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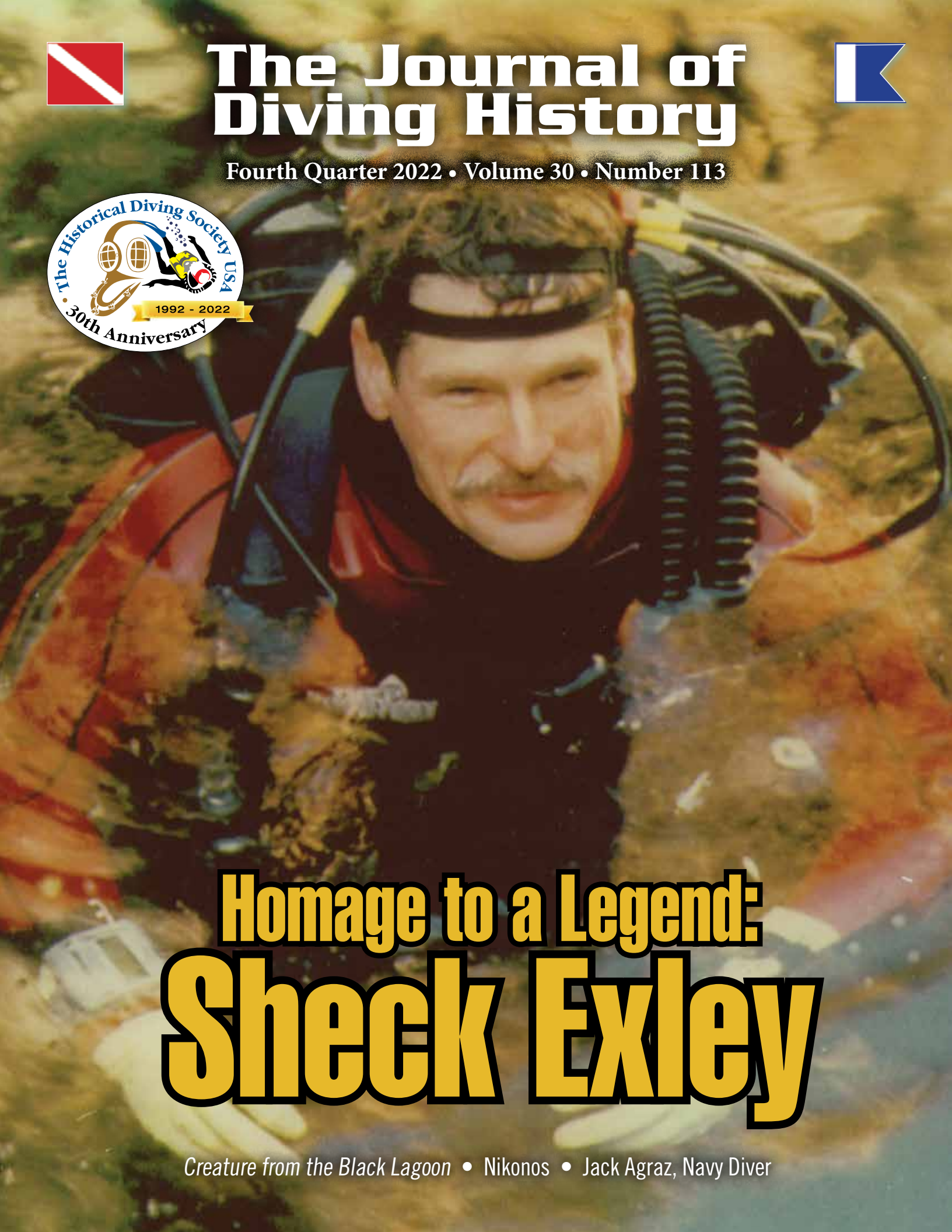
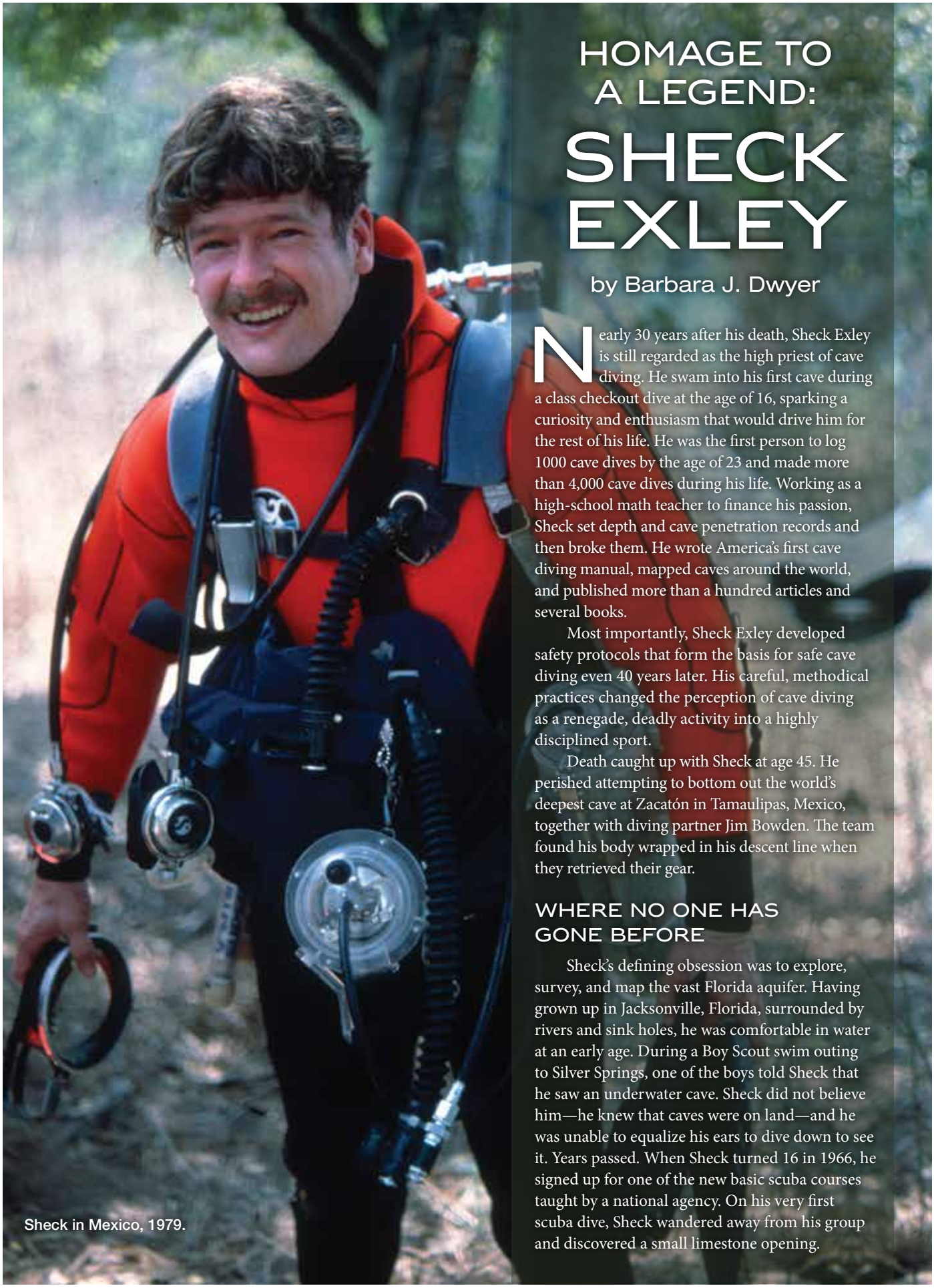


