Underwater Speleology

Journal of the Cave Diving Section of the National Speleological Society

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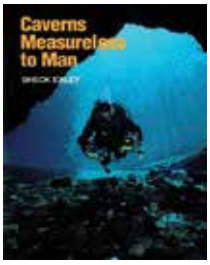
Volume 47, Nos. 3 and 4
July-December, 2020

Greg Flanagan (left) and Bill "Hogarth" Main. Greg Flanagan designed the first metal back plate. Bill Main constantly tweaked his dive gear into the minimalist configuration that bears his name. Photo was taken about 40 years ago at Ginnie Springs, photographer unknown. Thanks to Guy Bryant for the photo formatting.

A Two-for-One Combo from the Bookstore



Get two of our best-selling books for the price of one: Sheck Exley's *Caverns Measureless to Man* and *Cave Diving: Articles and Opinions* (Jill Heinerth and Bill Oigarden, eds.). $35.00 for both.

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Underwater Speleology
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July – December 2020

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Cover: *A diver descends into The Pit near Tulum, Mexico.* © Jason Gulley.

To our readers and members: Views represented in *Underwater Speleology* articles are solely the author's and do not reflect the views of the NSS-CDS Board of Directors or of the Editor.

We advocate freedom of speech and welcome discussion. Feel free to rebut previous articles and/or to submit your own.

The magazine encourages members to submit news, stories, letters, trip and exploration reports, maps, and photos for consideration. Please contact the Editor for publication guidelines to avoid duplication of work.

Underwater Speleology (UWS) is published quarterly (four times yearly) by the NSS-CDS, 295 NW Commons Loop, Suite 115-317, Lake City, FL 32005.

UWS is a membership benefit. Information about membership fees and registration can be found at www.nsscds.org.

Please send address changes to cdsmanager@nsscds.org or to 295 NW Commons Loop, Suite 115-317, Lake City, FL 32005.

a note from the chair

Well, 2020 is nearly over and what a crazy ride! It's not over yet, so hang tight with us as we press onward.

Sadly, a 2021 annual conference does not look promising. Our annual meeting will be held via Zoom on May 22, 2021. Meeting details will be posted at https://nsscds.org and on Facebook at a minimum. We are all disappointed, but safety is most important.

Because of the lost revenues, the Board has voted to move to a digital-only version of *Underwater Speleology* for at least one year. The publication cost for the hard copy that we all love is easily our highest expense. We are sad, too, but we believe that this is necessary to stay afloat without conference income. The Board will reassess the situation again in a year and make the decision whether to go back to paper or not.

It's that time of year again…

Kelly Jessop led a Bylaws Committee, which included members Barbara Dwyer and Panos Alexakos. This team made recommendations to the current bylaws and sent these to the Board of Directors for a vote. The membership will vote to approve the changes during the board election voting process.

A Nominations Committee also was selected, composed of members Jim Wyatt, Jozef Koppelman, and Sean Barnes. Kelly Jessop will serve as the Administrator of Elections. This team will organize and oversee the nomination and election of members to fill vacant Board positions. This team is a mix of newer and more seasoned members and volunteers. Think of it as an incubator to raise up new leaders and volunteers within our organization.

by Reneé Power

In order to vote, your contact information (name, snail mail address, and e-mail address) MUST be current in our membership database. Please check that your registration is current at https://nsscds.org/membership-listing-as-of-12-16-2020/. You can renew on the website or by emailing Adam Hughes at cdsmanager@nsscds.org and make sure you're good to go to receive your ballot. Stay tuned for updates!

The Training Committee has updated the NSS-CDS Training Program Standards and Procedures. If you are an instructor for the Stage, CCR Cave, or CCR Cave Crossover courses, please review the standards at https://training.nsscds.org or reach out to Max Kuznetsov at trainingdirector@nsscds.org before teaching one of these courses.

Our Board of Directors has been working hard for you this year. If you see any of us out and about, we would like to hear your feedback and ideas. Our email addresses are available on the *UWS* masthead and on our website https://nsscds.org/staff.

Have you checked out the store lately? We've got new and old logo shirts, books, maps, stickers, hats and other cool stuff. Adam Hughes is standing by to take your order! https://nsscds.org/shop.

Do you have ideas for fundraisers, clean ups, or projects? 'Got skills? 'Want to serve on a committee? Several committee coordinator positions are open, including IT, Landowner Relations, and Cave Photography Committees. Contact Richard Blackburn at committee@nsscds.org for more info. You can find the committees, coordinators, and contact information at https://nsscds.org/staff. Volunteers, we are honored that you give so much of your time; we recognize that it's valuable. Thank you.

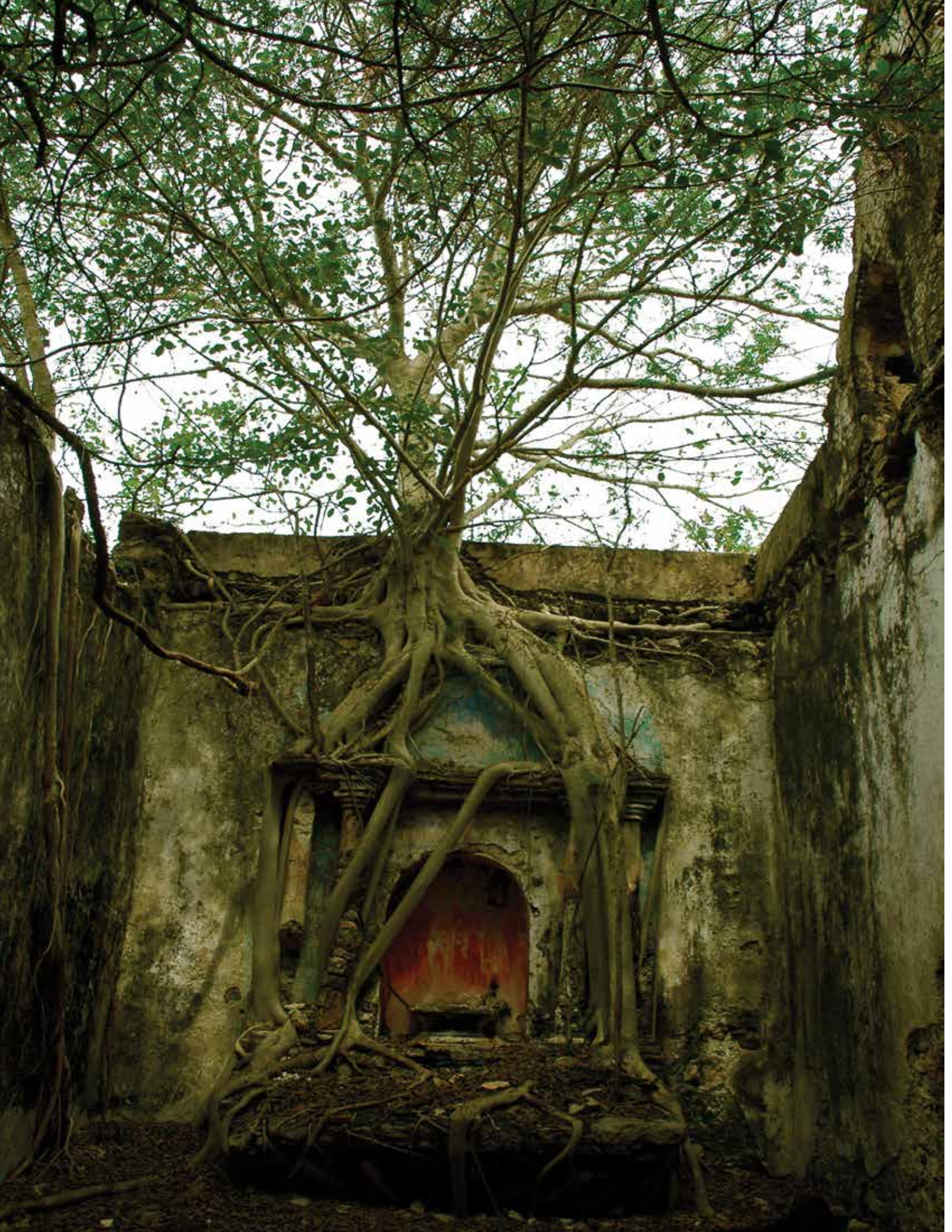
If you've been fortunate enough to get some diving in during this weird time, have you reached 100, 500, or 1000 safe cave dives? Don't forget to apply for the appropriate milestone award.

It's been a tough year for all of us. We are truly grateful for your continued support. If you want to make a donation and have the means, you may do so at https://nsscds.org/product-category/donations/. Thank you in advance!

A huge thank you to *Underwater Speleology* Editor Barbara Dwyer, Associate Editor Michael Ray, Contributing Editor Michael Menduno, and to all of you who contribute stories and photos.

Live large, be safe, be kind, and remember to pay it forward.

