

boatmans quarterly review

the journal of Grand Canyon River Guides, Inc.

volume 10 number 2 spring 1997

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Hard Hulled Adventure

Back in September of '94 on the Old Timer's trip we got to sitting around the campfire one night telling stories. How unusual. Well, Bob Rigg and John Cross Jr. told a couple stories about hard-hulled boating in the Canyon, and we all got to laughing so hard we about wept.

Bob Rigg

The *Esmeralda* was basically a Higgins landing craft. It had kind of a spoon bill on it and went down in 1949 with Dock Marston and Ed Hudson. They came back the following year—they ultimately desired to come back up the Canyon. Garth can probably tell you a lot of details I don't know about, that I'm not familiar with, or I might embellish in the wrong direction.

Marston: That's the best thing to do, both of us lie. [laughter]

Dock and Ed took off in 1950 for a second trip with the *Esmeralda* and Dock's Criscraft. They came down in really quite fast time. They cached a lot of gasoline along the way, for the eventuality of an upstream run. As things happen with engines, sometimes mechanical problems develop, and they developed a mechanical problem.

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John Cross Jr.

About 1969 or '70, I decided that the way of the future was a little bit faster boat through the Canyon. So I got talkin' to Don Harris and Bill Belknap and a couple of others about the possibility of runnin' a power boat through, because they had done it before. They kinda thought it was a neat idea, just for an expedition, but they didn't really think it was too good an idea to be takin' passengers down. But I disagreed, and ended up puttin' together about a 27-foot fiberglass jet boat.

The early history of it was it had made the first documented successful upstream run in Cataract Canyon a few years before that. The guy that had done it, John Newland—I don't know that he had a whole lot of interest in river running, but it was just something to do—a "guts and glory" thing. He called the boat the *Rapid Eater #4*, and after runnin' the river a couple of times up Cataract, he just parked the boat out in his back yard and it kinda weathered away.

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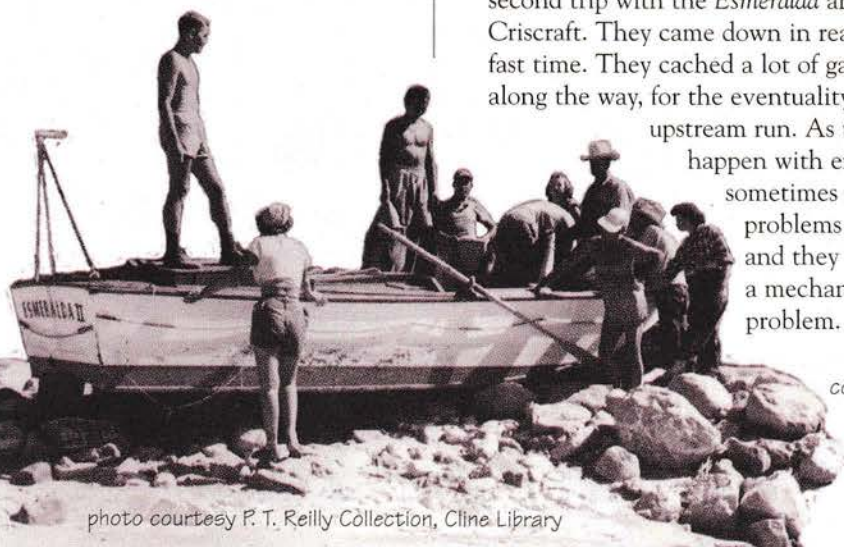


photo courtesy P. T. Reilly Collection, Cline Library

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.

Board of Directors Meetings are held the first Monday of each month. All innocent bystanders are urged to attend. Call for details.

Officers

President	Jeri Ledbetter
Vice President	Andre Potochnik
Secretary/Treasurer	Lynn Hamilton
Directors	Kim Crumbo Bert Jones Bob Grusy Larry Stevens Jon Stoner Tim Whitney

Our editorial policy, such as it is: provide an open forum. We *need* articles, poetry, stories, drawings, photos, opinions, suggestions, gripes, comics, etc.

Written submissions should be less than 1500 words and, if possible, be sent on a computer disk. PC or MAC format; MS 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 January, April, July and October. Thanks.

Our office location: 9½ East Aspen, Flagstaff, Arizona

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Looking for a Home

As rents climb, our downtown office becomes more and more unaffordable. We're looking for a new spot, somewhere in Flagstaff—something that's pleasant, roomy and affordable. Good luck, huh?

Give us a shout if you know of something!



Paddling Furiously

The Grand Canyon River Guides office in downtown Flagstaff has taken on an increasingly asylum-like quality throughout the winter. We might expect winters to be a relatively slow, relaxed period. Not so. We've been in a frenzy off and on since early November, between production of the BQR, finalizing the Adopt-A-Beach report, organizing three first aid courses and the Guides Training Seminar. Some days every computer screen is being stared into, every phone line is either ringing or in use, and every flat surface is covered with photographs, newsletters, reports, submissions, and letters that we swear to GOD we'll respond to any day now. We keep laughing, and do what we can. Lynn Hamilton, our ever patient Secretary/Treasurer, remains calm in the manic sea. As our first full-time employee (and our only compensated worker), I don't know what we would do without her.

