



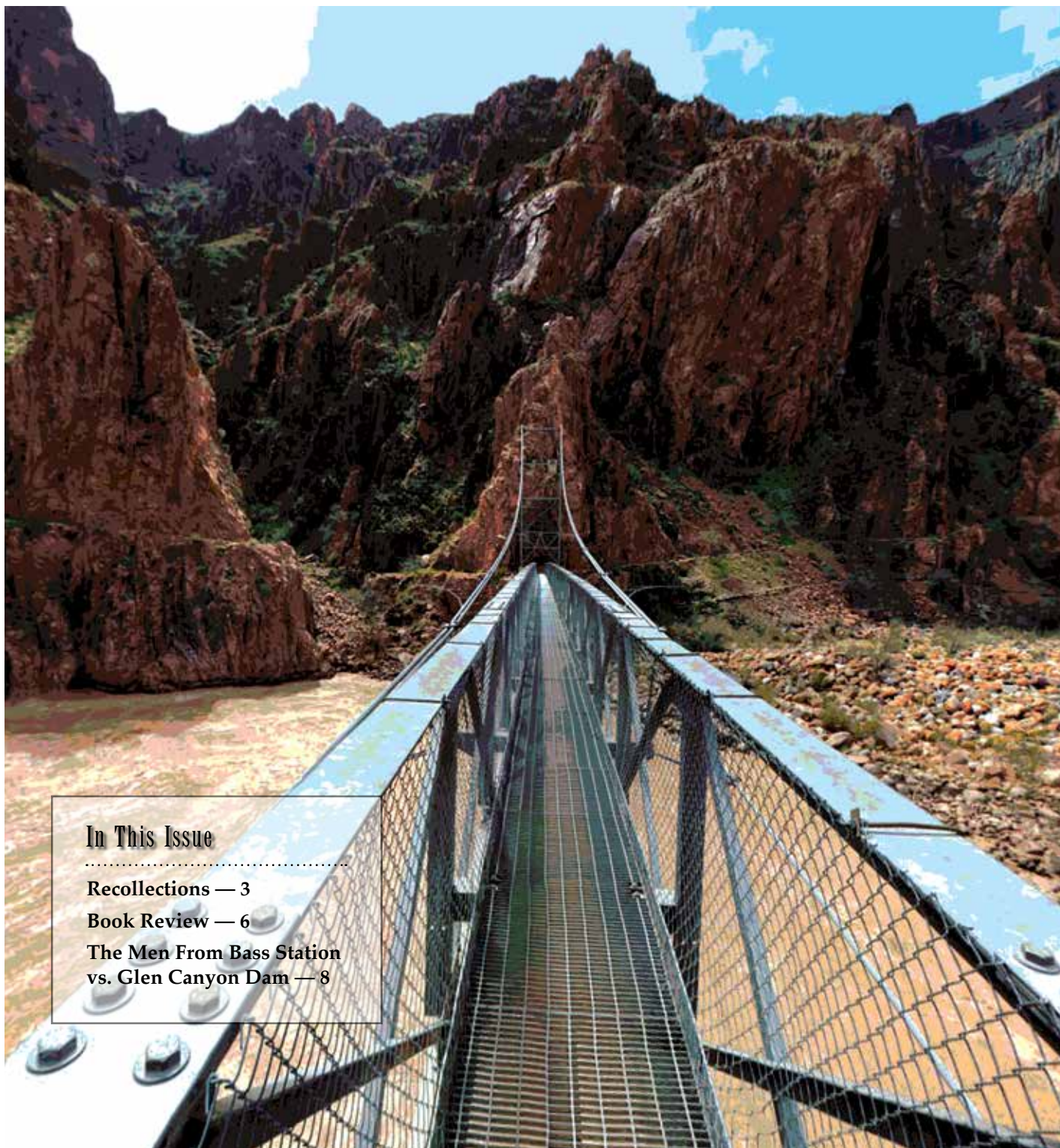
The Ol' Pioneer

The Magazine of the Grand Canyon Historical Society

Volume 26 : Number 1

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Winter 2015



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President's Letter

In November, a new Board was elected to serve the Grand Canyon Historical Society. Some new (and perhaps familiar) faces will serve on the 15-member GCHS Board, elected by you - members in good standing: Jon Streit, General Manager for Xanterra at Grand Canyon National Park, Steven Landes, the Principal of Grand Canyon Schools, Jack Pennington, Programs Manager for the Grand Canyon Field Institute, and Dave Mortenson an avid historical river boatman whose father made Dave one of only 1,800 people to raft the Grand Canyon before Glen Canyon Dam. The Board also welcomed back for second terms: Kathy Farretta, a longtime northern Arizona historian and volunteer extraordinaire, and myself, a former Grand Canyon backcountry ranger, river and trail guide, and author. Amy Horn, former archaeologist at Grand Canyon, is back after being one year away from the Board. Thank you to all of these *volunteers*, who give of their time to guide this increasingly important constituency of Grand Canyon National Park.

At the November Board meeting held with the new Board seated in the Community Building at Grand Canyon Village, a number of important action items were discussed and voted upon. As many of you will be aware, the National Park Service celebrates their 100th anniversary in 2016 and staff at Grand Canyon National Park have asked associated organizations (called Partners) to help with planning to commemorate the occasion. The Board voted for GCHS to be involved and to commit resources to an additional milestone to be observed in 2019, the 100th anniversary of Grand Canyon National Park. To put this important action in perspective, a previous Board voted a year or two ago to continue with the tradition of holding a multi-day history symposium every five-years, and which would have taken place in January 2017. The new Board however, after hearing a presentation by Kirby-Lynn Sheldowski, NPS Public Affairs coordinator for both events, elected to move our anticipated and seminal event "forward" by two months, such that a still loosely defined "event" or "events" will occur in or around November 2016.

Ideas that were discussed included organizing a smaller history symposium of perhaps one-day that might spotlight the National Park idea. NPS has been charged with finding ways to engage the next generation park enthusiasts (the 18 to 35 demographic), so this might serve as a focus for us as well. Many other well-known Partners will be involved and include among others National Geographic, Discovery Channel, Outside Magazine, and Leave No Trace. The Board decided that to sit on the sidelines for the 2016 commemoration would be a huge opportunity lost. It was suggested that the GCHS might also partner with Arizona Humanities to bring lectures throughout the state about the National Parks. (Four current GCHS Board members are part of that organizations' Speakers program).

What this means is that 2015 and 2016 are shaping up to be busy and exciting years for the Grand Canyon Historical Society! If you have not already renewed your 2015 membership (still only \$25 a year), please do so online by PayPal, or send in your dues with a check by regular mail. Don't forget the Scholarship fund - we funded a very well researched project on the Desert View Watchtower in 2014. All renewals this year receive a free commemorative sticker from the Society that will be mailed to you. Excitement awaits for all Grand Canyon historians in the next few years.

Wayne Ranney
GCHS President

Cover: Silver Bridge. Grand Canyon National Park.

