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Geography is covering new ground for travelers

The discipline isn't what you recall from grade school — it runs your GPS and enhances travel planning and on-the-spot decision-making. And it's advancing.

By Susan Spano

April 7, 2013

Forget about learning the state capitals, at least, as the sum total of your knowledge of geography.

"Geography is about meaning, not knowing place names and memorizing lists — that was school geography," said Daniel Edelson, vice president for education programs at the National Geographic Society in Washington, D.C.

Say hello to the new geography. It runs your GPS unit, takes you on mobile-device-guided tours, helps you find and see hotel rooms before you book them.

Want to calculate your estimated time of arrival, locate a nearby gluten-free restaurant, or find out whether it's raining in Río? No problem. Apps accessible from your laptop, tablet or smartphone can help.

Geographic innovation has "democratized travel by letting people take trips led by their own interests," said Joy Adams, a senior researcher for the Assn. of American Geographers. The Washington, D.C.-based organization holds its annual meeting Tuesday-Saturday in L.A., although the subjects will go way beyond trip-planning.

Planet Earth lovers should prepare to be amazed by the way new geography has set about solving some of the world's most pressing and mystifying problems, along the way making travelers safer, keeping them fully informed and throwing open the doors to new horizons. To wit:

— Since late last summer, satellites have been capturing photographic evidence of violence against civilians on the remote, war-torn border between Sudan and South Sudan. The Satellite Sentinel Project, co-founded by actor-writer-producer-director George Clooney and operated by earth imagery provider DigitalGlobe, gives international peacekeepers a new way to document crimes against humanity.

— During the destructive 2012 summer wildfire season in Colorado, which forced the evacuation of 32,000 people and destroyed 350 homes, Redlands-based Esri, a geographical information systems company, developed a real-time map of conflagrations affecting communities all around the state. Using satellite imagery, photos, video and social media sources such as Facebook and Twitter, it helped those in threatened locations make decisions while providing critical information to first-responders and firefighters.

— Without turning over a single stone, Sarah Parcak, a "space archaeologist" from the University of Alabama at Birmingham, has found subterranean structures in the ancient Egyptian city of Tanis. Slow, sweaty excavation has been underway at the Nile Delta site for almost a century. But now 34-year-old Parcak is using advanced satellite imagery that is revealing 3,000-year-old pyramids, tombs and a street plan.

In the simplest terms, the new geography is "the spatial organization of phenomena — the where, what and why," said Alexander Murphy, a University of Oregon geographer who chaired a recent study on the future of geography for the National Academy of Sciences.

But when information from myriad sources is integrated with a map, connections and patterns emerge.

For example, UCLA geographer Glen MacDonald said analyses undertaken at the university conclude that there will be enough water to supply L.A. throughout the 21st century, provided reallocation.

In his 2012 book "Why Geography Matters: More Than Ever," geographer Harm de Blij uses maps to describe the mind-set of jihadists and areas of potential conflict in the future.

Fields and mountains of study

Geography graduated from grade school in the '60s when American astronauts snapped pictures of the Earth from space. The images were not only spectacularly beautiful, said Matthew Larsen, a climate change and land use geographer for the U.S. Geological Survey, but they also suggested global surveying applications to a variety of government agencies.

Defense, agriculture and other departments joined together in pushing for satellites with information-gathering cameras trained back on the Earth.

Remote sensing — new geography's technological linchpin — was born, along with the Landsat program, co-operated by NASA and the USGS.

Since the launch of its first satellite in 1972, Landsat has collected millions of images — available to everyone for free at glovis.usgs.gov. A new generation of photos has started to arrive from Landsat 8, which was launched Feb. 11 and takes images so clear you can see a baseball diamond, if not the pitcher's mound, from 438 miles above Earth's surface.

It's crowded up there. Foreign countries have launched remote-sensing crafts; the GPS units in your car and other mobile devices display imagery captured by more than 20 Department of Defense satellites. The National Weather Service has its own unmanned weather stations.

Since the 1980s, when the government began granting commercial licenses for satellite imaging, private companies have refined the technology, developing laser and light spectrum sensors that can see into water and under jungle canopies.

DigitalGlobe, a Colorado-based earth-imaging company whose clients include the Defense Department and Google Earth, has reached the extreme limit of photographic resolution allowed by law, producing photos so detailed that you can see not only parked cars but their windshields. Remote-sensing hasn't yet seen inside buildings, but there's no reason to think that capability isn't coming.

It's the oh-wow side of new geography. Geographic information systems, or GIS, is the other side of the story. It has made geography a crucial partner with almost every other field of human endeavor by quickly integrating vast, interdisciplinary troves of information.

What has that to do with you, the traveler? Plenty. Every time you search for something on the Internet — fish and chip shops on London's Portobello Road, camping sites on the Big Sur coast — and click on an interactive map, you're using GIS.

