CAVE DIVING
IN THE MODERN WORLD

CHAPTER 1

Introduction

Cave Diving in the Modern World

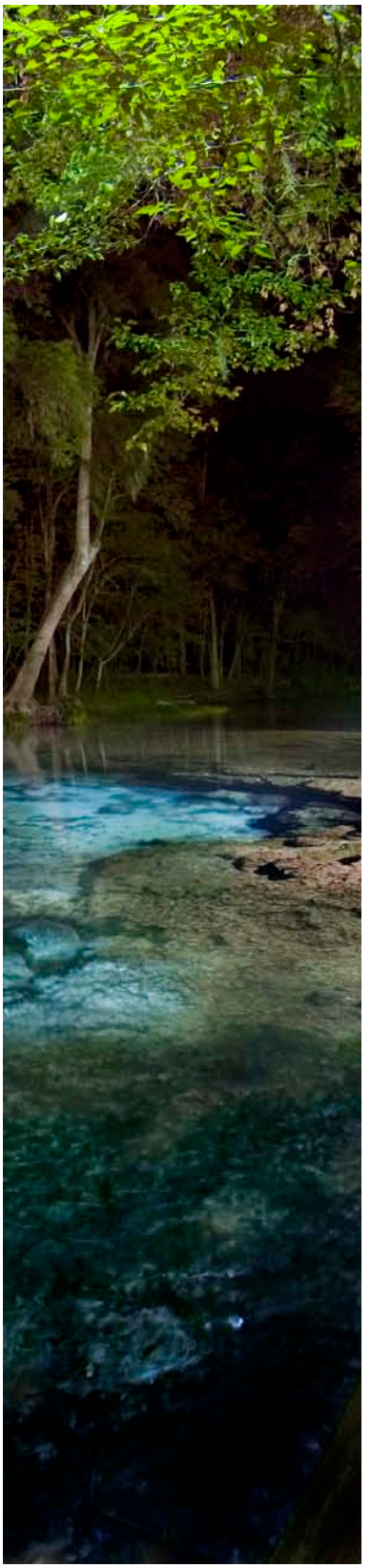
A pock-marked, turquoise van hobbles over the dirt road, throwing up a film of limestone dust, making the pines look like Christmas trees. 27-year old Agnes Milowka is relieved to stop, since the clanging tanks and shifting equipment have been ringing in her ears for what seems an eternity. She heaves the cumbersome side door open to reveal a mountain of gear; tanks on top of scooters, on top of yesterday's take-out and next week's laundry. She's been making this drive every night after work for months, punching the clock, dealing with life's necessities and then hitting the spring for a solitary swim through cathedrals of rock. Often surfacing well after midnight, she packs up the van and does it all again the following day. She both fascinates and frightens cave diving pioneers like Wes Skiles who discloses, "She reminds me of myself."

Skiles recalls his earliest forays in cave diving, when he strung countless spools of braided line through boundless caverns. In 1970, world record cave penetrations peaked just over 2,000 feet. Within the decade the record eclipsed 5,000 feet. As underground secrets were brought into the light, diving teams like Skiles' "Mole Tribe" were charting hundreds of thousands of feet of passages in dozens of new caves deep under Florida. Air bottom times followed by air decompression led to long, painful nights and eventual trips to hyperbaric chambers in Gainesville and Tallahassee. The Tribe paid dearly with their bodies, and friends lost in the murky depths. Their efforts were both celebrated and condemned. In the very dawn of the sport, there were attempts by Florida legislators to ban the activity completely. Locals could not bear witnessing the hangtag, warning signs, indicating how many divers had lost their lives at a spring that year.

