

EXPEDITION OF 1871.

boatman's quarterly review

WHEELER SURVEY



Prez Blurb • Guide Profile • Farewell • Dear Eddy
Escalade • Hybrid-Electric Motor • LTEMP • GTS Land & River
Glory Days • Ted Hatch Story • Harriet Strong • Book Reviews

boatman's quarterly review

...is published more or less quarterly
by and for GRAND CANYON RIVER GUIDES.

GRAND CANYON RIVER GUIDES
is a nonprofit organization dedicated to

*Protecting Grand Canyon
Setting the highest standards for the river profession
Celebrating the unique spirit of the river community
Providing the best possible river experience*

General Meetings are held each Spring and Fall. Our Board of Directors Meetings are generally held the first Wednesday of each month. All innocent bystanders are urged to attend. Call for details.

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Our editorial policy, such as it is: provide an open forum. We need articles, poetry, stories, drawings, photos, opinions, suggestions, gripes, comics, etc. Opinions expressed are not necessarily those of Grand Canyon River Guides, Inc.

Written submissions should be less than 1500 words and, if possible, be sent on a CD or emailed to GCRG. Microsoft Word files are best but we can translate most programs. Include postpaid return envelope if you want your disk or submission returned.

Deadlines for submissions are the 1ST of February, May, August and November. Thanks!
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Congratulations!

ORION VASEY SALSIE was born on on March 20TH to Gibby Siemeon and Justin Salamon (both guides at CANX). His name represents a constellation, a spring and a combo! He weighed 6 pounds, 6 ounces and was 20 inches long.



Cover: Stereograph. The start from Camp Mohave, Arizona Territory, September 15th, 1871. Photographer, Timothy H. O'Sullivan. Library of Congress



Timothy H. O'Sullivan is perhaps best known for his photos of the Civil War, which include his famous "Harvest of Death" photo. But after covering the war, O'Sullivan decided to strike out West, and when he came back, he brought with him some of the earliest photos of the (quite literally) "wild" American West.

O'Sullivan's explorations of the American West were done as part of different US Government-funded expeditions. Between 1867 and 1869, he was part of the Geological Exploration of the Fortieth Parallel led by Clarence King.

Afterwards, in 1870, he joined a survey team in Panama to survey for a canal across the isthmus, and then spent 1871 to 1874 in the southwestern United States, surveying west of the 100th meridian West under Lt. George M. Wheeler.

Prez Blurp

THERE ARE MANY THINGS about this time of year that make me feel so fortunate. I just got off my first trip of the season filled with mild temperatures, blooming brittlebush, and believe-it-or-not, downstream breezes. I don't know if we just got lucky or what, but sometimes things have a way of working out just as they are supposed to. When reading through emails I was delighted to find out that Roger Clark of Grand Canyon Trust noted that with the election of a new Navajo Nation president "the development proposal stalled in the Navajo legislature and lacking any support from elected leaders, we are beginning to focus on long-term solutions for protecting the eastern half of Marble Canyon from Lees Ferry to the confluence." *High Country News* reports the new changes this way, "A new president and a new tribal council for Navajo Nation are basically the equivalent of a new Congress for the U.S., and any legislation from the previous session that didn't become law will have to be reintroduced. The Escalade project will have to start from scratch."

Certainly, Grand Canyon isn't exactly in the clear yet, but these are just the boosts that organizations like Grand Canyon Trust and Save the Confluence need to continue to persist and gain momentum in their quests to preserve the integrity of Grand Canyon.

That's not the only good thing being carried in with the current. As I rowed through the Canyon, we relished the sight of the river banks covered with broad, steep sand banks the result of last fall's high flow experiment. New sediment in Grand Canyon as a result of these flows means better opportunities for the native flora and fauna of the riparian corridor to not only survive but perhaps flourish. It also proves that even the feds sometimes allow the scales to tip towards ecological preservation over financial gain. This is the result of many hardworking and persistent scientists whose work has influenced those in power.

There are so many reasons to feel hopeful for not only Grand Canyon's future but the future of our natural environment and resources. Martin Litton set a brilliant example, and just look at how many individuals and organizations have worked tirelessly to uphold the highest standard of resource preservation. Take note of all the gains made from their endeavors.

Let's keep up this momentum. The breeze is at our back. We can and will influence the decisions made about Grand Canyon. I believe one of the best things about our profession as river guides is that we get to watch Grand Canyon inspire our guests to play,

inquire into the meaning of things and find purpose. After telling guests on my last trip about the Grand Canyon Escalade proposal, the proposed Tusayan development and potential uranium mining endeavors, all of them were interested in learning more about the proposals and keeping an eye on how things develop. At least five out of our fifteen asked for the Grand Canyon River Guides brochure and the websites for Grand Canyon Trust and Save the Confluence. That's pretty good when you think about it. Even if only three out of those five become members, or donors, or active participants, that's three steps in the right direction for Grand Canyon.

So here's to an excellent season for you and your guests in Grand Canyon. Play hard, stay safe and keep on allowing Grand Canyon to work its magic. That's the heart of true transformation. See you on the water.

Katie Proctor

Begaye Formally Opposes Escalade Project

NEWLY SWORN-IN Navajo Nation President Russell Begaye has reasserted his opposition to the Grand Canyon Escalade. Here is his administration's formal statement, released May 13, 2015:

"The agreement signed yesterday during the Inauguration between President Russell Begaye and outgoing Ben Shelly was historic and a symbolic gesture of *Ahił na' anish*, a smooth transition and an agreement in principle as a new administration takes office. The listing of projects on the agreement are those of the Shelly-Jim administration. The Begaye-Nez administration will vet and evaluate each project and determine whether the project will be in the best interest of the Navajo Nation and our people. As for the project, Grand Canyon Escalade, this Administration has already stated it does not support the Grand Canyon Escalade project and that position has not changed, as Mr. Begaye has stated it is not in the best interest of the Navajo Nation and the Navajo people."

~ Russell Begaye, President of the Navajo Nation

Save the Confluence

Guide Profile

Ben Reeder, Age 33

WHERE WERE YOU BORN? Provo, UT

WHO DO YOU WORK FOR? I work for Colorado River and Trail Expeditions. 2015 will be my eighth season with them. I started out in Moab working for Adrift Adventures and spent my first five seasons guiding in Cataract and Westwater, the Moab Daily and Desolation Canyon.

WHAT KIND OF BOATS DO YOU RUN? Mainly 37-foot S-Rigs. But I also row and paddle. I feel really lucky when I can do all three in a season; it keeps things fresh. I also run a 14-foot sportboat that I rebuilt—whenever I get the chance for a private trip. I have it set up to motor or row.

WHAT OTHER RIVERS HAVE YOU WORKED ON? I really enjoy the variety of rivers that CRATE runs. I have been on the Tatshenshini in Alaska, and have worked all the sections around Moab.

WHAT ARE YOUR HOBBIES/PASSIONS/DREAMS? My three favorite things to do are skiing, climbing and boating. In these activities I can find my flow-state while connecting to landscape. I love climbing parallel splitter cracks in Indian Creek outside of Canyonlands, skiing powder in the Wasatch, and obviously boating in desert canyons. That's it for me, my dream is to keep doing the things I love in the places that most inspire me.

MARRIED/FAMILY/PETS? I got married to Jillian Small last September. She has been down the Grand with me about ten times. We have known each other since we were teenagers, and started dating while working together in Moab. We have two lab mutts—one black, one white.

SCHOOL/AREA OF STUDY/DEGREE? I graduated with a B.A. in Environmental Studies from Western State University in Gunnison Colorado in 2008. That summer I met Terry Tempest Williams on a Cataract trip and we became good friends. She convinced me to apply to the Environmental Humanities program she started at the University of Utah. I graduated with a M.A. in 2012 with Terry as the Chair of my thesis committee. She

helped me write a personal narrative about growing up disconnected to Mormon ideology and reconnecting to family through the Colorado River.

WHAT BROUGHT YOU HERE? I got interested in guiding through a group of guys I was skiing with at Snowbird. It wasn't until I started writing my thesis that I began putting together the stories of my Grandpa, uncles and cousins who had been guiding since the 1960s in the Canyon. I got hooked on the river completely independently. My dad did river trips early on, but we never went down as a family.



WHO HAVE BEEN YOUR MENTORS/ROLE MODELS? Early on it was Brad Gale, Josh Strain, Jake Skeen, Nate Haldeman and Jeremy Swindlehurst at Adrift. It was my cousin Zak Reeder that convinced me to come work for Colorado River and Trail Expeditions. On my first Grand Canyon trip, Walker Mackay taught me how to drive an S-Rig, and Mindy Mackay—dripping wet, shivering and pissed off—taught me that

soaking people first thing in the morning while running the roaring '20s wasn't very cool... John Toner taught me how to always have fun (even if none of the passengers are having fun) and how to avoid becoming a crusty old boatman. Greg Williams taught me how to drive my sportboat.

WHAT DO YOU DO IN THE WINTER? I coach alpine ski racing with the Snowbird Sports Education Foundation. And I continue to write.

WHAT'S YOUR MOST MEMORABLE MOMENT IN YOUR GUIDING CAREER? For me it happens all the time. During the season I go to sleep and often dream of the Grand Canyon. When I wake up and watch the light on the Canyon walls change, it seems surreal to spend so much time surrounded by such beauty. Sometimes I can't tell whether or not I am still dreaming.

WHAT'S THE CRAZIEST QUESTION? I had a Doctor from Alabama ask me "Now, why did they put those rocks there like that?" We were passing a cobble bar below Granite Rapid, and I knew she was a smart person, so it took me a bit to understand what she was asking.

WHAT DO YOU THINK YOUR FUTURE HOLDS? One of the scariest things I can think about is what life would feel like without being in the Canyon. I really enjoy interacting with clients, that hasn't gotten old to me. When I have a hard time being patient, it will be time to rethink my role down there. I can't imagine that I will ever get sick of running boats. Who knows? Science trips? I just want to keep going, even at the end of the season, I'm excited for the next trip.

WHAT KEEPS YOU HERE? Each trip I feel like I am learning so much. About driving boats, taking care of people, the nooks and crannies of the canyon. Each trip I am still amazed with the beauty, of storms rolling through the canyon, and how the light changes each day. I enjoy the simplicity of living. Everything you actually need is right there.

Farewell

ANN HAYMOND ZWINGER, MARCH 12, 1925–AUGUST 30, 2014

EXCUSE THE LATENESS of this notice, but readers of natural history and the *Boatman's Quarterly Review* should know that author and naturalist Ann Zwinger sketched her last drawing on August 30TH of last year. Writer of over twenty books and many more numerous articles, river runners would be most familiar with several of her works on rivers of the west: *Run, River, Run: A Naturalist's Journey Down One of the Great Rivers of the West* (the 1975 book river historian Roy Webb stated was the book on the Green River that he wished he had written; the *New York Times* called it a "standard reference work on this part of the American

West for many years to come; and winner of the John Burroughs Memorial Association Gold Medal for a distinguished contribution in natural history and the Friends of American Writers Award for non-fiction); *Downcanyon: A Naturalist Explores the Colorado River Through*



Grand Canyon (1995); and *Grand Canyon: Little Things in a Big Place* (2006).

I was very fortunate in knowing Ann, having met her while being the boatman on a Grand Canyon bald eagle trip in 1989. Just after New Year's Day, we launched from Lees Ferry with snow covering the rocks all around us. She was creating the index to her latest book, and also beginning her next, *Downcanyon*. I enjoyed many discussions with Ann about the writing process, organizational aspects and creativity. Ann was one of the botanists who have tried to teach me about plants, an unsuccessful endeavor through no fault of theirs, but I was ever grateful for the conversations none the

less. Ann stayed with my wife and me while researching in Flagstaff, then did a run out with us from Diamond Creek to Pearce Ferry to experience the lower Grand Canyon. We look with pleasure every day at a sketch Ann did on that trip and presented to us (below).



Following are some quotes from other naturalists who knew Ann, and also a few quotes from Ann's books.

Ann wasn't just a dreamy observer, but a polymath who could write authoritatively about the entire living world—and illustrate her words with lyrical yet precise pen-and-ink drawings. Her prose is gentle, affectionate and commanding. — John Hazlehurt

When I commented how flabbergasted I was by her capacity for taxonomic discernment, she simply replied that she had an artist's training to look in detail at shapes of wings, antennae, corollas, and fruits, and etch them into her memory. Although she trained informally with some of the best botanists and entomologists in the West, her degrees were in art and art history. I've never met anyone who has used artistic training to better advantage in being a naturalist. That, in

fact, was her highest calling—the humble vocation which these days has almost become just an avocation: *being a naturalist*. —Gary Nabhan

“But to own this land, as one owns a book or pot or a pan, is impossible. We own it only as it becomes a part of the experience of each one of us. It is its own reason for being. The life of the wood, meadow or lake go on with or without us... Humans are but intruders who have presumed the right to be observers and who, out of observation, find understanding.” “Because we can and do manipulate our environment, we are then charged with the responsibility of our acts; for if we are to survive, we must insure that this best of all possible worlds survives with us.”

“I reflect, for the thousandth time, that I never truly see a place until I draw it... It’s the learning that counts, and I learn through my hands as much as my eyes and ears and nose.” “The drought won’t be over until the fat river sings.” “Give me this day my daily river, and let

me keep these realizations tucked into a pocket along with some freeloading sand, a lizard footprint, a cicada carapace, a scrap of sky, sunburned hands, and faith in the health and wealth of the natural world. And in this river that always runs downhill.” (from *Grand Canyon: Little Things in a Big Place*)

In response to a question as to why Ann keeps coming back to do Grand Canyon river trips: “Certainly a powerful reason I return every chance I get is that the Grand Canyon presents a grand, dazzling panoply that cannot help but sustain me. But there must be more... To cherish the grace of the familiar... With human hubris, I relish knowing what’s ahead because I’ve been here before... The clamor of change... To be baptized by the canyon’s brilliant, iridescent water... To stay alive and healthy, vital and exuberant.” (from “Riversound,” *Writing Down the River*)

Richard Quartaroli

Art Runs His Last Rapid (Riffle)...Literally

ON MARCH 14TH, a memorial celebration for Art Gallenson was held in three parts at the Hatch warehouse, Lees Ferry, and the old Marble Canyon Lodge. Art’s brother Steve and sister Marcia brought together over 100 friends and family to celebrate a life well lived. After the first third of the celebration at Hatch, everyone drove down the road to meet at Lees Ferry for Art’s final run on the Colorado. A small inflatable raft was used to deploy an even smaller craft—a wooden replica of Powell’s *Emma Dean*, built by Clyde Ross Morgan—into the main current directly adjacent to the boat ramp. The *Emma Dean*, which was fashioned with small holes and designed to gradually sink; carried Art’s remains to the head of the Paria Riffle. Friends and family bid farewell to Art as each individual let a single flower drop into the river from shore. By the time Art began into the tongue of the Paria, Powell’s chair was all that remained visible above water line. A more poignant and beautiful send off could not have been created any other way.

Latimer Smith



photos: Pat King



Dear Eddy

IN REFERENCE TO BQR VOLUME 28, NUMBER 1, WINTER
2014–2015

TO THOSE RESPONSIBLE for the *Quarterly*, I just really want to thank you for a job well done. Your recent issue was exceptional and I read the pieces on Martin Litton twice in one day. (Not just because my memory is slipping but because I was inspired.) The write-ups by Brad Dimock and others told Litton's story in a way that lit up a little fire inside me. As a faculty member at Prescott College, I work with young people in wild places all the time. The Martin Litton tribute felt like both a validation for the work I do and an extra push to be increasingly intentional about my role. I hope to create a sense of reverence for these gifts of nature and inspire a deeper sense of stewardship among others. For all of us working and living outside, Martin Litton is a great reminder to never be shy about what we stand for and don't wait around for someone else to care for the places we love. Thanks again!

