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CHARLES SCHUCHERT

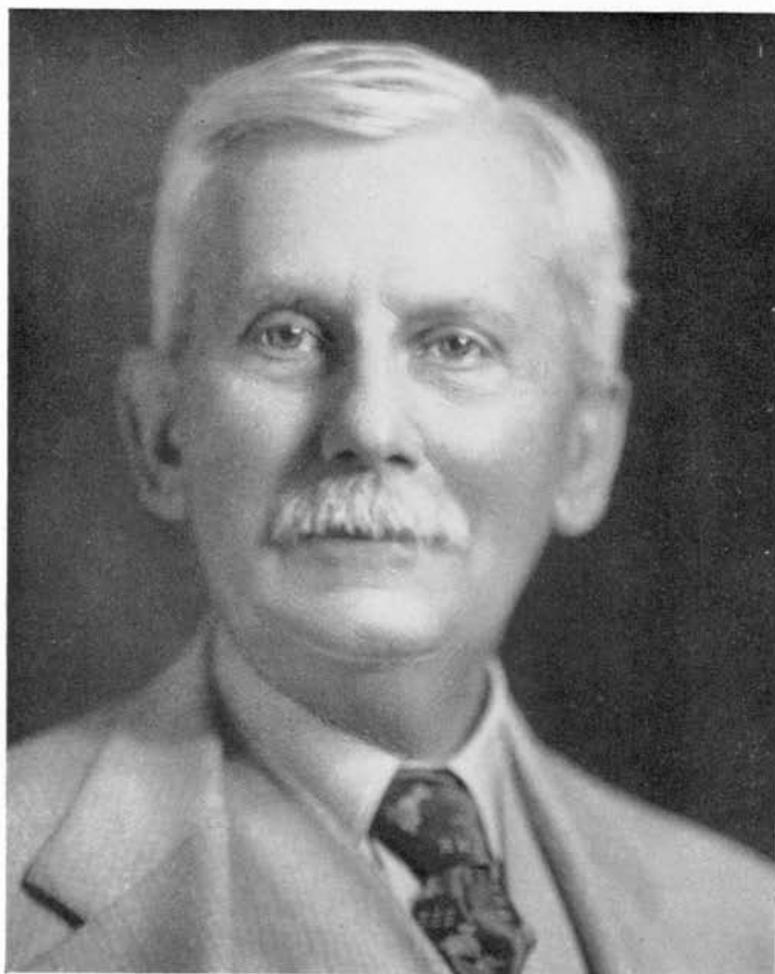
1858—1942

A Biographical Memoir by
ADOLPH KNOPF

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Biographical Memoir

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BY ADOLPH KNOPF

Charles Schuchert, paleontologist, stratigrapher, and foremost authority on paleogeography, died on November 20, 1942, in New Haven, Connecticut, in his eighty-fifth year. "A great man, a good man, a great scientist, a great investigator has gone," so voiced one of his most eminent students William H. Twenhofel, a sentiment that evoked the warmest responses in all who had known Professor Schuchert. Professor Schuchert attained his outstanding distinction as scholar and investigator without the benefits of high-school and college education. This achievement is extraordinarily surprising to many and naively mystifying to some. His life and what he made of it exemplifies in a remarkable way what can be achieved by native ability combined with determined effort.

He was born in Cincinnati, Ohio, on July 3, 1858, the oldest of six children. His parents were emigrants from Germany, who had come from the old country to Cincinnati only a few years previously. Philipp, the father, had arrived as a young man of 22 from Kranlucken, Saxe-Weimar, Saxony in 1855. Two years later he married Agatha Müller, then 20 years of age, who had come to this country from Reussendorf, in Franconia, Bavaria in 1854. Philipp was skilled as a cabinet-maker, and by hard work and enterprise he gradually built up a small but substantial business in making furniture. Young Charles, on reaching the age of six and a half years, was sent by his parents who were devout Catholics, to a parochial school. After finishing his schooling there at twelve, he began to attend a business school in order to prepare himself as bookkeeper in his father's firm. He had to help in the shop, however, opening it at seven in the morning and doing the necessary chores before going to school, and after classes he had to return to the shop to finish the day's work. Under this regimen he did not last out the year at the business school, but went to work in the varnishing

room of his father's furniture factory at a wage of two dollars a week. Thus ended all the formal education that Charles Schuchert was ever to receive. During the next six years he moved up from laborer to sales agent and finally to general manager.

