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This Week's Citation Classic

Orlóci L. Geometric models in ecology. I. The theory and application of some ordination methods. *J. Ecology* **54**:193-215, 1966.
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This paper introduced an experimental approach to automatic scaling (ordination). It offered technical innovations and a reformed methodology at a time when digital computers had begun to reach large numbers of enthusiastic users. [The *Science Citation Index*® (*SCI*®) and the *Social Sciences Citation Index*® (*SSCI*®) indicate that this paper has been cited in over 180 publications since 1966.]

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"In the early-1960s, a full decade had passed since Goodall's[1] pioneering work on ordination. Peter Greig-Smith[2] and Sokal and Sneath[3] had published their monographs, and Williams[4] (with his group) was challenging classifications. The transformation of ecology and systematics into quantitative science had begun in earnest.

"At the time, I was a postdoctoral fellow working with Greig-Smith at the University College of North Wales. I had an interest in classification and planned to study the mapping aspects of scaling in niche space. The available scaling methods, however, proved insufficient for the task and my interest shifted to the related problems of uniqueness, duality, and approximation. The cited paper presented the results.

"Whatever attention the paper received may in fact be owing to its seminal character. It promoted flexibility and experimentation in data analysis to see ideas and relations evolve about the data structure at a time when the conventional methods still reigned. As interest deepened in computer techniques, dissatisfaction with the conventional methods increased and the appeal of flexible approaches also increased. The trickle of papers treating the topic in the early-1960s became a torrent by the 1970s, and a new methodology evolved. I recently reviewed this in my field.[5]

"I was lucky enough to arrive in Bangor just about the time when the university installed its first computer, an ELIOT 803. Before the facility, most of us had to rely on longhand computations, aided by mechanical calculators. Some problems required months of hard work to solve. The ELIOT 803 did the job in seconds—and without potentially embarrassing mistakes in the arithmetic. The analysis of large sets of data had become a viable proposition and questions could be raised which would not have been practical under previous circumstances. Experimental studies with multivariate methods thus benefited enormously.

"The project required substantial field work. For this, my wife, Márta, and I spent many days on the sand dunes of Newborough Warren surveying vegetation, often in gale-force winds, and never without pullovers. On clear days, we could see the ridge just across the Menai which used to be the site of the Roman fort Segontium. We were surprised when we were told that the legionaries could not have seen the dunes; they abandoned Segontium before the winds had carried the sand to shore."

1. **Goodall D W.** Objective methods for the classification of vegetation. III. An essay in the use of factor analysis. *Aust. J. Bot.* 2:304-24, 1954.
2. **Greig-Smith P.** *Quantitative plant ecology*. London: Butterworths, 1957. 198 p.
3. **Sokal R R & Sneath P H A.** *Principles of numerical taxonomy*. San Francisco: Freeman, 1963. 359 p.
4. **Williams W T & Lance G N.** Automatic subdivision of associated populations. *Nature* **182**:1755, 1958.
5. **Orlóci L.** *Multivariate analysis in vegetation research*. The Hague: W. Junk, 1978. 451 p.