Safe diving,
Reneé Power



Fossil Finds in Cenote Canún

by Luís Sánchez and Antonio Ceballos

For cave divers who spend time in Mérida, nearby Cenote Canún offers adventure, a treasure trove of artifacts, and a sense of hitch hiking back in geologic time. Part of Yucatán's "ring of cenotes," Canún and nearby caves offer a close-up look at cultural treasures that too often are looted or whisked away for study. Beautifully preserved human skeletons, the bones of long-extinct animals, pottery, and tools remain *in situ.* Divers, including the author, are still discovering artifacts some 20 years after the cenote was first explored.

This small, exquisite cave lies about 50 km/30 miles east and south of Mérida, Yucatán's capital, in the Homún municipality.

Cataclysm wipes out dinosaurs, ecosystems, three-quarters of the planet's life

Yucatán's geology was determined some 66 million years ago when the immense Chicxulub (pronounced CHEEK-she-loob) meteor struck a then-shallow coral reef and embedded itself six km/ twelve miles into the earth.

The impact generated an estimated billion times more thermal energy than the total of all atomic bombs ever detonated on earth. A core of superheated plasma would have immediately vaporized all nearby life. Winds in excess of 1000 km per hour, worldwide wildfires, hundred-meter-high tsunamis, and massive clouds of bedrock granite, hot ash, and steam catapulted around the planet. Within minutes the underlying rock collapsed, forming a crater with a peak ring. Seawater quickly flooded the crater.

Over time the limestone fractured. Today, groundwater flowing north through the limestone meets the crater's rim. The water flow is deflected around the crater and flows (visibly) into the Gulf of Mexico where the peninsula's northern coastline overlies the crater rim. This process over time has dissolved the overlying limestone, producing the "necklace" of cenotes that surrounds the crater.

The Chicxulub cataclysm ended the dinosaurs' 135-million-year run. An estimated three quarters of the planet's species went extinct, leaving the birds to carry on evolution.

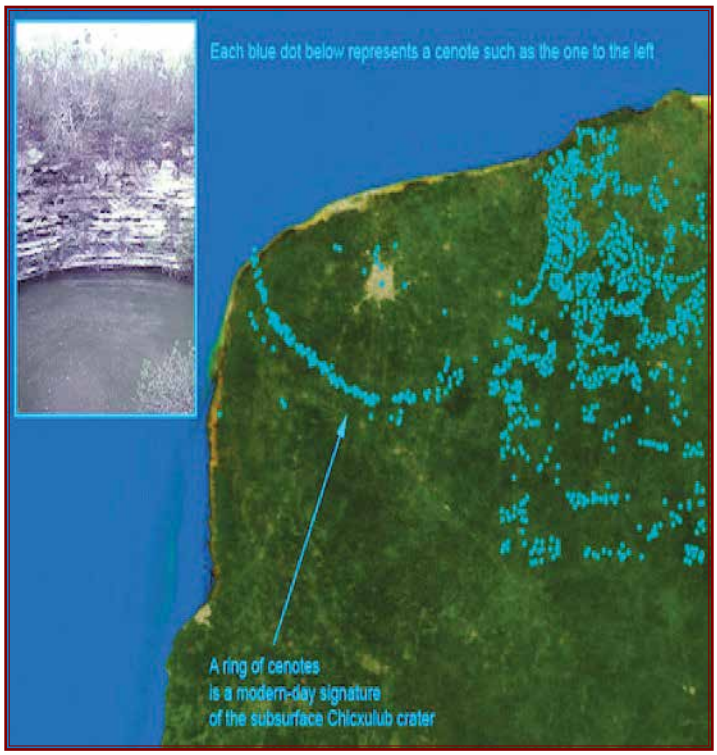
The Homún municipality alone contains some 375 known cenotes, but hundreds more are visible from the air. Yucatán's caves are typically shorter than Quintana Roo's. A typical passage might reach a kilometer/0.6 mile with circuits and some traverses. Depths vary considerably from very shallow to more than 50 m/164 ft. At least one of the area's sinkholes reaches a depth of 243 m/800 ft.

Blocks and tackles

Cenote Canún sits inside an abandoned henequen (sisal) plantation. (Henequen was an important crop until plastics made sisal obsolete and left the peninsula without industry). Its elevated and squared entrance indicates that the Maya used it as a waterwheel. The site is privately owned and closed to the public. But the owners allow certain local guides to escort certified cave divers. The guides arrange entry, provide transportation, unlock the gates, collect the entry fee, and provide the rigging necessary to enter and exit the cenote.

Expect to rappel or climb down about 14 m/45 ft into the dry cavern zone. A pulley system lowers and raises tanks and other gear, and a ladder eases the climb out. The large entry pool leads to a wide, beautifully decorated cavern and ends in a small room with walls adorned with the fossils of ancient sea

Guides rig a ladder, which means that you don't need to climb out using ascenders.



The ring of cenotes. Inset: typical cenote entrance. Courtesy of David Kring, Lunar and Planetary Institute, The University of Arizona,Tucson, AZ, USA,

crustaceans. The cenote also is home to some unique creatures that have evolved to live in total darkness.

Early exploration

Much of the initial exploration and discovery was done between 1999 and 2002. A guide showed the site to explorer Curt Bowen, who spent months securing the necessary federal permits. Videographer Wes Skiles helped to organize the exploration team and arranged for National Geographic to sponsor the project in 2002. Some of the other divers were Roberto Hashimoto, Jill Heinerth, Michael and Sherry Garman, Paul Heinerth, Tom Iliffe, Andrés Mattes, Agustín García, Roberto Fernando Rosado, and other members of the Asociación Yucateca de Espeleobuceo, A.C.

The divers and INAH archeologists catalogued skeletal remains from 14 humans, as well as horses, llamas, cows, and camels. They found some 20 vessels at the bottom of the cenote. The story was featured in the October 2003 edition of *National Geographic* and in *Advanced Diver Magazine* (Issue #16, 2004) and was the subject of a History Channel documentary. Yucatán's Technical and Sport Diver group explored ten more cenotes in the Homún area in 2007.

Canún keeps on giving

More recently the authors, diving with Juan Carlos Carrillo, found remains of two more humans. Nearby were two so-called "red Roman vessels," named for their similar appearance to Roman amphorae. These are egg-shaped red containers with intentional perforation that indicate funerary and offertory use. They date from the pre-classic Mayan period (400-250 BCE).

Skulls from a bird and a dog, both sacred symbols of death to the Maya, were found nearby as well as a tlacuache (opossum) skeleton. Mexico's federal archeological institute, INAH, removed a few of the bones for dating and study, but most are still in the cave.

The small terminal room contained a man's skeleton, nearly complete, estimated to be between 25-39 years old at the time of his death. He measured 1.64 meters/5.3 ft and was found with his body flexed, possibly in a sitting position. The intentional positioning indicates that the body was interred with funerary rites and placed in the cave when it was dry (rigor mortis would have caused stretching of the corpse, preventing the flexed position).

Interred remains such as these are found with vessels and offerings appropriate to the deceased's social status, age, and sex. Sacrificial human remains, by contrast, bear signs of a violent end. The bones often show cut marks that indicate defleshing (removal of flesh from bone). Dismemberment and decapitation are other indications of ritual sacrifice. The body was then disposed of with no particular care.

Canún's role in cenote protection and conservation

One of Cenote Canún's most important archeological contributions is that it helped to launch the Underwater Archeological Atlas for the Registry, Study, and Protection of the Yucatán Peninsula Cenotes — or the Atlas Arqueológico Subacuático for short. Mexico's submerged cultural heritage had sadly been ignored or looted until 1980, when INAH created its Underwater Archeological Department.

INAH works with the exploration divers to catalogue and protect the cenotes for their cultural and scientific interest. Today the cenotes are some of archeologists' most important sites. They are yielding invaluable clues about when the first humans appeared in the Americas and how they got there.

Skull of a now-extinct species of horse. © Luís Sánchez.

Underwater inhabitants

Cenote Canún is home to many species that have been evolving for thousands of years. Some of these include the blind swamp eel (*Ophistemon infernale*); crustaceans (*Typhlatya pearsei* and *Typhlatya mitchelli*); the indigenous Mexican blind brotula (*Typhliasina pearsei*), which is an albino cave fish that grows to nine to ten cm/three plus inches; isopods; and the remipedia, to name a few.

Topside: Take in the local culture

After diving, there is plenty to see and do around Homún. The people are warm and friendly. They have retained their Mayan culture and traditions, typical food and clothing, and festivities. Visitors are welcome to chat with the locals, eat at the restaurants, shop for crafts, and stroll through the ruins of an ancient henequen plantation.

Several important archeological sites are nearby. Mayapán was the area's political and cultural capital during the Late Post-Classic period (1220s-1440s). The site contains 26 cenotes. Its main building is a smaller replica of the Castillo of Kukulkán at Chichén Itzá. There are characteristic round observatories, temples, altars, murals, and shrines. The site lacks the traffic, crowds, and visitor chaos of nearby Chichén Itzá.