In 1877 the factory was destroyed by fire and the blow so prostrated his father that young Schuchert, barely turned twenty, was left with the duty of supporting the family. During the next seven years he gradually rebuilt the business, but again a fire completely destroyed the factory. After this overwhelming disaster Schuchert was reduced to earning his livelihood by working in other furniture factories.

During these early years Schuchert had had a thrilling avocation. It had begun in 1866, when as a boy of eight, he stood watching a gang of laborers digging a ditch near his home. One of the men picked up something, and after looking at it intently, threw it to the boy with the remark, "Here Johnny, here's something for you." The boy ran home with his treasure, but all his father could tell him was that it was probably a *Versteinerung*, a petrification. A year later his father brought him another fossil. In the mind of the boy a proper collection must be labeled, so Charles labeled the fossils for his cabinet: one, "the petrification of a nanny-goat's horn" and the other, "the petrification of a nanny-goat's hoof." Subsequently, the "horn" when properly identified proved to be a coral and the "hoof" to be a bivalve shell.

Three years later Charles was taken by his father to see the geologic museum of William Foster. The great quantity of fossils there displayed opened to him an unknown world. These marvels, he was told to his astonishment, had been found in the hills about Cincinnati. Better still, Mr. Foster took father and son to the quarries at the head of Elm Street, where the rocks were full of bryozoans. "Then and there," said Schuchert long afterwards, "I learned the astonishing fact that these fossils were once animals, that they lived in a sea, and that this sea had once covered the greater part of Ohio—the most far-reaching sermon on the mount I ever listened to."

When about seventeen, he became acquainted with a "real paleontologist," one who published descriptions of fossils. This paleontologist, U. P. James, was a Cincinnati book dealer and publisher, who identified some of Charles' specimens for him. In that year also he acquired a copy of the *Paleontology of Ohio, Volume I*, printed in German for the benefit of the many Teutonic citizens of Ohio, and by means of it he began to learn how to identify his finds.

Up to the age of nineteen Charles' interest in fossils was that of a collector, but in 1877 he met Edward Oscar Ulrich, the man who was to turn him from an amateur into a professional paleontologist. Ulrich, who had had some rather desultory college training, had just reached his majority and had recently been put in charge of the collections of the Cincinnati Society of Natural History at a small salary. He was just beginning the career that made him one of the foremost paleontologists of his time. Schuchert had called on Ulrich to have some of his fossils named, and finding Ulrich to be highly agreeable and helpful, he called again and again and a warm friendship began. Ulrich went off to manage a silver mine in the Front Range of Colorado, but the mine ran out of ore and inside of two years he was back in Cincinnati in 1881. Schuchert and Ulrich again became inseparable companions. Ulrich began to publish papers on the local fossils, and Schuchert, who had learned to do lithographic work, urged Ulrich to use this process in illustrating his papers. Both men soon became proficient in this work. Schuchert then urged Ulrich to obtain the job of describing and illustrating the chapters on the Bryozoa in some of the proposed reports of several of the State Geological Surveys. As a result the Illinois Geological Survey in 1885 gave Ulrich the contract to illustrate Volume 8, and shortly afterward the Minnesota Survey commissioned him to describe and illustrate the Ordovician Bryozoa for the *Paleontology of Minnesota*. Ulrich was now swamped with work, and in May, 1885, Schuchert, who had had his factory and business wiped out by fire in 1884, became his assistant in lithography. In the next three years, so Schuchert records, the two of them "drew more than

one hundred plates of fossils for the Surveys of Illinois and Minnesota, and my divorce from the furniture business was complete.”

In addition to assisting in the drawing, Schuchert sorted and prepared the material, but he was allowed no authorship. He made a pact with Ulrich whereby he acquired all Ulrich's brachiopods in exchange for all the non-brachiopods in his collection. Further, he began to exchange for brachiopods from abroad. In this way he built up an extraordinarily fine collection of brachiopods. These marine organisms have left a long and significant record in the rocks and are consequently of great importance in the determination of the ages of the older rock formations. The group was long the deepest interest of Schuchert.

In 1889 the great master of paleontology James Hall, State Paleontologist of New York, came to Cincinnati in search of material for a monograph on the phylogeny and evolution of the brachiopods. On seeing Schuchert's large and well-identified collection of brachiopods, he proposed that Schuchert come to Albany as his private assistant and allow him the use of the collection. Schuchert accepted and the arrangement lasted for nearly two and a half years. In other biographical accounts the more flattering statement is made that Hall wanted Schuchert because of his proved ability, but I have given the story as Schuchert has himself related it in his Memorial to John Mason Clarke and as he was wont to tell it in private conversation, along with other anecdotes of the incredible steps that James Hall would take to acquire collections of fine fossils.

