

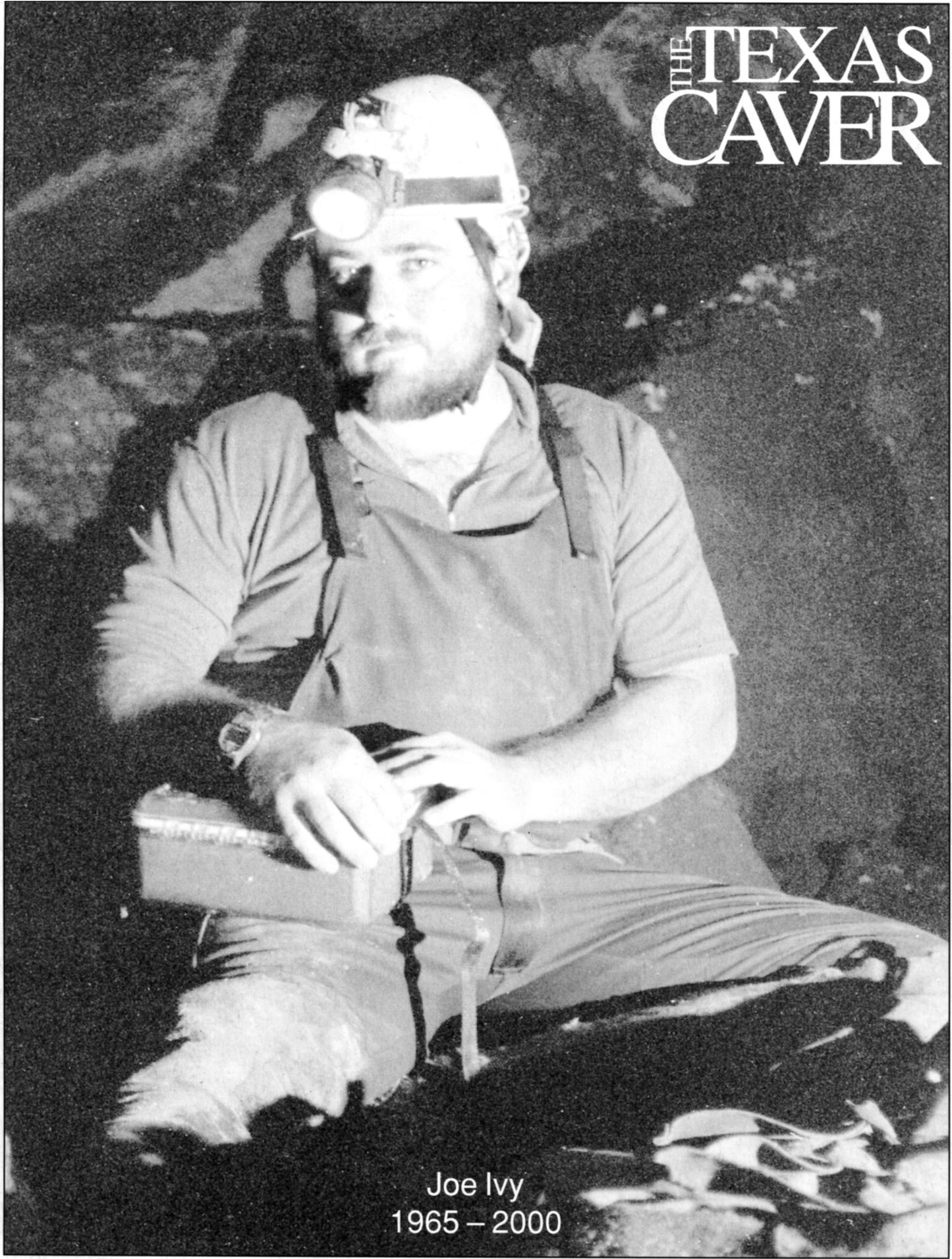
Joe Ivy

1965 – 30 September 2000, 35



Joe Ivy rigging a rebelay in Level 4 or 5 of Sótano del Venadito, Tamaulipas, December 1998. By Don Broussard.

THE TEXAS CAVER



Joe Ivy
1965 – 2000

Obituary

Joe Ivy (1965 - 2000)

By George Veni

143

Caving with Kids

Frank Herzig Family Caving

By April & Marie Herzig

144

Project Reports

Palmito Cave Cleanup, Labor Day

By Jan Knox & Aimee Beveridge

145

Trip Reports

Mapping Spiller Little Bear Cave

By Michael A. Moore

146

Pinnacles Cave, Nevada

By Rae Nadler-Olenick

148

Caving in Paradise, Part II

By Troy Shelton

149

Cave Safety

Carbon Dioxide in Caves

By Garry K. Smith

151

Accident Report

Joe Ivy: 0-9 Well, Crockett Co., Texas; 30 September, 2000

Edited By Rebecca Jones & Peter Sprouse

154

Tribute

Joe Ivy: From "09" to 0-9

By George Veni

159

Joe Ivy References in *THE TEXAS CAVER*

Compiled By Julia Germany, Jim Kennedy, and Logan McNatt

162

TSA News

TSA Fall Business Meeting

Submitted By Robin Barber

163

The TEXAS CAVER is produced by the Texas Speleological Association

Editors: Rebecca Jones & Brian Vauter
Proof Readers: Aaron Addison & Ray Craig

This issue is made possible by those who contributed material:

Robin Barber, Aimee Beveridge, Julia Germany, Keith Heuss, April Herzig, Marie Herzig, Jim Jasek, Rebecca Jones, Jim Kennedy, Jan Knox, Orion Knox, Logan McNatt, Michael A. Moore, Rae Nadler-Olenick, Troy Shelton, Garry K. Smith, Peter Sprouse, Brian Vauter, & George Veni

THE TEXAS CAVER is a bi-monthly publication of the Texas Speleological Association (TSA), an internal organization of the National Speleological Society (NSS).

Subscription rates are \$27/year for six issues of *THE TEXAS CAVER*. This includes membership in the TSA. Out-of-state subscribers, libraries, and other institutions may receive *THE TEXAS CAVER* for \$20/year. Back issues are available at the cost of \$3.00 per issue. Send all TSA correspondence (other than material for *THE TEXAS CAVER*), subscriptions, and exchanges to:

THE TEXAS CAVER
P.O. Box 8026
Austin, TX 78713

Exchanges should be mailed to *THE TEXAS CAVER* at the above address. *THE TEXAS CAVER* will exchange newsletters with other grottos.

Submissions to *THE TEXAS CAVER* should be sent to the editor at the following address:

Rebecca Jones
11916 Bluebonnet
Manchaca, TX 78652
rebeccaajones@earthlink.net

We encourage YOU to participate in this publication.

Opinions expressed in the *THE TEXAS CAVER* are solely those of the authors and do not necessarily reflect those held by the editors, the TSA, its members, or the NSS.

© **Copyright 2000** by the Texas Speleological Association.

Internal organizations of the NSS may reprint any item first appearing in *THE TEXAS CAVER* as long as proper credit is given and a copy of the newsletter containing the reprinted material is mailed to the TSA. Other organizations should contact the TSA about reprinted material.

OBITUARY

Joe Ivy 1965 - 2000

BY George Veni

On the evening of September 30, 2000, Joe Ivy died from a fall while performing a Texas record-high dome climb in O-9 Well Cave. Joe was one of the most skilled cavers in Texas, especially in vertical and cave rescue techniques. His death is a tremendous blow to cavers throughout the country, both from sorrow and concern on how someone so skilled could have perished. A detailed accident report is being prepared and will be published.

Joe began caving with the San Antonio Grotto at 16. His life story is one of persistence toward excellence. No one expected he would remain a caver for long. A slow moving, polo shirt-wearing preppie and the drum major of his high school band, he was somewhat nervous about doing the things necessary to caving. But by the time he reached 18 that had all changed. By his late 20s he had gained international respect for his strength, caving skills, leadership, and irreverent good humor.

Among his many caving accomplishments are hard-charging explorations of hundreds of caves throughout the U.S. and Mexico, most of which he surveyed or helped survey.

Joe played key roles in pushing/surveying the longest caves in Texas. He led the push of Pozo de Montemayor, and through his first bolt climb made it by far the deepest cave in northern Mexico at -515 meters. He was a regular member of the Sistema Cuicateca (Cueva Cheve) Project, one of the deepest caves in the world. He recently headed the exploration of Mexico's Cueva de la Puente, which

had long been written-off as a short cave, and pushed it to over eight kilometers in length through some of the most spectacular passages anywhere. His list of expeditions and projects are too numerous to mention.

Joe cared deeply about the caving community and served it in many capacities. Over the years he had been

rescue training seminars, and pioneered new, effective cave rescue techniques, especially small party self-rescue methods (he was writing a book on the subject) that could be needed in the remote caves he was so fond of exploring. In 1997, the NSS recognized Joe's achievements and made him a Fellow of the Society.

