CHAMBERLIN, SALISBURY, AND COLLIE: A TALE OF THREE BELOIT COLLEGE GEOLOGISTS

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ABSTRACT

After graduating from Beloit College in 1866, Thomas Chrowder Chamberlin served as principal of Delavan High School, took graduate work at Michigan, taught at Whitewater State Normal School, and then returned to Beloit as a professor. Here, he had Rollin Daniel Salisbury and George Lucius Collie as students. It has been written that Salisbury was one of Chamberlin's students at Whitewater, but that is incorrect. Chamberlin had known Collie as a boy, however, because Chamberlin was a member of the Congregational church in Delavan where Collie's father was the pastor.

Salisbury and Collie were classmates and fraternity brothers at Beloit College, both graduating in the class of 1881. Both were excellent students and no doubt there was strong competition between them for grades and academic recognition. Salisbury, however, was the better of the two, won several academic awards, and became Chamberlin's favorite pupil. Shortly before they graduated, Chamberlin accepted a position with the U.S. Geological Survey (USGS). He appointed Salisbury as an assistant, and "Sals" moved into the Chamberlin home.

In 1882 Chamberlin submitted his resignation at Beloit College to devote full time to his USGS activities and moved to Washington, D.C. Two years later Salisbury became the chair of geology at Beloit. In 1887 Chamberlin assumed the presidency of the University of Wisconsin. Four years later he invited Salisbury to become a member of the geology department at Madison, and Salisbury again joined the Chamberlin household. His place at Beloit was filled by his former classmate, George Collie. Collie held the position of professor of geology for more than 30 years, but stepped aside in 1923 to assume a new chair in anthropology. Chamberlin, meanwhile, had resigned as president of the University of Wisconsin to found the geology department and the Journal of Geology at the new University of Chicago in 1892. Salisbury went along to Chicago, and the two remained close associates until Salisbury's death in 1922. Collie's retirement in 1931 ended 58 years of professorial service to Beloit College by the Chamberlin–Salisbury–Collie trio. All three served as president of the Beloit College Alumni Association, all three served on the Beloit College Board of Trustees, and all three were awarded honorary LL.D. degrees by their alma mater.

INTRODUCTION

Most Wisconsin geologists and historians are familiar with the name and professional career of Thomas Chrowder Chamberlin (fig. 1), unquestionably one of America's all-time great scientists. Many are also familiar with the name Rollin Daniel Salisbury (fig. 2), largely through his professional association with Chamberlin and the classic Chamberlin–Salisbury textbooks of the early 1900s (Chamberlin and Salisbury, 1904, 1906, 1909). However, few persons today are aware of the long and close personal friendship of these two men, and fewer still are familiar with a lesser-known Wisconsin geologist by the name of George Lucius Collie (fig. 3). For more than forty years Chamberlin, Salisbury, and Collie had a close professional and personal association.

That association began at Beloit College in 1878 and ended with Salisbury's death in 1922. Because much of that association was centered around the college, one might well refer to these three scientists as

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Figure 1. *Thomas Chrowder Chamberlin, 1843–1928. Photograph taken in 1892. (Photograph from Beloit College Archives.)*

Figure 2. *Rollin Daniel Salisbury, 1857–1922. Photograph taken about 1910. (Photograph from Beloit College archives.)*

Figure 3. *George Lucius Collie, 1858–1954. Photograph taken about 1895. (Photograph from Beloit College archives.)*

the Beloit College geology trio. A second trio—an institutional triad of Beloit College, the University of Wisconsin, and the University of Chicago—played a significant role in the lives of two of these people. As described below, these men and schools have also played an important role in the lives of several other geologists.

This paper summarizes the lives, careers, and professional contributions of Chamberlin, Salisbury, and Collie (especially Chamberlin) and focuses attention on the interwoven personal associations of these three men. It consolidates the content of my recent talks about these outstanding Beloit geologists of the past (Schneider, 1989, 1994, 1996a, 1996b, 1997, 1998).