The sojourn at Albany was highly profitable in the education of Charles Schuchert. Not that James Hall aided it greatly, but Schuchert made the friendship of John M. Clarke, brilliant paleontologist then beginning his long and distinguished career on the Geological Survey of New York. To Clarke, Schuchert's stay in Albany for thirty months “was one of intimate and inspiring association and his departure in 1891 took away the only sympathetic soul there was in the place.” The result of the joint labors of the trio was a memoir of 760 pages and

90 plates, entitled "An Introduction to the Study of the Genera of Paleozoic Brachiopoda" by Hall and Clarke.

At Albany he met also Charles Emerson Beecher, who was to become one of his most intimate friends. Beecher was on the staff of Professor O. C. Marsh at Peabody Museum of Yale University, but had formerly been a member of the New York State Survey, and visited Albany from time to time on official business.

When the work at Albany was finished, Schuchert was invited to Minneapolis by N. H. Winchell, State Geologist of Minnesota, to study the brachiopods of Minnesota. His salary, which had been a bare \$15 a week during the past six years, was doubled, and better still, he was given the privilege of authorship and was allowed to publish the results of his investigations.

After finishing his work in Minnesota, Schuchert in 1893 joined the staff of the U. S. Geological Survey in Washington as Assistant Paleontologist, becoming assistant to Charles D. Walcott, who was then Chief Paleontologist of the Survey. In April of that year he was sent to the Peabody Museum of Yale University to spend a year in assisting Professor Beecher to prepare the remarkable Early Carboniferous crinoids from Crawfordsville, Indiana in the Marsh Collections, so that they could be used for display in the Government exhibition at the Chicago Exposition. By arrangement the specimens were to be divided between the Peabody Museum and the U. S. National Museum. While thus engaged in New Haven Schuchert had the good fortune to occupy for six months the room of L. V. Pirsson, who was away in Europe. Beecher the paleontologist, Penfield the mineralogist, Pirsson the petrologist, and Wells the chemist had fitted up living quarters for themselves in the attic of Old Sheffield Hall. After the return of Pirsson from his studies in Heidelberg and Paris, Schuchert continued for several months longer to foregather with the Attic philosophers as they called themselves, and to enjoy in this brilliant company pleasant companionship and intellectual stimulation. Beecher by this time in his career had arrived at the point in which he was no longer interested in describing fossils—in fact, he often

told Schuchert that he wished that all fossils had been named—and was engaged in ontogenetic and phylogenetic studies based on the law of recapitulation. These broad views, somewhat strange to find in a disciple of James Hall, stemmed from the philosophic paleontologist Alpheus Hyatt and doubtless greatly enlarged Schuchert's outlook upon paleontology.

The job of preparing the crinoids was finished in May, 1893. Schuchert then returned to Washington and spent the field season of that year in visiting all the important localities of Middle and Upper Cambrian rocks in Wisconsin, Minnesota, and Iowa to make complete collections of the fossils characteristic of the St. Croix terrane [now called "Croixan," of late Cambrian age]. In 1894 Schuchert was transferred from the Geological Survey to the staff of the U. S. National Museum, as Walcott had been appointed Director of the Survey. He became Assistant Curator in charge of Invertebrate Paleontology. During the ensuing eleven years he was in charge of the great collections of fossils that had been assembled through the field work of the various government surveys. Here at the Museum he enjoyed two great advantages: on the one hand abundant paleontologic material collected from a vast area and, on the other, unrivaled library facilities. An even greater advantage was the daily association with eleven paleontologists, all actively engaged in research.

In 1904 Schuchert was called to Yale University to fill the positions left vacant by the all-too-early death of Professor Beecher. In those days Yale University had two departments of geology—one in Yale College and the other in the Sheffield Scientific School. Peabody Museum, housing the important geologic collections, was another essentially autonomous unit. Schuchert was appointed Professor of Paleontology in the University and Curator of the Geological Collections in the Peabody Museum, also Professor of Historical Geology in the Sheffield Scientific School and a member of the Governing Board of that School. The salary was \$2750, "to be increased to \$3750 when Mr. Schuchert gives the instruction in historical geology to Sheffield seniors as done by the late Professor Beecher."

