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JOHN BERNARD REESIDE, JR.

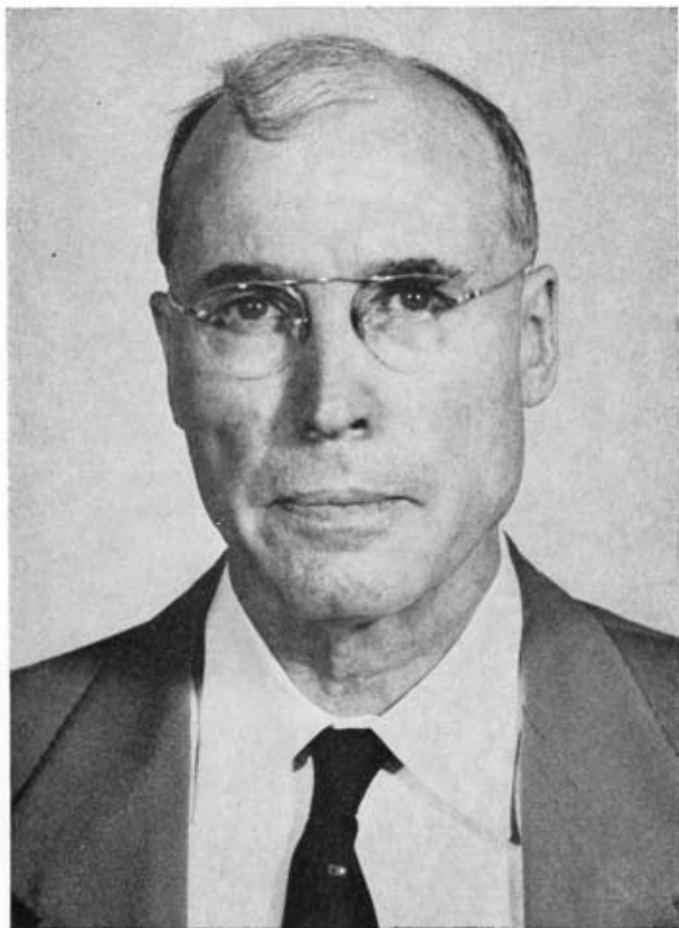
1889—1958

A Biographical Memoir by
CARLE H. DANE

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Biographical Memoir

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John B. Reside, Jr.

JOHN BERNARD REESIDE, JR.

June 24, 1889—July 2, 1958

BY CARLE H. DANE

THE UNEXPECTED death of John B. Reeside, Jr., from heart failure on July 2, 1958, after only a few days' illness, brought to an abrupt and untimely end a distinguished career of more than forty-six years of devoted service to the science of geology. As a member of the staff of the United States Geological Survey for his entire professional career, he worked unremittingly and almost exclusively in his chosen field, the paleontology and stratigraphy of the Mesozoic rocks of the western United States. He was internationally recognized as an authority on the paleontology of these rocks, particularly those of the Cretaceous system, and made an equally outstanding contribution to the increase of knowledge of the physical stratigraphic relationship of these rocks in the field and to their proper classification and the classification of the stratified rocks in general.

Of his seventy completed scientific papers, ranging from short notes in guidebooks or professional journals to Professional Papers of the United States Geological Survey, about forty can be regarded primarily as contributions to regional stratigraphy of Mesozoic rocks in the Rocky Mountain states, the remainder dealing with descriptive or taxonomic paleontology of the same general sequence of rocks. Of the stratigraphic papers, three-fourths were written in collaboration over a period of years with more than twenty different associates on the Geological Survey, ranging through three generations of field geologists engaged on mapping projects. To these joint papers he contributed in many ways, from intimate and painstaking participa-

tion in the stratigraphic studies in the field, with emphasis on contributions that he was able to make because of his specialized competence, to initiating or sharing in the preparation of large parts of the written reports and illustrations. Free from the chores and responsibilities of actual field mapping and map compilation after his first few seasons of field work, he was able to devote his complete attention to the elucidation of the stratigraphic and paleontologic problems. To these he brought an amazing fund of information, increasingly encyclopedic with the years.

Because of this extensive participation in many and widely varied field projects, because of his innumerable contacts with the geologists of the Survey and others as a consultant in the office, and because of the sound stratigraphic thinking that he brought to these contacts, no geologist of his time had a more deeply pervasive personal influence on the stratigraphic thinking of his associates. Midway in his career, this personal influence was vastly extended and will remain enduringly impressed on the geologic profession at large through the paper "Classification and Nomenclature of Rock Units" published by the Geological Society of America in 1933. This document was prepared in first and essentially final draft by Reeside in collaboration with W. W. Rubey.