Dzibilchaltún was the longest continuously used Mayan administrative and ceremonial city, serving from around 1500 BCE until the European conquest in the 1540s. Its most famous structure is the Temple of the Seven Dolls, named for seven small effigies found during excavation in the 1950s. Sunrise aligns directly with the temple's main door during the spring and fall equinoxes. The temple connects to the rest of the site by a *sacbe* (white road) named for its original coating of white limestone.

Cow's skull, most likely from the Pleistocene Era. © Luís Sánchez.

Jorge Orca dives in Cenote Canún. © Luís Sánchez.

Cenote Xlakah is located around the city center's ruins. Legend has it that a god, angered by a son's refusal to feed his travel-weary father, caused a thunderbolt to fall on the son's house. Its impact created the Xlakah cenote. A National Geographic Society diving expedition recovered some 30,000 Maya artifacts, many of ritual significance, in 1958 (*National Geographic,* January 1959). Many are displayed in the site's museum.

Acanceh is a compact but important site that dates to the Early Classic period between 200-300 CE. The town near the ruins contains the 16th-century colonial Catholic Church of the Virgin of Guadalupe, Mexico's patron saint and a powerful symbol of national identity and faith. The town's patron saints—San Buenaventura and Santiago Apóstal—also have chapels nearby. Their festivals are in July and December, respectively.

The Parque Estatal Lagunas de Yalahau contains four large quiet lakes. It's a long trek by trail, so bicycles provide the best transportation. The lakes are unsuitable for diving, but the area contains interesting ruins. The park is a government-protected area and provides refuge for all manner of wildlife, including jaguars, crocodiles, and migratory birds.

The cenotes' importance as life-sustaining water sources and ritual sites underscore their sacred significance to the pre-Columbian Maya. The rain god Chaac is said to have resided in the natural wells. Mayan farmers still invoke Chaac for the gift of rain. Divers owe these sites the same respect and protection as we give all caves.

Luís Sánchez is an NSS-CDS Cave Instructor and an avid underwater photographer. He lives in Mexico City. Antonio Ceballos, also a cave diving instructor, is based in Mérida, Yucatán.

If you go....

- Homún offers hotels, hostels, and cabañas. Mérida is 45 to 60 minutes away if you want to enjoy the night life.
- You don't need to rent a car. Buses, bikes, or collectivos all make it easy to get around. A comfortable and on-time express bus runs several times daily between Mérida and Playa del Carmen.
- Flights between Cancún airport and Mérida run several times per week, but luggage is sharply restricted
- Dive shops will arrange guiding for Canún or other cenotes in the area. Guides provide transportation and take care of cenote access and fees. They arrange the rigging and ladder necessary to get divers and gear in and out of the cenote. Nitrox and trimix both are available.
- Cenote Canún's maximum depth is 27 m/88 ft. Either back- or side-mounted tanks will do the job. The cave itself is very short.

A human humerus (long bone of the arm) next to a so-called "redcRoman" vessel. © Luís Sánchez.

Top: A well-preserved human rib cage. Below: "red Roman vessels," named for their similar appearance to Roman amphorae.

Retrospective

It's Your Call

by Sheck Exley

*Eighteen year-old Sheck Exley displays his newly set depth record at Zuber Sink,August 19, 1967.*Courtesy of Mary Ellen Eckhoff and Brian Udoff.

Since I retired from the car business seven years ago, I've had a blast teaching algebra and calculus to high school kids in Suwannee County, Florida.

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. I will never do either for fear of encouraging the "macho" so evident in teenaged males.

The guy that taught me how to dive, Ken Brock, had more guts than I have. In early 1966, he organized a scuba club especially for teenagers called the "Aquacks" at the Jacksonville YMCA and promptly ordered us to "stay out of caves." Given the poor technology available to cave divers at the time, abstention was the only rational advice to give to the aspiring diver.

So what did we do? You guessed it! While cave diving at Jugg Hole on April 3, I got caught in a current, hit my head on a rock and flooded my mask. On July 16th at Orange Grove Sink my partner and I got narked and entangled in our line. Later the same day, I discarded the troublesome line, got lost at Peacock and exited the cave by an unknown route with only a couple of minutes of air left.

The next weekend I got lost in a siltout at Ginnie Springs and dug my way out through a restriction on my reserve air supply. Later the same day, my partner ran out of air and attacked me. He survived only because Ken had taught me how to do CPR.

This experience should have stemmed my obvious problems with testosterone excess. Instead, I was portrayed as a "hero" for saving my partner's life, and became more arrogant than ever.

My youthful partners and I (including Joe Prosser, past training chairman of the NSS Cave Diving Section) continued to scare the heck out of Ken with our illicit cave diving escapades and close calls, diving ever deeper in a never ending quest to impress each other and prove how "brave" we were.

By August, 1967, I had hit 237 feet at Zuber Sink (now "Forty Fathom Grotto"), the club record. I was the clear leader of the club as well its hero.

My greatest admirer and emulator was probably my brother, Edward, who was three years younger than me. He bought equipment that looked like mine, gave talks about me in school, and even copied my mannerisms. It was great to be held in such esteem by him and the others.

On June 29, 1968, we stopped at Wakulla Springs for some snorkeling on our way to Morrison Springs, where I planned to try to set a new club depth record. I got cold and got out, but Edward, ever eager to impress me, said he wanted to stay in a little longer.

Ken Brock (above) first taught Sheck how to dive. Photo courtesy of Mary Ellen Eckhoff and Brian Udoff.

Unknown friend, Sheck Exley, and brother Edward Exley. Photo courtesy of Mary Ellen Eckhoff and Brian Udoff.

I told him 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.

If machismo stopped upon reaching the age of 20, we could prevent most diving accidents by simply outlawing diving at a younger age. Unfortunately, many of us seem to remain adolescents indefinitely.

Don't get me wrong. I applaud record setting in diving; virtually all human progress since the dawn of time has come from that desire to achieve, excel, and discover.

I also recognize that much of this motivation comes from the desire for recognition and esteem, a trait shared by all of us. But this desire should never be used as a rationale for cutting corners on safety procedures or leading unqualified partners into danger.

Unless, of course, you want to make a phone call like I did.

"It's Your Call" first appeared in aquaCORPS' technicalDIVER 3.1, October 1992. Thanks to UWS contributing editor Michael Menduno for making the story available and to Mary Ellen Eckhoff and Brian Udoff for allowing use of the photos.

Sheck Exley was a legendary and prolific cave diver/explorer. His Blueprint for Survival laid the foundation for accident analysis that we use today. Sheck perished during a record-setting attempt at a sinkhole at Zacatón in Tamaulipas, Mexico, five days after his 45th birthday.

Human Interactions During a Sump Rescue: Developing Rapport for a Safe Exit

–by Michael A. Raymond

In July 1991, two divers who had no cave training were exploring a flooded cave in Venezuela when they became lost. One found his way to the exit. The other surfaced in an air bell. Cave divers from the U.S. were flown in and found him two days later. When the lost diver first saw them, he was hallucinating and thought that they might be angels. When he discovered that they looked and sounded like Americans, his suspicions were confirmed. (Well, that last bit isn't true).

