DAVID B. KITTS, METAGEOLOGIST, 1923–2010

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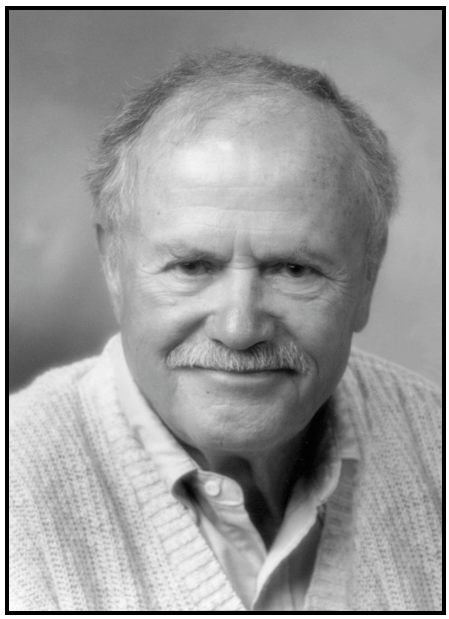

David Kitts (1923–2010). Photograph by courtesy of Nancy Kitts.

David Kitts, who made important contributions to the philosophical analysis of geological science as it has been practiced historically, died at Norman, Oklahoma, USA, on 30 October, 2010, at the age of 87. Kitts served as the first President of the History of the Earth Sciences Society at its founding in 1982.

David Burlingame Kitts was born October 27, 1923 in Oswego, New York. Because his father was a career naval officer, David attended many different schools—in New York, Washington, D.C., California, and Hawaii. He was a freshman at the University of Hawaii at the time of the attack on Pearl Harbor in 1941. He then enlisted in the U.S. Army, serving in New Guinea and the Philippines. A few months before the war ended in 1945 he contracted poliomyelitis, resulting in lifelong disability in one leg. However, he never allowed this condition to prevent his extensive involvement in vigorous physical activity.

Entering the University of Pennsylvania following the war, David majored in zoology, and received the B.S. degree in 1949. That year he entered the graduate program in zoology at Columbia University. He worked first in population genetics under the guidance of Theodosius Dobzhansky. After two years he shifted to paleontology, and was supervised by George Gaylord Simpson. He completed his doctoral research in 1953 with a dissertation on the American *Hyracotherium*. David spent a year as an instructor in biology at Amherst College, then joined the faculty of the University of Oklahoma's School of Geology in 1954. He remained at the University of Oklahoma until his retirement in 1988.

While teaching geology and paleontology at Oklahoma, David also served as a curator in the University's Stovall Museum (since then renamed the Sam Noble Oklahoma

Museum of Natural History). A popular and highly respected teacher, he was named David Ross Boyd Professor in 1966, a title honoring the institution's finest teachers. By that time he had begun a long-term affiliation with the History of Science program, holding an academic appointment in both Geology and the History of Science. In 1978 his status became full-time in History of Science, where he served as department chair from 1973 to 1979. In recognition of the philosophical expertise he acquired during the course of his career, he also earned appointment in 1984 as adjunct professor in OU's Philosophy Department. David was gratefully aware that the administrative liberality displayed at the University of Oklahoma, in not just tolerating but actually facilitating his trans-disciplinary professional trajectory, could not have been expected in many other educational institutions.

As early as his college years at Penn, under the influence of his academic adviser, the physiologist L. V. Heilbrunn, David cultivated an interest in the logical and conceptual structure of science. This led him in time to the philosophical and historical interests that occupied him for most of his career. While continuing his research in vertebrate paleontology at Oklahoma—involving fieldwork for many summers in the high-plains terrain of the State's far western counties—he introduced a new course for geology students called *Metageology*. Sensing a need for concentrated pursuit of his philosophical interests, he spent a year as a visiting fellow in the Philosophy Department at Princeton University (1964–1965), working with Carl Hempel.

During the early 1960s David began to publish papers examining geology philosophically. A collection of his main articles on the underpinnings of geological thought, *The Structure of Geology*, was published in 1977 by the Southern Methodist University Press. Like many other geologists, David wished to understand the nature of the science and its relationship to the other natural sciences. Very few of his contemporaries, however, endeavored to examine geology in the light of modern philosophy of science, as he did.

David was always clear that his philosophical inquiries aimed at addressing geological investigation and knowledge as they are, and as they have been historically. (While the cases of geological discourse he examined were for the most part contemporary, he sometimes sought examples as far back in time as Steno, Hutton, and Werner; and one of his main papers analyzed a feature of G. K. Gilbert's methodological views.) He had no intention of prescribing what geologists should do, or of trying to point out directions in which geology should go. Still less was he interested in any metaphysical or ontological project, of a sort sometimes associated with older philosophical traditions, to bring light to bear on the ultimate character or meaning of the natural world as disclosed by geological science. What he did hope to do was show how the analytical apparatus provided by contemporary philosophy of science might illuminate the nature of geological knowledge, as it has in fact been cultivated. He felt that philosophical examination could offer working geologists a perspective for comprehension of what their science aspires to do, and how it is accomplished. Among the philosophical scholars he mentioned as intellectual resources and sources of inspiration were, besides Hempel, Ernest Nagel, Adolph Grünbaum, Hans Reichenbach, A. J. Ayer, N. R. Hanson, and Karl Popper.

