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NEWSLETTER

Resources for the history of the Ecological Society of America
and the history of ecology and allied sciences

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Annual Meeting in New Orleans, August 5-10, 2018: Extreme Events

The theme of this year's annual meeting is Extreme Events, Ecosystem Resilience, and Human Well-being. Sessions in New Orleans explore how the impacts of events such as heat waves, droughts, floods, fires, and storms are made worse by human activities and land-use practices. They further consider how our well-being depends on maintaining ecosystem resilience, so that ecosystem functions (and hence ecosystem services) are not compromised by such events.

This year's theme offers rich ground for further exploration of the history of ecology and allied sciences. One prominent message, reiterated throughout the past century in response to environmental change, is the need for cross-disciplinary synthesis of ecology and other disciplines.

Searching for a New Kind of Synthesis

Extreme events such as the Dust Bowl of the 1930s prompted scholars from the natural and social sciences to look to ecology for new ideas. One example comes from the discipline of history. James C. Malin (1893-1979), a Kansas historian, noticed parallels between the historical methodology that he was developing for the study of the grassland regions of the United States and the methods of ecologists and other scientists. Starting in the mid-1930s he immersed himself in the ecological literature, including the writings of Henry Cowles, Frederic Clements, and many others. He was especially impressed by the ideas of Henry Gleason, whose "individualistic" hypothesis about vegetation, first proposed in the mid-1920s, challenged the Clementsian idea that ecological succession developed along a predictable path.

Malin believed that the events of the Dust Bowl posed a major challenge for deterministic theories of American history that were prevalent at that time. He viewed the world not as a closed system but as an open system of indeterminate change. But to understand how the future might develop, he sought a different approach to historical analysis. He argued that we needed a new kind of synthesis of the sciences of biology, climatology, geology, geography and soil science. One feature of this synthetic undertaking was to link the cultural history of different groups, including their deeply rooted values and traditions, with the impersonal findings of science. Malin was regarded as a maverick historian in his time, and had to publish his major study, *The Grassland of North America: Prolegomena to Its History*, privately in 1947. But he was setting the foundation for a new kind of ecological history that blended natural science, social science, and humanistic approaches.

Our second example, from the discipline of geography, involves a contemporary of Malin's, Carl Ortwin Sauer (1889-1975), who was a leading cultural geographer in the mid-20th century. Like Malin, Sauer rejected crude deterministic theories and looked to ecology for better understanding of how human populations adapted to their surroundings. His approach involved a synthesis of history, geography, ecology, and anthropology. His radical thesis was that human impact on the environment extended into the deep past. In a series of articles and books published from the 1930s to the 1960s, Sauer developed the idea that ever since humans had been on the scene, they had changed their environments and affected plant and animal evolution in significant ways. One extreme event captured his interest: as early as the 1940s he accepted the idea that humans were involved in the extinction of large mammals in North America during the Pleistocene, possibly by their use of fire, which could have set in motion major ecological changes. It was not really possible, he believed, to conceive of a "state of nature" without human impacts, as long as humans were present.

By the 1960s, controversies were developing about the stability of present-day climate, given rising carbon dioxide levels as well as increased dust in the atmosphere, both the result of human activity. F. Kenneth Hare (1919-2002), geographer and climatologist at the University of Toronto, focused on the challenge of understanding present and future climate in an address to the American Meteorological Society, at a symposium on the future of the atmosphere held in October 1969 [F. Kenneth Hare, "Future climates and future environments," *Bulletin American Meteorological Society*, June 1971, 52(6): 451-56]. At that time, there appeared to be a warming trend in the surface temperatures of the northern hemisphere between 1880 and 1940, followed by a slight cooling trend after 1940. Atmospheric dust was thought to be the cause of the cooling trend.

Hare concentrated on the need to combine the approaches of different disciplines to create a predictive science of climate change. "We have organized natural science", he complained, "so as to sunder one of the great natural unities." Physicists and chemists studied the atmosphere, whereas the land surface belonged to biologists, geologists, geographers, and soil scientists. Plant physiologists and ecologists stopped short of studying the links between biosphere and atmosphere. These boundaries had to be overcome to meet modern environmental challenges. He envisioned a "new kind of scientist who will have, I hope, a meteorological nucleus but many outer shells of a different kind." The greatest need, he argued, was for a transdisciplinary theory of how exchanges between atmosphere, biosphere, and soil were related to the stability and dynamics of the vegetation cover.

The comment about the importance of having a meteorological nucleus would not have been lost on H. T. Odum (1924-2002), one of the founders of ecosystem ecology (along with his brother Eugene) and a strong proponent of large-scale systems perspectives. The Odums' father, Howard Washington Odum, a sociologist, was one important influence on his two sons. H. W. Odum had become interested in ecology in the 1930s, because he saw a link between the ecological study of biomes and the regional approach to sociology that he was developing. But H. T. was also shaped by his military service in the 1940s, when he trained as a meteorologist in the Air Force. Among other things, he worked on developing new methods of forecasting hurricanes. As he recalled in a later interview with Cynthia Barnett, "You cannot predict the weather looking out the window; you have to look at the frontal systems, and so forth." His meteorological training, Odum explained, "was extremely important to me because you learn not only about

the earth and processes and engineering approaches to things, but also this view of the top-down, the systems-view, the real systems-view." Odum's systems view led to the development of what he called a "macroscopic" approach to ecosystems, one that linked natural and human systems and considered economic exchanges along with exchanges of matter and flows of energy within complex systems. This too was an inherently multi-disciplinary and transdisciplinary approach.

Across many disciplines certain themes have recurred over the course of the 20th century. Prominent among them is the need to advance our understanding of environmental problems by linking disciplines and seeking a transdisciplinary framework. Today's goals of maintaining ecosystem resilience, preserving ecosystem services, and linking ecosystem resilience to human well-being, similarly demand a multi-disciplinary approach, and likewise challenge us to forge new kinds of syntheses that break down disciplinary barriers.

Archival resources:

F. Kenneth Hare Papers are at the archives of Trinity College, University of Toronto, Toronto, Canada.

The James C. Malin Collection is at the Kansas Historical Society, Topeka, Kansas. Finding aid online: https://www.kshs.org/p/james-c-malin-collection/14064

Howard T. Odum archives are at the George A. Smathers Library, Special and Area Studies Collections, University of Florida, Gainesville.
Finding aid online: http://www.library.ufl.edu/spec/archome/MS130.htm

H. T. Odum interview with Cynthia Barnett, University of Florida, Gainesville. Online at: http://ufdc.ufl.edu/AA00004025/00001/5j

Carl O. Sauer's collection of research notebooks (1930-1955) is at the Bancroft Library, University of California-Berkeley. Finding aid online: https://oac.cdlib.org/findaid/ark:/13030/c8cn7540/entire_text/

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