Complex interpersonal interactions

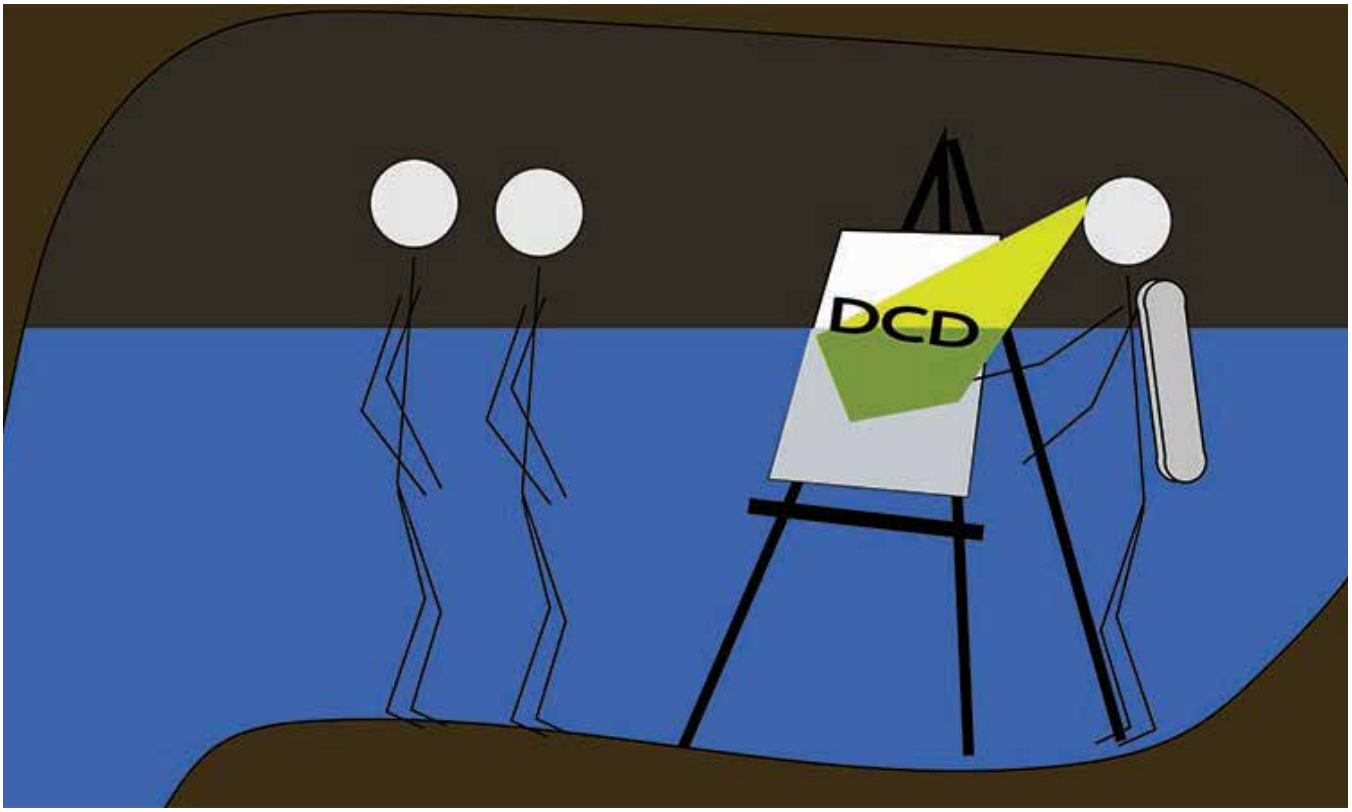
Sump rescue, like any type of rescue, generates potentially intense interactions. Group dynamics play out among the entrapped cavers; the rescuees and rescuers; and amongst the rescuers themselves. Awareness of these dynamics will help cave divers know what to expect if they ever are called upon to assist with a sump rescue.

This article reviews a number of case studies and highlights psychological considerations. We will pay special attention to those elements peculiar to sumps.

The entrapped cavers. Between the time that cavers realize they are trapped behind a sump and when rescuers first make contact, interactions between/among the cavers are generally cooperative. The feeling of danger, not knowing how long they'll be trapped, and their limited resources force the individuals to work together.

The most frequent disagreement is over whether to shelter or to gamble with a breath-hold dive. As time goes on and their lights die out, psychological pressure increases.

In several incidents, cavers have reported not knowing if they were hallucinating or not. Random cave noise is misinterpreted. They are not sure if a



Conducting an impromptu "Discover Cave Diving" class is essential for cavers who are not trained in cave diving. © Michael A. Raymond.

Things can get weird underground. From a cave rescue practice, 2018.© Michael Raymond.

rescuer has been there or not. These episodes of unreality tend to increase the longer the group is entrapped. The phenomenon seems to be more common with solo incidents or in small groups. It's important for rescuers to leave something tangible behind if they need to leave to report finding the group. This reassures the waiting cavers that a rescuer was there and that they did not imagine it.

The initial contact with trapped cavers is a precarious time. The rescuee will expect to be immediately extracted from the cave and may be desperate to get out. Open-water courses teach rescuers to stay out of a panicking diver's reach. Sump rescue is no different. If possible, stay out in the water while you talk to a caver up on shore. If you're going to get out of the water, leave your tanks where they cannot easily get to them.

Keep your initial conversation basic. The oxygen level may be reduced in small chambers and the carbon dioxide level increased. Do not be surprised if the cavers seem confused and unable to make sound decisions. They will want to talk about when they will be extracted, food, and the status of others who were in the cave but aren't with them now. If they have been trapped for any amount of time, they will be eager to eat anything you can give them. Consult with a physician before packing your kit, especially if the cavers have been stranded for several days.

Psychologists recommend that the first contact be made by rescuers familiar to the trapped cavers. This keeps things simple, is calming, and reassures them that they will be taken care of. Once they are reassured, you can introduce other rescuers.

Before extraction, regular communication and medical support will ramp up. In a hasty rescue, you'll swim the trapped cavers out as soon as you find them. But in a planned rescue there will be several dives to shuttle equipment.

What not to discuss. Passing messages between the trapped divers and their families is OK and reassuring. Whether to limit discussion topics is an open question. The cavers will worry about being blamed for the incident. They will want to know that their personal affairs are being taken care of. On the other hand, discussing problems that their families are having will not help them.

The group may be separated for swim outs. If anyone is injured or killed during the rescue, experts recommend against telling the survivors. It is vital that they maintain faith in their own rescue.

Coordination of timing is important. Ideally rescue from a temporary sump occurs via lowering the water levels. The rescued persons will be eager to leave the cave as soon as possible, no matter the method. Rescuers will want to prevent a premature exit because moving water in a temporary sump may create swift-water hazards.

Sump rescues are perhaps unique in that it is possible to wait too long. Worsening weather may re-close

the sump. If pumps are used, timing must be such that everyone can still get out if the pumps fail after the team has started movement. The rescuers must convince the rescued that they will not be allowed to choose the time of exit.

Rescuer-rescuee interactions are even more important when working in permanent or long-lived sumps. If you are going to swim out someone who does not have cave diver training, you need to be able to trust each other.

The case histories below describe three outcomes:

- there was a good rapport, and the rescued persons stayed calm;
- the rescuers took measures to restrain the evacuees, and
- there was a wrestling match.

Edd Sorenson guides Josh Bratchley's hand onto the correct exit line. From Edd's helmet camera; used with permission..

It's well worth the time to assess the rescued person's psychological state and your relationship with them.

Interactions among rescue team members. All too often controversy develops over who to send into the cave. For example:

- in a rapidly developing situation, should a local cave diver who knows local procedures and people be sent to get the missing group help as soon as possible?
- in a static situation, should the team wait for a Big-Name Caver to be flown in?
- do the available divers have compatible procedures, equipment, and languages?
- whose SnapFace account should they post updates to?

Four Case Studies

Let's take a look at case histories. We'll look at four incidents, focusing on interactions between the rescuers and rescuees.

Mill Pond Cave, Tennessee, USA. 2019. Cave divers were re-lining this cave in limited visibility when the team got mixed up. One diver, Josh Bratchley, wound up in a good-sized air bell with no line back to the exit. After his teammates searched extensively for him, they called in additional support. The initial encounter is well known due to its being captured on video. The rescuer, Edd Sorenson, spoke to Bratchley from some distance away. He made sure to check on his mental state and calmly and simply explained the extraction plan. Bratchley knew of him and could have faith in their exit. The hasty rescue was successful.

Falkenstein Cave, Germany, 2019. During a tour in this cave, a rainstorm was raising the cave's water level. Most of the tourists exited the cave, but the guide and one tourist pushed further. They got trapped when a low portion of the cave sumped.

Local sump divers, including Rainer Straub, responded and located them. After rewarming both, the rescuers dove with the guide out of the cave. The guide had experience in basic open-water diving and as a dry caver. The tourist had no diving experience. Straub gave the tourist a half-hour "Discover Cave Diving" (DCD) class. The tourist was given his own scuba equipment and followed Straub through the sump. Straub stayed well in front of him. A member of the German naval special warfare community swam behind the tourist, ready to bear hug him if he panicked and swim him the rest of the way. They figured they would resuscitate him on the surface if needed. The rescuers used good judgment to treat these two individuals according to their abilities and needs.

Tham Luang Cave, Thailand, 2018. The soccer team members were not the only ones to be rescued. During their initial dives, rescuers Rick Stanton and John Volanthen came upon four Thai workers trapped behind a sump and imperiled by rising water. The incident management team was not controlling access properly at the cave entrance. No one even knew that the workers were missing.

Communication difficulties made a rescue difficult. Gesturing was the only language that the divers and workers had in common. Stanton and Volanthen gestured their way through a DCD class. They had

Edd Sorenson encountered Josh Bratchley, who was calmly awaiting rescue. From Edd's helmet camera, used with permission.

the workers hold on to them and, one at a time, swam them through the restricted sump. When the workers saw air at the far end, they tried to bolt for the surface. Minor wrestling matches ensued. There was no relationship and no trust, but the rescuers were able to cope for a limited time.

Copiapó Mine, Chile, 2010. Our last case study involves a non-cave diving incident. Thirty-three miners were trapped 700 meters/2300 feet underground. Part of the mountain collapsed, completely blocking the exit tunnels. Fifty-two days elapsed between the time that a pilot hole was drilled down to discover the miners and when they were finally returned to the surface.

