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# The History of Plant Ecology in Iowa as Reflected in the *Proceedings of the Iowa Academy of Science*

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VAN DER VALK, A. G. (Department of Botany and Plant Pathology, Iowa State University, Ames, Iowa 50010). The history of plant ecology in Iowa as reflected in the *Proceedings of the Iowa Academy of Science*. *Proc. Iowa Acad. Sci.* 81 (1, pt. 2) 65-71, 1975.

All plant ecology papers published in the *Proceedings* from 1887 to 1973 were identified. On the average only 1.4 papers were published per year. An examination of the number of papers published in successive five-year intervals indicates that there were three distinct periods in the history of plant ecology in Iowa with three individuals dominating each period: 1887-1931—L. H. Pam-

mel, B. Shimek, and Ada Hayden; 1932-1951—H. S. Conard, J. M. Aikman, and Ada Hayden; 1952-1971—J. M. Aikman, R. F. Thorne, and R. Q. Landers. There have been very few active plant ecologists in Iowa, and more than 50 percent of all the papers published in the *Proceedings* were authored or co-authored by only 10 people. All the papers identified are also classified according to subject matter.

INDEX DESCRIPTORS: History of Plant Ecology, *Proceedings of the Iowa Academy of Science*, Prairie Vegetation, Forest Vegetation, Wetland Vegetation, Plant Ecology Bibliography.

Plant ecology in the United States originated in the mid-west at the close of the 19th century (Sears, 1969). Its formal beginning was marked by the publication of H. C. Cowles' classic study of succession on Lake Michigan sand dunes (Cowles, 1899). This was soon followed by the publication of F. E. Clements' immensely influential book, *Plant Succession* (Clements, 1916). These two pioneer midwestern ecologists created a theoretical framework based on the central concept of community succession which underlies nearly all subsequent work in American plant ecology. H. C. Cowles received his doctorate in 1898 from the University of Chicago and remained on the staff there for his whole academic career. F. E. Clements received his doctorate in 1898 from the University of Nebraska and stayed on as a staff member until 1907. He then moved to the University of Minnesota where he remained for 10 years (Humphrey, 1961). During the early years of the Iowa Academy of Science, Iowa was therefore literally in the center of the emergence of this new discipline.

In this paper I will examine the development of plant ecology in Iowa as reflected in the *Proceedings of the Iowa Academy of Science*. This will be done through an examination of the papers published annually in the *Proceedings* on topics in plant ecology to ascertain: how many papers appeared during different periods, who were the major figures in plant ecology publishing in the *Proceedings*, and what areas of plant ecology received the greatest attention.

## METHODS

All papers on topics that are considered in my judgment to be in the realm of modern plant ecology and on which papers are being published in contemporary plant ecology journals were identified in each issue of the *Proceedings*

through the end of 1973. Since the first volume of the *Proceedings* contains papers presented at meetings over a number of years, all papers were grouped for tabulation purposes by the year the paper was presented rather than on a volume basis.

It was generally very easy to decide if a paper should be included or excluded from consideration in this paper. There were several areas, however, where problems arose. Floristic surveys were excluded from consideration, except a few containing detailed descriptions of plant communities. Papers on seed germination and seedling establishment were only excluded if the work was obviously of a horticultural nature. Papers dealing with the control of soil erosion using vegetation plantings were another borderline area, but most of these were sufficiently ecological to be included.

Also excluded were nearly all abstracts and all published titles. The few abstracts included contained good summaries of data presented in the oral presentations.

No attempt was made to judge the quality of the papers encountered.

## RESULTS AND DISCUSSION

It should be made clear from the outset that many of the people who published articles on topics in plant ecology would not have considered themselves plant ecologists. All of the early authors had a wide variety of interests and published extensively in other areas such as geology, plant taxonomy, and plant physiology. In fact, most of the dominant figures publishing in the area of plant ecology in the *Proceedings* were plant taxonomists by training.