Joe's passion for caving spilled over into his work. He was the co-owner of Gonzo Guano Gear, and took justifiable pride in designing fine caving equipment that he rigorously field-tested on his many expeditions. With his Geography degree in Environmental Management, he regularly worked for thirteen years as a contractor in karst hydrogeological, biological, and related environmental research. During his last couple of years, he was increasingly being called to teach courses in vertical and rescue techniques.

Joe Ivy is survived by his companion, business partner, and co-editor Rebecca Jones, by his brother Marvin Ivy, sister-in-law Kristy Ivy, niece Ashley Ivy, and a large, internationally extended family of cavers who loved and respected him.

A fund to support cave exploration has been established in Joe's name. Those wishing to make contributions should send checks made out to the National Speleological Society, marked in the memo field for the "Joe Ivy Exploration Fund." Mail them to the NSS office at 2813 Cave Avenue, Huntsville, AL 35810.

Joe's passing has left an "Ivy-sized" hole in our caving community; a hole so large we may never be able to push far enough to find its end.



photo by Rebecca Jones

chairman of the Bexar Grotto and Texas Speleological Association, he served as the Texas Regional Coordinator of the National Cave Rescue Commission, and at the time of his death was co-editor of *THE TEXAS CAVER*. He had published over 60 articles on caving, including his many trademark insightful, no-nonsense reviews of caving equipment and techniques. He trained countless novices, led and assisted with numerous cave

ACCIDENT REPORT**Joe Ivy: O-9 Well, Crockett Co., Texas; 30 September, 2000****EDITED BY: Rebecca Jones & Peter Sprouse**

Contributions by: Rod Dennison, John Fogarty, John Ganter, Rebecca Jones, Dr. Jay Kennedy, Bill Mixon, Alan Montemayor, Bill "Carlos" Nasby, Matt Oliphant, Peter Sprouse, Tim Stich, Bill Storage, George Veni

O-9 Well is one of the deeper caves in Texas, around 100 meters deep. From the bottom of the 39-meter deep entrance drop, the downstream section continues down five more rope drops to a sump. In the dome above the sump, Joe had seen what looked like an infeeder in the ceiling that he felt might lead to more cave passage. In March 2000, Joe Ivy and Tim Stich made plans to do a bolt climb up the dome.

Aid Climb Project Background

To climb in O-9 Well, Joe and Tim used a cordless hammer drill and several types of protection in addition to expansion bolts. What was unique to this climb was the self-belay system. First, Joe drilled and set two bolts at the base of the climb, to which Joe attached a Kong Slyde. This shock absorbing mechanism is a small metal plate with holes drilled in it. The rope was then threaded through the holes in such a way as to create friction. The purpose of the Slyde was to turn the 9mm static rope they were using into a dynamic system. Under normal static load, the cord would not travel through the Slyde, but upon dynamic load it was set up to slip through the device and absorb the energy of a falling climber.

As the bolt climber made upward progress, the rope connected to the Slyde went up through the protection and then down to the climber. The ascender (or in some cases two ascenders) of the lead climber was the attachment point to the lead rope. An ascender was used in order to conveniently adjust the length of the belay rope, something that in a normal belay system would be done by the belayer. On the first climbing trip, Joe and Tim both took falls onto this rigging and it easily absorbed the energy of the fall. On average, the falls were around 4 meters, including movement through the Slyde. Tim says that in the case of his fall there was around 7 meters of rope below the top piece, making his fall somewhat less than a factor 0.6. In both cases they were using a new piece of protection by Climb Tech, called a removable bolt (RB). These are reusable wired camming

devices designed to be inserted into a drill hole, reducing the number of bolts that they would have to place. RBs come in a variety of sizes. Joe and Tim used both 3/8 inch and 1/2 inch RBs on the first climb. Tim took a fall when a 1/2 inch RB pulled unexpectedly, and Joe took a fall on a 3/8 inch piece, which he felt he had placed poorly. It was extremely difficult to avoid getting some water and mud on the RB before it was inserted. This adversely affects the performance of the protection. After the first trip, they decided to abandon using the 1/2 inch size RB and stay with the 3/8 inch ones.

The Day of the Accident

Joe and Tim made a total of five trips to continue working on the climb over three weekends. On the last weekend, 30 September, they had cleared a muddy section that had made progress on the second weekend unusually difficult. Thick, clinging mud made manipulating gear almost impossible. The final section to the very top of the bolt climb, which was about 50 meters off the floor, was relatively mud-free and on what appeared to be good rock. Joe took the first shift on the climb, as he usually set up the Slyde rigging at the belay point.

After making at least six meters of progress, Joe descended to the fixed line below him and rappelled to the base of the wall. He remarked that he was going to eat and get something to drink. From time to time during that day's climbing other cavers on the trip visited the bottom room. Some were still there when Joe descended the standing line. Tim got a wrench and some carabiners from Joe and also the adjustable one stirrup etriers, which Joe had designed himself. Tim preferred these to the standard multi-step ones Joe also had on hand. Tim climbed up to the anchor for the fixed line and then attached himself to the lead rope. The rope had been passed through a vertical line of 3/8-inch bolts to Joe's last protection, a bolt. (During this part of the climb they used three-inch wedge- and sleeve-type bolts.) Tim switched his ascenders to the end of the rope that came down from the carabiner in Joe's last bolt and climbed to where the lead continued.

Along the way Tim cleaned carabiners and hangers from the protection Joe had placed, leaving the last two bolts. When he

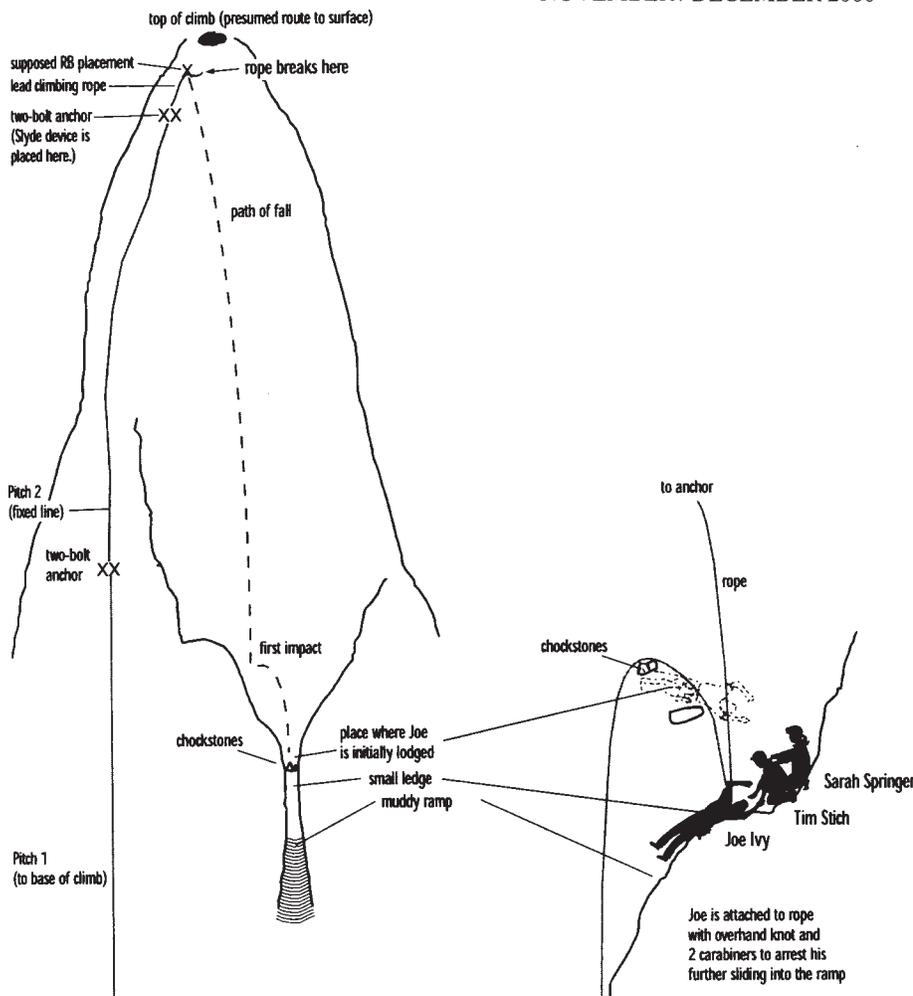
reached the top bolt, he transferred the hammer drill and bolt kit that were hanging on the bolt to his harness. From there, he continued the climb by the method they had established. Clipping his cow's tail into the bolt hanger of the topmost bolt, he then attached the etriers to the bolt carabiner that also contained the rope. This allowed him to stand and attach a fifi hook to the bolt hanger. The fifi hook is a flat metal hook attached to his harness with a short piece of cord, allowing him to get as close to the bolt as possible.