In the days between the collapse and when the first drill found them, the danger and limited resources forced the miners to put aside their differences and get along. After a generally positive start, interactions began to go downhill. Instead of having a fellow miner initiate contact, a national-level politician made the phone call. The first supplies sent to the miners were simple glucose drinks, which they were told to drink over a period of hours. The miners guzzled the drinks and got sick. The rescuers tried to limit conversations between the miners and their families. But all too often the families' problems came up, which only made the miners feel worse.

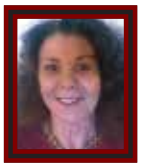
With the sense of danger removed, and disagreements about media rights after the rescue, relationships among the miners deteriorated. When drill bits broke and interrupted progress on the final shaft, the miners' faith in their rescuers also was shaken.

Have a straightforward plan

Sump rescues are complex operations, both technically and interpersonally. Rescuers should not assume that Thai soccer team's good behavior will be the norm. Cave divers who participate in a sump rescue should assume that the trapped cavers are under extreme pressure. Keep things simple, build the relationship, and be ready for when things fall apart.

Michael A. Raymond is at work on a series that explores controversies and best practices in sump rescue. He is Associate Editor for Underwater Speleology.

News Snippets



– by Barbara Dwyer

Exploration News

Florida

Karst Underwater Research (KUR) is juggling a number of projects:

- Line Eater Sink: The team is installing a six-m/20 ft habitat with an inline scrubber system.
- Fletcher Spring, Lafayette Co., FL: Matt Vinzant, Andy Pitkin, and Brett Hemphill are exploring, and Adam Hughes has begun cartography.
- Morgans and Chaplin caves on the Withlacoochee River also are being explored and mapped.
- Green Banana Sink (Gulf of Mexico west of Sarasota, FL): KUR divers are assisting Mote Marine Lab with sediment sampling. Cave divers have explored the Gulf's blue holes for many years (*Underwater Speleology*, Vol. 18, No. 4, 1991). Check out the PBS documentary in its "Changing Seas" series.

GUE divers have laid about 823m/2700 ft of line in Braddock Sink at West Light Farm, High Springs, FL.

Mexico

Photographers Rodrigo Friscione and Luís Leal reported discovering five fresh-water cenotes off the coast of Isla Mujeres, the only known undersea cenotes near the Yucatán peninsula. The Gran Acuífero Maya (Great Mayan Aquifer) project is working to obtain exploration permits, underwater archeologist Guillermo de Anda reports. Robert Ballard of Titanic fame will assist with ROV exploration.

Sam Meacham and divers of Mexico's CINDAQ reported finding ochre mines in the Yucatán cenotes. The iron-rich pigment was used for cave art, burials, and other rituals important to the pre-Mayan civilization.

The Bahamas:

Cristina Zenato and Kewin Lorenzen have discovered two new systems on Grand Bahama this year. They've surveyed and laid close to 6400m/21,000 ft of line since June in Svartalfheim. In Nifelfheim, the other system, they've surveyed and explored 4353m/14,283 ft. Cristina says that the exploration still is in progress.

Brian Kakuk and Rick Witter added another 152m/500 ft of passage to Dan's Cave in November.

Awards and honors:

Jason Gulley, whose image appears on this issue's cover, has been shortlisted in two of The Ocean Photography Awards categories — Adventure Photographer of the Year for his images of Cenote Angelita and Little River, respectively. www.oceanphotographyawards.com.

David Mayor received the NSS Merit Award medal for the first half of his Taj Mahal mapping project. You can see the map and read about the project on page 22.

Mladin Garasic was nominated for the Honorary Member Award of the National Speleological Society (NSS).

Newlyweds: Wayne Kinard and Alice Caberio-Jones were married in Texas on September 10, 2020. Congratulations and best wishes to them!

Publications and films:

Robert (Bobby) Scharping published an article in *Molecular Ecology* about his conservation work in Sulphur Springs in Tampa. The NSS sponsored the project.

Tom Illiffe appears in "Alien Worlds," Episode 1. This segment of the Netflix docuseries was filmed last year in Yucatán. Look for Tom and his student Fernando Calderón Gutiérrez in a cave diving segment toward the end. https://www.netflix.com/title/80221410

Guy Bryant, one of Madison Blue's early explorers, is working on a book about the exploration. He wants to hear from anyone who was also involved. Write ups, log entries, sketches, and stories would all help to make the history complete and accurate. You can reach Guy via email at brya1659@bellsouth.net

Manual básico de buceo en cueva: nsscds.org/product-category/books-2/. NSS-CDS announces the Spanish language translation of Sheck Exley's "*Basic Cave Diving - A Blueprint for Survival.*" Thanks to Jim Coke, César de la Torre, and Maria Nunez for translating one of the most important cave diving manuals ever written.

Close Calls. Just out is this collection of first-person, life-changing stories from divers at the top of our sport, edited by cave diving instructor and photographer Stratis Kas of Greece. Stratis will donate 50% of his net profits to Divers Alert Network (DAN). Look for a review in the next issue. https://intothewild.tech/closecalls/.

Adam Hughes finished his map of the Little River resurvey. You can pick one up at Extreme Exposure.

Fatalities:

Clyde Douglas Rorex drowned during a dive at Hole in the Wall in July. Edd Sorenson, who did the recovery, noted that Rorex was "close to making it out, about 120 feet from the entrance," and that a fresh bottle was a short distance away.

David Marlow failed to return from a dive at Cenote Vaca Ha on the week of July 19-20, 2021. He had recently presented the new map of the White River area near Tulum to the owners.

Daniel Hutnan (Czech Speleological Society) died during an open-water CCR dive on the Croatian island of Pag in June. Daniel had mapped Sistema K'oox Baal in the Yucatán peninsula, documented its significant anthropological sites, and discovered many wet and dry caves on its fringes.

In memoriam: Cameron Wheeler, a member of NSS-CDS and the Bay Area GUE chapter, died of a heart attack in Monterey, CA in October (not a diving accident). Cameron had received his Abe Davis award in 2019.

Events rescheduled or canceled:

The 2021 NSS-CDS International Conference most likely is not in the cards.The annual members' meeting will be held via Zoom on May 22, 2021. Look for details on Facebook and at nsscds.org.

TEKDiveUSA 2021, previously scheduled for April 16-18, 2021, in Orlando, FL, has been postponed.

Diving Talks - Lisbon, Portugal 2021 - International Diving Congress Conference - Portugal, October 8-10, 2021. https://www.facebook.com/events/246361463298566/

DEMA 2020 was held online. Michael Menduno tuned in, as did I to a lesser extent. New Orleans it wasn't.


© Tom St George

Mapping Sistema Taj Mahal

Part 1 of New Map Wins Top NSS Cartography Honor

by David Mayor

My first cave dives were in the downstream section of Taj Mahal, so it holds a special place in my heart. I had long wanted to create a high-level map of this system. Part 1, completed in September 2019, includes the western section —the cavern area, Cenote Taj Mahal downstream, the Waterfall passage and the Chinese Garden.

The Taj Mahal system, located between Playa del Carmen and Tulum in Quintana Roo, Mexico, consists of eight interconnected cenotes. Recently it was joined with the Cenote Box Ek (Dark Star), which increased its size from 8.2 km to 9.95 km/5 to 6 miles of flooded gallery. The system is a well-known and popular spot for cave diving. Recreational divers are able to enjoy its magnificent cavern with a guide.

The first explorations started in 1995 and involved several international teams of divers. Since then, more than 30 divers have discovered new passages or have tried to connect the Taj Mahal system with the Minotauro system further south without success.

Heavily dived but no state-of-the-art map

Several French Diving Federation teams published a partial drawing of the system created between 1996 and 1998. Another international team had planned to produce a stick map by 2000. But no accurate and realistic map ever materialized.

For ten years I had the idea in mind to map the Taj Mahal system. After years of local exploring and surveying, I wanted to take it to the next level and create cave maps. I have been a fan of maps since my youth, but I never imagined mapping a cave alone and winning a medal for it.*

But I wanted to be prepared and to have the required level of experience. I had discussed my plan with Bil Phillips and Alessandro Reato (Alessandro made the map of the Minotauro system). Taj Mahal would be my second project.

In 2014, I discovered giant sloth bones in an underwater cave not far from Cenote Taj Mahal. Mexico's federal anthropological institute, INAH, asked me to make a map, and I knew that my chance had come. I went to look for Bil Phillips to take a course. Bil connected me with Peter Sprouse, a US speleologist who works locally in dry caves, so that I could gain experience. After following Peter to learn the basic skills of dry cave survey and drawing techniques, I embarked on several small cave mapping projects under Peter's supervision. In October 2014 I took the entire underground cartography course with Bil. Shortly afterward I started my first mapping project, Cenote Toh or Cenote Gunney, finishing it in 2016.

