

*Intelligent, educated, bold, capable, our interviewee is known for her many accomplishments and contributions to cave exploration and the caving community. She may be found clad in diving gear pushing the limits of some of the world's most challenging caves or volunteering to organize the NSS Cave Ballad Salon. Whatever it is she does she provides high levels of competence, expertise, and direction to her projects. RZ.*

## Barbara AmEnde

NSS 15789 RE (FE)

### **Please tell me a little about your early years, where you lived, and what were you like as a kid?**

My parents were in their 40s when I was born and my brother and sister are quite a bit older than I am. So I wound up largely being left alone as a kid. Our family "hobby" was drag racing. My sister was written up in the local newspaper as it was unusual for a girl to race in the '60s or early '70s. But my dad sold the car before I was old enough for my license.

I had a Barbie doll but my favorite toys as a kid were my trolls! My folks were cheap but they did buy me a "cave" for the trolls—the only special thing like that I ever got. I also devoured Trixie Belden books. Trixie went into a cave in Missouri and had a carbide lamp. I read and re-read that description but never could figure out how the dang thing worked.

### **Ahh, the pursuit of knowledge; please tell me about your education and profession.**

I wrote down on my college form "geology" as a major when I first started. Really, I wanted to be a National Park Service ranger and had thought to transfer to a school in Montana and go into forestry. But I went on a field trip to the Florida Keys as a freshman—it was awesome! We studied trends in size, abundance, and diversity of invertebrates so if you understand their significance today you can interpret the depositional environments of rocks. That was it. I was hooked on geology. Of course it didn't hurt spending a week in Florida Bay in March, having endured another Iowa winter!

I continued on, earning my PhD in geology but looking at modern sedimentary environments a little differently. I was studying a puzzling mineral named glauconite. It only forms in the ocean. The peculiar thing is that it can be up to 30% iron oxide

(by weight), yet it grows in an ocean that is devoid of iron. I got to take a submersible to the bottom of the Atlantic Ocean to see and collect sediment.

Jobs are rather tough to find in geology. I wound up working in computer programming and related stuff. For the past decade I've worked at data exploitation and remote sensing.

### **How, where, and with whom did your interest in caving start?**

When I was a kid growing up in Iowa my family would go on vacations to visit relatives in Minneapolis. On the drive we'd pass Spring Valley Caverns and Harmony Cave. "Dad, Dad! Can we stop? Can we stop?" "No." I never got there, but what kid wouldn't want to go in a cave? A few years later I had gotten a bug about visiting a National Park. Where could I ever do that, barely a teenager living in Iowa? Then my big brother took a job in Nashville. I looked at a map and noticed that Mammoth Cave National Park was right on the interstate between Iowa and Nashville. I begged my mom and she stopped. I got to take the Historic tour and the Spelunking tour. It was GREAT! I went to the library once I got back home but back then there were hardly any books on caving, just Halliday's and Folsom's. I learned about something called the "National Speleological Society" with an address in Washington, DC. It had long since moved to Huntsville but without the Internet in 1974 it wasn't so easy to find out such things. I did reach them eventually but back then you had to have a sponsor to endorse your membership in the society. That was a hard one for me as the grotto in my home town of Bettendorf, Iowa had gone defunct many years before.

I found out about Cumberland Caverns, which is not far from Nashville. I asked the famous Roy Davis if I could get a summer job there guiding tourists. "No, we only hire boys." Drats! Would you please sign my endorsement form for the NSS?" "I don't know you, I'm not going to sign it." Double drats!