From there, he adjusted the etriers to a position that allowed him the highest comfortable step from which to drill a new bolt hole higher up. After setting a new bolt, he hung a carabiner from it. He put one etrier on this carabiner to use it to pull up on. This allowed him to thumb his chest ascender and get slack from the lead rope. Tim then stood up, clipped the rope into the higher carabiner and moved slack down through his two ascenders. Then he could remove his cow's tail and fifi and climb up to the new, higher bolt. This technique creates a temporary loop of slack not normally seen in a standard belayed climb, where the belayer would be paying out slack as needed by the climber's ascent.

When Tim finished his shift, he was within 4.5 meters of the top of the climb. A hole, two to three meters in diameter, could be seen at the summit of the climb. A low crawlway appeared to go off in one direction, although it was possible that it was merely a flat roof with a slightly hollowed out ceiling. At this point, it looked like the lead rope might not reach the top. In any case, Tim had run out of hangers and was exhausted. He decided to end his shift and let Joe finish the final pitch. At most, it would take four more placements. Tim set the two bolts at the top and rigged a standing line for Joe to climb. As he rappelled, he removed hangers and carabiners to give to Joe.

The Accident

Joe had gotten rest, food, and water, and was in good spirits. Tim told him that he might need another rope. Joe coiled one and attached it to his harness, then he ascended and disappeared from view into the darkness of the upper dome. The other cavers sounded like they were again visiting the



Accident Scene 0-9 Well Cave

bottom room, and Tim heard some voices and saw flashes of headlamps. He could occasionally see the dim glow of Joe's LED array high above him. Then, 30 to 45 minutes after Joe began his ascent, Tim heard what sounded like a brief exclamation from Joe and then a loud, resounding crash. Many times in the past, large chunks of mud and some rock had fallen on the climb, but this was much louder. Tim called up to Joe, but there was no response. More alarming still, Tim could no longer see any light above him. Tim decided that Joe must have had a mishap.

Tim shouted up to Joe several more times. One of the approaching cavers, Sarah Springer, heard the shouting and spoke out to Tim. He told her that he needed help. Sarah passed the word up and in seconds Sean Vincent was making his way to the surface. At this point, Tim began to hear Joe moaning and trying to say something. Sarah continued descending into the room where Tim was. Tim quickly put on his ascending gear and climbed the standing line. Joe's moaning was coming from a point well below the lead, which frightened Tim. When

he finally saw Joe, he could see that he was wedged within a slot above a muddy ramp they had discovered during their previous trips. Joe's legs were slightly raised, his helmet was missing (it was later found and put back on his head), and smears of blood were on the left wall. Joe continually complained of difficulty breathing. Joe had fallen 12 to 18 meters, hit a steep, sloping ledge on the left, and then wedged into the slot above the muddy ramp. Tim climbed above the slot and then down climbed to Joe from behind.

Tim noticed that Joe was not attached to any rope. That was the first thing he decided to attend to, as it was very possible that Joe could slip down the ramp and off the wall. He made a quick overhand knot in the rope below him and attached Joe's harness to it. Tim then asked Joe about his injuries. Joe said, "Can't breathe. Left arm fucked." Tim tried to pull Joe through the slot, grasping his right arm. Joe yelled in pain, and Tim asked if that arm hurt as well. "Everything hurts. Do it anyway." With that, he pulled Joe and ordered him to kick if he could. He did, and he eventually came out of the slot and slid down onto the top of the

muddy ramp. There is a very uneven ledge at the top of the ramp that is barely large enough to sit on. It is not possible to lie prone, but Tim reasoned that this was the best place to attend to Joe's injuries. The only other alternative was to pass him the three or so meters through the slot and immediately rappel to the bottom of the wall. Joe was loudly complaining that breathing was difficult, so Tim focused on that problem.

Joe's seat harness had ridden up around his chest and was constricting his ribcage. This was a butt-strap type of harness without leg loops. Normally this type of harness (similar to the Petzl Rapide) utilizes an additional strap that goes between the legs, around the butt strap, and comes back through the legs to fasten to a buckle; this keeps the butt strap in place and prevents the harness from riding up. Joe had deleted this strap from his own harness when he made it.

Though Joe needed to breathe, Tim was wary of removing Joe's harness because of the danger of falling off the ledge. Joe was still somewhat lodged in the lower recess of the slot. The angle of the ramp was too steep to allow him to pull Joe up onto the small ledge. Time was short, so Tim decided to get him off the wall altogether, but noticed that there was weight on the rope below him.

From where Tim had down climbed, the rope had rested on two rocks jammed into the top of the slot. These rocks were holding the weight of the climber on the rope. Tim asked Sarah to get off rope but, new to vertical caving, she did not know how to change over to rappel while on rope. Tim told her to keep climbing, as he reasoned that he couldn't describe how to do a changeover successfully. He then left Joe and climbed out of the slot to meet Sarah and let her change over to his part of the rope. This proved impossible, as the rope was deeply jammed within the chock stones and it kept Sarah from climbing to him. Instead, he pulled her through a wide part in the slot below the chock stones.

Once on the small ledge behind Tim, Sarah attached herself to the rope above Joe with her cow's tail. By this time, Joe had lost consciousness but still seemed to be breathing sporadically. Sarah and Tim again tried to move Joe to the ledge so they could take his weight off of the harness and allow him to breathe, but Joe's body was covered with slick mud and the only place to grab him was his harness. Tim managed to stem the sides of the small ledge and pulled Joe

up several times with his legs alone. This worked to relieve some of the weight from Joe's harness for only a short time before he again slipped down into a lower position in the slot.

Once again, Tim made preparations to get Joe off of the wall entirely instead of continuing the futile effort to get him onto the small ledge. The rope needed to be removed from the chockstones and passed through the back of the slot and down the ramp. He did that, and then rappelled below Joe and clipped him into his cow's tail with two carabiners. By now it was painfully obvious that Joe was not breathing. It would have been very difficult to administer CPR in Joe's awkward position, so they didn't attempt it. Sarah is an EMT, and she confirmed that Joe had no pulse and was not breathing.

Regardless of Joe's condition, they were committed to getting him down at this point. Once on the ground, CPR could be given easily. Since the slot was very tight, it was difficult for Tim to see his Micro Rack, much less manipulate it effectively. He knew that he wanted it locked off when he took on Joe's full weight. He had to guide Joe down the muddy ramp, frequently pulling his legs out from under him and getting him unstuck.

Eventually, Joe slid out and onto Tim's cow's tail. Tim then rappelled with Joe to the base of the wall. The Micro Rack held both cavers' weight well, and the rappel felt safe. When Tim got to the bottom, he got Joe to a somewhat flat area and quickly looked for a knife to cut his harness off. Charley Savvas and Frank Delgado appeared at that moment and came to assist. Tim knew that Joe was probably dead, but said that he was trying to get his harness off and needed a knife. Charley produced one, and they moved Joe to a better spot and cut off his harness and cow's tail. Frank, a paramedic, examined Joe and concluded that he was dead. CPR was briefly given, but it was too late to matter.

The Recovery

Other cavers arrived from the surface with a SKED litter and other rescue gear, and Joe's body was packaged for hauling. Patrick Lynott directed the rigging of haul systems that were used not only on drops but also in the canal areas. Patrick, Charley, Frank, Sean, John Smiley, and Doug Mannoser moved the body up four rope drops to the bottom of the second drop, then left the cave to get some rest at around 0300 on the morning of 1 October.

Calls for assistance had gone out to cavers in central Texas at around 2300 on 30 September, and cavers began arriving at the site before dawn the next day. Law enforcement authorities had been notified during the night; they visited the site and closed the entrance with police tape to keep anyone from re-entering the cave until the Justice of the Peace arrived in the morning.

After clearance was received from the authorities, trained cave rescue personnel led by John Green, South Central Regional Coordinator of the National Cave Rescue Commission, went in to finish the recovery just after 1200. Besides John, these were Tim Comer, James Davis, Rod Dennison, Tommy Gillis, and Monty Strange. Rebecca Jones and Patrick Lynott rigged the entrance pit. Joe's body reached the surface at 1610, 1 October 2000.

Review

At 1700 Andy Grubbs, Bill "Carlos" Nasby, Peter Sprouse, and Kevin Stafford entered the cave to photograph the scene, collect the equipment from the lead climb, and de-rig the cave. They found much of Joe's gear lying on the floor and in muddy pools. While Kevin and Andy gathered gear, Peter took photos, and Carlos climbed up the bottom fixed line up the dome to have a look at the ledge area where Joe landed.

