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In Memory of Jacques Renault

1933–2003

Jacques R. Renault, emeritus senior geologist at New Mexico Bureau of Geology and Mineral Resources, passed away on December 3, 2003. From 1964 to 1995 Jacques presided over the bureau's X-ray laboratories' development into facilities that provide researchers, educators, industry, and the public with chemical, mineralogical, and crystallographic analyses. Jacques' accomplishments in science are matched by such a range of creative talents (as an educator, musician, writer, and pilot, to name a few) that they have earned him the admiration of friends and colleagues, as well as local and state-wide recognition.

Jacques was born on July 26, 1933, in Alameda, California. He served in the U.S. Army from 1953 to 1955, and the following year he married Magali Larose in Carmel, California. In 1957 Jacques received his B.S. degree in geology from Stanford University. That same year he and Magali moved to Socorro where he began his graduate study at New Mexico Institute of Mining and Technology. In 1960 Jacques received his M.S. degree, earned in part for his master's thesis, "The growth pressure of fibrous sodium chloride." From Socorro he moved to the University of Toronto where in 1964 he received his Ph.D. degree; his dissertation was titled "The geological conditions of molybdenite deposition as deduced from textural analysis." In 1964 Jacques and Magali and their two young daughters, Elise and Claire, returned to Socorro where Jacques joined the New Mexico Bureau of Mines and Mineral Resources, originally as a post-doctoral research assistant to Dr. Frederick Kuellmer. When Kuellmer left the bureau for a teaching appointment in the Department of Geology, Jacques stayed on in the position of associate geologist but principally doing the work of mineralogist and petrologist and administering the bureau's X-ray facilities.

In 1967 Jacques and three students took over the task of completing an inventory of the bureau's mineralogical museum collection. They divided it into four subcollections: a *display collection*, consisting of spectacular specimens; the *Dana collection*, consisting of individual minerals classified according to the Dana System; a *working collection* of specimens available to researchers for chemical and mineralogical analyses; and a *backup collection* of duplicate

material. In 1969 Jacques and his students began to computerize specimen data that were recorded only on index cards and filed according to the specimen's date of acquisition. A series of computer programs were written in FORTRAN IV for New Mexico Tech's IBM 360/44 computer to facilitate the cross referencing of specimens with desired characteristics (i.e., mineral assemblages, geographic locality, storage or display location within the bureau). The system was designed to produce six basic lists either in alphabetical order by mineral or in numerical order by catalog number. In 1969 the only other mineralogical collection known to have been computerized was that of the Smithsonian Institution.

Jacques was one of the first geologists at the bureau to recognize the utility of computers. He bought one of the first personal computers, an Otrona, and over the years he taught himself several operating systems. For many years he served New Mexico Tech and the bureau on their computer advisory committees.

Under Jacques' leadership the bureau's X-ray facilities evolved into laboratories capable of rapid qualitative and accurate quantitative elemental analyses using X-ray fluorescence (XRF) spectrometry and mineralogical and crystallographic analyses by X-ray diffraction (XRD). Computer equipment dedicated to the running of the XRF and XRD equipment, for data reduction and analyses, and for efficiently storing data was always one of Jacques' highest priorities.

The laboratories became integral to many bureau-sponsored research projects and to a variety of other investigations such as measuring the lead content of paint and household dust, the ash content of coals, low concentrations of free silica in perlite and clays, and the elemental content of metal glasses and archaeological material for purposes of sourcing the material. Jacques' early work at the bureau included using variations in the thermoluminescent properties of quartz to determine the amount and timing of passage of uranium in aqueous solutions, applying it to uranium bodies such as the deposits in the Grants area. Jacques helped to develop a quartz crystallite geothermometer and showed how it can be used for petroleum and gold exploration.

Use of the bureau's X-ray facilities grew to include New Mexico

Tech professors and graduate students furthering their research projects and Tech classes in clay mineralogy, XRF spectroscopy, economic geology, metallurgy, and chemistry.