We continue in our commitment to keep GCRG's overhead costs as low as possible. Crammed into a one-room office in downtown Flagstaff and relying heavily upon volunteerism, we have managed to remain financially healthy without compromising our commitment to refrain from pushy fund raising. We do, however, need additional funding and support.

There are a variety of ways you can help. Contributions are fully tax deductible and are always appreciated. Members can solicit new contributors by passing out membership flyers to river travelers. Stop by the office to pick up a handful, or call the office and we would be happy to mail them. A significant portion of our income is generated from commercial passengers and private boaters in this way.

Also, if you're in the area, we can often use help around the office. Stop in and offer some time, or submit an article for the BQR. Perhaps you could help with one of our many projects. Volunteerism of the river community continues to be the greatest strength of your organization.

Jeri Ledbetter



Dear Eddy

Having been in the entire Canyon 3 times I have noticed the air traffic over the Canyon. I can't understand why GCRG has not come out against helicopter take-outs at Whitmore Wash. They are by far the worst air traffic noise in the Canyon. In my opinion, the only helicopters that should be allowed to land in the Canyon are NPS emergency helicopters. It also seems to be a cheap way of saving user days for mostly motor companies. I really feel that all takeouts should be at either Diamond Creek or on the lake.

Charles Perry

The Whitmore helicopter exchanges were specifically exempted from the 1987 Overflights Act, and therefore from the current rulemaking process. This is mostly because the Hualapai permit these operations on their tribal lands, and the FAA must abide by their wishes as a sovereign nation. The Hualapai, enduring an extremely high unemployment rate on their reservation, have come to rely upon the income from these operations.

However, it is within the NPS authority to limit or even restrict the outfitters from exchanging clients at Whitmore. In fact, the NPS has recently denied requests from outfitters to initiate new operations.

There are alternatives which might actually be more lucrative for the Hualapai. For example, helicopter operations could be shifted downstream to Diamond Creek, where there is a road, and the Hualapai have already initiated helicopter operations between there and Las Vegas. Passengers could be transported from Diamond Creek to an air strip on their lands, which would allow them further economic opportunities. Helicopters would then have no need to cross the river corridor or any part of Grand Canyon National Park. The Whitmore trail, significantly shorter than the trails used regularly for Phantom exchanges, is adequate for similar foot or stock use, for those who feel a need to exchange passengers there.

Any resolution of this issue can and should be approached in a cooperative spirit between the National Park Service, outfitters, and the Hualapai Tribe.



Air Tours

The saga continues in the effort to place reasonable limits on the air tour industry over Grand Canyon. Following the FAA and Department of Interior's announcement on December 31, 1996 of their long awaited rule which they claimed would restore natural quiet to Grand Canyon, it soon became apparent that the weak rule would be quite ineffective. Even with the proposed conversion of the tour fleet to quieter aircraft, noise levels would remain unacceptable.

Nevertheless, the air tour industry, claiming dire economic consequences, filed a lawsuit asking the rule to be set aside. This suit was responded to in kind by a coalition of environmental organizations, including Grand Canyon River Guides, who feel that the rule does not go nearly far enough.

Subsequently the FAA announced that implementation of part of the rule—the enlarged flight free zones and adjusted routes—would be delayed for another year. On May 1, 1997 the remainder of the rule is still scheduled to go into effect. This includes a temporary cap on the purchase of new aircraft and limited curfews on some routes. The air tour industry has now filed a legal challenge to the temporary cap as well. Meanwhile, the Havasupai tribe formally requested that all air tours be removed from over its reservation.

At this point, the lawyers are battling with paperwork as the air tour industry gears up for another busy summer with very little change to their operations. If the curfews go into effect in May, air tours originating from Tusayan will not be allowed before 8:00 a.m. or after 5:00 p.m. This will allow some respite in the early morning and late evening for those in the area of the Dragon Corridor, which crosses the river just above Crystal rapid. However, as the huge and growing number of flights originating from Las Vegas are exempt from the curfews, those in the area below Havasu will notice little change.

Jeri Ledbetter

Some Thoughts on a GCRG Mission Statement

At the Fall Meeting this year the subject of our bylaws and goals statements came up for discussion, as it tends to do every few years or so as we revisit our purpose and examine the changes happening in the world around us as well as within our own ranks. We spent a long time on semantics and whether or not the order of the statements was appropriate for the actions that we have been taking and wish to take in the future. We came to the conclusion that the statements are, by and large, good ones and that with a tad bit of re-shuffling the order looked fine. After all, it's hard to get the whole purpose of a group as diverse as this one, protecting a place as diverse as Grand

Canyon, down in a few simple statements.

