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Review of *Archaeology and Geographical Information Systems: A European Perspective*

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Archaeology and Geographical Information Systems: A European Perspective. GARY LOCK and ZORAN STANCIC, editors. Taylor and Francis, Bristol, Pennsylvania, 1995. xvii + 392 pp., figures, tables, references, index. \$99.95 (cloth).

Reviewed by LuAnn Wandsnider, University of Nebraska–Lincoln.

Although but six years old, our library copy of *Interpreting Space: GIS and Archaeology* (1990; edited by Allen, Stanton, and Zubrow) is tattered and in need of rebinding. Such has been the interest in this volume and its subject, the adaptation of Geographic Information System (GIS) technology to archaeological needs. *Archaeology and Geographical Information Systems* complements *Interpreting Space* in several ways. Where the latter features mostly North American authors, European authors are the main contributors to the former. And, in an effort to educate readers, the first offers brief reviews of hardware, software, and GIS concepts; such items are mentioned in the new book's postscripts. Predictive modeling applications of GIS that incorporate environmental data layers are unashamedly displayed in the first; the sophistication and suitability of such models for understanding the dense and complex archaeological landscapes of Europe are questioned in the latter.

Indeed, this book is designed to contrast with the North American treatment of GIS and archaeology. The volume documents a conference expressly convened to explore issues absent from the agendas of earlier North American conferences on the subject. The conference brought together archaeologists from all over Europe (and one American; alas, no Germans) involved in

using GIS to manage or investigate archaeological data from all over Europe (again, Germany is curiously absent). Contributions focus on the relatively large-scale archaeological remains of the post-Neolithic period; less visible remains from earlier time periods are cursorily mentioned.

The 27 chapters are arranged into four sections with "fuzzy" (a recently implemented GIS feature) boundaries. The first concerns cultural resource applications and includes community (Madrid; Baena et al.) as well as national (France; Guillot and Leroy) data management experiences. On this issue, Arroyo-Bishop and Zarzosa provide a very thoughtful discussion and introduce a format sensitive to the dimensions of geography and administration (useful for management), as well as descriptive, spatial, temporal, and interpretive dimensions (useful for research). A second section focuses on landscape archaeology, with several chapters on the past perception of the cultural landscape. Here, the theoretical imperativeness of being able to negotiate among various spatial scales—something at which GIS excels—is explored in chapters by Csa'ki et al. and Verhagen et al. The latter provide an especially provocative discussion of the relationship between human ecodynamics and spatial scale. Where regional survey data have been emphasized in many GIS applications, intrasite applications involving excavation data are also considered here. The final section explores various technical, conceptual, methodological, and theoretical issues.

Other important issues are also considered. The use of GIS to identify the operation of various formation processes, which is notably absent in the present attempts to interpret the cultural landscape, is nicely illustrated by Meffert. Smith pioneers the use of GIS to animate geographically detailed texts. And, Boaz and Vleberg introduce the concept of landscape room to organize regional analyses. Graphics feature prominently in GIS applications, and here they are bountiful in black and white as well as color. On this topic, Miller offers a must-read discussion of graphic design for archaeological GIS.

Other major contributions of the volume are the critical evaluations of the appropriateness of this technology. Biswell and colleagues, echoing admonitions heard upon the adoption of earlier new technologies by archaeologists, note that our GIS-enabled analyses seem to be driven by available technology, tradition, and budget, rather than the demands of a particular archaeological problem.

Two final chapters deserve special mention. Harris and Lock consider several trends in the archaeological GIS revolution. They note that we archaeologists not only traffic in space, but also in time. Presently, GIS

deals well with the topology of two-dimensional space; research on incorporating the third temporal dimension is underway. Clearly, an ability to construct and manipulate a 3-D topology would be most useful to archaeologists.

In addition, they generalize that North American archaeological sites, with their firm spatial and temporal boundaries, can comfortably be represented in GIS data layers and perhaps be related to local environmental indicators. In contrast, contemporaneous phenomenon in the complex archaeological palimpsests of Europe are best represented as sites with fuzzy and unrestricted boundaries. First, I challenge their characterization of North American archaeological landscapes; archaeological landscapes *everywhere* are accretional phenomenon, but vary in density. Second, rather than describe the archaeological landscape in terms of sites with fuzzy boundaries, palimpsest deposits may better be described in terms of a uniform landscape element with a specified archaeological character (a raster solution), or, if sparse, in terms of constituent artifacts and features, which may then be aggregated to meet various analytic needs (a vector solution). Sites, with either definite or fuzzy boundaries, are defective units with which to build a database, as Gaffney elsewhere notes.

The volume closes with a debate between Gaffney and van Leusen on the merits of GIS analyses of archaeological data against readily mapped environmental data—the so-called functional or environmental determinism approach—which is prominently displayed in many North American applications. Van Leusen argues for its utility in exploratory analysis; Gaffney contends that such studies are simplistic and much more contextual information than is presently called upon is needed. While a great deal of angst is exposed here, most of the volume chapters demonstrate the utility of playing the archaeologically manifested cultural landscape against this modeled physical landscape in an effort to learn both about the inadequacies of the determination and also the nature of the cultural landscape.

In sum, this volume offers a technically and epistemologically sophisticated counterpoint to GIS applications by North American authors. This refreshing volume will find use in dusty academic classrooms, government cubicles where management decisions are hatched and implemented, and the ozone-rich lairs of GIS computer-jockeys. I expect it will soon be as dog-eared as its predecessor.