Julie Munro



IN REFERENCE TO THE MARTIN LITTON TRIBUTE ARTICLES, IN
BQR VOLUME 28, NUMBER 1, WINTER 2014–2015

MARTIN SOMETIMES DROVE one of the vans down from Hurricane, bringing a load of clients the three hour drive across the Arizona Strip to the Ferry, when we used to launch out of Cliff Dwellers Lodge, back in the day. We had one room for the crew the night before launch, which was such a production that it took two days. You could work up a sweat trying to get all the stuff in the boats but you could come back to the room and take a shower, sleep out in the desert. Down at the beach there were no handwash buckets, chairs, toilets, sleeping pads, water pumps or sat phones to pack. There were no coolers or stoves. It still took three or four hours on the ramp to cram all that stuff into every nook and cranny of the dory, because the trips were 18 to 21 days, and even if it's canned ravioli and canned stuffed cabbage, it's a lot of stuff.

Martin would arrive in Hurricane, Utah in a tail-dragging Cessna 195, pack one of the old Dodge vans with a bunch of unsuspecting vacationers, and blast off toward Lees Ferry, waving his arms and harangu-

ing them the whole way, while barely maintaining the roadway. By the morning of departure he would have convinced a number of the clients to hike down to meet the trip at Jackass Canyon with him, thereby avoiding the headcount at the-put in, which would save him a trip's worth of user-days against his allotment. The chutzpa was of an Olympian scale, the disregard for authority complete, the motivation unimpeachable. Martin's passion; well...one of them, was the preservation of the Canyon and the tool he invented for doing that was Grand Canyon Dories. He was an outfitter by accident, but he was going to make it work.

Occasionally, to save money, he would bring a load of out-of-date bread from a distributor in Las Vegas, which would turn green somewhere above Havasu. This would give him a chance to greet participants on the next trip. We called these visits "one hour Martinizing," but you still had to ready yourself for the encounter, just being in the proximity of that much energy. Energy—and off color jokes and sermons about the environment, government, and the state of the world. He naturally spoke in oratory, without effort. It was like having James Earl Jones in the driver's seat, giving an award winning performance, instead of watching the road. He could convince you of almost anything, even that Shaefer's was a drinkable beer. He bought truckloads of the stuff, at 99 cents a six pack, that we were supposed to hand out to passengers at the boatman's discretion. We drank almost all of it ourselves, but it was an acquired taste, being as it had sat in a 150 degree aluminum box in the yard at the warehouse for six months.

We spliced broken oars back together. We repainted the boats for free. The company went one whole season without having any insurance on the trucks or vans. "I hardly ever need insurance," Martin told me. As a businessman, he was part Robin Hood, part Jerry Falwell and part W.C. Fields, with dashes of Bluebeard and Casanova and Groucho Marx. He brought all of these qualities to bear in his defence of Grand Canyon. The "most sublime spectacle on earth" will always be vulnerable to the developer, the hydroelectric engineer, the helicopter concessionaire, or, for that matter, the tramway builder. The tug of its revenue stream is irresistible. Martin



could be raised to heights of controlled, eloquent fury by these proposals. The outrage he expressed so well should certainly have been felt by anyone who knew what was at stake. “Dams in Grand Canyon? Are you mad?” He was willing to stand in front of the locomotive of Progress, while most of the rest of the country was feverishly shoveling coal, and say “No. Not here.” He had to be patient and indefatigable and eloquent and wily enough to deflect the whole insensate monstrous headlong mass. And he did.

There was this boat, *Diablo Canyon*, Martin had built that was about twenty percent bigger than our beloved Briggs dory. His accountant was telling him there was no way he could stay in business with a four-to-one passenger-to-crew ratio. He needed to get five payees in the boats. An 18-day trip was maybe \$850 and we were getting \$65 per day. The math wasn't working. This boat was going to be the solution, but it turned out to be a little awkward, so Martin was about the only one to ever row it. It was hard for the passengers to get into and so tall you couldn't bail it out without climbing down in the hatch, so Martin never did. It leaked pretty badly at the chine, and the hatch covers were loose enough that most of the deckwash would end up in the hold. With about a foot of water above the ribs, he'd just sit on in it in camp, surrounded by eager listeners, sipping Bombay gin out of a Sierra Club cup and holding forth. He was a mesmerizing speaker and had an impossibly diverse collection of tales. I knew him for ten years before I ever heard a word about his piloting a glider in France on D-day. One person in 50,000 has an event of this magnitude in their history but Martin seldom got around to talking about it. There were more important things to discuss—the fate of the canyon and the world at large; the misdirected efforts of mankind. His sermons and anecdotes and lectures would always find their way back to the fundamentals. We are screwing up, was his message. We have to stop.

It had to be the ruin of the best places he saw, looking through the viewfinder of his Hasselblad as a travel photographer and writer, that fueled the righteous indignation. We will trade an eternity of Glen Canyon for a couple hundred years of Lake Powell. That's no bargain. We traded Diamond Head and Redwood Creek and Celilo Falls the same way. It should piss you off and Martin was pissed. He was incensed, actually and we all should be too. We are screwing up. We do have to stop. We rowed across the lake every trip for years because Martin thought people should experience the difference between a living river and Lake Mead. It took us parts of three days and was usually perfectly miserable. That's how he it wanted it to be.

He wanted to grind peoples' noses into it, get them pissed off too, write their congressman. He'd tell people that all they needed for sleep gear was a Space Blanket. Dig a little hollow in the sand for your hips if you're compulsive. We hoped no one was listening, but on the trip, there he was, snoozing soundly on a thirty-degree bank, wrapped in an aluminized plastic rescue blanket whose crinkling could wake the dead. Get him a cup of coffee and he'd be ready to go hard another day, lively as a wagon full of wolverines, wearing out the guardian angel on his shoulder.

As a young man, climbing in the Sierra, he once fell “about sixty to eighty feet” and landed flat on his back, in a pool he reckoned to be about a foot deep. “I about splashed it dry,” he said. “Turned black and blue on that whole side of my body.” But walked away. He flipped in Crystal, then flipped in Crystal, then flipped in Crystal again one day, rowing three different boats. “I don't know what you all are so worried about,” he'd say, “It's just foam.” He'd tell the passengers they didn't have to wear their life jackets except in the rapids—or if another trip was in sight. “You're not going to fall off a dory,” he'd tell the people “and it's hot enough without 'em.” He was right of course, but can you imagine? The age of liability-phobia was already dawning but Martin was only governed by a righteous, fearless common sense. Can you imagine food prep, cooking and serving for thirty people with one three-foot by three-foot table? It can be done. And it's not about the food, remember? “Chairs? Chairs? For crying out loud! Please!” He told me once that being a boatman was suppose to be a summer job. You'd do it for a few years then go on to something serious. In the brochure, he advised prospective clients not to tip the guides, which would help to insure you couldn't inadvertently make a career out of it. “I pay them too much already,” he'd say. Maybe he had a point, but it didn't stop a lot of us. It was too much fun.

I owe to him my membership in the best community to which I have ever belonged. I owe him the introduction to my wife and the existence of a couple of remarkable offspring. I owe him the lesson of the immeasurable power of the determined individual and the strength of audacity. He showed me that in the face of a large and inplacable assemblage of myopic stupidity and greed, one must never despair. I will try to measure up. It won't be easy.

Tim Cooper

Escalade... Meet Earth Day

When you talk about Escalade or any projects out there, we need to involve...the voice of the local people, rather than allowing big corporations to make those decisions. Yes, we're trying to create jobs, but we're doing it in the wrong places and in the wrong way, and (Escalade) is one of those.

— Russell Begaye, CAMPAIGN STATEMENT

SITTING AT AN Earth Day information table on the South Rim, Renae Yellowhorse answers the same question—over and over: “How can we stop it?” Two days later, Navajo voters answer.

April's election of Russell Begaye as Navajo Nation president is a significant setback for Escalade, the proposed mega resort and tramway on Grand Canyon's east rim. It effectively ends promoters'



Renae Yellowhorse speaks to cyclist during Earth Day event at Grand Canyon visitors' center. photos: Roger Clark

multi-year push for approval, which gained momentum under the Joe Shirley/Ben Shelly administration (2007–2011) and reached its apex under President Shelly's four years in office. Shelly was the only elected official to ever endorse “Escalade.” Out of touch with his constituents, he finished seventh in the presidential primary election last September.

Save the Confluence family members have spent thousands of hours traipsing across the reservation to do radio programs, attend council meetings, and to meet with community leaders, journalists, presidential

candidates, and anyone who might lend a hand in stopping the Navajo Nation from approving Escalade. During the four years that outside developers have been trying to obtain the council's necessary approval, not a single delegate has ever spoken in support of the project or sponsored the legislation required to approve it.

Delores Wilson-Aguirre, Earlene Reid, and a tenacious band of opposing residents and grazing permit holders earned candidate Begaye's support through regular briefings before the election. In the Bodaway/Gap Chapter, where the development is proposed, Begaye out polled Joe Shirley by more than a two to one margin. Tuchoney Slim, their newly elected council representative, is also opposed to the project.

The campaign to defeat Escalade is not over. A fleet of black jeeps carrying interested investors on their way out to visit the site was recently intercepted by a local sheepherder. Escalade lobbyists are still courting council delegates. And there's talk of a revised development plan in the works. But the reign of Escalade advocates, employed within the Navajo president's office, is over... at least for now.

With your continued support, the *Save the Confluence* coalition

will keep educating the new administration and work to permanently prevent development below the entire eastern rim of Marble Canyon, down to the confluence. Thanks

to the guiding community for sustaining opposition to Escalade and a belated happy Earth Day to Grand Canyon fans everywhere.

Roger Clark



Vera Dallas speaks to KTNN radio audience during a two-hour live broadcast on March 18, 2015. Save the Confluence family member, Rose Tsosie, laughs in the background.



History in the Making— River Outfitters Run Hybrid-Electric Motor Through Entire Grand Canyon

FOR THE FIRST TIME in history, a hybrid-electric outboard motor has completed an entire Grand Canyon river trip.

For nearly eighty years commercial river outfitters have been providing the general public with exceptional multi-day backcountry and whitewater rafting



photo: John Dillon

experiences in one of the most remote and pristine locations in the world—on the Colorado River in the Grand Canyon National Park. Today sixteen professional outfitters provide this service to approximately 20,000 of the nearly five million Park visitors each year. These companies are the official authorized concessioners and partners of the National Park Service to provide these services to the public. The Grand Canyon River Outfitters Association (GRCOA) is a non-profit trade association headquartered in Flagstaff, Arizona, which represents the entire group of Grand Canyon outfitters.

On Saturday, April 4, 2015, the Grand Canyon River Outfitters launched on the first successful river trip operated through the entire Grand Canyon propelled completely by a hybrid-electric motor. Steve Hatch, owner of Hatch River Expeditions ran the boat as the trip leader. Others on the trip were John Dillon, Executive Director of GRCOA; Steve's wife, Sarah Hatch, owner of Hatch River Expeditions; Fred Thevenin, owner of Arizona Raft Adventures; and Trent Keller, General Manager of Western River Expeditions. Two Grand Canyon National Park officials, Park Super-

intendent Dave Uberuaga and Chief River District Ranger Brian Bloom, also participated on the trip. The trip ran seven days from Lees Ferry to Pearce Ferry and was completed successfully on Friday, April 10, 2015.

As the primary provider of public access to the extremely fragile ecosystem and river corridor environment within the Grand Canyon, the commercial outfitters have been continuously leading the way by exercising the most environmentally friendly practices and sustainable technologies on their multi-day river trips in Grand Canyon. "Leave No Trace" practices are strictly adhered to. Earlier this month due to more recent threats, the advocacy group America Rivers has declared the 277-mile stretch of the Colorado River that winds through the Grand Canyon as the most endangered river in the nation. "There is no more important time than now to do our part to protect this special place in every way we can. We all know of the constant threats to the Grand Canyon and we all share in this ultimate responsibility to preserve it unimpaired for future generations," said Grand Canyon National Park Superintendent Dave Uberuaga. "And the Grand Canyon river outfitters are truly taking steps and doing things that actually make a difference



photo: John Dillon



Superintendent, Dave Ueberuaga, driving the hybrid-electric boat.
photo: John Dillon

to protect the resource as well as greatly improve the visitor's experience here and now. It is a great partnership with the Park."

Almost sixteen years ago the industry voluntarily transitioned from louder, dirtier, and also much more affordable two-stroke conventional outboard motors to an entire fleet of conventional thirty-horsepower four-stroke outboard motors which produce much lower emissions and are nearly forty percent quieter than the previous two-stroke motors. "This was a large leap forward in the pursuit of restoring natural quiet and reduction of fossil fuels. That transition voluntarily replaced nearly 300 motors at a cost of \$1.5 million dollars to the outfitters. Most people do not understand or appreciate the commitment and investment that has already been made by the outfitters to improve the resource and visitor experience. It is significant. And the latest accomplishments with the hybrid-electric motor are truly remarkable towards our long-term goals," said John Dillon, Executive Director of the Grand Canyon River Outfitters Association.

In 2008, the river outfitters committed unanimously to partner with the National Park Service and pursue the development and implementation of a non-fossil fuel alternative motorboat propulsion system suitable for commercial river running operations within Grand Canyon. It is known as the "Alternative Motorboat

Program". Since the creation of this program, the outfitters have again voluntarily invested more than \$500,000 in the last seven years and have been working with the engineering departments of several universities and a few private sector companies in research and development to literally create a technology that doesn't actually exist for an application not found anywhere else in the country. "We started from scratch with the enormous goal to create something entirely new. We initially pursued a few competitive ideas but ultimately have settled on the hybrid-electric concept because it showed the most potential with the largest immediate benefits. We felt we should accomplish as much as we can now and not have to wait for future technology to catch up. We cannot just buy an electric motor and enough batteries off the shelf that could sustain a weeklong river trip with no ability to recharge. We made enormous strides with the University Programs but ultimately we have been waiting for battery technology to evolve and catch up to our needs," Dillon stated. "Until there is better technology that is affordable and can be readily obtained, the hybrid-electric model is our choice for now."

The hybrid-electric concept is the use of an all-electric 30-kilowatt outboard motor that is powered by two large packs of lithium-ion batteries. The motor is

basically the newest four-stroke thirty-horsepower Evinrude outboard that most outfitters use today that has had the gas motor removed and a liquid cooled 30-kilowatt electric motor and a special computer control panel installed in its place. The lower unit and propeller are the same as a conventional gas motor. Both battery packs weight approximately 300 pounds each, and still require charging throughout the trip. This is made possible by the most advanced, quietest, eco-friendly generator available on the market today. The Honda 7000eu generator produces 4500 watts and is still quieter than the standard four-stroke outboard motors in use today,

and uses sixty percent less fuel than is used for a regular outboard motor trip. The converted electric motor, batteries, chargers and generator are all sealed and waterproof to the best extent possible. And the electric motor is virtually silent!



**DO NOT PEE
NEAR BATTERIES
OR ELECTRIC MOTOR
(TRUST US!)**

Steve Hatch, President of GRCOA put it this way. “We are frequently asked if we are using solar panels to recharge the batteries. This isn’t a smart phone or a GoPro camera battery. I always explain that we would probably need enough solar panels to cover a basketball court to generate the power we need to charge



The crew of this historic trip—from left to right: John Dillon, Sarah Hatch, Dave Uberuaga, Steve Hatch, Fred Thevenin, Trent Keller, Brian Bloom. photo: John Dillon

these batteries. This is a 30-kilowatt motor. Your fridge, coffee maker, dishwasher, microwave, clothes washer and dryer, and flat-screen TV at home require about ten kilowatts of power. You could power several homes on the same amount of power required for this electric outboard motor!”

In the last few years, the outfitters have attempted two previous river trips with a few variations of hybrid-electric motors, batteries, and generators. All of which had promise, but none of which were able to make it through an entire trip without failing. “The first attempt in 2010 made it as far as Grapevine Rapid (river mile 82) before the control panel on the motor overheated and fried and we were forced to stop. Last year we beat that previous record of Grapevine and we were very excited to finally make it to Phantom Ranch (river mile 89). But it was not easy and on very low water (6500 CFS) and in the interest of safety we opted to pull the electric motor and run the lower end of the Canyon with a gas motor. While discouraged, I reminded our group of a Thomas Edison quote that said something like, “He [Edison] never failed, he only discovered 10,000 ways that wouldn’t work,” Dillon said. “We could all relate to that as we continuously found ways that would not accomplish what we were ultimately trying to do.”

