

Memorial to Howard A. Coombs

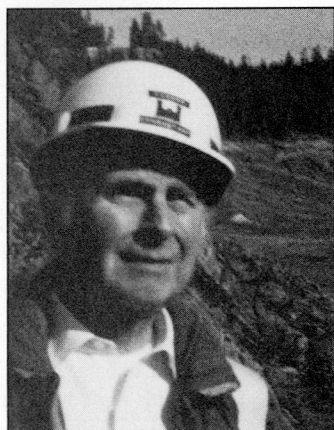
1906–1990

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The Pacific Northwest geological community in general and the engineering geology community in particular were saddened by the death of Howard Abbott Coombs on March 12, 1990, in Seattle. For more than a half century, Coombs was a legend in Northwest geology circles as a teacher, consultant, administrator, colleague, and friend. Those who encountered him in any one of these positions were fortunate; those who encountered him in several were privileged.

Howard Coombs was born April 10, 1906, in Dallas, Texas. Following completion of his high school years in Toronto and Chicago, he went to the University of Washington in 1925 as a pre-law student. An early encounter with a beginning geology course caused him to change his major and his career and influenced the careers of his future students. Coombs completed his B.S. degree in geology in 1929 and his M.S. in 1931. During this period he trained as a field assistant to Richard E. Fuller, who was doing his Ph.D. work at Steens Mountain in southeastern Oregon. Coombs also received his earliest indoctrination in the developing field of engineering geology through working with Henry Landes (then state geologist and department chairman at the University of Washington) investigating the geology of dam sites on the Columbia River for the U.S. Army Corps of Engineers "308 Report."



During the summers of 1931 through 1933, Coombs worked as a ranger in Mount Rainier National Park and mapped the geology of the park. This work was encouraged by an understanding chief ranger, who transferred Coombs from station to station so the mapping could be completed.

During the academic portions of those years, Coombs served as a teaching assistant at the University of Washington. One of his jobs was to service the monstrous Bosch-Omori seismograph, which had been moved to the basement of Johnson Hall in 1930. The work included smoking the paper and shellacking the records, and it sparked his long interest in seismology. Ultimately he served for 20 years as director for the University of Washington Seismological Station and collaborator on the seismology of Washington with the U.S. Coast and Geodetic Survey.

While he served as teaching assistant, Coombs showed his individualism and activism by going to the Dean regarding a fracas over work loads and hours. Department Chairman Landes retaliated by dismissing the rebel, but in a few days, calm returned—and so did Coombs. A greater sharing of the work load resulted. Coombs completed his doctoral thesis, "The geology of Mount Rainier National Park," in 1935 and was awarded his Ph.D. degree, the third such degree in geology to be granted by the university. At about this time, the Geology Department separated from the Geography Department, and Coombs was raised to faculty status with the title of Associate; he became an instructor a year later.

Coombs's move to a faculty position coincided with the beginning of the controversy on

the origin of granite, an issue that was to hold the attention of the geological profession for the next two decades. Collaborating with G. E. Goodspeed and R. E. Fuller, Coombs investigated replacement breccias and other petrogenetic heresies. He also continued his interest in the Cascade volcanoes with field studies on Mount Baker. During World War II, he continued to teach, served as a consultant to organizations establishing Navy bases in Washington, Oregon, and Alaska, and worked a full shift as a B-17 aircraft inspector at the Boeing Company.

It was during this period that he became the Pacific Northwest eyes and legs for the aging Charles P. Berkey, whose fame as a consultant on dams during the 1930s and 1940s is well known. This led to a growing involvement with dams throughout the Pacific Northwest over the succeeding 45 years. Coombs acted as consultant to the cities of Seattle and Tacoma, to private and public utilities, several private engineering organizations, and federal and state government agencies including the Corps of Engineers, Bureau of Reclamation, Puget Sound Power and Light Company, Portland General Electric Company, Washington Public Power Supply Company, and public utility districts in Washington and Alaska.

In 1950, Coombs went to Japan as geological advisor to the Supreme Commander, Allied Forces, under the AID program. After working with the Japanese on siting 16 dams, he returned to the United States showered with gifts from his appreciative colleagues. He was awarded a Special Service Commendation by General Douglas MacArthur for his work.