Although geology was his professional calling, Jacques' interests were broad; he was also a musician, a poet, and a woodworker. He played classical guitar, French horn, lute, and Cajun accordion. He was a founding member of New Mexico Tech's Performing Arts Series. He taught himself woodworking and made beautiful furniture. He also built a functioning model steam engine. Jacques was very active in San Miguel Parish, serving as president of San Miguel School Advisory Board, as a lector and eucharistic minister, and with the Society to St. Joseph the Carpenter, the society responsible for many of the repairs to San Miguel Mission.

A group of visitors arrived at the parish office asking to be shown through San Miguel by the church's architectural historian and tour guide. The priest, who was new to Socorro, said he didn't think that the church had such a person. "Oh yes," he was informed by the office staff, "that's Jacques."

Jacques had a great sense of humor and a sharp wit—no doubt

a family trait—that he shared with his brother, political cartoonist Dennis Renault. For Jacques poetry became his choice of expression. This past Veterans Day, November 11, 2003, he read one of his poems to the Veterans for Peace organization in Albuquerque.

After he retired Jacques learned to fly and bought his own plane. He was always willing to fly his old buddies from work over their field areas—for that all-important aerial view of the geology. Jacques joined Angel Flight, a national nonprofit charitable air medical transportation organization that provides financially needy patients and their families with access to specialized medical evaluation, diagnosis, treatment, and rehabilitation. On short notice Jacques could be called upon to pick up and deliver organs for transplant or fly a patient to Albuquerque for specialized life-saving medical treatment.

Jacques will be remembered for his intellectual and artistic skills—as a man who could express ideas equally well in French and English, through music and poetry as well as scholarly discourse. His pursuit of beauty, harmony, and perfection in the natural world that he loved continues to inspire his family and friends.

Outcrop

This is what an outcrop is, for what you think it's worth:
"That part of any rock formation...at the surface of the earth"*
Now any old geologist knows that outcrops are complex
Usually more than one rock shows from this place to the next.
And when it comes to size, of course, most any size will do
From just enough to trip on to greater than one's view.
I like my outcrops really big not hidden in the trees
Then I can see relationships and marvel as I please.
A mountain range is pretty big and has a lot of stuff
But when it comes to the best of things it isn't big enough.
For if I had my choice of outcrops, either large or small,
I'd have to take New Mexico, the biggest outcrop of all.

—Jacques Renault

* From the *Glossary of Geology*,
Second Edition, American Geological Institute, 1972.

Selected bibliography

Books and reports

- Renault, J. R., Bonem, R. M., and Riese, R. W., 1970, Computerization of the New Mexico Bureau of Mines Mineralogical Museum: New Mexico State Bureau of Mines and Mineral Resources, Circular 111, 49 pp.
- Renault, J. R., 1970, Major-element variations in the Potrillo, Carrizozo, and McCartys basalt fields, New Mexico: New Mexico State Bureau of Mines and Mineral Resources, Circular 113, 22 pp.
- Brower, E., and Renault, J. R., 1971, Solubility and enthalpy of the barium-strontium sulfate solid solution series: New Mexico State Bureau of Mines and Mineral Resources, Circular 116, 21 pp.
- Walker, C. W., and Renault, J. R., 1972, Determinative tables of $2\theta_{Cu}$ and $2\theta_{Fe}$ for minerals of southwestern United States: New Mexico State Bureau of Mines and Mineral Resources, Circular 127, 98 pp.
- Renault, J. R., and Hayslip, D. L., 1977, Thermoluminescence of quartz in sandstone uranium deposits, methods and initial tests: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 68, 34 pp.
- Taggart, J. E., and Renault, J. R., 1977, Mineralogical analyses of cuttings from Sandia WIPP drill hole #9: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 70, 26 pp.
- Renault, J. R., 1980, Application of carbonate thermoluminescence to petroleum exploration: New Mexico Energy Research and Development Institute, Report NMERDI-2-67-3314, 15 pp.
- Renault, J. R., 1986, Major element geochemistry of Nuclear Dynamic Corp. drill holes EB14, EB35, EB44, T17N, R9E, Española Basin, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 243, 31 pp.
- McKee, C. G., Renault, J. R., and Barker, J. M., 1990, Quantitative analysis of quartz in perlite by X-ray diffraction: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 364, 16 pp.
- Renault, J. R., and McKee, C. G., 1993, Method of XRF analysis for environmental Pb using thin film principles—preliminary tests: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 395, 8 pp.
- Renault, J. R., Armstrong, A. K., Repetski, J. E., and Oscarson, R. L., 1995, Geology, mineralogy, geochemistry, and geothermometry of Kelly Limestone jasperoids, Magdalena mining district, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 152, 50 pp.