“This is so exciting! I am so impressed with the dedication the outfitters continue to show towards the

long-term goals of this program. We have all had our doubts, and there remains to be many things improved before something like this could be a viable alternative to the existing outboard motors in use today, but it is big steps in the right direction,” said Superintendent Uberuaga. “I think we’ll look back on this someday as a huge stepping stone in the journey. And this is a perfect time as we celebrate Earth Day this month to have made such a historical accomplishment!”

It was not a flawless trip, however, and there are still many improvements that must be made, but the future is promising. It will likely take years for better battery storage technology to evolve to where a multi-day river trip could be done without recharging and for the overall unit costs of such a motor to be financially feasible to operate commercially. The current four-stroke motors are approximately \$5000 each. The outfitters have invested more than \$75,000 just this one prototype hybrid-electric motor and battery configuration. But the outfitters are committed to this project through 2017 and will re-evaluate the next steps. “I am so impressed with the commitment and monetary investment that all of the outfitters have made to this program, which includes the non-motor companies in our group that don’t even run motors! Everyone is behind this effort because it is the right thing to do,” said Dillon. “It also strikes me as to the historic nature of this project. Steve’s uncle, Frank Hatch, is believed to have run the very first motorized raft through Grand Canyon in 1948, and some 67 years later Frank’s nephew Steve is on the tiller of the first electric motor through Grand Canyon. How cool is that!”

The outfitters are proud of this accomplishment for many reasons. “We are actively trying to do things that help,” said Fred Thevenin. “We think this has great potential. We encountered more than a dozen private river trip groups throughout the week on the river, and without exception, every single one of those trips were extremely impressed and complimentary of the effort being made by the outfitters. Although I know we startled a few of them and caught many of them off-guard because the electric motor is virtually silent and they never heard us coming up behind them. It was fun to be part of such a historic trip.”

John Dillon

LTEMP: A Call to Action!

WHAT IS GOING ON?

THE PUBLIC DRAFT of the Long Term Experimental and Management Plan (the LTEMP) is coming out soon. This study, and the decisions the Secretary of Interior makes based on it, will determine how Glen Canyon Dam will be operated for the next twenty years or more. Dam operations affect daily fluctuations, beach building or loss, humpback chub populations, the wilderness feel of the river, and just about everything else that's important for a Grand Canyon river trip.

The LTEMP results will have a big effect on the heart of the Grand Canyon and how we take care of it for future generations.

WHAT CAN I DO?

Participate! When the draft report comes out there will be a chunk of time available for public comment. It's extremely important that people who know and love the river send in written comments. People who care about getting the most money possible out of the dam will have their say. We can't let their voices be the only ones heard!

TAKE THESE SIMPLE STEPS:

- Go to the LTEMP website (ltempeis.anl.gov) and subscribe. They'll tell you when the report comes out and how to get a look at it.
- Send them a letter or email during the comment period!

POINTERS FOR MAKING COMMENTS:

- *Say what you think and feel, in your own words.* It doesn't have to be long, it doesn't have to be formal. Your voice, spirit, and point of view are what's important.
- *Focus on what you know and care about.* A lot of science experts, economics experts, and legal experts (among others) have contributed to this report. What it really needs now is the input of river experience experts, Grand Canyon stewardship experts, and experts on the goodness and joy of life for now and the future.
- *If you're into the sediment science, biology, hydro-power numbers, or other details, certainly dig in and see what you think.* It's fascinating stuff, and it always needs some ground truthing.

KEY IDEAS TO MENTION:

- *High Flow Experiments.* We're just a few years in to a twenty-year experiment that may be the best hope for keeping and even rebuilding beaches in the Grand Canyon. The new plan should continue these experiments to the fullest extent possible.
- *Daily Fluctuations.* It's in the interests of hydro-power generation to increase daily fluctuations from what we've seen since 1996. How does a step backwards in the stewardship of the Grand Canyon sound to you?



The river running community has always had an important role to play in the care of the Grand Canyon. Thank you for doing your part at this key moment in time!

Sam Jansen

GTS Success!

HERITAGE (NOUN): *the traditions, achievements, beliefs, etc., that are part of the history of a group or nation*

WHAT AN INCREDIBLE Guides Training Seminar it was this year as we celebrated our river heritage in high style with an outstanding tribute to Martin Litton presented by none other than Brad Dimock. Even the irrepressible “desert goddess” Katie Lee joined us and wowed the crowd with her vibrancy and passion, inspiring the next generation of guides to love, laugh, and above all, fight tooth and nail for what they believe in. What an honor.

We examined river heritage from every possible angle—human history, boats, art, geology, cultural resources, and even new frontiers like the blind kayaking expedition. Then we took that marvelous *mélange* and used it as a springboard for a strong advocacy message about the many threats and challenges faced by this national park today.

Think about it, even the Guides Training Seminar itself is part of our colorful heritage. Year after year it brings us all together, strengthening and celebrating our ties as a community—motor, oar, north, south, guides, outfitters, private boaters, NPS, scientists, tribal representatives. Whole generations of river guides have flocked to this event since the 1970s. Now if that’s not a great tradition, I don’t know what is.

We would like to sincerely thank Steve and Sarah Hatch for giving us a home base surrounded by the magnificent Vermillion Cliffs. Nothing could be more fitting than setting up shop in the Hatchland warehouse with our “river kitchen” and the Whale Foundation Health Fair tents flapping in the wind out front. We are so very grateful for the outstanding speakers who came from far and wide to share their knowledge; the unwavering commitment of park superintendent, Dave Uberuaga and the innumerable NPS personnel who came to share the entire weekend with us and strengthen our partnership; the very special Native Voices segment that continues to build understanding of tribal traditions and values (with special thanks to Stephanie Jackson and John Dillon for coordinating it); all the cooks, kitchen helpers and volunteers who worked so very hard to make the GTS run smoothly; and last but not least to The Shiners for the great music on Saturday evening. What would a GTS be without an outstanding party! GCRG would also like to extend our deep appreciation to all the commercial river outfitters, the Grand Canyon Fund, and the Grand Canyon Association for their funding support

of this event, and to all the individuals and companies who donated items for our highly successful raffle and silent auction.

I think Martin Litton was smiling down upon us, perhaps a bit bemused at all the fuss. But what we accomplished (I hope) was to give you all a swift kick in the pants—don’t get complacent, don’t compromise and for heaven’s sake, speak up! Learn, teach others, and be a fierce defender of the place you love. The GTS gives you the tools, and hopefully the inspiration. Then it’s up to *you*.

Lynn Hamilton

Photos: Wayne Ranney







GTS River Trip 2015 by the Numbers

WHAT DO one motor rig, seven oar boats, a kayak and an NPS snout boat have in common? The Guides Training Seminar river trip! Not to mention, ten different outfitters sent their guides downstream into the best classroom in the world, the Grand Canyon. Special thanks go to Canyoneers for donating the motor-rig and assisting in so many ways, to our fearless trip leader Brandon Green who did Canyoneers proud, and of course to all of our outstanding speakers and NPS personnel. This cooperative learning opportunity is supported by the Grand Canyon Fund, a non-profit charitable grant-making program established and managed by the Grand Canyon River Outfitters Association.

We were especially honored this year to have Sarana Riggs from Save the Confluence along with us. As she told me afterwards, the GTS river trip was a life

changing experience for her. I leave you with a message she gave to her fellow voyagers: "...listen closely to Mother Earth and Father Sky, hear or feel what is being spoken by those unseen to keep protecting, preserving, and sharing the knowledge of what the Canyon holds. You all are unique in your own ways but we all share and feel the connection within the canyon walls. Keep up the great work that you all are doing."

The GTS river trip really is all about connections—bringing guides together from different experience levels and backgrounds to learn and get fired up for the river season. It gives them the tools they need to be the best in their chosen profession. Come and join us next year!

Lynn Hamilton



Photos: West Howland





Glory Days— Then and Now

Then:

LATE SIXTIES AND early seventies I had the best time a teenager could ever have—I was a guide for Grand Canyon Expeditions. I learned from Ron Smith, Dee Holiday, Dean Waterman, Art Gallenson, Pete Gibbs, Don Neff, and a host of other boatmen.

There were a slew of us young superheroes trying to learn the art: Me, Mark Smith, Tom Yeager, Blake (foxy) Hopkins, Terry McCarthy, and others. Imagine being a passenger, meeting the crew the first time in sneakers, no socks, cut off Levis, no underwear, no shirts, and enormous egos. Our personal equipment was a belt or piece of rope to hold up our pants, carry our pliers, knife, and Sierra cup. The knife and pliers





were used for cooking utensils, food prep, whittling, and mumbly peg. The cup was for burning your hand and lips with hot coffee and dipping into the river for a drink (actually worked well for that). River water was used for everything, everyone drank it, bathed in it, did laundry, and made Tang with it. Let the silt settle and hope you aren't the last to drink out of the jug. I never had a single case of giardia.

Boats were war surplus pontoons made into “S-rigs” outfitted with Dean Waterman’s boat frames, fiberglass plywood dry boxes, and jackasses for lifting two cycle mercury out-board motors. We carried two fifteen-foot ash oars in case the motors gave out. Imagine rowing S-Rigs through Crystal. What were we thinking?

We used drift wood to cook with and have a nice cheery fire to drink by at night. Drinking was part of our boatmen image as was smoking large rum soaked cigars. Image was everything. Imagine a couple of young men sweating away with no shirts cooking your dinner. We really did know how to cook; we had baking powder biscuits, cherry pies, anything and everything that could be made in a Dutch oven. The passengers were well fed and entertained by our antics, beer in one hand spoon in the other smoking a cigar and sweating away. Makes me hungry just thinking about it.

Which led to the inevitable bathroom facilities; women upstream, men downstream, burn your toilet paper and cover your leavings. Redwall cavern was like a giant outhouse, unburned toilet paper and human waste everywhere. Every back corner was disgusting and smelled horrible—all part of the river experience.

For sleeping we provided 18- by 48-inch foam pads, sleeping bag or fart sack, wet life preserver for a pillow, and a war surplus poncho for a ground cloth. No one complained or new any better anyway. Life was good. I’m sorry it’s raining, that’s what the poncho is for. Leave the fart sack in your river bag, enjoy your night, see you in the morning.



Oh god we’re all going to die; hurry bend over and kiss your ass goodbye; this is going to be like a hummingbird flushed down a toilet; this is all part of the river experience—all catch phrases we used to instill confidence in the passengers. All joking aside we were young but had a keen sense of our responsibility and knew our actions directly affected the happiness and safety of our passengers.

Now:

In July and August 2014, I had the best time a 63-year-old could ever have: I went through Grand Canyon on a paddle boat trip with Colorado Rivers and Trails Expeditions (CRATE). I learned from Kyndl, Dewey, Sonia, Casey, and Katy, all well educated and responsible young adults. On our arrival to Lees Ferry we were all suitably impressed. They were all dressed in tailored shorts, button up shirts and either tevas or boat shoes. Four out of the five were women (we didn’t have those back then), and all very attractive.

Dewey, our trip leader and only male guide, instilled confidence and optimism that won the trust of the passengers; he then gave us some guidelines:



if you're hot, get in the river, but don't drown, stay in your boat, listen to your guide, and don't drown. They handed out water bottles and cups; we were directed to refill them at a five gallon water jug of purified water that was taken along with us.

Off we went (wife) Blondie, (son) Nate, Mark Smith, and twelve other hearty souls. There were eight people to a boat, two paddle boats, and one S-Rig for all of our necessary gear. I dipped my cup in the water when I was thirsty (some things will never change) and caught flak for being old school. I was informed by Kyndl that they had medicine for diarrhea, but I never got sick. On the fourth day out the other paddle boat threw left over pancakes at us. I fished them out of the river and fed them to everyone in my boat, including my guide Kyndl (for good juju). Our boat never flipped and we had no swimmers, and no one got sick—amazing. Can't say the same for the other boat.

Dinner time comes around and out pops the propane stoves, tables, chairs, dinnerware, tented outhouse, and groover set up for open air enjoyment. All waste was bagged and packed out. We stopped at Redwall Cavern. It was an amazing site—white sand and not a trace of humans.



First night we were each given a cot and instructed on how to set it up. The cots were equipped with a deluxe 26-inch by 84-inch self-inflating foam pad. This enabled us to sleep in luxury compared to the fart sacks of old. Did I mention the tents for the rainy nights they brought and helped to set up? No poncho hotel for the passengers.

The food was excellent and the presentation was five stars, still made with mostly Dutch ovens. No pies or biscuits but they did have layered cakes with frosting. Treats and snacks were supplied all day to our heart's content. The turkey jerky was damned good.



Our very attractive guides also had catchy phrases to instill confidence. Don't fall out of my boat, it looks bad on my record; don't drown, it also looks bad on my record; paddle Dougy paddle; go big or go home; and it's all part of the river experience. It's still all about image. No matter how much things change they still stay the same. Guides don't do it for the money they do it for the love of the river and for the adventure.

Thanks to Mark Smith for talking me into going on an eleven-day paddle trip, and then bailing out at Phantom.

Doug Shapiro

DEDICATED TO: Art Gallenson and all the other boatmen who have moved on to different rivers.



A Ted Hatch Story

A LOT OF THE OLD river stories are gear-based, or at least, gear-informed. You have to understand something about the rigs—how they were designed and operated—to get the stories. So for me to re-tell one of Ted's stories, I need to mention the rig. When Bus Hatch and his sons Don and Ted put WWII surplus rubber on the rivers, there wasn't much design sense available, but there was a lot of water. Some of you may know the large rock in the river near the spring below the mouth of Jones Creek in Whirlpool Canyon, up on the Green. According to Ted, the old boatmen didn't know it. On the peak of spring high water you ran a couple of Lodore and Yampa trips in the 10,000 to 30,000 CFS range, and that was it for the summer. When they were on it, the water was never low enough to reveal that iconic rock. With that kind of water available it made sense to put the bigger boats on the river. A ten-man or

a seven-man raft was fun, a regular water-strider, but uneconomical. You could only put about two or three people in one. The work-a-day boat was a 27-foot pontoon because you could put eight or ten people on it and only have to pay one boatman's wage. They built a rig for the 27s with frames constructed of two-by-ten-inch side boards and cross pieces on which the oarsman sat. The frames were attached to the boat by chains with large hooks. You slipped them into the row of low D-rings that had once allowed CBees to lash these pontoons together with elephant ropes when building bridges with them in World War II and Korea. Four hooks into four D-rings and the boat was rigged.

The Upper Basin had not used up very much of its allotted water in those days, so there was plenty of water in Grand Canyon, too. For the Grand Canyon you could go bigger than a 27; if you put a 33-foot on the water it was ten to thirteen people, and only one

boatman's wages. This made sense and it made money.

The old-time boatmen were a bit slower than their bosses to realize there was a difference between 27s and 33s. One of the differences, of course, is that a river-savvy, moderately powerful oarsman can actually row a 27 with ten people and gear. Pretty much nobody could row a 33 with thirteen people and gear. So when it came time to design a Grand Canyon rig, they used the rowing frames because they were there, and because we still rowed the worst of the rapids, at least when the water was low. Really. Stopped on the left



Boatmen Brick Wells and Curtis "Whale" Hansen running a 33 in Crystal in 1967.

photo: Earl Perry

above Lava, took off the motor, lashed it down, stuck four 13- or 14-foot hickory oars, got another boatman aboard, and rowed. But since you were going to be motoring nearly all the time, back behind that rowing frame they built a motor frame out of doubled two by twelves that stuck off the back of a 33. The motor frame squashed

the whole back end of the 33 into the water, and under power sometimes the transom even scooped water. These were the taildraggers.