Homage to a Legend: Sheck Exley

Creature from the Black Lagoon • Nikonos • Jack Agraz, Navy Diver



Sheck in Mexico, 1979.

HOMAGE TO A LEGEND: SHECK EXLEY

by Barbara J. Dwyer

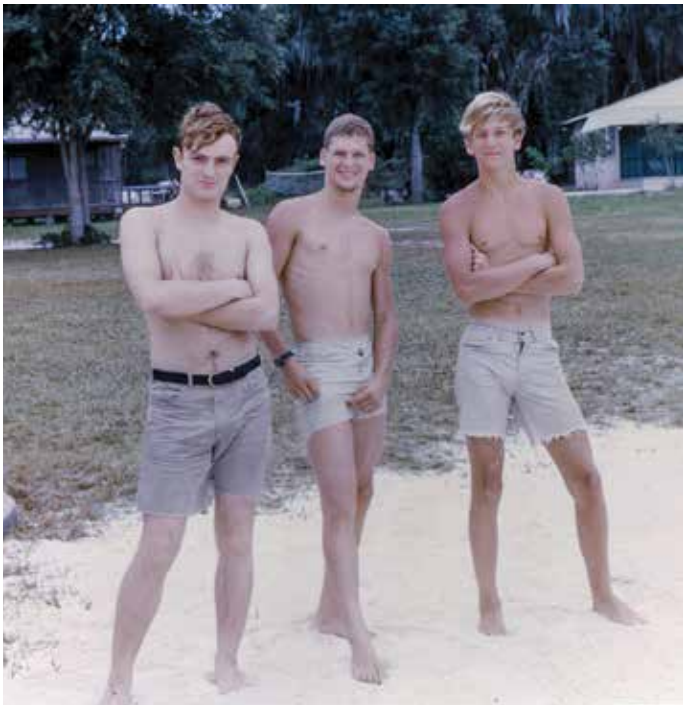
Nearly 30 years after his death, Sheck Exley is still regarded as the high priest of cave diving. He swam into his first cave during a class checkout dive at the age of 16, sparking a curiosity and enthusiasm that would drive him for the rest of his life. He was the first person to log 1000 cave dives by the age of 23 and made more than 4,000 cave dives during his life. Working as a high-school math teacher to finance his passion, Sheck set depth and cave penetration records and then broke them. He wrote America's first cave diving manual, mapped caves around the world, and published more than a hundred articles and several books.

Most importantly, Sheck Exley developed safety protocols that form the basis for safe cave diving even 40 years later. His careful, methodical practices changed the perception of cave diving as a renegade, deadly activity into a highly disciplined sport.

Death caught up with Sheck at age 45. He perished attempting to bottom out the world's deepest cave at Zacatón in Tamaulipas, Mexico, together with diving partner Jim Bowden. The team found his body wrapped in his descent line when they retrieved their gear.

WHERE NO ONE HAS GONE BEFORE

Sheck's defining obsession was to explore, survey, and map the vast Florida aquifer. Having grown up in Jacksonville, Florida, surrounded by rivers and sink holes, he was comfortable in water at an early age. During a Boy Scout swim outing to Silver Springs, one of the boys told Sheck that he saw an underwater cave. Sheck did not believe him—he knew that caves were on land—and he was unable to equalize his ears to dive down to see it. Years passed. When Sheck turned 16 in 1966, he signed up for one of the new basic scuba courses taught by a national agency. On his very first scuba dive, Sheck wandered away from his group and discovered a small limestone opening.



Left to right: Unknown friend, Sheck Exley, Edward Exley at Cowpen Lake, c. 1967 or 1968.

Trimix class at 40 Fathoms Grotto, Ocala, FL. November 23, 1993. Lee Meister, Curt Bowen, Sheck Exley, Doug Embler (front), and Darin Cowhard (rear).