SCIENTIFIC CONTRIBUTIONS OF T.C. CHAMBERLIN

Chamberlin's contributions to science were indeed enormous and highly significant. His biographers have described him as a master of research, a giant of geology, and the leading American geologist of his generation. One of his biographers—the great geologist Bailey Willis—listed Chamberlin as one of the world's greatest thinkers, placing him alongside Aristotle, Copernicus, Galileo, Newton, LaPlace, and Darwin. "Few among living investigators," Willis (1929, p. 23) wrote, "have demonstrated equal capacity for inquiry." Chamberlin's bibliography consists of about 250 titles. This number is somewhat misleading, however. Ten papers dealing with his studies of glacial motion in Greenland, for example, are listed as a single entry. His first paper was published in 1872 and his last in 1928, less than a month before his death.

So diverse and so significant were Chamberlin's contributions that it is difficult, indeed impossible, to state which was the most important. Some have argued that the "planetesimal hypothesis," which Chamberlin formulated with the astronomer F.R. Moulton, published in 1904, was the most significant. It essentially replaced the LaPlace "nebular theory," which was then the generally accepted theory of the Earth's origin.

Others would say that Chamberlin's paper in the *Journal of Geology* on multiple working hypotheses was his most important contribution. It has been described (Mackin, 1963) as one of the three outstanding papers on geologic method. Still others would argue for the three-volume textbook *Geology,* which Chamberlin co-authored with Salisbury. In this comprehensive work, the authors presented many original ideas. It was described as "the most thorough geology text ever written in English." It restated the planetesimal hypothesis, proposed new causes for vulcanism, subsidence and uplift, defined new geologic periods,

and used cyclic changes in the earth as a basis for major time divisions.

Many others would surely argue that Chamberlin's most important contributions were in glacial geology. His major contributions in this field included evidence for multiple glaciations, the classification and nomenclature of glacial deposits, the origin of loess (a windblown silt deposit), studies of glacial motion, and global climatic changes and causes of continental glaciation.

Much has been written about Chamberlin (often misspelled Chamberlain; for example, Chamberlain Avenue in Madison, Wisconsin), perhaps more than about any other American geologist, with the possible exceptions of G.K. Gilbert and John Wesley Powell. The literature contains many accounts (far too numerous to cite here) of Chamberlin's life, his professional career, his scientific contributions, and even his philosophy and religion. Some of these accounts are more than 100 pages long, including Rollin Chamberlin's biographical memoir of his father, published by the National Academy of Sciences (R.T. Chamberlin, 1934), and a more recent Ph.D. dissertation by Susan Schultz (1976). Many today regard Schultz's biography as the definitive study of Chamberlin's life.

One of the most comprehensive treatments is a two-part account of Chamberlin's life written by George L. Collie (1932), his former student at Beloit College. Collie's accounts (1928, 1932) have been my principal sources of information about Chamberlin's life and are here acknowledged. I also acknowledge as primary sources Professor Hiram Densmore's (1931) biographical account of Salisbury's life and R.T. Chamberlin's (1931) memorial of Salisbury.

INTEREST OF THE AUTHOR IN THE BELOIT COLLEGE GEOLOGY TRIO

My interest in the Chamberlin–Salisbury–Collie association began in 1945, when I was an undergraduate student at Beloit. My major professor and academic advisor was Monta E. Wing (Schneider, 1978), who came to Beloit in 1923 with a fresh Ph.D. from the University of Chicago. The opportunity to join the Beloit faculty came when Professor George L. Collie left the geology department to organize and chair the anthropology department. (Wing is probably best remembered as one of the founders of AGT, now known as NAGT—the National Association of Geoscience Teachers).

Monty Wing came to the University of Chicago as a graduate student from Kansas, where he had been a field assistant to the late Raymond C. Moore. Chamberlin had retired from his position as professor and chair of the geology department just three years earlier; this was about a year before Salisbury's death. As a graduate student at Chicago, Wing had contact with Professors Chamberlin and Salisbury as well as with Professor Rollin Chamberlin. It was largely through the good offices of the Chamberlins, to be sure, that Wing obtained his teaching position at Beloit. And it was mainly through the stories of Professor Wing that I first became interested in the Chamberlin legend.

