1-1-1985

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1985. *Transactions of the Nebraska Academy of Sciences,* XIII: 107-110.

HISTORY OF SCIENCE

THE PAUL SEARS I KNOW

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A compact review of the contributions Paul B. Sears made to science should be part of the record commemorating the 60th anniversary of his presidency of the Nebraska Academy of Sciences. The recollections presented here refer to the multitude of things he has done, primarily as an ecologist. However, the overriding objective is to give a glimpse of the exceptional person his associates have come to know.

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It is indeed an honor to give a commentary on Paul Bigelow Sears in recognition of the 60th anniversary of his presidency of The Nebraska Academy of Sciences. Those who want to know more about his scientific achievements will find that Love Library, University of Nebraska-Lincoln, has a commendable number of his publications. Reading any of them will eventually provoke the question: What sort of a human being is this man Sears? Providing a partial answer to that question is the primary objective of this thumbnail sketch.

I first saw Dr. Sears on the Agricultural Campus of the University of Nebraska in the spring of 1927. He was on his way to the Plant Industry Building to teach the beginning course in plant physiology. Dr. Harvey Werner of Horticulture, my advisor at that time, had just told me that this botanist was looking for graduate students. He urged me to become one of them. Never having had a course under Dr. Sears, I had to rely on recommendations; and a faculty opinion, impressive as it was, left an uncomfortable hiatus in my immature mind. I wanted to know how students reacted to this man. A close friend of mine, Marx Koehnke, who had taken his course in plant physiology, agreed enthusiastically with Werner that Sears was tops. So in the fall I became a Sooner with Sears when he went to the University of Oklahoma as Professor and Head of Botany.

Since leaving his faculty in 1933 to work on a Ph.D., I have kept more or less in touch with him. Surely, the summarizing of his contributions should be no problem. Not so! On the one hand, Sears was never dormant; and on the other hand, many other matters competed for my attention. As years went by, he kept adding to his thought-filled books and professional papers—which may or may not have come to my attention.

Sears's profound regard, almost reverence, for the essential dignity of the individual has always impressed me deeply. As a major professor of graduate students, he had an uncanny insight into their individual needs. He listened more often than he directed.

Whenever possible, graduate students chose their own thesis problems. Jack (Dr. Aaron J.) Sharp, Professor Emeritus of the Botany Department at the University of Tennessee, concentrated on the bryophytes of southeastern Oklahoma. I followed up my summer's experience at the experiment station in Oak Harbor, Ohio, where Sears, Fred Bukey, and I began trying to find out what attracts the moth of the European cornborer to its principal host (my master's thesis dealt with cell specialization in the epidermis of maize). Phyllis Draper, who affectionately referred to Sears as "Uncle Paul," let him pick her problem. She did the first paper in the United States on the study of fossil pollen in bog sediments.

The Oklahoma experience was a saga for us graduate students. In response to a letter I wrote him, Sharp (1984, personal communication) expressed it this way: "I remember the weekly social get-to-gethers at the Sears' home the first year when we all were getting acquainted—his and our first year at O.U. They were great."

Sometimes these weekly events were dinners with all the trimmings. At one of them, Sears sparked interest by making special place cards without names. Each card was inscribed with a conundrum of sorts, set off by mini-sketches. Mine read, "His skin is full of corn, but he's a sober lad" (referring to my research on the epidermis of maize).

A field-trip enthusiast himself, Sears took us to many interesting natural settings from the Wichita Mountains on the west to the Ouachita Mountains on the east. Included were sites in between, especially the Arbuckle Mountains.

One of his master's students, Helen Vincent, took her studies a bit too seriously. Her oral examination had been a nightmare for her. To convey his understanding of her inner turmoil, at the end of the grilling Sears handed her one of his impulsive sketches made during her ordeal. Looking at her from the paper was a dog with pleading eyes and with a tin can tied to his tail.

Nebraska Poet-Laureate John G. Neihardt once gave a talk on the University of Nebraska-Lincoln campus in which he reduced all art to a format of dimensions. Looking at art this way, writing has one dimension, painting and sketching two, sculpture three, and music no dimensions at all. Whether he realizes it or not, Sears has tried his hand at all four. Of course, he is best known for his contributions to the art of one dimension, writing. But, his flair for the art of two dimensions, sketching and painting, is a second nature to him. See, for example, his many pen sketches in *This Is Our World* (1937). When I bought a copy of this book, he whipped off a sketch with a small, wispy brush, producing a truly distinctive autograph which I proudly pasted on the front flyleaf of my copy. He also did extensive sketching for his book, *Who Are These Americans?* (1939). Occasionally, he sends special greetings to friends on small cards with the other side done in color.

Some years ago he was absorbed in an art of three dimensions, making wood blocks, which he chiseled from apple wood and printed on a press of his own design.

His love for the art of no dimensions, music, must not be overlooked. He had learned to play the violin. But while at the University of Oklahoma, he played the viola in the university's symphony orchestra (there were plenty of violinists, but the director needed a violist). In recent years, when he visited my home in Lincoln, he always brought along his violin because he knew that my wife, Martha, skilled at sight reading music, could accompany him at the piano. In Taos, New Mexico, where he has lived since "retirement," he has introduced several youngsters into the delight of playing the violin.

Highlights of the Sears family, past and present, are essential to this résumé. Richard Sears came from England in 1630 on the third voyage of the Mayflower. He was the first American in the genetic line to which our Paul Sears belongs. [Paul neglected to mention this geneological bit to us in Oklahoma: I found it very recently in the *National Cyclopedia of American Biography* (Anonymous, 1964).] Paul Bigelow Sears was born in a modest home in Bucyrus, Ohio, 17 December 1891. He spent most of his growing years in a large, eye-catching residence of native red brick, designed by his grandfather in 1860. This impressive structure, with its corner tower extending through three stories, has recently been placed on the National Register for Historic Sites.

