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"Mathematizing Nature's Messiness: Graphical Representations of Variation in Ecology, 1930-Present"

Martin, Laura J.

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This article explores the rise of the line graph and an associated statistical method, linear regression, in ecology. At the turn of the 20th century, many ecologists studied variation in organismal traits, like height and weight, among populations of a species. The statistical practice of "polygons of variation" emerged out of such studies. But between 1930 and 1950, polygons of variation were gradually eclipsed by line graphs. Motivated by the recent and disastrous Dust Bowl, American ecologists began to place organismal variables and environmental variables on the same graph. They began to use linear regression, a then-obscure statistical method first developed to study whether parents passed their morphological traits onto offspring, to interpret these graphs. This use of linear regression marked an important shift in how ecologists interpreted biological variation. Variation—once ecologists' object of study—was now noise. Yet ecologists did not abandon their commitment to the idea that nature is complex, various, and interconnected. Rather, they came to read biologically meaningful patterns in seemingly "messy" graphs, using linear regression differently than other scientists, even those in closely allied disciplines. I situate this analysis in a broad STS literature on modeling that has tended to analyze the decision to model, or the choice of variables to include in a model, rather than how practitioners interpret the models they choose. I contend that not only has ecologists' use of linear regression shaped understandings of nature, but ecologists' understandings of nature have also shaped their use of linear regression. (Text from author's abstract)

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