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The Historical Society was established in July 1984 as a non-profit corporation to develop and promote appreciation, understanding and education of the earlier history of the inhabitants and important events of the Grand Canyon.

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Editor: Mary Williams

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Submissions to *The Bulletin* should be sent to Karen Greig, kgreig@yahoo.com

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Recollections

Occasionally, the *Ol' Pioneer* publishes the personal recollections of those wishing to share their Grand Canyon experiences with a wider audience. This month, former GCHS Board member and NPS interpreter Keith Green, shares his reminiscences of canyon life from the early 1970s. The Grand Canyon Historical Society neither endorses or condones any activity that is outside the law within Grand Canyon National Park. Not all aspects of the canyon's history will meet with the approval of every reader, but it is the mission of the GCHS to preserve and relate the canyon's history, as experienced by those who lived it first hand.

by Keith Green

Author's note: *The Ol' Pioneer* has printed many articles written as personal remembrances of times gone by at Grand Canyon. During those times, different segments of the population of Grand Canyon Village were involved in different activities. During Prohibition, there must have been a fair amount of the GC Village population using illegal alcohol. In the 1960s and 1970s, there was a large proportion of the minimum-wage workforce that used marijuana, psychedelics, and other illegal drugs. Grand Canyon history cannot be complete without stories from these populations at these times.

I first came to the Grand Canyon to work a summer job in 1972. Little did I know then that I would live at the canyon most of my life. My first job there was washing dishes at the Bright Angel Lodge for \$1.50 per hour plus room and board. I was the only dishwasher with a master's degree. I had one day off each week; so I commenced exploring the canyon one day at a time.

It was such a treat to live on the edge of the Grand Canyon for an entire summer. That is why I stayed washing dishes in a hot, noisy kitchen for minimum wages until October. Other dishwashers would sign-on but leave about the time they got their first paycheck, but that's because they weren't falling in love with the wilderness that is Grand Canyon.

I went as far down each of the South Rim trails as I could, while still getting back up the same day. As I descended into the canyon's depths, I began to discover the peace and harmony of the natural world. It is wilderness unmarred by man. The cares and problems of the world seem to be screaming overhead at rim level, but down in the canyon, everything is as it should be - all according to the laws of nature and physics.

Then there is the enormity of the Grand Canyon. Sure it looks big whenever one views it from the rim, but, as I descended the trail, I realized that the Grand Canyon is much bigger than it looks from the top. It has something to do with the various perspectives one gets descending into the canyon. The Coconino Sandstone, for example, is the huge 300 foot cliff 800 feet below the top. From the rim, the Coconino Sandstone seems to stretch nearly halfway to the bottom of the canyon. However, looking up from only a third of the way to the bottom on the Bright Angel Trail, the Coconino Sandstone has shrunk to a very thin layer of rock practically on the rim. The north and south rims look like big, rugged, mountain ranges from the Tonto Plateau.

Somehow I got two days off one week during the summer of 1972 and made my way down to the bottom of the Grand Canyon for the first time. I came down the Bright Angel Trail from Indian Garden and got to the river in the morning. It was amazing. The Colorado River was that emerald green color it gets during dry spells. It pours over what I assumed was a rapid below Pipe Creek. It was really only a riffle. Real rapids are much bigger.

Let me tell you more about myself. I am a child of the 1960s. I don't know about you, but I was a fairly common freak of a college student. Yes, I was against the Vietnam war. In fact, I spent some nights in jail for demonstrating against it. Yes, I took mind-enhancing drugs back then. Any history of the 1960s and 1970s that doesn't include illegal drug use is revisionist history and does not give a complete history of that era. Mind changing drugs were a part of the culture back then.

I had brought down a hit of mescaline, a psychedelic, which I had kept ever since leaving Oklahoma. Why not take it and make this day really memorable?

I found a place in the shade and watched the river for an hour or so while the mescaline came on. Summer temperatures in the bottom of Grand Canyon can range around 110 degrees. I was getting over-heated, and the shade was disappearing. The river was too cold and swift there; so I laid in the creek to cool off. I was feeling energetic and the colors of the canyon and sky had become deep and even more beautiful. To minimize the effects of the sun, I made sure to get everything wet including my shorts, t-shirt, and hat. As soon as I got my hiking boots on, I was ready to walk the last mile and a half to Phantom Ranch.

The trail climbs for half a mile to a point on a cliff several hundred feet above that cool, green river. By the time I got to that point, the river looked cooler and greener than it had ever looked before—a green deeper than any emerald. The point seemed to hang over the river maybe two hundred feet below. I was uncomfortably hot after climbing up the trail, and I considered for awhile jumping off the point into the nice, cool river. I wondered if the river was deep enough to absorb my fall so that I wouldn't hit the river bottom too hard.

"Wait a minute," I said to myself, "I'm messed-up! Maybe I shouldn't do something like jumping off this point until I am straight again."

Whenever I've been by that point since then, I can't believe that I ever even considered jumping from it. I've thrown rocks off that point about as far out as I could have leaped, and they

bounce a few times off the rock wall below before they plunk into the river. I would have died a terrible death if I had jumped from there.

My walk along the River Trail consisted of explorations of amazing places around every corner. The bottom of the Grand Canyon was a wonderland to me. I felt like a child walking into a new playground. The River Trail has been blasted out of the hard, twisted schists and granites of the inner gorge. Most of the rock is dark in color; so it absorbs the sunlight and radiates heat. The walls hold strips of browns, blacks, and pink, with occasional stripes of white rock. They were shiny - reflecting the bluest sky - almost blackish blue.

Then the trail turns to sand. Before me was a series of dunes of fine river sand blown up against the cliffs of the inner gorge. The trail skirts several sand dunes. Walking in sand in 100+ degree heat almost killed me.

I trudged around a bend and was confronted by the strangest plant I'd ever seen. It was some kind of yucca except that it had a trunk like a tree. The six-inch diameter trunk rose to face level, and then there was the typical burst of sharp yucca spines. I had never seen anything like it before. It looked like a Dr. Seuss tree. I had to reach out and carefully touch it to be sure it was real.

I found a huge, cabin-sized boulder, which looked like it had just rolled down the dune and stopped precariously next to the trail. I didn't care if it was about to continue rolling. There was shade under the rock. I lay down in the cool sand and tried to cool off.

Now the trail turned and perched against a cliff wall, which reflected the heat in addition to the overbearing sun. By this time the sun was exactly overhead. I made it about a hundred yards before I found a crack in the rock just wide enough for me to squeeze into it and get the only shade around. Some hikers walking by gave me a quizzical look.

The trail was getting close to the river now. It came to a point where an other-worldly vision stood at the edge of the trail. There was a silver suspension bridge stretching across the river. On either end was a tall, gleaming

structure much like the towers on the Golden Gate Bridge in San Francisco only silver and not so big. Two bundles of suspension cables were draped over these towers arcing down and across the river. At equal intervals, metal cables joined the main cables to the bridge. The geometric symmetry of the bridge marked a sharp contrast to the natural lines of the canyon. The bridge went immediately over the edge of the cliff above the river. The bridge is five feet wide and the sides and floor of it are made of a see-through aluminum grate. I had to put my foot on it without my weight just to be sure it was really there. I later learned that mules refuse to cross this bridge because they can see through it. A sign was attached to the bridge assuring me that Phantom Ranch is on the other side of the bridge; so I began to walk across it. I was suspended 45 feet over the churning and roaring Colorado River. It took my breath away.