Although offered only as "recommended to the geologists of the United States" this document gradually became known to American geologists as *the Stratigraphic Code*, a recognition attained in considerable degree because its inherently sound statement of principles led to its nearly universal acceptance as an authoritative guide to the solution of nomenclatural problems. It has been for more than twenty-five years the only available comprehensive declaration of stratigraphic principles and rules for North America. Those associated with the development of the new code now in preparation by the American Commission for Stratigraphic Nomenclature know that both in format and in basic thinking the new code for rock stratigraphic classification will follow closely that which John Reeside helped so greatly to establish.

Nearly thirty of his completed scientific contributions deal pri-

marily with descriptive and taxonomic paleontology. In contrast to the stratigraphic papers, most of these represent his work alone, particularly the longer and more significant analytical studies of the cephalopod faunas of the western interior and Rocky Mountain regions. Although the writer of this memoir is generally aware of his competence and the immensity of his knowledge of his specialized field, he is not qualified to pass critical judgment on the level of his attainments as a paleontologist. This has elsewhere been attested by one of his confrères in that field in the following words:

“His ability to evaluate new biological evidence and consequently change his mind concerning taxonomic concepts was illustrated in a study of the ammonite genus *Neogastrophites* that he carried on from 1952 until 1958. The study demonstrated clearly the enormous variation that may occur in a single ammonite population comprising thousands of individuals and suggested that similar variations may occur among other genera even though not generally recognized by paleontologists. During seven years of study, Reeside at first intended to subdivide the ammonite population under study into several genera and many species. A few years later he decided to divide it into several subgenera and fewer species. Eventually he decided to recognize only one genus and five species. This study will inevitably become a classic illustration of the susceptibility of adequate paleontological assemblages to treatment by the methods of community analysis and population dynamics and will point the way to critical evaluation of present taxonomic arrangements among the ammonites and other groups of fossils” (Ralph W. Imlay in Proceedings volume of the Geological Society of America, Annual Report for 1958, p. 174).

A further measure of the esteem with which Reeside was held by other paleontologists (*idem*, p. 175) is given by the fact that three genera of fossils and at least twenty-one species were named in his honor by more than twenty different paleontologists.

The volume and quality of his published paleontologic papers are even more impressive when it is realized that they reflect only a fraction of the expenditure of his time on paleontologic work. Many

hours and days of his time were devoted to identification of material, often inadequate and incomplete, transmitted to him for specific identification and age assignment by associates of the Geological Survey and other geologists. These requests were never treated lightly; he devoted his best efforts to the examination of such material. He was fully aware that there were many mistaken identifications in the reports on these inadequate materials but he felt that the field man deserved the best guess that the paleontologist was able to make as to the significance of collections. His "guesses" were highly valued and usually surprisingly accurate.

Neither his childhood nor early education foreshadowed the field of specialization he was to make his own nor the distinguished eminence that he would attain in that field. He was born in Baltimore, Maryland, on June 24, 1889, the oldest of five children of John Bernard and Florence May (Feathers) Reeside. He attended public schools and was a good student but not a brilliant one. His father was a grocer in a working-class neighborhood and Reeside helped in the store after school hours and on Saturday. In what spare time he had, he read books on many subjects, obtained from the nearby public library. His earliest scientific interest was in chemistry, an interest that probably developed because of a small sideline business of his father in the manufacture of common household remedies. This interest carried over into his early years in the Johns Hopkins University, where he received an A.B. degree in chemistry in 1911. As a day student he presumably participated little in the social activities of college life but he engaged in college athletics as a member of the track team.

In his senior year at "the Hopkins" he took a course in geology with the able stratigrapher and paleontologist, Dr. Charles K. Swartz. Professor Swartz was an inspiring teacher and Reeside was filled with enthusiasm for the subject. His life course thus set, he entered the graduate school at Johns Hopkins as a student in geology in the fall following his senior year. In the summer of 1912 he was fortunate in obtaining employment with a field party of the U.S. Geological Survey that, under the direction of C. J. Hares, was

completing a survey of the lignite fields of northwestern South Dakota and southwestern North Dakota, as part of the extensive program of classification of the public lands with regard to their mineral resources. He was thus at once engaged in a project of detailed field mapping with an economic objective. It is interesting to note that the area was one that included part of the western edge of the Cannonball marine member of the Lance, a unit then involved in controversy as to its Cretaceous or Tertiary age, a controversy ultimately resolved by the recognition that its contained marine and brackish water invertebrate fossils were of Paleocene age. This and similar problems of stratigraphy and paleontology were to continue to be his lifelong field of specialization. The succeeding two summers were of even greater interest and value in introducing him to this field. During these summers he continued to serve as a field assistant, chiefly with Hares, in a reconnaissance study of the structure and stratigraphy of anticlines in an area of nearly 5,000 square miles in central Wyoming, directed to an appraisal of their oil and gas potentialities. The numerous stratigraphic sections studied included rocks ranging from Pennsylvanian to Tertiary in age, but introduced him chiefly to many thick, variable and widely separated sections of Mesozoic rocks.

