

Memorial to Perry Byerly 1897-1978



Perry Byerly died in Oakland, California, on September 26, 1978. He was one of the first professors to teach seismology in the United States as a separate discipline. He was associated with the University of California, Berkeley, for most of his life and for thirty-eight years was in charge of the university's network of seismographic stations, keeping track of earthquakes in northern and central California.

Perry Byerly was born in Clarinda, Iowa, on May 28, 1897. He was the only child of Perry Byerly and Pauline Watson Byerly. In 1905 the family moved to California; Perry entered the Riverside schools, which he attended from the third to the eighth grades, and he graduated from Redlands High School in the spring of 1916. He attended the University of Redlands for his freshman year and the University of Southern California for his sophomore and junior years, majoring in mathematics. Between the latter two years (during World War I) he served in training to become a master gunner in the Coast Artillery Corps at Fort Winfield Scott in California and at Fortress Monroe in Virginia.

At the end of his junior year one of Perry's professors, Paul Arnold, advised him to transfer to a university that offered more mathematics, and in the fall of 1920 Perry entered the University of California, Berkeley. A letter of recommendation from Arnold to Elmer Hall of the physics department gained the young man an assistantship in physics on the condition of his transferring his major to that department. Perry received his A.B. in 1921, his M.A. in 1922, and the Ph.D. in 1924, all in physics.

James B. Macelwane, S.J., was also a student of Hall. Macelwane was interested in seismology, a field that Perry had not heard of previously. Macelwane's thesis was a study of seismograms. The university had established seismographic stations in 1887 at Berkeley and at Mount Hamilton, the first such stations in the Western Hemisphere. Operation of these stations had been entrusted at various times to the Department of Astronomy, the College of Civil Engineering, or the Department of Geological Sciences, but the stations were always merely the sideline of some professor. Andrew C. Lawson was chairman of the Department of Geological Sciences in 1922, and he asked Macelwane to join the department and make the seismographic stations his life-work. But Macelwane was a Jesuit, and his superior gave him permission to spend only two more years at Berkeley after attainment of the Ph.D. So Lawson asked Macelwane to find a young physicist to succeed him in the Berkeley post; Macelwane asked Byerly and he accepted. Macelwane held the post in seismology from 1923 to 1925, which left Byerly with a year to mark time, so he took an instructorship at the University of Nevada in Reno.

On Friday, June 26, 1925, Macelwane left the office of the seismographic station;

on Monday morning Byerly took over. But on Saturday evening western Montana felt a great earthquake, and early Monday morning Santa Barbara was severely damaged by another shock. So Perry entered his office accompanied by the clamor of reporters and the clangor of a constantly ringing telephone; it was his baptism by fire. As the details obtained from the seismograms were not enough for the newspapers, the young seismologist had to make a general statement. It was conservative: "The earthquakes were tectonic shocks." This relation of earthquakes to mountain-building was news, and Byerly's observation made the front page in New York and elsewhere.

In 1925 the University of California still operated only the two seismographic stations at Berkeley and Mount Hamilton. The equipment consisted of Wiechert and Bosch-Omori seismographs, but a movement was afoot to expand and modernize the stations. It was Bailey Willis, a professor at Stanford University, who raised the needed money in his role as chairman of a committee of the Seismological Society of America appointed for that purpose, so that in the early thirties the stations on the Stanford University campus at Palo Alto and on the University of San Francisco campus were established, and new equipment was purchased for the two older stations. By 1962 the university was operating twenty stations. Although members of the geology department were not interested in the physical methods the seismologist used, they were quite interested in his conclusions regarding earthquake mechanisms and earth structure.

From the beginning of his career in the Department of Geological Sciences, Byerly had a small group of graduate students working with him. This help was especially necessary because at that time there was no other member on the university faculty interested in the methods of physics as applied to the problems of geology. The physicists had no interest in the problems, and the geologists had no interest in the seismographic instruments or methods. But Byerly was never lonely; he had a way of attracting students, and he always considered as his greatest accomplishment the score of Ph.D. candidates that he trained. Most of them now occupy highly respected positions in the field of seismology.

