

Published in the *NSS News*, June 1989

*Opinion*

## Will We Map As We Survey ?

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An ethic for cave exploration appeared in the mid-1970s. Caving had begun to mean more than just finding and sampling new caves each weekend. There were frontiers to be pushed, patiently and systematically. There was a realization in the maturing caver community that little caves could be made into big caves through human force of will and mutual endeavor. Competition among groups, regions and nations emerged. The Long and Deep Cave List became standard fare in updates of new progress made, barriers broken. The "cave project" was seen as a community investment to be maintained through stewardship. Such sustained efforts, *cooperative* caving where the individual worked for group success, required some mechanism to reward team players. And so there appeared an ethic: *Survey as You Explore*. Virgin passage was rationed. Caving had always been a gamble, and now the odds shifted to the long-term players. Patient cavers, the regulars who pushed the leads no one else wanted, got their due. So they surveyed as they pushed. The somewhat bitter medicine was swallowed, the mild penance for our sins of defilement paid.

What became of the survey notes? In many cases, they were turned into maps and reports; visible, tangible products of dedicated activity. We saw, for the first time, those interested in the science of caves able to draw broader understanding from these unprecedented stores of knowledge. But sometimes, along the way, the cavers forgot that survey notes are not an end product, but a small part of a process. Survey notes are fragments, shorthand reminders of what the survey team has experienced. They are simple records that have the potential to be manufactured into complex documents of great value. But the pieces must first be reassembled. Survey notes are information for the surveyor, but they are not knowledge for the community. They remind the surveyor of what he has seen, but say little to anyone else.

The physicist and philosopher Michael Polanyi, in *Personal Knowledge*, distinguishes between two basic types of knowledge. *Tacit knowledge* can never be properly expressed. It is black art: the musician's ear, the surgeon's touch, the expert's hunch, the caver effortlessly navigating a familiar maze or levitating up a climb. *Explicit knowledge*, for example a map or list, is codified and put down. You can look at it, read it, run it through your mind over and over. You can see the errors, fieldcheck, refine, test. You can begin to solve puzzles, to explain things, to see what was hidden there all the time. Explicit knowledge can be permanent, a time-capsule. Maps and documents fade, but memory fades more. Explicit knowledge travels to others and imbues them with what you know, and how you have learned it.

There is a lot of tacit knowledge in caving. A tiny bit appears in our folklore. It steers us, if we patiently seek certain people, to caving areas and to leads. You sense its presence around campfires, and occasionally you can be shown The Bypass or learn how the miracle climb was done with no protection. But it goes away. Cavers leave caving. They forget. How are we to carry on, to pursue the leads "left for the next generation" if explicit knowledge is not produced that will communicate across time to this generation? How can we make new progress if the same dead-ends must be checked over and over?

But what of secrecy, and conservation, and the individual's right (some would claim inalienable) to do Whatever-They-Damn-Well-Please in the caves that they discover and explore? Some cavers reject the idea of community. They say they do not or will not belong. But I suggest that often they do belong, even if (literally or figuratively) they pay no dues. No caver exists in a vacuum. They have learned from others, been trained, been exposed to new experiences, found new caving areas, been steered away from old areas, supplied with companions. They have glimpsed role models and possibilities. Everyone takes knowledge from our community pool; each should consider giving some back.

"Community" is also a relative term. There is no sin in making maps and writing descriptions that few will see. But this does not mean that explicit knowledge should not be created while the notes and experiences are still fresh. Times and attitudes change. Someday, the knowledge may need to be passed on. It is immeasurably safer to invest in the future rather than to condemn it. A file cabinet can be like a wine cellar.

What if you are interested only in the visceral, tacit pleasure of pushing caves? A caver once told me about exploring the caves of a previous generation who had left no trace a decade earlier. She anticipated, she told me with a smile, getting whispered questions in the years to come as the next generation discovered, and in their turn explored, the same caves. Recycling. But don't waste your time, and condemn your followers to waste their's, by pretending to survey.

Why have even the best-intentioned cavers had difficulty achieving their goals in producing what I am calling explicit knowledge about the caves that they explore? Some of the problem lies in surveyors getting into situations that they lack the experience to handle. Other times experienced people work too fast for the conditions presented by the cave and quality suffers. The sketcher has a particularly crucial role: all the information that the team generates must pass through the mind and pencil of the sketcher and into the survey book. The sketcher is the conductor, setting the tempo, spotting the blunders, putting the pieces together, getting it all down in a coherent fashion. The other members of the survey team must follow the baton or they will only make noise.

Regardless of the cause, there has been a discouraging amount of re-surveying which has had to be done. Experience shows that this always takes **at least** one-and-a-half times as long as it would to simply do it right in the first place. If a team is completely out of control, salivating at the borehole stretching to infinity, it is probably better to scoop ahead (carefully estimating the number of stations that you want to "borrow") and survey out than to do a survey that will have to be repeated.

Another significant problem is that the task of drawing, editing and updating maps inevitably becomes more and more complex as a cave project continues. Each survey trip may require the modification of large parts of the existing map. It is not unusual to spend at least two hours at a desk for every hour in the cave. Few have this kind of time, and virtually all mapping projects are chronically behind. Meanwhile, the project participants want to see progress and some results from their work. Quite often, we use a line plot of the survey traverse as a manuscript map.

But it is important to recognize that a line plot is not a map. The survey traverse is a metrical artifact of the way we orient ourselves underground. It gives us absolute position (within the limits of error), general orientation and distance, and a crude notion of connectivity between passages and regions of the cave. But it gives us little sense of relative space; the sizes of passages, their shapes, what lies on their floors, where water flows, etc. Most importantly, it does not show leads. Why? Because it is just data display. A data display becomes a map when a human gets involved and performs a *subjective* interpretation on the data. The human thinks, and the thought goes on the map. There is something here; it is represented by this symbol. A drop is here; they will need this amount of rope. This is a good lead; they will need to dig. As the *Mapper* interprets the cave, using notes, the traverse plot and memory, he or she creates through words and graphics an explicit document telling about the cave. The process is laborious, but the product communicates and explains, laying the foundation for future efforts.

Technology has the promise of reducing the labor of knowledge-creation in caving. If a caver can quickly enter the results of surveying without tedious redrawing, then they will be encouraged to do so. We need to create tools that will reduce labor in maintaining collections of information, to allow rapid creation of documents. Functionality, not wizardry, is in order. Unfortunately, those who possess the talent to build such tools often know little of their use or even their history. Much effort has been expended in re-inventing wheels that have been rolling along for many years. The fact that we can now edit and plot survey traverses with microcomputers rather than mainframes says a lot about hardware and very little about software. Only with dialogue between users and builders, and widespread sharing of the results, will we move towards realizing the potential of digital technology.

Perhaps the 1990s will see the emergence of a twin to our existing ethic: *Map What You Survey*.

John Ganter founded the NSS Survey and Cartography Section in 1983. This is a revised version of an editorial that first appeared in the Section's newsletter, *Compass & Tape*, Vol 5:4, Spring 1988.