In those days there had also been no thought given to the effective and safe ways to load D-rings. These old Hatch motor frames loaded them about as badly as you can: instead of stressing them radially, or tangentially, or leaving them unstressed except when the rig was flexing, the chains and hooks for the old Hatch motor mounts slanted, and pulled the sharp corner of the D-ring into the boat, where it abraded holes right through the neoprene. At the same time, since they were being pulled back at an angle, the D-rings were tearing through the strapping that was supposed to hold them. At some point—sooner rather than later—those D-rings would either pop a hole in the tube or pull right through the strap. One fail, or another fail.

Now Don Hatch was one of the great rivermen for

a lot of reasons, one of them being that his technical ability was unequalled. You just never saw a boatman to match him. Ted, well, Ted loved the Grand, but he was a kind of bulldozer of a man who turned most of the rigs he ran into bulldozers too. So, no shit, there we were, sitting, drinking, lounging in the motor well at the back of a taildragger, and Ted is telling the story. He is loud, more vivid than almost anybody you normally meet. High voice, very heavy sloping shoulders, receding red hair, lots of freckles, sipping a bit of whiskey from a Sierra Club cup, delighted to have a delighted audience.

“So there I was, boys, comin’ down onto Crystal. Wasn’t a lot of room on the right, and I sort of centered it. Right smack into that hole in the middle, and it was a bad day for it. Just kind of a wall of water comin’ out from the left bank across the river, boilin’ up musta been fifteen, twenty feet high. Well, I started climbing up that god-damned wave, and my hell, that boat stuck there, started washin’ around on that wall of water. Began to wonder, ‘am I gonna get over this one or not?’”

“Well, by God if just about then, that god-damned motor frame started slidin’ off the back of the boat. It’d tore loose. Ripped right through the straps. Tiltin’ me up goddamn near vertical. So I *really* poured the coals to her. Plan A, boys, I was gonna drive that motor-mount right straight back up the ass end of that rig and onto the top of the boat where it belonged ’n keep ’er there by powering all the way down the left side of Crystal. Right smack down the cliff, past the island.” Ted’s right hand is a horizontal fist, the rounded back end of the 33; and his straight vertical left hand, just touching the right, is Ted, the Mercury, and the motor mount. He slides his vertical left hand up, up, over the right hand, it tilts over the knuckles, eases back down onto the back of his right hand, and there were Ted, outboard, and motor-mount back on top of the 33, safe and ready to complete their run down the left, beside the cliff in Crystal.

“But all that Merc could give me, it wasn’t enough. Me and that motor-frame, we just kept slidin’ backwards off that boat, down into the hole, that black Merc screamin’. So I thought, ‘What the hell? These people’ll do just fine, they got a huge boat under ’em. Now me, not looking so good. It’s time for Plan B. They got the boat, but I got a motor and a motor-mount. I’ll just do me a Parnelli Jones with that Merc 20 and that motor mount. I’ll run the rest of the rapid with the motor planing this son-of-a-bitchin’ motor mount. Turn my motor mount into a speedboat.”

“Well, boys, somehow Plan B didn’t work out. The boat keeps washin’ around on the face of that wave, I

just keep slidin’ backwards into that hole, and all that howlin,’ from that Mercury, all of a sudden it turned into one plug.”

“Boys, it took me down musta been twenty feet ’til that motor mount was whackin’ the rocks on the bed of Crystal. I can tell you it was cold, dark and wet enough down there. I could hear and feel that frame and that motor on the rocks. I decided I better let go my buckin’ strap and try Plan C.”

“Plan C, Ted?”

Eyes crinkling, mock exasperation. “Jesus Christ, boys, you know Plan C. Come on. Plan C. Same as it always is. Swim for it.”

Earl Perry

Lost and Found

LOST: In the Dreaded 36 Mile Rapid (funny story... almost flipped!) XtraTuf boot, Size 11. Thanks!
928-308-6243

Job Opening

OARS IN CANYONLANDS, Moab, Utah is looking for an Assistant Manager for Cataract Canyon and the San Juan River. The position has two primary responsibilities: 1) Warehouse Manager in charge of mechanical side of the operation; 2) 4x4 Operation Manager in charge of scheduling, training, and operation of daily 4x4 program. Contract for \$15 per hour for 40-hour week on a seven month schedule for qualified person. Possible other incentives.

Please contact Steve Kenney, OARS-Canyonlands Manager for further information at stevek@oars.com.

The Other “Woman of the River”—Harriet Strong, the Dame Who Would Dam Grand Canyon

DAMMING THE Colorado River in Grand Canyon has been an intellectual exercise for more than a century. Cockeyed schemes of all sorts were raised, from building piddling electrical-production dams for a mine or two, to blasting royal hell out of the canyon walls all at once to dam the gorge with debris (to power *all* the mines around). All kinds of dams were proposed—rock-fill, masonry, and concrete; even a steel one.

Some early ideas came kind of close, notably James B. Girard’s valiant efforts between 1915 and 1925 to put up a masonry dam and powerhouse just below the mouth of Diamond Creek. Girard, variously of Phoenix and New York, also wanted to stick dams in all the way down to the mouth of Grand Canyon, and in Boulder Canyon beyond that. His plans, never presented by him or by federal agencies to the Hualapai Tribe, were nonetheless thwarted by state and federal agencies at every turn, but never so quickly or assertively that he lost hope.

The 1923 U.S. Geological Survey expedition under Claude H. Birdseye is legend, of course. They identified and surveyed dam sites one after another along the Colorado River. The stair-step reservoirs pooling along the river profile is a famous illustration—what might have been. (And it nearly did happen in the 1960s, with bookend dams at Marble and Bridge Canyons.)

Yet the idea of stair-step reservoirs in the Colorado was already history by the time Birdseye and company boated the Colorado. A 73-year-old widow from California presented the idea in testimony before Congress on May 14, 1918. Mrs. Harriet Williams Russell Strong (1844–1926) gave a lengthy statement and answered congressmen’s questions before the House Committee on Water and Power. Despite the fair sex’s general disadvantage in those days, Strong was a force in the worlds of public affairs, farming, and irrigation.

Strong explained to the congressmen that she was in favor of reserving the Grand Canyon; but not in the way we might hope. She was opposed to commercial inroads at the canyon, where power and flood-control dams would be built by for-profit enterprises. Instead, she asked Congress to set aside the canyon not so much for

the sake of parkhood but for *government projects*, favoring dams that would pool irrigation water, with power production secondary. Filling Grand Canyon—*end to end*—would do nicely. A letter of support was read into the record, from James W. Reagan, Chief Engineer of the Los Angeles County Flood-Control District. She had the support of Gifford Pinchot, too, who had been the first chief of the U.S. Forest Service who then was running for (and would win) the governorship of Pennsylvania.

Congressman John Esch, a 19-year representative from Wisconsin, asked Strong, “About how many miles of the Colorado would you reserve?” “Only the canyon,” she replied, “from the mouth of the canyon where the cliffs are high.” Well of course you can’t build a dam there high enough to flood out the length of the canyon. But that’s where Strong’s ideas came into play.

Mrs. Strong was an inventor, holding several patents. In 1887, she received U.S. Patent No. 374,378 for “Dam and Reservoir Construction.” In 1894 came Patent No. 528,823 for a

“Method of and Means for Impounding Debris and Storing Water.” These inventions called for series of dams. The dam most downstream would be the most substantial. The reservoir behind it would help brace the base of the next dam upstream and would eliminate channel scouring—and so on, marching upchannel, one reservoir after another. She also envisioned truss-work arrangements, which would catch and prohibit any movement of “debris.” Her testimony before Congress encouraged the government’s privilege of building irrigation dams; specifically, like her series of dams. The congressmen had some concerns about the engineering problems of superdams of 700 feet or more, eclipsing the heights of the largest dams then known. But that would change soon enough anyway; in twenty years, Hoover Dam was up and running.

H. W. R. Strong (as she sometimes promoted herself) had money and moxie, but these were in short supply during her younger years. Born in Buffalo, New York, Harriet’s family moved in 1852 to Plumas County, California. In 1863 she married Charles Lyman Strong, a mine superintendent in Virginia City, Nevada. He was an on-again, off-again miner and farmer with



photo: 1921 Encyclopedia

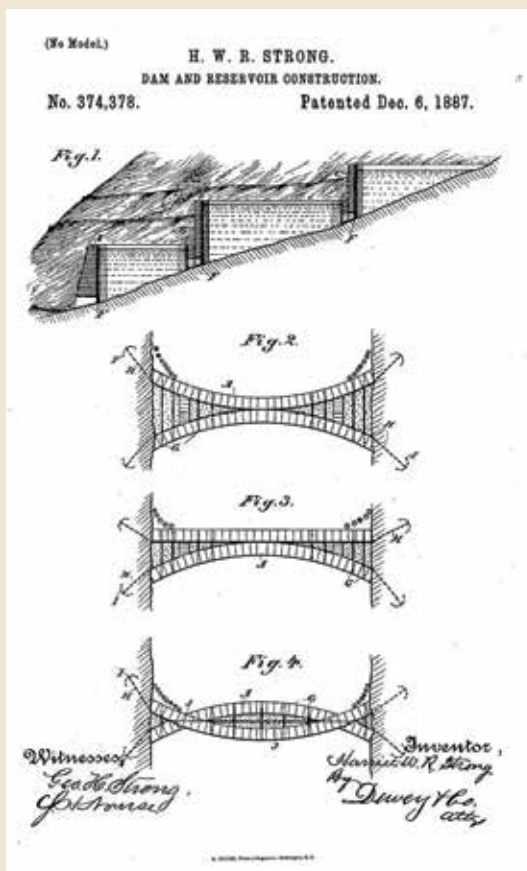
health issues and poor luck. Harriet had some bad health, too, and a spinal disorder that was not resolved until 1883. In the meantime, they had four daughters.

The Strongs and Harriet's brother, William, bought a 220-acre, mostly dry farm in what today is Whittier, California. The lack of sufficient water made the ranch a failure. Charles roamed from state to state, trying his luck at farms and mines, including investing in a gold mine that proved to be a fraud. Finally, in 1883 while Harriet was being treated in Philadelphia for her neurological condition, the desperate Charles killed himself. Her children insisted that their mother continue her recovery, and Harriet did not return to the ranch for several months more. It was a turning point.

Harriet Strong studied voraciously and interviewed everyone about farming, horticulture and irrigation. Walnuts, she decided, were her future—150 acres of them, and groves full of other kinds of nut and fruit trees. Her irrigation ideas came into play, and stair-step lines of (small) irrigation dams, each propping up the one upstream from it, worked well for the thirsty walnuts. The "Walnut Queen's" farm quickly proved profitable, and she paid off her debts.

She planted pampas grass (not a usual crop), finding that the ornamental South American plant, plain or dyed, was wildly popular as decoration. Sales were huge in eastern markets and in Europe. Her Pampas Plume Palace at the World's Columbian Exhibition in 1893 launched her to renown. All the while she became a staunch, but not embattled, feminist, promoting women's education and self-reliance, and the role of women in business affairs. She was the founder of the Business League of America and the first woman delegate to the Chamber of Commerce of the United States. (Neither was Strong "all business." She founded the First Christian Science Church of Whittier. She was an officer or on the boards of symphonies and art clubs; and she was the first woman on the board of trustees for the University of Southern California law school.)

Strong added thousands of acres to her property holdings. Water came from artesian wells and a steam-



powered pumping station, distributed by her reliable innovations. Some lands were leased out to farmers; others she managed for her own. She sold off properties with significant profits. A frequent witness to destructive floodwaters in the region, Strong positioned herself as an "agitator" for flood control, sitting on several water commissions including the Los Angeles County Flood Control Association. She promoted her patented system of storage reservoirs and her concept of source conservation, focusing on the needs for flood control and irrigation across southern California. Clearly, the need for lots of water was pressing. The Colorado River—all that virtually free, but wild, water—beckoned. And there was not

yet that pesky Colorado River Compact.

Just when Harriet Strong conceived the idea to dam the Grand Canyon is not clear, but the Colorado River was the elephant in the room. As an expert witness in Congress in 1918 she implied that scaling up her dam designs would allow for the canyon impoundments she envisioned. The idea of damming the canyon was not as heart-stopping as it would be decades later. Congressman Esch asked, "Is there any objection to your plan by people who think that the scenic grandeur of the place would be destroyed?" "No," she said, "it would be increased, because such reservoir[s] could be a place for boating and fishing. The scenic part of it is above the granite, if you remember." There was no further discussion on that point—not until the 1960s, anyway!

Those river profiles with the stair-step reservoirs let us dream of what could have been. A selection from among Birdseye's dams is one thing, but the string-of-pearls pools of Harriet Strong, all the way up from Grand Wash, is the stuff of aplomb. Imagine the entire river corridor deeply flooded clear through the Grand Canyon. True, Thunder River and the Havasu falls might be more accessible. But no more rapids; not a one. No scenic stops, at least as we know them. And the one and only "Woman of the River," Georgie White, never would have had a river to be the woman of—if the Dowager Dammer of the Colorado had had her way.

Earle Spamer

Book Reviews!

River to Rim—Second Edition, by NANCY BRIAN, Earthquest Press, 236 pages, ISBN: 978-1-881438-01-4, \$24.95

WHO HAS NOT STOOD on the rim of Grand Canyon tongue-tied by sublime scenery that literally steals your breath away? Or been hushed to speechless terror down below by the white-water maelstroms of Crystal or Lava Falls? It is at these transcendent moments, appropriately so, that words escape us. The urge to name places, however, is distinctly human. Some have even claimed the capacity to name essential for our earliest ancestor's survival. One might well make the same claim if you are a working river guide (or independent voyager) in Grand Canyon. Sometimes, of course, a guide's memory falls short. Then they are forced to resort to embellishment or far worse, outright fabrication. Fear not, fellow voyagers! Nancy Brian's *River to Rim* (Second Edition) will not only rescue you from those moments of geographical perjury, but increase your river cache as a knowledgeable canyoneer.

For those logophiles (lovers of words) among the river community *River to Rim* lands in the category of onomasticon, a vaguely erotic-sounding label, whose definition reads "a dictionary of names, especially personal or place names." The quality of any dictionary of names surely rests on two primary attributes: a pleasing prose style informed by clarity and brevity and an organizational scheme that invites, not discourages, the reader in search of information at their fingertips. *River to Rim* achieves both.

Dear reader, an alert: resist the urge to skip the Foreword and Introduction of *River to Rim*. It is here that Brian, a one-time park botanist and river guide with a head for details, offers a tasty first bite from her place name menu. Brian sets the stage with a timely personal anecdote, briefly explores the importance of place names, touches upon the history of place names in the Canyon and finally, presents a how-to-use this guide section for those readers who, like some drivers, are reluctant to ask for directions—all accomplished in a breezy style in a meager eight pages.

Avid guide book readers will appreciate *River to Rim*'s organizational scheme and layout. In the first four chapters Brian focuses specifically on the river corridor from Lake Powell to Lake Meade. The entries

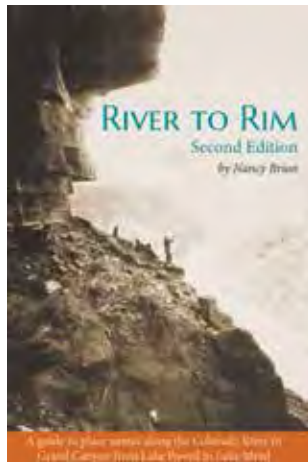
on the page are spaced nicely, absent the crowded feeling one sometimes experiences with guidebooks. Above each entry are mileage markers and equally important, river right (RR) and river left (RL) designations. If a place is away from the river, the entry is indented under the main drainage. The final three chapters address place names from the perspective of Major Plateaus, Rock Formations and Groups, and Native Americans. In other words, any guide on the river could plot with ease the upcoming day of naming places over morning coffee and *River to Rim*.

Comfortable access to information allows Brian's guide book prose to move effortlessly downstream. Her easy mix of historical facts, assorted quotes, and river vignettes invite the reader to speculate on larger Canyon narratives. We find out who named the place, events that gave a place its name, and most interesting to any guide, the contributions of river guides over the years. Brian's addition of fifty or so "new" place names (like my favorite, *God's Pocket*) are sure to intrigue other place name zealots. The observant reader will also catch Brian dropping a dollop of playful humor (See Indian Dick) into a number of her entries.

