Center for Spatially Integrated Social Science

Vernor C. Finch: The "Fractional Code" for Land Use Mapping, 1933.

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Background

One of the leading geographers of the first half of the twentieth century, Vernor C. Finch played a major role in reshaping the way spatial information is cataloged and used. A longtime professor at the University of Wisconsin, Finch is best remembered for two innovations. One was the widely-used dot map technique, first used in his 1917 book, *Geography of World Agriculture*, to show distributions of agricultural variables over a large geographic area. The other was known as the "fractional code," which allowed for the collection of vast amounts of data for relatively small areas. Among countless honors, awards, and titles, Finch was elected President of the Association of American Geographers in 1938 and received the prestigious Distinguished Service Award in 1950.

Innovation

During the heyday of regional geography, the desired goal of geographic study was to properly identify unifying characteristics of broad regions. Geographers such as Vernor C. Finch lamented that generalizations could not be properly made without a detailed understanding of small areas. Methods of mapping characteristics of small scale areas were lacking, so Finch set out to create his own. His idea was to observe the spatial patterns of each of several characteristics, such as land use, vegetation, soils, and drainage, but rather than merely creating a map for each, he made a single map that combined information about land use and natural environment. The map would be divided

into areas in which several characteristics were constant. For example, an area which was characterized by a flat surface, tilled for corn, with good drainage, would be considered a single type and given a unique number for that combination. All other separate locations with the same combination would receive the same number. On the other hand, an area with steep slopes, forest, and sandy soil, would be given its own distinct number. In 1925 Finch, along with W.D. Jones, published a study of agricultural land near Hennepin, Illinois, in which this method was put to use. The map contained seventeen different area types for tilled land, grasslands, wooded land, and idle land, along with two further types for farmsteads and transportation corridors, such as roads and railroads. Although the technique was clearly a step in the right direction, the numbering system was unwieldy, as the number of types multiplied with each combination.

In his 1933 article, "Geographic Surveying, and Montfort, A Study In Landscape Types in Southwestern Wisconsin," Finch introduced a far more simplified version of the numbering system for each area, or compartment, as Finch called them. Instead of listing dozens of numbered types, each with complex combinations of geographic features, Finch created a code in which each of six characteristics, such as soil type, drainage, or land use, was listed separately and in a precise order. The information was shown as a fraction, with the numerator containing information about land use and the denominator holding information about the land itself. The numerator had three elements: land use type, specific crop, and condition of the crop. The denominator was comprised of two elements: the slope of the land, and the soil type, with an optional third element regarding the condition of the drainage. Hence, a fractional code, such as 132/22, could be read as tilled land + hay + medium condition/rolling land + Knox soil.

The Montfort study, with its use of what became known as the "fractional code," enabled the compilation of vast amounts of data on a small tract of land. Any given square mile of land could have from 40 to 150 compartments. As Finch noted, "since each numbered compartment represents a complex of six elements involving six records of fact, it follows that there are available [in the Montfort map] from 250 to nearly 1000 specific facts of geographical significance per square mile of area." But this was not all. The fractional code could be broken down into fewer than six elements, so that by knowing the surface area of each compartment and choosing particular elements of interest in any combination, a percentage of the whole area of study devoted to an element or specific complex of elements could readily be calculated, a matter of great importance in the days before the advent of the computer and GIS software.

Publications

Geographic Surveying, and Montfort, A Study in Landscape Types in Southwestern Wisconsin. *Geographic Society of Chicago Bulletin No. 9*: 6–40. University of Chicago Press, 1933.

Detailed Field Mapping in the Study of the Economic Geography of an Agricultural Area. *Annals of the American Association of Geographers* 15: 148–157, 1925.

Related Works

Whittlesey, Derwent. Major Agricultural Regions of the Earth. *Annals of the Association of American Geographers* 26: 199–240, 1936.

Dicken, Samuel N. Galeana: A Mexican Highland Community. *Journal of Geography* 34: 140–147, 1935.