In the meantime he continued his graduate studies at Johns Hopkins, taking as the subject of his doctoral dissertation the correlation of the subdivisions of the Helderberg limestone from Maryland to New Jersey. The stratigraphy and paleontology of these rocks were studied in meticulous detail at seven selected localities in central Pennsylvania. The concluding sentence of the historical summary of the dissertation, published as a Professional Paper of the U. S. Geological Survey, contains an explicit expression of philosophy of stratigraphic correlations which he would have endorsed and underscored more than forty years later:

"The present study of seven selected localities, it is hoped, will contribute toward the solution of some of the problems involved, though the writer recognizes fully the difficulties and limitations

imposed upon correlations which are made without field work throughout the areas between the exposures discussed and which are based entirely upon the fossils collected" (U. S. Geol. Survey Prof. Paper 108-K, p. 187, 1917).

Following the receipt of his Ph.D. in 1915, he was appointed as a geologic aide in the Survey to work with C. M. Bauer who with three other assistants was beginning a detailed mapping project on coal in the northwestern part of the San Juan Basin in San Juan County, New Mexico. During the following summers of 1916 and 1917, Reeside continued the project with three other geologists as assistants. Reeside participated actively in the triangulation and detailed plane table mapping of the coal beds as well as in the stratigraphic work. The work was done chiefly on horseback from tent camps established by wagons. Economic results of the study were published in a Bulletin of the U. S. Geological Survey in collaboration with C. M. Bauer, and several other papers on the stratigraphy and paleontology also resulted from the extensive collections made by the party.

The project was interrupted by service in the United States Army from September 27, 1917, to November 30, 1918. At the end of the war Reeside was a First Lieutenant in Field Artillery. Obviously he had, as always, done the job at hand well. He was able to return to the San Juan Basin project in 1920, and stratigraphic studies and reconnaissance were continued in 1920, 1921, and 1923. The field work on the project was again interrupted during the summer of 1922 when he undertook an effective reconnaissance study of the Green River from the town of Green River, Wyoming to Green River, Utah, as part of a river boat survey made to gather data on the power resources of the river.

Reeside's classic paper "Upper Cretaceous and Tertiary Formations of the Western Part of the San Juan Basin of Colorado and New Mexico" appeared as a Professional Paper of the Survey in 1924. Thirty-five years later this is still a standard and indispensable reference work for geologic students of the San Juan Basin, a region

in which hundreds of millions of barrels of reserves of petroleum and even larger reserves of natural gas have since been developed. Pipe lines and paved roads now crisscross large parts of the area over which Reeside and his associates traveled on foot or on horseback during their pioneer geologic mapping. This was the last large mapping project for which Reeside was personally responsible. Thereafter his geologic studies included many long, active field seasons in the west, but working with mapping parties under other field supervisors. These need not be recapitulated chronologically here, but four episodes may be mentioned as especially significant.

During the first of these episodes, in collaboration with E. M. Spieker, at first from 1921-1923, but intermittently in later years, studies of the stratigraphy of the Wasatch Plateau in central Utah resulted in 1) the recognition of facies changes in the Upper Cretaceous that recorded repeated transgressions and regressions of the sea across the region, 2) new paleontologic information on rocks near the Cretaceous-Tertiary boundary that made substantial changes in the concepts of stratigraphy and geologic history in central Utah, and 3) the development of knowledge of repetition of mountain building from mid-Cretaceous through early Tertiary time in the Wasatch Plateau region.

A second period of collaboration began in 1924 and extended through 1929. During this period, many months were spent in the field in many parts of the west, but the period was noteworthy especially for collaboration with James Gilluly in the San Rafael Swell of central Utah and with Arthur A. Baker and others in the salt anticline region of eastern Utah and adjoining states. This collaboration led to a succession of regional stratigraphic papers on the correlation of the Permian, Triassic, and Jurassic formations of the Colorado Plateau, papers that became the essential foundation for the subsequent intensive and detailed geologic investigations of the Colorado Plateau undertaken by the Geological Survey in support of the intensive search for uranium resources.