Paul Sears married Marjorie Lee McCutcheon on 22 June 1917. They reared three children: Paul McCutcheon, Catherine Louise (Frazer), and Sally Harris. Presently, the family includes four grandchildren, four great-grandchildren, and Mrs. Marguerite Saxer, who recently became Mrs. Paul Bigelow Sears, following Marjorie's death after 65 years of beautiful companionship.

Sears has a B.S. in zoology (1913) and a B.A. in economics (1914) from Ohio Wesleyan University and an A.M. in botany from the University of Nebraska (1915). His instructorship in botany at Ohio State University was interrupted by military service. In 1918 he became a private in the army, rose to battalion sergeant major in the infantry, and finished in the air force at Dorr Field, Florida.

He was Assistant Professor and then Associate Professor of Botany at the University of Nebraska (1919-1927) when Dr. Charles Bessey was chairman. During his assistant professorship, he continued his research on the dandelion and wrote his doctoral thesis, "Variations in Cytology and Gross Morphology of *Taraxacum*." The University of Chicago granted his Ph.D. degree in 1922.

Sears was Professor and Head of the Botany Department at the University of Oklahoma (1927-1938) and Oberlin College (1938-1950); Chairman of the Conservation Program (1950-1960) and Chairman of Plant Science (1953-1955) at Yale University and Professor Emeritus since 1960. During these years, he contributed to botanical journals and magazines and lectured on ecology at other institutions.

He wrote eight books and revised three of them. Also, he collaborated with others to write two additional books. The complete list includes: *Deserts on the March* (1935), which merited the 1937 Book of the Month Fellowship Prize of $2,500; *This Is Our World* (1937); *Life and Environment* (1939); *Who Are These Americans?* (1939); *This Useful World* (1941); *Charles Darwin: The Naturalist As a Cultural Force* (1950); *Where There Is Life* (1962); and an expanded version of this book, *The Living Landscape* (1966); *The Biology of the Living Landscape* (1964); *Lands Beyond the Forest*

(1969); the third revision of *This Is Our World* (1971); *Wild Wealth* (1971); and the fourth revision of *Deserts on the March* (1980).

His honorary degrees include: D.Sc., Ohio Wesleyan University (1937), Oberlin College (1958), and Bowling Green State University (1968); Litt.D., Marietta College (1951); L.L.D., universities of Arkansas and Nebraska (1957) (Fig. 1) and Wayne State University (1959).

Sears has the ability to crystallize finely tuned factual appraisals of people and ideas. Take for example, the Galileo fuss. Sears (1950) summarized it this way: "The discipline visited upon Galileo, while a regrettable page in the history of knowledge, had more to do with his manners than his findings." Or consider his estimate of another philosopher (1950): "The great St. Thomas Aquinas, eminently clear-headed, understood the validity of natural knowledge, but made it subordinate to spiritual knowledge."

Sears belongs to the Botanical Society of America, the American and the Connecticut academies of Arts of Sciences, the Society of Natural History of Mexico, Sigma Gamma Epsilon, Phi Sigma, Sigma Xi, Phi Beta Kappa, and Delta Tau Delta. He was president of the American Society of Naturalists and the Ecological Society of America. He shares with Charles Bessey the honor of having been president of both the Nebraska Academy of Sciences and the American Association for the Advancement of Science. He was a trustee of the Pacific Botanical Garden, 1963-1971.

He has done his share on the work forces of science, including the State Biological Survey of Oklahoma (1928-1938), the National Committee for the Development of Scientists and Engineers formed in 1956, and a six-year term on the National Science Board of the National Science Foundation. Beginning in 1959, he became a member of the Advisory Committee on the Peaceful Uses of Atomic Energy of the U.S. Atomic Energy Commission. For years he has been a collaborator with the Soil Conservation Service. He was on the Ohio Wildlife Council (1944-1952) and Past Director and Chairman of the Board of the National Audubon Society and now an Honorary President.

Sears was also a director of the Virginia-Carolina Chemical Corporation, Richmond, Virginia (1956-1960) and of the Crawford County National Bank of Bucyrus (1942-1963).

But let us get back to his major interests, the dynamics of vegetation and their relation to the human race. By 1932 he had demonstrated the general pattern of post-glacial climatic changes in the north-central states, using analysis of fossil pollen in organic sediments. This pattern closely parallels that of Europe and includes conditions warmer and drier than the present, thus explaining relicts of western vegetation in the east and probably explaining certain cultural shifts among American Indians. Similar studies in Mexico in 1948 showed a correlation between cultural activities and lake levels as determined by climatic changes. Currently Sears is involved in several ecological and human problems of the American Southwest.

FIGURE 1. Paul Bigelow Sears (left) being presented an Honorary L.L.D. by Clifford Hardin, Chancellor of the University of Nebraska in 1957.

Invaluable as his contributions to knowledge are, Sears does not rank them as his primary accomplishments. His self-evaluation (1967) may be a surprise: "Teaching is my profession and has been for more than half a century. Now that retirement has freed me from the grimmer aspects of academic life, I have nothing to lose by referring to my research as an avocation. Largely it has been concerned with the total landscape; not only earth-forms and the climates that impinge upon them, but the living communities that clothe and give them character."

Certainly, whether we know him personally or not, all of us owe a perennial vote of thanks to this naturalist, master mentor, and staunch friend who did so much to integrate the diverse scientific and philosophical disciplines created by humankind in such a way as to strengthen all of them.

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