Only 124 plant ecology papers have been published to date (see Table 1), and on the average only 1.4 papers have been published per year in the *Proceedings*. There have been 25 years in which no plant ecology papers were published at all. The maximum number of papers appearing in one year in the *Proceedings* is five. This occurred only once, in 1966. The full breakdown of the number of papers per year is presented in Table 1. Years when four or more

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TABLE 1. THE NUMBER OF PLANT ECOLOGY PAPERS PER YEAR PUBLISHED IN THE PROCEEDINGS OF THE IOWA ACADEMY OF SCIENCE FROM 1887 TO 1973

Number of Papers per Year	Number of Years
0	25
1	27
2	15
3	10
4	8
5	1
<b>TOTAL</b>	<b>86</b>

papers appeared in the *Proceedings* coincide with the peaks in Figure 1 (see below). Altogether, plant ecology papers account for only one to two percent of all the papers published in the *Proceedings*.

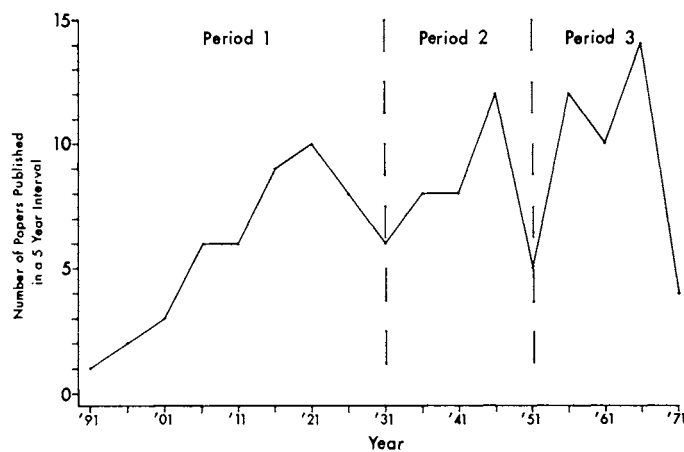


Figure 1. Number of plant ecology papers published in the *Proceedings* during successive five-year intervals from 1887 to 1971.

The forest vegetation of Iowa was the topic which most interested the state's first plant ecologists. L. H. Pammel's 1891 paper on the "Forest vegetation of the Upper Mississippi" was the first plant ecology paper published in the *Proceedings*. Two other plant ecologists who published before 1900 also had papers on this subject (Macbride, 1895; Shimek, 1899). Plant ecology in Iowa, then, dates back to the 1890's and began here at the same time as in Illinois and Nebraska (Sears, 1969).

The number of papers published in successive five-year periods beginning in 1887 is presented in Figure 1. This graph shows that there have been three periods during which the number of papers rose to a peak and then dropped off sharply. These three periods run from 1887 to 1931, 1932 to 1951, and 1952 to 1971 (Figure 1).

An examination of the authors of papers published during each period indicates that three individuals dominated each period. However, the career of one of them always spans two successive periods. During the first period (1887-1931), two of Iowa's pioneer plant ecologists were active: Bohumil Shimek (1861-1937) working at The University of Iowa, whose papers dealt primarily with prairie and forest vegetation in Iowa, and L. H. Pammel (1862-1931) at Iowa State

University, who worked primarily on weed populations and the vegetation of the Rocky Mountains. During the last part of this period Ada Hayden (1884-1950), also at Iowa State University, began to publish on prairie ecology. The second period (1932-1951) was dominated by Ada Hayden and H. S. Conard (1874-1971; retired 1944) working at Grinnell College, and during the latter portion by John M. Aikman, who was on the staff of Iowa State University. Conard's papers deal primarily with moss communities; Aikman's with a wide variety of subjects including soil erosion control, prairies, forests, and competition. The final period (1952-1971) includes the remainder of John Aikman's academic career (he retired around 1962). It was also dominated initially by the taxonomist Robert F. Thorne at The University of Iowa. Thorne's impact is much greater than the few papers he co-authored in the *Proceedings* would suggest. His students (J. L. Carter, L. J. Eilers, T. G. Hartley, and K. E. Holte, among others) published many descriptions of vegetation types both in and outside Iowa during this period. Thorne left Iowa around 1962. The only active, publishing plant ecologist during the final years of this period was Roger Q. Landers, who replaced Aikman at Iowa State University. Landers' papers deal primarily with prairie restoration and management.