A third noteworthy period of collaboration began in 1945, but

was most effective beginning in 1949, when Reeside was permitted to return full-time to research work, relieved of all administrative responsibilities in the Survey. This collaboration, with W. A. Cobban, continued to the end of his career. It was notable for several primarily paleontologic contributions such as a study of the Mowry shale and contemporary formations in the United States, recently published as a Geological Survey Professional Paper, which describes with exhaustive completeness the physical setting and morphologic aspect of the ammonite faunas. The collaboration was also notable for a summary of the correlation of the Cretaceous formations of the Western Interior of the United States (Bull. Geol. Soc. Amer., 63: 1011-1044) in terms of numerous distinctive faunal zones as identifiable by zone guide fossils. This period also provided Reeside the opportunity to summarize his knowledge of the relations of paleontology and lithology of the western States in the paper "Paleoecology of the Cretaceous Seas of the Western Interior of the United States" (Geol. Soc. Amer. Mem. 67, p. 505-541).

A fourth period of collaboration is noteworthy for the light it sheds on Reeside's capacity for service and determination in completing assignments. From 1925 to 1927, Geological Survey mapping parties under the direction of D. J. Fisher and C. E. Erdmann completed detailed studies of the stratigraphy, structure and coal resources of the Book Cliffs of Utah and Colorado respectively. Bulletins describing the geology, but particularly focused on the economic resources, appeared within a few years. The task of summarizing the stratigraphy of the region as a whole, and placing in its regional setting was soon thereafter assigned to Reeside, who had as usual provided guidance and counsel throughout the conduct of the projects. Administrative responsibilities and a flood of other duties and more urgent assignments kept him from working at this task for more than twenty-five years. He was finally able to take it up once more as a service that he had obligated himself to perform and in 1956 transmitted the completed manuscript, including the results of some new field work in 1955 that had been requested for comple-

tion of the project. The resulting Professional Paper 332, of the Geological Survey, largely the result of Reeside's personal synthesis of the available material and enriched by his special knowledge and his store of regional information of the Cretaceous and Tertiary rocks of adjoining regions, gives a picture of the stratigraphy of east-central Utah not heretofore available.

It is axiomatic that those who truly profess science as a way of life are impelled to seek the truth, but for John Reeside this impulse was a compelling and all-absorbing one. He thought of himself not as the great scholar he had become but just as a student eager for knowledge. He continued active field work until the spring of 1956, when he was nearly sixty-seven years of age. In a letter to me at that time, he wrote:

"We spent yesterday, Easter Sunday, journeying to Alamosa Creek from Datil and returning. The wind was a howling gale and sand and dust composed an appreciable fraction of the atmosphere. However, the Lord was kind to us heathens, and I think we can now show by fossils that the shale under the Bell Mountain sandstone and the shale under the Gallego are essentially the same. The six hours on the creek available to us were well spent—there was an inch of snow on the ground in Datil this morning and more was falling. We doubt that we could have made it today or been able to see anything after we arrived."

Those who knew John Reeside will recognize his joy at having successfully wrested one more bit of truth from his long-time adversary, an earth reluctant to give up its secrets.

In 1932 Reeside became Chief of the Paleontology and Stratigraphy Branch of the Geologic Division of the Survey, a position that he held for seventeen years. He conceived his role in this position to be that of a counsellor and guide rather than a leader and throughout his tenure he commanded the respectful admiration, loyalty and affection of his associates and subordinates. He never was comfortable with the handling of the devices and paper machinery by which legitimate needs for space, equipment, and supporting personnel

could be fulfilled and was impatient with the devious mechanisms of government administration. Accordingly, he was profoundly relieved and grateful when given the opportunity to return to his own research. He continued to serve as Chairman of the Geological Survey's Geologic Names Committee until 1952, and was then also relieved of this responsibility. This post he had held from 1947 after prior service on the committee since 1929. He continued to serve as a member until 1958 and his counsel on the committee, which has responsibility for adjudicating difficult or controversial problems of classification or nomenclature, was greatly valued, for he brought to countless decisions personal familiarity with the area or the rocks involved. It was noteworthy in the committee deliberations that, wherever possible, he was holding forth for the field man's views and opinions as to the feasibility or practicality of alternative possible solutions. Quite literally, as long as he lived, he continued to have his "feet on the ground," where they had been for so long in the field.

He was a member of many learned and honorary societies, including the following: The Geological Society of America, The Paleontological Society, Society of Economic Paleontologists and Mineralogists, Washington (D. C.) Academy of Sciences, New York Academy of Sciences, American Association for the Advancement of Science, American Museum of Natural History, Geological Society of Washington, Paleontological Society of Washington, Biological Society of Washington, Society of Systematic Zoology, Sociedad Geológica del Peru, Sociedad Geológica Mexicana, Asociación Mexicana de Geólogos Petroleros, Phi Beta Kappa, Society of Sigma Xi, Cosmos Club of Washington and Cushman Foundation for Foraminiferal Research. He was elected to membership in the National Academy of Sciences in 1945.

