J. Michael Queen (1948 – 2019): A Memorial

Arthur N. Palmer
Department of Earth Sciences, State University of New York, 108 Ravine Pkwy, Oneonta, NY 13820, USA

Dr. James Michael Queen of Carlsbad, New Mexico, passed away on August 20, 2019, from pancreatic cancer, at his family’s home in Oak Hill, New York. He devoted most of his life to the innermost processes of speleogenesis. His other interests ranged widely, starting from a foundation in geology and paleontology and branching in many directions through the fine arts and humanities.

On the day of his death, he dictated these last few words to his family: *Dear Friends, if you are reading this it means that the time on my ticket has expired and I have shuffled on. I don’t know about the when or how of the return trip. As a bat perhaps, or a cephalopod? Or a new biothem ([a speleothem built around organic filaments]?* Watch for me soon! A close friend, Ron Kerbo (retired Cave Specialist at Carlsbad Caverns National Park), wrote a eulogy that concluded with: *He showed us that to be rich is to never stop wondering….* Ron and I collaborated on a remembrance of Michael for the November 2019 NSS News (National Speleological Society, USA). Here I focus on some of his more important work in the field.

Born in California in 1948, Michael grew up in New York State and obtained B.A., M.A., and Ph.D. degrees at the State University of New York at Stony Brook, with concentrations in biology and geology. Employment never ranked high among his priorities. He held many part-time jobs throughout the USA, mainly in college teaching and petroleum geology, which gave him the flexibility to pursue geology at his own pace.

In 1971 he interrupted his university studies to work for Shell Oil Company, near the cavernous Guadalupe Mountains of New Mexico. On his first caving trips there, he noticed that much of the limestone in the cave walls had been replaced by gypsum, which preserved the textures of the original limestone. This idea launched him on a 40-year study of Guadalupe caves, particularly Carlsbad Cavern. His first interpretation of the interaction between limestone and gypsum was presented at the 1973 NSS Convention and won an award for best scientific paper by a young student.

A closely the same time, the concept of speleogenesis by sulfuric acid was proposed by Stephen Egemeier, also a graduate of State University of New York (New Paltz), from observations in the still-active Kane Caves of Wyoming for his PhD studies at Stanford University. His work was published in 1981 and helped to steer Guadalupe researchers in the same direction. Michael and one or two fellow researchers (e.g., Donald Davis of Colorado) also considered sulfuric acid to be a factor in late-stage modification of the Guadalupe caves; but further observations convinced him that, in fact, most of the cave enlargement was the work of sulfuric acid.

Michael wrote few technical papers, but they described speleogenetic processes with unusual clarity. His interpretations tend to follow paths independent from other researchers. For example, he stressed the importance of cave enlargement by sulfuric acid above the water table long before the concept became well accepted. He was not the first to conceive of some of these concepts, but he expanded on them independently and helped to explain them to others.

A prominent feature in Carlsbad Cavern is a sponge-like zone of bedrock called the Boneyard, which was long considered an iconic example of phreatic dissolution. On the basis of morphology, air patterns,
and relation to other cave features, Michael claimed
that this and similar dissolution features were instead
vadose in origin. Specifically, they were formed by
sulfide-rich water rising from depth and releasing
H₂S into the cave air. The H₂S is absorbed by thin
moisture films on the cave walls, where it is readily
oxidized to sulfuric acid, the main driver of local cave
enlargement. One corollary is that the air movement
needs to be cyclic, passing from, and to, other parts of
the cave. In fact, the Boneyard was found not to be a
local feature, but instead a connection between the Big
Room level and lower cave levels. This idea came from
Michael’s standard procedure of following trails of air
movement, using diagnostic clues, such as distinct
levels of dissolution and flared “ears” of corroded
bedrock. The validity of this process has recently
been documented experimentally elsewhere. Michael
warned that caves that are still rapidly enlarging by
these processes can be dangerous to one’s health
upon lengthy exposure without protective gas masks.