One persistent question lurked at the corners of the discussion. What exactly is the Grand Canyon experience that we are trying to "provide"? (Normally, we'd put the word experience into quotes but I place the quotes around the word provide because I'm not sure we provide it—maybe just help it along a little.) Discussion of the question always raises the point (quite true) that we can't define the Grand Canyon experience, that it is different for everyone who comes down the river, for privates and commercials, for motor or oar passengers, for guides or guests. End of discussion. OK, but I still think that "providing the best possible river experience"

is a little nebulous when it comes down to arguing details of the new CRMP. This is probably the most important document that we will encounter in our river careers, in part because it may be the last one governing the actions for most of us who are now running the river, and in part because WE have a chance to affect its direction. When we come to the table to talk turkey, do people know what brand of turkey we're talking? (They know we don't want drug testing, hair nets and rubber gloves and "loss control specialists", but do they really know why?) Do we usually find ourselves RE-acting to ideas proposed by other people? In short, do we appear like a bunch of people who can be magnanimous when it comes to "protecting the Grand Canyon", but who whine when it comes to rules and regulations that might affect our independent, iconoclastic lifestyle?

I have a feeling that few people out there really understand what we are fighting about with a lot of these regulations. Is that in part because we have no "mission statement" of what we believe to be true and right and worth protecting about the Grand Canyon experience? What is it about a river trip that enables (to use a very '90s term) people to have that experience, whatever experience it might be, that we are trying to provide and protect? I think we need to tell the world what we know, not just in letters to the editor, or poems or short stories, but in a statement that can be read at meetings, given to the NPS and air tour operators, handed to bureaucrats and politicians and lobbyists. We need a calling card by way of



CLEAR CREEK FALLS

WEBSTER '96

introduction to what follows in the meetings and the sessions and the discussions.

This is brought up occasionally at board and general meetings. It gets some attention and then dies a painless death through disinterest, or perhaps the belief that it's not important or can't be done. I'm bringing it up here as a way of seeing if this is something that other people feel is important. The following statement is one I wrote as a way of starting off. This is what I have written, based on my experiences. It is not what I am suggesting we as an organization say. But perhaps it is a place to start. Whatever the final outcome of this idea, nothing at all or something that bears no resemblance to what I have written, I don't think it's wrong for us to speak from our hearts in this instance—we have a lot of love for this place and this community, the job we do and the people we take down the river. Let's tell people why it matters.

It is Grand Canyon River Guides' belief that the Grand Canyon and the Colorado River, in all its manifestations, offers an experience of wildness (notice I did not use the word wilderness for those who are squeamish about such things) and connection with the land that is important for the human spirit and can be equaled in few places on the earth today. The Grand Canyon has the ability to change people's lives in lasting positive ways that go far beyond relief from stress or exciting fun usually associated with a simple vacation. We have seen the Grand Canyon provide confidence, awareness, understanding and peace in its tiniest of grottos and its grandest of vistas, in its silence and beauty and the mystery of the unknown. We have seen that with the passing time of a river trip, people can leave more and more of the unnecessary concerns of their lives behind, and begin to connect with what is truly important for them. We have watched people learn to accept the land on its own terms and take responsibility for their own actions through living in the Grand Canyon. We have seen people leave better, happier, stronger and healthier than they came. We believe that these experiences stem directly out of separation from the trappings, rules, conditions and technology of the outside world. They come from the ability to take risks, to hurt oneself, to immerse oneself in the natural world around one, rather than being "protected" from it. And we believe ourselves to be stewards and protectors of this experience for the river visitor.

We need to define the resource that we are trying to protect. Of course the air tour operators will argue about being the most "protective" of the resource: they think that the "resource" is simply the physical being of the rocks and sands and plants and waters of Grand Canyon. We're saying that the resource is more than just that. Perhaps we have never made a statement like this because we think it's obvious: "it's the Grand Canyon, stupid." But I don't know how self-evident this is. We are the ONLY people in the world who have seen what we have seen. We are the only ones who have 30 years

of consistent opportunity watching the "Grand Canyon Experience" happen to people. We have the numbers, we have the stories, we have the people behind us. (This is not to say that our experience is more valid than anyone else's—only more consistent.) Lew Steiger made the point that every time a new cadre of NPS officials comes to the table we have to start from ground zero. Would a statement like this help them to understand why we fight the way we do, why we choose one alternative over another, why we believe what we believe—in short, who we are? Would it matter to them? I don't know—perhaps not. Certainly, some sort of statement to this effect might give us a definable framework with which we could go to the table and make our case. We don't want hairnets and rubber gloves because they are inconsistent with what we believe to be important about this place, which we have stated here. Perhaps this is a proactive way to define something that all of us are fighting to protect because we see it dribbling slowly through the legal and economic cracks of the amusement park era we live in.