Wing often spoke of Chamberlin's influence upon his own career and of the Chamberlin–Salisbury and the Beloit–Chicago associations. It was, in fact, Monta Wing, more than anyone, who convinced Rollin Chamberlin to donate the Chamberlin homestead along Raccoon Creek west of Beloit to Beloit College before he died. I remember Monty's several trips to Chicago to visit the Chamberlins to accomplish this goal. I remember well one Arbor Day when many of us went to Chamberlin Springs with Professor Wing to clean up the grounds and unplug the main spring so that it could flow freely once again. At that time (1947) the president of Beloit College was Carey Croneis. Professor Croneis had left the geology department at Chicago, where one of his colleagues had been Rollin Chamberlin, to become president of Beloit in 1944. It was mainly through the influence of President Croneis that I enrolled at The Pennsylvania State University for my master's work, the relevance of which is explained below.

My interest in the Chamberlin–Salisbury association was reinforced by making the acquaintance of Dr. Collie and hearing him give an informative talk to the student body on the early history of the College (Collie, 1948). At that time (1947), Dr. Collie was 90 years old. My interest was further reinforced when, in 1949, I discovered, much to my surprise, Collie's paper on the Ordovician of central Pennsylvania (Collie, 1903). His Bellefonte field area was a mere 10 miles away and directly along strike from the section of Trenton Limestone that I was working on for my master's thesis (Schneider, 1951). It was this coincidence that prompted me to meet with Dr. Collie regarding his association with Chamberlin and Salisbury. Much of what he had recorded in his extensive biography of Chamberlin (Collie, 1932), he related to me in person.

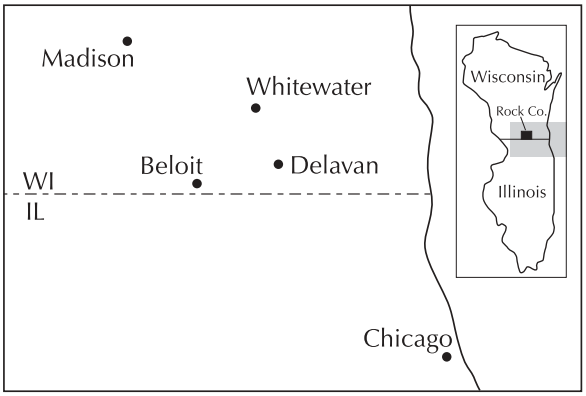

Figure 4. *Map of southeastern Wisconsin and northeastern Illinois showing significant locations mentioned in the text.*

CHAMBERLIN'S EARLY LIFE

Thomas Chrowder Chamberlin ("Tom" or "T.C."; fig.1) was born in Coles County, Illinois, near the present-day city of Mattoon, on September 25, 1843. Perhaps it is significant that his birthplace was at the crest of the Shelbyville Moraine (the outermost ridge of the last glacial age, which Chamberlin later named the Wisconsin), because for the first 30 years of his career Chamberlin's chosen field was glacial geology.

Thomas' father, John Chamberlin, was a Methodist minister and a farmer—a minister by preference and a farmer by necessity, according to his grandson Rollin (R.T. Chamberlin, 1934). In 1846 John Chamberlin moved his family to southern Wisconsin, where he purchased property from the government in Rock County near the city of Beloit and built a log house. For 40 of the next 46 years, T.C.'s life would be concentrated in southern Wisconsin (fig. 4).

As a youngster, Chamberlin was fascinated by nature. His interest was no doubt fostered by helping his four brothers quarry limestone building blocks for a new house and shoveling sand for mortar. He was particularly interested and puzzled over the "snakes and snails" (Ordovician fossils) he observed in these rocks.

Young Tom attended the district school, then the Beloit Academy, and in the fall of 1862 he enrolled at Beloit College. The backbone of the curriculum at the academy and the college was severely classical. The college curriculum was modeled after that of Yale. (For many years Beloit was known as the "Yale of the West"—an appellation seldom, if ever, heard today.) It was entirely prescribed, consisting mostly of Latin, Greek, rhetoric, and mathematics. It did, however, include some history, philosophy, and science. Although a good student, Chamberlin was not at all interested in the classics, but math and science relieved to some degree his boredom of Latin and Greek (Collie, 1932). However, it was Tom's good fortune to enroll in a course taught by Henry B. Nason, professor of chemistry and natural sciences. Nason had come to Beloit in 1858 with a fresh Ph.D. degree from the University of Goettigen in Germany and was the first Ph.D. on the Beloit faculty. Later, Nason was to be one of the founding fathers of The Geological Society of America. Nason's enthusiasm for geology and the natural sciences greatly influenced Chamberlin (Croneis, 1968).

