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CARTOGRAPHY PROFESSION GROWS AT RECORD PACE

MISSOULA--

Looking for a hot profession? Ever considered cartography, the science of making maps?

Its future is huge, says Professor Paul Wilson, cartographer and geography department chair at The University of Montana-Missoula. But the stereotypical cartographer hunched over a drafting table laboriously penning in lines, circles and dots isn’t what Wilson is talking about.

Cartography has a new tool now, the computer, which has revolutionized map making by sparking the development of Geographic Information Systems software. GIS in turn has sparked an enormous growth industry.

“For the past decade and a half the growth rate in GIS technology has been double digit,” Wilson says. “For the past five years, the growth rate has been calculated at over 40 percent, which is absolutely incredible. GIS is one of the computer industry’s hottest niches.”

Before the computer, cartographers drew maps by hand based on the observations and measurements of navigators, explorers and land surveyors. About the time of World War II, airplanes equipped with sophisticated cameras started taking vertical aerial photographs of the

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earth's surface, adding photogrammetry to the cartographer's sources of data. By making measurements from aerial photographs, a photogrammetrist could plot Earth's geographic features and produce base maps that located rivers, mountains and other basic geographic features. The cartographer could then elaborate on those base maps, penning in place names, coloring in forests, drawing county lines and other useful or needed details.

GIS has changed that. With GIS came the power to store base maps in the computer as databases to be called up and manipulated in myriad ways.

"The whole objective of GIS is to store geographical information about parts of the earth's surface as databases in the computer and then relate or link those to attribute databases, which carry different kinds of information about those areas," Wilson says.

Population, employment and income level are examples of attributes. Attributes also can include themes like climate, elevation, grizzly bear habitat, national forests and the like.

Maps that display a theme came into being about the turn of the century when the Census Bureau expanded from collecting population statistics to gathering information on race, sex, income, manufacturing, agriculture and more. Theme maps marked a milestone in map making, which had previously focused on the location of geographic features.

Before the advent of theme maps, cartography had undergone two other bursts of development. The first came during the heyday of the classical Greeks and Romans, when the circumference of the earth was accurately determined and the concepts of latitude and longitude were formulated. The second was during the Renaissance and age of exploration, when mapping became such a craze that whole families devoted themselves to map making, and aristocratic women had map-coloring bees instead of sewing bees, Wilson says.

"Much of what we know about map making grew from that time," he says. "Map
projections, for example, were developed.” Map projections are what cartographers invented so they could put a map of the world, which is round, onto a flat piece of paper. Almost all of the map projections used in cartography today were developed then, Wilson says.

“I would characterize what happened during the Renaissance as monumental change,” Wilson says. “I would characterize what’s happening now to map making as a revolution. The map projections that were invented in the Renaissance and the age of exploration are now formulas that reside in the computer. You call (a formula) out, and the computer draws the projection you want.”

As Wilson talks, his computer screen displays a map he called up from his geographic database. With a few clicks of his mouse, he can change it in seconds without changing the database. The map he’s developing shows the number of pigs per square mile in Indiana and part of Kentucky. Wilson got the information on pigs -- the attribute database -- off a CD-Rom from the census of agriculture. Wilson can link the geographic and attribute databases together with what’s called a geocode.

“This becomes a very strong tool for doing geographic analysis,” he says.

“Government agencies -- the Bureau of Land Management, the Forest Service -- anyone who has questions of a geographic nature would want to have a GIS so they could link attribute information to geographic information and ask questions. And get answers. It’s a fabulous thing. It’s the next step in what’s happened in cartography over hundreds and hundreds of years.”

In this huge step forward, the computer has changed map making from merely a form of description to an analytical science, Wilson says.

“You can query the computer and have it draw maps that are your answers,” he says.
“This is why it’s such an interesting tool for people in management because they’ll ask a question like ‘Where should my next retail outlet be?’” The GIS expert can then ask questions of the maps on the computer, and the computer will analyze the data and come up with an answer.

GIS also is used extensively in public policy formulation. In both of his presidential campaigns, for example, President Clinton had a team of GIS experts behind the scenes who canvassed the states he was visiting to find out which areas to visit and what types of questions to try to answer, Wilson says.

In his 30 years of teaching geography and cartography at UM, Wilson has trained hundreds of cartographers.

“It’s a lot of detail work, a lot of attention to careful reasoning and careful planning,” he says.

Almost any college student could make a good cartographer, he says, but it takes someone who loves maps, who will sit and look at an atlas or a road map instead of reading a magazine article or watching a TV show. It also takes some math skills -- the geography department requires intermediate statistics or calculus. And it doesn’t hurt to be artistic, Wilson says.

“You’d think that the artistic part of cartography would have been lost, but that’s not the case,” he says. “The tools have changed, but the artist is still there. And the profession is an awful lot of fun.”

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