From Tim's description they knew this rope was tied to two bolts that had not been affected by the fall. The rope passed up a narrow crack to the steep, muddy slope. The rope went up over a rounded hump to the side, and was fixed to two bolts about eight meters above the mud ledge. From that point, a smaller diameter rope went straight up out of sight. The bottom end of it was tied to one of the two anchors; the top end was presumably attached to the two bolts that formed the belay point that Joe was using. The Slyde was not present at the bottom. Carlos tugged on it, and it felt solid, but at that time there wasn't any assurance that this rope would be safe to climb.

On 2 October, John Fogarty, John Green, Rebecca Jones, Missy Lynott, Patrick Lynott, Carlos Nasby, Charley Savvas, Jessica Snider, Peter Sprouse, Kevin Stafford, and Tim Stich met to analyze the gear that had been retrieved from the base of the climb.

Items Damaged in the Fall

1. The frog chest loop was cut at the point where it went through the Croll.

2. The belay rope was cut in two, half of which was recovered, the other half is presumably at the top of the climb.

Unfortunately the Croll was not found. This seems to have been lost in the mud as his body was being prepared for removal. No one specifically remembers removing it when the gear was removed from the body, but Joe's body was covered with heavy mud at the time. It would be useful to inspect the Croll for fall damage or rope fibers.

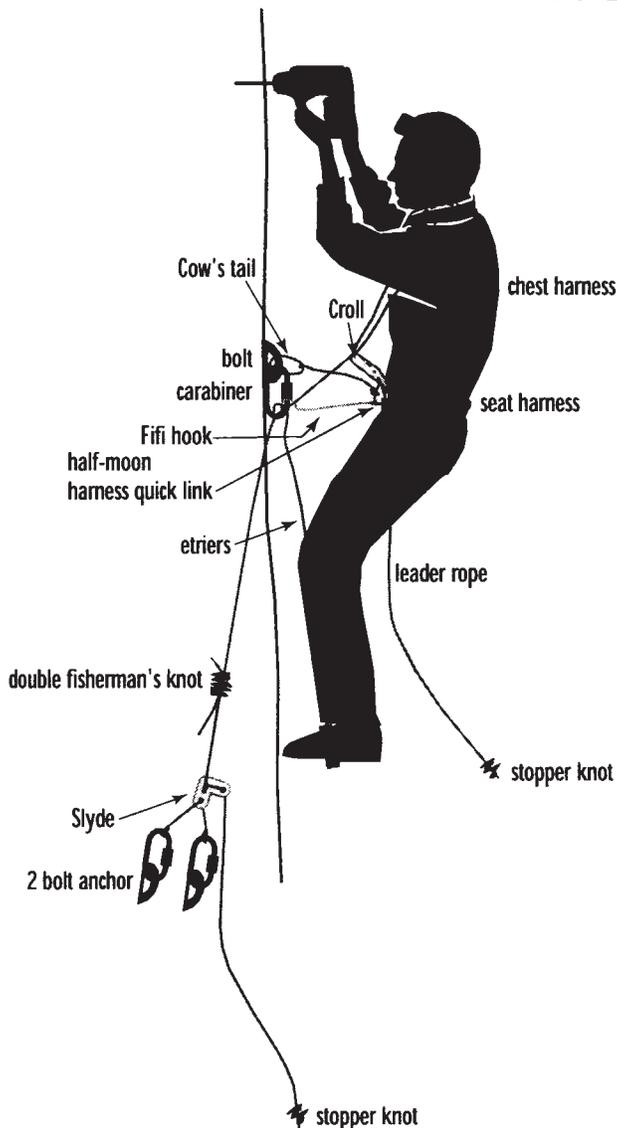
The cut lead rope was immediately seen as the cause of the fatality. The damaged area on the rope had 80 cm of core exposed, though due to stress on the core the actual length of this section of core prior to the damage may have been less. The core was puffy, bundles separated, and there were lumps where it had melted. The sheath was shoved down the core and had noticeable compression for 90 cm. It is assumed that the Croll cut the rope under a catastrophic load.

Gear Selection and the Belay System

Joe always looked for ways to improve caving techniques, and for this climb had developed a direct aid self-belay technique. In Joe's experience, more than one of his belayers on dome leads had fallen asleep or dropped him a long way during the many hours a climb typically takes. The climb in O-9 Well would have been especially dangerous to belay. The route corkscrews, making communication from top to bottom nearly impossible, and large chunks of mud were continuously knocked down to clean the wall for the drill. Self-belayed aid climbs are more common in outdoor rock climbing than caving.

One of the components that Joe decided to use was the shock absorbing Kong Slyde. This device had worked in previous falls in the dome, however the performance of friction devices of this type is unpredictable due to variables such as water or mud on the rope, orientation of the device at the time of loading, and friction added by pieces of protection and rock rub above the belay.

Joe also used a seat harness that did not employ individual leg loops, but rather was made up of two sewn webbing bands: a waist belt and a butt strap. Joe had used this harness - without the crotch strap to hold the butt strap in place - without incident in many minor falls. With the severe shock load, the butt strap came out of position and the entire harness rode up around his chest.



Self-belay lead climbing system used in 0-9 Well climb.

Possible Scenario

Joe climbed the second standing line and moved the self-belay setup to the highest two-bolt anchor. In the 30-45 minutes between the beginning of his ascent and his fall, he would have been able to drill and set a maximum of two pieces of pro. At the time of the accident, Joe's hammer was on his seat harness in the carabiner that held it, and his hammer drill was in its pack, which Joe used like a holster to keep mud off of it.

Joe was alone when he fell, and no one knows exactly what he was doing at that moment. This scenario is speculative, based on the evidence currently available. If and when it is possible to inspect the actual fall site, a more accurate account may be possible.

It is believed that Joe set one piece, probably a 3/8 inch RB. Joe had set the RBs in between bolts on the previous pitch, so it

is likely that he continued the practice. Following the steps, he would have put a carabiner with etriers on the RB, and stood up to pass a loop of slack from the lead rope into the carabiner. He would have ascended to the RB, put his fifi hook into it, and then readjusted and stood in the etriers. He may have drilled a second hole, put a bolt in with a hanger and carabiner, and again thumbed his Croll to get slack in the rope.

At some point during this process, the protection that Joe was hanging on pulled out, and he fell with very little rope out. This would result in a short fall that approached fall factor 2. [A factor 2 fall, falling twice the length of the rope, puts tremendous strain on equipment and climber.]

As Joe reached the end of his rope and began to decelerate, the first thing to break was the chest harness, which cut at its attachment point to the Croll. (The chest harness in the Frog system is not a life support component by design.) Joe's hips then slipped through his seat harness, which rode all the way up to his chest. There is no way of knowing how much cord, if any, traveled through the Slyde, since the rigging at the top has not been inspected. The few meters of wet 9mm static rope may have stretched as much as 10%. However, not enough energy was dissipated in these events, so the remaining force caused the cam on the Croll to cut the lead rope. Joe then fell free for 12 to 18 meters.

Flaws in this Belay System

Connecting the climber to the rope with an ascender was a major problem. Ascenders are designed for ascending, not belaying. Petzl's loading figures indicate that the Croll will cut a 9mm static rope at 4kN, a moderate fall.

Although Joe was aware of this data, he did not believe the failure mode of the Croll with the rope diameter he selected would be the complete cutting of the rope. Joe had expressed to Tim that he believed

that the rope sheath would be ripped and bunched while the Croll slid down core. Joe had several experiences where a Petzl ascender had cut a sheath in this manner, most dramatically when shock-loading an 8:1 haul system. The core was puffy and separated, but held. In this case, the load was removed after the sheath failed. The force in a fall will continue until expended in other ways.

Using a static rope for a leader belay, where high fall factors are by definition expected is dangerous, even with the addition of energy absorbing devices. The lead rope Joe and Tim used was 9mm static line. In standard lead climbing practice, the stretch in dynamic rope absorbs most of the force of a fall. 9mm dynamic rope is generally used doubled.

Testing conducted by Petzl shows that an 80kg climber taking a factor 2 fall on dynamic rope will generate a force of 9 kilonewtons (kN). [A kN is the force which gives to a mass of 1000 kilograms an acceleration of 1 meter per second squared.] Joe weighed more than 110 kg with his gear, increasing that load to 13 kN. A paper by Bill Storage and John Ganter suggests that these forces may be MORE than doubled by the use of static rope, bringing the impact force to greater than 26kN.

UIAA standards state that 12kN is the maximum acceptable force on a climber. Joe was exceeding this figure, even assuming a standard belay system. The tremendous forces involved in this fall would have caused severe injuries even if no equipment had failed.

Relying on the Slyde to absorb all the energy of a fall was a miscalculation that did not consider the worst case scenario fall. Whether because of its inherent functional limits or because of the method of application, it was not able to absorb sufficient energy. In the earlier, less severe falls, the Slyde had worked adequately, but had used all the available cord.

