

Memorial to Robert H. Tschudy

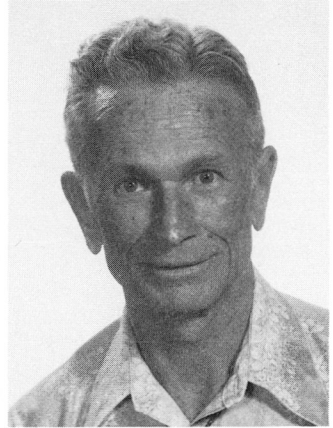
1908–1986

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Robert Haydn Tschudy, a pioneer in the field of palynology, died October 31, 1986, at the age of 78. He was, in a sense, at the peak of his long and productive professional career.

Bob Tschudy (or just “Tschudy,” as he liked to be called) was born May 7, 1908, in Pocatello, Idaho. He initially attended the University of Idaho and received his B.S., M.S., and Ph.D. degrees in botany from the University of Washington. While in Seattle at the university, he met and married Bernadine Dunsford, who became his life-long companion and scientific partner. His research specialties at the time were plant physiology and oceanography. Bob and Bernadine often recalled with pleasure their early years together at the Puget Sound Biological Station (later Oceanographic Laboratories) at Friday Harbor, in the San Juan Islands off the coast of Washington.



Tschudy's early career, in the late 1930s and early 1940s, included research and teaching. His earliest publications were on marine algae. He conducted research for the U.S. Bureau of Ships while at Scripps Institute of Oceanography. He taught botany at the University of Wyoming, held a postdoctoral position at Cornell University, and then taught biology at Willamette University in Salem, Oregon. During World War II, while at Willamette, he taught pre-medical courses for the U.S. Navy's V-12 program.

After the war, Tschudy was offered a position with Creole Petroleum Company (an affiliate of Standard Oil) in Caracas, Venezuela, which was to set the direction for the major part of his career. Creole was interested in investigating the utility of the relatively new field of palynology in oil exploration. Bob and Bernadine went to Caracas to establish a laboratory and develop techniques of studying fossil spores, pollen, and other acid-resistant microfossils in the Cretaceous and Tertiary rocks of Venezuela. They were in Caracas from 1945 to 1950. It was during these years that Tschudy pioneered in developing preparation techniques for these palynological fossils and in using them for age determination and correlation of subsurface strata. This laboratory was one of the first of its kind in an oil company. Always a teacher, Tschudy also taught a course in biology—the first ever—at the University of Caracas, and he taught it in Spanish. Other diversions while in South America included team softball (Tschudy was the pitcher) and a nine-day trek through the rain forest in the vicinity of Angel Falls.

On returning to the United States, Tschudy chose Boulder, Colorado, in which to establish a private palynological consulting laboratory. His partners were Bernadine Tschudy and Constance Ogden. They continued to conduct research for Creole, and later for many other petroleum companies, most of which eventually established their own labs and palynological staffs, as the value of palynology to oil exploration became recognized. Bob and Bernadine returned to South America briefly in 1957 to set up a palynological laboratory for Petrobras in Salvador, Brazil. The Tschudys' own first laboratory in Boulder was in a converted garage. In 1957 they built a combination laboratory and home in a scenic setting in Left Hand Canyon, in the Rocky Mountains near Boulder.

Tschudy soon became quite active in community affairs in the Jamestown, Colorado, area. He joined the Boulder County Fire Fighters Association (later the Left Hand Fire Protection District) as a volunteer. He was trained as an emergency medical technician, taught first aid and CPR in several nearby mountain towns, and was a member of the Boulder Red Cross disaster team.

In 1962, when oil exploration and consulting were entering another periodic decline, Bob Tschudy joined the U.S. Geological Survey in Denver, Colorado, where he began the third phase of his career: the application of palynology to a wide spectrum of geological research. Bernadine was hired soon after and began working with Estella Leopold of the Survey's palynological staff. Bob's calling as a teacher led him to become an adjunct professor at the University of Colorado, a position he held from the 1950s to the 1970s. Bernadine retired from the Survey in 1973, but Bob continued until 1978, and thereafter became first a rehired annuitant and finally a volunteer. His enthusiasm for palynological research never diminished. He was active in the field, in the laboratory, and at the microscope right through to July and August of 1986.

Tschudy's research while with USGS led to the publication of numerous scientific papers and the well known textbook *Aspects of Palynology*. A partial bibliography is appended to this memorial (the complete list comprises more than 60 titles). Highlights of his research, for which he will always be remembered among palynologists, include studies on megaspores, on pollen of the Normapolles group, and on palynofloras of Late Cretaceous and early Tertiary age from the Rocky Mountains and Mississippi Embayment.

Ironically, Tschudy's greatest contribution to science may have been work that he began after his retirement. His work on palynology of rocks near the Cretaceous-Tertiary boundary led to his involvement in perhaps the most exciting scientific debate in recent history, the theory that the terminal Cretaceous extinctions were caused by the impact of an extraterrestrial body. Working with scientists from Los Alamos National Laboratory and the Survey, Tschudy used palynology to locate the first iridium anomaly at the Cretaceous-Tertiary boundary to be discovered in nonmarine rocks. This research (along with his earlier work) won him the Meritorious Service Award from the U.S. Department of the Interior in 1983; a paper he helped write on the Cretaceous-Tertiary boundary won an Excellence of Oral Presentation Award from the Society of Economic Paleontologists and Mineralogists in 1985. To the end of his life, Tschudy continued to work actively on the nature of the Cretaceous-Tertiary boundary event and its effects on plants. He introduced the view that vegetation had suffered an unprecedented ecological shock at the end of Cretaceous time, although he did not support the concept of mass extinction among land plants. His last paper on the subject (co-written by Bernadine Tschudy) was published in August 1986.