However, contacting the NSS, they told me the annual convention would be in Iowa this year (1974). Wowie! My mom drove me 3 hours north to Decorah. Anyone who arrived at convention and paid their money (\$14 I think it was) would be signed up for membership! The convention was run by the Iowa Grotto. The grotto was located 60 miles from Bettendorf and my dear sweet mom would later drive me to grotto meetings. But 1974 was a curious time. Streaking was quite popular and there were a lot of naked



people at convention! Some people even did the Speleolympics nekkid. Ouch! I couldn't help but think sliding through a coat hanger or car tire with no clothes would HURT. Fortunately my mom dropped me off and headed to a café in town to have a cup of coffee. She missed the naked people. When she did come back to retrieve me she found that Bill Cuddington had me up a rope in the ceiling of the gymnasium. That was an enduring memory for her.

### **Certain people influenced your caving career. Who are they and why are you grateful to them?**

To start at the beginning I have to give a lot of credit to Greg McCarty. He was my main caving buddy while I was a teenager in Iowa. He was the mover and shaker in that state and was an inspiration, mentor, and guide. Before I had a car he would fetch me for weekend trips while I was in high school. Sadly he died of a heart attack this year while hiking on the surface during a weekend caving trip.

There are endless more people along the way. Go to an NSS convention and maybe a quarter of the people have been role models in one way or another. The list is so huge I can't begin to recount them all. Pat Kambesis, Donald Davis, Ron Kerbo, Bill Stone, Hazel Barton, and hundreds more.

### **What is the lure of caving for you and what personal rewards do you experience?**

I really enjoy project caving. Of course being the first in the passage is the pinnacle (or is it 'nadir' when referring to caving?). I've done several re-survey trips and that has gotten boring. But generally, caving with a purpose is what I'm all about. I just like the satisfaction of accomplishment. I've always

liked doing things that others don't get to do. It took a few years (but not many) to realize that most people don't want to go in caves. Even still, I feel privileged to explore caves.

### **Many people think cave divers are crazy, really crazy. What sparked your interests in cave diving?**

*Au contraire!* Cave diving really isn't any crazier than dry caving. Cave divers tend to be similar though perhaps a lot more redneck coming from North Florida!

I first was interested in cave diving in the 70s when I started caving in Iowa. Greg McCarty had been certified by Sheck Exley and I had hoped to take it up then. I took SCUBA for my first PE class in college. The class was OK and it was much more rigorous back then than they are now but I failed my certification dive. The dive was in an Iowa quarry in November and the cold got to me. But I figured if I couldn't hack the quarry I wasn't cave diving material.

I didn't reconsider cave diving again until I met Bill Stone during a cave rescue and found out about his cave diving. Since I was back in grad school I took an open water certification class again. This time I took my certification dives in Florida and they were a piece of cake.

I started my cave diving training while spending two months rebreather diving and testing in Florida in the spring of 1993. Bill had designed a 4th generation prototype rebreather to use in Huautla. Rebreathers recirculate exhaled gas so you don't have to carry heavy bottles just to lose most of the gas in exhaled bubbles. This is very important in sump diving since sherpas are hard to come by. I may be the only person around who had more closed circuit (rebreather) dives than open! I finished my full cave diving certification that Thanksgiving from Paul Heinerth.

After the trips to Mexico and lack of obvious alternatives to finding a way into the mountain, the US Deep Caving Team, Inc. (which sponsored the expeditions) moved on to Wakulla Springs (more on this later). After that, I dropped away from cave diving and went on dry-only caving expeditions to the Caribbean and India. Maybe because my knees are giving out, I got to thinking I ought to get back to cave diving—partly due to White Nose Syndrome but mostly because it's seriously fun. I am currently obsessed with cave diving! Try ascending a shaft in an air-filled cave with a push of a button on your buoyancy compensator!

### **What are the necessary physical, mental, and emotional characteristics of cave divers? What kind of person becomes a successful cave diver?**

I hope that for most people they understand that cave diving is not a thrill seeking

sport. It demands rigor, care, and the realization at all times that the cave is trying to kill you. It is deadly serious caving. OK, so scooter diving can be a bit of a thrill but cave diving really is not an adrenaline sport at all. There's a T-shirt out there that says, "If at first you don't succeed then cave diving's not for you." Fundamentally, you have to prepare for and act with the philosophy that if something goes wrong you must solve the problem there, on the spot, and not panic. Another motto amongst cave divers is, "Any diver can call (end) any dive for any reason." It's very important.