Christa Sadler

The Colorado River Management Plan

We've been keeping in touch with the National Park Service regarding the timetable on the upcoming review of the Colorado River Management Plan and expect a publication from the South Rim in the very near future. They will be identifying the NPS mission and guiding principles pertaining to the process, along with a tentative schedule for the process as a whole. Their hope is to find out from the public the real issues and the best solutions.

Those of you with good memories may recall that GCRG has been planning to put out a major publication on this very issue, similar to the *Perspectives* piece we did on the Glen Canyon EIS process. We haven't forgotten and we still have all the input you folks sent in. *Perspectives II*, as we have nicknamed it, is still in the works, of course, and will be exquisitely timed to appear at the most useful and productive moment possible. Theoretically.

Financial contributions toward this project, and submissions, are gratefully appreciated.

Lew Steiger



In our last issue we gave the wrong address for Glen Canyon Institute. It's 476 East South Temple #154, Salt Lake City, Utah 84111, (801) 322-0064 info@glencanyon.org. Annual dues are \$25 and are tax deductible.

In our last issue we introduced Glen Canyon Institute, calling for a lowering of Lake Powell. On the next page was a piece by David Brower, calling for draining it entirely. The two views have since melted into one. On March 11, Glen Canyon Institute formally incorporated with Richard Ingebretsen as president, Dave Wegner as a vice-president, and both David Brower and Martin Litton on the Board. The goal: the eventual draining of Lake Powell and the beginning of what is being called the Glen Canyon Restoration Project.

Since the Sierra Club Board of Directors formally endorsed the concept last fall, quite a bit of press has been generated on the issue—some in praise, some in scorn and much questioning the sincerity of the stand. A foolish quixotic assault? A ploy to get new younger members? Certainly they can't be serious.

Both Glen Canyon Institute and the Sierra Club are quite serious, in fact. What is the rationale?

First, the sooner it's begun the better—Glen Canyon will take a long time to restore itself. Although initially it would be a bleached muddy mess, in a generation or two the canyons, grottos and glens would return. And it will take time to plan a way to do it without destroying Grand Canyon.

Second, Glen Canyon Dam has a short life span regardless of whether it is drained on purpose or fails on its own—sedimentation will eventually fill it, but long before that, silt will begin to reduce effective flood control and clog the penstocks. More urgently, the spillways, engineered to withstand 30 hours of use, failed miserably in '83 and although they were rebuilt in 1984, it is doubtful they will withstand a thousand-year flood—which could come along any time.

Third, between Lake Powell's evaporation and the amount that soaks irretrievably away into the sandstone, around a million acre-feet of water are lost each year—around one seventh of the annual flow of the river. This at a time when water is becoming nearly as valuable as gold. Most states and Indian tribes in the Southwest are crying out for more, while Mexico receives a trickle of black brine and the Sea of Cortez dies a lingering death.

Who could argue with that? Well, the city of Page, for one. Joan Nevills Staveley, at the Page Chamber of Commerce, sent down the following ad to be placed:

FOR SALE: TOWNSITE Formerly inhabited by 8,200 people, stocked with businesses, schools, churches and homes. Reason for sale: NO WATER OR POWER. Please call 1-800-IT'S-A-SHAME.



Brad Dimock

Passage of the Colorado River Storage Project Act of 1956 authorized construction of Glen Canyon Dam and marked the loss of a long battle by Sierra Club founder David Brower to stop further damming of the Colorado River. Now, 34 years after completion of the dam in 1963, Brower has sounded the second battle cry—let the river flow freely through Glen Canyon Dam but let the dam stand as a reminder to our mistakes.

Decommissioning Glen Canyon Dam may seem inevitable as sediment is expected to fill the reservoir in 700 years and the dam structure and retaining walls slowly erode, but this time frame is considered in centuries, not in years or decades.

Political considerations aside, what then are the ecological consequences of allowing the Colorado River to flow freely through Glen Canyon Dam? At its present volume of 25,000,000 acre-feet—or nearly double the annual flow of the Colorado River—it would take approximately 2 years to drain the reservoir at a constant release of 20,000 cfs and also accommodate an average runoff

An estimated 868,231 acre-feet of sediment had accumulated on the bottom of Lake Powell as of 1986, mostly in the Colorado River and San Juan River inflows. Maximum depth in 1986 at Dark Canyon was 182 feet with 36 feet at the dam. At an accumulation rate of 36,946 acre-feet per year, the volume of sediment in the reservoir in 1997 is about 1,237,691 acre-feet. This is enough sediment to fill nearly 200 million dump trucks, or cover an area of about 2,000 square miles to a depth of 1 foot—an area the size of the State of Delaware.

