

# Memorial to Preston Cloud

## 1912–1991

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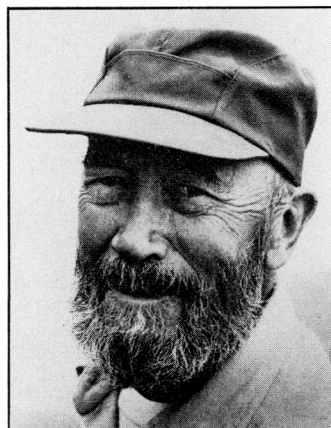
Preston Cloud<sup>1</sup> was born in West Upton, Massachusetts, on September 26, 1912, the third of seven children of Preston Ercelle and Pauline L. (Wiedemann) Cloud. The family moved around a good deal; by the time Preston was going to high school they were living in Waynesboro, Pennsylvania, and he graduated from Waynesboro High School in 1929. At that time he found scouting more fun than schooling, for he loved nature and the outdoors. He continued through to Eagle Scout, but his studies suffered somewhat.

After high school, Cloud spent three years as an Able Seaman in the U.S. Navy. (His father too had served in the Navy and while attending Annapolis had considered the Navy as a life-time career, but instead became a civilian engineer-draftsman.) At the end of his Navy service, Preston chose to take his discharge in California, and he spent the summer of 1933 hiking and working his way back east.

Cloud had hoped to enter a regular four-year college in the fall of 1933, but circumstances made it difficult; it was then the pit of the Great Depression, and both money and employment were hard to come by. He found enough money for a semester at George Washington University in Washington, D.C., which accepted him provisionally in spite of his weak high school record, and he began by taking all the courses he could in biology and geology, many of them in the evening. Moreover, a Navy friend of his father's helped him find incidental jobs and even more "incidental" lodging.

The part-time professor of geology, Ray S. Bassler, was also curator of geology at the U.S. National Museum and, struck by the young man's ability and drive, he arranged for Cloud to be employed at the museum. Thus, from the beginning of his second year in college, he was working full-time during the day and going to classes at night. At first he was simply a man-of-all-work at the museum, but he quickly demonstrated his scientific ability and interest in both minerals and fossils. (Quite a number of paleontologists have started out as students of minerals; Cloud's first two published papers appeared in the mineral collector's journal *Rocks and Minerals* in 1934.) Before long he had become a preparator in the paleontology laboratory of the museum, working for G. Arthur Cooper, an outstanding expert in Paleozoic fossil brachiopods, and Cloud's interest in research paleontology had begun. Moreover, Cooper made Cloud junior author of a paper on Devonian brachiopods and other fossils from Illinois, published in 1938.

Despite working full-time for the museum, the young Cloud completed all the work for a Bachelor of Science degree in four years, a remarkable achievement. The degree was conferred in June 1938, and Cloud was elected to Phi Beta Kappa. (In 1990, George Washington University invited its night-school alumnus to come back and deliver a Distinguished Alumnus address the next year, but unfortunately Cloud's death intervened.)



<sup>1</sup> Cloud, baptized Preston Ercelle Cloud, Jr., tended not to use the middle name Ercelle, the initial E., or the Jr. after 1970.

Cooper, who had studied at Yale under Charles Schuchert and had been awarded his Ph.D. degree in 1929, called Schuchert's attention to this gifted, hard-working, and indomitable young man, and Schuchert saw to it that Cloud was admitted to the Yale Graduate School in geology with adequate financial support. Cloud and I arrived in New Haven the same week; I still remember our meeting on September 30, 1937, as the new geology students gathered to discuss their class schedules with the Department faculty. Within a short time we had become close friends for life.

For his doctoral dissertation, under the direction of Carl O. Dunbar, Cloud completed a major systematic monograph on a large group of Paleozoic brachiopods; he completed it in three years and was awarded the Ph.D. degree in 1940. Moreover, the work won him the A. Cressey Morrison Prize in Natural History of the New York Academy of Sciences in 1940, and it was promptly published by the Geological Society of America as Special Paper 38 in 1942. Yet Cloud spent the summer of 1939 as field assistant to A. Lincoln Washburn on Victoria Island in western Arctic Canada, where Washburn was working on *his* dissertation, published by the Society as Memoir 22, with contributions on the stratigraphy and paleontology by Cloud.

