
- A brief grammar of the Portuguese language. Second edition. 1914. pp. 216-223.
- Address to the graduating class of Stanford University, delivered May, 1914. *Daily Palo Alto*, May, 1914. Stanford Alumnus, May, 1914.
- Earthquakes and business in the West: An address before the Commonwealth Club. *The California Outlook*, Jan. 10, 1914, Vol. XVI, pp. 17-18.
- Geologia elementar preparada con referencia especial aos estudantes Brasileiros. 2a edição. Paris, 1914.
- Some of the obstacles to North American trade in Brazil. *Journal of Race Development*, April, 1914, Vol. IV, pp. 461-470.
- Papers of the Stanford expedition to Brazil in 1911. Introduction. Stanford University, 1914. pp. 3-6.
- Review of "Across Unknown South America. By Henry Savage Landor." *Science*, 1914, Vol. XXXIX, pp. 577-579.
- Review of "The Upper Reaches of the Amazon. By Joseph F. Woodroffe." London, 1914. *Bulletin of the American Geographical Society*, 1914, Vol. XLVII, pp. 59-60.
- Review of "Geological Expedition to Brazil and Chile. By J. B. Woodworth." *Bulletin of the American Geographical Society*, July, 1914, Vol. LXVI, pp. 936-937.
- Seismological notes. *Bulletin of the Seismological Society of America*, 1914, Vol. IV.

1915

- Annual report of the president of Stanford University, 1914-1915.
- Address to the graduating class, May, 1915. Stanford Alumnus, May, 1915.
- Annual report of the president of the university for the 24th academic year ending July 31, 1915. Trustees series No. 29, 1915.
- Brief grammar of the Portuguese language. Third edition, 1915.
- American Association for the Advancement of Science. Pacific Coast Committee. *Nature and Science on the Pacific Coast*, San Francisco, 1915. pp. 62-64.
- Patronizing the South American republics. *Science*, 1915, Vol. LXI, pp. 236-237.
- Seismological notes. *Bulletin of the Seismological Society of America*, 1915, Vol. V.
- Structural engineering and earthquakes. *Engineering Record*, 1915, Vol. LXXII, pp. 780-781. Separate, 1916.
- Earthquakes. *Nature and Science on the Pacific Coast*, San Francisco, 1915.
- The untrustworthiness of personal impressions of direction of vibrations in earthquakes. *Bulletin of the Seismological Society of America*, 1915, Vol. V, pp. 26-29.
- Review of "Brazil and the Brazilians. By G. J. Bruce." *Yale Review*, April, 1915, Vol. IV, pp. 640-645.
- Review of "Through the Brazilian Wilderness. By Theodore Roosevelt." *Yale Review*, April, 1915.
- Review of "The Naturalist's Directory. By S. E. Cassino." *Science*, Jan. 22, 1915, Vol. LXI, p. 135.
- Review of "The River Amazon from its sources to the sea. By Paul Fountain." *Yale Review*, April, 1915, Vol. IV, pp. 640-645.
- Review of "The Lower Amazon. By A. Lange." *Science*, March, 1915, Vol. LXI, pp. 363-364.
- The mistakes of professors. By a student. *School and Society*, 1915, Vol. I, pp. 132-135.
- Address to the student body. Stanford University, Sept. 7, 1915.

1916

- Can we keep the canal open? *The Sunset Magazine*, June, 1916. pp. 13-15.
- The Panama slides. *The Sunset Magazine*, June, 1916. pp. 13-15; 70-71.
- Committee on Panama Canal slides, of the National Academy of Sciences. Preliminary report on the possibility of controlling the land slides adjacent to the Panama Canal. *Proceedings of the National Academy of Sciences*, April 15, 1916, Vol. II, pp. 193-207.
- The Geological Survey of Arkansas. *Manufacturers Record*, July, 1916. p. 47.
- Orville A. Derby. *Science*, 1916, Vol. LXIII, p. 596.
- Orville A. Derby. *Journal of Geology*, 1916, Vol. XXIV, pp. 209-214.
- Memorial of Orville A. Derby. *Bulletin of the Geological Society of America*, March, 1916, Vol. XXVII, pp. 15-21.