In October 2017 I showed the map of my first project to Bil and Alessandro. With their encouragement, I started my first dives.

Percolation rains down in the less-frequently traveled passages. © Tom St. George

Making an accurate map involves creating a "canvas" of lines to geolocate the important structures. © Tom St. George

Step 1: Creating the skeleton

Surveying is the first step in mapping a cave. It involves setting up survey stations that enable precise drawing to create the "skeleton" for future drawing. I did not want to use other divers' data so that I could be sure of my map. I surveyed the main and important loops, taking care to be accurate. This stage required 10 dives (1008 minutes) and covered 3511 m/11520 ft.

Because the Yucatán Peninsula's caves are complex, surveying the main guideline alone does not allow for an accurate map. Some rooms or galleries are over 60 m/nearly 200 ft wide or have pillars that obstruct visibility. Making an accurate map involves creating a "canvas" of lines in order to geolocate the important points to include on the map (walls, columns, speleothems, etc.). In the end, it looks like a spider's web.

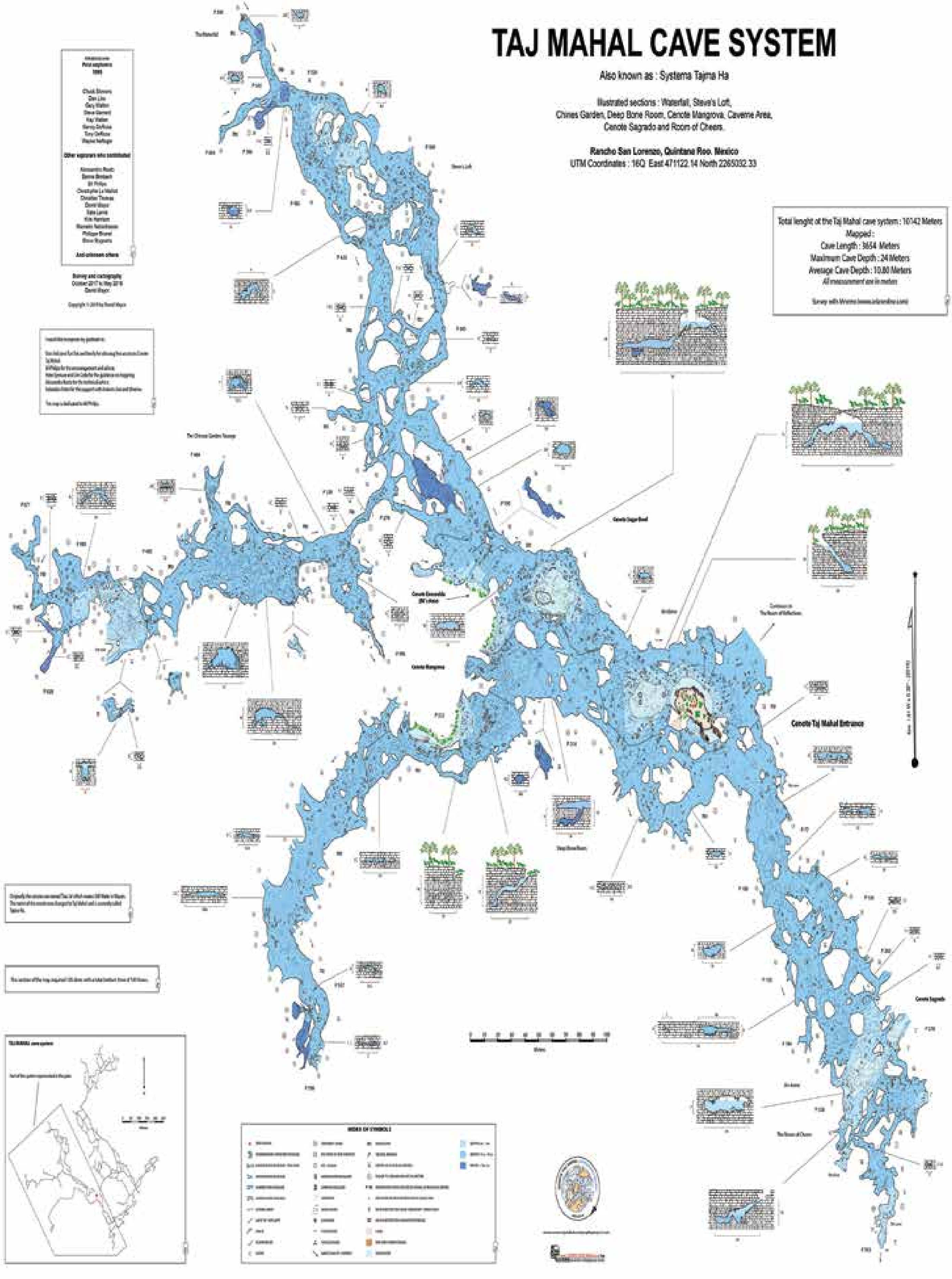
Taj Mahal has heavy diver traffic. I had to be careful to avoid confusing others' navigation. My lines are temporary. I remove them once I have finished drawing the area.

Step 2: Drawing

This step involves representing the cave using symbols. I personally use the symbols of the International Union of Speleology and other symbols used conventionally for underwater cave maps.

I start by printing an area's survey lines on a plastic sheet. Then I return to the cave to sketch this section. How long this takes depends on how well I previously laid the lines. Depending on the cave's features, the drawing can be very complicated.

The Taj Mahal system's depth averages between 10 and 12 m/33-39 ft of depth. The halocline sits at this depth, which hinders visibility and complicates the task. Percolation often rains down once I'm away from the well-traveled passages. My strategy is to draw the features that I see in front of me and move forward when visibility becomes too problematic. I try to optimize dive efficiency by drawing part of the time, then recovering my lines and laying new lines for the next dive). My dives average about 110 minutes in duration. Depending on the areas to be drawn, I


TAJ MAHAL CAVE SYSTEM
Also known as : Systema Tajma Ha
Illustrated sections : Waterfall, Steve's Loft,
Chines Garden, Deep Bone Room, Cenote Mangrova, Caverne Area,
Cenote Sagrado and Room of Cheers.
Rancho San Lorenzo, Quintana Roo. Mexico
UTM Coordinates : 16Q East 471122.14 North 2265032.33
Total lenght of the Taj Mahal cave system : 10142 Meters
Mapped :
Cave Length : 3654 Meters
Maximum Cave Depth : 24 Meters
Average Cave Depth : 10.80 Meters
All measurement are in meters
Cenote Taj Mahal Entrance
Cenote Sagrado
Cenote Mangrova
Deep Bone Room
The Room of Cheers
The Waterfall
INDEX OF SYMBOLS

sometimes bring a stage tank and/or a scooter or use a rebreather.

Step 3: Digitization

The last step before editing is to scan my drawings and redraw them using a vector drawing program. During this important step, I render the final cartography. It requires a lot of time. For every hour spent drawing underwater, I spend an average of two hours on the computer vectorizing the walls, placing the symbols, writing comments, layering colors that correspond to the depth, and creating the cross sections.

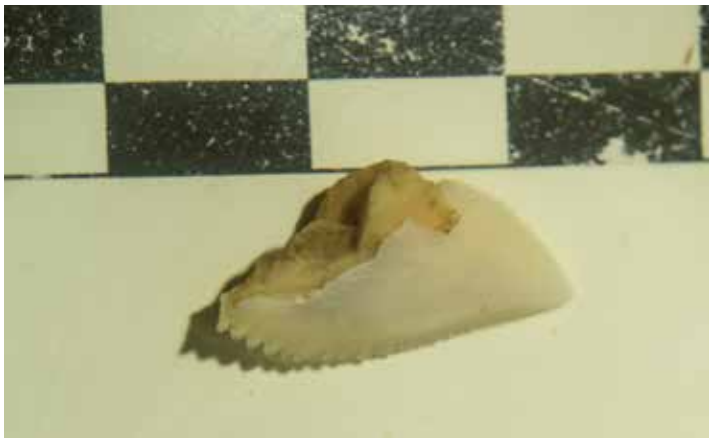
Step 4: Publication in print is the final phase of mapping.

A labor of love

The story, cartography, and drawings here represent the first half of my project. It has involved 115 dives (214 hours) and approximately 400 hours of computer work. I'm working on the second part and hope to finalize it by the end of 2020. The project is self-funded and supported by donations and sales of T shirts and printed maps.

Some divers have contacted me to take underwater surveying and cartography courses. I'm happy to share my knowledge and passion for cartography. I would like to see more cave divers get involved in similar projects.

You can follow the project at [https://www.cenotetajmahalcartographyproject.com/.](https://www.cenotetajmahalcartographyproject.com/)



Tiger shark tooth fragment found in the sediment on a ledge during a mapping dive. Archeologists estimate that it's more than one million years old. © David Mayor Opposite: *Surveying out.* © Tom St. George

Drawing the cave using conventional symbols. © Tom St. George

— Originally from Toulouse, France, David Mayor explores and teaches cave diving in Playa del Carmen, Quintana Roo, Mexico.