The river there is making a wide turn around a delta to its north. As the river slowly turns northward, its current is pushed along the south wall of the inner gorge. Just upstream of the bridge, the river bounces off of a rock ridge on the side of the canyon and rolls over itself as it rushes under the bridge.

Even though the bridge railings were too hot to touch, I had to stop there and experience the power of the river. I stood there a long time. I could feel the power that dug the tremendous depths of Grand Canyon - the carrier of rock from deep within the Earth on towards the sea. Still the river was pushing with unimaginable force against the wall of the canyon just upstream. Never mind that it is carving into solid rock a mile under the surface of the land. What an introduction this was to the vicinity of Phantom Ranch.

I could feel the power of twenty-foot deep water pushing into the canyon wall and bouncing off it and rolling under itself as it went under the see-through bridge. There I was leaning on the railings without touching them having all these mind-blowing realizations when another hiker started across the bridge. I knew he was coming because the bridge shook with each of his

steps. Instead of going by, he stopped right next to me and seemed to be wondering what I was staring at. This made me paranoid since I was still tripping. I tried to think of something to say that wouldn't give away my state of mind.

Finally I turned to him and said, "It's kind of like a light show."

His eyes went from me to the river and back. Then he shook his head without saying a word and walked on. That gave me a shock of paranoia. Thankfully I never saw that guy again.

From the north side of the bridge, the trail skirts the rocky shore between the river and the cliffs above until it reaches the delta of Bright Angel Creek. I walked by a mule corral and found a couple of buildings.

"Ah, this must be Phantom Ranch," I thought and walked around the buildings staring into the windows wondering how to get in. There was an unassuming door, but no signs about lemonade.

"Where do I get that famous Phantom Ranch lemonade?" I wondered.

The building actually was the River Ranger Station where the only law enforcement ranger lived! Luckily there were no rangers inside.

Then there was Bright Angel Creek flowing soft and clear out of a thin canyon coming in from the north. After I cooled-off in the creek, I hitched up my boots and walked the last half mile up the creek to the ranch. The smell of sun-drenched grass and other plants permeated the air. Once I got there, many towering cottonwood trees made walking onto the Phantom Ranch grounds like walking into a green cave. It was cooler and there were little streams of water gurgling through the grasses around each tree. A ring of rock and wood cabins surrounded a central area of weeds and rocks. The North Kaibab Trail cut through the center of the ranch like a highway. The lodge stood impressively at the north end of the oasis. It was also rock, glass, and dark, weathered wood.

On the south side of the lodge was a grass lawn. I thought manicured grass looked pretty ridiculous in the middle of a wilderness like this. Beyond were the vestiges of what might have been

flower gardens some time in the past. Someone had worked hard building fences of rock, cement, and wooden rails. These fences no longer made meaningful barriers. On the south end of the enclave was a wooden building also with a gabled roof. It had wide, covered porches along its north and

south sides and seemed to stand as a relic of a time, which is no more. In 1972 the north porch overlooked a pit full of garbage!. I didn't realize it at the time, but what I was looking at was what remained of a swimming pool.

It was all so strange and unfamiliar. I finally found a canteen window around

the side of the lodge and bought a wonderful glass of ice and lemonade. I sat in the shade of the cottonwood trees outside the lodge to cool off and swat flies. Little did I know then that this would be my home for most of the next ten years.

Book Review

by Don Lago

If you've read any Colorado River history books written in the last 30 years, you've made a second-hand trek to the Huntington Library near Los Angeles, home of Dock Marston's massive, amazing collection of river history research. Marston was so enthralled with the river that he hated to leave it and pursued river history to stay immersed. Marston's Grand Canyon river career was impressive: he crewed with Norm Nevills twice, ran the record high of 126,000 in 1957 and, in a sportyak, record lows in 1963, joined Ed Hudson's first motorboat descent in 1949 and Jon Hamilton's upriver jet boat run in 1960. As a researcher he was equally resourceful, contacting everyone who had run the river or knew anything about it, sleuthing out sources no one else imagined. Marston did his research to write an epic history of Grand Canyon boating, a book nearly complete when he died in 1979. Unlike his research collection, his manuscript remained under restricted access until 2012. Now, thanks to Vishnu Temple Press, Marston's magnum opus is available. It's an essential, foundational book for everyone's river library.

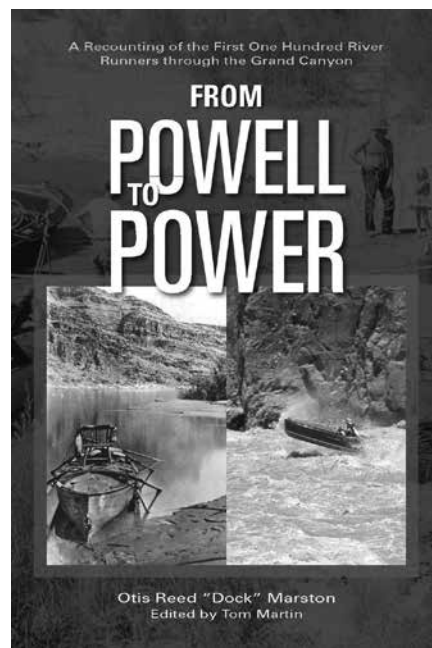
Marston's early research aided Wallace Stegner and William Culp Darrah in writing their admiring Powell biographies, yet neither Stegner nor Darrah had been down the river and they handed Powell a blank check for river heroism, as had previous historians like Dellenbaugh—and Powell himself. Marston turned a century of accumulated river experience into a more

critical assessment of Powell's boat designs, river skills, leadership, and accuracy as a historian. Stanton's too. Marston often targets inflated claims: "Dellenbaugh struggled to keep Powell as a hero against the satanic villainies of the record." Marston's judgments are fascinating and usually justifiable but he clearly enjoys pointing out other people's flaws, and this book has something to provoke most readers.

This book's main strength is its fact-filled narratives of all Grand Canyon river trips up to 1951. While Marston's recounting of the Powell expedition may be familiar ground, er, water, everyone will learn new things about less famous trips, although even Mar-

ston could come up with only a few pages about the most obscure voyagers like Hum Woolley. Marston offers lots of background stories, often surprising, such as Julius Stone helping Pete Berry build the Grandview Hotel in 1896. Marston goes into long-standing discussions about boat designs, rowing styles, wave sizes, rapid dynamics, the best runs, historic lore, geographical confusions, boatmen reputations, and events like Separation Rapid. Marston doesn't quite rank the boatmen but you'll find out why he has high respect for Nathaniel Galloway, Julius Stone, and Buzz Holmstrom, less for the Kolbs, much less for "archaic" Clyde Eddy, a criminal indictment for Robert Stanton, and thorough contempt for Norm Nevills. Marston generally is not an imaginative writer but he sometimes comes up with vivid images: "In 83 Mile Rapid, Nevills carelessly broke one of his heavy oars and metamorphosed more of the Precambrian walls with the heat of his comments about his jammed fingers." With his engineering eyes (and degrees from Berkeley and Cornell) Marston studied boat designs, but he admiringly quotes Galloway's more homespun philosophy: "Watch a nice big duck floating on the water. That's the way I want my boats." Marston was fascinated by psychology and tried it on his subjects, if sometimes clumsily, but he does offer good questions and insights, for example into Bert Loper's desire to die on the river.

