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Memorial of E. Dale Jackson 1925–July 28, 1978

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Dale Jackson died on July 28, 1978 after a 9-month battle with cancer. With his death, the scientific community lost an impressive gift of insight into the workings of the earth. He left an example of energetic dedication to learning, and a memory of friendship and sensitivity toward his many friends. The published products of his life's work reveal great breadth of interest and mastery of his chosen fields of endeavor, but much more was passed on to his children, colleagues, and students by word-of-mouth and by example.

Everett Dale Jackson was born in Fresno, California in 1925. The difficulty of his early life is revealed by voluntary entry into the Marine Corps at the age of 18. He survived these experiences with a strongly developed sensitivity toward others as well as himself. In 1947 Dale entered the University of California, Los Angeles uncertain of the direction that he would take. By fortunate accident he enrolled in geology and was captured by it. He graduated *magna cum laude* in 1950.

After graduation, Dale married Josephine Arburua. Together, they enlarged the scientific community with a son and twin daughters, each now pursuing a different scientific career with the dedication and care imparted by their parents.

Dale's graduate career was interrupted by a choice opportunity to work with the U.S. Geological Survey mapping in the Stillwater complex in Montana. This work provided the basis of his Ph.D. dissertation, completed in a brief two years between 1959 and 1960. The thesis was published as U.S. Geol. Surv. Prof. Paper 358. It is, without doubt, a landmark in petrology. The Stillwater work exemplified that thoroughness and tireless effort to fill all of the holes that characterized Dale's work throughout his life. The insights that make his contributions to geology of permanent value came from this approach.

In 1962, Dale was assigned to administrative duties in Washington. The one word—NONE—under the item of "Interest in Administrative Position" in Dale's Professional Record is an eloquent final verdict upon this experience. The way out of Washington came in 1963 when Dale filled an immediate and urgent need to establish a course of geologic training for the Apollo astronauts.

Until July 1963, when Dale took charge of the astronaut training program at Eugene Shoemaker's request, there had been no organized geologic training of the astronauts. When Dale arrived in Houston for a scheduled 2-year stint, he found the astronauts, if not downright hostile to geology, preoccupied by matters more pressing to them. Dale broke the ice in his characteristic fashion: a direct, personal approach under the most informal circumstances he could find—over coffee in the NASA cafeteria. His success in winning the astronauts over was a measure of his ability to communicate the importance of geology in a way that gained the listener's interest and confidence.

The syllabus developed for the astronaut training bears the hallmark of Dale Jackson: it is beautifully organized and complete. These characteristics were products of enormous effort, and of Dale's truly remarkable tenacity that allowed him to direct his full critical attention to a project until every detail was in place.

Dale's relations with the NASA training staff were as strained and difficult as those with the astronauts were easy and mutually respectful. While Dale was tolerant of little foibles, he had no patience with anything that he perceived as a threat to the proper and complete scientific instruction of the astronauts. As one startled observer noted upon emerging from a battleground: "Dale Jackson is a formidable opponent!" He was an equally formidable teacher and scientist.

After only a year in Houston, the political conflicts were such that Dale left the training program. His interest in lunar science remained strong, however, and the personal relations he had established with the astronauts were unruptured. At that time Dale began his classic work on xenoliths in Hawaiian basalts, again displaying the care and thoroughness that characterized his work: who else would systematically describe literally tens of thousands of xenoliths, avoiding the temptation to jump to early conclusions? While one might be inclined to temper his

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admiration of that dedication with a view to the setting in which the work was done, Dale responded to the gentle chiding of his astronaut friends by noting that he would do it even if it were at the South Pole.

The excitement of the lunar adventure was too much to resist, and Dale reentered the program as a coinvestigator on Apollo 11 and 12 samples. That was not enough, however, and Dale allowed himself to be talked back into the mission geology experiments. He was a member of the live-time science advisory team for Apollo 14–17, and an essential part of the Field Geology Experiment for those missions.

The reports delivered in the immediate aftermath of each mission were products of Dale's ability to organize the efforts of many people. The willingness with which so varied a group worked together was in no small measure a reflection of the esteem in which Dale was held. The writings of this diverse group, produced under horrid deadlines, were, to put it gently, spotty. Dale welded them into a coherent whole the same way he counted xenoliths: each and every item was reviewed over and over again until it passed muster, revealing an endurance far beyond that of most people.

Dale's contributions to lunar science are internationally recognized, as are his contributions in all other fields to which he directed his attention. Each paper that bears his name received the same thorough analysis and review whether he was the first or last author. His dedication to training the astronauts and to extracting the scientific content of their missions earned him NASA's Exceptional Scientific Achievement Medal in 1973.

Following the lunar program, Dale's versatility led him to make important contributions to the origin of dike swarms in shield volcanos, and to the origin of alignments of volcanos in the Hawaiian–Emperor chains; from these studies he gleaned valuable information on stress fields in the Pacific Ocean Plate. During completion of this work, he continued to influence the course of research in mafic and ultramafic rocks through a teaching stint at Princeton (1976), and in advisory and editorial capacities for various Survey and University projects and for the Journal of Petrology. In all of these endeavors, he drew on a reservoir of knowledge that reflected the depth of his understanding of the earth.

Throughout these varied, sometimes frenetic, activities, Dale remained a readily approachable man

who was warm in his response to those who came his way, giving of his time and vast knowledge, and ever ready to make light of overly serious matters with his delightful, earthy wit.

Dale was acknowledged for the value of his contributions to Earth Science. In addition to the NASA medal, he was Co-Chief Scientist for JOIDES Leg 33, he received the Geological Society of America's Special Commendation Award, and was an honorary member of the Advisory Board of the Journal of Petrology, among many other expressions of confidence in his abilities and contributions to science. Perhaps more important to Dale, however, was the validation of his life's work by his friends and colleagues before he died. He was a human being before he was a scientist, and his individuality will be remembered by all who knew him. His work will be appreciated by all who read the literature of geology. (To receive a bibliography, order Document AM-80-127 from the Business Office, Mineralogical Society of America, 2000 Florida Avenue, NW, Washington, DC 20009. Please remit $1.00 in advance for the microfiche.)