Papers

- Renault, J. R., 1963, Molybdenite paragenesis at the Lacorne mine, Quebec: *Economic Geology*, v. 58, pp. 1340–1344.
- Peach, P. A., and Renault, J. R., 1965, Statistical analysis of some characteristics of British Columbia molybdenite occurrences: *Economic Geology*, v. 60, no. 7, pp. 1510–1515.
- Renault, J. R., and Brower, E., 1971, X-ray line broadening in the barium sulfate-strontium sulfate series: *American Mineralogist*, v. 56, no. 7, pp. 1482–1485.
- McGehee, R., and Renault, J. R., 1972, The use of standard deviation of X-ray diffraction lines as a measure of broadening in the Scherrer equation—a curve fitting method: *Journal of Applied Crystallography*, v. 5, pt. 5, pp. 365–370.
- Renault, J. R., and Hayslip, D. L., 1977, Thermoluminescence of quartz in uraniumiferous sandstones—methods and initial tests: New Mexico Bureau of Mines and Mineral Resources, Annual Report 1976–1977, pp. 66–75.
- Renault, J. R., 1978, Overview of Rio Grande basalts with special reference to TiO_2 variation; in Hawley, J. W. (comp.), *Guidebook to Rio Grande rift in New Mexico and Colorado*: New Mexico Bureau of Mines and Mineral Resources, Circular 163, pp. 230–233.
- Renault, J. R., 1980, Rapid determination of ash in coal by Compton scattering, Ca, and Fe X-ray fluorescence; in Rhodes, J. R., et al. (eds.), *Advances in X-ray analysis*, vol. 23: Plenum Press, New York, pp. 45–55.
- Renault, J. R., 1981, Variations in the thermoluminescence properties of quartz associated with migrating uranium deposits: *Bulletin de Mineralogie*, v. 104, no. 6, pp. 715–723.
- Renault, J. R., 1984, Turbine drive sample spinner for X-ray diffraction: *Review of Scientific Instruments*, v. 55, pp. 805–806.
- Renault, J. R., 1987, Pictographs in Arroyo del Tajo, Socorro County, New Mexico: *New Mexico Geology*, v. 9, no. 4, pp. 80–81.
- Renault, J. R., 1987, Quantitative phase analyses by linear regression of chemistry on X-ray diffraction intensity: *Powder Diffraction*, v. 2, no. 2, pp. 96–98.
- Renault, J. R., McKee, C. G., and Barker, J. M., 1991, Quantitative X-ray diffraction analysis of trace quartz in selected mineral products—standardization II; in Lootens, D. J., Greenslade, W. M., and Barker, J. M. (eds.),

Environmental management for the 1990s—proceedings of the symposium: Society of Mineral, Metal, and Exploration Geologists, pp. 361–362.