Schuchert was then forty-six. To fulfill the teaching requirement, he had to make, as he himself characterized it, "the somewhat painful metamorphosis from curator to professor." The difficulty of presenting to undergraduates a broad over-all picture of the ever-changing distribution of lands and seas during geologic time stimulated the new professor to prepare a set of paleogeographic maps to give visual presentation of the past geographies. The improvement of these maps, as data kept accumulating from year to year, became his most engrossing task throughout the remainder of his life. In 1909 Schuchert was made chairman of the Geology Department of the Sheffield Scientific School, and when the University was reorganized in 1918-1919 and the departments were unified, Schuchert became the chairman of the University department, serving until 1921, when he relinquished it at his own request. During 1914-1915 he served as Acting Dean of the Graduate School.

On reaching the age of sixty-five in 1923, Professor Schuchert decided that because of the large amount of research work he had in hand he would ask to be released from his teaching duties. Then he was appointed Professor Emeritus of Paleontology, and in place of Curator of the Geological Collections he became Curator of Invertebrate Paleontology. In 1926 he retired as Curator Emeritus. Thus freed of all teaching and administrative duties, he began the third period of his life. Rich in experience, equipped with an encyclopedic store of information on his chosen fields; keenly interested, enthusiastic, and open to all new ideas; and zealous in his work, Professor Schuchert in the nearly two decades that remained to him produced a great body of work which few younger men can hope to rival in the same span of time.

During the first few years of his retirement he would give a series of lectures in the winter months at universities in the Southwest,—at the University of Texas, University of Arizona, and others. Later, however, he gave up this program, and would leave New Haven early in December, for Florida, and return to New Haven about the middle of April. These winter sojourns in the South were far from the nature of vacations

however, as he always took along with him ample material to keep him fully employed. They undoubtedly helped to maintain the good health that he continued to enjoy until the final months of his life.

Schuchert was never married. To G. Arthur Cooper he explained that he was "married to the science," and this explanation sums up his life-long absorption in his work and his wholehearted devotion to his chosen mate. He was no misogynist, however; he was in fact friendly to all, warmhearted, and generous. He was in particular devoted to the graduate students in paleontology and stratigraphy, among whom were included not only his own students but those who came during the years of his retirement. He encouraged and heartened them by his kindly interest in their work, their problems, and their aspirations. Many of them he aided financially in their field work. Characteristically the aid thus given remained unknown to outsiders, except as the recipients themselves caused it to become known.

In his will Professor Schuchert left to Yale University the bulk of his estate, amounting to more than \$50,000, to establish the Charles Schuchert Fund, to be used first, to endow a fellowship in Invertebrate Paleontology and Stratigraphy and second, to support research work on or for the increase of the collections in invertebrate paleontology.

SCIENTIFIC WORK

Professor Schuchert's first interest in science, as the early history of his life has shown, was in paleontology and was centered in the brachiopods. The fine collection of brachiopods that as a young man he had assembled in Cincinnati moved the great paleontologist James Hall to acquire it and to take it to Albany by appointing its owner on the staff of the New York State Museum in Albany. Later when Schuchert had become Assistant Curator of Stratigraphic Paleontology in the United States National Museum, he was enabled to bring out in 1897 his first major contribution, "A Synopsis of American Fossil

Brachiopoda, Including Bibliography and Synonymy," a volume of 464 pages. This publication, as Twenhofel pointed out, "brought to some degree of fruition the work begun in his boyhood—his determination to master all that was known of the Brachiopoda—and placed him among the foremost students of this group of invertebrates." Much later, in 1932, he published with the assistance of G. Arthur Cooper, a memoir of 270 pages on the "Brachiopod Genera of the Suborders Orthoidea and Pentamerioidea," which is regarded as his greatest contribution to paleontology.

His devotion to the Brachiopoda never waned, but as time went on his interests widened more and more to the implications of the paleontologic record. Stratigraphic problems, the delimitation of the geologic systems, the climates of the geologic past, the geosynclinal doctrine, and the dating of mountain-making movements were some of these new interests.