> "In the shadowy entrance, I could see a dozen yard-long eels which wriggled into crevices in the rocky floor as I approached…I would have given anything to have had a light so I could see where the tunnel went from there. Did it get deeper? Were there big rooms? Or did the tunnel branch out into a confusing maze of passages, its floor littered with the fossil remains of huge prehistoric animals?"

Dive instructor Ken Brock forcefully shooed Sheck away and back into the boat. He was about to scold him but recognized the look in Sheck's eye. "You're hooked," Brock told him.

Within weeks of his checkout dive, Sheck, his younger brother Edward, and their friends were "spring hopping" using Ned DeLoach's *Guidebook to Florida Springs*. They explored every cavern and cave they found, not knowing where they went, diving as many as three or four springs each day.

WELCOME TO CAVE COUNTRY

North and central Florida is home to the biggest cluster of underwater caves in the U.S. The area was submerged beneath an inland sea around 65 million years ago. The compressed skeletons of tiny marine animals form the limestone (calcium carbonate) that underlies much of the state. Rainwater that seeps into the porous rock becomes weakly acidic and, by constant action, carves out the caves and sinkholes. The Suwannee and Withlacoochee Rivers and their tributaries are dotted with karst windows that offer portals to the aquifer below. Florida's meandering rivers surface and go underground again; ninety percent of the state's drinking water comes from the Floridan aquifer.

A handful of self-taught cave divers had been exploring its springs since the AquaLung regulator appeared in the 1950s. It was the wild west—there were no rules. The pioneers, Sheck among them, learned by surviving their mistakes or learning from those of others. They figured out safety measures as they went along—use a guideline, stay off the floor, have enough light, and reserve sufficient air to get out of the cave alive. Buoyancy compensators were years away. Divers tied inverted milk or bleach bottles to their belts and used their second stage to inflate them. These sufficed until diving manufacturers began marketing the "horse collar," the Mae West vest, and the first "stabilizing" jacket BC in the early 1970s.

CLOSE CALLS

Sheck narrowly avoided the Grim Reaper more than once while in his teens. During his first several months of diving, he survived emergencies that would have finished most divers. He was blown forcefully out of the fire-hydrant-like flow of Jugg Hole, hit his head on a rock, and flooded his mask. Shortly afterward, Sheck and his buddy got narced while diving to about 130 feet at Orange Grove sink near Luraville, FL. Worse, they became entangled in their nylon guideline they used for navigation. According to some accounts, they came close to drowning. But they managed to sort themselves out.

The entanglement fiasco persuaded Sheck not to use a guideline while diving later that day at Peacock Springs. Peacock begins as a wide, gin-clear cavern that slopes gradually downward to the cave entrance at about 60 feet. Sheck and his buddy Tommy Hawkins explored to the cavern's end. Tommy decided to exit. Sheck swam back with him and then returned to the cave entrance.

Using a partially empty 72-cu-ft tank and a dim flashlight with a dying battery, Sheck ventured solo about 400 feet into the cave. He swam rapidly to stay off the silty floor and several times crashed down to rest. The cave's graceful arches and interconnecting tunnels beckoned to him. But when Sheck turned to swim out, the branching passages all looked the same. After finding his way to the end of the maze, he looked up, expecting to see the cavern

Sheck Exley geared up at Indian Springs, Florida, November 22, 1981.

Bob Johnson, Larry Murphy, Sheck Exley, Dan Lenihan, Barry Kerley at Warm Mineral Springs, Sarasota County, FL, March 1975.

above him but found only solid rock. His regulator began to breathe hard, so he pulled his J valve for his five remaining minutes of reserve gas. Pushing back panic and determined to get out, Sheck found an "impossibly tiny" crack in the ceiling. He squeezed and wriggled his way through the crevice with his arms pinned to his sides, barely able to breathe. A distant faint blue glow signaled an exit. He finally broke through and swam toward the light. Sheck exited the cave by a route entirely different from the one he used to enter. He never entered a cave without a guideline again.

Sheck and Tommy decided to drive to Little River near Branford for the second dive of the day. To enter Little River, divers fight fire-hydrant-force flow to swim into a short cavern, then down a narrow chute that leads to the cave 90 feet below. The boys had had their tanks refilled, so Sheck was astonished when Tommy signaled that he was out of air close to the beginning of the dive. Sheck donated his second stage, upside down and free flowing, flooding Tommy's mask. Terrified, Tommy tried to get a good breath. Sheck got the regulator back for a breath and tried to urge Tommy back toward the entrance. Tommy panicked and attacked Sheck. Sheck managed to get his reg back but saw his friend begin to convulse and flail. Sheck pulled him out of the cave and performed CPR, which his diving instructor had taught him. Tommy regained consciousness at the surface but suffered a case of decompression sickness. He recovered after treatment in a recompression chamber.

Sheck's exploits commanded a brash respect from his fellow divers. His brother and friends treated Sheck as a "hero" for saving Tommy, which he wrote made him "more arrogant than ever." The boys in the teenaged dive club plagued their instructor with macho bravado and near misses, diving deeper to impress each other. A "testosterone excess" accounted for this behavior, Sheck thought.

By the early 1970s, divers were flocking to Florida to enjoy the clear, warm springs. More serious cave divers had formed local alliances and now began to organize more formally. The National Association for Cave Diving (NACD), formed in 1969, was the first organization. Sheck served as an officer but envisioned a structure in which members, not committees, ran the show. In 1973, he formed the Cave Diving Section as a chapter or "grotto" of the National Speleological Society (NSS-CDS). Sheck served as the new organization's first president and as its newsletter editor. By 1976, the NSS-CDS was the world's largest cave diving organization and has remained so since that time. The two organizations began to develop safety guidelines and training concepts.

