

Paul B. Sears: The Role of Ecology in Conservation

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ABSTRACT. Paul B. Sears made his mark in four interrelated fields: botany, natural history, ecology and conservation. His personal commitment to, and academic and professional competence in plant sciences paved the way to a rigorous analysis of the intricate interrelationships among living things and their environments that are of central concern to ecologists. However, Sears' contributions as a conservationist may have been even greater, as he championed the need for coherent communication between the professional scientist and the lay public, especially political decision-makers. He believed that environmental choices can be scientifically sound only to the extent that they understand the nuances and implications of the science underlying their practical concerns and obligations. Sears maintained that scientists must communicate their findings in language that is understandable and with a sense of urgency that can elicit a positive response. Several of his own works, particularly *Deserts on the March*, clearly exemplify how this can, and should be, accomplished. He also left an enduring contribution to society: a sharpened focus on the meaning and necessity of an ecological perspective on the human role in nature.

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In 1988, an Ohio biologist visiting 97-year-old Paul Bigelow Sears in Taos, New Mexico, found himself the examinee in an impromptu field quiz. The question was: "How long had sagebrush been the dominant plant species here?" The response was: "probably since antiquity; what else could this climate and soil support?"

However, according to Sears, this response was not consistent with available information. Historic records indicate that the area was covered by grasslands as recently as a few hundred years ago. Overgrazing, along with soil compaction by herds of cattle and horses managed by Spanish ranchers extirpated native grasses creating a desert with sagebrush the area's primary, viable, life form. Sears believed that a sagebrush-dominated desert caused by human activities would probably persist (Charles C. King, personal communication).

Sears' reputation is based on his work as an ecologist and a conservationist. He is especially renowned for 13 popular works, including *Deserts on the March* (1935), *This Is Our World* (1937), *The Living Landscape* (1966) and *Lands beyond the Forest* (1969). In particular, the publication of *Deserts on the March* had extensive impact on public understanding of the forces that caused the phenomenon known as the American Dust Bowl of the 1930s (Brooks 1980). Quoting Sears (1935):

The white man in a few centuries, mostly in one, reversed the slow work of nature that had been going on for millennia. Thus have come the deserts, so long checked and held in restraint, to break their bonds. At every step, the girdle of green about the inland deserts has been forced to give way and the desert itself literally allowed to expand. On the coast where once was forest the trees are gone. In the grassland which was once unbroken is inferior growth and much bare soil. Just as we have seen that under extremely favorable conditions, the vegetation can move inland beyond its usual climatic limits, so now we see the process reversed. With the restraining influence of soil and vegetation broken, the desert moves outward from its proper climatic confine, and because of cultural or artificial conditions comes to occupy the place that rightfully belongs to other provinces.

The laws which govern the development of soil and vegetation are as inescapable as the laws of conservation of energy and of matter upon which they are based. No matter how complex or seemingly mysterious the operations of the organic world, they are still based upon cause and effect. It is as impossible to get something for nothing, as it is to make water run uphill. Balance and equilibrium are demanded by nature. If man destroys the old order, he must take the consequences. There is no magic that will undo the mischief he has wrought.

In reviewing discussions of Sears' career and contributions, the descriptive terms "ecologist" and "conservationist" frequently appear in the same paragraph, frequently in the same sentence. Sears also achieved acclaim as a botanist and a naturalist. At one point, he referred to ecology as "natural history in a new guise." He also observed, "the rise of the ecologist almost exactly parallels the decline of the naturalist." Taken together, these four overlapping fields, ecology, conservation, botany and natural history, are concerned with a broad range of perspectives on the natural world and man's interrelationships with it.

In elaborating on a comment by Paul Shepard (1969) that "the trouble with naturalists is that they are always against something," Nash (1989) grouped ecologists, conservationists and naturalists together as individuals seeking change in the way society approaches natural resource and other environmental problems. In 1964, Sears referred to ecology as "a subversive subject," in the sense that it "...has mounted a powerful threat to established assumptions in society and in economics, religion and the humanities, as well as the other sciences and their ways of doing business." Lynton Caldwell (1971) also referred to ecology as a "subversive science" and both he and Shepard appear to have followed Sears' lead and certainly his argument.

Sears also saw ecology and conservation as "subversive" in the academic community because ecology did not conform to established disciplinary definitions. He spent much of his career establishing ecology within the academic community and was successful to the extent that his own inexhaustible energy, prodigious productivity, formidable scholarship and reputation for excellence allowed.

Deserts on the March clarified the enormity of the task of bringing soil erosion under control through effective land management. Sears

¹Posthumously published.

provided evidence of human impacts on the environment globally over times with lucid descriptions of ecological ramifications that were clear and compelling. His approach was similar to views of George Perkins Marsh (1874), of contemporaries and near contemporaries including Stuart Chase (1936), Walter Lowdermilk (1953), William Vogt (1948), Fairfield Osborn (1948) and Harrison Brown (1954) and of more recent writers including Lester Brown (1978) and Gerald Barney (1980).