After receiving his degree, Cloud taught for a year at the Missouri School of Mines in Rolla, but then he returned to Yale (as what would now be called a post-doc) to continue his work on brachiopod evolution. But World War II had already begun in Europe and soon involved the United States. Josiah Bridge, a paleontologist with the U.S. Geological Survey, who had known Cloud at the National Museum and who was now involved in the Survey's wartime Strategic Minerals Program, recruited Cloud for a field party studying manganese deposits in Maine during the summer of 1941 and then arranged for his permanent employment by the Survey in late 1941.

First, Cloud was Chief of Party for a bauxite investigation in Alabama (final publication of the results of that work was delayed for about a quarter of a century). Then in 1943 he was transferred to Texas to work with Virgil E. Barnes of the Texas Bureau of Economic Geology on the Ellenburger limestone (of Late Cambrian and Early Ordovician age) where it crops out in central Texas, because that limestone is an important oil reservoir in the subsurface to the west and north. Thorough study of the stratigraphy and sedimentation of the Ellenburger and the overlying strata resulted in a long series of publications and a major monograph, and these established Cloud as not only an able paleontologist but also an acute and perceptive observer of carbonate rocks and their paleogeography.

In 1946, after the war, Harvard called Cloud to fill the position in invertebrate paleontology vacated by the death of Percy Raymond, and Cloud returned to academia and the study of brachiopods. He also spent some of the time there writing up the Texas work. But he became frustrated and disillusioned at Harvard, where he received virtually no material support for building up the teaching and research facilities. After two years he resigned and returned to the U.S. Geological Survey.

Cloud's study of the Ellenburger limestone had convinced him that ancient carbonate rocks can only be understood in the light of carbonate deposits forming today, and the U.S. Geological Survey, which had taken on the project of mapping the islands in the Trust Territories of the western Pacific, made him Chief of Party to study Saipan in the Marianas. Again Cloud found himself in a field of geology that was new to him, not only the geology of the relatively recent limestone on the island itself, but even more the modern deposits now forming in the adjacent reefs and seas. In addition to many articles, a major series of monographs resulted from this work; Cloud's contributions were the chapters on general geology and on submarine ecology. Nor did he confine himself to Saipan; he became interested in coral reefs and other geological problems all around the Pacific.

About a year later, Wilmot H. Bradley, Chief Geologist of the USGS and a shrewd judge of people, picked Cloud to be Chief Paleontologist of the Survey and Head of its Paleontology and Stratigraphy Branch. Cloud held this position for 10 years, during which he quadrupled the research staff of the branch and enormously increased its support personnel and its effectiveness. He felt strongly that paleontology has a dual role in the earth sciences, on the one hand to provide the absolutely essential basic chronology for geological history as recorded in the rocks, at least for the last half billion years—what he called biogeology—and on the other hand to document the evolution of life on Earth, also recorded in those rocks—evolutionary paleobiology. He recognized the great importance of the former for the mission of a geological survey, but he insisted on the latter as of at least equal importance in the geological research endeavor.

Much of Cloud's own research time during those 10 years was used to complete manuscripts stemming from earlier work and to explore avenues suggested by them. But one notes a broadening of perspective as the decade went on, a greater and greater interest in general questions and in the health of paleontology as a discipline. Moreover, the decade of administrative work did not lessen his drive to explore new avenues. The work in the Pacific had reinforced his sense of how important it is to study modern deposits on the sea floor, and in 1955 and 1956 he went to the Great Bahama Bank to study modern carbonate sedimentation there. Later he was a prime mover in persuading the U.S. Geological Survey officially to step off the land and study the oceans, and in the two years after he stepped down as chief paleontologist, he initiated and organized the USGS program in marine geology.