There are several devices available, designed for industrial applications, which absorb the energy of a fall onto static rope and limit the force on the climber to less than 12 kN. Further, the rock climbing community has developed self belay systems for aid climbing, which closely approximates the conditions of bolt climbing in caves.

Modifying the seat harness for comfort was a bad thing. Preliminary information suggests that the damage to Joe's ribcage was the immediate cause of death. As of 27 December, the autopsy report is still not available, but other severe injuries

from the fall would likely have resulted in Joe's death as well.

Even if the rope had not broken, it is likely that hanging suspended by the harness around the chest would have had serious consequences. It is questionable whether even an uninjured person could recover from this position. Without immediate assistance from a partner - unlikely in this case since Tim was alerted to the accident by the noise of the impact and the absence of light at the top of the climb - Joe could have died hanging in his harness.

Joe was using a caving harness, designed to maintain a low point of attachment for efficient ascending. Climbing harnesses are designed to maintain a head-up position and to distribute the energy of a fall to the body in the least damaging manner.

RB Performance in Cave Conditions

The problem with placing RBs during this dome climb was that they performed erratically in the cave. It was nearly impossible to keep them clean before inserting them in the drill holes. Muddy hands, random patches on clothing, and the mud and water covering the cave wall almost assured contamination. The hardness of the limestone varied, as is common in caves, and the integrity of the rock affects how well an RB will hold. Wallowing out the hole with the drill also negatively affects RB performance. RBs were, however, quick to place and did hold in many cases without trouble. One 3/8-inch RB placed in an overhang caught Tim's fall, which attests to the device's po-

tential performance. Overall, the small time and weight savings in using RBs is questionable, given their unreliability in cave rock. It takes only a few more minutes to install a bolt.

Joe and Tim used Climb Tech Removable Bolts, and they each fell when these pulled out. In every fall, they had the benefit of several pieces of protection prior to the RB placement, thereby reducing the fall factor. Tim found the fall he took to be fairly soft; he was able to immediately continue bolting and was not unduly shaken by the experience. Joe was similarly unconcerned about the force of his own two falls and did not see a need to redesign his belay system to handle more energy. Both Joe and Tim stopped using the 3/8-inch variety after the first trip, and by the last trip, Tim had quit using RBs altogether, though he blamed their failure on mud and water contamination of the holes. *Through their experiences of falling, they became wary of the performance of the RBs, but developed more trust in the belay system.*

Lessons Learned

A mechanical ascender should never be used as a primary part of a belaying system, no matter how many subsequent devices are added to absorb the energy of falls.

Static rope is unacceptable in a system to belay a lead climber. Dynamic rope of 10mm or larger diameter should always be used.

A single energy-absorbing device is not reliable in a dynamic system.

Climbing harnesses should be used when anticipating falls; caving harnesses are intended for ascending only.

Although counterintuitive at first glance, a short fall at the beginning of a pitch can be the most dangerous because of the potential for a factor 2 fall. [In rigging fixed ropes for caving, where there is no energy-absorbing mechanism, it is essential to design and rig anchors to minimize potential fall factors.]

Removable bolts, if used at all in caves, should be used with extreme caution, as they perform poorly under wet and muddy conditions.

Conclusion

The fact that some falls of lesser force had occurred before the

accident led the climbers to feel that the belay system was adequate; however, these falls were too few to actually validate the technique. Planning an ascender belay, which was believed would "only" result in the stripping of the rope sheath, was poor judgment from the start. Joe's death was due to his own actions and the judgments he made in designing and applying his belaying system. No piece of gear failed in a way that was not known to happen. The belay system design was perilously flawed in that it did not allow for the force of a factor 2 fall. A belay system should be designed to handle the maximum fall possible. The good performance of the belaying system on gentler falls helped foster a sense of complacency in the climbers. Overconfidence kept them from continually questioning their system and methods.

For the complete accident report, details of the recovery, and all related links, see www.texasroperescue.com/0-9

JOE [from p. 161]

of e-mail messages notifying Joe's many friends of the sad news, I got a note from Gary Poole, who took Joe on his first survey and serious caving trip in Honey Creek Cave. Gary had dropped out of caving for several years and had recently returned to the grotto. He wrote:

"Before I started going to the caving meetings my last memory of Joe was that of a kid, a high schooler. Then there he was at the meetings, a man of accomplishments and skills, someone that people depended on and respected. I'm sorry that I didn't get to see him change from that kid into that man."

I've written this biography because most people don't have that perspective. To many cavers, Joe had always been a superhero like Kamikaze Bob. He was strong, brave, skilled, funny, irreverent, dependable, smart, and seemingly indestructible. We all have a tendency to see people like that and think their skills came naturally and with little effort. Joe was not a natural. He struggled hard, overcame his fears and shortcomings, and dedicated his life to meeting the high goals he set for himself. He was a true role model for us all. And that makes his loss sadder, greater, and a truly Ivy-sized hole in our community.

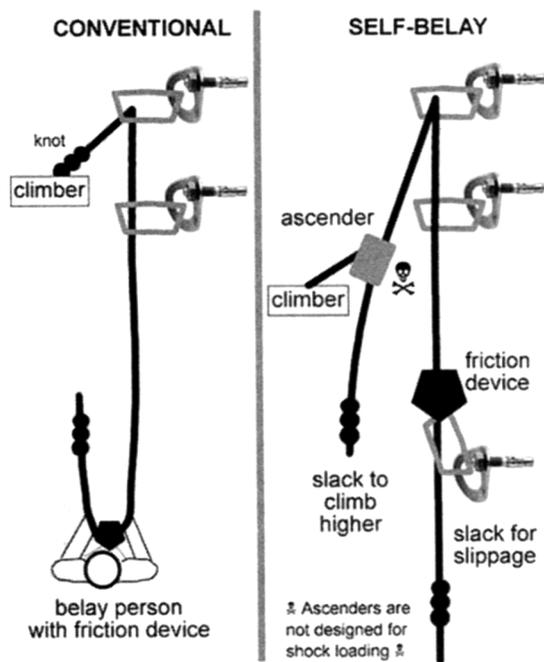


Figure may also be viewed at www.texasroperescue.com/09

TRIBUTE

Joe Ivy: From "09" to O-9

BY George Veni

Joe the 0-9er

"Hello Mrs. Short. Is Eric home?" said the polite, soft-spoken 15-year old boy. "No. He went to the cave over on Cave Lane. Some spelunkers are cleaning it up and are offering tours of the cave afterward."

The cave had been off-limits to the nattily dressed young man. His father, the Vice-Principal of Alamo Heights Middle School, had warned him away from there. Kids were always sneaking off to skip school and smoke dope in the cave. At least since Eric had the permission of his parents, Joe Ivy now had a legitimate excuse to satisfy his curiosity about the cave.

When Joe arrived at Robber Baron Cave on 17 January 1981, he was barely noticed by most cavers. He was just another preppie gawker who was curious about the sinkhole cleanup effort, but who didn't seem to want to get his hands dirty. He fit the neighborhood stereotype. For those who even bothered to notice him, Joe was "a typical 0-9er," as residents of the affluent San Antonio suburban town of Alamo Heights were known for their exclusive 78209 zip code.

Perhaps he wasn't so typical. In the coming weeks Joe spoke to his high school buddy, Eric Short, about caving. Eric had jumped into caving following his introduction at Robber Baron. For about a year Joe listened to Eric's tales of adventure. He attended a grotto meeting or two, went crawling into Robber Baron and a couple of other small caves, but he didn't have much time for caving. He was too involved with high school activities, such as his successful efforts at becoming the next year's high school band drum major.

By 25 July 1982, his interest slowly grew in things underground, and Scott Harden, Dottie Kern, Gary Poole, and Randy Waters took him on his first "big" caving trip and first survey trip, the QA passage in Honey Creek Cave. Joe didn't fully realize it for some time, but the trip was a near-disaster for his caving future. He arrived late at the cave and with too little sleep and too little preparation. He was clumsy, awkward, and slow to learn and slow to cave, more so than was typical for most novices. He would soon earn the nickname "Slow Joe" for his molasses pace of caving.

If Joe would have realized how poorly he performed on that first survey trip, he might have quit caving out of embarrassment. However, Randy saw a spark in Joe and reluctantly took him back to Honey Creek and other caves when few others would. This was still the case a year later. I'd been in graduate school in Kentucky for the previous six months, when I returned for the summer of 1983 to work on my thesis and the upcoming *The Caves of Bexar County*. I had many caves to survey and most cavers couldn't get away from work during the middle of the week to help. Despite mixed reviews I'd heard from others, Randy pushed me to enlist Joe for help. Out of necessity, I did.