Stegner and Darrah were unusual: most Grand Canyon river history has been written by river runners, proud of their own feats, and rightly so, but pride mixes uneasily with writing



From Powell to Power, by Otis Reed "Dock" Marston. Vishnu Temple Press, 2014. ISBN: 978-0990527022. 532 pages. \$30.

history. Marston relentlessly portrays Nevills as a foolish egomaniac, but it's not hard to guess that Nevills stepped on Marston's own ego. River historians are hardly uniquely flawed: I've just been wading through the historiography of the Battle of Shiloh, where

Powell lost his arm, and it's a mess of generals promoting themselves and dissing others, with a revisionist trend that removes Powell from important heroism to irrelevancy. History isn't just facts, it's the stories we weave from them: Marston was the ultimate

collector of facts, but also an important and colorful weaver. This fat book may be hard to fit into your ammo box, but it provides plenty of new fuel for dinner circle stories and debates.

The Men From Bass Station vs. Glen Canyon Dam Hunting and Rescuing Grand Canyon's Most Exclusive Animal

by Earle E. Spamer

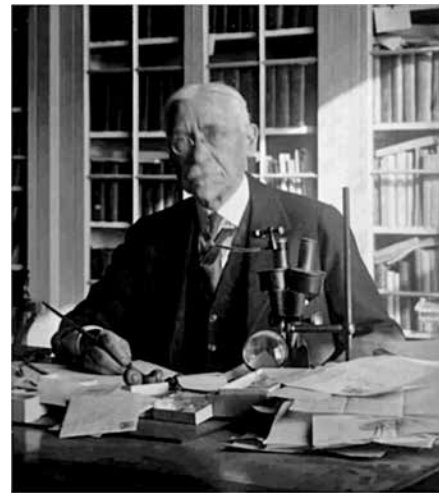
Might the National Park Service at Grand Canyon brand Vasey's Paradise on its park management maps, "NO VISITATION"? They could, and I worried that it would look like it was my fault. Just because I found an Endangered Species living there. A snail, of all things.

Worrisome park administrators might think heavy-footed river runners could tread and shred the little shelled creatures and their fragile Colorado Riverside habitat in Marble Canyon. Then too, Bureau of Reclamation power brokers in their ivory dam upstream might frown on a reigned-in river, denied some of their profitable electricity-producing potential just because unregulated water pulses might wash away the wee beasts. I envisioned ruffian river runners waiting for me around bends in the river. I imagined Reclamation managers sending me to "live with the fishes" in Lake Powell.

This really wasn't my doing! It was (*clichés* and all) a goateed, bespectacled, pipe-smoking scientist—a scientist of snails.

But First . . . a Thousand Mice

On October 16, 1906, Henry A. Pilsbry (the one with the goatee) and friend James H. Ferriss were on board the Grand Canyon Railway from Williams, Arizona. Bags in hand, they awaited the train to roll to a halt at Bass Station; not a train station, just a trackside flag stop in the Kaibab Forest



Henry A. Pilsbry at his desk in the Academy of Natural Sciences of Philadelphia; date unknown but likely about 1920. (From a glass negative recovered by the author about 2002 in the Archives of the Academy.)

south of Grand Canyon's rim. What curious glances they must have gotten from the other passengers all primed to see *The Grand Canyon*. Where would one go from such a lonely place of piñons and pines?



James H. Ferriss in 1904. (Photo from *Tomorrow*, Vol. 1, no. 1 [January 1905], p. 36.)

Pilsbry, from Philadelphia, and Ferriss from Chicago, were malacologists—people who study mollusks.¹ The canyon was just the next stop for them in a years-long series of explorations through the Southwest. Widely accomplished in his field, Pilsbry was the better known of the two. Now in his mid-40s, he was approaching the pinnacle of an ordinary career, little realizing that he would yet have over 50 more years of work, world travel, and accolades coming to him.

Stepping down from the car in the crisp fall air, ignoring whiffs of coal smoke, Pilsbry and Ferriss dropped to their knees. No, not from awe—the canyon was still miles away—but to rummage under rocks and in forest litter for the secluded, shelled animals that were their livelihood. They found them.

Cheered with such bounty, they climbed aboard an arriving stage for the ride to their hotel on the canyon rim. But far from easing into genteel accommodations at El Tovar, the Santa Fe Railway's brand new Fred Harvey-powered magnet hotel at the village of Grand Canyon, Pilsbry and Ferriss instead bounced away into Grand Canyon's science history, bound for rustic Bass Camp and the specter of Glen Canyon Dam.

Unfortunately for us, the men seem not to have written down anything about their experiences with their host, William Wallace Bass. Nor do we know how either Pilsbry or Ferriss came to know of Bass's remote accommodations and trails in light of the

overpowering advertising efforts of the Santa Fe Railway that lured thousands to Grand Canyon Village. Had they caught an advertisement placed by Bass? Perhaps they had been inspired by reading *In and Around the Grand Canyon*, the recently published book by the perennial Bass fan and canyon haunter, George Wharton James. They would spend a couple of weeks in Bass's hospitable, if lean, arrangements on the rim and in the canyon. Yet all we know about their trip is the dry, clinical record left in a series of scientific publications and among the mollusk specimens meticulously arranged in museum drawers.

Our snaileers were among science pioneers, and the fact that they had lucked into W. W. Bass rather than Fred Harvey was good for science. The first, casual mollusk collection made at Grand Canyon was by the leading environmental scientist C. Hart Merriam, when he visited the canyon in 1889 during his seminal studies of life zones in the vicinity of the San Francisco Peaks and northward. He went down the Old Hance Trail, along which he picked up a land snail that was in 1890 described as a new species by R. E. C. Stearns, who named it for the Colorado River; today it is known as *Sonorella coloradoensis*. Otherwise, virtually nothing was known of the Grand Canyon's mollusks when Pilsbry and Ferriss arrived. If they had instead booked into El Tovar (or less sumptuous accommodations nearby) they likely would have ventured into the canyon only along the (even then) touristy Bright Angel Trail, going no farther than the Colorado River. Perhaps thus a bit rushed, they may not have had the chance for the kind of casual field examinations that they had with Bass.² Nor is there evidence that they had heard of John Hance and his accommodations and trail far east of Grand Canyon Village, which incidentally was the chosen headquarters for several scientifically organized expeditions over the years (including Merriam's).