More than forty years later, the sport of cave diving has changed dramatically. On an attempt to check off the last corner of the map of Ginnie Springs, Agnes Milowka recalls,"...suddenly and unexpectedly, I found myself at the end of the line... with a bunch of gas... and thought, now what do I do?" Over 4,500 feet back, while following exploration lines placed by James Toland and Andrew Ainslie, she realized that all she had was a small safety spool carrying a meager 125 feet of line. Chuckling to herself, she carefully uncoiled the line and launched her exploration career. "I'd be lying if I said I didn't get a kick out of this, but, I am under no illusions. In the scheme of things, my little sojourn 100 feet into new passage means absolutely nothing. It's not a cure for cancer. It's not even a footnote to the exploration that has been done and is being done around cave country, not to mention the world." What is does illustrate is a brave new paradigm in cave diving.

With old records shattered almost daily, it is hard to imagine that accidents are declining in cave diving. Thirty years ago, bodies of ill-equipped, open water instructors were dragged hundreds of feet out of darkened passages. Now it is rare to find unqualified divers in the depths of Florida's systems. Instead, a trend towards long-range recoveries is developing. Divers moving recklessly, beyond their skill and experience, are adding tasks that eclipse their ability and control. A typical recovery these days requires a team of scooter-driving, rebreather divers with multiple bailout bottles and substantial surface support.

Perhaps the most significant technical innovation in cave diving over the last decade has been the proliferation of rebreathers. In fact, closed-circuit rebreathers (CCRs) were employed long before traditional SCUBA in caves of the United Kingdom. In 1945, Graham Balcombe began exploration of Keld Head by walking finless on the bottom



while breathing from a military surplus rebreather. Further efforts by Balcombe, John Buxton and others, yielded significant discoveries in the famed Wookey Hole and other sites.

The combination of rebreathers with DPVs has allowed for significant increases in traffic at cave landmarks such as the Henkel Restriction of Ginnie Springs. What was recently out of range of most divers, is now a regular dive for relative novices with money to spare for technology and toys. The cave zones that were restricted to divers using stage bottles and/or scooters can now be accessed by CCR cave divers with time on their hands. When an open circuit diver reaches one-third of their tank pressure, they will "call the dive" and head directly to the exit. A CCR cave diver often selects a distance from the entrance that equates to the limits of bailout gas and may swim for hours within that range before exiting; exploring side passages and new tunnels along the way.

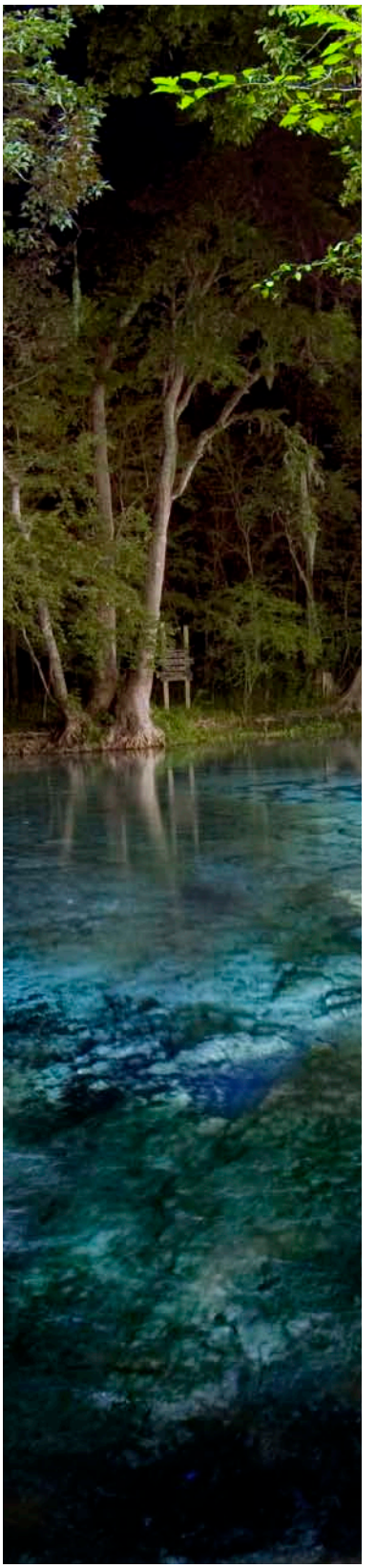
The earliest cave divers employed sidemount diving methods; carrying their cylinders on their sides, below their armpits. This streamlined technique somehow fell into obscurity in the United States. Instead, Canadian diver, Dr. George Benjamin, developed a manifold systems to link tanks together. Sidemount equipment became restricted to the domain of small passages, and the tool of divers who were willing to sew their own custom harnesses. These days, several companies manufacture off-the-shelf sidemount rigs. Golem Gear's Armadillo and Dive Rite's Nomad have captured the interest of hundreds of new explorers and divers who prefer carrying their gear to the water one-tank-at-a-time.