Because Iowa has had so few plant ecologists active at any one time, the death, retirement, or departure from the state of one individual has had a striking influence on the number of papers appearing in the *Proceedings* in a given period (Figure 1).

Table 2 contains a list of the most prolific authors of papers, their affiliations, and the period they were active. These 10 individuals authored or co-authored more than 50 percent of all the plant ecology papers in the *Proceedings*. Only four Iowa universities or colleges have had active plant ecologists: The University of Iowa, Iowa State University, Grinnell College, and Iowa Wesleyan College. Of the four schools, Iowa State has had the largest number of plant ecologists on its staff, followed by Grinnell and then The University of Iowa and Iowa Wesleyan College. However, The University of Iowa and Grinnell had the most famous and influential plant ecologists both inside and outside of Iowa on their staffs: Shimek and Conard.

Shimek posthumously published the first attempted synthesis of information on the vegetation of Iowa (1948). This was soon followed by Conard's "The vegetation of Iowa" (Conard, 1952). However, Shimek is primarily known for

TABLE 2. THE NUMBER OF PAPERS AUTHORED OR CO-AUTHORED IN THE PROCEEDINGS, PLUS THE AFFILIATION AND PERIOD(S) OF ACTIVITY OF ALL PLANT ECOLOGISTS WHO PUBLISHED FOUR OR MORE PAPERS

Author (affiliation)	Period Active*	Number of Papers
J. M. Aikman (I.S.U.)	2, 3	12
L. H. Pammel (I.S.U.)	1	11
Ada Hayden (I.S.U.)	1, 2	8
B. Shimek (U.I.)	1	7
R. Q. Landers (I.S.U.)	3	6
H. S. Conard (Grinnell)	2	4
H. E. Jacques (Wesleyan)	1, 2	4
J. N. Martin (I.S.U.)	2	4
N. H. Russell (Grinnell)	3	4
F. E. A. Thone (Grinnell)	1	4
<b>TOTAL</b>		<b>64</b>

\* 1-1887 to 1931; 2-1932 to 1951; 3-1952 to 1971.

his early papers on prairies (Shimek, 1911, 1913, 1925). Conard's reputation nationally and internationally is to a large extent the result of his translation of Anton Kerner's *The plant life of the Danube Valley* into English (Kerner, 1951) and his translation, with G. D. Fuller, of the first edition of J. Braun-Blanquet's *Planzensoziologie* (Braun-Blanquet, 1932). This still remains the only major work of this foremost European plant ecologist in English and its translation had a profound effect on the development of plant ecology in the United States during the middle third of the century.