Coombs became chairman of the Department of Geology in 1952, a position he held for 17 years. He presided over a period of unparalleled growth in faculty, students, and research facilities. During this period he continued to teach and do consulting work, mostly on dams; he also began associations with the Weyerhaeuser and Crown-Zellerbach timber companies.

Neither the administrative tasks of the department nor consulting work took precedence over his teaching duties. After he relinquished the department head position, Coombs's consulting work moved heavily into nuclear power plant siting and construction in Washington and Oregon.

After 42 years on the university faculty, Coombs retired to emeritus status in 1976, but continued his consulting work. In 1976 he was appointed as the geologist member of the U.S. Department of Interior Blue Ribbon Panel to determine the causes of failure of the Teton Dam in Idaho. In 1977 he served as chairman of the special panel investigating the location and characteristics of the 1872 North Cascades earthquake. The eruption of Mount St. Helens in 1980 further increased Coombs's work load; Portland General Electric Company and Weyerhaeuser Timber Company both sought his analysis of the volcanic hazards to engineered projects. Perhaps his greatest contribution during these years was his personal effort to improve technical communication among engineering geologists in the Pacific Northwest by sharing unpublished reports and data with geologists of various private organizations and government agencies. Between 1986 and 1989 he served on the committee that produced a commemorative volume, *Engineering Geology in Washington*, published by the state of Washington as part of its centennial celebration in 1989. Coombs wrote several papers on dams that were included in the volume.

Coombs was a Fellow of the Geological Society of America (GSA) and served as chairman of the Society's Engineering Geology Division in 1971. He was a founding member of the Washington State Section of the Association of Engineering Geologists (AEG). In 1970 he won the AEG publication award for his paper "Leakage through buried channels," which was originally presented at AEG's 1968 annual meeting in Seattle. In 1979 he was awarded honorary membership in AEG. He was also a member of the U.S. Committee of the International Commission on Large Dams. In 1980 he served as the GSA representative on the National Research Council's Committee on Tunneling Technology.

Howard Coombs always exhibited a kindly, often reserved, yet enthusiastic and dynamic

manner. This manner encouraged students and colleagues and often disarmed and impressed legislators, clients, and critics. In addition to his many technical contributions in the fields of engineering geology, seismology, and volcanology, it is this manner and his even approach to technical problems for which he will be fondly remembered.