Footnote: *How Sheck got out has long intrigued cave divers. (Cave diver Jim Thomas recently reconstructed this dive. He used equipment similar to Sheck's and had a safety diver). See: https://www.youtube.com/watch?v=wE3m8FAomn0*

THE DEATH TOLL

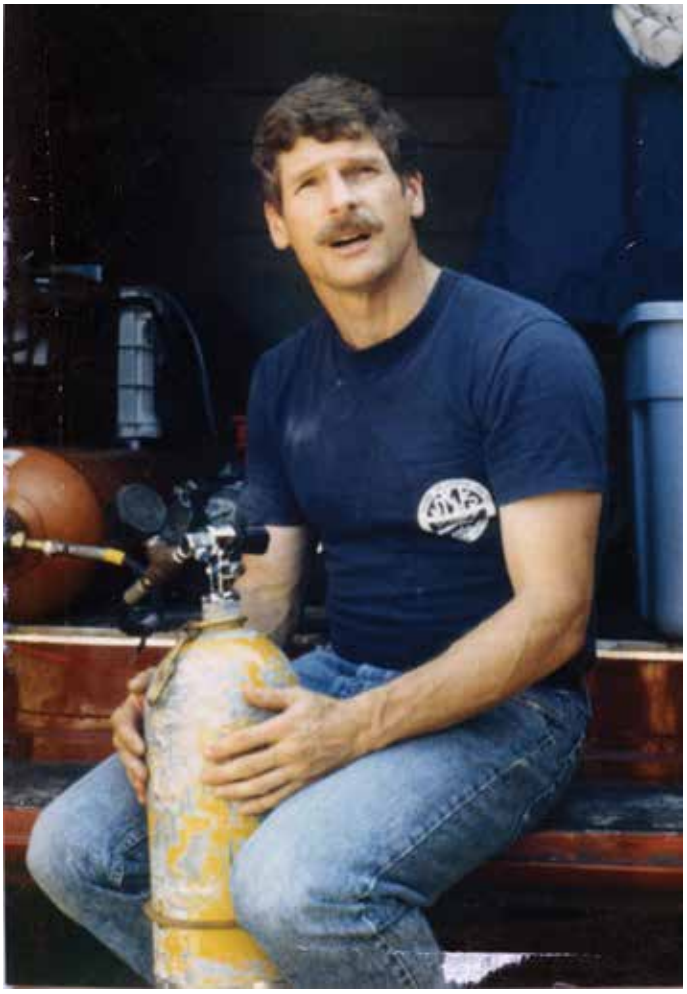
More than 300 people perished in Florida's underwater caves between 1960 and the 1980s, including 26 in 1974 alone. The state began dynamiting cave entrances shut in response to public outcry. Some landowners banned cave diving on their properties. The State of Florida considered legislation to prohibit cave diving altogether. Serious cave divers could see what was causing the deaths. Most of the fatalities involved untrained open-water divers, some of whom were instructors. These divers could not resist "just a peek" into an underwater cave entrance. Curious, they continued "just a bit further," often past a warning sign that cautioned against entering the cave.

Rarely did these novices run guidelines back to the surface. They did not know how to handle guidelines, especially while fighting their way into a cave against ferocious flow. Divers who tried to use guidelines sometimes became entangled. Most were diving on a small, single 72-cu-ft tank that may or may not have had a pressure gauge. A flashlight was typically weak and subject to flooding. (Divers who did not carry a light usually survived because they turned back when they reached the dark end of the cavern).

"KILLER CAVE CLAIMS ANOTHER VICTIM"

The scenario went something like this: The diver(s) would swim into a cave using a flutter or bicycle kick, which stirred up the clay floor. Clay stays suspended in water for hours and wipes out visibility quickly. Even with good visibility, Florida's underwater

In-water meditation was part of Sheck's pre-dive strategy. Nacimiento del Río Mante ("Mante"), Tamaulipas, Mexico, 1988.



Conducting a trimix class at Zuber Sink, 1992.

caves branch into side tunnels that can look similar to one another. Open-water divers wouldn't know to look back to reference a cave so that it would look familiar on the way out. Imagine the horror when these divers turned around to find the passage completely silted out to zero visibility. Even today's LED lights do not cut through silt.

Around this time, the diver's air supply would be getting low. Flashlights would run down their batteries and become increasingly dim. As the diver(s) realized that they were lost with diminishing air supply, anxiety would cause the person to breathe more rapidly, further depleting their air supply. In most cases this spiraled into panic. If there were more than one diver, they might try to buddy breathe when one ran out of gas, or they might fight till the end for the last breath of air.

Eventually someone would report the victim(s) overdue from the dive. Then, as now, volunteer cave divers recovered the bodies for local law enforcement. It is a grim and sobering task, one that no one hopes to do. There are rarely live rescues in cave diving.*

Sheck was one of the first to approach the fatalities in a problem-solving way. It was imperative to learn what was killing these divers, he believed. Analysis of the accident data over several years showed that the deaths had several factors in common. In 1979, Sheck published *Basic Cave Diving: A Blueprint for Survival.* A free download is available here: https://nsscds.org/wp-content/uploads/2018/05/Blueprint-for-Survival.pdf

Divers could survive, he emphasized, by following some basic guidelines, including:

- running a continuous guideline from the surface;
- planning breathing gas according to the rule of thirds (one-third for penetration, one-third for exit, and one-third for emergencies);
- carrying at least three lights; and
- avoiding deep cave diving. Few experienced cave divers had died, but most of those fatalities involved diving in a deep cave using air as a breathing gas.

Later he would add training, how to avoid silting, preventing panic, and a number of other considerations.

The book hit the shelves in Florida dive shops soon after it was published in 1979. The fatalities that had peaked at 26 in 1974 began to trend downward. However, Florida still saw 20 to 30 deaths per year through the late 1980s.