Normally I am not an Appendix guy, too lazy to commit to a search-and-enlighten mission. Brian's three appendices, however, are worth the effort for those interested in elevating their Name-Game. *River to Rim*'s extensive bibliography is also sure evidence that Brian has done her homework. A few moments scanning the two-hundred titles may reward the hardcore devotee of Canyon lit with a few no-longer-hidden gems.

It's true, as Mark Twain suggested, that you never want to ruin a good story with the truth (or put another way, "Never let a few facts get in the way of a good story"). It's also true that a solid fact (or name) is the bedrock launching pad for many a tall tale. *River to Rim* is, indeed, a treasure trove of Canyon information at your fingertips. Novice guides just starting out, veterans mid-stream in their career, ancient mariners whose memory may need a jog—take heed! Keep *River to Rim* close at hand, in your boat or beside your bed during the off-season.

Vince Welch



From Powell to Power, BY OTIS REED “DOCK” MARSTON, Vishnu Temple Press, 2014, 532 pages, ISBN: 978-0990527022, \$30.

IF YOU’VE READ ANY Colorado River history books written in the last thirty 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 CFS in 1957 and, in a sportyak; record lows in 1963; joined Ed Hudson’s first motorboat descent in 1950 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 Marston

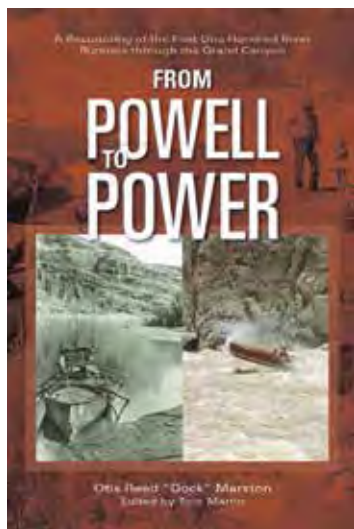
could come up with only a few pages about the most obscure voyagers like Hum Woolley. Marston offers lots of background stories, often surprising, such as Julius Stone helping Pete Berry build the Grandview Hotel in 1896. Marston goes into longstanding discussions about boat designs, rowing styles, wave 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 admirably 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 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.

Don Lago



Deadbeat Dams—Why We Should Abolish the U. S. Bureau of Reclamation and Tear Down Glen Canyon Dam, BY DANIEL P. BEARD, Johnson Books, Boulder Colorado, 2015, 143 pages, ISBN: 978-1-55566-460-2, \$16.95.

DAN BEARD'S CAREER with the Federal Government spanned four decades during which he worked for the White House, both chambers of Congress, the Interior Department, the Library of Congress and—at the suggestion of Bruce Babbitt—he was appointed Commissioner of the U.S. Bureau of Reclamation by President Clinton. Consequently he has an inside view of how Washington politics works, especially when it involves the Bureau of Reclamation.

These massive Federal water projects were originally sold on the basis that they would pay for themselves and provide a public benefit. Repayment terms for project costs were incredibly favorable: payments were not scheduled to start until some time after the projects were finished, and no interest was charged. Because of this time lag, repayment would be with devalued dollars, i.e. significantly less than true cost. In reality, repayment doesn't materialize: the "Water Nobility" either "can't afford" it, or has the political clout to avoid it. Hence the term "Deadbeat Dams."

This little book is a timely wake up call, and a reminder of what many have known for a long time: water management under the Bureau of Reclamation is a classic example of political favors extended to special interests—the "Water Nobility"—at the expense of the public at large. We are in drought-driven water crisis, and our ability to deal with it rationally is crippled by our history of bad water management.

Take California: the problem is not a shortage of water, as such, but rather the system that encourages the largest users to waste water, while nonagricultural users are ordered to conserve. This happens because the "Water Nobility" has a strangle hold on the supply and use of water: their (highly subsidized) water rights come before those of everyone else.

Water is being provided to the largest users at much less than its actual cost. Because it's so cheap, there's no incentive to use it wisely. But that's not the worst of it: some of this water is used to grow crops (like cotton) which themselves are subsidized: the infamous "double

subsidy."

Beard, who should know, says that all essential functions of the Bureau of Reclamation could be done by other agencies.

He also believes it doesn't make sense to store Colorado River water in two half full reservoirs—"Lakes" Powell and Mead—in light of the current drought, which may well last for a couple more decades. Instead, it makes sense to store all the water in Lake Mead, where less would be lost to evaporation.

The book is a brief outline of the author's arguments. He could have expanded them into a book large enough that most people wouldn't read it. The truth is that more details supporting his arguments are easy to find in other books (or on the Internet); many of them are already familiar to anyone who has been paying attention.

Beard answers the question "How do we get from the current mess to the improved, rational, water management that we desperately need today?" His idea: get rid of the subsidies that keep the current system alive; better water management will follow for economic reasons.

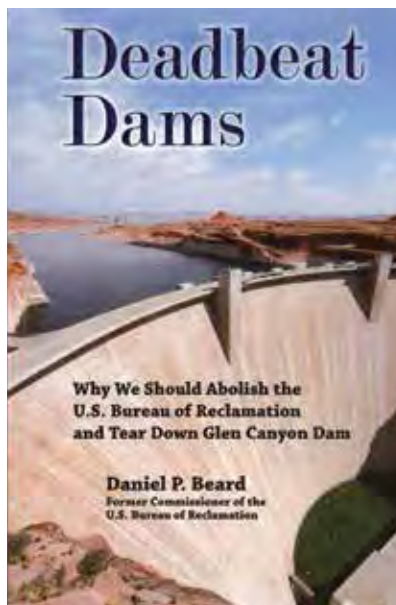
If large-scale water users had to pay what their water actually costs, they would make more intelligent use of it. Some water that's now used to grow low value or subsidized crops would be sold to urban users instead. This could be very profitable for anyone who owns water rights.

I've always thought that agribiz has such a stranglehold on Californian politics that nothing could ever change. It only took a minute, however, to learn that large scale agriculture—which uses much of the land, and eighty percent of the water in the state—only contributes something like two percent to the state's economy. Of course, the "Water Nobility" doesn't want you to know that.

In an era where much government spending is financed by borrowing, there's a lot of interest in anything that generates savings. As powerful as the "Water Nobility" might be, they are also ultimately vulnerable—once voters learn the truth, and start putting pressure on politicians to end the giveaway.

What you can do: read this book, help spread the message.

Drifter Smith



The Hidden Canyon, BY JOHN BLAUSTEIN, Cameron and Company, 2015, 160 pages, ISBN-13: 978-1937359744, \$29.95.

THOSE LUCKY ENOUGH to be around Grand Canyon in 1977 might remember a wonderful book by John Blaustein called, *The Hidden Canyon: A River Journey*. This was about the time I finished my first river trip in the canyon and the book appeared just as my senses were being inundated with the sights, sounds and smells of the Colorado River in Grand Canyon. I was in love and the book seemed to capture the essence of that relationship, equally seductive and terrifying to a young man fresh from the suburbs of southern California. Fortunately, Blaustein's book came just when I could either turn away from the terror or approach the seduction. I think I chose pretty well.

With an introduction written by Martin Litton and a river trip journal penned by Edward Abbey (yes, that Litton and that Abbey), *The Hidden Canyon* became an instant classic and tangible tool that we could use to show those

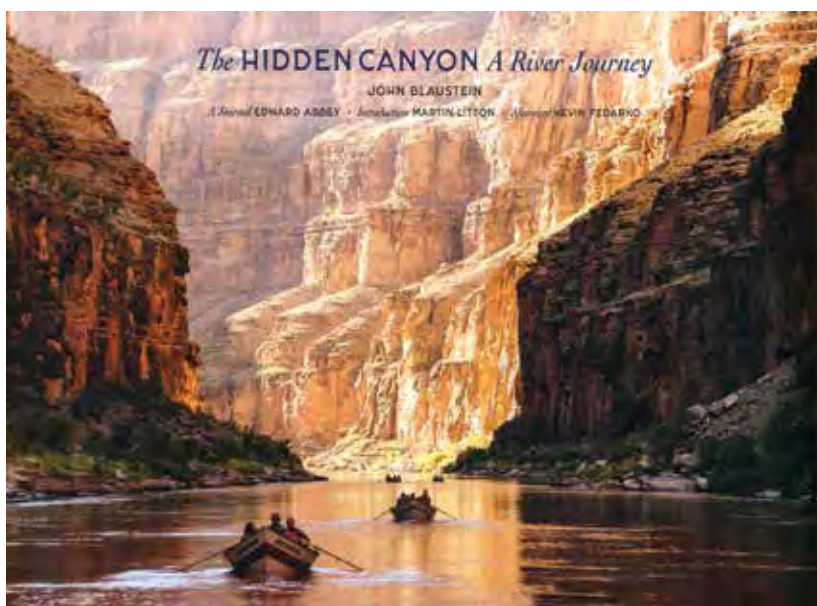
not-yet-been-down-the-river folks exactly what we were raving about after each take-out. Blaustein's photographs captured many of the ephemeral flashes of beauty that pop up everywhere in that world of rock, water and light. My copy was dog-eared and ruined long before I began a personal library. The first edition of *The Hidden Canyon* sold 52,000 copies in its fifteen-year run and a second edition in 1999 sold over 18,000 in ten years. That's a book with legs.

Something this good should not simply go away. So Blaustein, who still rows a baggage raft once or twice a year with the dories, has come out with a sparkling new third edition full of upgrades including additional pages and some new photos. Much of the original work is in here and those who think well-enough-should-be-left-alone will not be disappointed. It looks and feels like the '70s edition but with a 21st century

upgrade. The book has been nicely redesigned such that the text and photos are interleaved now (previous editions had alternating signatures that contained only text or photos). Now, as each day moves downstream from Lees Ferry, Abbey's journal is accompanied by corresponding images.

Blaustein also updated his own preface but left Litton's introduction mostly alone (only a few now discredited geologic ideas were given an update with Litton's voice and message still very much alive in there). And of course, Cactus Ed has been gone now for over 25 years so naturally his journal remains unchanged with the very words he penned while on the river in the 1970s. (Curiously, Blaustein had to negotiate rights to reprint the curmudgeons' words with his

widow, Clarke Abbey, who is thrilled to have Abbey's words still resonating for people who travel down the river). Also new to this edition is an Afterword written by Kevin Fedarko and describing how Martin Litton first became enchanted with dories while writing an article in *Sunset Magazine*. That enchant-



ment ultimately spread to myriad guides who were then fortunate to experience the rivers' charms behind oars in small wooden boats.

There are 147 images in this new edition, 49 of which have not been published before. Unlike the earlier paperback editions, this one has a cover printed on laminated cardboard stock, giving the book the feel of a hardcover. It seems more substantial than previous editions. My only quibble with the book is that there isn't a hot meal simmering away on a sandy beach at the end of each chapter. Anyone with a love of Grand Canyon, Ed Abbey, Martin Litton, or John Blaustein's beautiful photographs should pick up a copy or two. There still are those who wonder what the hell it's like down there.

Wayne Ranney

The Wheeler Survey in Grand Canyon

MOST BOATMEN HAVE HEARD of the 1871 Wheeler Survey or perhaps seen a photograph of Mohave Indian guides dragging their boats upriver or the group posing with their boats at the mouth of Diamond Creek. But few know much more of the story. What follows is the Colorado River portion of Captain George M. Wheeler's massive report of that most peculiar survey.

At some point one has to ask what on earth this expedition was all about. Beginning at Fort Mohave near modern day Bullhead City, the expedition sailed, poled, and dragged their boats for 210 river miles to Diamond Creek. When they arrived Wheeler wrote, "The exploration of the Colorado River may now be considered complete." But hey, didn't Lieutenant Ives explore the lower canyon in 1858, and John Wesley Powell traverse the river in 1869? Of course they did, which tends to portray Wheeler as desperate for some ill-timed fame or relevance.

It turns out that after the Civil War, the Army was slow to resume its mapping of the West, with the civilian led surveys of Hayden, Powell and King taking center stage. Wheeler was in a desperate attempt to reinvigorate the Army's mapping program, which to him would have practical purpose over the purely scientific pursuits of the other surveys. This may yield some reasoning for why Wheeler dragged his boats 55 miles up the Colorado in Grand Canyon. The competition between surveys also helps explain Wheeler's blatant omission of Powell's previous exploration of the Colorado.

Stephen Pyne, noted historian of the exploration period in Grand Canyon wrote about the attempt:

Wheeler searched eagerly for a spectacle that would put his survey in the public eye. Powell had the Colorado canyons, Hayden the Yellowstone, King the Sierra Nevada. With a mixture of boldness and temerity, Wheeler sent field parties to all of them—too late to claim priority yet early enough to be charged with duplication. His grand gestures always fell short. When he labored up a mountain in the Sierra Ancha [central Arizona] and satisfied himself that no white man had ever been there before, no white man seemed to care. His expedition up the Colorado River in 1871, clearly intended to challenge Powell's presumption and to recapture the glory days of the [Army] corps, instead left him fighting against the currents of popular opinion. Wheeler was traveling the wrong way.

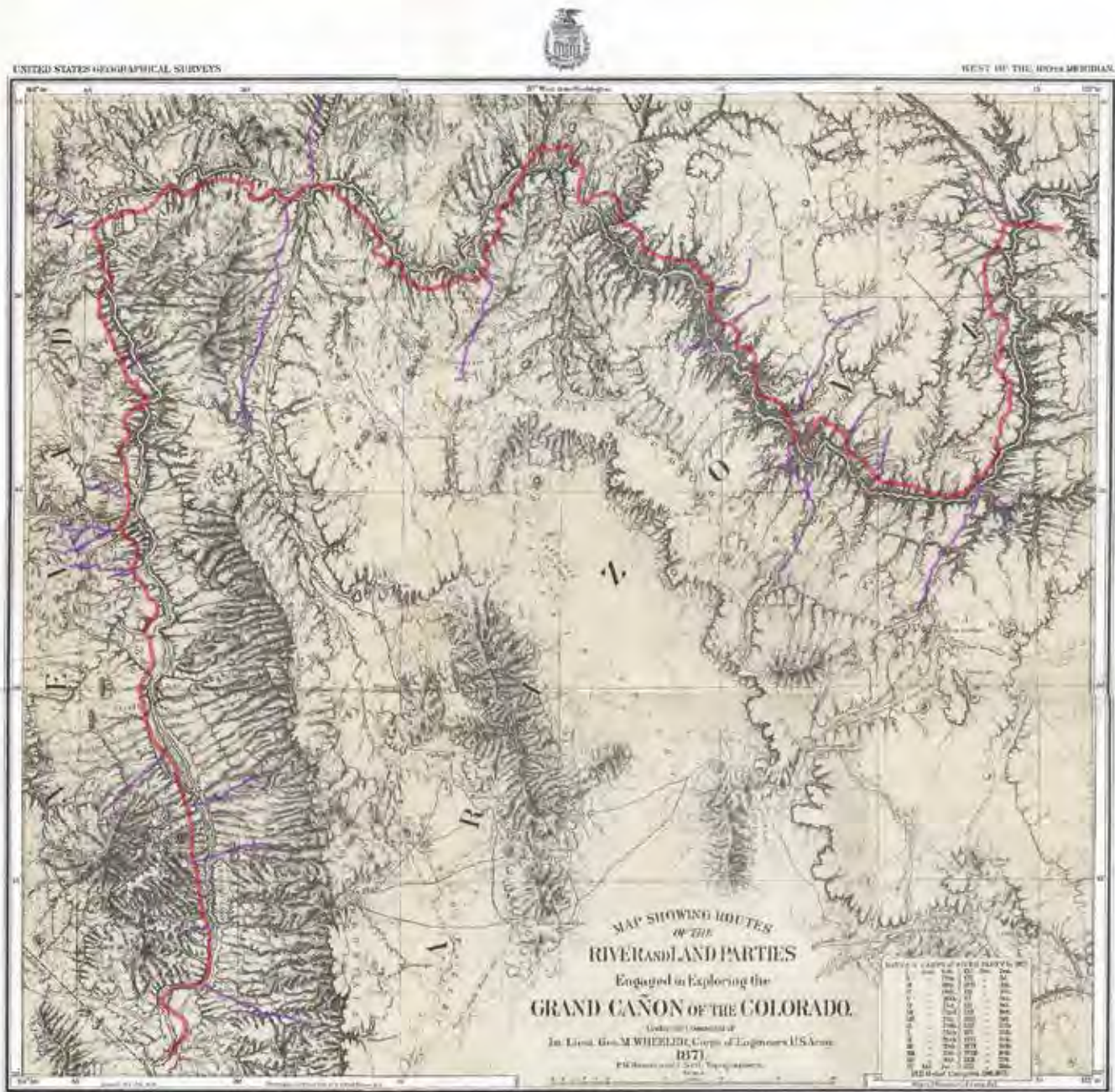
Wheeler's report was not published until 1889, by which time it had lost all its remaining relevance. In spite of this, the expedition resulted in some firsts. Timothy O'Sullivan was along with his huge, glass-plate camera and took the very first photographs of Grand Canyon. Two geologists of note were along as well, Archibald Marvine and G.K. Gilbert. Marvine was well versed in the geology of the Rocky Mountains and was one of the first scientists to clearly challenge John Wesley Powell's idea about antecedence for the Green River. Gilbert needs no introduction to geologists, who often cite him as America's greatest earth scientist. His introduction to the Grand Canyon and the Colorado Plateau (which he named along with the Basin and Range) was in the service of the Wheeler Survey.