Cave diving lights are upgrading faster than cameras and PCs these days. Gone are the days of sealed-lead-acid monstrosities that required butt-mounting to be swimmable. Today's back-up lights are brighter than our best primary lights of just ten years ago. Nickel Metal Hydride, Lithium Ion and Lithium Polymer batteries have lengthened burn times. HID and LED bulbs have increased power and duration. Recent advances in semiconductors, coupled with improved controllers and dimmers add to time underwater. Amateur videographers and

their buddies now carry 200-watt lamps, producing 16,000 lumens, previously found only on Hollywood movie sets.

Today's cave divers wear personal computers that exceed the capabilities found on early space shots. A better understanding of mathematical algorithms and decompression, have fostered development of new deco models. The modern cave diver has an understanding of various mathematical blueprints and how they affect the human body. They plan personal Gradient Factors, use exotic gases, and crunch profiles on their laptops. Recently, Kevin Gurr took a bold step in releasing the new VRX dive computer, allowing for customized decompression using the Variable Gradient Model (VGM). Gurr notes, "The human body cannot currently be mathematically modeled. Not only are individuals different because of age, fitness, pulmonary and cardiac (PFO) defects, but they also vary on a daily basis due to hydration, stress, exercise, micro-nuclei generation and many other factors." He feels the diver should be able to have the flexibility (and take the responsibility) to design their own decompression matrix. "Some experimentation has historically been done to produce 'reasonably safe' decompression tables that 'fit' most people for a shallow water (primarily air diving) environment. In modern technical diving, much of the deeper diving we do is simply an extrapolation of the early shallow water research. We now know that this does not always work."

Modern DPVs have been juiced up with new battery technologies that increase the diver's range to staggering limits. In 1998, using new Nickel Metal Hydride (NiMh) batteries, I was able to drive for 5-hours bottom time at full throttle in the depths of Wakulla Springs. These days Lithium Ion and Lithium Polymer batteries offer significantly longer run times than their Sealed-Lead-Acid predecessors. Reliability and availability have increased, resulting in intensified traffic in caves. But, with inexperienced scooter drivers, comes damage to fragile geology. As a result, most state parks in Florida have banned the use of scooters inside their caves. Wes Skiles is worried about the damage and about cave divers going too far, too fast. He recently remarked, "...if you haven't swam to the Henkel, you shouldn't be at the Henkel."



Much has changed in training and equipment in recent years, yet some things in the cave diving community never change. Divers have been sharing stories over lunch at the Luraville Country Store for decades.

DPVs are no replacement for serially learning a cave.

Few cave divers today realize that Florida's, Devil's Ear cave system was once colored completely black. Years of traffic, bubbles and pulling have resulted in the loss of the geothite covering on the underwater surfaces. Worse yet, scooters and poor buoyancy have left rifts and gouges in the bottom sediments. Delicate speleothems in Mexico's cenotes have been thoughtlessly destroyed and passively eroded by bubbles. Other systems, such as Cow Springs and Troy Springs, have been the victims of vandalism; divers carving their initials in clay banks for the sake of posterity. The NSS-CDS, led by former Chairman Kelly Jessup, recently tracked down and prosecuted one such vandal, using a little-known Florida statute. Heartbroken by the damage, a team, led by artist Michel Angelo Gagliardi, re-sculpted the clay bank and returned it to its original beauty; the first underwater restoration ever attempted in a cave. Recognizing the need for increased awareness, the NSS-CDS and NACD have published brochures and articles bringing attention to cave preservation activities. Organizations like GUE, actively carry out conservation and public education activities.