Sheck's own close calls, the ongoing cave fatalities, plus the horrifying experience of seeing his younger brother drown in 1968 while free diving, brought about a sharp change in his thinking. He recounted this event in the October 1992 issue of *aquaCORPS' technicalDIVER:*

** Edd Sorenson, a cave diving expert from Marianna, FL, has five live recoveries to his credit. One of these is a cave diver who participated in the Thai cave rescue in 2018.*

Using "quint" tanks, Sheck enters for the 1988 push of Mante.

L to R: Dan Lenihan, Paul DeLoach, Sheck at Río Choy, 1979.

> "I told [Edward] to be careful, then watched him swim out to the deepest section, take a few breaths, and disappear behind the huge ledge. A minute later he reappeared, swimming at a strange angle instead of straight up to the surface. When he got to the surface, he kept on swimming instead of clearing his snorkel, then slowly started sinking toward the 125-foot bottom. After an hour of CPR, my mouth filled with his vomit, we had his heart and lungs going again, but he never regained consciousness.
>
> My only brother, Edward, was dead. I was the one who had to make the call to my parents."

A copy of Sheck's story, "It's Your Call," can be found here: https://gue.com/blog/its-your-call/

Sheck warned readers not to shortcut safety, lest they had to make a phone call like he did. After his close calls and his brother's death, he had grown out of his disregard for safety "the hard way." Sheck refused to teach his high-school students about diving. "Most of the kids have no idea that I am a diver, but a few find out and inevitably ask me to teach them to dive or sponsor a scuba club, he said. "I will never do either for fear of encouraging the "macho" so evident in teen-aged males."

Was Sheck's relentless pursuit of excellence a lifelong attempt to psychologically "undo" his brother's death?

THE GOLDEN AGE OF CAVE DIVING

The 1970s and '80s were heady times for Florida's explorers. Sheck, together with Mary Ellen Eckhoff**, John Zumrick, Paul DeLoach, Wes Skiles, and other early cave-diving luminaries, were among the first to see much of the new passage.

Exploration expanded tremendously in the 1970s and more than doubled again in the 1980s. Cave diving in the Yucatán peninsula began in earnest. National and international rivalries and friendships formed. Penetration and distance records rose and fell as one cave's explored territory pulled ahead of another's.

Some of Sheck's major projects included:

The Peacock system. Sheck called the idea of exploring the Peacock system his "dream." He knew from the day that he got lost there that the cave would be large and extensive. When he organized an exploration effort in the early 1970s, John Harper, Tom Mount, Ike Ikehara, Randy Hylton and others had explored the outer passageways and connected the Peacock system with Orange Grove Sink.

Shortly thereafter, John and Randy made the first nonstop traverse from Orange Grove Sink to Peacock I, surpassing John's own 2800-ft traverse in the Hornsby system. The exploration took many years and many more dives. By March of 1977, the Peacock Springs cave system at 19,203 feet of passage became Florida's longest surveyed cave.

Devil's Eye/Ear. Sheck, Lewis Holtzendorff, Court Smith and others extended the line in the Devil's system at Ginnie Springs in 200-300-ft increments, reaching 3000 feet by April of 1975.

Manatee Springs. Joined by Dana Turner, the group picked up exploration in the gigantic and high-flow Manatee Springs. Bob and Sue Friedman had surveyed about 1400 feet in 1969 before the ferocious outflow that they compared to swimming up Niagara Falls stopped them. Sheck's group added between 200 and 500 feet of line for most dives until they began using stage tanks. By May 1975 they had extended the line out to 4110 feet before park policy restricted access.

Lewis Henkel and Dave Manor got access in 1979 and with difficulty pushed to 5323 feet. Predicting that no one would go further, they left their reel in place. Sheck returned with Bill Main in June of 1981. Diving with as many as five stages each and enduring up to seven hours of decompression, they pushed to 6867 feet. Bill took a break, and Sheck and Clark Pitcairn laid line to 7665 feet. They believed that they had walled Manatee out.

*** Sheck and Mary Ellen were married on October 29, 1983, while submerged in Thunderhole Cave System. Henry Nicholson performed the ceremony. The marriage lasted only a few years, but the affection and partnership endured.*

Sheck sets his new depth record of 225 feet at Zuber Sink (now 40 Fathom Grotto), Ocala, FL. August 19, 1967.

The Cathedral-Falmouth system. The Manatee penetration record endured for more than seven years. Sheck bested it in Cathedral Springs, an enormous and deep system that he explored to 10,935 ft between 1972 and 1990. Cathedral is more than 200 feet deep in its deepest section. Sheck purchased the property. Unfortunately, agricultural pollution and water withdrawal for industry use have all but destroyed this once-pristine, white system.

Hole in the Wall. The team surveyed this Marianna, FL, system between 1975 and 1978. Working with Dale Sweet, Sheck, Mary Ellen Eckhoff, Paul DeLoach, and John Zumrick used twin 100-cu-ft tanks with double, triple, and even quadruple stages to explore the cave to just over 4500 feet by early 1978.

Madison Blue. The team used stage tanks to push passage in this lengthy high-flow cave. Court Smith discovered and named the spectacular "Courtyard." Exploration continues today.

SAFETY, DISCIPLINE, AND EDUCATION

Sheck and his contemporaries pioneered improvements in equipment, technique and learning. Necessity drove early equipment innovation. John Harper's use of plastic jugs for buoyancy compensation is one example. Frank Martz manufactured the first dependable, bright underwater lights and guideline reels in the 1960s. Jamie Stone and Jim Lockwood modified the Farallon MK 7 DPV by replacing its lead acid batteries with NiCad cells to extend burn time and range. George Benjamin's isolator manifold did away with divers needing to use pony bottles for redundancy.