In 1961 Cloud returned to academia but, characteristically perhaps, he kept moving. He spent four years at the University of Minnesota, where as Chairman of the Geology Department he organized a School of Earth Sciences with the department as one of its units; three years at the University of California at Los Angeles; and six years at the University of California at Santa Barbara. In both the latter institutions his title was Professor of Biogeology.

Even before 1961, however, he was looking in another new direction. His interest in and knowledge of the evolution of life as displayed during the last half billion years—the Phanerozoic eon, the time of an obvious, apparent fossil record—made him ask about its evolution during the preceding and much longer “Cryptozoic” eon, for which the fossil record had seemed hidden or even nonexistent. In just these years, however, undeniable evidence of life forms of Cryptozoic age was beginning to appear, not least in the work of Elso Barghoorn, whom Cloud had come to know and admire during his years at Harvard. Cloud threw himself into the new subject, which became the center of his research interests for the rest of his life. Characteristically, he did not confine himself to the purely biological questions but began to explore the physical and chemical environment that surrounded those early organisms, and to see that changes in that environment might help to explain many features of early evolution, including the change from the “hidden” to the “apparent,” from Cryptozoic to Phanerozoic, a change he was especially concerned to document as unequivocally as possible. In particular he made seminal contributions to the history of Earth's atmosphere, showing how changes in its chemistry, above all the appearance and increase of free oxygen, itself the result of biological evolution, may have caused the precipitation of the banded iron formations, the principal ores of the world's iron, and at the same time may have favored the evolution of radically new forms of life, leading in the long run to the transition from “hidden” to “apparent.”

It may have been his realization of how important atmospheric changes have been in the past history of life that led Cloud to reflect on the vulnerability of life to further changes, such as those produced by human beings during the Industrial Revolution, especially in recent decades. He also turned his attention to the question of the mineral resources required for our industrial civilization to continue. Both these questions became more and more important to him, and a large part of his published work since 1965 was devoted to them. In the late 1960s,

he was chairman of a National Research Council Committee on Resources and Man, which produced a major report directed not so much to scientists as to policy-makers and the general public, and during the 1970s he chaired several other committees and groups dealing with aspects of these questions. He stated that he did not consider his studies of mineral resource problems to be research, but they have been a significant part of his scientific activity, a part for which he will be widely remembered.

While still in graduate school, Preston met and became engaged to Mildred Porter, a docent in the School Service Department of Peabody Museum at Yale, and they were married in Missouri, where he had his first postcollege job. She went with him to Alabama, to Texas, and to Cambridge, Massachusetts. Preston and Mildred had no children. But when Preston resigned from Harvard, he and Mildred were divorced, and she returned to New Haven and the Peabody Museum, regretful but not bitter.

Early in his Washington years he married Frances Webster, whom he had met on Saipan. They had three children, Karen, Lisa, and Kevin, of whom Preston was intensely proud. When Preston was getting ready to leave Minnesota, however, they too were divorced; the children remained a bond between them, though, not a source of contention.

After some years in Santa Barbara, he met and married Janice Gibson, an accomplished opera singer and vocal teacher. She made a permanent home for him in Santa Barbara, and he became a surrogate father for her three young children. She also went with him on some of his travels. Moreover, she became interested in his family history and pursued the Cloud genealogy, incidentally laying to rest a few family myths that Preston himself had believed. He was fortunate to have had three devoted helpmates in the different stages of his career.

In 1974 Preston decided to "retire" at the University of California in Santa Barbara and to return to a full-time job with the U.S. Geological Survey; he kept right on working as hard as ever. He had earlier organized, on the Santa Barbara campus, the Survey's Biogeology Clean Laboratory to look for evidence of life, past or present, in the rocks brought back from the moon; with the Survey's approval, he now used it to study the "pre-Phanerozoic" Earth. After five years of this work, he went away for extended visits—a Visiting Professorship of Cosmology at Mount Holyoke College, a Senior Fellowship at Canberra in Australia—but he continued to make Santa Barbara his home and his base of operations right through the 1980s. In October 1990 he was the innocent victim of a surprise party there, to present him with the Preston Cloud volume of the *American Journal of Science*, of which he had been an Associate Editor for 21 years. On January 16, 1991, he died in Santa Barbara, in his 79th year.