We surveyed nine caves in about seven

weeks, and searched for and dug in many more. Like his mixed reviews, caving with Joe proved a mixed pleasure at first. He lived up to his 0-9er stereotype, was reluctant to get too dirty, and would not go into caves with "too many" harvestmen at the entrance unless I chased them out first. But with each trip, I saw small changes and was periodically surprised to see Joe push himself beyond his 0-9 background to become a caver.

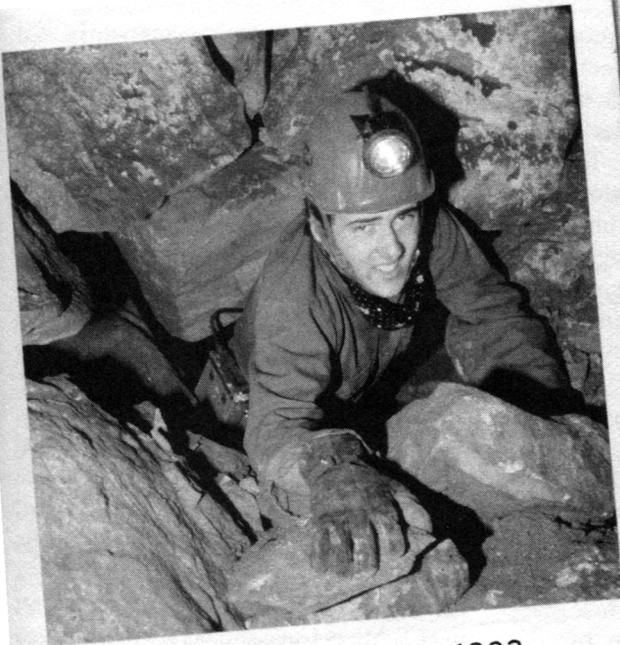
Joe the Caver

By 1984, Joe was a regular caver and a core member of the Bexar Grotto. He had written reports for *The Texas Caver* and had begun to lead his own caving trips. He had made a couple of trips to Mexico and was psyched to take on the big vertical pits. During the 1984 Thanksgiving holiday, Joe joined a trip to Hoya de Guaguas to rappel down the 202-meter-deep high side of the pit and climb up the 147-meter-deep low side. As he backed up to the edge of the awesome pit, some watching cavers began to wonder if they were seeing the beginning of the end of Joe's caving career. He was frozen there. He was given encouragement to go down and honorable excuses to stay on top – just do something! After 55 minutes at the edge, Joe finally rappelled down.

This was a turning point in Joe's caving. He overcame his fear and was rewarded with the exhilaration of hanging in a vast, beautiful space, where six meters down the lip, the pit cuts back 80 meters into the giant sunlit room. A month later during the Christmas holidays, he was at Sotano de las Golondrinas. It's about twice the pit that Guaguas is and, while Joe was still slow crossing the lip, he did it in less than half the time, 25 minutes.

In 1985 Joe led his first cave surveys and drafted his first maps when he and Allan Cobb surveyed Assassin Cave and Cub Cave in Bexar County. Throughout that year and the next, he continued to survey more and cave more intensively throughout Texas and Mexico. More often than not, he was now leading the trips instead of tagging along.

The "Slow Joe" reputation began to fade by 1988 and was replaced by a new term on the caving scene: "Ivy-sized." As Joe reached manhood, he grew stout and larger than most of his companions. During



Joe in Frio Queen, 1983

J. Jasek, photo

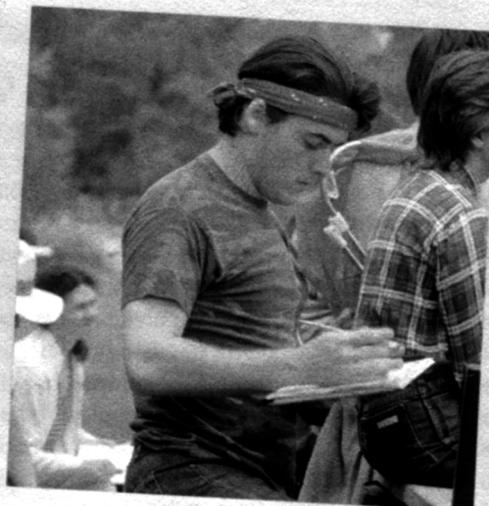
a 1987 Christmas trip to Mexico, Joe began to release his frustrations on offending rocks and limestone walls that kept him from following his companions and the airflow in a new cave they found near Cueva de la Puente. Joe proved an unrelenting force and would not give up until he could get through. He felt that to give up there because of his size would be to give up the push for virgin cave everywhere, and he had become too fond of new discoveries to give up, ever. Since then, cavers now regularly point out formerly impassable or barely passable constrictions in Texas and Mexico that are now comfortably Ivy-sized.

In the late 1980s to mid-1990s, Joe led many trips and helped with many projects. He made his first trips to O-9 Well and Montgomery Gypsum Cave in 1988. He began a close association with several TAG (where Tennessee, Alabama, and Georgia come together) cavers in 1989 and enjoyed the many deep and wet caves in that area. Also that year, he co-led a trip to check out the caving potential of Potrero Redondo near Monterrey, Mexico. One of those trips was made famous by hurricane spawned rains and epic road-building efforts to escape the mountains. He assisted with several projects as well, making his first trips of many to Powell's Cave in 1989, Sorcerer's Cave and Colorado Bend State Park in 1991, Government Canyon State Natural Area in 1994, the Tequila Project in Veracruz, Mexico in 1995, and Proyecto Espeleológico Purificación in Mexico in 1996.

Joe the Artist

When Joe graduated from high school and went to college, he began as a geology major but later pursued a degree in graphic arts. Joe had long enjoyed drawing and among his first contributions to *The Texas Caver* were a couple of cartoons in 1983. The characters were well drawn, squat and stocky on a fairly bare, static background. They reflected Joe's modest approach to life. They were a far cry from "Kamikaze Bob," the caver superhero who first appeared in *The Texas Caver* in 1987. This cartoon was in the style of an action comic book, with dynamic characters, background, and layout, and was in sync with Joe's developing outgoing style. For a few years, many cavers didn't know that "Mud," the artist's named signed on the Kamikaze Bob cartoons, was Joe.

By 1988 Joe changed his degree plan but still continued to produce innovative and creative cave art. He designed my business



TSA Survey Workshop, 1983.

J. Jasek, photo

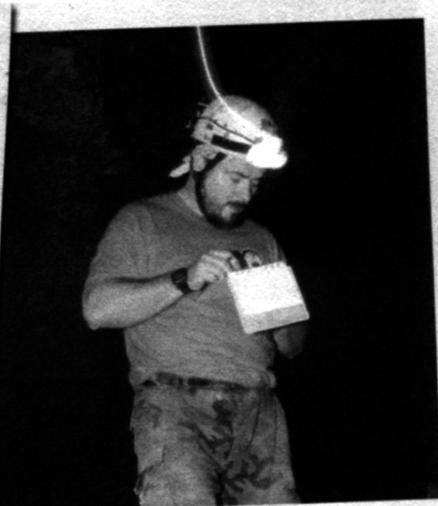
logo that year. We sat at Taco Cabana discussing the scope of my new karst consulting firm, and he quickly cut to the heart of the matter with an image that captured the essence of the business. Thirteen years later, I'm still getting compliments about his logo. In 1989, Joe drew the banner of *The Bexar Facts*, the newsletter of the Bexar Grotto; it was used for 10 years. Three years later he sketched a creative design for the grotto T-shirt, which is still popular considering the grotto is currently printing 100 new shirts. Much of Joe's published artwork during the 1990s were sketches of caving gear and techniques to clearly illustrate their proper use and execution.

Joe's artistic temperament took a different turn in 1999 when he and Becky Jones began to edit *THE TEXAS CAVER*. Together, they produced eight attractive, informative, and on-time issues, a brief but impressive record that many editors of caving newsletters can't claim. Joe's last article on sketching was the clearest and best-written article on the subject I've ever read.

Joe the Expedition Leader

From an initially unassuming lad, Joe quickly established a strong personality and the ability to lead people. He was to-the-point, knowledgeable, assertive, and not afraid to tell you what he thought. Some people were put off by this attitude, especially if they disagreed with him. But even those who disagreed with Joe respected his honesty since they knew where they stood.

The growing respect for Joe was obvious early in his caving career when he was voted Chairman of the TSA in 1985 and to a



Natural Bridge Caverns, 1999.
Joe surveying in the South Caverns.

B. Vauter, photo

second term in 1986. During his two terms, he gained needed experience in organizing and managing cavers and caving projects. In 1987 he organized several cavers to survey Schwarzs Cave, a stream cave in Kendall County. Later that year, he organized the first caving project held at Kickapoo Cavern State Park.