One big difference I've noticed between caving and cave diving is that there's a tremendous amount of skill and finesse that needs practicing. I spent last year trying to perfect my finning. You have to fin horizontally to avoid stirring up silt. This year my goals are to improve my rusty reeling skills, practice underwater surveying (something much harder to implement than what I know, theoretically, how to do), and to ramp up on stage diving, that is, carrying extra gas cylinders.

### **How have you helped understand Wakulla Springs' underwater mysteries?**

Wakulla Springs is an enormous cave in Florida that has a river flooding out of it, full to the ceiling. It's miles long and nearly 300 feet deep. Wakulla has been a draw to cave divers but the State Park issues very few diving permits. The US Deep Caving Team, Inc., proposed to go there and do the first fully 3D map of an underwater cave. We got the permit and had a giant pool of the greatest volunteers for 3 months in 1998-1999.

Bill Stone designed the 3D mapper that had 32 sonar transducers that pinged at 4 Hz. So divers took the mapper mounted on a scooter into the cave and brought back millions of automatically collected wall points. Fred Wefer crafted his existing software for cave maps to mesh with the wall mapper. I spent my 3 months at Wakulla doing all things computer-related including building maps from the survey data gathered through the hard work of so many people. Along with the millions of survey points we used underwater cave radio to correct for any errors. We made a map of the cave. The mapping hardware and software have been cannibalized and modified by the Depth X project, with which I'm no longer affiliated.

### **A young person comes to you for advice about getting started in cave diving. What would you tell her or him?**

Go for it! But use care. Get the proper training (four levels to achieve "full" cave certification) and listen to advice from more experienced people. They're not always right

(for you) so use your judgment, but listening is important. Going from zero to hero in a short time is a good way to get yourself killed. Oh, and one other thing. Cave diving is EXPENSIVE! Unlike dry caving it's hard to do on the cheap. I laugh at cavers reluctant to spend the money to get a Sten Light. They cost about the same as a powerful **backup** light in cave diving. I'm guessing maybe \$10,000 will get you kitted up for cave diving.

### **You've traveled a bit. Where have you been caving?**

In the US I've caved a lot in the states where I've lived. I started in Iowa, then moved to AZ for grad school where there are no caves to speak of. New Mexico was great but it was a long haul for a weekend of caving in the Guads from Farmington 500 miles away. Then, when I moved east, I didn't do quite so much local caving.

Internationally of course I've been caving and cave diving in Mexico. I've been caving in the Dominican Republic, Cuba, Mexico, and India.

### **Do you have a favorite cave or caving area?**

Sure. I have a very special spot in my heart for Carlsbad Caverns and the Guads. That was where I moved up to the "big time" from the grubby little holes I went to in my home state of Iowa. Plus I love the NM and CO cavers! And the caves are fabulously beautiful.

Certainly, Huautla will always be a special place for me. In addition to the thrill of the exploration it was a very friendly cave. A lot of work, but friendly. The underwater caves of Florida and the Yucatan are pretty special. I seem to be spending a lot of time in Florida these last few years.

### **What's your attraction to deep caving?**

I think the lure of deep caving was mostly because I like having a goal. I'm not so keen on caving just to go caving. I need a purpose. So with Huautla we had some pretty audacious goals with the potential for big payoff. For me, "deep" doesn't necessarily mean that much in and of itself. *(To better understand Huautla explorations two books are recommended that focus on the subject, Beyond The Deep, by Stone, am Ende, Paulsen, and Huautla, by Steele. RZ).*

**The Huautla Cave exploration is an incredible achievement. The system is known to be deep, difficult, and dangerous. You played a major role in its exploration as described in your book *Beyond the Deep* with Bill Stone and Monte Paulsen. Please share some**