In recent years, cave maps that were closely-held secrets have been released to the general cave diving community. A recent check of the NACD website, www.safecavediving.com, revealed more than twenty maps available for purchase. In the past, these maps were infrequently distributed, but now, many weekend enthusiasts use them as virtual check-off lists. Instead of learning the cave slowly by discovery, impatient divers choose to tick-off different tunnels from their map as they "conquer and move on." Maps can be extremely useful tools when used judiciously, but when divers

exceed their training and experience, there can be deadly consequences.

Almost thirty years ago, training for cave divers was limited to an apprenticeship with experienced divers. Like surfers who defend their right to certain waves, cave divers policed their own ranks and kept divers in their place. Instructors from the NSS-CDS were not permitted to advertise or recruit students, but only reluctantly teach those that might come to harm if not corrected. In the last decade or so, NAUI, TDI/SDI, IANTD, PADI and other corporations have jumped into the training game, adding hundreds of cave diving instructors to their ranks. Today's neophyte must carefully interview and select an instructor who not only has teaching credentials, but also a wide range of diving experiences in the overhead environment.

It is doubtful that cave diving records can sustain an exponential increase much longer. Yet, with the help of rebreathers and spirited teamwork, Jarrod Jablonski, Casey McKinlay and a dedicated group from the Woodville Karst Plain Project continue to log penetrations well over 20,000 feet. Young explorers in Mexico have linked neighboring systems, and mapped single caves to lengths well over 500,000 feet. But its not always the long distances that are the most remarkable. It's the fact that there are no limits to previously explored caves. Deep cavers, like Richard Harris, have not been afraid to push line 600 feet deep. Inventors, like Rick Stanton, have pushed the parameters of life support by using home-made micro-rebreathers. Sassy sidemounters, like Agnes Milowka, have never been bridled by limits to their imagination.

Within the bounds of a popular Florida state park, Milowka rumbles her old van through overgrown pastures and woodland and arrives at a stunning oasis. Patchy heirloom crops disclose the existence of the earliest settlers, the Timmucua Indians. Remnants of later civilizations litter the spring basin; an old timber, leather boot soles and dull brass buttons from a soldier's uniform. Centuries ago, at this spring, a Spanish Mission was built, thrived and was subsequently destroyed by the native people it attempted to tame. It's a wild and beautiful place.

Agnes, a native Australian, begins her dive, stripped of all but a wetsuit, then digs her way into the crumbling passage. Her tiny 110-pound frame is sustained by the tank she pushes ahead. She doesn't know that countless divers have already given up on this squeeze. She doesn't care that she's trespassing on state property. She doesn't even worry that if she has a bad day, her body won't be recovered. She just presses on, exploring in a vacuum, moving ahead because nobody has stopped her. She's made choices that few would make. The risks are her own and perhaps only engaged in the invincibility of youth. But despite taking risks some might call insane, she hits pay dirt and reveals another 8,500 feet of the mysterious conduits inside Mother Earth. Is it prudent? The community will undoubtedly judge her actions as either heroic or psychotic. Although reliable technology and tools have increased the range of modern cave divers, some things will never change. Wes Skiles' unlikely protégé will agree that, "Nothing can beat the moment you unwind a reel into completely uncharted territory."

This book reveals the fundamentals of cave training, while also delving into the edgier topics that pepper our sport today. If you are new to the sport, it will offer you the basics. If you have been cave diving for thirty years, it will welcome you into the fold of today's state-of-the-art explorers. Enjoy.