Today GIS helps medical researchers understand the spread of disease, farmers know which crop to plant where and biologists preserve endangered species. Using satellite imagery, real-time GPS functions and even geo-referenced social media, it guides advertising and market research, the siting of stores and factories, delivery and shipping routes.

The GIS revolution, which started about the same time as remote-sensing, took shape when geographers began fooling around with computers, amalgamating and digitizing layers of data in the context of a map.

"What emerged was a quantitative revolution in geography. Once you digitize the data, you can actually begin to analyze patterns and relationships in space," said Jack Dangermond, founder and president of Esri, a company that supplies geography-based computational tools to almost every company on the Fortune 1,000 list.

Laypeople are finding a surprising level of user-friendliness in even more sophisticated GIS tools, such as Esri's ArcGIS Online, a new subscription-based service (with a 30-day free trial) that makes 100 million maps a day. It includes base maps, imagery, data and step-by-step instructions about how to build your own map, using information you choose.

Esri has made ArcGIS Online available to high school geo-tech clubs. Recently, teenagers at Bishop Dunne Catholic School in Dallas helped police reallocate patrol cars by using ArcGIS to find out when and where crimes occurred in their community.

"These kids don't know it's hard; they just dive in and do it," said Esri education manager Joseph Kerski.

GIS at ground level

For real-time wanderers, GIS is a technological soundtrack, underscoring nearly every travel application accessed by laptop, tablet, GPS unit and smartphone.

The next phase, though, is using it yourself to make rich and deep travel plans precisely tailored to your own interests, a retainable, shareable souvenir — all in the form of a map.

The emphasis on new, high-tech geographical tools raises this issue: What does it matter if we forget the traditional nuts-and-bolts geography — which is what appears to be happening? Today, 30 states do not require geography courses at the middle and high school levels, and studies show that half of young Americans can't find New York on a map.

It does matter. In December 2004, when 10-year-old Tilly Smith of England saw waves being sucked off the beach in Phuket, Thailand, she knew what it meant because she had just learned about earthquakes, tectonic plates and tsunamis in her geography class. Sure that a big wave was coming, she ran along the waterfront, telling people to take shelter on the upper floors of a hotel, thereby saving an estimated 100 lives.

Despite electronics, old-fashioned maps still matter too. The Auto Club of Southern California distributes more than 3 million paper maps annually to members who rely on them for the big picture and detail that can't easily be viewed on mobile device screens, according to 2012 member surveys.

Maps haven't changed in essence, but the amount of information they can almost instantaneously amass and display has exploded, as have the ways that information can be used. People who know how to manipulate digital maps are in great demand in the business world, for everything from stocking shelves at Wal-Mart to urban economic development.

Indeed, the workforce for the geospatial industry is one of the fastest-growing in the country, according to a report by the U.S. Department of Labor's High Growth Job Training Initiative. A 30% increase in the last five years in the number of students taking Advanced Placement courses and exams in the field of geography suggests that students know it, even if Mom and Dad haven't heard that a degree in geography could be more useful than law or economics.

In conversations with young people, longtime editor in chief of National Geographic Traveler magazine Keith Bellows has found a much less parochial next generation, fully willing to connect with the world. "More and more young people want to go abroad," he said — perhaps on a gap year, a concept that encourages kids to take a year between secondary school and college to travel. "We're going to get a gap year," Bellows said. "American kids are already doing it."

The broadest vision of what new geography can do may come from a speech Al Gore delivered at the California Science Center in 1998 about a radical geographical concept he called Digital Earth, a sort of multidisciplinary atlas that could tell people everything about every place in the world.

Like the Internet, it would be widely available by computers, mobile phones and other devices, voice-activated, backdropped by high-resolution satellite imagery, loaded with information and data, updated in real time and interactive, meaning that users could dovetail searches to their particular interests, as if looking into the subject-matter drawer of a science-fiction card catalog.

Digital Earth is meant to connect people by sharing information across borders and to explain complex issues — climate change, poverty and food distribution, urbanization, species and environmental preservation, natural disaster management, geopolitics, economics — that haven't been comprehended by old-fashioned methods of data collection and analysis.

Boldly forward

Does it sound as if Digital Earth could make travel itself seem utterly inconvenient and unnecessary? Google Earth founder John Hanke says no, pointing to soon-to-be-unveiled Google Glass, with all the capabilities of hand-held devices but voice-activated and mounted in the frames.

If used in conjunction with GPS-backed, real-time apps such as Google Field Trip, travelers would be able to boldly go, if not into outer space, at least without a smartphone or guidebook in hand.

The technology, Hanke said, "allows you to be more spontaneous, connects you in a deeper way with the physical world."

Which is what most real travelers long to do.

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