CHAMBERLIN'S EARLY CAREER AS A PROFESSOR AND SURVEY GEOLOGIST

After graduating from Beloit in 1866, Chamberlin obtained a master's degree from Beloit, then served as principal of Delavan High School for two years. In 1869 he enrolled as a graduate student at the University of Michigan, where he studied under the renowned Alexander Winchell. After a year at Ann Arbor, Chamberlin returned to Wisconsin as professor of natural sciences in the state normal school at Whitewater (now the University of Wisconsin–Whitewater).

According to Collie (1932), Chamberlin's attention was first directed to glacial studies during his residence in Delavan. Here he pioneered the concept of field trips, frequently leading his high school students on hikes through the nearby fields and woods to make observations on rocks, plants, and animals at a time when learning was largely restricted to the classroom. No doubt his interest in glacial geology was reinforced during his three years at Whitewater, located at the southern end of the Green Bay glacial lobe and in the very shadow of the Kettle Moraine.

In the fall of 1873, Chamberlin returned to Beloit College as professor of natural history. In 1880 the Natural History Department was divided and Chamberlin was made professor of geology. Also in 1873, he was appointed assistant geologist with the Complete Geological, Mineralogical and Agricultural Survey of Wisconsin, under the direction of Increase Lapham (see paper by Hayes, this volume). After Lapham's death in 1875 and O.W. Wight's one year as

chief, Chamberlin was appointed chief geologist (state geologist) in 1876, a position he held until 1882, although the survey work was largely completed by 1879.

During Chamberlin's days with the Survey, the organization was expanded from a staff of four to more than a dozen. The work of the survey culminated with the publication of the *Geology of Wisconsin,* a grand four-volume set that treated every aspect of Wisconsin geology and is still of considerable value today. Chamberlin himself contributed much, including now-classic treatments relating to the origin of lead and zinc ores of southwestern Wisconsin, description of the Paleozoic stratigraphy of eastern Wisconsin and of biotherms or reef structures in the Silurian rocks of southeast Wisconsin, and of course the topography, hydrology, soils, and glacial deposits of eastern Wisconsin, including the Kettle Moraine. His skill in directing the completion of the survey brought him national recognition and undoubtedly contributed to his being invited to accept the presidency of the University of Wisconsin.

SALISBURY'S EARLY LIFE

Rollin D. Salisbury ("Saul" or "Sals"; fig. 2) was raised on the family farm near the tiny rural community of Spring Prairie in southeast Wisconsin, which remains today much as it was during Salisbury's boyhood. At age 16 he entered Whitewater State Normal School, completed the four-year course in less than two and a half years, and graduated in 1877 as salutatorian of his class. His father, Daniel Salisbury, had been a teacher in upstate New York and two of Rollin's sisters had attended Whitewater, so it is not surprising that he should choose to enter the teaching profession at an early age (Densmore, 1931).

Following his graduation from the normal school, Saul taught for a year at the village school in Port Washington, Wisconsin. Virtually nothing is recorded regarding his experience there, except that it was then that he decided to attend college. He entered Beloit College as a sophomore in September, 1878.

THE CHAMBERLIN–SALISBURY–COLLIE ASSOCIATION AT BELOIT

Salisbury and Collie were undergraduate classmates and fraternity brothers at Beloit College. The two took classes together from Professor Chamberlin and graduated together in the class of 1881 (fig. 5). In their excellent book *Giants of Geology,* Fenton and Fenton (1952) wrote that Salisbury was one of Chamberlin's students at Whitewater, a statement that is clearly incorrect. Professor Chamberlin had already moved from Whitewater to Beloit before young Salisbury entered the normal school. The Chamberlin–Salisbury association did not begin until Salisbury was a student at Beloit (R.T. Chamberlin, 1931, p. 126) and apparently not until 1880 or 1881—the exact date is not clear.

The first meeting between Chamberlin and Salisbury was suggested by one Roger Leavitt, a mutual friend of Collie and Salisbury in the class of 1882. Salisbury was a melancholy, pessimistic, and temperamental individual with a complex personality. Although he was apparently tolerant of other's religious beliefs, Salisbury himself was not a believer in any re-

Figure 5. *Beloit College senior class of 1881. Salisbury is top row on the right; Collie is bottom row on the left. (Photograph from Beloit College archives.)*

ligious doctrine. In fact, he described himself as an infidel. Concerned about his friend's indifference, Leavitt suggested that Salisbury have a talk with Professor Chamberlin.