Since 1985, Joe had led several trips to Minas Viejas, the old mining area and ranch on the mountain range east of Bustamante, Mexico. Various cavers had visited the mountain over the years, but Joe encouraged the first systematic approach to checking out the area's potential. In late 1989, he had a major project on his hands due to his persistence. At the bottom of the biggest cave known on the mountain, Joe spied a high lead up one wall. He trained to develop bolt climbing skills and on 7 October 1989, climbed 10 m up from the bottom of Pozo de Montemayor to find a short passage to the Argo Well, a 106-m-deep pit. Over the next few years, Joe pushed the cave to a surveyed depth of 515 m, making it by far the deepest cave in northern Mexico.

He continued joining other projects and expeditions in leadership positions and made substantial contributions. In 1993 he joined the Sistema Cuicateco (Cueva Cheve) project, one of the deepest caves in the world, located in Oaxaca, Mexico. Back home in Texas, Joe renewed cavers' interest in H.T. Miers Cave and bolt climbed a high dome at the back of the cave in 1995. During the spring of 1996, he led the survey of a major cave for the Socunusco Project in Chiapas, Mexico. A year later, after an encounter with masked, armed, Zapatista rebels,

he decided to put off caving in Chiapas until the political situation improved!

Joe began a resurvey of Cueva de la Puente, one of his favorite caves, in 1997. The cave had long been written off as a relatively short, but fun cave in San Luis Potosi, Mexico. From his earlier trips to the cave, he knew there had to be much more to the cave and by applying his usual careful, systematic survey style, he proved himself right. Finding and pushing some obscure leads, Joe extended the cave to nearly eight kilometers in length and through some spectacular rooms and passages. You don't recall hearing about this spectacular stuff? Joe was more concerned about protecting the cave than generating fanfare.

Joe the Vendor

Like many cavers, Joe became frustrated with the design and limitations of his caving gear. Most cavers experiment to some degree with improving their gear, and Joe was no different, except that he took this much farther than most. In 1987 he tried his hand at making his own pair of caving pants and was pleased with the results. Encouraged, he experimented with other equipment, climbing systems and harnesses, and sought improvements so the gear would stand up to hard, expedition-level caving. In 1989, Joe and Linda Palit started Gonzo Guano Gear – “Gonzo” for the type of caving the gear was meant for, and “Guano” more for Linda's now late dog by that name, rather than the stuff you often find in caves. Joe handled much of the work, including the sewing and design of equipment. “GGG” became a regular fixture at TSA and NSS Conventions. Much of GGG's success was due to Joe's dogged determination to personally “trash” every piece of equipment he made or sold by harsh caving conditions in order to find its flaws and limits. He earned and deserved the confidence of his many customers. In 1996, Rebecca Jones became Joe's new partner at GGG.

Joe the Rescuer

As Joe began caving in increasingly remote areas and in increasingly difficult caves, he became acutely aware of cavers' vulnerability should accidents occur. In the early 1990s he signed up for National Cave Rescue Commission (NCRC) cave rescue courses. By 1993 he was actively assisting with NCRC rescue seminars in Texas and other states, and became the rescue coordinator for Sistema Cuicateco, significantly raising the rescue skills and safety levels of

the cavers involved.

Joe became the Texas Regional Coordinator of NCRC in 1995 and held that position for three years. During that time, he organized more cave safety and rescue training seminars in Texas than had been held in the past 20 years combined. Taking his position to heart, and even after he retired as Texas Coordinator, Joe published 19 well-written articles in *The Texas Caver* on cave safety, vertical training, and a brutally honest equipment review column called “The Inquisition.” In the late 1990s he was increasingly called to professionally teach classes on vertical techniques for outdoor and adventure groups.

One aspect of cave rescue to which Joe was especially dedicated was what he concisely termed “small party self rescue.” Joe understood that whether cavers were in the mountains of Mexico or the desert of west Texas, any real help for a rescue could be tens of hours or even days away. He felt it critical that effective techniques be developed for cavers to rescue themselves when necessary in remote areas or in critical situations where time was short. During the 2000 NSS Convention in West Virginia, his paper on harness hang syndrome was widely praised, as was a demonstration of new pick-off techniques where a small Becky quickly, safely, and single-handedly “rescued” a much larger Joe from hanging “unconscious” in his harness on the rope, and lowering him to the floor. These and other techniques and information were staples of a book that he was preparing on small party self rescue, which he planned to publish within a couple of years.

Joe the Karst Consultant



R. Jones, Photo

With his passion for caving, Joe understandably tried to find work involving caves and karst. He changed his college major from graphics arts and around 1991 got his degree in Geography and Environmental Management from Southwest Texas State University. He worked as a hydrology technician for the Austin office of the U.S. Geological Survey from 1987 through 1989. Most of his professional karst work was as a subcontractor for George Veni and Associates. He was with me on my first job in December 1987 and was working for me the day before he died. I was very lucky to have him available. He was the master rigger where technical caves were concerned, he searched for and surveyed caves, dug open sinkholes, blasted expertly, collected hydrologic and geochemical data from caves, wells, and springs, ran high-tech GPS equipment, and conducted intensive biological monitoring surveys with Bill Elliott.

Joe could do it all and well. The NSS recognized his accomplishments by awarding him as a Fellow of the Society in 1997. His skills in and dedication to cave biology were also recognized. In 1992 I called to tell him that he and I were forever linked. “What are you talking about?” he asked. I explained that a mold beetle we collected together in 1984 turned out to be a new species and was named *Batrisodes excavodes venyivi* after the two of us. He responded with his trademark, “THE HORROR!”

Joe the O-9er

During his last few years, Joe developed a renewed interest in exploring O-9 Well. He was not only interested in pushing the cave but in developing and honing new techniques for use in larger caves in Mexico. He also used the cave for small party self-rescue training and surprised many people when he demonstrated in January 2000 that he could package and remove an injured person from that deep, wet, and technical cave in about six hours. Ironically, Joe was the direct recipient of his mock rescue training when those he taught and worked with at O-9 played key roles in recovering his body from the cave.

Joe's death was a harsh blow to many cavers throughout the U.S. and Mexico. The town of Hondo is still talking about his memorial service that filled the never-before-filled giant funeral parlor, not only with nearly 300 people, but people hailing from at least six different states. During the flurry

Joe Ivy References in *THE TEXAS CAVER*

Compiled by Julia Germany, Jim Kennedy, and Logan McNatt

Joe Ivy had a tremendous impact on Texas caving in the 18 years he caved with us. We scoured back issues of *The TEXAS CAVER* for material by and about Joe. We discovered 86 references, but undoubtedly missed a few. Joe himself contributed 56 of those. His contributions to the *CAVER* included one letter to the editor, one poem, three cartoons, six feature articles, three trip reports, three editorials, thirteen equipment reviews, six cave rescue articles, four articles on vertical techniques, two cave maps, over ten photos, and one cave accident report. Joe's work was frequently reprinted in other publications. In addition, Joe and Rebecca Jones co-edited the last eight issues of *The TEXAS CAVER*. Watch for a few more of Joe's articles in future issues of *THE TEXAS CAVER*, including a long-awaited short story.

Waters, Randy. October 1982. Honey Creek Cave. 27(5):98. [first mention of Joe in a trip report]

Ivy, Joe. April 1983. Letter to the Editor. 28(2):35.

Ivy, Joe. August 1983. *Subterranea Amo* (poem). 28(4):70.

Ivy, Joe. October 1984. Isopit, Bexar County, Texas. 29(5):34-35.

Cobb, Allan. December 1985. Cover photo (Honey Creek Cave - shaft entrance). 30(6):117. [first appearance of Joe on the cover]

Ivy, Joe. February 1986. Sotano de Tlamaya. 31(1):20-21.

Ivy, Joe. April 1986. Bexar Grotto Report (trip reports) 31(2):43.

Mud. [Joe Ivy] April 1987. The Adventures of "Kamikaze Bob" (cartoon). 32(2):32. [Joe's first cartoon in *The Texas Caver*]

Mud. [Joe Ivy] August 1987. The Adventures of "Kamikaze Bob" The Super Caver (cartoon). 32(4):80.

Mud. [Joe Ivy] December 1987. The Adventures of "Kamikaze Bob" The Super Caver (cartoon). 32(6):140.

Jorden, Jay. February 1988. The Continuing Saga of Indiana Joe and the Cavern of Doom starring Slow Joe Ivy (cartoon). 33(1):20.

Ivy, Joe. April 1988. Cueva de la Puente, San Luis Potosí, Mexico. 33(2):45-46.

Gonzo Guano Gear. June 1991. Advertisement. 36(3):67. [first appearance of GGG ad]

Ivy, Joe. February 1992. The Mexican Ropewalker. 37(1):9-10. [includes a "Kamikaze Bob" cartoon]

Ivy, Joe. June 1992. Proyecto Montemayor Expedition. 37(3):50-51.