Safety concerns prompted other developments. By 1968, at only eighteen years of age, Sheck had proposed the "rule of thirds" that we still use today. Lewis Holtzendorff developed directional line arrows made from duct tape in 1976 after an experienced cave diver made a fatal wrong turn in Peacock, and used his last breaths of air to write a farewell letter to his family. Forrest Wilson later designed and produced plastic clip on line arrows. Sheck was the first to use staging (placing full tanks at intervals in the cave) to survey Madison Blue cave to 2099 feet in 1970. Before this, divers were limited to tanks that they could carry on their backs.

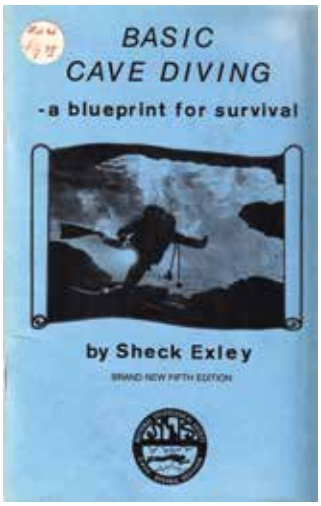
Discipline. Sheck's commitment to discipline, fitness, equipment maintenance, and meticulous dive planning set the bar high. He began karate training while in high school and had earned a black belt by college. Sheck noted frequently that karate training benefited his diving because it improved his physical condition, willpower, and ability to concentrate. Before a dive, Sheck used the exercises that he had learned in martial arts to clear his head and to increase body awareness.

"I've learned to handle the fear by what I call controlled paranoia—a combination of meditation and experience," Sheck told Ned DeLoach. "The meditation clears and settles my mind, allowing me to stay at a high state of alertness and continually aware of my body's reaction to the stress. My experience has taught me how vulnerable I am."

"Survival depends on being able to suppress anxiety and replace it with calm, clear, quick, and correct reasoning."

Sheck was "easily the most disciplined man I have even met.," Jim Bowden recalled in an interview after the fatal Zacatón dive. "Sheck had a calm intellect and strength that he often cloaked in the 'good ol' boy' image seen by others."

Sheck contended seriously that the cave was out to get him and that the odds would catch up with him sooner or later. To stay alive, he believed that he must envision everything that possibly could go wrong on a dive and solve all problems beforehand. "I mix my own gases, I check every piece of equipment over and over, and



A Blueprint for Survival: Basic Cave Diving

Ten rules from *A Blueprint for Survival: Basic Cave Diving*

Sheck (left) and Mary Ellen Eckhoff get married at Thunderhole by Henry Nicholson, October 29, 1983.

I memorize each aspect of the dive plan," he told Ned DeLoach. "Fear keeps me alert. I am constantly attuned to every feeling in my body, every function of my equipment, and every happening in the surroundings. Off guard for a minute and the tiger is on my back."

Education. An untiring effort has produced some one hundred articles and six books about cave diving. Sheck has been repeatedly recognized for his accomplishments, including being named a Fellow of the National Speleological Society and Explorers Club. He received the Lew Bicking Award as America's top cave explorer in 1981. This year, the Historical Diving Society honors him with its Pioneer Award.

FIGHTING THE DEPTH DEMONS

Cave divers knew early on that they were pushing the limits of human endurance by diving deep on compressed air. Sheck had claimed the depth record at Eagle's Nest in 1969, diving to 292 feet and adding on to the existing line. He had dived in Mystery Sink and Forty Fathoms Grotto. Despite its limitations, however, it was the only readily available breathing gas during the 1970s.

Deep air. Hal Watts, owner of Forty Fathoms Grotto, held the depth record of 355 feet in 1967. Hal believed that divers could manage nitrogen narcosis by performing short, progressively deep, air dives. Two of his students topped his record by 1971 by diving to 437 feet, although both passed out**.**

A series of deaths marred the 1971 Andros Blue Hole expedition, which was headed by the legendary George Benjamin. While exploring off Andros since the 1960s, Benjamin had an extraordinary safety record. He chose his divers with great care and custom designed his equipment (including the isolation manifold that bears his name). Benjamin had established his limits early on: These caves were extremely deep, and their greatest depths far exceeded the safe use of compressed air. To go further would require special mixtures of helium and oxygen. These greater depths, Benjamin decided, were well beyond their safety limits. Observing these limits had kept the expeditions without a major incident for years.

That all ended in 1971.

Sheck saw some of this horror close up. Just before he arrived on Andros, a rookie diver persuaded a more experienced member to take him into a deep cave on air, against Benjamin's orders. He panicked, and perished at about 180 feet. His body was recovered the next day at 255 feet.

Later the same week, Frank Martz disappeared into a silty corkscrew restriction at around 300 feet during an air dive with Jim Lockwood. Frank was one of the world's top cave divers and had considerable experience diving air at depth in caves.

Arriving on Andros a few days later, Sheck felt sad and disturbed. The other divers told him that Frank had been especially moody and anxious and was intent on doing dives that seemed hazardous. Frank had recently mentioned to Sheck that he was avoiding Eagle's Nest, his favorite Florida cave, because an encephalitis-causing amoeba had been discovered in the water. Sheck and Frank were not particularly close, and Frank's personality was normally acerbic and bizarre. But Sheck wondered: Had Frank contracted encephalitis or believed that he was terminally ill? Had he arranged his suicide by plunging into a "bottomless" cave?

Sheck retraced Frank's dive route and found the cut end of his guideline. Possibly Frank had dropped his knife, started after it and was weighted down by his heavy dual steel 100s. There was no sign of Frank, and his body never was found. The accident haunted Sheck and continued to do so whenever he visited Andros.