In contrast to Salisbury, Chamberlin was a cheerful, optimistic, and confident man. He was also a deeply religious person, although he did not accept many of the orthodox beliefs and creeds. He taught a Sunday school class at the Second Congregational Church and occasionally gave public lectures on various subjects related to the Bible, including a series of seven lectures on the beginning of the Earth as recorded in the first chapter of Genesis and another series on the philosophy underlying the Book of Job. After some time, Salisbury agreed to see Chamberlin. The meeting significantly altered Salisbury's attitude toward life and religion and marked the beginning of the lifelong association of the two men (Collie, 1932).

Chamberlin had known Collie (fig. 3) as a boy, however, because the Chamberlins were members of the Congregational church in Delavan where Collie's father, the Rev. Joseph Collie—also a Beloit graduate—was the pastor. When Chamberlin arrived in Delavan, George Collie was a young lad in the fourth grade, and he later recorded his boyhood memories of the "stalwart principal and his petite, charming wife, as they first appeared in the little pioneer village" (Collie, 1932, p. 412).

Figure 6. *Home of Professor T.C. Chamberlin adjacent to the Rock River in Beloit, Wisconsin, where Salisbury and Collie met for recitations as seniors. Photograph taken in the early 1880s. (Photograph from Beloit College Department of Geology.)*

At Beloit, Salisbury and Collie were good students, and no doubt there was strong competition between them for grades and academic recognition. Salisbury, however, was clearly the better of the two and won several academic awards. He won the Roger scholarship given to the student making the highest record in his class for the junior year and the Stanley scholarship for a similar attainment as a senior. He was also selected valedictorian of the senior class and was asked by the college faculty to deliver the valedictory address at the commencement ceremony (Densmore, 1931). It is not surprising, therefore, that he was Chamberlin's favorite pupil.

In addition to the usual geology course work, Salisbury and Collie took advanced studies together under Chamberlin in their senior year. Reading and field work supplemented the textbook assignments in these courses, and recitations and discussions of assigned readings were held in the study of Chamberlin's home (fig. 6). Chamberlin's favoritism of Salisbury is well illustrated by an event, recorded by both Collie and Densmore, which occurred early in 1881. After one of their weekly recitations at the Chamberlin home, Collie and Salisbury left the house together. "No sooner had we reached the street," wrote Collie (1932, p. 439), "when Salisbury began capering about, showing an exuberance of joy, unusual with him, which included slapping the writer on the back sharply. When asked the meaning of this outburst, he said, 'My future is assured. Professor Chamberlin has been offered the position of geologist on the Federal Survey and he has offered to appoint me as an assistant' " (Collie, 1932, p. 439; Densmore, 1931, p. 43–44). Collie apparently received no such offer. This event served to cement the friendship that had been growing between professor and student and marked the beginning of their long professional association, which lasted more than 40 years until Salisbury's death in 1922.

In 1881 Chamberlin was named chief of the new Glacial Division of the U.S. Geological Survey (USGS) by John Wesley Powell, who had been appointed director of the Survey the previous year. Following his graduation in 1881 and while working as Chamberlin's assistant on the USGS, Salisbury lived in the Chamberlin household. He was made to feel completely at home by Professor and Mrs. Chamberlin. Indeed, they treated him as a son, and when their own son (Rollin Thomas Chamberlin) arrived that same year, he was named after Salisbury.

In June of 1882 Chamberlin submitted his resignation at Beloit College to devote his full-time efforts to Survey research and moved to Washington, D.C. His glacial studies in Wisconsin soon merged into glacial studies of the entire northern United States, for he worked from the Atlantic coast to Montana. In these endeavors, he was ably assisted in different areas of the country by many associates, including Rollin Salisbury in Wisconsin and New Jersey. During his tenure with the Survey, Chamberlin authored many significant publications.