Gilbert had studied two years under Newberry, the first geologist to see the Grand Canyon. Gilbert gave the Grand Canyon its first named formation—the Redwall Limestone, and his introduction through the Wheeler Expedition spurred him into a second visit in 1872 where he visited the North Rim and descended Kanab Creek to the river. He later met with Powell in Salt Lake City where, in his own words, Powell and he "swapped lies." Understandably, Gilbert soon switched allegiances, joined forces with Powell, and went on to an illustrious career. What he had learned on the Wheeler Survey was later published as part of the Powell Survey.

The story of this trip begins just below modern day Davis Dam and proceeds upriver beneath today's Lake Mohave and Lake Mead, describing country seen by virtually no one alive today. Photographer O'Sullivan and geologist Gilbert captained the two successful upriver boats, naming them *Picture* and *Trilobite*. Topographer P.W. Hamel calculated their flow upon departure at 16, 232 cfs. It is worth noting that several of the fearsome "rapids" in their first three weeks were routinely upriver by early steamboats. After regrouping at Pearce Ferry for a few days, Wheeler's bizarre quest spends another twelve desperate days battling the river's rapids, the canyon's topography, and dwindling rations, to rendezvous with their overland party at Diamond Creek. Two days later, as Wheeler dispatched several of his men to return downriver to Pearce Ferry, Powell's 1871 expedition was just reaching Lees Ferry.

Relevant illustrations from Wheeler's report are included, along with some of O'Sullivan's stereoviews now housed at the Library of Congress. The map they produced is remarkably accurate, considering the conditions and technology.

Wayne Ranney and Brad Dimock



Wheeler Survey map overlaid by the actual location of the river (in red) and side canyons (purple) as shown via satellite.

* * *

ASCENT OF THE COLORADO RIVER AND EXPLORATION OF THE GRAND CAÑON TO THE MOUTH OF DIAMOND CREEK IN 1871.

The report of the results from this special party of the expedition of 1871 is made in itinerary form, as the examinations presented special features, making this boat trip an expedition in itself and the route prominent above all others.

The river party left camp at Cottonwood Springs, on the east base of the Spring Mountain Range, Nevada, and, traveling by the most direct line of march, reached Camp Mohave on the evening of the 12th of September.

Here were stored the boats, three in number, that had been constructed in San Francisco and shipped via the mouth of the Colorado to this point. In addition thereto, one barge, the property of the Quartermaster's Department, through the courtesy of the commanding officer, Bvt. Maj. R. H. Pond, at Camp Mohave, was added to the little fleet.

Time had been most actively employed in concluding the arrangements necessary for the trip, among which was the making of terms with the Mohaves, whose services were actually necessary in order to carry out the enterprise. Captain Asquit, the second peace captain of the tribe, and thirteen others, finally decided to attempt the trip, although they were timid and greatly feared the dangers of the region outside of the

country of the Mohaves.

The river party consisted, in addition to myself, of P. W. Hamel, topographer; G. K. Gilbert, geologist; Dr. W. J. Hoffman, naturalist; T. H. O'Sullivan, photographer; E. M. Richardson, assistant topographer and artist; Frank Hecox, barometric assistant; F. W. Loring, general assistant; six boatmen, six enlisted men (one sergeant and five privates from Company G, Twelfth Infantry) from Camp Mohave, and Captain Asquit and thirteen other Indians of the Mohave tribe.

I wish here to renew my appreciation of the kindness extended by all the officers then stationed at Camp Mohave, especially to Bvt. Maj. R. H. Pond, commanding, and Lieut. Charles P. Eagan, quartermaster and commissary.

September 16.—River Camp No.1, near the old mill at Hardyville. About 1 p.m., by hard rowing, the boats and barge were fairly under headway in the stream, but on account of the current were soon obliged to put out the tow-lines. These are firmly handled by the different members of the party, all of whom are possessed of a genuine enthusiasm for the trip, and the boats, except No. 2, anchored at the mill near Hardyville, reaching the camp about dusk. The Indians so far feel well disposed, having the promise of a good time and plenty to eat.

[now Bullhead City, Arizona]

September 17.—River Camp No. 2, near foot of Mount Newberry. Estimated distance traveled, about 15 miles, towing greater part of the day. Alexander's Camp was passed about 1-1/2 miles above Hardyville. This is the highest point at which the Colorado River was then crossed by a ferry. One has since been established at the mouth of the Virgin River, whence a road to the southward reaches the Hualapais mines. Pyramid Cañon was passed (see Ives's Report) and camp made on the eastern side of the river, nearly opposite Mount Newberry. A treaty relative to rations (the first discipline applied to the Indians in regard to subsistence) was here made. As the land of the Pah-utes, with whom the Mohaves were lately at war, will soon be reached, strong guards are therefore necessary. The parties all sleep in a line along the low sandy beach. Travelled a distance of approximately 15 miles. The float rock in the washes indicate that the Black Mountains to the east are volcanic.

[now beneath Lake Mohave]

September 18.—River Camp No. 3, foot of Painted Cañon. This morning the first considerable rapids are met just above the camp, and the entire party are obliged to take hold of the line. Above this point to Cottonwood Island the river flows with a lesser current, and a favorable wind allows of the use of sails. The island is reached shortly after meridian, where ruins of two huts formerly



Stereograph card. Camp below Painted Cañon. Photographer, Timothy H. O'Sullivan. Library of Congress

occupied by white men are alone seen. Near here crosses the mail trail from Camp Mohave to Saint Thomas and other towns in Southern Utah.

The Pah-utes have left this locality since their late trouble with the Mohaves, and it is now neutral ground. The island is nearly 7 miles long, is quite narrow, but covered by a fine coat of rich alluvium. From this point, the sails being again set, we reach a delightful little camp at Painted Cañon, named after the variegated lavas of its walls, where the boats are beached and overhauled. Observations for latitude were here taken, and also a section of the river.

September 19.—River Camp No. 4, near Big Bend. At the last camp the camera was first called into requisition. In the early part of the day the boats thread their way easily through Painted Cañon, passing the small round island shown on Ives's map, near which cemented gravel mesas in bold bluffs of 150 feet are noted. Camp is made along a narrow sand strip just above the first noticeable bend of the river. Nothing of marked interest is noted except the peculiar mountain forms, many dark and others variegated, that project from the sandy mesas along the banks, and the variety of miniature cañons entering into the main or Painted Cañon from both sides. Observations for latitude are taken.

September 20.—River Camp No. 5, mouth of El Dorado Cañon. The day has been warm, progress slow and tedious. Several rapids stronger than those heretofore have been encountered, and they are becoming gradually more difficult to pass on account of the steepness of the banks. A number of curiously eroded beds of half consolidated gravel are seen, especially on the eastern bank. The growing moon lends its attraction to the camp, situated near the old quartz mill, the point reached by Lieutenant Lockwood and myself in 1869, in crossing the desert from Las Vegas ranch, via Forlorn Hope Springs. A lava butte of brown and orange colors on the Arizona side is passed. The river is the color of red clay and quite as thick as the Missouri. The Black Cañon in advance seems to be an eroded channel through dark volcanic rock, while near its foot volcanic

"Free-viewing" is seeing stereoviews in 3D without the use of a stereoscope. Focus your eyes to infinity. Hold the card 12-18 in. away and raise it into the center of your field of vision maintaining infinity focus with your eyes. You may see 4 images at first or only 2. You may need to focus the image by moving the card closer or further away. You want to see 3 images with the center image appearing 3 dimensional. It will get easier to do as you practice until it becomes almost automatic.



Camp No. 7. Looking downstream from Mirror Bar, Black Canyon
T. H. O'Sullivan. Library of Congress

conglomerate appears. Sextant observations taken for time and latitude.

September 21.—River Camp No. 6, Black Cañon, below Roaring Rapids. A redistribution of boat parties is made and a rendezvous fixed for a camp above the Black Cañon. One boat following in the rear, which contains the photographer and his outfit, is called the "Picture." There are still short spaces along which rowing may be done. Several rapids are passed during the day, but none that give the barge much difficulty except at the mouth of a cañon coming in from the west. Observations made for time and latitude.

September 22.—Camp No. 7, above Roaring Rapids. A reconnaissance, following the Wash and reaching the heart of the ridge on the west side of the Black Cañon, proves the existence of a pass leading toward Las Vegas Springs and ranch, and of water in little pools here and there, and of natural tanks cut in pot-hole shapes in the walls of the winding cañon. Pass Roaring Rapids (see Ives's Report) during the day; also a cave on the western bank, known as Conner's Cave.

[near Willow Beach, Arizona, head of Lake Mohave]



Camp No. 8, view upstream. T. H. O'Sullivan. Library of Congress

September 23.—Reached Camp No. 8, heart of Black Cañon, above “Violent Rapids” of Ives. The walls of the cañon at this point make apparent sunrise very late, and not until 6.30 a.m. does this messenger appear. The sunshine does not reach the river part of the cañon for one-third of the daytime, as the walls, varying from five to fifteen and even seventeen hundred feet in height, approach perpendicularity in this portion of the cañon. To the east plateau beds rise from three to four thousand feet above the river. To the west the Black Cañon range, so called, is composed of volcanic material overlying sedimentary rocks.

The moon is now so far increased that the last two evenings in the Black Cañon have been most picturesque and lovely. The rapids on to-day's route have been severe, delaying the barge and obliging a portage of much of its cargo. We were unfortunate in capturing game, whether mammals or birds, although the tracks of deer and mountain sheep, probably coming to the river for water, are noted at the entrance of nearly every side cañon; still little game is secured, while now and then flocks of duck, sandhill cranes, and pelicans are seen, but rise, as a rule, beyond gunshot range.

[approaching Hoover Dam site]

September 24.—Reached Camp No. 9, head of Black Cañon. —The necessity for reaching the land parties at the crossing near the foot of the Grand Cañon does not permit of our resting even on Sunday. By diligent labor camp at the head of the cañon is reached, where the walls are quite abrupt and fully 1,700 feet in height. This brings us out to daylight once more. During the day several rapids have been passed, none very difficult except one, which will be called Horseshoe Rapids, because of its form.

Here the face of the current strikes the western bank and from it rebounds to the south and east with impinging force along a collection of seemingly small boulders; and upon striking the sharp bluff along the eastern shore takes a similar turn to the southwest. This rapid delayed us two hours. The channel has been deep and the water smooth, although the current was strong. The walls of the cañon have exceeded the usual height, and come for the greater part to the immediate edge of the water, bordered, however, at intervals by little sand banks. The walls of the cañon near its head are composed of a highly metamorphic sandstone, exposing here and there brecciated cliffs and conglomerate boulders.

The Black Cañon, although interesting in the ex-

treme, does not equal in grandeur what was expected of it from the description given in Ives's Report. The walls are not so high nor as vertical as therein represented. However, the velocity of the current and number of rapids that are met, the sombre character of the walls, many peculiar weird forms, points at which a stillness like death creates impressions of awe, all tend to the belief that one of nature's grand labyrinths has been passed.

September 25.—Reaching River Camp No. 10, in sight of Callville (deserted). An early start soon brings us past Fortification Rock to the mouth of Las Vegas Wash. A considerable rapid is passed near the head of the cañon. Those encountered later in the day were less violent, as the river spreads over a wider space. There is a marked change in the temperature. The equinoctial having passed, there are fewer changes in the increased currents due to local precipitation at points nearer the sources.

Las Vegas Wash was passed at noon, and thus have had views on three sides of the isolated peak which will be called Black Butte. Fortification Mountain is in sight during the entire day. The shallow rapid opposite Las Vegas Wash contained sufficient water to allow the passage of the barge, which only reached camp at 11 p.m. The brightness of the moon affords, however, a light nearly equal to that of day. Table Mountain, nearly opposite the head of Black Cañon, an elevation of approximately 2,250 feet, is one of the marked features. The immediate cañon walls are not greatly in excess of 1,000 feet, while protruding points are from 1,750 to 2,000 feet, approximately.

September 26.—Reaching River Camp No. 11, near the foot of Boulder Cañon. This point, a short distance within Boulder Cañon, has been selected as a rendezvous. Leaving the boats for a while, following up the wash that comes in from the south at a point in sight of Callville, an Indian trail, supposed to lead into the Hualapais country, is noted. One of the boatmen says that the Hualapais and Pah-utes cross the river at this point and interchange commodities. It is called one and a half days' long Indian marches, probably 75 miles, to the Hualapais mining district.

The walls of Fortification Rock seem to be sandstone highly metamorphosed, while those in Boulder Cañon are of granite. Floating pieces of iron ore (hematite) are noticed in the wash. Here in a marked degree is shown the large annual denudation of these sandy and conglomerate mesa forms. Thus it is made clearly manifest that the erosive agents of nature little by little are decreasing the profile of all mountain forms.

The Indians exchange powder and ball for sheep and buckskin, the Pah-utes buying from the emigrants.

September 27.—At Lay-Over Camp. Astronomic and magnetic observations are here made, the former having been taken at all other camps. The boats and barge are carefully overhauled, cleaned, and caulked. Reports were heard of gold ore having been found near the wash that leads into the river from the south, at the mouth of which camp is made. This day of rest, being the first since the commencement of the trip, is heartily appreciated. The "Picture" comes up a little before noon, and the party are all together again. The photographic party have met with good success. Having rationed anew, they will still continue on a roving commission until the rendezvous at the crossing is made.

September 28.—Reached River Camp No. 12, near head of Boulder Cañon. Being anxious to arrive at the crossing, an early start is made, and all the force crowded to its utmost. A severe wind storm is met near the head of the cañon, and the party becomes divided, one portion camping at the head of the cañon and another fully 2 miles above. At the former camp a gale fills the air with sand so completely that it could not be kept out of the food, and during the night formed in drifts, covering the blanket beds.

Mr. Gilbert furnishes the following general section of Boulder Cañon: a nucleus of syenite, against which rest plicated crystalline schists, and over the whole are successive massive layers of trachyte, flanked at the east by basalt.

September 29.—Camp No. 13, near mouth of Virgin River. The river here makes a sudden bend to the southward, and although the right-line distance to the mouth of the Virgin River does not exceed 5 miles, by the river course it is fully 10. The rapids encountered to-day are less violent than usual. Two settlers are found, who have just arrived for the purpose of establishing a ferry to aid prospectors en route to the Hualapais mines, in Arizona. They have found a good road to the head of the Sacramento Valley, which to the southward skirts the mountains to the eastward of this valley. An Indian was here found with a note from the guide, Spencer, which gives hope that he will accomplish his difficult mission of selecting a camp on the south of the river for a land rendezvous after having planted signals at the mouth of Diamond Creek, the objective point of the river party, and having selected a crossing and made a junction with the land command near Saint George, Utah.