Disaster struck again in December of 1971. Jim Lockwood had recommended Sheck as a support diver to Canadians Archie Forfar and Anne Gunderson, who operated a dive shop on Andros and were part of the deep exploration crowd. Anne and Archie planned to set a deep-air record to 485 feet diving a 1000-foot deep wall. Using Hal Watts' techniques, they had built up to air dives to 400 feet and not surprisingly had developed symptoms of severe oxygen toxicity—partial to total blindness, amnesia, and loss of consciousness. Archie had devised a system of drop-away weights to descend and auto-inflating BCs to bring them up "automatically" if they lost consciousness.

Sheck made two practice dives with Anne, Archie, Jim, and Randy Hylton and developed symptoms of oxygen toxicity. "When I looked at Jim, it seemed as if there were three of him, one above the other. In all of my deep dives. I had never experienced symptoms like this. I prudently stopped kicking and inflated my

compensator for the rest of the trip up." He resumed swimming at 300 feet and became nauseated and developed cramps. The symptoms receded upon ascent.

For the record dive, Anne and Archie would try for 480 feet while Sheck, Randy, Jim, and photographer Bill Wiggins waited at 300 feet. The day dawned cloudy, windy, and wretched with roiling seas. Sheck, made miserable by seasickness, decided to skip breakfast and take a double dose of the nausea suppressant marezine. His regulator was free flowing slightly so he changed to one with more resistance.

Anne, Archie, and Jim had trouble with their descent line, but eventually freed it. Nauseated, Sheck waited at 300 feet with Randy and Bill, but Jim continued swimming. Nine minutes into the dive, Jim floated upward. He was able to inflate his BC just before losing consciousness at 400 feet. Randy grabbed his tank valve and hauled him up.

Anne and Archie were nowhere to be seen. Sheck, running lower on air than he had planned, started down to look for them. At 400 feet, he spotted his friends far below. Bubbles came from their regulators but they were not moving. Knowing well that no one had ever rescued a depth blackout victim below 340 feet, Sheck dived to 465 feet, "further than anyone had dived on air and lived to tell about it."

At 400 feet, Sheck saw them far below, exhaling bubbles but not moving. At 420 feet, he could see Archie face down, his legs kicking slowly. Anne was nearby, motionless. Sheck's vision began to change; he could see no further than 10 feet without shapes deteriorating into "a silver-grey blur of pale light and dim shadows." Still, he continued to 465 feet. Blackout and/or a convulsion was seconds away."

Anne and Archie were dead, and Sheck feared that Randy and Bill also were lost. He found them at decompression, which lasted for 162 minutes beginning at 110 feet.

As late as 1988, WKPP (Woodville Karst Plain Project) diver Bill McFaden drowned 50 feet short of the Little Dismal Sink entrance after he experienced a series of problems during his dive. Most of these difficulties stemmed from diving deep on air. The WKPP founders quickly tightened up their already stringent standards, including prohibiting any deep dives on air.

"Air diving records viewed objectively are on a par with playing Russian roulette with an increasing number of bullets in the gun," Rob Palmer noted in *Deep into Blue Holes*. "The deeper you go, the more likely you are to convulse of oxygen toxicity and die." Ironically, Palmer died nearly a decade later in 1997 on a deep air dive in the Red Sea.

Voodoo gases. Mixes containing helium and added oxygen largely remained in Navy and commercial use at that time. Sheck followed the developments with interest. Some early European divers had experimented successfully with mixed gas in South Africa in 1967. The U.S. track record was less favorable, even when using specialized Navy tables. Hal Watts suffered a terrible hit while diving on an oxygen-helium (heliox) mix to recover a diver's body from 355 feet in Mystery Sink near Orlando. A support diver drowned. Hal remains skeptical of helium to this day.

The next year, Sheck's close friend, Lewis Holtzendorff, died during an underwater seizure while using pure oxygen at 40 feet to decompress from a heliox dive. A successful trimix dive took place at Blue Springs, Missouri, in 1978. Frank Fogarty and Roger Miller reported diving to 325 feet. They became severely chilled but survived the dive.

"From the time of the Lewis Holtzendorff tragedy in 1975, opinion was very strongly opposed to the use of trimix," Martyn Farr wrote in *The Darkness Beckons*.

As far as Sheck was concerned, air remained the only available breathing gas for deep dives, despite the risk of oxygen toxicity's developing below 218 feet or with prolonged exposure. He and many of the other deep explorers stayed wary of helium mixes for years to come.

In 1980, Dale Sweet of Winter Haven, Florida, launched the era of mixed-gas diving. Using trimix, Dale broke Sheck's Boiling Hole (Andros) depth record of 340 feet by diving Diepolder II to 360 feet. This was the first exploration dive in a Florida cave using mixed gas. Dale placed a small American flag with a secret message on the back for all those who would follow. A week after Dale's dive, Sheck dived to the "Flagroom" on air, and reportedly saluted the flag in what was called, Sheck's "Salute the Flag" dive.

As other divers using helium caught up with Sheck's depth records, he began to believe that mixed gasses were at least part of the answer.

Jochen Hasenmeyer of Germany had dived to 470 feet at Vaucluse, France, in 1981, then to 656 feet in 1983. "If I had any reservations left about the superiority of helium over nitrogen for deep cave diving, they were dispelled by [Jochen's] dives," Sheck wrote. "Now I felt that I could start a cautious program of helium diving with acceptable safety."

However, Sheck was out of deep Florida sites in which to train. Mystery Sink, the only local cave known to be deeper than 360 feet, was closed because of the fatalities during the 1970s. Morrison Springs, thought to reach depths of 1000 feet, had been dynamited shut following fatalities there. Wakulla Springs was reported to be 250 feet deep but was closed. Nothing in the Bahamas or the Caribbean seemed suitable.