**of your thoughts and feelings when you and Bill were pushing the far reaches of the cave.**

We were on a mission to get as much explored and mapped as we possibly could in the short time we had beyond the sump. Conditions were Spartan. But this was the climax of years of planning and work. We were pretty focused on mapping and exploration. It was curious that we sort of took turns finding the way on in the cave. For instance, when we were turned back by the wall with the Rio Iglesia pouring in from a hole 30' up, I thought that was it. But Bill had seen a lead to the left where the main passage took a bend. He was grubbing around in a crawlspace trying to find something. I got bored waiting for him and I looked up. Sure enough, there was a narrow fracture continuing up. So I went. And it kept going. It was a fault zone with slickensides on the walls where the rock had slid past the other wall sometime in the past. Then, the crevice popped up into a huge room, Adams Avenue. I poked around at the bottom of the room where there was no moving air and it was discouraging. Bill found the other side of the big room and found the water re-emerging. That got us to another big passage: Rockin' and Rolland. We split up and I had a smooth, oval, walking passage going up and back with air. I returned to Bill and he spent a long time trying to get in a high lead that was muddy and gnarly. I should have demanded he give up on that and return to mine. But by then I was tired and not thinking clearly.

**Is there something that really made you uncomfortable beyond Huautla's Camp 5? What brought you comfort then and there?**

Camp 5 itself made me uncomfortable! It was kinda miserable. We were -840 meters (2755 feet) below the San Agustín entrance and 2 months into the expedition. You have to get soaked to your armpits wading in the water to get there. The nylon decking of the portable platform that we slept on above the stream was waterproof so you couldn't get your feet dry before crawling into your sleeping bag. The nearby waterfall was \*loud\*

and you'd have to shout to your mates just a couple feet away. The toilet facilities were baggies in a dry bag. No fun living at Camp 5. But I was very excited about the prospect of the exploration until we had several problems to fix. By the time we got them taken care of the cold and wet had seeped in and I wasn't so perky anymore. But I couldn't say no after all we did to get to this point in the cave.

Diving through the sump where Ian's body was found was fine except when swimming past Ian's boots floating in the sump. I never did learn why Bill must have pulled them off. I guess it was easier to move Ian's body through the passage. But it sure was spooky seeing them abandoned in the water.

There were any number of things that gave us pause back there (read the book), but nothing that really wiggled me out. We did lie in our bags in Camp 6 resting, thinking about what we would eat if we could. I wanted Chinese food and Bill wanted a gallon Nalgene filled with a vanilla malt. Back then I still had time for sewing clothes and was fantasizing about the flowered, black sleeveless top I wanted to sew when I got home. Crazy, but it's true.

**Beyond the Deep had me on the edge of my chair from cover to cover. It's especially poignant for me that the farthest reaches of Huautla were explored together by one woman and one man. Astronaut Buzz Aldrin said that until he read your book he was wrong to believe that humans could not be any more remote than on the surface of the moon. You and Bill were at that time perhaps the two most remote persons on, or inside the earth. How did you feel about the remoteness at the time and how do you feel about it now?**

I felt incredibly privileged to have the opportunity to be one of the few to explore beyond the sump. It took tremendous effort—months of work by dozens of people. And I can't thank them all enough. One thing about the remoteness was that we built up our fortitude. We had seemingly endless trips hauling gear, food, ropes, carbide, etc. So by the time we dove the sump it wasn't quite as daunting as the early trips were.

When we got out I was ready to go back the next year. I kind of felt on a roll. We'd had a lot of success and learned a huge amount. Unfortunately no one else seemed to share my desire for a quick return. Sadly the momentum waned and now I doubt I'll ever return. I hear the Brits are interested in returning next year. That's the way of exploration. People build on the work of others. I have a couple of great leads for them!

**What's it like writing a book about one of history's great cave explorations?**

At the time I thought that writing the book was harder than the expedition itself!