The territory of the Pah-utes, who have lately been at war with the Mohaves, has been successfully traversed and neutral ground reached. The Mohaves held a long conference with the Pah-utes of the Muddy region, several of whom live in this locality.



Camp No. 16, Iceberg Canyon. T. H. O'Sullivan. Library of Congress

A singular salt well on the mesa was visited. The elevation is found to be approximately 50 feet above the river. It is doubtless a reservoir of waters accumulating on the rock bed that here ascends nearer to the mesa surface.

September 30.—River Camp No. 14, near Notre Dame Rock. A distance of from 13 to 14 miles was traveled and camp made on the southern bank a little after dark. A heavy rapid was passed a little less than 1 mile below camp, and also during the day, on the southern side, peculiar mesa forms, denoted respectively as Dome Rock and the Cloister. The river here bends considerably to the south. The barge moves slowly, and the duty forced upon the white men, who have to go frequently into the water, is very severe. One sees what appears to be a high range of mountains about 30 miles distant, apparently perpendicular, which is presumed to be the commencement of the Grand Cañon.

October 1.—Reach Camp No, 15, above Long Rapid. Rattlesnakes have been very plenty along the sides of the cañon. To-day Notre Dame and Cathedral Rocks were passed, and a little higher another mesa, islands that are the commencement of the cañon cut out by the river from the Virgin Range. As this is our first cañon upon entirely new ground it will be called Virgin Cañon. Two or three slight rapids are passed, and a very large one at the head of the cañon, by far the most violent yet seen.

The difficulties of towing have been very great. A salt spring is noted on the southern bank, near the center of the cañon.

October 2.—Reached Camp No. 16, foot of Iceberg Cañon. Emerging from the cañon are some lone rocks, against which the water breaks heavily in the flood season. An island appears here which is doubtless covered at high water. Indians approached from the southern bank and proved to be Pah-utes, who are planting a small strip of land near the river. They bring squashes, melons, and nets, to trade. They seem to be entirely sequestered from the other Pah-utes, and have no news except that they have apparently seen the source of Truxton Springs. It is surmised that they have seen white men cross the river a little above the Grand Wash. The Mohaves are getting tired and lazy, and the boats move wearily, passing a wash coming in from the north, and next a rapid, just at the foot of the cañon, that, because of the peculiar contour of its northern walls, is called Iceberg Cañon. The barge, as usual, does not reach camp until after dusk.

[near South Cove]

October 3.—Camp No. 17, foot of Grand Wash, Iceberg Cañon. The peculiar shades of color drifting in the strata and the contour of the prominent walls have all been most singular in this cañon. The progress to-day is

slow, and at night the distance traveled is not more than 7 or 8 miles.

[multi-day layover at Pearce Ferry]

October 4.—Camp No. 18, crossing of the Colorado.

To-day beaver-holes were noted and paths very plentiful along the river. One boat pushes ahead to reach the point of crossing, where it is expected to meet one of the land parties prior to October 5. The barge and other boats are left, with orders to come in as rapidly as possible. The walls of the cañon are soon passed, and what seems to be the extreme face of what well could be the beginning of the Grand Cañon is seen. In between are numbers of broken washes of semi-plateau slopes. In less than a mile horse-tracks are discovered, and it is concluded that a few horsemen had camped there some days since. In tracing these up the river the land camp would doubtless be struck. Traveling ahead alone on foot on the river bank voices are soon heard, and it is found that Lieutenant Lockwood and his party had come to the river, thinking it might be necessary to build a raft, and had gone a little way up the river to the old Ute crossing to get timbers and find a trail on the other side. Our meeting here was a cause for mutual congratulation. Here the mail is received, and parties

at once dispatched to bring the main command to the crossing. Our rendezvous camp is made on the southern side, and everyone is gladdened to know that the most difficult enterprise of the expedition has been so far consummated in a most satisfactory manner.

October 5.—At the crossing of the Colorado. The day was spent in camp in pleasant intercourse, making arrangements for further operations, and the opportunity is taken advantage of to thoroughly overhaul the barge and boats. The former is to be left at the old Ute crossing, about 3 miles above the camp. The start will be made with picked crews, rationed for 15 days, hoping to reach the mouth of Diamond Creek in that time. The barge will form the basis of supply in case the difficulties of the ascent necessitate falling back upon it. Good grass is found upon the plateau about a mile and a half to the southward, where the animals can recuperate. A marked change as to the conditions of grazing is noticed at once upon crossing the river. Between the walls of the cañon to the east and the Virgin range to the west, nearly as far north as Saint George, Utah, is an area almost entirely destitute of grass, while every plateau, with its contiguous mesas, is covered with a thick bed, as one passes to the southward.

Parties of relief are projected, to reach the crossing



Camp No. 18, Pearce Ferry, looking downstream. T. H. O'Sullivan. Library of Congress

from the rendezvous at Truxton Springs with further rations in case of disaster. Another party is to attain the mouth of Diamond Creek, which is about 35 miles from the general rendezvous. Different routes of travel to be followed between now and the close of the season are discussed and arranged. About 4 o'clock the command begins to file down to the river bank and is brought across the river as fast as the different parties come up. All the boats are brought into requisition and the concentrated force quickly completes the crossing. The entire expedition is safe on the southern side of this turbid, unmanageable stream; and thus the greatest and most extraordinary obstacles of the season are successfully passed.



Pearce Ferry, looking upstream. T. H. O'Sullivan. Library of Congress

Friday, October 6.—At crossing of the Colorado. All the animals are brought across this morning by swimming against a fierce current with a single loss. Mr. Gilbert proceeds with his boat to the mouth of the Grand Cañon with a view of making a geological section at this point. He succeeds in reaching the high mesa, about 3,500 feet, but is unable to return to the bed of the river before dark, and makes his camp high up in the rocks.

The Mohaves have a great feast over the animal that was killed in crossing, and in consequence many are sick; but the presence of a Pah-ute medicine-man has its influence in relieving the horrible pains of several of the overfed aboriginals. A greater part of the day has been made hideous by his roars, screams, and moans over the victims. For the third time the Mohaves have tried to desert and return to their homes. By dint of threats and persuasions they are, however, induced to remain until the completion of the river exploration. Observations are here made by Lieutenant Lockwood and myself for

time and latitude. The barge is left near the crossing as the nucleus of a relief station, and with it Sergeant Eisenbise, one soldier, Captain Asquit, and three other Indians. The cañon exploration is to be made by 3 crews of 9 persons each.

October 7.—Camp No. 19, near foot of the Grand Cañon. The land parties are left this morning to take one more day for recuperation, and the three boat parties merrily start out to search for further wonders in the Grand Cañon, imagining but few of the many difficulties that were soon to be met.

Gilbert Camp is reached at 1 p.m. but he had not then returned from the summit of the plateau. A little farther on a full view, magnificent beyond description, of the walls of the Grand Cañon is had. Camp is made after nightfall on the southern shore, near a little stream trickling from the sides of the cañon. Sheltered by the foliage that clusters around this little ravine one manages to protect himself from the wind-drifting sand. In the vicinity of the old Ute crossing, near the foot of the Grand Cañon, the river widens and the rapids are more shallow. This is the best point yet noted for fording, still in the lowest of waters swimming would be necessary, and at high water doubtless the swift current would prohibit this method even.

[near Emery (Columbine) Falls]

October 8.—Camp No. 20, head of Winding Rapids. In following up the little ravine near the camp the source of its pure stream of water is discovered, and near it most beautiful beds of ferns. The photographer remains in this locality taking views. The springs near the Tufa Bluffs, on the north side, not far from our former camp, were examined and four were named—Tufa, Grotto, Baptismal Font, and Holy Water Cup. The temperature of these springs is 70 degrees Fahrenheit. The water is most clear and sparkling. A small stream of water, entering the river from a side cañon to the south, was passed where elm trees were seen. Five rapids are passed within two miles. A section of the river is here made by Mr. Hamel, and observations for time and latitude are taken by myself.

October 9.—River Camp No. 21, near Cascade Rapids. Camp is broken early and the start made in fine style. It is hoped this day to make considerable distance, but soon many rapids are stumbled across, and at noon 9 had been passed, and prior to sunset, 15, some of which had as many as three falls. Observed three tufa mineral springs about noon, temperature 70 degrees. During the day a monument on the north shore was passed, in



Springs near the Tufa Bluffs, north side.
Top: Near Rampart Cave?, Baptismal Font Spring
Bottom: Above Grotto Spring, Grotto Spring,
Note: If anyone can match these skylines on a runout and pinpoint the photo locations, please contact Brad Dimock with info. info@fretwater.com.

which was found a memorandum signed by “4” men, one of whom was O. D. Gass, of Las Vegas Ranch, Nevada, who had ascended to this point in 1864(?) (the “4” was partly obliterated.)

The rapids are more formidable than any yet seen. I am satisfied that no one has ever ascended the river above this point, and Mr. Gass, one of the 4 persons mentioned above, told me in 1869 at Las Vegas ranch that he considered it impossible to penetrate further. It is for this party to try it, however, and if successful to-morrow there will seem to be little doubt of reaching Diamond Creek. Traveled 7-1/2 miles to-day. The narrowest point in the river yet reached is immediately above Tufa Springs—75 feet. Its bed here is one of erosion through the underlying granite walls rising on either side. The coarse carving, noted in detail on the limestone and boulders of debris beaches, is here shown on a grander and more picturesque scale than elsewhere seen. The geological horizon of granite is just reached, and it is not improbable that it extends as far as Diamond Creek, where it was noted by Dr. Newberry, in 1858. A wash with high banks comes in at the camp from the north and is covered with driftwood, evidencing the rise at stages of high water.

October 10.—River Camp No. 22, opposite Vernal Falls.

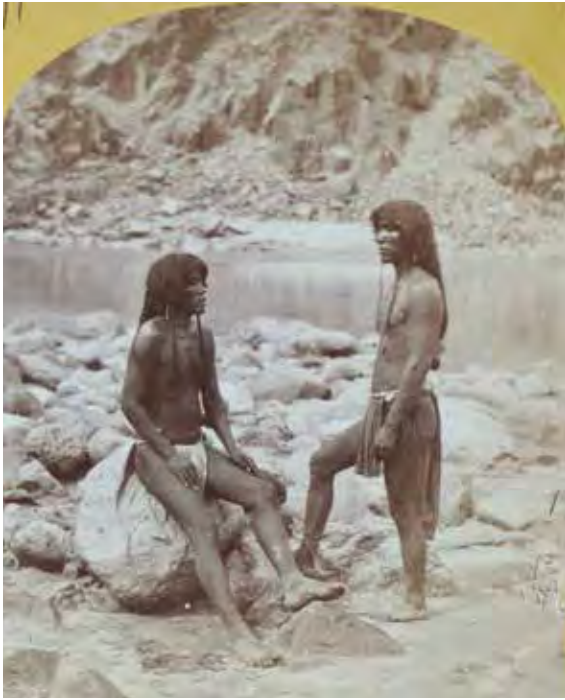
We traveled this day not far from five miles. Two boats are lost over the rapid immediately in front of our camp, but secured again without damage. Early to-day a rapid is passed with a direct fall of at least 8 feet. The entire fall of the rapid before mentioned is 35 feet, above which comes smooth water for approximately 1-1/2 miles, flowing along solid granite walls of the cañons on either side. Another rapid met during the day calls for all the strength of the different crews. Much water has been taken by the boats. At last a long rapid of two falls appears, with smooth water at its head, extending for quite a distance. The boats succeed in passing the first one a little after dark. It is not considered safe to try the other, as everything has to be unloaded and the first boat has been very nearly swamped. Therefore a dark and dreary camp is made among the debris of the slopes, where, cuddled up Indian fashion, the weary hours of the night are passed. The labor of the past few days has been very wearing upon the men, and one of the strongest Indians was thrown upon the rocks and badly bruised, making two invalids in the party. I have several times during the day despaired of reaching Diamond Creek in time to join the relief party there, as each rapid in turn seems to be more powerful than the last, and the number per mile is evidently on the increase; and, furthermore, it appears unlikely that any party has ascended the river farther than this local-



Maiman, Mojave Indian, guide and interpreter.

ity, or that one ever will. Still, the objective point can be reached, it is believed, if the men and boats hold together. Traveled approximately 5 miles and camped on north shore.

October 11.—Camp No. 23, below Disaster Rapid. This morning Mr. Gilbert makes certain special geological examinations, among others examining an injected dike-like mass of basalt in the granite. Portage is made, and the rapid near camp passed. Another appears within one-fourth of a mile, then smooth water for a little distance, after which a powerful rapid that takes the strength of all of the three crews. Then appears another stretch of fair water that brings one to the worst rapid of the trip. All the boats are brought up and lines thrown ahead. This rapid seemed long but not dangerous, however, but the first boat going into it proved differently. The first dash filled the boat with water, the second swamped it, and in this way the lives of two boatmen were endangered. The boat ran back against the rocks almost a perfect wreck, and its contents were washed down below the overhanging rocks. A stout case containing my most valuable private and public papers and data for a great share of the season's report, which for the first time has not been taken out of the boat at a portage, was lost, as well as valuable instruments, the astronomical and meteorological observations, and worse than all the entire rations of that boat. These losses could not be made good, and this disaster threatened to drive the cañon parties back to the barge station at



Mohave Indians; Panambona and Mitiwara.

the crossing, thus pronouncing the trip a partial failure. Night came, and the boats dropped back about half a mile to camp. Weary myself and much dispirited, it is still necessary to maintain cheerfulness toward the little party, who see great trouble ahead. A compact vein of basaltic lava of 6 feet thickness obtruding through the granite was noticed, as also like intrusions at a number of points elsewhere on either side of the cañon. The granite grows higher and is beautifully sculptured in pot-holes and other forms.

[Wheeler's boat and contents were lost near the mouth of Surprise Canyon]

October 12.—Reached Camp No. 24, head of Disaster Rapid. The morning is occupied in searching up and down the river for any trace of articles lost from boat No. 1, but without success. Our party are all despondent, and as the boat swamped yesterday was badly damaged, and rations are very short, a portion of the party is here detached to make the descent in this boat, with the expectation of reaching the land party and following their trail to the southward from the point on the river where the barge lies anchored. No one except Mr. Gilbert and myself think that the boats can pass the rapids in front of us. It requires no little courage to continue farther on, since one day later would prevent a return in time to meet the relief party at the river-crossing, and the barge has rations only up to a certain date. Mr. Gilbert and myself propose to reassure the men by taking the first

boat across the rapid. Portage of the stores is made to the wash at the head of the rapids, which consumes the greater share of the day, and half an hour before twilight a rope is stretched and the emergency prepared for. The entire force is stationed along the line, and the cast-off is made. In five minutes the worst part of the rapid is over, and just as the sun sinks gloomily behind the cañon horizon the worst rapid is triumphantly passed, amid the cheers and exultations of every member of the party. Astronomical observations were made here.

October 13.—River Camp No. 25. This morning the second boat passes Disaster Rapid successfully, and a fresh start for the further ascent is made. Three other severe rapids are passed during the day, still the distance traveled has been nearly six miles. About 3 p.m. a beautiful vista is passed, formed by the granite boulders that approach quite to the bed of the river, contracting the channel so as to produce an enormous current. The shifting current for quite a distance has sculptured strange contours among the granite walls that at this low stage protrude above the water. Many are carved like full columns, others honeycombed in extravagance of form, making the view in all its phases the grandest and most sublime of any noticed along the route. The channel here is the narrowest yet met—being less than 50 feet wide. The thickness of the granite beds becomes greater and greater, and now reaches from 700 to 800 feet. The more solid the granite the less dangerous and difficult the rapids and falls. This is easily explained, since the rapids have formed by accumulated debris breaking in from the side cañons, and from the boulders detaching from the sides of the main wall and falling into the stream. The latter more frequently make the dam, and the irregular flow of the water causes these most terrible rapids. It becomes necessary to make a very difficult portage just at dusk. It is very severe, since the men are greatly worn. The hope of ultimate success sustains the sinking courage as also the belief that no one will follow speedily in our tracks, thus making the ascending exploration of the river complete and final.