Byerly's relations with Lawson were most interesting. Adding the young seismologist to the staff was the last appointment Lawson made before he retired, but Lawson remained active for another twenty years or more. He was a man of violent temper, and all were afraid of him. Perry was dismayed when early in his career Lawson came to his office saying, "Byerly, I am embarking on research which requires the use of mathematics. You must read all my papers and criticize them. You must keep me from making a fool of myself." Lawson was not a man to whom one said, "You are wrong," and escaped unscathed. Perry never forgot the first paper (on the Atlas Mountains) Lawson brought him. After Byerly had criticized it, Lawson turned red, pounded on the desk, and cried in his high voice, "We won't get angry! We won't get angry!" The day finally came when Byerly could say, "This reasoning is unsound," only to receive the mild answer, "So I've been told, but I am too far committed to it to retreat."

Lawson was followed as chairman by George D. Louderback. Through the years Louderback and Byerly became rather close friends and colleagues. Louderback's interest in geology turned toward earthquakes and faulting. Later, he became editor of the *Bulletin* of the Seismological Society of America, and Byerly became secretary of that society, a post he held for twenty-seven years (1930-1957). Thus, the two men met together almost daily. Louderback was a great committeeman and had learned to debate any issue. He would come to Byerly with a problem as to which of two courses the editor should take. To Byerly the decision was immaterial, and he soon learned

how to handle the situation. Perry would at once endorse one course, then listen to George's response. It did not take Byerly long to discover whether his choice was the course that Louderback preferred. If it was not, Byerly would simply reverse his original position, and all would be well.

Byerly's research in seismology covered subjects ranging from the theory of the seismograph to the structure of the Earth's crust and the focal mechanism of earthquakes. Perhaps his most important contributions were (1) the establishment of the existence of a "root" under the southern Sierra Nevada, (2) the development of a method that permitted use of the direction of first motion on seismograms to compute the nature of the forces that act as the source of an earthquake, (3) the discovery of the 20-degree discontinuity in traveltime curves, and (4) the development of mathematical equations that compensate for Earth tilt.

After his long term as secretary of the Seismological Society of America, Byerly served a year as its president in 1958. He also served a term as president of the Section of Seismology of the American Geophysical Union and a term as chairman of the Section of Geophysics of the National Academy of Sciences. He was elected president of the International Association of Seismology and the Physics of the Earth's Interior.

He served on many National Research Council and other government panels and was chairman of the Panel on Seismology and Gravity of the International Geophysical Year. He was a consultant to the U.S. Air Corps, the U.S. Atomic Energy Commission, the U.S. Coast and Geodetic Survey, and the California Division of Water Resources.

His earliest consulting job for companies was for Frank Rieber, Inc. He was the seismological expert for the Texas Oil Company at the time of the famous lawsuit on seismic prospecting in the early 1930s. He was for many years a consultant to the Stanolind Oil and Gas Company and to the Texas Instruments Company and the Pacific Gas and Electric Company.

Byerly's titles and appointments included (1) Guggenheim Fellow (twice), (2) Senior Fulbright Research Fellow (Cambridge), (3) Smith-Mundt Lecturer (University of Mexico), and (4) Condon Lecturer (Oregon). His first Guggenheim fellowship (1928-1929) at the University of Cambridge left a profound impression on him.

On campus at the University of California, Berkeley, he was at times a member of the university's senate committees—the Committee on Courses, the Graduate Council, and the Committee on Memorial Resolutions—but he was too impatient for a good committeeman. His one committee-related accomplishment (and a great one) was on the Committee on Public Ceremonies where he persuaded the administration to lend caps and gowns to the faculty without charge on days of public ceremonies. His most useful committee work was off campus, where he was usually chairman and could cut the meetings short by forcing a vote. Byerly served also as Assistant Dean of the College of Letters and Science.

Note: For a complete list of Perry Byerly's publications and for a critical account of his contributions to seismology, see the memorial by Bruce Bolt in the June 1979 *Bulletin* of the Seismological Society of America.