Center for Spatially Integrated Social Science

John Kirtland Wright: Early Quantitative Geography, 1937
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Background

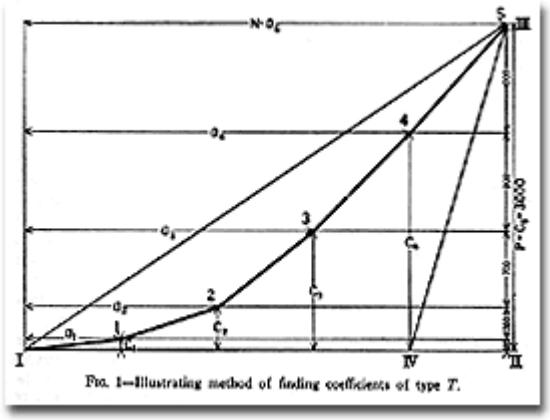

FIG. 1—Illustrating method of finding coefficients of type T.

One of the foremost geographers of the 20th century, Wright was known for his multifaceted approach to the study of geography. He is best known for his studies of the history of geographic thought, most notably in his landmark work *The Geographical Lore of the Time of the Crusades* (1925), his accomplishments in cartography, and his role as Director of the American Geographic Society (1938 to 1949). Wright was also an early advocate of the adoption of quantitative statistical techniques in geographic study. In 1937 Wright published an article demonstrating how the Lorenz Curve could be applied to geographic areas.

Innovation

Geographers have always been a visual and intuitive bunch, and their methods of analysis historically tended to be somewhat crude. The relative population distributions between cities or rainfall distributions between states would be largely guessed at. In the 1930s John K. Wright published several articles advocating more sophisticated forms of spatial analysis in geography, such as increased use of the Lorenz Curve. Developed in 1905 by M.O. Lorenz for analyzing the distribution of wealth and other patterns of inequality, Wright believed it could be used equally effectively in studying trends across geographic space.

The Lorenz Curve takes social variables, such as population, income, voting

patterns, crime, or land area and compares them with one another to find the relative evenness of distribution in space. One variable is placed on the x-axis, another on the y-axis. The points are arranged from smallest to largest ratio between the x and y variables, and are plotted on the graph by determining the cumulative percentage of each variable (see illustration).

If both variables are equally distributed, the line created by the cumulative figures would be a straight 45 degree line from the starting point (zero percent cumulative) to the sum total (or one-hundred percent). The more the line curves away from the straight diagonal line, the less evenly distributed one variable is with respect to the other. Imagine a typical staircase in which each step is equal in space and height. The stairway would trace a straight line. On the other hand, a staircase in which certain stairs are increasingly shorter or taller than others, would trace a curved path to the next floor. In more precise terms, the degree of evenness is the ratio of the area between the curve and the two axes below and to the right of it with the area within the optimal straight line and the same axes. If the variable is evenly distributed, it would fall along the diagonal line, and therefore its ratio would be 1.0 to the optimal area. If the variable is completely uneven in distribution, than the curve would follow the axes, and the ratio would be 0. The inverse of this ratio, often expressed as a percentage, is known as the index of dissimilarity.

Wright believed that the Lorenz Curve would be a valuable analytical tool for looking at topics such as the spread of the population between the largest U.S. cities or the distribution of rainfall in different parts of the country, which indeed it was. In later decades, use of the Lorenz Curve increased, becoming a political tool during the desegregation efforts of the 1960s and 1970s and later for studying issues such as health care access and environmental racism.

Publications

A Method of Mapping Densities of Population: With Cape Cod as an Example, *Geographical Review* 26: 103–110, 1936.

Problems in Population Mapping, in *Notes on Statistical Mapping, with Reference to the Mapping of Population Phenomena.* Mimeographed Publication no. 1, ed. J. K. Wright. New York: AGS and Population Association of America, pp. 1–18, 1938.

Certain Changes in Population Distribution in the United States. *Geographic Review* 31: 488–490, 1941.

Links Is Wilson's analysis true of Springfield?