Throughout his professional life, Bob Tschudy was a meticulous and methodical researcher who always carefully documented his observations and interpretations. He was a man of imagination, but he never failed to root all of his ideas in reproducible fact. He was a man of dry humor and great personal warmth. An inspiration to students, colleagues, and friends, he is missed by all.

SELECTED BIBLIOGRAPHY OF R. H. TSCHUDY

- 1934 Depth studies on photosynthesis of the red algae: *American Journal of Botany*, v. 21, p. 546-556.
- 1941 (with Emery, K. O.) Transportation of rock by kelp: *Geological Society of America Bulletin*, v. 52, p. 855-862.
- 1957 Pollen and spore formulae—A suggestion: *Micropaleontology*, v. 3, p. 277-280.
- 1961 Palynomorphs as indicators of facies environments in Upper Cretaceous and lower Tertiary strata of Colorado and Wyoming: *Wyoming Geological Association Sixteenth Annual Field Trip Guidebook*, p. 53-59.

- 1965 Palynology and time-stratigraphic determinations, *in* Cross, A. T., ed., Palynology in oil exploration—A symposium: Society of Economic Paleontologists and Mineralogists Special Publication 11, p. 18–28.
- 1969 (and Scott, R. A., eds.) Aspects of palynology; An introduction to plant microfossils in time: New York, Wiley Interscience, 510 p. [three chapters written by Tschudy].
- 1971 Palynology of the Cretaceous-Tertiary boundary in the northern Rocky Mountain and Mississippi Embayment regions, *in* Kossanke, R. M., and Cross, A. T., eds., Symposium on palynology of the Late Cretaceous and early Tertiary: Geological Society of America Special Paper 127, p. 65–111.
- 1973 Stratigraphic distribution of significant Eocene palynomorphs of the Mississippi Embayment: U.S. Geological Survey Professional Paper 743-B, 24 p.
- Complexiopollis pollen lineage in Mississippi Embayment rocks: U.S. Geological Survey Professional Paper 743-C, 15 p.
- 1975 Normapolles pollen from the Mississippi Embayment: U.S. Geological Survey Professional Paper 865, 42 p.
- 1976 Stratigraphic distribution of species of the megaspore genus *Minerisporites* in North America: U.S. Geological Survey Professional Paper 743-E, 11 p.
- 1980 Normapolles pollen from *Aquilapollenites* province, western United States: New Mexico Bureau of Mines & Mineral Resources Circular 170, 14 p.
- 1981 Geographic distribution and dispersal of Normapolles genera in North America: Review of Palaeobotany and Palynology, v. 35, p. 283–314.
- (with Orth, C. J., Gilmore, J. S., Knight, J. D., Pillmore, C. L., and Fassett, J. E.) An iridium abundance anomaly at the palynological Cretaceous-Tertiary boundary in northern New Mexico: Science, v. 214, p. 1341–1343.
- 1983 (with Nichols, D. J., and Jacobson, S. R.) Cretaceous palynomorph biozones for the central and northern Rocky Mountain region of the United States, *in* Powers, R. B., ed., Geologic studies of the Cordilleran thrust belt: Denver, Rocky Mountain Association of Geologists, v. 2, p. 721–733.
- 1984 Palynological evidence for change in continental floras at the Cretaceous-Tertiary boundary, *in* Berggren, W. A., and Van Couvering, J. A., eds., Catastrophes and Earth history: Princeton, New Jersey, Princeton University Press, p. 315–337.
- (with Pillmore, C. L., Orth, C. J., Gilmore, J. S., and Knight, J. D.) Geologic framework of nonmarine Cretaceous-Tertiary boundary sites, Raton Basin, New Mexico and Colorado: Science, v. 223, p. 1180–1183.
- (and Pillmore, C. L., Orth, C. J., Gilmore, J. S., and Knight, J. D.) Disruption of the terrestrial plant ecosystem at the Cretaceous-Tertiary boundary, Western Interior: Science, v. 225, p. 1030–1032.
- (and Tschudy, B. D., and Craig, L. C.) Palynological evaluation of Cedar Mountain and Burro Canyon Formations, Colorado Plateau: U.S. Geological Survey Professional Paper 1281, 24 p.
- 1985 (with Nichols, D. J., Fleming, R. F., Upchurch, G. R., Jr., and Pillmore, C. L.) Paleobotanical changes across the Cretaceous-Tertiary boundary at Sugarite, New Mexico; New data and interpretations [abs.]: Society of Economic Paleontologists and Mineralogists Annual Midyear Meeting Abstracts, v. 2, p. 68.
- 1986 (and Tschudy, B. D.) Extinction and survival of plant life following the Cretaceous/Tertiary boundary event, Western Interior, North America: Geology, v. 14, p. 667–670.