Sears suggested communication strategies and governmental staffing policies that still have not been effectively considered and implemented (Speth 1988). In particular, he was critical of the failure of scientists to communicate their findings to political leaders and the public in language suggesting a sense of urgency that was easily understood. His own popular books were designed to meet this objective. He also strongly recommended the hiring of a “resident ecologist” in each county as a grassroots-level expert, a gatherer of local data and purveyor of ecological information... devoting his energy to study and his thought to the future,” and supplementing the efforts of the county agricultural agent by “... furnishing the sustaining background of policy which...is too often lacking in the strain of meeting problems directly (Sears 1935).” He continued:

The ecologist, with all of his professional training, should be chosen with some regard for his talents as a publicist. People no less than plants and animals are a part of his material. He should of necessity have the equipment to work with them, comprehend their problems, and admit them to his own confidence, for unless the general citizenry catch an understanding of the whole scene of which they are part, they will not be fitted to participate in a solution of their own problems. And upon their capacity to do so, if honestly and well informed, are free institutions predicated.

Sears had great hopes for the Soil Conservation Service of the United States Department of Agriculture, which also began in 1935. However, he saw the realities of the practical situation: “Yet we must not forget that this unit, like the Forest Service, has to operate in a democracy and cannot develop effective strength beyond that which public sympathy and support will confer upon it.” (Sears 1935).

Donald Worster (1979), a premier historian of ecology, identified *Deserts on the March* as the most important popular ecological work of the 1930s. It was a selection of the Book Find Club. During the late 1930s and 1940s, Aldo Leopold specifically recommended it to Wisconsin schoolteachers for use with their students in the study of conservation (Meine 1988). In 1988, it was re-issued by Island Press as an entry in its Conservation Classics series. The distinguished naturalist, writer and editor Paul Brooks (1980) acknowledged Sears as a gifted scientist and writer who “... deplored the failure of most scientists to impart their knowledge to the general public, to bridge the gulf between what C. P. Snow later called ‘the two cultures.’” As Sears said it: “Among those who have achieved professional distinction by their original work, is the honorable exception who has taken pains to explain to the man on the street what he is trying to do. Yet the greatest have never been ashamed to do this ...” (1935).

Paul Sears was a key figure in botany, natural history, ecology and conservation both in Ohio and nationally (Stuckey 1990). His location at the University of Oklahoma, (1927-1938), provided the opportunity, and at least some of the motivation, to write *Deserts on the March*. It also may be interpreted as an

opportunity for redirection, in the sense that Sears began dealing with broader audiences than the readers of technical papers. He became a man with a mission. If the difference between “ecologist” and “conservationist” is definable in terms of differences in audiences sought and served, this is the point where Sears added conservationist to his suite of professions. As an early example, he became chairman of the Oklahoma committee that drafted the first soil conservation district law in that state.

The conservationist came through particularly loudly and clearly while Sears was at Oberlin College. His discussion of the history of conservation in Ohio (Sears 1942) traced the progress of conservation legislation in the state through three periods: the “pioneer agricultural phase” (1790-1850), the “industrial transition phase” (1850-1900) and the “neotechnical urban phase” (1900-1940). Sears saw these transitions as an effort to “... produce a permanently balanced relation between a human group and its environment ...” by conservation of natural resources “... to obtain the maximum good for the longest possible time.” This report was extended and updated in a paper for the Ohio Mid-Century Governor’s Conference on Natural Resources, Ohio’s Conservation Record, 1908-1958 (Sears 1958a). In his address as he assumed the presidency of the Ohio Academy of Science, Sears (1950) highlighted successes and failures of human interactions with environment and summarized much of his conservation philosophy.

A native of Ohio, Sears was a distinguished participant in academic activities at Ohio Wesleyan University as a Phi Beta Kappa undergraduate in zoology and economics (1909-1914), at The Ohio State University as an instructor in botany (1915-1919) and at Oberlin College as professor and department chairman of botany (1938-1950). Out of state, Sears earned an MA in botany from the University of Nebraska (1915) and a PhD *summa cum laude*, also in botany, from the University of Chicago (1922). He served as a faculty member in botany at the University of Nebraska (1919-1927) and at the University of Oklahoma (1927-1938). From 1950-1960, he was professor of conservation and founder and chairman of the Conservation Program at Yale University. This was the first graduate program in conservation of natural resources in the United States (Stroud 1985). He became professor emeritus in 1960, at which point the Yale program came to an end, probably because it was ahead of its time and, in the absence of its progenitor, was unable to maintain an identified niche in that university’s academic ecosystem. The program was revived later as “Environmental Studies” in what is now the Yale School of Forestry and Environmental Studies (Lee 1991).

Sears’ emphasis was on the demands of nature on humans and human institutions. He pointed out that natural resource problems require an ethical re-evaluation of the American way of life, directly questioning and challenging the appropriateness of individual decisions that permit apparently insatiable patterns of consumption (Barnett and Morse 1963). Sears (1958b) strongly endorsed a common element he detected in statements by Aldo Leopold, Fraser Darling and Albert Schweitzer: “an insistence on ends greater than the immediate satisfaction of the individual.”

Sears also addressed aesthetic aspects of sound conservation practice: “... there are only two kinds of landscape that are tolerable—one where man has never been; the other where he has achieved harmony.” However, he based his arguments for the need for conservation on rigorously determined scientific information, not on ethical grounds or aesthetic considerations (Sears 1958b).

Sears' enduring contribution is the importance of understanding the meaning and necessity of an ecological perspective on the human role in nature. For scientists are in positions and professionally obligated to communicate scientific information to the general, nonscientific public. Sears is the consummate role model in this regard. As he insisted (1953): "underlying all technological aspects of conservation is the need for a value system, generally accepted, that takes into account the limitations and possibilities of biological process."

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