Allowing the Colorado River to flow freely through that large sediment deposit would result in a constant erosion and subsequent downstream relocation of sediment as well as constant turbidity and suspended sediment load for many years. Persistent sediment would virtually eliminate all instream photosynthetic production, reproduction by all fish species, and the blue ribbon tailwater trout fishery. Release of contaminants in sediments could infuse massive and persistent quantities of chlorinated hydrocarbons, petroleum byproducts, and heavy metals for uptake into downstream ecosystems. Draining Lake Powell would release tons of some 15 different species of fish, posing serious predation, competition, and disease pressures on native fishes as well as game fishes through Grand Canyon, Lake Mead, and very likely, the rest of the reservoirs in the system, including Lake Mohave and Lake Havasu.

Draining Lake Powell may sound like a long-term environmental solution, but the short-term impacts may be costly trade-offs that could spell ecological disaster.



Rich Valdez

A Geologic Train Wreck

The Long View on Colorado River Dams

The Colorado River serves many functions for humankind; agriculture, water supply, recreation, electricity, spiritual sustenance and so on. By building dams and diversion works along its path, we have demonstrated mastery and control of the water. This control is short term, however, and will likely be relinquished in just a few generations.

The river's role in nature is geologic; it moves both water and sediment from the uplifted continental interior to the sea. Our dams can manage the water, but not the sediment. Great annual pulses of sediment will continue to move irresistibly toward the sea. All future management of the river needs to include sediment transport in the equation. If we continue to ignore this train barreling down the track toward us, then we are likely to become road kill in its path.

Consider this hypothetical future scenario; it is September 29, AD 2099. The Commissioner of Reclamation is pacing the floor, cursing those who didn't see this train wreck coming. She holds a document entitled Approaches to Basin Management, 1996. "The ideas are here; they had the knowledge, the expertise. Why didn't anyone speak up? They must have had their heads in the sand. How could they be so short sighted?" She assesses the situation...

During the past century, three multi-year wet climate cycles in the southwest have mobilized enormous amounts of sediment from thousands of small tributaries across the Colorado River basin. The effect has been to nearly double the predicted rate of sedimentation in Lake Powell. Now that the reservoir is almost half full of sediment, it can barely store the average annual flow of the river. Lake Powell is drained very low each winter in order to prevent unplanned clear-water floods from coursing through the Grand Canyon, floods which would scour the remaining sand and vegetation from the riverine habitat in this treasured National Park and World Heritage Site. The advancing sedimentary deltas of the San Juan River and local tributaries near the dam

have silted-in the penstocks for the turbines.

*If we don't change direction,
we will likely end up where we're headed*
ancient Chinese proverb

Due to greatly fluctuating lake levels, Glen Canyon Dam produces relatively small amounts of electricity and only because of the multi-level intake structure, originally built to protect the endangered native fish in Grand Canyon.

In the previous several decades, "long-term sustainability" has become the governing concept for all public works projects, and is also the new societal paradigm which replaced the old paradigm of "limitless growth". There is little political will to support costly federal water projects. Local food production has largely replaced industrial agriculture, with its attendant high transportation and environmental costs. The once fertile agricultural valleys of the lower Colorado River have mostly returned to desert conditions due to soil salinization and water transfers to thirsty urban areas.

The Commissioner must submit a recently completed Environmental Impact Statement on reservoir operations to the Secretary of Interior by Jan. 1, 2100. It boils down to basically three alternatives:

- 1) let sediment continue to fill the reservoir, causing ever larger clear water floods to bypass the turbines, eventually scouring the remaining sand and vegetation from the river corridor in Grand Canyon (no action alternative),
- 2) initiate massive sediment slurry pumping from the reservoir into the Grand Canyon, eventually requiring slurry lines in all downstream reservoirs (highest long-term cost alternative), or
- 3) disassemble the dam, allowing the river to slowly re-establish its ecological and geohydrological heritage (high initial cost alternative).

The Commissioner thinks to herself..."it was inconceivable 100 years ago, but there can be only one preferred alternative, ...disassemble the dam. A large segment of the public would be very enthusiastic about the "reclamation" of Glen Canyon to its natural state, restoring what many consider to have been a lamentable loss. The Bureau of Reclamation will live up to its name. It's the bold, visionary approach. It's the politically expedient alternative. In the longer view, it's the only reasonable answer. Yes, the President may like this..."

One can argue with the details of this futuristic scenario and the solution proposed, but not the basic problem. Put your ears to the track; anyone hear a train coming? I, for one, do not wish to leave a time bomb ticking for future generations. The longer it ticks, the bigger it gets.