Hambright, Robert N. March 1993. NCRC: Level I Seminar. 38(1):3-4. [documents Joe's involvement]

Ivy, Joe. September 1993. A Regional Cave Rescue Seminar Comes to Pass. 38(3):52-54.

Ivy, Joe. September 1994. What About Cave Rescue and the NCRC in Texas? 39(3):78-79.

Ivy, Joe. March 1995. The Inquisition: Petzl Pompe Ascender. 40(1):24.

Ivy, Joe. March 1995. Cave Rescue. 40(1):25.

Ivy, Joe. June 1995. The Inquisition: BMS Micro Rack. 40(2):67.

Ivy, Joe. September 1995. The Inquisition: Petzl Duo Headlamp. 40(3):90.

Ivy, Joe. March 1996. The Inquisition: Sterling Rope and Cancord Polyester Rope. 41(1):6.

Ivy, Joe. March 1996. Rock Exotica Mini Prusik-Minding Pulley. 41(1):7.

Ivy, Joe. June 1996. The Inquisition: Cancord Polyester Rope. 41(2):41.



Joe & Beck in SimaDarwin, Chiapas, Mexico

Ivy, Joe. September 1996. Cover photo: Pozo de Montemayor, Nuevo León, Mexico. 41(3):45.

Ivy, Joe. December 1996. The Inquisition: Omega-Pacific Omegalite 3 Locking Carabiner. 41(4):84.

Ivy, Joe. January/February 1997. Pickoffs. 42(1):14.

Ivy, Joe. March/April 1998. Sotano de las Golandrinas: Pit Bopping in one of Mexico's Newest Regional Parks. 43(2):29, 35.

Ivy, Joe. March/April 1998. The Inquisition: Kong-Bonaiti Speleo Descender. 43(2):30.

Ivy, Joe. May/June 1998. Cheve '98. 43(3):41, 51.

Ivy, Joe. May/June 1998. The Inquisition: 1998 Petzl Ascension. 43(3):47.

Ivy, Joe. July/August 1998. The Inquisition: UK Mini Pocket Light. 43(4):59.

Ivy, Joe. November/December 1998. Map: Pozo de Montemayor. 43(6):93.

Ivy, Joe. January/February 1999. Rappelling 101: Getting Down a Rope Without a Lot of Nonsense. 44(1):5-6.

Ivy, Joe. January/February 1999. Small Party Self-Rescue Course. 44(1):7.

Ivy, Joe. May/June 1999. Rappelling 101: Using a Bobbin Descender. 44(3):40-41, 46.

Ivy, Joe. May/June 1999. The Inquisition: Petzl Tibloc Ascender. 44(3):46.

Ivy, Joe. July/August 1999. The Inquisition: Kong Lift Ascender. 44(4):70.

Ivy, Joe. September/October 1999. Accident Report: Sotano del Aire. 44(5):80-81, 92.

Ivy, Joe. September/October 1999. Rappelling 101: Using an Open Frame Rack. 44(5):85-87, 92.

Ivy, Joe. September/October 1999. The Inquisition: Petzl Duo Belt headlamp. 44(5):91.

Ivy, Joe. November/December 1999. Inquisition: Kong-Bonaiti Cam Clean Ascender. 44(6):115.

Ivy, Joe & Rebecca Jones. March/April 2000. Editorial: Preservation, Recreation, Conservation. 45(2):27.

Ivy, Joe & Rebecca Jones. May/June 2000. Editorial: One Big Happy Family? 45(3):55.

Ivy, Joe. July/August 2000. The Sketcher's Burden. 45(4):86-87.

Ivy, Joe. September/October 2000. Editorial: To Make A Map. 45(5):115.

Veni, George. November/December 2000. Joe Ivy. Obituary. 45(6):143.

Jones, Rebecca & Peter Sprouse, eds. November/December 2000. Accident Report: Joe Ivy. 0-9 Well. 45(6):154-158.

Veni, George. November/December 2000. Joe Ivy From "09" to O-9. 45(6):159-161.

Ivy, Joe. January-March 2001. Harness Hang Syndrome. 46(1).

Ivy, Joe. July-August 2001. A Caving Short Story. 46(3).

TSA Fall Business Meeting

Submitted by Robin Barber

The meeting was called to order at 10:30 AM.

OFFICER REPORTS

Chairman: The Chairman was not present.

Vice Chair: Nothing to report.

Secretary: Nothing to report.

Treasurer: Aimee Beveridge reported that proceeds from the spring convention brought us out of the hole. The bookstore brought in \$700. The money from the auction has been earmarked for publication expenses.

A special \$20 membership rate for students will be introduced. Libraries and out of state cavers may subscribe to the Caver for \$20 a year, without the ANL. Regular membership will remain \$27 for individuals and \$35 for families.

The land fund has about \$2000 in it now. This is a good time to get the money out of a money market and into a mutual fund. This will be looked into.

COMMITTEE REPORTS

Publications: *THE TEXAS CAVER* is healthy. Rebecca Jones will continue to be content editor. Brian Vauter will be taking over as production editor.

Curtis Vaughn and Russ Johnson are considering publishing the *TSA Activities News Letter* every other month.

The TSA Webpage: Ann Marie Milkowski



THE TEXAS CAVER editors at Minas Viejas.

says that bookstore sales have not been good over the webpage, but the webpage has generated \$29 through sponsoring links to companies. There are now five people using the server texascavers.com as their web address.

Membership Committee: The membership renewal cards that were sent out were a big success with getting members to renew. This has resulted in a lot of revenue for TSA.

Safety Committee: We regret to announce that the chairman of the safety committee, Joe Ivy, died in a caving accident. Rebecca Jones will be taking over as safety chair. This committee will now focus on safety and training, rather than rescue.

TSA Bookstore: The bookstore has done good business this last period.

Constitution Committee: Rebecca Jones reported that the proposed constitution was reviewed by Bill Mixon, who pointed out that the TSA is an internal organization of the NSS. The changes needed to reflect this will be made and the constitution will be reviewed again.

PROJECTS

Powells – People are needed to start drafting the map. A set of standards will be given and the maps may be drawn with any method the cartographer chooses.

CBSP – started back up last month. Still going strong with good participation.

Bustamante – Bustamante was a success once again this year. The project will continue next year as long as politics remain good with those in charge.

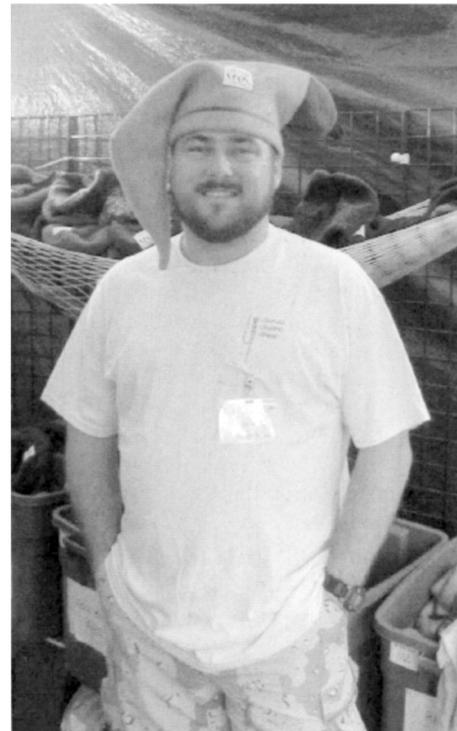
OLD BUSINESS

TSA Webpage – One dollar from every membership will go to paying for the webpage. Bill Bentley has graciously been paying for the webpage himself.

NEW BUSINESS

Jim Kennedy reported that people are needed to help gate a cave around Kickapoo Caverns. This will be taking place shortly. Also, he has been talking with the current manager and is starting to gain access for the caving community again.

Cathy Winfrey suggested that Texas submit a proposal to host a NSS Board of Governors meeting. This will probably not happen for a couple of years and she is willing to act as lead for that endeavor. Having the meeting



Joe Ivy at NSS Convention 2000

here will help the BOG members to become familiar with Texas caving issues.

The subject of grotto representation was brought up again. Each grotto is encouraged to have a representative at TSA functions. There has been no response from any of the grottos yet. The membership committee needs to do handle this.

OFFICER ELECTIONS

Nominations were solicited on CaveTex. If the nominee agreed to serve, then they were asked for a paragraph about themselves. Next year this will be done via snail mail rather than at TCR so that the entire membership can be represented.

Most of the votes this time were from members. Not everyone voted in every category. There were some miscounts at TCR that were corrected the day after the meeting. The corrected values are reflected below.

Chairman: Terry Holsinger

Vice Chair: Ron Ralph

Secretary: Felicia Vreeland

Treasurer: Allan Cobb

The new officers take charge in January. The time and place for the next meeting have not been determined.

Meeting was adjourned around 11:30