Figure 7. *Professor R.D. Salisbury with his geology class at Scott's quarry (Ordovician rocks), Beloit, Wisconsin. Salisbury is center right with beard, white hat, and white shoulder strap. Photograph taken in 1889. (Photograph from Beloit College Department of Geology.)*

SALISBURY'S CAREER AT BELOIT

When Chamberlin resigned his position at Beloit, Salisbury was appointed to assume T.C.'s teaching responsibilities, undoubtedly due to Chamberlin's influence and recommendation; the following year Salisbury became an assistant professor. Following the example set by his mentor, Saul frequently took his students into the field (fig. 7). In 1884 he was promoted to full professor and chair of the geology department at Beloit College.

Salisbury's reputation as an excellent teacher spread rapidly and was attested by several persons who had intimate knowledge of his ability as an instructor. In his long two-part biographical sketch of Salisbury's life, Densmore (1931) devoted several pages to Saul's teaching methods and his positive influence upon students. Densmore himself was a student of Salisbury in his senior year at Beloit (1885) and was thereafter a close friend. According to Densmore (1931, p. 122), another former Beloit student wrote that Salisbury "was a good geologist and did some most excellent original work in the field of glacial geology. His great forte, however, was that of a teacher, and among all of the men with whom I have worked he stood head and shoulders above the rest." Professor A.W. Burr, at one time principal of the Beloit Academy, stated that "Salisbury was a great teacher. There was business in his classroom from the moment he came through the door until he left the room . . . Professor Salisbury made not only good students, but marked teachers, the best product of a master in any calling" (Densmore, 1931, p. 123).

During his tenure with the USGS and as a member of the Beloit College faculty, Salisbury made several contributions to the geology of Wisconsin. These include studies of the Driftless Area (co-authored with Chamberlin), preglacial gravels of the Baraboo Hills, drift phenomena near Devils Lake and Baraboo, and the geography of Devils Lake and the Wisconsin Dells (both co-authored with W.W. Atwood).

CHAMBERLIN'S PRESIDENCY AT THE UNIVERSITY OF WISCONSIN

Early in 1885 Chamberlin was asked whether he would be a candidate for president of the University of Wisconsin. He resisted the pressure of the Regents to consider the position but finally agreed, took a year to complete his work with the USGS, and assumed the presidency at Madison in 1887 (fig. 8). He met some opposition to his appointment, for he was a scientist rather than a theologian. Some faculty members felt

that university presidents should be clergymen in order to understand students' spiritual needs and deliver baccalaureate sermons (Fenton and Fenton, 1952, p. 306). Nevertheless, his presidency was highly successful. His ability as an organizer and administrator won him full support from the Regents, and during his term he changed the nature of the university and started it on its course to becoming the great university that it is today. He greatly strengthened the administration of the university, recruited outstanding faculty, doubled the size of the faculty, broadened the curriculum, established alternative systems of study, stressed the importance of science, and placed new emphasis on graduate programs and faculty research. He also established the first laboratory of psychology in the Midwest and launched an extension program to serve the entire state. (Bailey, 1981; Curti and Carstensen, 1949)

Chamberlin's active field studies largely ceased when he became president of the University of Wisconsin. However, he remained in charge of the Glacial Division of the USGS for 17 more years, until 1904.

About three years after Chamberlin became president of the university, he invited Salisbury to join the geology department at Madison. When the rumor spread that Salisbury might be leaving Beloit, a petition urging him to stay was circulated and signed by nearly every student at the college. Saul was so touched by this expression of student support that he declined the offer. However, when the offer was renewed the following year, he resigned his position at Beloit to join his former mentor at Madison and once again Rollin Salisbury—a lifelong bachelor—became a member of the Chamberlin household.

Chamberlin's service to Wisconsin as state geologist and as president of the University of Wisconsin are commemorated with a large Precambrian gneiss erratic and plaque atop a drumlin next to the observatory on the Madison campus (fig. 9). A classroom building on the campus also bears his name.

Figure 8. *The T.C. Chamberlin family in 1889, when Chamberlin was president of the University of Wisconsin and Rollin Chamberlin was eight years old. (Photograph from Beloit College archives.)*

Figure 9. *Chamberlin Rock on the University of Wisconsin–Madison campus, commemorating Chamberlin's service to Wisconsin as state geologist and president of the university. (Photographs by the author.)*

COLLIE'S CAREER AT BELOIT

Salisbury's place at Beloit was filled by his former classmate and lifelong friend, George Collie, who had earned a Ph.D. from Harvard University. Collie held the position of Professor of Geology for more than 30 years, but in 1923 he assumed a new chair in anthropology. In this position he gained national attention, organizing and participating in anthropological expeditions to many parts of the world. He was responsible for Beloit's first student field expedition in 1930, which was probably the first expedition for undergraduates in the country. For 25 years he served as dean of the college and twice served as Beloit's acting president. He was affectionately referred to by his friends and colleagues as Dean Collie.