*Mankind exists by geological consent,
subject to change without notice*
Will Durant



Andre Potochnik

Palm Trees

One of the most serious problems affecting natural ecosystems globally is the invasion of nonnative, exotic plants and animals. Some of the most intractable, damaging, and widespread exotics, such as cheatgrass (*bromus sp.*) and tamarisk, are well known. Cheatgrass, for example, competes with native plants for water and nutrients, an often critical factor in the arid southwest. Even more significant, however, is the resulting foreign fire regime that now threatens desert archetypes such as the Joshua tree and saguaro cactus, not to mention hundreds of other species dependent upon natural ecosystems. The effect of tamarisk has been especially damaging, displacing native vegetation and drying up critical water sources for native wildlife. There are literally hundreds of other nonnative plants and animals which collectively imperil native biodiversity by damaging the ecological balance of plants, animals, soil and water achieved over many thousands of years. As native plants are displaced, animal populations that rely on the plants for food and shelter also decline. This directly and adversely affects the features dependent on complex food web relationships.

Exotic seeds and plant parts are introduced by wildlife, wind, water and humans. The National Park Service is required by law to keep the parks as unaltered by human activities as possible, and has a clear policy on protecting natural processes within its natural areas, such as the 1.1 million acre proposed wilderness of Grand Canyon. The NPS defines nonnative species as any animal or plant species that occurs in a given location as a result of direct, indirect, deliberate, or accidental actions by humans. This definition allows the NPS to recognize and distinguish between changes to park resources caused by natural processes of animals and plants, such as natural range expansions, and those changes caused by animals and plants introduced by humans.

In its *Preserving Our Natural Heritage: A Strategic Plan for Managing Invasive Nonnative Plants on National Park System Lands*, the NPS has developed management strategies to address the problem of ecosystem alteration due to nonnative invasion. The first line of defense, the most economical and efficient means of management, is to prevent introduction. The introduction of nonnative plant and animals into natural zones is not permitted, except in rare cases where they are the nearest living relatives of extirpated native species, where they are improved varieties of native species that cannot survive current environmental conditions, where they may be used to control established exotic species, or when directed by law or expressed legislative intent.

Obviously, the best time to attempt control is when the population of exotics is relatively low, such as for Russian olive or ravenna grass. These two species are potentially extremely damaging to natural riparian areas and both were

deliberately introduced to areas immediately adjacent to Grand Canyon. The park, as well as a small group of dedicated volunteers operating on a shoestring budget are effectively controlling these two species. These folks are investigating the feasibility of controlling camelthorn in limited areas such as campsites. Control or eradication of widespread species, such as tamarisk and camelthorn lies beyond the realm of possibilities, at least for now. Such large scale restoration efforts require considerable research and funding, and could actually adversely impact the natural environment in unforeseen ways.

Other park restoration programs include control of the Himalayan blackberry (also deliberately planted), a tasty but damaging exotic that has taken control of an entire drainage off the South Rim. A variety of introduced plants plague the urbanized environment of the North and South Rim developed areas. Again, a dedicated cadre of volunteers lead by a few NPS revegetation crew leaders has made impressive inroads in controlling many of these problem plants.

Palm trees, a tenacious, some would say beautiful exotic, first appeared along the river in Grand Canyon toward the end of the 1970s. The first one actually removed once happily thrived near Mile 103 at the "Shady Grove" camp. It took a lot of digging, but ultimately the palm, or most of it, perished. Since this deed occurred in 1982, the year before the 90,000+ flood flows, no one knows if in fact it would not regenerate from remnant parts hidden beneath the sand since most of the sand ended up in Lake Mead anyway. Since then, no less than ten palms have appeared throughout the park (Hermit Creek, Bright Angel Creek, Havasu, Thunder River, and at Christmas Tree Cave). It is interesting to note that at least two of the Havasu palms survived the great flash floods that removed much of the native velvet ash population. The odd distribution of trees suggest either avian, human, or divine intervention contributed to the modest proliferation of this species. I always thought it was a dory boatman.

For 20 years I would pass Christmas Tree Cave and think of the exquisite stalagmite and dust loaded with bat droppings that characterized the cavern. On the 21st I noticed another palm tree. Given the difficulty of removing them, another 5 years or so passed before an approved herbicide with a qualified applicator (human) accompanied a resource river trip. On that trip we removed (killed, murdered, or whatever) a dozen Russian olives, scores of ravenna grass, a few hundred camelthorns, and one palm tree. Rain prevented the crew from working up Thunder River, Havasu, and Hermit Creek.

There was nothing vindictive about the palm's slaughter. Another nonnative plant, probably planted as an ornamental in what should be a wilderness setting, was removed. But, as is often the case involving killing an attractive, living organism, more than a few caring, very sane people are quite upset about it. For that I am sorry.

Kim Crumbo



Ciao Susan

Anyone lucky enough to do a private river trip through Grand Canyon in the past 13 years probably worked with a woman in the N.P.S. River Permits Office named Susan Cherry. Those of us in the commercial sector know Susan through a variety of contacts, which included, among other things, ranger ride-along evaluations, operating requirements, and a few years ago, the implementation of the then-new entrance fees at Lees Ferry—(not an altogether popular assignment among guides). Throughout most of these various duties, Susan's obvious love for the Canyon seemed to be the main reason she stuck around all these years. That love didn't compromise her ability to "toe the line" when compliance with N.P.S. regulations came into play, whether on the water or in the permits office. Her unofficious manner, in light of the ever-growing list of regulations for both private and commercial river trips, left one with a sense of fair and even-handed treatment. These qualities, along with the desire to "stay put" inside a system designed to move people



around from place to place, generated respect.

