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CHESTER RAY LONGWELL

1887—1975

A Biographical Memoir by
JOHN RODGERS

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BY JOHN RODGERS

CHESTER LONGWELL, the son of John Kilgore and Julia (Megown) Longwell, was born in 1887 near the settlement of Spalding in northeastern Missouri, in the Mark Twain country, an association that he loved to recall and that colored his speech, his many anecdotes, and perhaps even this way of thinking about life. He did not go to college immediately after high school but spent seven years working, partly at various jobs in the Far West, partly on the farm or teaching school at home in Missouri. He then went to the University of Missouri (Columbia), completing a bachelor's degree (with honors) in 1915 and a master's degree the following year. In 1940 the University honored its by then successful alumnus with an LL.D. degree.

From Missouri he went to Yale as a graduate student in geology, but the First World War interrupted his studies, and he spent two years in the U.S. Army, part of it overseas, emerging as a captain. At the time of his death, more than fifty years later, one of his fellow regimental officers wrote: "His composure under unusual circumstances made all officers of the regiment admire and respect him."* After returning from the war, he completed his graduate work at Yale and was awarded a Ph.D. degree in 1920.

* Henry Broyce to Mrs. Irene Longwell, 1976.

For his doctoral dissertation Longwell worked for five months (summer and fall of 1919) in the Muddy Mountains and vicinity, then a virtually unknown corner of southern Nevada; indeed in his report on the region he mentions the "strong appeal to the geologist" of an area "practically unmapped" (even topographically) and with "the lure of the unknown." The area was primitive, travel was by mule or horse, water was very scarce, and isolation was the rule. He made his camp where he could, often with local hermits or prospectors or with the Indians of the region; it is characteristic of the man that decades later they would remember him with affection.

During those five months he made major discoveries that opened a new chapter in geological exploration of the Great Basin. By subdividing the Cenozoic deposits of the area, he showed that strong tilting and other deformation, some of it contemporaneous with deposition, produced angular unconformities within the Cenozoic sequence, a new result at the time. Furthermore he showed that the Paleozoic and lower Mesozoic stratigraphic sequence in the southern Great Basin, while it can be matched to some degree with the well-known sequence on the adjacent Colorado Plateau, is much thicker and more complete—in other words, that it is geosynclinal. Perhaps his most spectacular result was the demonstration of large low-angle thrust faults involving this thick Paleozoic-Mesozoic sequence; such faults were then known no nearer than southeastern Idaho and adjacent Wyoming and Utah. Subsequent work, much of which was inspired by Longwell, has made clear that the belt of such thrusting is continuous from southeastern California, through the Muddy Mountains region to Idaho, and indeed far beyond into Canada, always associated, as in Longwell's area, with the zone of westward thickening of the stratigraphic sequence into the geosyncline.

In 1920 Longwell was appointed to the faculty of Yale University and also became a member ("when actually employed") of the U.S. Geological Survey; he retained both connections throughout his career. At Yale he advanced steadily to a professorship in 1929 and was chairman of the Department of Geology for eight years, including the difficult period of the Second World War when the university was in continuous session and leaves were not taken—thus he taught and administered "around the clock" for several years. Except during those years, however, he continued a very active program of field work, mainly, though not entirely, in southern Nevada and vicinity, and he made many additional major contributions to the geology of the region up to and long after his official "retirement" in 1956. He mapped the floor of the Boulder Dam reservoir (Lake Mead) and the Davis Dam reservoir (Lake Mojave) before they were flooded and restudied the Muddy Mountains and other ranges nearby, in particular the high Spring Mountains west of Las Vegas, where the thrust belt he discovered is well displayed.

When he approached retirement, he chose to move to California in order to be closer to his field area and to be able to work there at all times of year, and he continued active field work well into his eighties. Many former students and other younger geologists have testified to their inability to keep up with him during those years. In 1974 they organized a symposium in his honor at a meeting in Las Vegas. Characteristically, Longwell gave an outstanding research paper at that symposium, consolidating the evidence for a major strike-slip fault zone in the Las Vegas Valley, an idea he developed largely in his retirement years.

During his years in New Haven, Longwell did not neglect Connecticut geology. Picking up where his Yale predecessor, Joseph Barrell, had been interrupted by his early death, he demonstrated the contemporaneity and close genetic associa-

tion of faulting and deposition in the Newark (Triassic) basin of Massachusetts and Connecticut and, by implication, in the other Newark basins, an idea close to one he had demonstrated in his doctoral dissertation for the Cenozoic deposits in southern Nevada. Furthermore, he was one of the first to see the value to structural geologists of geophysical data, especially gravity measurements, and he pursued this subject through a series of related papers. Such work led on to the subject of isostasy, and an article of his was in good part responsible for the rehabilitation of Airy's "roots-of-mountains" concept in crustal structure.

Teaching structural geology naturally led into orogenic theory, and Longwell kept abreast of new syntheses and hypotheses in this field, especially in Europe, although he never attempted a synthesis of his own. He took an active part in the long debate over continental drift and was indeed invited by S. Warren Carey to represent northern-hemisphere skepticism at the Tasmania symposium (1956) that preceded (and helped to trigger) the turning of the tide.

Longwell took an active part in the organizational side of geology. Even before his election to the National Academy of Sciences (1935), he was active in the National Research Council, and he served as chairman of its Division of Geology and Geography for three years. One of his activities as chairman of the Tectonics Committee of this division was to urge and organize the work on the first large tectonic map of the United States, the execution of which was entrusted to Philip B. King, whose small-scale tectonic map of 1932 had stimulated the project. Longwell was also active in the Geological Society of America and was elected its president for 1949. In 1948 he agreed to take over the editorship of the *American Journal of Science*—"Silliman's journal," the oldest scientific periodical in America, but now devoted to the geological

sciences. He enlisted the present writer as an assistant, leaving him in charge on departing for California. His insistence on improving standards for publication was influential in maintaining the journal's position as a leading geological journal.

Naturally Longwell taught and worked with a great many graduate students; it is quite remarkable how many of those students themselves came to eminent positions in geology. Already, eight of them have followed Longwell into the National Academy of Sciences; five have been, like him, president of the Geological Society of America; and five have received the highest honor in North American geology, the Penrose Medal. He was also active in teaching elementary geology at Yale, and after Pirsson's death he inherited the "Yale" textbook of *Physical Geology*, which, as Longwell, Knopf, and Flint, dominated the textbook field for a decade or so. Into another textbook, compiled of quotations from original sources by Agar, Flint, and Longwell, he inserted several passages from his favorite Mark Twain. He also edited a popular guide to the geology around Connecticut.

Professor Longwell was married in 1921 to Doris Smith but was divorced in 1931. He was married again in 1935 to Irene Moffat. When he and his family moved to California in 1955, he established himself, appropriately enough, on Mark Twain Street in Palo Alto. In California he was welcomed into the active Geological Survey group at Menlo Park and the faculty at the School of Earth Sciences of Stanford University, which he served as research associate and consulting professor. He retained his activity and his ebullient spirits (and bad puns) to the very end, and many of his California associates celebrated his eighty-eighth birthday with him on 15 October 1975. He died two months later. He is survived by his wife, three children, five grandchildren, and by innumerable former students and friends.

I AM DEEPLY APPRECIATIVE for the help I have received in preparing this memoir from Mrs. Irene Longwell. I have also made use of material gathered by Ward C. Smith, Arthur D. Howard, and Professor Longwell's brother, Dean John Harwood Longwell; I am grateful to them for permitting me to use it.

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