**Cave diving is equipment dependent. The photos I've seen of you diving a sump tell me that with my basic SCUBA I would only get in trouble. Could you tell me about the specialized gear that you use to explore underwater caves?**

Cavers already know about having 3 sources of light. The same is true for cave diving except you need backups for almost everything. Although you might have more, cave divers carry two tanks and regulators. Many divers have two line cutters to cut potential line entanglements. Most cave divers I know use redundant computers. Everyone has at least 3 lights but 4 or 5 aren't uncommon. There's also the question of dual bladders in your buoyancy compensator versus diving in a drysuit that can be used for buoyancy. Unlike in dry caving where guidelines are useless, in an underwater cave a guideline is mandatory. Everyone has at least one safety reel to use to find a lost line in case of a siltout or loss of light. Line arrows (the modern one created by my friend Forrest Wilson) are used to point the way out of the cave. Because of the limited supply of gas (not always air because you could be breathing some mixture of gasses), you want to be able to find your way out quickly in an emergency.

One thing about cave diving gear is how minute things can be very important. Two pounds of lead moved to the wrong place can totally screw up your trim (your orientation and cleanness in the water). I used to dive short tanks and I had my gauges pointed forward. But with longer tanks they became silt scoops so I aimed them back. I saw a picture of myself in a cave in Mexico earlier this month. My gauges were hanging down and I need to fix that. I have a local buddy who is helping me sort out all these minor details that can make a big difference. On the one hand I'm not a gear head and don't get super wrapped up with the gear, but on the other hand, trying to make a successful dive is a bit of a puzzle and I find that to be fun.

Rebreathers are a whole, entirely different ball of wax. In a nutshell they're like putting a plastic bag over your head but scrubbing out your CO<sub>2</sub> and adding O<sub>2</sub> to keep it breathable. My motto is 'A rebreather will kill you faster than anything else and it'll save you when nothing else will.' Rebreathers are fairly complex. They're expensive and require a huge amount of maintenance. There are some caves where you really need rebreathers. But if you don't they're just too much work for me to deal with. Some folks go "tourist" cave diving in Florida. Instead

of doing two two-hour dives, they do one four-hour dive with rebreathers. Yes, you can penetrate deeper in the cave but it just doesn't make it worth the work and expense to me. On the other hand, if I go back to a project that needs one, I'll definitely start rebreather diving again.

**Related to cave diving, aren't you a moderator on Cave Chat, the NSS discussion forum and the Cave Diver's forum?**

Yes, I don't have a lot of close friends in the Washington, DC metro area. Plus the friends I do have are busy and live tens of miles away. My best friends are cavers and cave divers who live around the country (and the world). So I spend a lot of my time as a mouse potato keeping in touch with everyone. Two Internet fora where I spend a lot of time are the NSS site, Cave Chat, and the Cave Diver's Forum. For some reason the folks in charge made me a moderator on each of these sites. Some of my job is just deleting spam but also it means keeping abreast of postings that break the Terms of Service.

Sometimes things get unnecessarily heated on the fora but in general the sites are really great for sharing information. If there's been a rescue you'll find out about it soon on Cave Chat. If you want to know something about LED lights, Cave Chat's the place to ask. Come join the fun!

**Besides caving you keep busy with other pastimes including bicycling and gardening. Please tell me what you get from participating in these activities.**

I have almost no time for gardening anymore. I love puttering in the garden and doing yard work but it'll have to wait for sometime when I can't go caving or diving. Bicycling is something I try to do on a regular basis. I had to give up jogging because of my bad knees. So I got a bike. I'm really into mountain biking and discovered it is really fun. In contrast to caving where I like projects I cycle with no other goal than to enjoy the forest or desert and to get the blood flowing.

