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Gender in Geography. *See* Feminist Geography.

Genre de Vie

French social scientists began to use the term *genre de vie* (way of life) as a descriptive device at the end of the eighteenth century; they contrasted hunters and gatherers or nomads with peasant farmers. Vidal de la Blache transformed the phrase into a fundamental category of geographic analysis.

The idea is to decipher the relations between man and nature through the listing of operations needed for exploiting the environment. The study of *genres de vie* gives geography an ecological dimension. *Genre de vie* also describes patterns of social relations and expresses social ideologies. *Genres de vie* differ from place to place, thus stimulating exchanges, fostering spatial organization, and explaining the emergence of political constructions. In this way, the study of *genres de vie* gives human geography a social dimension.

Genres de vie are standardized sets of roles observed in primitive or traditional societies; within them, nearly everybody has to participate in the same way in the exploitation of nature. In urbanized and industrialized societies, standardization disappears because of the increasing variety of productive occupations; geographers have to rely on the constitutive elements, the roles, to grasp the ecological bases and the social life of groups. Time geography, the modern form of *genre de vie* analysis, performs the same functions and offers similar advantages.

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Geoarchaeology

Physical geographers have long contributed to identification of events in Quaternary history and the resolution of related environmental changes, with geographers A. Penck and E. Brückner establishing the model of fourfold Pleistocene glaciation in 1909. Culture-historical geographers have also shown interest in "reconstructing" natural environments before human modification, such as R. Gradmann in Germany and C. O. Sauer and his students in North America. Geographers such as H. J. Fleure and P. Deffontaines collaborated with archaeologists or historians to understand changing human settlement or subsistence patterns. With the development of more systematic interdisciplinary excavation projects since the 1950s, geographers and other earth scientists have sharpened their analytical methodologies to participate more fully in the search for archaeological sites, in regard to specific landform units and sediments; in the interpretation of past human activities within specific sites; in recognizing abandoned agricultural landforms, such as raised fields and field terraces, in regard to potential productivity; and in assessing the mosaic of regional resources and potential environmental impact of a particular prehistoric group or historical community. This is a well-established international branch of applied geography that has significantly influenced the ways in which archaeologists work and interpret their data. Both methods and ideas from spatial theory and systematic human geography have also been transferred to archaeology with considerable success, and some archaeologists now work within a geographical paradigm.

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Geographic Information Systems

A Geographic Information System (GIS) may be defined as a method, normally digitally based, for the encoding, storage/management, retrieval, manipulation/analysis, and display of spatially addressable data. All operational GISs incorporate specific hardware and software for data input, storage, processing, and display of computerized maps. The incipient field of GIS may be traced, to a large extent, to activities in computer cartography and the initial developments at the Laboratory for Computer Graphics and Spatial Analysis at Harvard University. Here, it was the software package SYMAP, developed by Howard T. Fisher and his colleagues in the 1960s, that first enabled geographers, planners, and landscape architects, among others, to easily encode spatial data and produce thematic computer maps, including choropleth, isarithmic, and proximal types. Other systems developed during the 1960s were the Canadian Geographic Information System (1964), the New York Landuse and Natural Resources Information System (1967), and the Minnesota Land Management Information System (1969). DIDS (The Domestic Information and Display System), a state-of-the-art statistical mapping system designed for decisionmaking in the federal government during the late 1970s, produced both choropleth and bivariate maps, but for a variety of reasons was abandoned in 1983.

Two types of geographic information systems have emerged during the past fifteen years: vector-based and raster-based. Vector-based systems represent spatial data as strings of x-y coordinate pairs in a Cartesian coordinate system. Thus a railway line, which on a traditional manuscript map is a continuous feature produced with pen and ink, is represented in digital format with a set of x-y coordinate pairs, called an ARC. Alternatively, the raster-based systems represent the surface of the earth as a matrix of grid cells, or pixels (picture elements). Each of the individual grid cells depicts a constant area, such as 10m × 10m (SPOT imagery), 30m × 30m (Landsat thematic mapper imagery), or 79m × 79m (Landsat multispectral scanner imagery), and is referenced with both a row-column number and a value or category of the attribute (*e.g.*, land-cover type).

The significant feature that distinguishes GISs from basic computer mapping systems—such as SYMAP—or computer-aided design systems (CAD) is the capability for spatial analysis and modelling. Both C. Dana Tomlin and Joseph K. Berry have formalized the concept of a distinct map algebra and fundamental map analysis techniques. Additionally, P. A. Burrough's *Principles of Geographical Information Systems for Land Resources Assessment* (1986), which has become the standard text in the field of GIS, details the relationship between map algebra and spatial modelling. Three classes of transformation functions have been identified for analysis and modelling: point, region, and neighborhood operators. For instance, an elementary point function might simply *add* together, cell by cell in raster-