With Bass, things were leisurely. The men began their long stay at the canyon with a couple of days of prospect-

ing in the vicinity of the Bass hostelry near the Grand Scenic Divide. They found all kinds of land snails, some like grains of rice (even smaller), others nice round ones the size of a nickel.³ On sojourns into the canyon they went as far as Le Conte Plateau and Mount Huethawali before returning to their rim lodgings.

On October 20th Pilsbry and Ferriss rode the trail deep into the canyon, finding more snails of course. The next day they crossed the Colorado River on Bass's wooden boat (the cable car didn't come until 1908). Passing over the ridge to the north they dropped into Shinumo Creek to Bass's sometimes mining campsite, sometimes rude dude ranch and orchard—Pilsbry and Ferriss called it the "Thousand Mouse Camp." They went upcanyon collecting, ambling and clambering along Shinumo and White Creeks. Well into their Southwest explorations now, they were in their element.

Finally finishing their natural history prospecting in the inner canyon, they returned across the river to the South Rim on the 26th, laden with small bags of snails. Pilsbry's ubiquitous pipe tobacco pouches made handy containers. (To this day a few stray strands of tobacco can be found with some of his collections.) For some scientific colleagues back in Philadelphia, Pilsbry also gathered a few plants and bagged some toads—the toads were "stupid and easily caught," he wrote in his scant notes.⁴ The bountiful expedition inspired them to plan a repeat trip, which would have ramifications nearly a century later.

Three years after the Pilsbry–Ferriss trip to Mr. Bass's camps, Jim Ferriss went back to the canyon with Indiana colleague Lorenzo E. Daniels, a geologist and amateur malacologist. This time, they followed a more ambitious itinerary, crossing the river (no word on whether Ferriss enjoyed the cable car) and traveling around the Arizona Strip. Again, Bass was their canyon host; but who they may have traveled with during their sojourns on the Strip is not known. It seems that they had expected Pilsbry to arrive sometime, but, busy at home, he did apparently

write to them. Ferriss mentioned in his trip summary that they were relieved that Pilsbry had not gotten lost trying to find them somewhere on the Strip.⁵

Departing "Thousand Mouse Camp" (this time not so mousey, Ferriss reported in his letter), the snail prospectors continued up Bass's trail to the North Rim and looped through the Kaibab Plateau where they passed along and across numerous smaller canyons on the west flank of the plateau. They visited some of the infrequent springs there and passed through Ryan, the one-time copper prospect and smelter. They went out onto the Powell Plateau, and west to Mount Trumbull. Returning toward the Kaibab they went along the Vermilion Cliffs to Pipe Spring, en route to Kanab, Utah. There Ferriss visited watered gulches north of town, gathering snails and tiny freshwater mussels. He called that place "The Greens," but today no one there recognizes that name.

When Ferriss returned home to Chicago he dutifully sent boxes of shells and jars of alcohol-preserved mollusks to good friend Pilsbry in Philadelphia. The specimens would be used for creature identifications in their publications; and for Pilsbry those that he stored away would be returned to in decades to come. It was the opportunistic collection at The Greens that would contain an enigmatic little snail, which eight decades later would rouse excitement and consternation.

Paradise, and Paradise Lost

Vasey's Paradise is a lush, green oasis nestled against a red-stained cliff, rising up in tiers for dozens of yards above the Colorado River in Marble Canyon. Gorgeous cascades pop from openings dissolved in the limestone. Glistening water pours down a vertical blue-gray and rust face before splashing and sliding down ledges, pools, and chutes to the river. Occasional floods, sourced on the distant Kaibab Plateau, also send cold torrents through the plateau's karst plumbing to burst into this bit of watery paradise. Here is one of the most diverse groupings of plants in the inner



Vasey's Paradise, on the edge of the Colorado River in Marble Canyon, as seen on the day when the Kanab ambersnail was gathered here during the first mollusk survey of the river corridor. (Photo by Earle Spamer, July 25, 1991.)

Grand Canyon ecosystem, a hanging garden, clinging to a steeply inclined space of an acre or so. For river runners the springs' cool, crisp waters are a welcome respite from the chill, pea-colored canned stuff drained into the canyon from Lake Powell. All around is desert and stone.

John Wesley Powell was the first to describe Vasey's. It must have been a remarkable sight in 1869. The talus-lined river corridor, peppered with mesquites and other pleasing bank-side flora, bare of the invading wisps of tamarisks that smear the banks today, turns to the left and reveals, in the midst of a hall of ruddy river and magenta limestone, a diadem of cheery silver water and green life. Powell, so delighted by the sight—as river runners have been ever since—named the place for George Vasey, a botanist friend back East who incidentally never saw it himself.

Powell likely never spied one of the secrets of Vasey's Paradise: the Kanab ambersnail, a small, seemingly inconsequential mollusk. Never mind the fact that the snail wasn't known then, and in fact wouldn't have a name until 1948. It might have lived there in 1869, but we'll never know.

Kanab ambersnail, photographed at Vasey's Paradise. It is less than an inch long even when extended from its shell. (Photo by U.S. Geological Survey.)



George Vasey (1822–1893). (Engraving from a memorial to Vasey in *The Botanical Gazette*, Vol. 18, no. 5 [May 1893], frontispiece.)

No one knows how long the snail has called Vasey's home, or for that matter how it got there (more on this later). There's some evidence that it was seen (but misidentified) during ecological surveys in the 1970s, but canyon biologists weren't paying much attention to lowly mollusks then, usually tallying them under "Other" in censuses of organisms.

The U.S. Fish and Wildlife Service lists the Kanab ambersnail as "Endangered." The term means very different things to conservationists, resource managers, and some landowners. On the one hand endangered species are a precious few creatures on the verge of being eliminated by humans subduing the earth, thus we are bound to protect them. On the other hand they are needless interferences to livelihood; the reason, for example, for a rancher's loss of land use through the bureaucratic meddling of policymakers. The Kanab ambersnail also held the potential to interfere in the plans of power brokers at Glen Canyon Dam.

People may be emotionally responsive to the plights of endangered owls, ferrets, or tigers, because these plaintive creatures are in the news and each in its way has a certain beauty and charisma. But endangered species can creep in tiny, fragile, overlooked packages, too. The modest Kanab ambersnail has a rotund, teardrop-shaped shell; the brownish animal inside has a sometimes amber-colored translucence, and its shell likewise may have the same coloring, hence its name. When fully grown, the shell still barely covers the diameter of a dime and the animal does not completely fit inside its shell.

Until 1991 this snail from Vasey's was known to live only in two small, well-watered places a few miles north of Kanab, Utah, on privately owned ranch lands. Then in the summer of 1991 the Vasey's

colony was discovered, more than 60 miles and "a flight down" from Kanab, tucked just by yards within the protective, legislative boundary of Grand Canyon National Park; and the only place it was known to live in an ecologically pristine environment. Ironically, had Marble Canyon Dam been built in the 1960s, as originally planned and before the enlargement of the national park, we would never have known of the Kanab ambersnail at Vasey's. The springs there would be filtering today directly into Marble Canyon lake, deep underwater; Vasey's Paradise Lost.