He also served on committees of many of these societies, or as a major officer. He was President of the Geological Society of Washington in 1941, and of the Paleontological Society in 1943. He was Vice-President of the Geological Society of America in 1935 and 1944. He was a Vice-President and founder of the Cushman Founda-

tion for Foraminiferal Research, which he took an active role in organizing, after the death of J. A. Cushman and the consequent end of the Cushman Laboratory for Foraminiferal Research (Lloyd G. Henbest, in *Contributions from the Cushman Foundation for Foraminiferal Research* 10: Part 2, April 1959).

Despite the intensity and scope of his professional activities, John Reeside lived a full life otherwise also. On May 3, 1918, a few months after the end of his military service, he married Adelaide C. Quisenberry, whom he had met through Dr. R. S. Bassler, for whom she had worked at the U. S. National Museum. Theirs was a long and truly happy marriage. Mrs. Reeside, their daughter Corinna, a son, John B. Reeside, III, and a grandson, John B. Reeside, IV, survive. Mrs. Reeside frequently accompanied Dr. Reeside to local scientific meetings in Washington and to the annual meetings of the Geological Society of America and her quiet good humor was an excellent foil to the sometimes more volatile temperament of her distinguished husband.

For many years Reeside participated in the annual Pick and Hammer Club shows given by members of this informal organization in the Survey. He had a good tenor voice and during the twenties and early thirties greatly enjoyed singing second tenor each week with a double quartet that included J. T. Pardee, G. W. Stose, G. R. Mansfield and Frank Calkins, among others. This group usually converted their well-rehearsed music into songs with livelier versions for the Pick and Hammer show.

In recent years, his principal hobby was working with his stamp collection, and he enjoyed spending leisure time with his grandson, but he remained physically active, normally walking from the Museum for appointments or committee meetings in the Geological Survey offices rather than using the public transportation that was readily available.

John Reeside was a gentle and honorable man. As his colleague for nearly thirty years, at times under the arduous, uncomfortable, and exasperating situations occasionally inevitable in geologic field

work and at times under the stress of vigorous group debate on technical or administrative matters, I never knew him to be unfair, ungenerous, or unjustly unkind. A man of complete, unswerving, and unquestioning integrity of purpose and thought himself, he was least tolerant of any indication of lack of integrity or evidence of self-seeking in others. For such, he reserved his very rare and brief, but bitter displays of anger. He was more likely to exhibit quick impatience with petty tribulations or annoyances than with more serious or enduring problems, which he was inclined to accept somewhat fatalistically as foreordained travails to be borne. Although life was a serious and earnest matter to him, he had a wry sense of humor, much more likely to be evidenced by a dry chuckling snort than by hearty laughter. Modest and unpretentious, he was nevertheless gratified by the honors that he received in his later years. These he cherished more as a verification by others of the rightness of his course and way in life than as emblems of personal distinction. Even so it is doubtful if he was fully aware of the profound respect and affection in which he was held by his close associates.

In 1946 he was awarded the Mary Clark Thompson medal of the National Academy of Sciences for distinguished contributions in paleontology and stratigraphy.

In 1956 he was cited for "spirit of cooperation, devotion to work and dedication to scientific progress, which is necessary for the perpetuation and preservation of any science," in the dedication to the Seventh Annual Field Conference of the Intermountain Association of Petroleum Geologists entitled "Geology and Economic Deposits of East-central Utah."

Early in 1958, a few months before his death, he was presented the Length of Service Emblem of the Interior Department for more than forty years of distinguished service with a citation from the Director of the Geological Survey that read in part:

"The high standards of excellence and achievement that you have set as a scientist and an administrator have had a profound influence on the quality and soundness of the work done by your associates.

Your breadth of knowledge in stratigraphy and paleontology is unsurpassed in this generation. You have frequently astonished other geologists with your understanding of subjects which they did not expect you to know. Your work has contributed greatly to the respect with which the Geological Survey is held by the geological profession."

This statement was confirmed in full by an inner frontispiece "In memoriam" in the 1959 Guidebook of the 11th Field Conference of the Rocky Mountain Association of Geologists "Symposium on the Cretaceous Rocks of Colorado and Adjacent Areas," the rocks that Reeside knew and loved so well. Part of this citation reads, "His contribution to the knowledge of Cretaceous stratigraphy and paleontology of the Rocky Mountain region is unexcelled . . . Members of the Rocky Mountain Association of Geologists are deeply grateful for the many years of service and the contribution to geological knowledge made by Dr. Reeside."