If this account of Preston's life seems breathless, it is because I feel it so. He was almost endlessly restless, moving on from one home and place of work to another, from one scientific search to another. Even during his periods of relative stability, he kept moving around. During his thirteen years with the Survey in Washington he made extended geological field trips to Spain and to the Bahamas, and during his twenty-three years in Santa Barbara, he was always on the move. In addition to the visits I have mentioned, he spent a great deal of time in Washington, D.C., in Texas, in South Africa, and in Siberia. He could boast that he had searched for pre-Phanerozoic fossils on every continent except Antarctica. He also kept moving around scientifically, turning every so often into some new field which he then had to, and did, master. Besides the subjects listed above, he wrote on lunar geology, on extraterrestrial life (or its absence), and on creationism. Moreover, he wanted to share his knowledge and his growing wisdom with others. In his later years he wrote books of almost unbelievable breadth, addressed more and more to the general reader: *Adventures in Earth History* (1970), *Cosmos, Earth, and Man* (1978), and *Oasis in Space* (1988).

Cloud's restlessness was matched by his intensity. Whatever he did, he did to the hilt. When he moved on to a new position or a new scientific problem, he threw himself into it, yet

he didn't forget the work he had done earlier but saw it through to completion. Among the many jobs he tackled there are few loose ends. His capacity for work was enormous right from the start. He earned a bachelor's degree in four years of night school while holding down a full-time job (at which he worked equally intensely, earning the whole-hearted respect of Bassler, Cooper, and Bridge, the mature scientists who supervised his work) and then a doctor's degree in three. He drove himself intensely, and he drove others the same way. He was not an easy colleague; still less was he an easy boss. Intensely loyal to his subordinates, he was nevertheless exceedingly demanding of them; some were grateful for his driving them into achievement, some were not. He seems to have had an overwhelming need to excel, to prove himself, perhaps to dominate. Fortunately, he was equally intense at play. He loved a good party and a good joke, and his laughter was forthright, uproarious, and contagious. He left the strictest instructions on how his family and friends were to commemorate him after his death; there was to be a celebration of his life, a champagne-and-balloons party of the kind he so much enjoyed—and there was, with his wife Janice Cloud as mistress of ceremonies and his former wife Frances Cloud and the six children of their two families in happy attendance.

Cloud's outstanding achievements earned him many honors. I have already mentioned his election to Phi Beta Kappa at the end of his night-school college course and the Morrison Prize in Natural History awarded to his doctoral dissertation. In 1956 he received the Rockefeller Public Service Award and was elected an Honorary Fellow of the Paleontological Society of India. His address on that occasion appeared in Volume 1 of the Society's Journal. Toward the end of his second tour of duty with the U.S. Geological Survey, he was given the Department of Interior Distinguished Service Award and Gold Medal (1959) and was elected to the National Academy of Sciences (1961). He was elected to the American Academy of Arts and Sciences in 1969 and to the American Philosophical Society in 1973; later he was elected a foreign member of the Geological Society of Belgium, the Polish Academy of Sciences, and the Paläontologische Gesellschaft. In 1975 he delivered the Alex. L. DuToit Memorial Lecture of the Royal Society of South Africa, the first American to do so, and the lecture was published by the Geological Society of South Africa. He received the Paleontological Society (of America) Medal in 1971, the Lucius Wilbur Cross Medal of the Yale Graduate School in 1973, the Penrose Medal of the Geological Society of America in 1976, and the Walcott Medal of the National Academy of Sciences in 1977.

Knowing Preston Cloud has been a great privilege for many of us.

I would like to express my great debt to Mrs. Janice Cloud for much information about Preston's life, especially the early years before I met him, and for her advice and encouragement.

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