"Green" Science

Once designated "Endangered," federal law offers some protection for an organism and its habitat. Had the National Park Service decided that river runners and other visitors pose a threat to the snail or its habitat at Vasey's Paradise, the locale may have been one more place marked on river guides as off-limits to visitation. The unwitting nemesis responsible for this hypothetical scenario is not me, as I've pleaded, but Henry Pilsbry—it was he who recognized and scientifically described the Kanab ambersnail, adding it to the world's list of creatures. Without him, we may never have known.

When in 1909 Pilsbry's friend Ferriss sent him some specimens from the latest southwestern trip, among the shells and alcohol-preserved innards were a couple of dozen ambersnails from the place he called The Greens, on a tributary to Kanab Creek north of Kanab, Utah. At the time, both Pilsbry and Ferriss thought the snail was another, already widely known species, checked it off, and moved on in their work; fooled by a shell.

By 1948 Pilsbry, now a great statesman of malacology aged 88 years, was still showing up for work every day at the Academy of Natural Sciences in Philadelphia, just as he had been doing since 1885 (when he wasn't snailing around the world). When Pilsbry took a look at the snails from Kanab again, knowing a bit more about the anatomy of mollusk bodies than he did in 1909, he realized that the small

animals were a different kind of snail than he originally had thought. He found, in fact, they were a sub-species of ambersnail entirely new to science. He named it for Kanab, where Ferriss had collected it; four decades late, but science can be patient. A name is, anyway, only the whim of a biologist's momentary fit of brilliance. Scientific names are the scheme of giving classical Latin or Greek names to living organisms that was officially started in 1753 by the Swede, Carl Linnaeus. In this case, the Kanab ambersnail's "Linnaean" name is *Oxyloma haydeni kanabensis*—pronounced "ahks-ee-low-ma hay-den-eye kan-ab-en-sis," which is why common names are invented, thus "Kanab ambersnail."⁶ And for the next 43 years, so far as anyone was concerned, that was that.

In 1991, the U.S. Fish and Wildlife Service was ready to list this snail as "Endangered." The two colonies north of Kanab were the only ones known then, living precariously on private land. A couple of thousand miles away, in Philadelphia, I had been aware of the Kanab ambersnail only by name, because it was something found during one of the early biological reconnaissances in the greater Grand Canyon region; and through the publications whose authors and titles I had captured for the Bibliography of the Grand Canyon. I also knew that Pilsbry's reference specimens from Ferriss's original gathering near Kanab were in a drawer in the Academy's Malacology Department—where coincidentally I worked (though more than 35 years after Pilsbry). I never guessed that I was rushing headlong toward learning things about the Kanab ambersnail that Henry Pilsbry never knew.

A Snail Runs Through It

In late July 1991, I stood at Lees Ferry with a group of students and professors from Northern Arizona University ready to leave on a 12-day research trip on the Colorado River. Our work was part of the ongoing Glen Canyon Environmental Studies (GCES) program that gathered and evaluated information toward an En-

vironmental Impact Statement for the operation of Glen Canyon Dam. The students were working under NAU biologist Dean Blinn's research grant, studying, among other things, the "biomass" that forms part of the food chain for the river's creatures. I was a tag-along under the grant; my day job was to prospect for mollusks pretty much everywhere I could reach in minutes, an "ambush" kind of biological investigation. It was an aspect of biology that hadn't ever been purposely studied along the Colorado River. In fact, mollusks had not been studied in Grand Canyon anywhere for nearly a century; not since Pilsbry, Ferriss and Daniels were there. Thanks to Grand Canyon ecologist Larry Stevens, I connected up with one of the GCES trips.

By day the students worked on the river and along wet tributaries, collecting water and bottom-sediment samples, measuring characteristics of the channel and recording chemical and physical properties of the water. I rooted through talus and plants, darted up side canyons, and stooped along streams and the river's edge, finding quite a lot. Unsurprisingly, the most productive places for mollusks were near springs. A kind of aquatic snail called a physid, which is found worldwide, also thrives along the Colorado River and in wet tributaries; but it is so common that it was casually collected for the record, and instead attention was paid to all the other mollusks.

By evening I was conscript labor with the students. Sitting at folding tables in the dark, we peered into flat-bottomed glass Petri dishes of river water set atop upended flashlights. With forceps we picked out any little, squiggly, living organism that was in there and separated out other organic material, the biomass booty from the crew's day work. Once, though, I got the night off. Deep in the Upper Granite Gorge on my birthday, our cook whipped up a Dutch oven cake. The ensuing revelry attracted some boaters from a private trip camped nearby, who arrived out of the darkness with falso Mexican accents and a bottle of tequila. Later they went back into the darkness with their accents.

In 1991, the mollusk fauna of the Colorado River corridor in Grand Canyon was virtually unknown. Mollusks are not a significant part of the food chain in the Grand Canyon, so earlier Colorado River surveys tended to overlook them; the focus was more on the diversity of fishes and a few invertebrates that are a portion of the fishes' food sources. So for me this was an expedition of exploration, much as was the expedition of Pilsbry and Ferriss 85 years earlier. Still, my survey was pretty cursory, not having the the luxury of meandering as they had had. Other than at the vicinities of nightly campsites, collecting stops on the 226 miles between Lees Ferry and Diamond Creek afforded me as little as 15 minutes or so, although at Vasey's Paradise I had a luxurious hour and a half. At least it was all territory never explored—even by Pilsbry and Ferriss—and no matter what I found it would be new information.

When I collected mollusks from Vasey's there was no shout of discovery. Although the information I gathered about mollusk distributions was new for Grand Canyon biology, and some new state records were later realized for Arizona, quick examination of the snails on the spot seemed to show them to be species commonly encountered in other places.⁷ For one snail, repeating Pilsbry's original prognosis, I was fooled by a shell. There wasn't a lot of time to be focused on one snail or another anyway. Only when I returned to Philadelphia would there be time for sorting and classifying. That's when things got stirred up.

But It Shouldn't Be Here

One Saturday a few weeks after my mollusk expedition on the Colorado, Arthur Bogan (the brains here) and I were looking through a microscope at the anatomy of the body of an enigmatic snail. Art and I had identified the snails from the trip, but we had a couple of dozen left-overs, all from Vasey's Paradise oddly enough. They just didn't "key out"—a term biologists use when they are identifying things. The anatomy of the mollusk's body inside the shell showed that it

belonged to the genus called *Oxyloma*, a kind of ambersnail. And that didn't make sense. You see, *Oxyloma*—the whole genus *Oxyloma* that is, comprising different species—wasn't supposed to live in Arizona. But tell that to the snails. My first thought was that it had been accidentally introduced to Vasey's. Did it come along in the veg-gies of some river runners' lunch box?