A breakdown by topics of the papers published in the *Proceedings* reveals that papers have been published on a fairly wide variety of subjects. However, about 55 percent of the papers published have been vegetation surveys. These include many surveys done outside Iowa (Pammel, 1902, 1904, 1914, 1922, 1925; Gow, 1904; Fink, 1906; Macbride, 1913; Peck, 1915, 1919, 1920; Anderson, 1916; Pammel and Cratty, 1920; Trenk, 1925a; Wilson, 1936; Drexler, 1941; Warner, 1945; Russell, 1953, 1955a, b; Aikman, 1955; Ward, 1956, 1957; Hartley, 1960). Vegetation surveys in Iowa fall into four subgroups: forest vegetation (Pammel, 1891; Macbride, 1895; Gow, 1898; Shimek, 1899, 1901; Trenk, 1925b; Clark, 1926; Conard, 1938; Larsen and Dillworth, 1938, 1939; Loomis and McComb, 1944; Aikman and Gilly, 1948; Dick-Peddie, 1953; Scholtes, 1953; Dimit and Russell, 1954; McComb and Thomson, 1957; Graf *et al.*, 1965; Sanders, 1968); prairie vegetation (Shimek, 1910, 1924; Hayden, 1911, 1918, 1945; E. Shimek, 1915; Burk, 1928; Anderson, 1936, 1945; Hayden and Aikman, 1949; Rudman and Pohl, 1951; Aikman and Thorne, 1956; Morrissey, 1956; Ehrenreich and Aikman, 1957; Hinz, 1961; Sorensen, 1962; Freckmann, 1966; Christiansen and Landers, 1969; Crum, 1972; Richards and Landers, 1973); wetland vegetation (Shimek, 1896; Wylie, 1920; Catlin and Hayden, 1927; Aitken, 1936; Grant and Thorne, 1955; Conard, 1958; Holte and Thorne, 1962; Volker and Smith, 1965); and general papers on the vegetation or plant geography of Iowa (Boot, 1917; Pammel, 1923; Catlin and Hayden, 1927; Davidson, 1960; Carter, 1963; Eilers, 1963, 1965). Papers on other topics have accounted for generally less than eight percent of the total number of papers published. Papers in physiological plant ecology on such topics as seed germination and water relations account for a large group of papers (Fawcett, 1908; Pammel and King, 1910; Aikman, 1934; Bakke, 1938; Turrell and Turrell, 1943; Martin, 1943; Weber, 1951; Bakke and Sylwester, 1953; McWilliams *et al.*, 1966; Christiansen and Landers, 1966). Topics in applied ecology, especially relating to soil conservation and weed populations, have also received a fair amount of attention in the *Proceedings* (Baker, 1906; Pammel, 1910; Pammel *et al.*, 1928; Aikman and Boyd, 1941; Aikman and McDermott, 1943; Hayden, 1944; Martin, 1944; Aikman, 1945; Landers, 1966). Phenological studies have been published occasionally (Jacques, 1918; Dodds and Jacques, 1934; Jacques and Hilleary, 1945; Conard, 1946; McConnell and Russell, 1959; Baird and Ignoffo, 1958), as have papers on succession (Thone, 1915, 1916, 1917, 1918; Adams, 1929; Aikman and Barr, 1939; Pohl and Loomis, 1963; Cowley, 1965). A number of topics are barely represented in the *Proceedings*. These include competition (Aikman, 1928); pollination ecology (Kenoyer, 1916a, b); life histories (Martin, 1935, 1938); production ecology (Weber, 1958, 1963); microclimate studies (Aikman, 1930, Dodge

and Aikman, 1932); and population ecology (Jacques, 1926). There are also a number of papers which are difficult to classify (Shimek, 1902, 1908; Conard, 1932; Hayden, 1945, 1948; Allen *et al.*, 1970).

The breakdown of papers by topics reveals an important fact about the lack of development of plant ecology in Iowa since its early years. Before the Second World War, most plant ecologists throughout the world were concerned with vegetation descriptions (synecology) and this was the type of publication appearing in the *Proceedings*. Since the Second World War, the horizons of plant ecology have expanded greatly (see McIntosh, 1974). Ecologists have begun to look more at the interactions between plants and their physical environment, between different species of plants, and between plants and animals. Unfortunately, this change in emphasis, found in national and international journals of plant ecology, is not reflected in the *Proceedings*. There have been no papers on community energetics, seed predation, allelopathy, mineral cycling, or systems ecology. Plant ecology in Iowa has been stagnant since about 1950. This is due primarily to a lack of new positions for plant ecologists in Iowa during the fifties and sixties. The reasons for this are obscure and undoubtedly complex, but I suspect that in large part they are due to a lack of natural vegetation in the state and the low profile of ecologists in the general academic community until the late sixties.

This stagnation is also reflected in the role played by ecologists in the administration of the Academy. The early plant ecologists played prominent roles in the Academy. L. H. Pammel was president twice, 1892-1893 and 1923-1924, and Shimek, Conard, Jacques, and Martin (see Tables 2) each served one term as president, respectively in 1904-1905, 1914-1915, 1932-1933, and 1938-1939. However, in recent years no plant ecologist has played so prominent a role in the Academy.

The *Proceedings of the Iowa Academy of Science* have had a major role in preserving a record of the natural vegetation of Iowa. It is, for example, the most frequently cited journal in the bibliography of Conard's "The vegetation of Iowa" (Conard, 1952). It is cited more than twice as often as the *State University of Iowa Studies in Natural History* and more than three times as often as the *Iowa State Journal of Science* or any national publication. With the increasing difficulty in publishing vegetation descriptions and other types of ecological studies primarily of local interest in national journals, the *Proceedings* of the Academy should, in the future, play an even more important role in preserving this type of information than it has done, and done well, in the past.

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