SELECTED BIBLIOGRAPHY OF H. A. COOMBS

- 1932 Quartz-diopside-garnet veinlets: *American Mineralogist*, v. 17, p. 554–560.
- The geology of the southern slope of Mt. Rainier [M.S. thesis]: University of Washington, 47 p.
- 1933 Certain features of the volcanic sequence and geomorphology of Mt. Rainier [abs.]: *Geological Society of America Bulletin*, v. 44, p. 148.
- Preparing quick-drying Canada balsam: *Science New Series*, v. 78, p. 193–194.
- 1935 Extension of the Keechelus Andesitic Series: *Geological Society of America Proceedings*, 1934, p. 336.
- The geology of Mt. Rainier National Park [Ph.D. thesis]: University of Washington, 141 p.
- 1936 The geology of Mt. Rainier National Park: *University of Washington Publications in Geology*, v. 3, no. 2, p. 131–212.
- The physiography of western Washington: *Yearbook of the Association of Pacific Coast Geographers*, v. 2, p. 20.
- 1937 Two views of Mt. Rainier: *The Puget Sounder*, v. 3, p. 1–4.
- Geology of Mt. Rainier National Park [abs.]: *Geological Society of America Proceedings*, 1936, p. 321.
- (with Goodspeed, G. H.) Replacement breccias of the lower Keechelus [abs.]: *Geological Society of America Proceedings*, 1936, p. 319; also, *American Journal of Science*, v. 34, no. 199, p. 12–23.
- 1938 (with Goodspeed, G. H., and Fuller, R. E.) Metasomatism of a shale to an igneous appearing rock [abs.]: *Geological Society of America Bulletin*, v. 49, p. 1882; also, *American Mineralogist*, v. 24, no. 3, p. 186.
- 1938 (with Goodspeed, G. E., and Fuller, R. E.) Development of a breccia from a carbonaceous sediment [abs.]: *Geological Society of America Proceedings*, 1937, p. 239.
- Volcanism in the Cascade Range: *The Mountaineer*, v. 31, p. 23–24.
- 1939 Mt. Baker, a Cascade Volcano: *Geological Society of America Bulletin*, v. 50, p. 1493–1510.
- 1940 (and Barksdale, J. D.) The Puget Sound earthquake of November 12, 1939 [seismological note]: *Seismological Society of America Bulletin*, v. 30, no. 1, p. 88.
- (with Goodspeed, G. E., and Fuller, R. E.) Metasomatism of a coaly sediment into an igneous appearing rock: *Journal of Geology*, v. 49, no. 2, p. 190–198.
- 1941 Hornblende and magnetite heavies in the Ellensburg of central Washington: *Journal of Sedimentary Petrology*, v. 11, p. 142–144.
- 1942 (and Barksdale, J. D.) The Olympia earthquake of November 13, 1939: *Seismological Society of America Bulletin*, v. 32, no. 1, p. 1–6.
- Expansion of concrete due to reaction between cement and andesitic aggregate: *American Journal of Science*, v. 240, p. 288–297.
- 1945 (with Mackin, J. H.) An occurrence of cave pearls in a mine in Idaho: *Journal of Geology*, v. 53, p. 58–65.
- 1946 (with Barksdale, J. D.) The Puget Sound earthquake of February 14, 1946: *Seismological Society of America Bulletin*, v. 36, no. 4, p. 349–354.

- 1946 Geological problems at Ross Dam in the northern Cascades of Washington [abs.]: Geological Society of America Bulletin, v. 578, p. 1251; also, Annotated Bibliography of Economic Geology, v. 19, p. 155–156.
- 1948 Buried channels and their relation to dam sites along the Cowlitz River, Washington [abs.]: Geological Society of America Bulletin, v. 59, p. 1368.
- 1949 Vibration studies at Ross Dam: University of Washington Trends in Engineering, v. 1, no. 3, p. 1–5.
- 1950 Granitization in the Swauk arkose near Wenatchee, Washington: American Journal of Science, v. 248, p. 369–377.
- Geological investigations of dam sites in Japan: Natural Resources (in Japanese), p. 1–57.
- 1952 Spherulitic breccias in a dome near Wenatchee, Washington: American Mineralogist, v. 37, p. 197–206.
- 1953 A summary of Washington earthquakes [abs.]: Seismological Society of America Bulletin, v. 43, no. 1, p. 1–5; also, U.S. Geological Survey Bulletin 1002-A, p. 38.
- 1954 Buried channels at northwest cities dam sites [abs.]: Geological Society of America Bulletin, v. 65, p. 1242.
- 1956 Tectonic petrogenetic history of the central Cascades of Washington [abs.]: 20th International Geological Congress Proceedings, Mexico City, p. 132–133.
- Geology of Boundary Dam site, Pend Oreille River, Washington: Federal Power Commission Report no. 2144, p. 1–16.
- 1959 (with Swiger, W. F.) Geology of the Rocky Reach dam site, Columbia River, Washington [abs.]: Geological Society of America Bulletin, v. 70, p. 1751.
- Quaternary history of the upper Baker Valley, Washington [abs.]: Geological Society of America Bulletin, v. 70, p. 1788.
- 1960 (and Hoidel, C. R.) Geologic problems at the high Gorge Dam, Skagit River, Washington [abs.]: Geological Society of America Bulletin, v. 71, p. 2054–2055.
- (with Howard, A. D.) Catalogue of the active volcanos of the world, part IX, the United States: International Volcanological Association, p. 1–68.
- 1963 Natural diversion channels at some dam sites in Washington [abs.]: Geological Society of America Special Paper 73, p. 132.
- 1964 (and Willis, C. L.) Increasing the stability of a slope by post-tensional rods [abs.]: Geological Society of America Bulletin, v. 75, p. 186.
- 1966 (and Hutterer, G.) Canyon geology—Pend Oreille River, Washington: Seattle City Light, 77 p.
- 1967 (with Wheeler, H. E.) Late Cenozoic Mesa Basalt sheet in northwestern United States: Bulletin Volcanologique (Italy), v. 37, p. 21–44.
- Earthquake reports for the Pacific Coast and Western Mountain Region [abs.]: U.S. Department of Commerce, ESSA, MAS 130, April–June 1966, p. 1–79.
- A preliminary engineering study of engineering seismology benefits: U.S. Department of Commerce, ESSA Symposium, 46 p.
- 1968 Leakage through buried channels [abs.]: Association of Engineering Geologists Annual Meeting Program, p. 28–29.
- George Culmbach (Sultan) Dam, in McKee, B., and Coombs, H. A., eds., Guidebook to field trips: Association of Engineering Geologists Annual Meeting, Seattle, p. 75–76.
- Upper Skagit River Dams, in McKee, B., and Coombs, H. A., eds., Guidebook to field trips: Association of Engineering Geologists Annual Meeting, Seattle, p. 102–107.
- (with Wheeler, H. E.) 100,000 miles of burning rock: Saturday Review, v. 5, p. 60–63 (October 5, 1968).