He accepted that H₂S oxidation could also play a
role in phreatic speleogenesis, but only in a minor
way because of the limited availability of dissolved
oxygen and the fact that highly acidic water cannot
be sustained in a carbonate aquifer. In the mid-1970s
Michael also promoted the concept of speleothems
produced by microbial activity (later named “biothems”
by biospeleologists ). This topic has flourished in
recent decades.

Michael had an unusually clear memory for small
geologic details in the caves he studied. Very few are
shown on cave maps, but when asked for directions
to any of them, he could usually sketch from memory
their exact location and how to traverse the area
without causing damage. His sketches started as
crude lines that seemed to have little relation to each
other, but which grew together like ice crystals on a
pond, revealing ever-clearer details, and always in
correct proportion, as in a jigsaw puzzle.

Most of Michael’s publications were short
summaries in conference proceedings, which did not
draw the attention they deserved. His interpretation
of Guadalupe speleogenesis was summarized in the
proceedings of the 1994 Karst Waters Institute meeting
in Colorado Springs, Colorado; the 2006 meeting of
the New Mexico Geological Society in Carlsbad; and
the 2009 International Congress of Speleology in
Kerrville, Texas. He was reluctant to publish in high-
profile journals with widespread readership, because
he was still learning and exploring.

What was it like to go caving with Michael? He was
a skilled and careful climber, with a gentle touch, and
very protective of cave features. He wore any kind of
clothes that were handy – tennis shoes, etc. – as long
as they were clean and not abrasive. He became close
friends with many Guadalupe cavers, particularly Ron
Kerbo at Carlsbad Caverns. Their most memorable
feats were climbs far above the cave floor. Along the
main tour route they saw holes high above them lined
with evaporative speleothems, which suggested strong
air flow. They used helium-filled balloons to lift loops
of parachute cord, maneuvered them over projections
near the ceiling, and then pulled up a climbing rope.

Their greatest success was in the highest ceiling in
Carlsbad’s Big Room, nearly 80 m above the floor,
which led to a major upper chamber. The rope is still
in place along the main tour route, and although
inaccessible, it is considered an attraction by visitors.

Meanwhile Michael became the founding member of
a group of photographers that concentrated on large-
format prints of caves and karst, which they called
“Karst Features” (www.karstfeatures.com). He also
wrote two geologic guides to the tours in Carlsbad
Cavern that illustrate the many details that can be
seen on a leisurely trip. The latest is listed below
(Queen and Hose, 2006). His other publications were
mainly short summaries in conference proceedings
and guidebooks, which did not gain the attention they
deserved.

A couple of decades ago Michael acquired an old
house at the foot of the Guadalupe Mountains in
Carlsbad, New Mexico – “the Hacienda” – which
he used for storing his antiques and art treasures,
and as a home for entertaining friends and visiting
geologists. He was a welcoming host and superb cook.
His health began to decline rapidly in the past few
years, but he continued to help with caving and karst
events. He made his last public appearance at the
June 2019 National Speleological Society Convention
in Tennessee. A gathering of friends was held on
November 8 to cheer his final journey, as ashes, down
a remote canyon in the Guadalupe Mountains. We
regret his death but treasure his memory and the life
he shared with us.

Significant recent publications
by J. Michael Queen:

Few of Michael’s publications are easily available,
but some can be accessed through repositories on the
Web, e.g., Karst Information Portal. A few of his recent
and most accessible papers are listed below.

Queen J.M., 1994a - Influence of thermal atmospheric
convection on the nature and distribution of microbiota
in cave environments. In: Sasowsky I. & Palmer M.V.
(Eds.), Breakthroughs in Karst Geomicrobiology and

Fig. 2. Michael Queen at a photo lecture in Carlsbad, NM, 2011.
Photo by Gosia Allison-Kosior.


Queen J.M., Hose L., 2006 - Trail guide to, and discussion of, the geology of Carlsbad Cavern: Main Corridor and Big Room. Caves and karst of Southeastern New Mexico, New Mexico Geological Society, 57th Annual Field Conference, Socorro, p. 151-160.