**You are a chair person for the NSS Cave Ballad Salon. Please tell me about your interest in cave music and the Salon.**

I always liked songs that were humorous (think Tom Lehrer and Weird Al). I used to sing, Gory, Gory, Cave Explorer from words printed in a Speleodigest. When I lived in Colorado, while trying to finish my Master's, I had access to a lot of cave ballads through Rich Wolfert who had them on reel-to-reel tapes. Then, at the Tularosa convention, there were songs submitted to the NSS Salon but no one to coordinate. Doug Bradford did

the salon that year but didn't want to after that. So I started in 1987 and I'm still running the salon. I figure if someone like me, whose only instrument she knows how to play is the iPod, can organize, then that frees up others to submit the songs.

**Some of us think we sound pretty good singing in the shower. How can we get involved with the Cave Ballad Salon?**

Awesome! It's always great when we get new participants in the salon! Go to the NSS website and there are links to the salon. There's entry information and links to a great many of the songs from over the years as MP3s.

**Do you keep a caving log book? What value do place on keeping a log?**

I really never kept a log book of caving. When I started going on expeditions I did keep journals of those trips. I'm really glad for doing that. At first I kept dive logs but I was diving with so many people who didn't I didn't bother. I quit keeping a log pretty quickly but later I realized that was a mistake. I tried to reconstruct my dives as best I could. There's an award the NSS Cave Diving Section has called the "Abe Davis Award". It's given after an applicant completes 100 "safe" cave dives after earning your full cave diving certification. Eventually, I reconstructed my cave diving experience and logged whichever dives I could scavenge from buddies' books or that I distinctly remember making. I know I've lost a few. The advantage of having the Abe Davis is that there are caves such as Hart Springs where the management policy won't let you dive unless you have your Abe. (See the NSS Cave Diving Section web site for more information. [nsscds.org](http://nsscds.org). RZ).

Now I'm kind of obsessive about logging my dives. I calculate my air consumption rate, plot the dive profiles from my dive computer, slap it together with a map of the cave as well as a brief written discussion and list of buddies.

I started off writing a journal in a small notebook. Then I used a Palm or Laptop when I could (not everywhere would have electricity for power). Sometimes I just can't quite find the time to write or type. Then I added a digital voice recorder. So now I can speak into the recorder to get my thoughts down. I often record in my truck while driving home from a dive site. I can always transcribe later. On my recent trip to Cozumel I fell down on the job and had to get copies of the logs from my buddy.

**Many American youth are turned off by studying science curricula. How would you encourage girls and boys to pursue studies in science?**

It's a shame that what you say is true. I one time worked a job fair and had some fossils to show to the kids. One kid picked up a *Tyrannosaurus* tooth and asked, "How much could I sell this for?" Grrrrr.

Science is so much FUN! I like rocks, fossils, gems, water, caves, volcanoes—all of it. Some folks like animals or stars or a million other parts of our fabulous earth. Biochemists can cure diseases. Be open to finding your passion and then it's not work. It's fun to become a scientist and do what you love to do.

**You've been honored in a variety of fields with awards. What are they?**

Well, I earned my Abe Davis Award. I got an NSS Fellow award in 1991. Last year, the NSS prez recognized my volunteering on the Awards Committee with a certificate.

**In the future what would you like to do and what would you like to accomplish?**

I've been trying to polish up my cave diving skills. It's tough when I live so far from good water. My goal is to do sump diving. There are a lot of dry cavers and a lot of cave divers. Very few of them like to dive crappy vis caves to get to the booty beyond. I want that!

The other interest of mine is thermal imaging of cave entrances. Caves are about the average annual temperature of the overlying land. But the ground surface heats up night to day and winter to summer. So at the right times, there can be a huge temperature difference that has the potential to be used to find new caves. I did a huge amount of field work using a handheld imager in New Mexico when I got a grant from my employer, the Aerospace Corporation. Then my grant ran out and I've got an unrelated project that leaves me little time to wrap up all my work. I'd really like to find time to publish my findings and maybe do more work in the field!

