

Evolving Communities:
How Ecology's Succession Debate Got Started

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Biology 101

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A knowledge of history is necessary for anyone interested in science. Whether they want to experiment in the field, theorize in the lab, or teach in the classroom, it's vital that scientists understand not only today's scientific ideas, but also how all those theories came to be. The history of the succession debate in ecology is an excellent example of how knowledge of the past can help facilitate an understanding of the work being done today. The idea of succession—that plant and animal communities evolve together in a recognizable pattern—was first introduced in the late 19th century and quickly became the subject of intense debate. By looking at the work of Henry Chandler Cowles, Frederic Clement, and Arthur G. Tansley, three early ecologists, it's possible to trace the succession debate back to its earliest roots.

Cowles's seminal work on plant community succession was done in the sand dunes that surround Lake Michigan near Chicago. He believed that plant communities were closely tied to geographic features, and when surveying the plant communities there hypothesized that "plant formations should be found which are rapidly passing into other types by reason of a changing environment" (Cowles 1899, p. 97). And indeed, that was what he found—plants communities changing to fit the environment. He further argued that "successional stages leading to the climax community—the final stage of succession—were never in a straight line, but could even regress in the normal course of events" (Kingsland 1991, p. 5). It was in this assertion that Cowles would encounter resistance from other ecologists and ignite fierce debate.

Cowles's contemporary Frederic Clements studied plant communities in the grasslands and forests of western prairies, and he outlined a competing model of succession. He saw plant communities as living organisms which grew and evolved with their surroundings until a climax community was reached. Clements (1916, p. 61) believed there could be only one climax community that fit perfectly with the surroundings: "the inherent unity of the climax rests upon the fact that it is not merely the response to a particular climate, but is at the same time the expression and the indicator of it." This meant that once a climax community was achieved, it could last as long as climate conditions held and it was not disturbed—possibly indefinitely.

Many of his contemporaries resisted the idea of plant communities as organismic. To them, plants should be viewed as interrelated but separate entities. Chief among these critics was Arthur G. Tansley, who "in 1935 coined the word 'ecosystem' as a more accurate characterization of the vegetational unit" (Kingsland 1991, p. 6). This idea of the ecosystem—a community of plants and animals interacting with their environment—is the basis for most ecological studies today. Thus, from the debate on climax communities, one of the most important and widely-used ecological concepts was born.

In the fast-paced world of science today it can be easy to forget the importance of those early biological pioneers. But the work being done today rests on the foundation built by those first scientists who changed the way we study the world around us. Henry Chandler Chowles, Frederic Clement, and Arthur G. Tansley may no longer be with us, but their ideas continue to affect us all.

Works Cited

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