Transcending all these, however, were his paleogeographic studies. From them resulted a series of paleogeographic maps, on which he showed the distribution of land and sea during the geologic past. As already mentioned, the stimulus to prepare maps of this kind came to Schuchert soon after he began to teach historical geology at Yale in 1904, when he attempted in his lectures to acquaint his students with the distribution of the geologic formations of North America. In order to visualize to the students where the formations occur and their geographic extent he drew a series of paleogeographic maps. The results proved at once that this mode of presentation is strikingly helpful. In 1910 he published his now classic "Paleogeography of North America," which is illustrated by 50 paleogeographic maps. These maps show the lands and seas at 50 successive stages in the history of North America, ranging in time from early Cambrian to Pliocene. Although many paleogeographic maps had been drawn since the first of this kind had been made by James D. Dana in 1863, the maps here presented marked a great step in advance, for they were based on much closer time limits and more accurate correlations than had been employed in making any previous map. The encyclopedic command of in-

formation and the synthesis of the vast array of material are typical of Schuchert's work. These maps confessedly were regarded by him as imperfect and were published to elicit comment and further information from which to construct improved versions. It became Schuchert's absorbing task during the remainder of his life to add to these maps day by day all new information as it came along. By 1913 their number had already increased from 50 to 85, and eventually it grew to 130. These maps surpassed in detail and accuracy all earlier maps and they brought their author international acclaim.

By 1928 Schuchert could say that "no paleogeographic map is worth the paper on which it is printed unless it depicts the actual state of affairs for a limited geologic time, say several hundred thousand years." Taken literally, this dictum would necessitate the preparation of more than 1000 maps to portray the successive geographies from the beginning of the Cambrian to the present. The maps show that the North American continent has been many times extensively flooded by the sea; and that after the sea had advanced a maximum distance inland, it withdrew. Each transgression of the sea and the succeeding regression constitutes a rhythm, though the terms "periodic" and "rhythmic" thus applied are somewhat loosely used. The idea of rhythms in geologic history strongly colored Schuchert's thinking and through his writings many others, but the "periodicity" he envisaged, as just pointed out, is far from the periodicity of physics.

Construction of the paleogeographic maps led Schuchert inevitably to the study of geosynclines and their significance in geologic history. The fundamental tenet of the geosynclinal doctrine, that belts of thick sedimentary accumulation determine the sites of future mountain ranges built of folded strata, was outlined by James Hall in 1857 and was expanded by Dana, who in 1873 named the troughs in which the load of strata were deposited "geosynclines." In his presidential address before the Geological Society of America in 1922 entitled "Sites and Nature of the North American Geosynclines," Schuchert illumined this doctrine in the light of his great stratigraphic

knowledge. A vast amount of stratigraphic information had accumulated since the time of Hall and Dana and this was utilized to locate the sites of the North American geosynclines that came into existence from Proterozoic to Late Cretaceous time. Among the important conclusions drawn are: one, that the amount of sediment laid down in the geosynclines appears to have nothing to do with when they were folded, the amount ranging in thickness from less than 10,000 feet to 76,000 feet in the Cordilleran geosyncline [later work has greatly reduced this figure, as the immense amount of erosion prior to the deposition of the middle Cambrian Flathead quartzite had not been recognized at the time Schuchert wrote]; and two, the length of time has nothing to do with the vanishing of the geosyncline, i.e., the life of a geosyncline may range from short (a portion of a geologic period) to very long, comprising six or more geologic periods.

The history of geosynclines led to studies of the deformation of the strata laid down in them, of the "orogenies" as they are called. An outcome of this interest was his paper on "Orogenic Times of the Northern Appalachians," in which he showed that the belt from New Jersey to Newfoundland had been affected by three orogenies—Taconian, Acadian, and Appalachian. Of the three, the Acadian orogeny was recognized to have been the most powerful, though according to the doctrine he had himself laid down in 1915 in his widely influential text book on Historical Geology the Acadian orogeny, occurring *within* an era, should have been a mere "disturbance" and the Appalachian orogeny, occurring (as he then thought) at the *end* of an era should have been a far stronger orogeny, a "revolution." This paper marked a growth in Schuchert's geologic philosophy and illustrates his life-long tendency, undiminished to the end, to advance with advancing knowledge.

A work that engrossed Schuchert during the closing years of his life was the writing of his "Historical Geology of North America." In reality thirty years of his life had already gone in its preparation. Two volumes were published and the third was in preparation when death called him. As the plan was

originally conceived, the volumes were to be built around the paleogeographic maps; they were to present the factual data on which the maps were based. The first volume, "Historical Geology of the Antillean-Caribbean Region," comprising 811 pages, was published in 1935; it synthesizes the work of countless geologists and gives us a picture of the geologic development of the region as a whole. The volume is therefore valuable not only as a synopsis and a reference book but also for its broad generalizations and its stimulus to other workers. The second volume, "Stratigraphy of the Eastern and Central United States," of 1013 pages, appeared in 1943. These volumes, wrote Professor Schuchert, "are the end-results of my life-long work in Geology." They were to him labors of love, but to those to whom they are indispensable they should be gratefully regarded as gifts of scientific altruism. We shall not soon look upon their like again.