[near Spencer Canyon]

October 14.—At River Camp No. 26, above Portage Rapids. The temperature at night in the cañon has been of late decreasing and the morning fire that can be made by a little drift-wood picked up is very agreeable. An old Indian trail is found in the creek that comes into the cañon from the south. There are a few hills of scanty corn of this season's growth, while a little avenue among the willows seems to have been planted with beans in hills, but no appearance of fruit. The Indians



MOUTH OF THE LOWER GRAND CANYON OF THE COLORADO RIVER.

have evidently been here in the early spring, but not since. One of the worst rapids of the trip was met to-day, which obliged the portage of the boats with all the stores for fully one fourth of a mile. Mr. Hamel and myself penetrated a second creek coming in from the south, following a gentler slope than any yet seen, which leads to the belief that possibly one could emerge by it from the cañon bed, if necessary. The distance to-day is 2-3/4 miles. It took six hours to pass the rapid above mentioned. This morning the rear boat picked up a duck floating down the stream that had been killed by a shot, and it is hoped this may indicate that the land party has reached the mouth of Diamond Creek, and that it is not far distant.

Camp is made at a southern bend of the river, and for the first time out of sight of a rapid. Now and then a stray duck is seen, but hardly any other winged animals. The flora of the side cañons is extremely meager. Their streams have no fish. A peculiar salmon and hunchback are found in the river at places, but being without hooks it has been impossible to increase the scanty stock of provisions. No new plants or other forms appear, and the entire cañon is but one grand rock laboratory. Noted to-day a small snake with black and white rings, different from any yet seen. Traveled 2-3/4 miles, approximately.

October 15.—River Camp No. 27, Castaway-Rapids. After an inspection of provisions held this morning, it becomes necessary to further curtail the amounts

allowed to each individual. A rapid is passed early in the day with a fall of 8.8 feet, at which point the river is 48-5/8 feet in width. Eleven rapids are met and passed during the day, the entire distance gained being about 3-1/4 miles. The semi-granite walls appear on either hand with a superior cap of sandstone more prominent, giving at this special locality great perpendicularity to the walls. Towing is hence a thing very much to be dreaded. The short lengths of apparently smooth water are becoming less frequent, and swift currents are noted at each turn in the river. This indicates—and our aneroids verify the fact—that the fall per mile increases at every step.

Mr. Gilbert's boat is cast away in pulling through the last rapid, and he and Hecox go so far down the stream that the crew could not reach them, hence they go superfluous to bed among the rocks in this wild cañon. Our camp is a little shelving place in the rocks, with scarcely room enough for the little party to sleep among the boulders. Everyone is gloomy at the prospect, starvation staring one in the face without the certainty of relief either in advance or retreat.

[approaching Separation Rapid]

October 16.—Camp No. 28, Starvation Camp. To-day it has often been necessary to climb as high as 100 feet to pass the tow rope ahead. Two portages of stores were necessary, and one portage of the boats. In passing the third nest of rapids the rope parted and one of the boats



Dragging upstream through the rapids.

was cast away upon one of the roughest rapids in the river. The sight, although exciting, was an extremely sickening one. The boat was caught, however, on the other side, and extricated after much difficulty. Such accidents are disheartening in the face of the presumable dangers yet in advance, the number and extent of which are yet unknown. The boat upon the second trial, however, passed safely. Washes reach the river from either side at the head of this rapid, and hence the magnitude of the dam accounts for its length. The one from the north is a stream with about 200 inches flow; the one from the other direction has a very gentle slope.

Mr. Hamel climbed the granite wall, and reports it smooth and level on the top of the mesa. It may yet be necessary to take this route to the mouth of Diamond Creek. Astronomical observations were made for time and latitude. The entire rations of the party scarcely make a re-enforce to my blanket pillow, where they are at night placed as a precaution.

October 17.—Camp No. 29, below Concealed Rapids.

Made a portage of boats to-day among the narrowest and heaviest rapids of the trip. Width 35 feet, fall 10-1/10 feet. Speculations are rife to-day as to the prospect of either want and starvation and inability to get out of the cañon, and yet I believe there will be some loophole in event of the utmost emergency. Fortunately the weather during the day continues fine. The warm genial sun now and then reaches the river and improves the temperature of the water, with which all persons have constantly to deal, and the hands are not so cold that any of the party suffer ill consequence. The river trip would still continue practicable were the unforeseen trials and privations known so as to be mastered. As it is, each day seems like an age, and the danger of complete disaster stares one so plainly in the face that a state of uneasiness naturally prevails. To-day I have been thinking over a plan of sending forward upon the mesas to reach Diamond Creek. My mind is still bent upon taking the boats to their original destination if they will hold together. It has been necessary to guard the entire stock of rations in person for the last few days. It is decided this evening in the event of emergency that the boats shall be abandoned, the mesa reached on foot, and the mouth of Diamond Creek thus reached. Gained 3-1/2 miles to-day. Saw the new moon by daylight, 2 p.m.

October 18.—River Camp No. 30, Look-ahead Camp.

It is now hardly daylight until 7 o'clock, at which time the weary labors of the day are begun. A portage about 9 o'clock is effected at a rapid where some ugly boulders of enormous proportions are the only beach. To-day

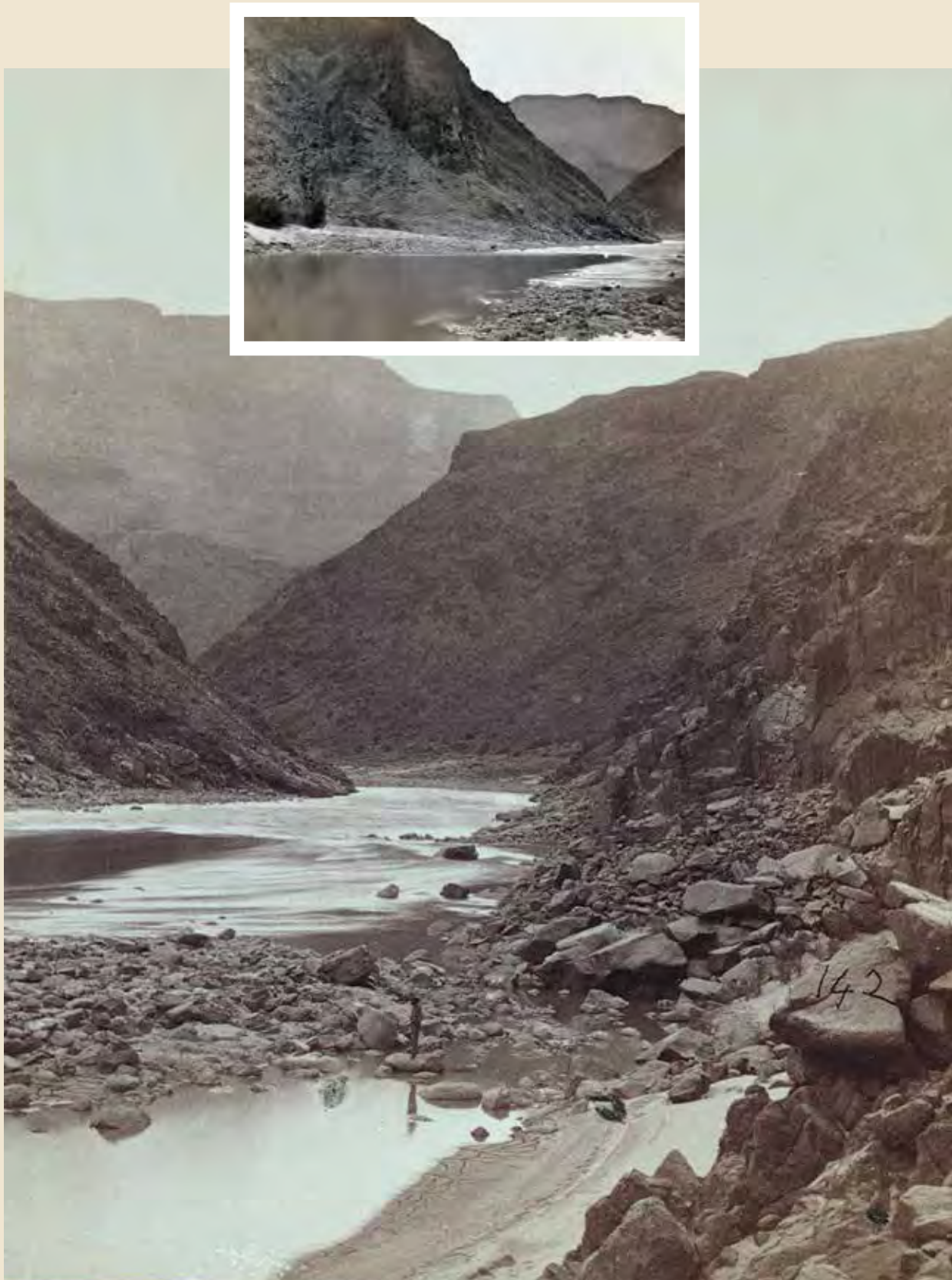
the fifth castaway is noted, and Gilbert and Salmon try their luck at swimming. It is estimated that the distance to the mouth of Diamond Creek cannot exceed 17 miles. The track of a man's foot with boots or shoes on is noted on the southern bank. It is hoped that it may be some one from the relief party. A longer portage of boats has to be made, but it proves successful, and the camp at night is so selected that it is believed the mesa in close proximity may be climbed in the morning. Notwithstanding the great obstacles of the day, a distance of 3-1/2 miles has been gained. The boats are leaking badly. Complete instructions are made for the two messengers, Hecox and Roberts, who volunteered to start out in the morning to reach Diamond Creek. This seems a necessary measure, as the lives of twenty persons are now dependent upon the success of the messengers sent ahead for food. A fair-sized loaf is cooked for each, and they will depart at daylight. Between 10 and 11 a.m. Mr. Gilbert saw plainly the planet Venus. Astronomical observations were here taken.

October 19.—Camp No. 31, mouth of Diamond Creek.

The climb to the top of the first mesa is very steep, but it was pleasant to find that there was sufficient space to the rear to admit of a pretty level trail along the next series of bluffs. The messengers feel hopeful, and fully appreciate the necessity for vigorous efforts on their part. It is fully understood by them that the parties intend to abandon the boats and follow on their trail on the morning of the 22d, if no assistance is sent before then. There is a slight chance of their reaching Diamond Creek and bringing provisions back by the second night. If not there must be considerable suffering on the part of those left with the boats. At a mile a little creek is crossed, on which old fire beds show the presence of Indians in their hunting season. I attempted to explore the bed of the stream crossing into the river, and was obliged to climb to the lower mesas, narrowly escaping a fall of 150 feet. The cañon cut out by this stream is the most romantic I have ever examined among the varied scenes of years of mountain life.

[Travertine Grotto]

Shortly after, one of the members finds a fish-pole and line with a large salmon attached, which probably came from the party at the mouth of Diamond Creek, and a little later a float and message from Hecox, who had reached the mouth of Diamond Creek. About 2 p.m. a signal is seen, which proves to be a handkerchief left by Spencer, about 6 miles ahead, toward which all possible exertion is made, hoping to reach that point before



Across from Diamond Creek, looking downstream. T. H. O'Sullivan. Library of Congress

sundown. Camp is reached before dark, not knowing until then how tired and weary all had become. Mr. Hamel reports having seen during the day a star at a point in the cañon where the upper walls were in close proximity. Sextant observations for time and latitude were here made, and also a cross-section of the river by Mr. Hamel.

Observations for time and latitude were made by Lieutenant Lockwood and myself at the mouth of Diamond Creek. This same point had been reached by Ives during his land trip eastward to Fort Defiance. The relief party is overhauled at Peach Tree Spring by the advance runners, and they and a fresh relief party from the rendezvous at Truxton Springs reach the river on the 20th, bringing mental comfort and rations. A number of the boat party proceed the 21st to join the rendezvous, while the balance begin their perilous journey down-stream, joining the barge and continuing the descent to Mohave, which point was reached in safety on the evening of the fifth day, thus evidencing the difference in rate of travel whether with or against the current.

The transfer of the land parties to the south to the selected point of rendezvous, through a section almost a desert waste, without water and a terra incognita, the successful junction of the river and land divisions, and the accomplishment of the duties laid out for the different parties at the specified times was a masterpiece of successful exploring, and shows the admirable will and energy of all parties of the command. The guide, Charles Spencer, contributed in no small degree to the harmonious working of the plan, and to his intimate knowledge of the country was due the certainty as to date of connecting forces.

[This is the Charles Spencer of Spencer Canyon, not the later Spencer of Lees Ferry fame]

The river at Camp Mohave on September 15, 1871, was found by Mr. P. W. Hamel to have a mean velocity of 3.006 feet, and a volume of discharge of 16.232 cubic feet per second. The observations were taken along a profile of 870 feet in width and cross-section of 5.400 square feet. Lieutenant Bergland, on September 3, 1875, found a mean velocity of 1.25 feet near the same point, a discharge of 11,611 cubic feet through a cross-section of 4,628 feet, the width being 1,116 feet. The above observations can alone be reconciled in view of the sudden rises

of the river from violent mid-summer rains near the sources of the Green and Grand and the Little Colorado. These local floods, having their source at great altitudes, are of short duration, and their influence will be felt but for a few days at any point along the stream, and hence the observations at intervals of not more than ten days may not properly be comparable or bear a fixed ratio to the mean flow. Soundings from 14 to 28 feet were noted in the river channel at foot of Boulder Cañon. At Stone's Ferry, on August 11, 1875, Lieutenant Bergland found a flow of 18,410 cubic feet per second through an orifice of 5,723 square feet, the width being 480 feet. The cross-section at foot of Grand Cañon was 2,610 square feet, the width 315 feet, and soundings were recorded from 3 to 20 feet. At mouth of Diamond Creek the width was found to be 280 feet, and soundings noted from 9 to 30 feet.

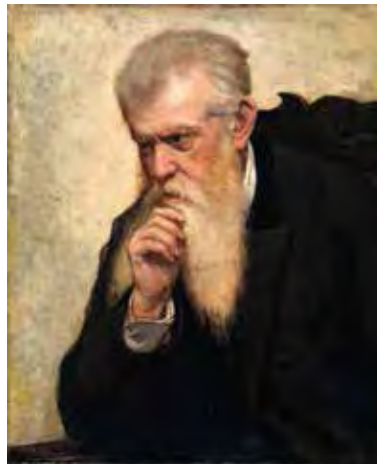
One of the results of the river exploration has been to determine the absolute limit of navigation, a question not settled by the exploration of Ives, as a steamer ascended the river to a point (Callville) a short distance beyond the uppermost point reached by him in his boat. This limit is the foot of the Grand Cañon, or near the crossing of 1871.

It is certain that at no stage of water could steamers reach this point unless the channel shall be improved by the removal of sunken rocks; but

no insurmountable obstacles of this nature exist. The furthest practical head of improved navigation must remain permanently at the foot of the Grand Cañon.

The exploration of the Colorado River may now be considered complete. Its course has been traced from its mouth to the junction of the Green and Grand, and the positions of incoming tributaries noted. The greater part of the basins of the Grand and Green have undergone quite thorough exploration and survey during the past ten years, as well as much of the Great Colorado Plateau that borders the river in the vicinity of the great cañons,

These stupendous specimens of extended rock-carving that make up the system of the cañons have been partially described and made known. They stand without a known rival upon the face of the globe, must always remain one of the wonders, and will, as circumstances of transportation permit, attract the denizens of all quarters of the world who in their travels delight to gaze upon the intricacies of nature.



Captain George M. Wheeler

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Timothy O'Sullivan's stereos of Lt. Wheeler's 1871 arrival at Diamond Creek were used as a basis for an etching in the official report. The background, however, is pure invention.