Figure 10. *Original Chamberlin geology department faculty at the University of Chicago, 1892. From left to right: R.A.F. Penrose, Jr., J.P. Iddings, T.C. Chamberlin, C.R. Van Hise, and R.D. Salisbury. (Photograph used with permission from the Chair, Department of Geophysical Sciences, University of Chicago.)*

CHAMBERLIN AND SALISBURY AT THE UNIVERSITY OF CHICAGO

Meanwhile, Chamberlin had resigned as president of the University of Wisconsin in 1892, when the University of Chicago opened its doors. President William Harper invited Chamberlin to organize and head the geology department. Although he was reluctant to leave Wisconsin, Chamberlin was anxious to rid himself of administrative tasks and return to his great loves—teaching and research. Thus, he accepted President Harper's challenge, notwithstanding the monumental efforts of the University of Wisconsin faculty and students and the Madison newspapers to retain him. Salisbury went along as professor of geographic geology, and the two remained associates at Chicago until Salisbury's death. Upon the move to Chicago, Salisbury wished to remain a member of the Chamberlin household, but for reasons unknown to us this could not be arranged, and Salisbury had to rent his own quarters and look after himself.

As other writers have pointed out (particularly Willis, 1929), the new geology department at Chicago was fully staffed with men of national reputations from the very beginning, and within a year the department was recognized as one of the best in the country. In addition to Chamberlin and Salisbury, the original geology department at Chicago included R.A.F. Penrose, Jr., J.P. Iddings, and Charles R. Van Hise (fig. 10). Three of these men—Chamberlin, Penrose, and Van Hise—later served as presidents of The Geological Society of America. Van Hise, of course, was one of Wisconsin's early Precambrian geologists and served as chair of the Department of Geology and as president of the University of Wisconsin for several years (see paper by Dott, this volume).

In 1918, upon nearing his 75th birthday, Chamberlin resigned as professor and head of the geology department at Chicago and was appointed professor emeritus. His successor as head of the department was, of course, Rollin Salisbury.

If Salisbury did his best teaching during his tenure at Beloit, as was Densmore's opinion, his influence as a teacher certainly continued at Chicago. "If his students had been asked who was the greatest teacher they had had at the University, they would undoubtedly have said Professor Salisbury," someone stated (Densmore, 1931, p. 124). One of his col-

leagues at Chicago wrote that "all acclaim him as one of the greatest teachers of his time" (Densmore, 1931, p. 124).

Many of Salisbury's professional activities were either arranged by Chamberlin or were the result of collaboration. Saul's extensive field studies in glacial geology in the Upper Mississippi Valley, in New Jersey, and in Wyoming's Big Horn Mountains were made possible by his association with Chamberlin and the U.S. Geological Survey. It was Chamberlin who arranged for Salisbury to be a member of the 1895 Perry Relief Expedition to Greenland, where Chamberlin had been the previous year. In 1893, Chamberlin founded the *Journal of Geology,* with himself as editor-in-chief. Salisbury acted as managing editor as well as editor of geographic geology, and for 30 years the two collaborated in its publication.

As the years passed, however, the academic and scientific paths of these two great friends began to diverge. Although Chamberlin's research interests remained paramount, Salisbury's zeal for scientific discovery gradually diminished. Teaching and administrative work became an obsession. From 1897 to the time of his death in 1922, he served as dean of the Ogden Graduate School of Science. From 1903 to 1918, he organized and headed the Department of Geography and built what was probably the strongest and most progressive geography department in the nation (R.T. Chamberlin, 1931, p. 132). Nevertheless, the two men remained close friends.

TRIBUTES TO SALISBURY

In his memorial editorial in the *Journal of Geology* shortly after Salisbury's death in 1922, Professor Chamberlin stated that "Dr. Salisbury's greatest service to science lay in his singular success in stimulating and training young talent not only for the teaching of science but for research" (T.C. Chamberlin, 1922). With regard to Salisbury's various capacities as professor, head of the geography and geology departments, and Dean of the Ogden Graduate School of Science, Chamberlin (1922) wrote that "he (Salisbury) came into touch with thousands of young minds and gave them effective impulses toward sound scholarship and the higher life."

