

## essay

GEOGRAPHY AND  
CARTOGRAPHY IN THE  
TWENTY-FIRST CENTURY

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This essay is a short after-dinner address delivered in State College, Pennsylvania, on October 14, 1995, at a banquet celebrating the 50th anniversary of the Department of Geography at the Pennsylvania State University.

When asked to articulate my "thoughts on the future of geography and trends in cartography in the twenty-first century," I found it difficult, if not a bit painful, to disentangle what I think geography and cartography **will** be doing from what I think geography and cartography **should** be doing. The result, then, is two parts "will happen" and three parts "should happen"—or is it three of "will" and only two of "should"? (I don't know. But on with it.)

First, geography. Perhaps even before the year 2000, post-modernism will have run its course. Maybe; maybe not yet. In its defense, the postmodern critique has made us more fully aware that bias is everywhere and that "objectivity" is either nonexistent or impossibly difficult—and that's good. But the history of science and the recent history of our discipline have also taught us that paradigms come and paradigms go, even big ones. If you sense that I haven't really bought into postmodernism, you're right. Even so, I am enthusiastic about the questions it has encouraged geographic scholars and social

scientists to ask, and the phenomena and issues it encourages us to examine. What I don't like is its needlessly impenetrable jargon: a dialect devised largely to keep the public (not to mention most undergraduates) out of the discourse. And a jargon that on occasion gets geographers noticed in ways that are embarrassing—as when newspaper columnists cite our intellectual kinfolk whose ludicrously dense sentences must be intelligible only to those who already know what the author is trying to say. Or think they do.

Should geographers be critical? Absolutely. We need to be critical of our data, of what we read, and of what we see. And we must be more critical, both inwardly and outwardly, than ever before. More important, though, we need to recognize that our insights can usefully inform public policy and that we have a moral obligation to publicize our insights effectively, by contributing to public-policy debates on poverty, housing, environmental justice, employment, global climatic change, and many other issues. But to do so effectively allows less time for the elitist whining that often results when we address our insights largely to other social scientists and humanists. They listen, of course, because geography with its integrative powers has much to say about many issues. Yet we ought not forsake the clarity of ordinary language and graphics for the arcane, privileged vocabulary of English professors who write poorly yet seek the elimination of successful creative writing programs.

What I'd like to see, however uncertain I am it will actually happen, is a geography that enthusiastically accepts the challenge of insightfully and reliably describing the Earth. But first we must accept that proposition that insightful and reliable description is never 'mere descrip-

tion'. If we accept this proposition, geography could become the undergraduate major of choice for the careers in law and public service. And the Joan Didion's, the Joel Garreau's, and the Tony Hiss's, if not professional geographers themselves, would at least trained be in our field.

And now for cartography, which with its extension, geographic information systems, has made enormous strides in the past decade. But there's a long way to go before cartography and GIS achieve their full potential. In the next century I see progress in three principal areas:

First, electronic geoarchives will become much richer in the variety of information, degree of detail, and level of integration. They will not only surpass the map libraries of today in content and coverage but also link maps to representations currently found only in books. And historical geographers, cultural geographers, and social geographers will want to—indeed, they'll have to—use GIS, and in so doing, they'll contribute to the databases.

Second, our electronic cartographic archives will be much more user friendly. By this I mean that—for the user with a good inkling of what he or she wants—the GIS interface of the future will prove no more formidable than the typical library database search system of today. Searches will be quick and customized. Cards carried in wallets (or whatever one carries) will contain user profiles, summarizing the user's training, experience, interests, color preferences, and satisfaction with the system's past performance. In addition to helping the system ferret out highly relevant information, user profiles will support customized guided tours, in which the electronic atlas tells us about itself, about places and spatial relationships, about the quality of its data, and the reliability of its

representations-as much or as little as we care to know. And for different insights, we might even borrow someone else's user profile. Customization will be enormously important in helping users find, interpret, and understand cartographic information. And customization will also replace the geographic information paradigm with a focus on geographic understanding.

Third, maps and other visual material will become standard writing tools, readily available and widely used by writers, who will develop the knack of using both sides of the brain. We have seen the effects of earlier representational revolutions, among which I would include printing, public education, photography and photographic engraving, motion pictures, and the current mix of video, computer graphics, the personal computer, and the graphic user interface. Especially promising for geography is the power of dynamic, interactive multimedia to integrate words and pictures and numbers and maps. Already this new technology is having profound effects on writing and public communication. Computer graphics has become

just plain graphics. Computer literacy is becoming just plain literacy. And electronic multimedia is sure to become just plain media. For the educated professional geographer, the artificial division of labor between writing and illustrating will disappear.

Helen Couclelis suggested the name "spatial understanding support system," or SUSS, to describe the GIS of the twenty-first century. Development of SUSS technology will, no doubt, focus on and be driven by three closely related problems: energy, population pressure, and hazards. Energy's informational needs are varied: searching for new fuel reserves, managing waste streams and resource recovery, assessing the externalities of fossil fuels, and weighing the benefits and costs of nuclear power, including high-level and low-level radioactive waste. In the area of population, epidemiology might well eclipse traditional concerns with food, housing, and ethnic conflict, as the vast global gene pool of well over six billion human organisms demonstrates its effectiveness as a research and development laboratory for ever more deadly viruses. And because a complexly inte-

grated world economy is especially vulnerable to both natural and technological hazards, mapping will have a key role in efforts to understand hazards as well as manage risk through insurance schemes, remediation projects, land-use regulations, and emergency planning.

As a preview of its key role in SUSS, cartography is an important element of the scientific visualization movement, which should mature early in the 21st century. Within cartography, visualization is attracting the most attention and producing the best research. And that's good for both cartography and its client disciplines.

Unfortunately, cartographers and geographers seem not to recognize their stake in public policy across a broad range of issues, including public access to geographic information, privileged users, biased content, intellectual property rights, and liability—when bad decisions result from incomplete or flawed data, or from sloppy analysis? We can confront these issues head on, or we can talk amongst ourselves, in a closed academic debate of little relevance to what's really happening. □

### correction

In the last issue of *Cartographic Perspectives* we announce a CD-ROM atlas of U.S. Topography produced by Chalk Butte Inc. (CP 22, page 24). Unfortunately, we incorrectly listed the area code in Chalk Butte's phone number. Please note that their correct phone number is 307-537-5283. We apologize for any inconvenience this may have caused. If you are interested in any Chalk Butte Inc. products you may contact them at: Chalk Butte Inc., 137 Steele Lane, Boulder, WY 82923. 307-537-5283 □

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