Susan once said it would take some dynamite to uproot her from the Grand Canyon—her connection was that strong. Now, I suspect, it seems the system of which she was a part has stretched the limits of her concepts of fairness and rightfulness. New fee policies recently enacted affecting backcountry users at Grand Canyon National Park are such that Susan cannot, in good conscience, continue to do the job she has believed in for these many years. In March, Susan left Grand Canyon and moved to Organ Pipe National Monument in southern Arizona.

I, for one, am sorry to see her go. The Canyon surely needs as many public servants with her honesty and integrity as possible—Grand Canyon now has one fewer such employee on its staff. Stop in and say howdy if you're down Ajo way.



Dirk Pratley

Canyon De Chelly Exchange

Maybe a few of you all heard about this exciting project, but if you didn't go you missed out! Tom Workman, Chief Ranger at Canyon De Chelly, ex-Lees Ferry Ranger, and all around great guy, organized ten GCRG members and ten Navajo guides from Canyon De Chelly to exchange and share with each other's training program.

Canyon De Chelly National Monument organizes a training program for guides each year. This year they spent three days in class, followed by an overnight trip into the canyon. The Park Service would like to see the Canyon De Chelly guides get more organized, motivated, and professional. Sound familiar? Most of the talks were about building self esteem, Navajo tradition, and ways to be a better guide. Other talks covered geology, archeology, Hopi involvement, and low impact camping. Also Brad Dimock gave a quick talk on some of the pros and cons for setting up a guides organization.

The weather service had predicted a foot of snow during the overnight trip. We went as diehards anyhow, but as the snow fell some of us became less enthusiastic and got to go 4-wheeling out of the canyon. Yippee!!!

We hope to have several Navajo guides join us for our spring land and river seminars in April, to allow further opportunity for camaraderie with these fellow guides. They are very knowledgeable about their canyon; they like to play, joke, and have fun. Many depend solely on guiding as their livelihood. We have many similarities, and I hope we can keep a connection going with our fellow Navajo brothers and sisters.



Jon Hirsh

Ed and Ray

As we move into a new river season, we will see a new face at Lees Ferry. Blu Picard has moved to a cooler climate on the North Rim, and Ed Cummins has taken the position after 8-1/2 years at Tuweep. The Glen Canyon Lee's Ferry ranger, Ray Hall, will now be checking out river trips as well.

Be sure to have your first aid, CPR, and current guide licenses *in your possession* when you show up for a trip. A new Commercial Operating Requirement states that a trip will not be allowed to launch without the necessary credentials. (Photocopies are acceptable). Call Ed at (520) 355-2232 to arrange to take your test. You may take the test at the South Rim if you arrange an appointment in advance by calling (520) 538-7841.



Attack of the Killer Fees

Implementation of a substantial increase in National Park Service fees for non-commercial river trips and back-country hikers continues to be a major concern to the river community. The lack of public input into the decision making process, the abruptness of implementation, and the amount of the increase are prominent arguments against the new fee structure.

Since 1989, private boaters were charged \$25 to add their name to the waiting list, a \$4 per person park entry fee, and \$50 for the permit to launch. A standard 14 person trip for 15 days would pay about \$131 in fees to the park. Although many recognized the need to increase the admittedly low fees, they were alarmed at the amount of the increase and method of implementation.

Position & Percentage of salary attributed to private river permit system

Canyon District Ranger 25%
River Subdistrict Ranger 50%
River Permits Ranger 60%
Permits Clerk 100%
Lees Ferry Ranger 75%
Lees Ferry Seasonal Ranger 75%
River Patrol Ranger 35%
Seasonal River Patrol Ranger 35%
Boat operator/equipment manager 50%
Meadview Ranger 25%
Total personnel costs \$205,200

New fees stem from two different programs - cost recovery and fee demonstration. Cost recovery fees include \$100 to add their name to the waiting list, \$25 per year to remain on the list, and \$200 to launch the trip. The increase to \$10 per person to enter the park and a \$4 per person per day "impact fee" are part of the fee demonstra-

tion program. The result is that the same 14 person, 15 day trip mentioned above would now cost \$1,530, assuming a 10 year wait.

There are several obvious problems with the new fee structure. Those who had already obtained a launch date for 1997 were presented shortly before Christmas with a choice to give up their launch date after perhaps a nine year wait, or pay an extra \$1000 or more. Their reaction was predictable. Another failing is that an intimate, single boat trip has become cost prohibitive for most. A solo kayaker could pay as much as \$900 for the privilege of solitude - one of the most cherished values in Grand Canyon, and an experience which can only be found within the private permit system.