Professor Bailey Willis, in commenting on the Chamberlin–Salisbury association, wrote: "Salisbury ranked high as a teacher. It was for Chamberlin a great good fortune to have drawn to himself a spirit so loyal, a collaborator so competent, a fellow teacher so superior as Salisbury" (Willis, 1929, p. 27).

An example of Salisbury's legendary status is illustrated by an amusing incident that occurred about 25 years ago. One of my former colleagues at the University of Wisconsin–Parkside, in searching for colloquium speakers, phoned the geology department at Beloit and asked to speak to Rollin D. Salisbury. My colleague was familiar with Salisbury's name and reputation, but he obviously did not know that Saul had been dead for more than half a century.

The legend of Salisbury the teacher lives on and is perpetuated by the geology department at Beloit College, which is formally named the Rollin D. Salisbury Department of Geology. His portrait hangs in honor both at Beloit and at the University of Chicago. Appropriately, the building in which the geology department at Beloit is housed is named the Chamberlin Hall of Science.

TRIBUTES TO CHAMBERLIN

Thomas Chrowder Chamberlin died in 1928. He is buried in the family plot in Oakwood Cemetery in Beloit, just a few blocks from his beloved Beloit College. Chamberlin was one of The Geological Society of America's Original Fellows, he served as president of the Society in 1895, and in 1927 he was the recipient of the first Penrose Medal, the highest honor of the society. He also served as president of the Wisconsin Academy of Sciences, Arts and Letters (1885–87) and the American Association for the Advancement of Science. In 1941 a 13,000-foot mountain peak in the Sequoia National Forest in California was named in his honor.

In his years at Chicago, Chamberlin published approximately 145 papers. About sixty of these appeared in the *Journal of Geology*. Several of these papers dealt with his studies of glacial motion in Greenland with the Perry Auxiliary Expedition in 1894. One of his earliest papers on this subject was his Presidential Address of The Geological Society of America, which was published in the Bulletin of the Society.

When Carey Croneis, then chancellor of Rice University, was asked to speak at the dedication of Beloit College's Chamberlin Science Hall in 1968, it was suggested to him that his address should be titled "Thomas Chrowder Chamberlin, Beloit's Greatest Scientist." Said Croneis, "One cannot quarrel with such a title—except that it is too limiting. In many

ways, T.C. Chamberlin was one of the most creative scientists the world has produced" (Croneis, 1968, p. 2).

EPILOGUE

When I last met with Dr. Collie in 1949, he was 92 years old but mentally alert. We talked at some length about Chamberlin and his (Collie's) undergraduate experience at Beloit. He expressed a good deal of bitterness about the Chamberlin–Salisbury relationship during his student days some 70 years earlier. Although I was unable to determine whether that bitterness was directed at Chamberlin or at Salisbury, it seemed to be directed more at Chamberlin and at the situation in which he (Collie) found himself, usually playing second fiddle to Salisbury. However, I can find absolutely no semblance of this bitterness in Collie's long biography of Chamberlin (Collie, 1932), which was written nearly 20 years before my last conversation with him. Indeed, his account of Chamberlin's career is one of great respect and admiration for his former teacher.

Collie's retirement in 1931 ended 58 years of professorial service to Beloit College by the Chamberlin–Salisbury–Collie trio. All three served as president of the Beloit College Alumni Association; all three served on the Beloit College Board of Trustees—Chamberlin for 23 years; all three were awarded honorary LL.D. degrees by their alma mater. It may be stated with assurance that all three remained loyal sons of Beloit College until their deaths.

ACKNOWLEDGMENTS

I thank Monta E. Wing and especially George L. Collie for sharing with me many years ago their knowledge and personal experiences with Rollin Salisbury and the Chamberlins. Special thanks are due Fred Burwell, Beloit College archivist, and also Professor Emeritus Henry Woodard for making available old photographs and unpublished documents. The University of Chicago also permitted use of photographs. The manuscript was reviewed by Robert H. Dott, Jr., and Henry H. Woodard, whose helpful comments are much appreciated.

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