The whole family of snails to which *Oxyloma* belongs is hard to identify just by looking at the shells. Some professionals say it's impossible. Variations in the shape of one species' shell too often overlap with variations in the shells of related species. To identify these snails correctly one has to look at the anatomy of the animal that lives in the shell. That requires a microscope and some pretty fine work with delicate probes. And of course, the animal is dead, which, for an endangered species, is not good.⁸

When we got as far as knowing these animals were *Oxyloma* we were stumped. What exact species was it? So we sent some of them to Shi-kuei Wu at the University of Colorado, an expert in this family of mollusks called the Succineidae (pronounced "suck-sin-ee' ih-dee," or in general, the ambersnails). One may not be surprised to learn that the parcel post box of snails arrived before the first-class cover letter telling Dr. Wu they were on the way. (We were not yet wired for email in those days.) He phoned us, puzzled, because he hadn't asked our department for any loans of study specimens recently. We filled him in on what they were, from where, and what had stumped us.

Being the inquisitive sort of scientist, though, before calling us Dr. Wu had already taken a look at the specimens; he knew what they were. He told us that, yes, these were *Oxyloma*, but specifically they were the Kanab ambersnail, *Oxyloma haydeni kanabensis*. — And oh yes, he added parenthetically, did we know that, based on the Utah colony, the U.S. Fish and Wildlife Service was about to place it on the list of Endangered organisms?

That caught our attention! We opened the drawer containing Fer-

riss's original 1909 set of shells from Kanab, the ones that Pilsbry had used to name the Kanab ambersnail in 1948. They were a dead-ringer for the shells from Vasey's! Yet, the genus *Oxyloma* had never been found living in Arizona. We also knew the problems with depending only on shells in this family of organisms, so we turned to the alcohol-preserved specimens Pilsbry had used in describing their anatomy. When we went into the collections to find them we were dismayed to learn they were gone. Perhaps they were discarded after Pilsbry had used them in 1948; or they had dried out and were rendered useless at some later time, then thrown away. Although we were left with just shells that were from Pilsbry's set of original Kanab ambersnails, we also had Dr. Wu's authoritative identification of the newly collected Vasey's snails, based on anatomy, the same anatomy first deciphered and published by Pilsbry in 1948.

This caught the attention of the U.S. Fish and Wildlife Service, too. One phone call led to more. Specimens were shared around. One issue after another passed from one government environmental scientist to another. At the last minute, the colony of ambersnails at Vasey's Paradise was added to the decision to designate the Kanab ambersnail as Endangered. It was, after all, the only population of this snail known to be alive in a pristine habitat—even if it wasn't "supposed to be" in Arizona!

Monkey Flowers and Monkey Wrenches

The discovery at Vasey's had come just in time. Legislative protection is not necessarily preemptive when a species lives on private lands. Shortly after being listed as "Endangered," the smaller of the two original Kanab ambersnail colonies, in Kanab Creek Canyon, was eliminated when their marshy land was drained. So the original population north of Kanab was down to one little locale, at Three Lakes, north of Kanab. Vasey's held the only real hope for stringing along the snail's existence.

When the snail was discovered at Vasey's, the GCES program under the Bureau of Reclamation was collecting baseline information and formulating predictions about the effects of a large man-made flood from Glen Canyon Dam, then being planned for the first time. A flood would mimic (sort of) some of the floods that used to rush through the Grand Canyon before the dam was built. One purpose of the experiment was to lift sand loads from the river bottom to the banks, a process of sedimentary gentrification that had effectively ended when the dam blocked off the river's overwhelmingly rich supply of sand and silt to Marble and Grand Canyons. A controlled flood, believed to be good for the overall river community, also had the potential to wipe out some of the endangered snails at Vasey's Paradise, as well as some of its preferred food, decaying monkey flowers—not quite the intention of the protective measures of the Endangered Species Act. This was an unexpected bump in the road. (Never mind that the natural, pre-dam floods were much larger and must have affected the snail every time, if it was there.) If a flood of any magnitude would wash away some of them, how many would be too many? Could this snail come through a flood without serious effects? It was a monkey wrench in the power-hungry plumbing of Glen Canyon Dam.

The Kanab ambersnail at Vasey's has yielded more than just some notebook observations and government agency memoranda. Since 1991, many biologists and ecologists have gotten long mileage out of the Kanab ambersnail in Marble Canyon. Numerous study trips—some traveling by river, others by long hikes into the canyon—went to Vasey's Paradise to study in exhaustive detail the biology and ecology of the snail, which was almost wholly unknown. Two biologists based the research for their Master's degrees on it. Numerous studies and professional papers were written about an organism that was until then little known except by name.

Briefly stated, the Kanab ambersnail favors decaying monkey-flower stems

and other vegetation in the mist-cooled environs of running water, does not generally seek seclusion, winters over in a kind of suspended animation, lives about a year and a half, is apparently not a favored food by any other animal, and sometimes is parasitized by a peculiar, tiny worm-like animal called a trematode. But as interesting as these and other findings were, they went beyond just academic exercises. Would plans for controlled-flood experiments envisioned by GCES go on hold rather than decimate the snails in their one-acre habitat? If the floods were off, the dam's stingy retention of water for power production would continue; the habitat downstream through the canyon would not have a chance for any kind of recovery and none of the "controlled floods" run from the dam in recent years would have taken place. For questions to be answered, work had to move ahead. The dam's power managers stared up against the snail's environmentalists. Who would "blink" first?

Logistically, research at Vasey's provided exciting challenges. The site is filled with poison ivy, a deterrent to casual visitation. In fact, Vasey's is just one of just a few places in the Grand Canyon "lucky" enough to host poison ivy. Workers entering deep into the site wear protective suits against the irritant toxins of the plant. To gain access to some parts of the site, rock climbers with technical gear played out across the sheer cliff face beneath Vasey's bursting springs, dropping down into parts of the cliff-hugging vegetation. The site was precisely surveyed with laser instrumentation and plotted on computers; estimates were made of where flood flows would reach. In another study, individual ambersnails had numbers placed on their shells; some were transplanted to higher levels just before a controlled flood was released from the dam. After the flood another census was taken. The collateral damage was within predictions; there were no adverse surprises.

Some snails were taken alive for breeding programs at the Phoenix Zoo and at Northern Arizona Uni-

versity. A third nursery was set up, ironically, on the green-grass "football field" atop the powerhouse at the base of Glen Canyon Dam—almost taunting, up against the man-made monolith that threatens the snails' riparian ribbon downstream. And at least one more colony, descended from a group of snails transplanted to Upper Elves Chasm on Royal Arch Creek in the middle part of Grand Canyon, is now reproducing and thriving there.

Other studies, much more technical and far-reaching, have looked into the molecular bits and pieces of animals that tell us about the genetics of the Kanab ambersnail and its taxonomic cousins. There are some other snail colonies in the Grand Canyon, one at Indian Garden and another nine miles upstream from Lees Ferry near Glen Canyon Dam, that contain ambersnails related to *Oxyloma haydeni* (the species in which the Kanab ambersnail is a sub-species). These other populations, though, may each be genetically different, thus perhaps they are not all the same. And where the Kanab ambersnail fits it may reveal some relationship to one of them—or not. We shall see. It's still a very interesting time for Grand Canyon ecologists.