- The opportunities for and obstacles to North American business in Brazil. *The South American*, Dec., 1916. pp. 17-19.
- The potash-bearing rocks of Arkansas. *Arkansas Gazette*, April 30, 1916.
- Recifes de pedra da costa nordeste do Brasil. *Revista do Instituto Historico e Geographico Brasileiro*, Rio de Janeiro, 1916, Vol. LXXVII, pp. 68-85.
- Seismological notes. *Bulletin of the Seismological Society of America*, 1916-1917, Vol. VI.
- 1917
- The genesis of asbestiform minerals. Discussion of the paper by Stephen Taber. *Bulletin of the American Institute of Mining Engineers*, Mar., 1917, Vol. CX XIII, pp. 397-400.
- One of Mrs. Stanford's ideals. Founder's Day address. *Stanford Alumnus*, Mar., 1917, Vol. XVIII, pp. 217-222. And separate.
- Seismological notes. *Bulletin of the Seismological Society of America*, 1917, Vol. VI.
- Some of the scientific problems and duties at our doors. Presidential address before the Pacific Division of the American Association for the Advancement of Science. *Science*, May, 1917, Vol. LXV, pp. 417-424.
- Abstract with title Ignoring the Earthquake in Literary Digest, July 7, 1917, Vol. LV.
- One of the scientific problems at our doors. *Bulletin of the Seismological Society of America*, 1917, Vol. VII, p. 45. (An abridged form of the paper just listed.)
- The Tejon Pass earthquake of October 22, 1916. *Bulletin of the Seismological Society of America*, 1917, Vol. VII, p. 51.
- 1918
- Address at the reunion of the descendants of Casper Branner of Virginia, held at Forestville, Virginia, August 30, 1918. *New Market, Va.*, 1918. 24 pp.
- Review of "South America." By Nellie B. Allen. *Science*, 1918, Vol. LXVIII, pp. 249-250.
- A favor da lingua Portuguesa. *O Estudante Brasileiro*, 1918. Vol. I, pp. 3-4.
- Seismological notes. *Bulletin of the Seismological Society of America*, 1918, Sept., 1918, to Sept., 1919.
- 1919
- The importance of the study of the Portuguese language. *Hispania*, March, 1919, Vol. II, pp. 87-93.
- One of Mrs. Stanford's ideals. Extract. *Daily Palo Alto Times*, Memorial number, Stanford edition, 1919. pp. 19-20.
- Outlines of the geology of Brazil to accompany the Geologic map of Brazil. Reprinted from *Bulletin of the Geological Society of America*, 1919, Vol. XXX, pp. 189-338.
- Incidents in the history of the Geological Survey of Arkansas, and some conclusions to be drawn therefrom. *Arkansas Gazette*, Nov. 20, 1919.
- 1920
- Bauxite: Historical foreword in "Outlines of Arkansas Geology." By John G. Ferguson. Little Rock, Arkansas, 1920. pp. 45-46.
- Herbert Hoover as an educational illustration. Address delivered at the banquet offered Herbert Hoover by the Alumni of Stanford University at San Francisco, Dec. 29, 1919. *Stanford Illustrated Review*, Jan., 1920.
- Incidents in the history of the Geological Survey of Arkansas, and some conclusions to be drawn therefrom. In "Outlines of Arkansas Geology." By John G. Ferguson. Little Rock, Arkansas, 1920. pp. 14-20.
- Resumo da geologia do Brasil para aomparar o mappa geologico do Brasil. *O Estudante Brasileiro*, Vol. I, pp. 3-5, April, 1920.
- Resumo da geologia do Brasil. *Edição Brasileiro*, 152 pp. 1920.
- Trouble with Loro Tatus. *Nature Study Review*, 1920, Vol. XVI, pp. 189-194.
- What some animals know about topography. *Nature Study Review*, 1920, Vol. XVI, pp. 143-144.
- Oil and gas geology (of Arkansas). In "Outlines of Arkansas Geology." By John G. Ferguson, 1920. pp. 104-105.
- Recent earthquakes in Brazil. *Bulletin of the Seismological Society of America*, 1920, Vol. X, p. 90.
- In addition to the seismological publications of Doctor Branner already mentioned, he was the author of a number of notes and reviews in the bulletins of the Seismological Society of America from 1910 to 1920. Some of these were not signed.
- 1921
- Brazil and its geology with reference to future possibilities of developing oil. *California Oil World*, May 26, 1921, Vol. XIII, pp. 32-33.
- Memorial of J. C. da Costa Sena. *Bulletin of the Geological Society of America*, March, 1921, Vol. XXXII, pp. 16-18.
- O que en faria si fosse estudante Brasileiro. *El Estudiante Latino-Americano*, May, 1921, Vol. III, pp. 4-7.
- Oil prospects in Arkansas. *Arkansas Gazette*, May 25, 1921. p. 16.
- How and why stories. *Henry Holt & Company*, 1921. 104 pp.