

THE ROLE OF CAVE EXPLORATION IN KARST RESEARCH

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In the early years of mountaineering, it was customary for expedition members to haul up a variety of scientific instruments to give the impression that the climb was really just a way of pursuing serious research. Some climbers were indeed scientists with a bona fide interest in the data, but in many cases the science was simply a smokescreen to deflect any argument that exploration by itself was not a worthy endeavor. Of course none of the measurements amounted to much, but the feats of exploration stand today as major triumphs.

Today, in a similar way, many karst researchers downplay the importance of cave exploration in their work. They slice away any hint of sport from scientific papers, as though caves serve merely as gathering-grounds for scientific data and are not of interest by themselves. There are several good reasons to do so. First, there is a scientific pecking order in which theoretical and quantitative topics are considered more lofty than applied and qualitative studies. Those who aspire to the higher echelons must not soil their hands with field work (or so the current thinking would have it). Besides, the average scientist looks at cave studies merely as glorified spelunking. Why should karst researchers hobble their work with unnecessary references to muddy crawlways?

There is a second and more important reason to avoid describing caves in the professional literature—conservation. When writing for non-karst journals, I and many of my colleagues avoid unnecessary references to cave studies that involve sampling, to avoid sending the message that collecting in caves is justified, even for scientific purposes. A genuine speleologist cares more about

the cave than about his or her research and will collect samples with caution and integrity, and only if no damage is done. Can we guarantee that the next person will be so conscientious? Even a small number of “outside” samplers can cause havoc, and have done so in some instances. This is not a case of wanting the entire playing field for ourselves. Unless a researcher has a comprehensive view of how caves relate to their geologic setting—which can be gained only by a lengthy study of the caves and their surrounding karst—the results are worthless.

However, among ourselves, we must recognize the importance of cave exploration. Without it, the various karst sciences would still be in the dark ages. Many scientists made the first steps toward their careers as cave explorers. Let’s not abandon our roots. Karst researchers who disparage exploration have lost an important part of their heritage.

There is a growing tendency, particularly in the geosciences, to minimize field work. Industry and consulting firms realize that time is money, and there is no more time-consuming process than field work. As a result, employees are asked to solve problems with computer models, remote sensing, and legal maneuvers rather than by direct field observation. The quality of their work suffers enormously. This problem is most serious among traditional groundwater hydrologists, most of whom know

appallingly little about karst, as a glance through any modern textbook on groundwater will show. One groundwater hydrologist acquired an international reputation as a karst specialist without ever visiting a cave! Needless to say, few of his contributions have stood the test of time. Caves control the devel-



opment of a karst landscape, and without their service as underground drains, most surface karst features could not exist. A personal knowledge of cave patterns and their hydrologic function is essential to the full understanding of karst. And only by mapping and exploring (or working closely with explorers) can one appreciate the full significance of a cave's layout. Exploration of caves beyond their normally accessible limits has yielded some of the most scientifically important discoveries, such as Jewel, Lechuguilla, and Movile Caves. As a result, cave science is no longer restricted to improved trails in show caves. Microbiologists and geochemists are now buying wetsuits and honing their vertical skills in order to visit important field sites in caves.

But cave exploration and mapping are not real science, are they? Let's take a closer look. As we explore a cave, we must review the basic ideas of how the cave is put together. This does not always bear fruit, and on the other hand there are many examples of blind luck. But the process of thinking about where the cave might go — whether or not it actually cooperates — is one of the most fundamental kinds of scientific inquiry! It requires a synthesis and an understanding of what is already known, and a projection of that information into unknown territory. This requires fundamental ideas about how a cave forms. New discoveries demand new ideas to explain them. Such hypotheses are tested in the field, often at great labor. The success or failure of the explorer-researcher cannot be exaggerated or hidden by technical jargon. During my thesis field work in Indiana, I spent a great deal of time with local cave explorers who were still in high school. It was a memorable experience to hear them debate among themselves the developmental history of the caves they were exploring. Without realizing it, they were spontaneously turning into scientists. This is fairly simple science, to be sure; but can anyone deny that it lies at the heart of the scientific method?

Most scientists dwell at the cutting edge, where the action is. Unfortunately, public support for science has withered in recent decades, despite widespread alarm about diminishing standards in our schools, because the link between science and the common welfare is no longer clear. Ironically, the need for decisions based on scientifically sound reasoning has never been greater. The bridge between science and the public must be repaired, and the easiest way is to communicate the thrill that was so apparent in those Indiana teenagers.

One of the greatest problems in selling karst to the outside world is the remarkably poor public understanding of what caves are really like. There is plenty of cave information available, but most people cannot find it when it is needed. In an ideal world, those faced with a karst problem would simply turn to Speleologists in the Yellow Pages. Instead they try to solve the problem themselves simply because they are unaware that such talent even exists. Will they know enough to reach for the *Journal of Caves and Karst Studies*? That is unlikely. But if the *Journal* encourages even a few more explorers to take that extra step in the direction of science, there will be that many more voices of authority speaking up when decisions must be made about land use and environmental problems in karst.

I recommend the following. Give the *Journal* a greater focus on the basic description of caves and their setting. Imagine the value of articles that describe the basic layout, physical setting, and biology of the major caves of the US, written in language accessible to all readers. Aspects of cave exploration can be included if their link with science is clear, or if they provide significant historical perspective. In the same spirit, the dynamic aspects of science should be emphasized by opening the *Journal* to another kind of exploration — of controversial ideas, including debates of alternative viewpoints. This would require loosening the present format, but if such contributions are written authoritatively and submitted to peer review, they will actually increase the scientific value of the *Journal*. We can afford to do this, because the primary goal of the *Journal* is to benefit our own members. We may wish it to be widely recognized for its scientific content, but it is a specialized publication of limited circulation that can never attain the status of a mainstream professional journal. Instead, let it do what it is best equipped to do: bring science to the non-scientific public. Our members can help achieve this goal by contributing articles designed to appeal to a wide range of readers. The *Journal* will grow stronger as a result, and so will the link between cave exploration and research.