- 1969 Leakage through buried channels: Association of Engineering Geologists Bulletin, v. 6, p. 45–52.
- (and Macken, J. H.) Geologic problems at the Sultan River dam site [abs.]: Geological Society of America Special Paper 121, p. 499–500.
- Mossyrock dam site, Cowlitz River, Washington [abs.]: Geological Society of America Abstracts for 1969, pt. 7, p. 40.
- 1970 Geologic problems at Ross and Gorge dams, Skagit River, Washington: International Association of Engineering Geology, International Congress Proceedings, v. 2, p. 1197–1203.
- Geologic problems in raising Ross Dam, Skagit River, Washington [abs.]: Geological Society of America Abstracts with Programs, v. 2, p. 526.
- 1971 (with Bostrom, R. C., Sherif, M. A., and Vali, V.) Laser seismograph project, in National Academy of Sciences Upper Mantle Committee, 1971, Upper Mantle Project; United States Program Final Report: National Academy of Sciences, p. 70–71.
- Nuclear plant sites in the Pacific Northwest [abs.]: Geological Society of America Abstracts with Programs, v. 3, no. 7, p. 531–532.
- 1974 (chairman) Meeting the geologic hazard challenge: Report to the Washington State Legislature (1975 session) from the Ad Hoc Committee on Geologic Hazards, 116 p.
- 1976 (and Milne, W. G., Nuttli, O. W., and Slemmons, D. B.) Report of the review panel on the December 14, 1872 earthquakes: Washington Public Power Supply System, 1 v.
- 1984 (with Davis, G. A., Crosson, R. S., Kelleher, J. A., Tillson, D. D., and Kiel, W. A.) Juan de Fuca/North American plate convergence: Seismic or aseismic subduction?: Report prepared for Washington Public Power Supply System Nuclear Project No. 3, 57 p.
- 1989 (with Galster, R. W., and Waldron, H. H.) Engineering geology in Washington: in Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 3–12.
- The Baker project, in Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 175–186.
- The Skagit projects: Ross, Diablo and Gorge Dams, in Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 189–200.
- (with Galster, R. W.) Cascade Ice Border dams: Geologic setting, in Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 203–208.
- The Nisqually projects: La Grande and Alder Dams, in Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 249–256.
- The Cowlitz River projects: Mayfield and Mossrock Dams, in Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 265–274.
- The Skokomish River Projects: Cushman Dam No. 1 and Cushman Dam No. 2, in Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 311–316.
- (with Galster, R. W.) Dams of the Middle Columbia River: Introduction and geologic setting, in Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 367–375.
- Rocky Reach Dam, in Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 391–396.

- 1989 (and Bliton, W. S.) Dams of the Pend Oreille River: Introduction and geologic setting, *in* Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 433–435.
- Boundary Dam, *in* Galster, R. W., chairman, Engineering geology in Washington: Washington Division of Geology and Earth Resources Bulletin 78, p. 437–442.