David's map of the western section of Taj Mahal won top honors—The Medal Award—from among 50 entrants in the 2020 NSS Cartography Salon. The Medal Award is given for outstanding maps that demonstrate consistently excellent cartographic technique. The map won a Merit Award as well.

More at: https://caves.org/committee/salons/Cartographic_2020_Winners.shtml

On the Loop

Why Manual Mode? The Debate Goes On

– by Joe Citelli

"Regardless of where the 'parachute' is set, nobody has yet explained why this is anything other than a daft idea."

The above quote was taken from a recent discussion on an internet dive forum about gradient factors. Per the norm, it eventually morphed into a sub-discussion about the benefits (or lack thereof) of diving an ECCR (Electronic Closed Circuit Rebreather) manually. I considered joining the fray but then thought better of it. Having wasted time discussing topics with people who don't want to hear what you have to say, I decided it would be more productive to write an article expressing my views.

For me — the concept of using the solenoid as a failsafe or parachute is for the express purpose of developing both muscle memory and an internal clock in your head. This will eventually enable you to intuitively know when the solenoid is supposed to fire. Contrary to the opinions of some, it is NOT because anyone believes the electronics are unreliable.

When I dive, I often like to use a controller set point of 1.0 and maintain a 1.2 or 1.3 manually. When I hear the solenoid fire, I view it as the machine telling me "Hey, dummy! Pay attention!" To make it interesting I try to make a game out of it. I like to see how long I can go without the solenoid firing. In the spirit of "every dive is a training dive" I use this as a learning / teaching tool. If the machine fails I will (hopefully) catch it easily because I have trained myself to be acutely aware of what is going on with my ppO_2, all by making it a game rather than a "chore".

Of course, when I have a "busy" dive, I use the solenoid and fully appreciate the convenience it brings to the table. Interestingly, I also find that subconsciously I know about when I should hear it fire and have found myself reaching for the manual add O_2 button at the same time the solenoid is doing its job. This kind of validates the main purpose of the exercise.

For a seriously deep dive I favor not using the solenoid at depth. My preference is to dial it back to a safe level that is well below the desired set point. The idea is that it is far less likely to stick in the open position if it is not opening and closing.

Also, remembering that it is not necessary to add O_2 on descent, if you use the correct diluent, you should be close to your desired set point once you reach target depth. My rationale is that a stuck-open solenoid at say 500 to 600 feet is quite serious, and its risk should be minimized. I mitigate that risk by using the proper diluent gas for the dive—one that gives me an acceptable ppO_2 at depth, manually tweaking it when necessary. I use the solenoid on ascent where a stuck-open failure is not quite so serious and much easier to manage.

To those whose opinions differ and who believe utilizing the electronics is the preferred way to dive, I say fine. I agree that the human hand on a button is no match for the precision of a computer. However, even with today's modern controllers, a solenoid cannot anticipate minor depth changes that will cause it to fire unnecessarily. Once mastered, holding setpoint manually is actually more precise. Also, I prefer to retain as much control over the unit as is reasonably possible. If I were to buy a Ferrari or a Lamborghini I would want a manual transmission even if an automatic were available because I want to DRIVE the car, not the other way around. In that same spirit, I want to DIVE my rebreather.

Joe Citelli teaches cave diving, open- and closed-circuit rebreathers, mixed gas, and other technical diving. He is a past president of the NSS-CDS Board of Directors.

Training Director's Update

by Max Kuznetsov

Hello, everyone - On behalf of the Training Committee, I hope that you are finding the new NSS-CDS training website helpful. You can download the new forms described below at https://training.nsscds.org. Please refer any questions to me at trainingdirector@nsscds.org.

Good news from Divers Alert Network (DAN)

Ninety days of free liability coverage. Your professional liability insurance will expire within the next 30 days if you're covered through DAN's Risk Management Group. This is because of the 90-day extension DAN granted its policyholders.

One question that has come up is whether your premium will cover an entire year when you renew, or will that 90-day extension count against it? Rochelle Wright, manager of DAN's Professional Programs, confirmed that the 90-day extension was, in fact, nearly three months of additional coverage at no charge. So when you renew, it will be for a full year from the day your current coverage expires — provided you renew before that day arrives.

NSS-CDS as an additional insured. Our US instructors (including those who teach here or train US citizens or residents) must list the NSS-CDS as an additional insured with their professional liability insurance. It is the only way the Section can be covered for their actions. DAN has made doing so absurdly easy.

Your online DAN renewal application will be pre-populated with all of your additional insureds from last year. The NSS-CDS should be among them, or you can easily add it.

Click on the checkbox below the list of additional insureds. DAN will send us a certificate listing the NSS-CDS as one of your additional insureds so that you don't have to do it.

Start using the updated NSS-CDS student waiver now

The student waiver that appeared on the NSS-CDS website for several years was intended to be more of a dive site waiver than a teaching waiver. It created the potential for a plaintiff's attorney to claim that is it too broad in scope. We have updated the waiver to address these issues.

- The new waiver has places to list the student's name and the names of any instructors and dive centers within the body of the waiver itself.
- When students sign the waiver, it is now clear that they are waiving the right to sue the named entities for damages.
- The new waiver also includes a paragraph addressing COVID-19-risks.

The new waiver is a fully-interactive Adobe Acrobat PDF.

Hopefully, the availability of an effective vaccine will make the nightmare of the past year little more than a bad memory. However, people who suffer COVID-19 may have diving-related risks that could continue for years to come.

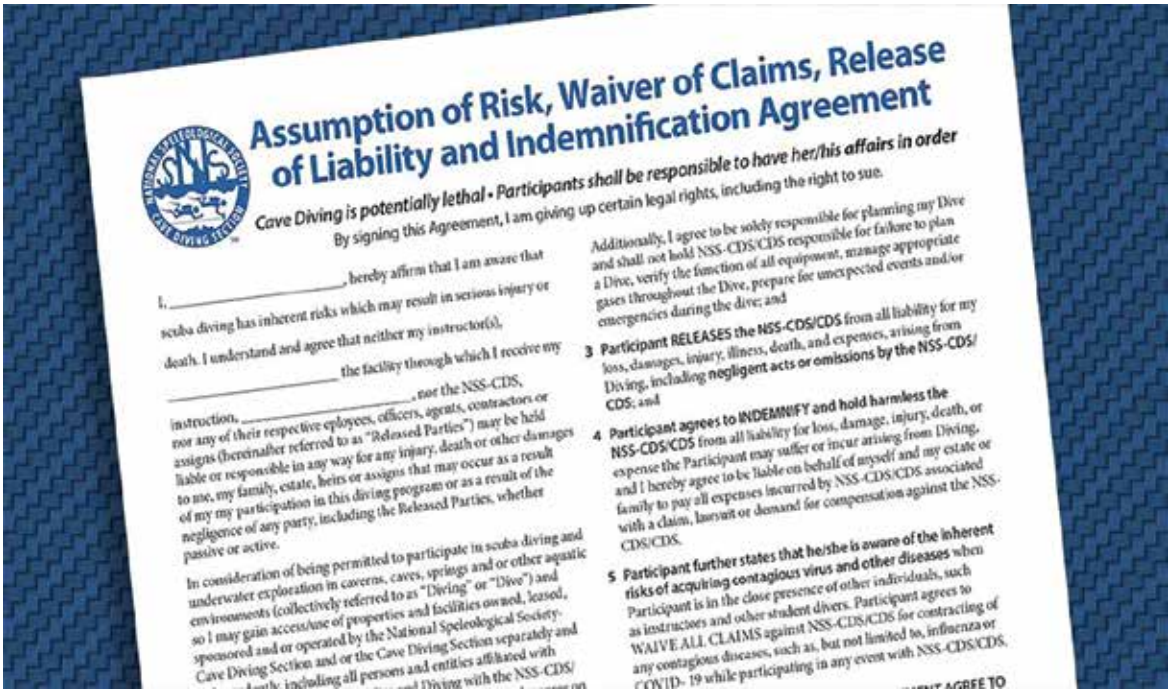
It's important that students have the opportunity to read and sign the waiver before they invest time, money, and effort signing up for a course that may not be right for them. If they do not, an attorney can always claim that a student signed the waiver under duress. This can invalidate the waiver completely.

Discard any previous versions, and use only the new waiver in its place.

Changes to how we teach gas sharing

Concerns over disease transmission have changed how we teach gas sharing. The NSS-CDS Board of Directors has approved the final wording of a standards change pertaining to this. This affects gas sharing both before and during training dives. In short:

- Students may, if they so choose, practice actual gas sharing during training dives. However, this must be entirely voluntary.
- Instructors may not compel or coerce any student to put another diver's second stage into the mouth.
- Instructors must explain to students that they have this option, along with the risks and benefits of doing so.