Before Dr. Reeside's death the Geological Survey had already nominated him for the Interior Department's Distinguished Service award. This was presented posthumously with a citation that reads in part:

"In recognition of his long and distinguished career of outstanding scholarship and of selfless service in the Geological Survey . . . his valuable, original contributions in the fields of paleontology, stratigraphy and general geology, his outstanding professional and administrative leadership, his unique scholarship, and his unswerving integrity throughout his more than forty-three years of devoted service, the Department of the Interior grants to Dr. Reeside posthumously its highest honor, the Distinguished Service award."

The spare, active figure with scrubtoed shoes and battered hat that we knew in the field and the intense office worker at the neat but crowded desk is with us no more. His example will long be an inspiration to three generations of his professional associates on the Geological Survey and the record of his many triumphs and few temporary setbacks in his lifelong search for the truth remains in the published record cited below.

KEY TO ABBREVIATIONS

- Amer. J. Sci.=American Journal of Science
 Bull. Amer. Assn. Pet. Geol.=Bulletin of the American Association of Petroleum Geologists
 Bull. Geol. Soc. Amer.=Bulletin of the Geological Society of America
 Geol. Soc. Amer. Mem.=Geological Society of America Memoir
 Int. Geol. Cong.=International Geologic Congress
 J. Geol.=Journal of Geology
 J. Paleont.=Journal of Paleontology
 J. Wash. Acad. Sci.=Journal of the Washington Academy of Sciences
 Smithsonian Misc. Coll.=Smithsonian Miscellaneous Collections
 U.S. Geol. Survey Bull.=United States Geological Survey, Bulletin
 U.S. Geol. Survey Oil & Gas Inv. Prel. Map=United States Geological Survey Oil and Gas Investigations Preliminary Map
 U.S. Geol. Survey Prof. Paper=United States Geological Survey, Professional Paper
 U.S. Geol. Survey Water-Supply Paper=United States Geological Survey, Water-Supply Paper
 U.S. Nat. Mus. Proc.=United States National Museum, Proceedings
 Wyoming Geol. Assn.=Wyoming Geological Association

BIBLIOGRAPHY

1917

The Helderberg Limestone of Central Pennsylvania, U.S. Geol. Survey Prof. Paper 108:185-225.

1919

Some American Jurassic Ammonites of the Genera *Quenstedticeras*, *Cardioceras*, and *Amoeboceras*, Family *Cardioceratidae*, U.S. Geol. Survey Prof. Paper 118:1-64.

1921

With C. M. Bauer. Coal in the Middle and Eastern Parts of San Juan County, New Mexico. U.S. Geol. Survey Bull. 716:155-237.

1922

With Harvey Bassler. Oil Prospects in Washington County, Utah. U.S. Geol. Survey Bull. 726:87-107.
 Note on the Stratigraphy of San Juan County, New Mexico, with Special

Reference to the Occurrence of Dinosaurs. Smithsonian Misc. Coll. 72: 4-6.

With Harvey Bassler. Stratigraphic Section in Southwestern Utah and Northwestern Arizona. U.S. Geol. Survey Prof. Paper 129:53-77.

1923

The Fauna of the So-called Dakota Formation of Northern Central Colorado and Its Equivalent in Southeastern Wyoming. U.S. Geol. Survey Prof. Paper 131:199-207.

A New Fauna from the Colorado Group of Southern Montana. U.S. Geol. Survey Prof. Paper 132:25-33.

Notes on the Geology of Green River Valley between Green River, Wyoming and Green River, Utah. U.S. Geol. Survey Prof. Paper 132: 35-50.

1924

Upper Cretaceous and Tertiary Formations of the Western Part of the San Juan Basin of Colorado and New Mexico. U.S. Geol. Survey Prof. Paper 134:1-70.

A New Nautiloid Cephalopod *Eutrephoceras sloani* from the Eocene of South Carolina. U.S. Nat. Mus. Proc., 65, art. 5, 4 pages.

A Rare Cretaceous Sea Urchin, *Scutellaster cretaceus* Cragin. U.S. Nat. Mus. Proc., 66, art. 20, 4 pages.

1925

With E. M. Spieker. Cretaceous and Tertiary Formations of the Wasatch Plateau, Utah (with discussion by Charles Schuchert). Bull. Geol. Soc. Amer., 1, 36:435-454.

1926

A comparison of the genera *Metaplacenticeras* Spath and *Placenticeras* Meek. U.S. Geol. Survey Prof. Paper 147:1-5.

With N. H. Darton. Guadalupe group. Bull. Geol. Soc. Amer., 37:413-428.