HONORS

Many honors came to Charles Schuchert. He was elected president of the Paleontological Society in 1910 and president of the Geological Society of America in 1922, and served as vice-president of the American Association for the Advancement of Sciences in 1927. He was elected to the National Academy of Sciences in 1911. His eminence was also recognized abroad by election to membership in many scientific societies, in Austria, Belgium, China, Germany, Great Britain, Norway, Russia, and Sweden.

The degree of LL.D. was conferred on him by New York University in 1914, the Sc.D. by Yale in 1930 and by Harvard in 1935. The Hayden Gold Medal was awarded to him by the Philadelphia Academy of Sciences in 1929; the Mary Clark Thompson Medal was given to him by the National Academy of Sciences in 1934; and in the same year the Penrose Medal of the Geological Society of America was conferred on him, "in recognition of eminent research in pure geology" and "of outstanding original contributions or achievements which mark a decided advance in the science of geology."

EPILOGUE

“Professor Schuchert was unquestionably ‘one of the great’ of his time. No one could have dreamed in 1884, when Charles Schuchert watched his business reduced to smoke and ashes, that here was a man who almost sixty years later would be the foremost paleogeographer of his day, a great paleontologist and stratigrapher, a most inspiring teacher, and a man revered by many former students.”—*William H. Twenhofel*.

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KEY TO ABBREVIATIONS

- Am. Acad. Arts Sci. Proc. = American Academy of Arts and Sciences, Proceedings
 Am. Assoc. Petrol. Geol. Bull. = American Association of Petroleum Geologists, Bulletin
 Am. Geol. = American Geologist
 Am. Inst. Min. Met. Eng. Trans. = American Institute of Mining and Metallurgical Engineers, Transactions
 Am. Jour. Sci. = American Journal of Science
 Am. Phil. Soc. Proc. = American Philosophical Society, Proceedings
 Am. Phil. Soc. Yearbook = American Philosophical Society, Yearbook
 Ann. Mag. Nat. Hist. = Annals and Magazine of Natural History
 Arch. Zool. Exper. Gen. = Archives de Zoologie Expérimentale et Général
 Biol. Soc. Wash. Proc. = Biological Society of Washington, Proceedings
 Econ. Geol. = Economic Geology
 Geogr. Rev. = Geographical Review
 Geol. Fören. Förh. = Geologiska Föreningens i Stockholm Förhandlingar
 Geol. Soc. Am. Bull. = Geological Society of America, Bulletin
 Geol. Soc. Am. Proc. = Geological Society of America, Proceedings
 Geol. Soc. London Quart. Jour. = Geological Society of London, Quarterly Journal
 Geol. Sur. Canada Bull. = Geological Survey of Canada, Bulletin
 Jour. Geol. = Journal of Geology
 Jour. Paleon. = Journal of Paleontology
 Jour. Sed. Pet. = Journal of Sedimentary Petrology
 Minn. Geol. Nat. Hist. Sur. = Minnesota Geological and Natural History Survey
 Nat. Acad. Sci. Biog. Mem. = National Academy of Sciences, Biographical Memoirs
 Nat. Acad. Sci. Proc. = National Academy of Sciences, Proceedings
 Nat. Res. Coun. Bull. = National Research Council, Bulletin
 N. Y. State Mus. Bull. = New York State Museum, Bulletin
 Pan-Am. Geol. = Pan-American Geologist
 Peabody Mus. Nat. Hist. Bull. = Peabody Museum of Natural History, Bulletin
 Pop. Sci. Mo. = Popular Science Monthly
 Sci. Am. Suppl. = Scientific American Supplement
 Sci. Mo. = Scientific Monthly
 Smithsonian Inst. Ann. Rept. = Smithsonian Institution Annual Report
 Smithsonian Misc. Coll. = Smithsonian Miscellaneous Collections
 U.S. Geol. Sur. Ann. Rept. = United States Geological Survey Annual Report

CHARLES SCHUCHERT—KNOPF

U.S. Geol. Sur. Prof. Paper = United States Geological Survey Professional Paper
U.S. Nat. Mus. Bull. = United States National Museum, Bulletin
U.S. Nat. Mus. Proc. = United States National Museum, Proceedings
Wash. Acad. Sci. Jour. = Washington Academy of Sciences, Journal
Yale Rev. = Yale Review

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