Assumption of Risk, Waiver of Claims, Release of Liability and Indemnification Agreement

Cave Diving is potentially lethal • Participants shall be responsible to have her/his affairs in order

By signing this Agreement, I am giving up certain legal rights, including the right to sue.

I, _____, hereby affirm that I am aware that scuba diving has inherent risks which may result in serious injury or death. I understand and agree that neither my instructor(s), _____ the facility through which I receive my instruction, _____, nor the NSS-CDS, nor any of their respective employees, officers, agents, contractors or assigns (hereinafter referred to as "Released Parties") may be held liable or responsible in any way for any injury, death or other damages to me, my family, estate, heirs or assigns that may occur as a result of my participation in this diving program or as a result of the negligence of any party, including the Released Parties, whether passive or active.

In consideration of being permitted to participate in scuba diving and underwater exploration in caverns, caves, springs and or other aquatic environments (collectively referred to as "Diving" or "Dive") and so I may gain access/use of properties and facilities owned, leased, sponsored and or operated by the National Speleological Society-Cave Diving Section and or the Cave Diving Section separately and all persons and entities affiliated with Diving with the NSS-CDS/

Additionally, I agree to be solely responsible for planning my Dive and shall not hold NSS-CDS/CDS responsible for failure to plan a Dive, verify the function of all equipment, manage appropriate gases throughout the Dive, prepare for unexpected events and/or emergencies during the dive; and

3 **Participant RELEASES the NSS-CDS/CDS** from all liability for my loss, damages, injury, illness, death, and expenses, arising from Diving, including **negligent acts or omissions by the NSS-CDS/CDS**; and

4 **Participant agrees to INDEMNIFY and hold harmless the NSS-CDS/CDS** from all liability for loss, damage, injury, death, or expense the Participant may suffer or incur arising from Diving, and I hereby agree to be liable on behalf of myself and my estate or family to pay all expenses incurred by NSS-CDS/CDS associated with a claim, lawsuit or demand for compensation against the NSS-CDS/CDS.

5 **Participant further states that he/she is aware of the inherent risks of acquiring contagious virus and other diseases** when Participant is in the close presence of other individuals, such as instructors and other student divers. Participant agrees to WAIVE ALL CLAIMS against NSS-CDS/CDS for contracting of any contagious diseases, such as, but not limited to, influenza or COVID- 19 while participating in any event with NSS-CDS/CDS.

- Students should always test the long hose for deployability before every dive.
- Unless students choose otherwise, gas-sharing practice should go no further than the point at which a donor presents a second stage, right-side up, with the mouthpiece facing the receiver.
- The receiver can take the offered second stage and clip it to a shoulder D ring. The receiver should then switch between his or her own two second stages to demonstrate that s/he can do so while maintaining buoyancy and trim. This of course does not pertain to any actual emergency that may occur during training.

Revised standards for some specialty classes

The other significant change in NSS-CDS diver training for 2020 was a revision of the standards for the CCR, Stage, and DPV Cave Diver courses. The revised standards are more comprehensive and require more of students. You can download the standards for these and other courses at https://training.nsscds.org.

New forms for medical and to assess diver fitness

The COVID-19 pandemic created the need for an updated medical form. DAN, RSTC and UHMS have created a substantially improved and streamlined form — one that you should start using now.

These same organizations have also introduced a new set of guidelines to assist physicians with assessing a student's ability to dive. These guidelines address the COVID-19 issue and have been updated in other areas as well.

You can get the new forms by logging into the NSS-CDS training website and going to the Downloads section. Do it now so you won't forget later.

Dive safely!

Max

Announcing Nominations for 2021 NSS-CDS Board of Directors

Our bylaws also are up for a vote

by Kelly Jessop
NSS #40001FE

Nominating and electing members to the NSS-CDS Board of Directors is an important way in which we're privileged to shape our organization. Occasionally the organization's bylaws also come up for the membership's vote. In 2021, there will be an election for new board members and a vote on the bylaws. Our goal is to act early to help increase participation.

The election will be handled by email ballot using the Election Buddy™ software, which we have used successfully in the past. All ballot links are sent by email. Having an accurate, up to date membership database is critical to getting your ballot. Please confirm that your membership and email are up to date. You can check it on line at https://nsscds.org/membership-listing-as-of-12-16-2020/. If you have questions or don't see your name, contact Adam Hughes at cdsmanager@nsscds.org.

We are making every effort to enable members to view the proposed bylaws. You can see these at: https://nsscds.org/nsscds/proposed-bylaws-changes-coming-membership-vote/. There are two versions. One contains the proposed edits, and the other is a formatted copy of what the document will look like.

The CDS election is a time to solicit people interested in running for the Board, The only requirement is that the nominee be a member for one year prior to being nominated. A committee will form at the beginning of 2021 to accept Board of Director nominations. You can mail these to kjessop@bellsouth.net.

The 2021 election will follow this time line:

- February 13th: Last day for nominations to be accepted.
- February 27th: Platform statements due for all candidates who choose to run.
- March 13th: The election starts. We will send an email with a ballot link to all members. If you don't receive a ballot, please check your membership status with the CDS manager.
- May 8th: It's the last day to vote.

- May 15th: Notification of all winning candidates.
- May 22nd: Membership annual meeting.

We look forward to facilitating your participation and hope acting early will reduce issues that arise. Look for a posting on the CDS Facebook page and on the web site for pertinent information.

As always, please don't hesitate to ask questions. You can direct comments to kjessop@bellsouth.net. Thank you, and please vote.

Kelly Jessop is a past Chair of the NSS-CDS Board of Directors and a passionate cave conservationist. He is a founding member of the North Florida Springs Alliance and has played a key role in keeping caves open for diving. Kelly has graciously agreed to serve as Administrator of Elections.

— Editor's note

Below you'll find a listing of the instructors who were in Active status as of 26 March 2020. Because this can change, you will want to go to the NSS-CDS website for the most up-to-date instructor listings. For each instructor, you will find:

- ☐ Current instructor rating
- ☐ Authorized specialty instructor ratings
- ☐ Clickable buttons that will take you to the instructor's website, Facebook page and email

Bahamas

Cristina Zenato 325

Mexico

Juan Carlos Carrillo 342
Ricardo Castillo 386
Jonathan Kieren 397
Olivier Prats 384
Luis Sanchez 387
Michael Silva Netto 398
Roger Williams 396

Russia

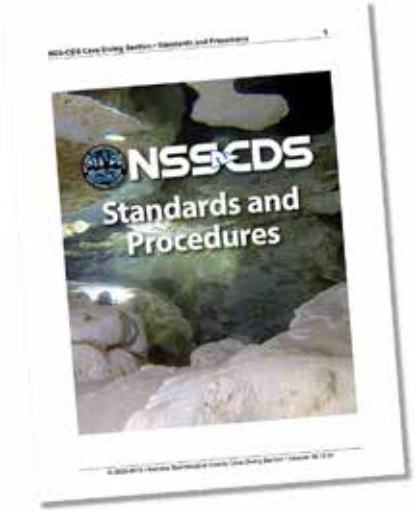
Elena Kryzhanovskaya 382
Maxim Kuznetsov 352
Timofey V Novikov 393
Evgeny V Runkov 371

USA

Harry Averill 218
Brenton C Booth 241
Chris Brock 392
Peter Butt 186
Mel Anne Clark 373
James Draker 395
Steven D Forman 106
Mark E Fowler 379
Georges Gawinowski 369
Jill Heinerth 340
Paul Heinerth 165
Lamar Hires 191
Thomas L Johnson 368
Jonathan Kieren 397
Maxim Kuznetsov 352
Jeff M Loflin 360
Mal Maloney 374
Bill Oestreich 253
Daniel C Patterson 353
Conrad Pfeifer 287
Renee S Power 383
Ken Sallot 390
Edd Sorenson 375
Pam Wooten 388
Jim Wyatt 355
Timothy Young 400

Western Europe

Johan Asplund 399
Martin J Robson 350
Phillip Short 365
Jose Mario Roberto Ventura 389
Sébastien Wilem 394



There's more in store…

Up-to-date instructor listings are not all you will find on the NSS-CDS website. Among other things, you can:

- ☐ Renew your CDS membership
- ☐ Order books and apparel
- ☐ Replace a lost cart
- ☐ Contact CDS Board members

In the *Training* section, you will find an in-depth description of all current NSS-CDS diver training courses. You will also be able to download the current standards for each CDS course. Here you will find:

- ☐ Student prerequisites
- ☐ Required dives, bottom time
- ☐ Course content
- ☐ Skill requirements
- ☐ Limits of training

Cave Diving Section of the
National Speleological Society, Inc.
5200 NW 43rd Ave., Ste. 102-380
Gainesville, FL 32606

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