David's work proceeded in recognition of a key distinction familiar to both philosophers and historians of science: the different kinds of consideration involved, in the scientific enterprise, between the "context of discovery" and the "context of justification". In common with most philosophers, he saw the tools of philosophy of science, which he took in the main to be those of logic, as bearing far more fruitfully on justification than on discovery. So the "structure of geology" explored by David amounted essentially to an analysis of the sorts of understanding geologists have produced, of how geological knowledge is presented and defended, and of the relations between that knowledge and the kinds generated in other sciences. He cautioned, however, against any supposition that acts

of discovery and of justification can be seen as fully and neatly separated in actual geological practice. On the contrary, he argued that as one unpacks the elements of geological knowledge, it becomes evident that important parts of the justificatory architecture of geological thinking necessarily enter into the investigative process through which discoveries arise. Past events—knowledge of which he held constitutes the core feature in the goals of geology—are themselves intricately tied together through an explanatory process that cannot be divorced completely from the means by which the past events themselves are discerned. As he put it in the lead article of this journal's inaugural issue: "finding out what happened in the past and explaining how it happened are scarcely separable activities" (*Earth Sciences History*, 1982, Vol. 1, p. 5).

Central to David's view of geology was his insistence on its fundamentally historical character. The paramount concern of geologists, he maintained, has been to focus on the establishment of distinct terrestrial events, and the placement of those events in a sequential order. More than any other feature of the science, this is what he held distinguishes geology from sciences like physics and chemistry. As he put it, physics and chemistry are certainly concerned with natural events too, but only as a means to the end of establishing general laws governing them. Geology, which of course relies on the knowledge provided by physics and chemistry (not to mention biology), puts that knowledge to use for the purpose of establishing specific events.

An almost unavoidable concomitant of the symmetry of these reversed relationships, David believed, is that geologists hardly ever contest what passes contemporarily as physical or chemical knowledge. Partly for this reason, David thought that Thomas S. Kuhn's analytic framework for the dynamics of scientific change (in his *The Structure of Scientific Revolutions*) was less than fully adequate in accounting for historical developments in geology. As David saw it, theoretical paradigms (historically contingent general knowledge systems such as those of physics) have indispensable roles in geological work, but their functions have been in providing tools for improved historical investigation. So while geologists do employ physical paradigms, their work accepts them as unproblematic and is not directed at testing them. (On this point he thought he detected an interesting difference between the practice of geology and that of paleontology: whereas geologists consistently avoid finding fault with physical theory, he said, paleontologists have sometimes taken issue with biological theory when they perceive it to be in conflict with the record of biological events.) As a result, David argued, the 'revolution in geology' of the 1960s, remarkable though it was as a stage in the history of geology, was not in all respects a Kuhnian revolution, since continental mobility is framed as a set of specific events rather than in universal terms.

Lest it be thought that these views amount to a denigration of geology, it should be said that David opposed as misleading any suggestion that geology is somehow less completely a science than physics. He considered it to be a science in which special kinds of difficulties have been surmounted—a science whose achievements should be counted among the great intellectual accomplishments of modern times. He pointed specifically to the fact that the sorts of events that concern geologists are enormously complex and extensive, both spatially and temporally. One need only think, for example, of the geologist undertaking to understand the origins and history of a specific mountain range. Not only is this an event of almost unfathomable complexity, it also stands outside immediate empirical accessibility. David thought that some scientists, including some geologists, habitually underestimate the conceptual intricacies involved in establishing rational methods to get from the present to the past.

While David saw himself, at least initially, as addressing mainly practicing geologists, he gradually became resigned to the fact that only a minority of geologists seem to find philosophical issues relevant to their regular concerns. However, he felt some

compensation in seeing that he met with success in turning attention among philosophers of science to the logical and historical processes in geological reasoning.

By the 1980s Kitts' philosophical interests were turning toward biology. His research in the philosophy of biology centered first on the concept of biological species, and then on the logical structure of Darwin's argument in *On the Origin of Species*, a subject he continued to investigate for many years after his retirement in 1988. In this work, as in the philosophy of geology, he closely analyzed historical and contemporary scientific and philosophical texts in order to inform philosophical claims with historical accuracy. He also continued his study of Aristotelian philosophy, of which he acquired a considerable knowledge.

David's students, colleagues and friends knew him as a man of wide interests, keen sense of humor, and remarkable energy. As a mentor and colleague he was an unfailing source of stimulation and encouragement. He possessed unusually sharp analytical skills, which made him both a valuable critic and a formidable adversary in argument—and there was little he relished more than a good argument.

Despite the effects of polio, David was an ardent cyclist, riding in England, France, all over Oklahoma and to the top of some of the highest mountain passes in both the western United States and the French Alps. He also enjoyed canoeing and rowing, and building and flying model airplanes. He suffered a stroke in May 2006, and thereafter never fully recovered his capacity for speech—a cruel blow for a man who so greatly loved conversation and debate.

In October 1945, David married Nancy Fennon in Washington, D.C. They were married for sixty-five years and had two sons, Peter W. Kitts of Troy, Montana and David J. Kitts of Santa Fe, New Mexico.

ACKNOWLEDGEMENTS

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