

margaret b. davis, president

1987–1988

The new president of the Ecological Society, Margaret B. Davis, has been a lifelong leader in the use of palynological data to study past vegetation dynamics, ecosystem processes, and response to climatic change. As ecologists reconsider the debate over equilibrium communities and the theoretical implications of nonequilibrium conditions, paleoecological records generated in recent decades provide new empirical data for examining the stability of plant and animal communities and thus offer important information for evaluating old questions. Such records typically show continuous community change and thereby challenge the concept of community equilibrium, which has been the cornerstone ecological theory for the past two decades.

Margaret Davis first became interested in past vegetation as an undergraduate biology major at Radcliffe College, where she took courses in paleobotany from Elso Borghoorn. She became intrigued by the vegetation history of the late-Quaternary as a Fulbright Scholar studying palynology in the laboratory of Johannes Iversen of the Danish Geological Survey in Copenhagen. Iversen, who was a world leader in the field of palynology, concentrated on the ecological rather than stratigraphic interpretation of pollen records, stressing the importance of understanding the physiology and ecology of plant species in order to interpret past vegetation records. While in Iversen's laboratory, Margaret changed her focus to the recent geologic past and to the role of pollen in studying plant population and community dynamics.

Margaret began palynological research in North America as a graduate student at Harvard, under the supervision of Hugh Raup. At that time, the mid-fifties, little was known of the vegetation history of North America nor of the power of palynology for resolving this history. Spurred by Raup's skepticism regarding untested assumptions, she pursued several projects during postdoctoral research at Harvard, Cal Tech, and Yale that were aimed at clarifying the relationship between pollen in



lake sediments and vegetation composition. The ultimate goal of this work was to enhance the precision of pollen records for describing past vegetation.

Working with Edward Deevey at Yale, she showed how pollen accumulation rates could be measured to supplement pollen percentages for inferring past plant population sizes. The first application of this approach at Rogers Lake helped resolve the character of late-glacial tundra and boreal forest communities in New England. This research approach has now become a standard palynological technique.

As a research associate at the University of Michigan, Margaret collaborated with John Goodlett, comparing pollen in surficial lake sediments with the composition of surrounding forests. This work led to studies of lake circulation and deposition processes affecting the pollen content of sediments. She has

maintained this research emphasis throughout her career, adding considerable understanding to the circulation and sedimentation processes in small lake basins.

Combining her interest in lake sedimentation and vegetation history, Margaret became involved with ecosystem studies at the Hubbard Brook Experimental Forest. She examined the sediment record of Mirror Lake in an attempt to understand the postglacial history of lake, watershed, and regional ecosystems. This study, done in collaboration with Robert Moeller, Gene Likens, Jesse Ford, and others, is the most thorough examination of postglacial lake sediments in North America, providing information to test ideas of sedimentation processes as well as patterns of ecosystem development, productivity, and stability.

As part of the Mirror Lake study, Margaret also examined the development of forest zonation in the White Mountains of New Hampshire. During this work she became interested in the dynamics of tree population responses to climatic change. How rapidly do colonizing populations expand in size? What constrains their response to climate? Such questions cannot be addressed by the study of modern populations.

Margaret used various paleoecological approaches to focus on these problems. She examined pollen records and forest simulation models to assess the potential magnitude and rate of forest responses to secular climatic changes in the New England mountains. She addressed the role of geographic barriers imposed by the Great Lakes and past prairie zones to the spread of American beech and eastern hemlock across the Great Lakes States. Differences in the life history characteristics of these species are reflected in their ability to establish and expand colonizing populations beyond continuous range limits.

Margaret's newest research examines the stability of canopy mosaics in hemlock-hardwood forests of northern Michigan. This work, done in collaboration with John Pastor, investigates the importance of prior forest con-

ditions to current species distributions. In particular, can species affect forest development through soil-forming processes?

In summary, Margaret Davis has made major contributions to a variety of fields within historical and neoecology. Her research has generated much primary data, which will outlive current theories and disciplinary biases. These data have been gathered to answer specific questions and test current hypotheses. Thus, despite the empirical nature of palynological data, Margaret's research has used an experimental approach. She continuously examines data quality and research assumptions—both her own and those of others. In a search for alternative explanations, she has challenged the relevance of equilibrium concepts to the understanding of past climate and community structure.

Margaret's academic career includes appointments as research associate in the Great Lakes Division and later as associate professor and professor in the Zoology Department at the University of Michigan, and professorships in the Department of Biology at Yale University and Department of Ecology and Behavioral Biology at the University of Minnesota. She was Head of the Department of Ecology and Behavioral Biology from 1976 to 1983 and has been a Regents Professor at the University of Minnesota since 1983. As in research, she has brought to university service a creative energy for solving difficult problems and developing new programs.

Margaret's professional contributions include membership on numerous national committees and boards, the advisory panel for the ecology program at NSF and the editorial board for *Quaternary Research* and *Trends in Ecology and Evolution*. In 1982 she was elected to the National Academy of Sciences. She has been president of the American Quaternary Association and now the Ecological Society of America.

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