It's a Snail's Life

Now, the question begs, just how do these snails get into such widely distant, tiny locales in the first place? It's not as if some of them miraculously led thousand-generation crawls between these places.

The mechanisms of distributing mollusks to far-flung places on land and in fresh waters are not complete mysteries, but neither are they well understood or well documented. Some species of mollusks get caught in the feathers of aquatic birds, which fly from place to place. This is an especially reliable conveyance during migratory seasons. The tiniest of land snails can be lofted and cradled by strong winds too, but the Kanab ambersnails are too large to sail. Other kinds of mollusks, freshwater mussels, even have been known to reflexively close their valves onto the feet of birds that step on them, and they are

airlifted to another body of water. But snails don't have that advantage.

As for the Kanab ambersnail—who knows? We don't know how it got to the places it lives, or how long it has lived there. But there it is, eking out a life at Kanab, and at Vasey's Paradise standing up to a dam. Many tales about mollusk dispersal are anecdotal and once were published as brief notes in scientific journals. Today such kinds of notes are "unscientific," rarely given precious printing space. But one journal for malacologists, *The Nautilus*, once relished such notes, peppering its pages of scholarly studies with these kinds of anecdotes and curious observations—that was during the decades that it was edited and published by our old friend, Henry Pilsbry.

What Are the Odds?

It seems a very unlikely scenario, two fellows from the same museum department in Philadelphia, Pilsbry and me, generations apart, serendipitously coming across the same snail living in the Grand Canyon region, each for the first time. To be honest, for either of us it wasn't particularly big science, but science doesn't have to be Big to be interesting and useful. This little snail the size of a dime stood up to a big power dam's managers, provided employment for researchers, and offered opportunities for volunteers, students and professors—a mighty mollusk, indeed. Because of the work by all these people and the establishment of new populations of the endangered Kanab ambersnail, this creature now has a chance to continue its easily overlooked life as one of the canyon's marvels. All thanks to James Ferriss, Henry Pilsbry, and (with a tip of the hat) W. W. Bass. "So long, and thanks for all the snails."⁹

Notes

¹ Henry Augustus Pilsbry (1862–1957) had graduated from the University of Iowa and for a while worked for newspapers in Iowa and New York. He was an avid malacologist, which with his proofreading experience was noticed by George Tryon of the Academy of Natural Sciences of Philadelphia, who hired the young Pilsbry in 1885. A few months later Tryon died and Pilsbry was given the man's position in the Department of Malacology and the editorship of Tryon's ongoing *Manual of Conchology*.

(Conchology is an older term for malacology, though restricted more to the shelled creatures. Mollusks actually include the likes of octopuses and squids, too.) Pilsbry remained in the Academy's employ until his death, although at the end he was at his daughter's home in Florida recovering from a heart attack. At the age of 80 he said in a newspaper interview that he had ten years' worth of work on his desk; and, he added, when that was finished he had ten years' more work awaiting. He pretty much finished it up!

James Henry Ferriss (1849–1926) was a politically involved newspaper editor in Illinois. He always was an avid malacologist, although he never was employed professionally in that field. But this was nevertheless a time when avocational enthusiasts could, and did, routinely make professional contributions to the fields they pursued. At the time of his Grand Canyon expeditions he was the editor of the *Joliet News* and the recent chairman of the national People's Party.

² Pilsbry and Ferriss would indeed go to Grand Canyon Village—at the end of their stay at the canyon—where they spent a little time on the uppermost portion of Bright Angel Trail. In short order, Pilsbry found there a couple of kinds of snails that would be new to science, once he had a chance to examine them carefully. They spent only a portion of two days at the village before boarding the train for Williams on October 30th, but left no record whether they had lodged at El Tovar or opted for economy accommodations.

³ For those who may be “keeping score,” these snails belong to the genera *Pupilla*, *Sonorella*, and *Oreohelix*. Other, relatively less common ones were found, too. Many of these snails favor limestone terrains, ingesting the calcium

carbonate to help build their shells.

⁴ Henry Pilsbry's field notes are notoriously brief and telegraphic, an indication that much of his research methodology was by brute force of memory. His sparse notebooks are often a disappointment to modern-day researchers who may hope to learn many more details surrounding his activities.

⁵ Ferriss wrote a letter to Pilsbry in 1910 outlining the itinerary of his trip with Daniels and recounted many observations. It was published as “A Collecting Excursion North of the Grand Canyon of the Colorado” in *The Nautilus*, Vol. 23 (1910), pp. 109-112. Ferriss also included with his letter an annotated topographic map that marked all of the collecting points for mollusks he gathered on the trip, adding to it the places at which he and Pilsbry had collected in 1906. This important key still survives in the departmental archives of the Malacology Department in the Academy of Natural Sciences, and which was used exhaustively in providing a modern (1990s) update of early mollusk collections made at Grand Canyon (E.E. Spamer and A.E. Bogan, “Mollusca of the Grand Canyon and Vicinity, Arizona: New and Revised Data on Diversity and Distributions, with Notes on Pleistocene–Holocene Mollusks of the Grand Canyon,” *Proceedings of the Academy of Natural Sciences of Philadelphia*, Vol. 144 (1993), pp. 21-68).

⁶ The species epithet, *haydeni*, had been named for geologist Ferdinand V. Hayden, who incidentally also has named for him a canyon butte a few miles from Vasey's Paradise, Mount Hayden. Although in the field of biological systematics “*O. h. kanabensis*” is a subspecies, it is colloquially less confusing to refer to the organism by itself as a “species.” A few

researchers have also considered this animal to be a separate species, as just *Oxyloma kanabensis*, but that has not gained wider acceptance.

⁷ Despite Vasey's Paradise having such a rich diversity of life, including mollusks, the one place in Grand Canyon thus far known to have the greatest variety of mollusks is the area around Thunder River—another finding from the 1991 prospecting trip. Thunder River uniquely mixes certain species that are otherwise restricted to the environment either of the inner canyon or the lofty Kaibab Plateau.

⁸ How, indeed, to distinguish between two similar-looking mollusks if you can't dissect them? The problem is evident even at Vasey's Paradise, where our endangered friend *Oxyloma* lives with another, look-alike mollusk, *Catinella*. A few years later I discovered a way by which an investigator in the field may reliably segregate all but the most youthful of *Oxyloma* and closely similar shells just by measuring two seemingly unrelated dimensions on the shell. Non-invasive, non-life-threatening identification is an important consideration when dealing with protected species. (E.E. Spamer and A.E. Bogan, “Contrasting Objectives in Environmental Mediation, Reconnaissance Biology, and Endangered Species Protection—A Case Study in the Kanab Ambersnail, *Oxyloma haydeni kanabensis* Pilsbry 1948 (Gastropoda: Stylommatophora: Succineidae),” *Walkerana*, Vol. 9 (2002), pp. 177-215.

⁹ A grateful wink to Douglas Adams (*So Long, and Thanks For All the Fish*, Pan Books, London, 1984; book four of *The Hitchhiker's Guide to the Galaxy* trilogy).