Abstracts

- Peach, P. A., and Renault, J. R., 1966, Silicate-molybdenite paragenesis in granitic rocks (abs.): Geological Society of America, Special Paper 87, p. 125.
- Renault, J. R., 1968, Determination of the area of grain contact in thin section (abs.): Geological Society of America, Special Paper 101, p. 175.
- Renault, J. R., 1969, Variation in some Quaternary basalts in New Mexico (abs.): Geological Society of America, Special Paper 121, p. 247.
- Renault, J. R., and Brousse, R., 1972, Zoned chromite-magnetite spinels from basaltic rocks of the Cantal, France (abs.): Geological Society of America, Abstracts with Programs, v. 4, no. 3, p. 223.
- Hayslip, D. L., and Renault, J. R., 1976, Potential of quartz thermoluminescence in uranium exploration (abs.): Geological Society of America, Abstracts with Programs, v. 8, no. 5, p. 590.
- Iovenitti, J., and Renault, J. R., 1977, Crystallite size variation in cherts and jasperoids from the Magdalena mining district, Socorro County, New Mexico (abs.): Geological Society of America, Abstracts with Programs, v. 9, no. 6, p. 735.
- Renault, J. R., and Iovenitti, J., 1978, Resolution of X-ray diffraction lines—a model of the 68-degree 2-theta quartz quintuplet (abs.): Geological Society of America, Abstracts with Programs, v. 10, no. 5, p. 236.
- Renault, J. R., 1978, Petrology of the Cerro de los Lunas, Wind Mesa, and Cat Hills volcanics, Bernalillo and Valencia Counties, New Mexico (abs.); in Olsen, K. H., and Chapin, C. E. (eds.), 1978 International Symposium on the Rio Grande rift, Programs and abstracts: Los Alamos Scientific Laboratory, Report LA-7487-C, pp. 75–77.
- Renault, J. R., 1979, Silica crystallite geothermometer—initial calibration (abs.): Geological Society of America, Abstracts with Programs, v. 11, no. 7, p. 502.
- Renault, J. R., 1980, Variations in the thermoluminescence properties of quartz as applied to the study of uranium migration (abs.): 26th International Geological Congress, Abstracts, v. 1, p. 141.
- Faris, K. B., and Renault, J. R., 1980, A geochemical model for the magmatic history of the Carrizozo basalt field, south-central New Mexico (abs.): Geological Society of America, Abstracts with Programs, v. 12, no. 6, p. 273.
- Hayslip, D. L., Fuller, G. E., Levy, P. W., and Renault, J. R., 1980, Thermoluminescence of uranium host rocks in Ambrosia Lake area (abs.); in Rautman, C. A. (comp.), *Geology and mineral technology of the Grants uranium region 1979*: New Mexico Bureau of Mines and Mineral Resources, Memoir 38, p. 398.
- Mukhopadhyay, B., Beck, R. G., and Renault, J. R., 1983, Thermoluminescence evidence of uranium migration—Jackpile mine area, New Mexico (abs.): American Association of Petroleum Geologists, Bulletin, v. 67, no. 3, p. 521.
- Renault, J. R., 1984, Major-element stratigraphic correlation in the Tesuque Formation, Santa Fe, New Mexico (abs.): Geological Society of America, Abstracts with Programs, v. 16, no. 4, p. 252.
- Renault, J. R., 1985, Geochemistry XRF in an academic service environment (abs.): Advances in X-ray analysis, 34th annual X-ray conference, Denver, Colorado, Abstracts, p. 129.
- Renault, J. R., 1985, Multiple regression approach to quantitative XRD analysis (abs.): Advances in X-ray analysis, 34th annual X-ray conference, Denver, Colorado, Abstracts, p. 52.
- Renault, J. R., 1986, Mass balance calculation based on hypothetical igneous precursor compositions (abs.): Geological Society of America, Abstracts with Programs, v. 18, no. 5, p. 405.
- Renault, J. R., and Singh, A., 1986, Factor and cluster analysis of fluvial sediment major-element geochemical data (abs.): Geological Society of America, Abstracts with Programs, v. 18, no. 5, p. 405.
- Robinson-Cook, S. E., Campbell, A. R., Kyle, P. R., and Renault, J. R., 1986, An examination of the geochemical controls on infrared transparency in the mineral wolframite (abs.): Geological Society of America, Abstracts with Programs, v. 18, no. 6, p. 731.
- Renault, J. R., 1987, Possible orbital forcing of Miocene alluvial sedimentation (abs.): Geological Society of America, Abstracts with Programs, v. 19, no. 6, p. 442.
- Renault, J. R., 1989, Climatic forcing and continental sedimentation (abs.): Geological Society of America, Penrose Conference.
- Austin, G. S., Brandvold, L. A., Hawley, J. W., and Renault, J. R., 1991, Lead contamination studies at abandoned Billings smelter site (abs.): *New Mexico Geology*, v. 13, no. 4, p. 92.