EL NACIMIENTO DEL RÍO MANTE

Based on a scouting expedition to Mexico's Sierra Madre that Sheck had led in 1979, he believed that the enormous spring in Mante, Tamaulipas, was the only spot where he could beat Jochen's record. The divers had discovered a 100-ft-long crack that ran straight down the fault of the uplifted coastal plain. This crack was five feet wide at its largest point, emitting a torrential outflow that exceeded that at Manatee. The crack widened slightly, allowing Sheck and Paul DeLoach to drop rapidly to 290 feet to peer into a vast black abyss. Because they were diving on air, they believed that diving below 330 feet would be extremely hazardous.

Mante was to be the "proving ground" in which Sheck intended to break his own record. One thousand feet was "a nice round number," he thought. Realistically he knew that his age and the effects of the gases he breathed were against him.

It would be eight years before Sheck would return to Mante. Meanwhile he made trimix dives at Florida's Cathedral Canyon and at Holton Spring. But he became "uncharacteristically apprehensive" in the months before his Mante dive because he knew that he would be venturing into unknown and perilous

Diving at Jackson Blue cave, Marianna, FL (image from the cover of *Caverns Measureless to Man*, © Cave Books, 1994.)

Gear laid out for Bushmansgat dive, 1993.

Sheck at Zacatón.

territory. Mante's violent outflow guaranteed exertion, which increased the risk for narcosis, and toxicity from both oxygen and carbon dioxide.

The effects of diving on helium also concerned Sheck. Breathing helium at depth carries the risk of high-pressure nervous syndrome (HPNS), a central nervous system excitability disorder. Its neurological symptoms begin vaguely with headache or dizziness and progress to violent tremors, chills, and muscle weakness and jerking. Disturbances in memory, cognition, and performance greatly imperil affected divers.

Sheck developed symptoms of high-pressure nervous syndrome on several of his Mante dives and again during his landmark 1993 landmark Bushmansgat dive to 863 feet. Of this latter dive he reported, according to Martyn Farr: "The tremors were quite intense by the time I reached the bottom, severe enough to make operation of my inflator difficult. My entire body began trembling, gradually escalating to uncontrollable shaking by the time I landed." The symptoms resolved upon ascending to around 300 feet.

Diving at Mante to 520 feet on April 22, 1987, Sheck established a new American record. During ascent, he lost his watch on his 260-foot decompression stop and had to count off his decompression time on his fingers until Mary Ellen brought him a replacement while he was at his 80-foot stop. He experienced several possible symptoms of decompression illness and/or oxygen toxicity during the ascent and developed skin bends. Sheck returned in June of 1987 and extended his line to 660 feet, tying Jochen Hasenmeyer's Vaucluse depth record.

He surpassed this record in April of 1988, diving to 780 feet. Although he had made several recent mixed-gas dives, this was the first one he would make with a custom decompression schedule that physiologist Bill Hamilton had developed for him.

"We were so far off the charts (in terms of depth and duration) that we were going on gut feeling," remembered Hamilton, editor of "Pressure," the Undersea and Hyperbaric Medical Society newsletter. "The computer would spit out numbers but we couldn't take them at face value—they weren't based on actual exposures. So, we manipulated them, worked around them, interpolated between them—all the things you're not supposed to do—and, eventually we got a dive plan."

Sheck set another world record in March of 1989 by diving to 881 feet using trimix. He surfaced following 14 hours of decompression with no adverse effects.

ZACATÓN

Probably as much has been written about Sheck's death as his life. Sheck and explorer Jim Bowden joined their efforts on a pit known as Zacatón north of Tampico, Mexico, that has been sounded to deeper than 1000 ft. Sheck and Jim planned to descend to 1000 feet on separate lines so as not to interfere with each other. Jim used his gas much more rapidly than anticipated and aborted the dive. Sheck never ascended.

Present on the day of the fatal dive in addition to Sheck and Jim Bowden were Mary Ellen Eckhoff, Karen Hohle (Bowden's wife), Dr. Ann Kristovich, and Marcos Gary.

The team did not expect to recover Sheck's body. It was retrieved only because he was hooked to the descent line. Whether he had known that he was doomed or had wrapped the line while he solved some problems is unknown. Almost everyone agreed that Sheck was unlikely to have gotten entangled by accident. Sheck's computer showed that he had reached a depth of 879 feet.

What caused Sheck's death is uncertain. It is believed that he suffered from an incident of HPNS, ran low on gas, and drowned. Dr. Bill Hamilton, Gordon Daughtery, Dr. Ann Kristovich, and Jim Bowden prepared the accident report, "What happened to Sheck Exley," which was originally published in the Undersea Hyperbaric Medical Society's newsletter, "Pressure." Their report was reprinted with permission in *aquaCORPS Journal #9 Wreckers* January 1995. A copy of the report can be found here: https://gue.com/blog/wp-content/uploads/2021/03/Exley.incident-report.-aquaCorps_N9-1.pdf

Writing in *Caverns Measureless to Man,* Sheck noted:

"On deep dives you move into the physiological and psychological unknown, where all the components of the air that you are now breathing become poisonous, where the normal problems of diving in caves are magnified a hundredfold, where bizarre disorders arise that medical scientists have never dreamed of."

Sheck would not have been surprised.

For a variety of stories about Sheck Exley and his achievements, see "Celebrating Sheck Exley," *InDEPTH,* April 2021: https://gue.com/blog/the-deepest-dive/

Barbara Dwyer is the editor of Underwater Speleology, *the journal of the National Speleological Society-Cave Diving Section (NSS-CDS) and a cave diver. She lives in San Francisco, and her home port for diving is Monterey, California.*

All photos courtesy of Mary Ellen Eckhoff and Brian Udoff.