With E. M. Spieker. Upper Cretaceous Shoreline in Utah. Bull. Geol. Soc. Amer., 37:429-438.

1927

The Cephalopods of the Eagle Sandstone and Related Formations in the

- Western Interior of the United States. U.S. Geol. Survey Prof. Paper 151:1-87.
- With A. A. Baker, C. E. Dobbin and E. T. McKnight. Notes on the Stratigraphy of the Moab Region, Utah. Bull. Amer. Assn. Pet. Geol., 11:785-808.
- Cephalopods from the Lower Part of the Cody Shale of Oregon Basin, Wyoming. U.S. Geol. Survey Prof. Paper 150:1-19.
- The Scaphites, an Upper Cretaceous Ammonite Group. U.S. Geol. Survey Prof. Paper 150:21-40.
- An *Acanthoceras rhotomagense* Fauna in the Cretaceous of the Western Interior. J. Wash. Acad. Sci., 17:453-454.
- Two New Unionid Pelecypods from the Upper Triassic. J. Wash. Acad. Sci., 17:476-478.

1928

- With James Gilluly. Sedimentary Rocks of San Rafael Swell and Some Adjacent Areas in Eastern Utah. U.S. Geol. Survey Prof. Paper 150:61-110.
- New Cretaceous Mollusks from Colorado and Utah. J. Wash. Acad. Sci., 18:306-313.

1929

- With A. A. Baker. The Cretaceous Section in Black Mesa, Northern Arizona. J. Wash. Acad. Sci., 19:30-37.
- "Triassic-Jurassic 'Red Beds' of the Rocky Mountain Region"; a Discussion. J. Geol., 37:47-63.
- Exogyra olisiponensis* and *exogyra costata* Say in the Cretaceous of the Western Interior. U.S. Geol. Survey Prof. Paper 154:267-278.
- With A. A. Baker. Correlation of the Permian of Southern Utah, Northern Arizona, Northwestern New Mexico, and Southwestern Colorado. Bull. Amer. Assn. Pet. Geol., 13:1413-1448.
- With C. E. Dobbin. The Contact of the Fox Hills and Lance Formations. U.S. Geol. Survey Prof. Paper 158:9-25.

1930

- Descriptive Geology of Green River Valley between Green River, Wyoming and Green River, Utah. U.S. Geol. Survey Water-Supply Paper 618:56-63.
- The Cretaceous Faunas in the Section on Vermilion Creek, Moffat County, Colorado. J. Wash. Acad. Sci. 20:35-41.

A Cretaceous Pelecypod with Color Markings. *J. Wash. Acad. Sci.*, 20: 59-60.

The Preparation of Paleontologic Illustrations. *J. Paleont.*, 4:299-308.

1931

With A. Allen Weymouth. Mollusks from the Aspen Shale (Cretaceous) of Southwestern Wyoming. *U.S. Nat. Mus. Proc.*, 78, art. 17, 24 pages.
Supposed Marine Jurassic (Sundance) in Foothills of Front Range of Colorado. *Bull. Amer. Assn. Pet. Geol.* 15:1095-1103.

1932

The Upper Cretaceous Ammonite Genus *Barroisicerus* in the United States. *U.S. Geol. Survey Prof. Paper* 170:9-29.

With others. Stratigraphic Nomenclature in the United States. 16th Int. Geol. Cong., United States, 1933. Guidebook 29, 7 pages.

1933

With others. Classification and Nomenclature of Rock Units. *Bull. Geol. Soc. Amer.*, 44:423-459.

With A. A. Baker and C. H. Dane. Paradox Formation of Eastern Utah and Western Colorado. *Bull. Amer. Assn. Pet. Geol.*, 17:963-980.

1936

With A. A. Baker and C. H. Dane. Correlation of the Jurassic Formations of Parts of Utah, Arizona, New Mexico and Colorado. *U.S. Geol. Survey Prof. Paper* 183:1-66.

With C. H. Dane and W. G. Pierce. The Stratigraphy of the Upper Cretaceous Rocks North of the Arkansas River in Eastern Colorado. *U.S. Geol. Survey Prof. Paper* 186:207-232.

1938

With L. W. Stephenson. Comparison of Upper Cretaceous Deposits of Gulf Region and Western Interior Region. *Bull. Amer. Assn. Pet. Geol.*, 22:1629-1638.

1941

With H. E. Wood and others. Nomenclature and Correlation of the North American Continental Tertiary. *Bull. Geol. Soc. Amer.*, 52:1-48.

1944

Map Showing Thickness and General Character of the Cretaceous Deposits in the Western Interior of the United States. U.S. Geol. Survey Oil and Gas Inv. Prel. Map 10.

1945

With W. A. Cobban and R. W. Imlay. Type Section of Ellis Formation (Jurassic) of Montana. Bull. Amer. Assn. Pet. Geol., 29:451-453.

1946

With T. C. Yen. Triassic Fresh-water Gastropods from Southern Utah. Amer. J. Sci., 244:49-51.

With T. C. Yen. Fresh-water Mollusks from the Morrison Formation (Jurassic) of Sublette County, Wyoming. J. Paleont., 20:52-58.

With C. J. Hares and others. Geologic Map of the Southeastern Part of the Wind River Basin and Adjacent Areas in Central Wyoming. U.S. Geol. Survey Oil and Gas Inv. Prel. Map 51.

With C. J. Hares and others. Geologic Map of the Southern Part of the Wind River Basin and Adjacent Areas in Central Wyoming. U.S. Geol. Survey Oil and Gas Inv. Prel. Map 60.

1947

Upper Cretaceous Ammonites from Haiti, U.S. Geol. Survey Prof. Paper 214:1-11.

With A. A. Baker and C. H. Dane. Revised Correlation of Jurassic Formations of Parts of Utah, Arizona, New Mexico and Colorado. Bull. Amer. Assn. Pet. Geol., 31:1664-1668.

1951

With W. A. Cobban. Lower Cretaceous Ammonites in Colorado, Wyoming, and Montana. Bull. Amer. Assn. Pet. Geol., 35:1892-1893.

With W. A. Cobban. Frontier Formation Near Sinclair, Carbon County, Wyoming. Wyoming Geol. Assn., Guidebook 6th Annual Field Conference, 60-65.

1952

Summary of Stratigraphy of Morrison Formation, in T. C. Yen, Molluscan Fauna of the Morrison Formation. U.S. Geol. Survey Prof. Paper 233:22-26.

- With W. A. Cobban. Frontier Formation, Wyoming and Adjacent Areas, Bull. Amer. Assn. Pet. Geol., 36:1913-1961.
- With D. V. Harris. A Cretaceous Horseshoe Crab from Colorado. J. Wash. Acad. Sci., 42:174-178.
- With W. A. Cobban. Correlation of the Cretaceous Formations of the Western Interior of the United States. Bull. Geol. Soc. Amer., 63:1011-1044.

1954

- With W. A. Cobban. Ammonite Accumulations in the Cretaceous Mowry and Aspen Shales. Science, 119, p. 355.
- With R. W. Imlay. Correlation of the Cretaceous Formations of Greenland and Alaska. Bull. Geol. Soc. Amer., 65:223-246.

1955

- Revised Interpretation of the Cretaceous Section on Vermilion Creek, Moffat County, Colorado. Wyoming Geol. Assn., Guidebook 10th Annual Field Conference, 85-88.

1956

- With W. A. Cobban. Cretaceous Rocks of the Western Interior of the United States. 20th Int. Geol. Cong. p. 341.
- With C. H. Dane and A. A. Wanek. Reinterpretation of Section of Cretaceous Rocks in Alamosa Creek Valley Area, Catron and Socorro Counties, New Mexico. Bull. Amer. Assn. Pet. Geol., 41:181-196.

1957

- Paleoecology of Cretaceous Seas in Western Interior of United States. Geol. Soc. Amer. Mem. 67; 2:505-541.
- Nonmarine Pelecypod (*Nippononaia asinaria*) from the Lower Cretaceous of Colorado. J. Paleont. 31:651-653.
- Cretaceous Fossils, in J. Gilluly, General Geology of Central Cochise Co., Arizona. U.S. Geol. Survey Prof. Paper 281:83-86.
- With others. Correlation of the Triassic Formations of North America Exclusive of Canada. Bull. Geol. Soc. Amer., 68:1451-1514.
- With C. H. Dane and G. O. Bachman. The Gallup Sandstone, Its Age and Stratigraphic Relationships South and East of the Type Locality. Four Corners Geological Society 2d Field Conference, Southwest San Juan Basin, New Mexico, pp. 99-113.

1960

With D. J. Fisher and C. E. Erdmann. Cretaceous and Tertiary Formations of the Book Cliffs, Carbon, Emery, and Grand Counties, Utah and Garfield and Mesa Counties, Colorado. U.S. Geol. Survey Prof. Paper 332:1-80.

With W. A. Cobban. Studies of the Mowry Shale (Cretaceous) and Contemporary Formations in the United States and Canada. U.S. Geol. Survey Prof. Paper 355:1-126.

In press

Ammonites (of Cretaceous of New Jersey). New Jersey Geological Survey.