As reported in the last BQR, park service officials claimed the cost recovery fees were increased due to an audit which faulted them for not performing a cost analysis and increasing fees earlier. However, we obtained a copy of the audit and found no such language. Rather, the NPS was faulted for not implementing and accounting for fees park wide in a consistent manner. According to the audit, in 1994 the Grand Canyon special permit system actually had a surplus of approximately

\$6,000 after paying expenses of about \$54,000. They noted, however, that this expense figure did not include overhead costs.

In a cost analysis performed in the fall of 1996, the Grand Canyon River Subdistrict Ranger estimated total costs of the private permit system at \$260,000 per year. This includes just over \$205,000 in salaries and training of various NPS employees which were not addressed by the audit.

The NPS has received, at last count, 80 letters of complaint and one in support of the new fees. In addition, the river permits office states that they have received an average of eight phone calls per day. NPS officials assert that, "The majority of callers are simply inquiring and after the program is explained, support the fee structure." Susan Cherry, who has been managing the private permit system for a number of years, has left Grand Canyon National Park (see page 9); the vacancy has not yet been filled. Therefore at this point, if you have concerns about the fee structure, it would be important to express them in writing. (see box)

In an attempt to provide an explanation for the new fees and answer the most commonly asked questions, the National Park Service produced a newsletter, *Below the Rim*. Within this document, the NPS commits to spending all the funds

within the river corridor, including expenditures for resource monitoring and management. The NPS also proposes to dramatically increase the number of ranger patrols. "During your trip, rangers will be on patrol to answer questions, enforce regulations as necessary, provide emergency medical services if needed, and to perform the numerous rescues and medical evacuations required each year." One must wonder what processes predicated this change in management policy, as there does not appear to have been a clamoring desire for an increased level of service, nor has there been proven to be a need for increased enforcement. In addition, it seems unwise for the NPS to promise a level of protection services that cannot possibly be provided.

The NPS considers *Below the Rim* an adequate response to the letters of complaint they received prior to its publication. If no further response is received, the official position of the NPS is that the recalcitrant boaters have changed their minds and now support the fee structure. If this is not the case, it is important for those people to write again.

The increased fees appear to have substantially affected the size of the waiting list. Last year, there were 1500 new applicants; this year there were less than 1/3 that number. Only

Superintendent Robert Amberger
Grand Canyon National Park
PO Box 129
Grand Canyon, AZ 86023

Bruce Babbitt
Secretary of Interior
1849 C Street, NW, Interior Bldg.
Washington, DC 20240-0001

about 1/2 of the 6200 people who were on the waiting list had sent in their \$25 by mid-March. As of March 31, the remainder will be dropped from the list. Might this result in a decrease of the current, lengthy wait to obtain a permit? Possibly.

Obviously the \$100 fee has significantly reduced the growth of the list. The wild card is the current 40% cancellation rate, which currently allows private boaters to obtain a permit with little or no wait. It could be that many of those who drop from the waiting list rather than pay an additional \$25 would have ultimately given up their launch date. The fee structure, then, might reduce the opportunity for private boaters who have previously been able to obtain a canceled launch date each year. In time the full impacts of the new fee structure will become more apparent.

We have attended several meetings with various NPS officials at the South Rim, in Washington, and in Flagstaff, discussing the fee structure, the omission of public involvement in the process, and the plan for how these additional funds are to be spent. However, the NPS's official position is that the fees should not be changed again until the effects can be fully determined.

Backcountry hiking fees also present unsettling questions. On a philosophical level, imposition of these fees reflects the park increasingly being managed for the casual visitor who never strays from the pavement. For example, consider two families of 4, each visiting the South Rim for a week. Both pay a \$20 entry fee.

The Smiths visit the South Rim, take a few short day hikes, and rely heavily on the infrastructure, flush toilets and other available services. They spend their nights outside the park in a Tusayan hotel, each taking long, hot showers perhaps with water provided by future flows to Hermit Creek and Elves' Chasm. With feet remaining firmly on the pavement, they pay no additional fees to the park.

The Joneses enter the park via a remote road on the north rim. There is little signage to the trail head; the trail itself is unmaintained and rarely patrolled. So much the better; they seek a wilderness experience with as great a separation from the ever increasing clamor of rules, structure, and clamor of mankind. They carry out all their trash, and leave little trace of their having passed through. For this personal connection with the Canyon, the Joneses must pay an additional \$20 permit fee, plus \$4 per person per day—a total of \$132.

For some this may be unaffordable; for others it may seem reasonable. However, there is an even more basic consideration. Of greater importance is the shift in what type of visitation for which the National Park Service is managing. Backcountry use, which most of us consider to be among the most appropriate and virtuous forms of visitation, is considered "special use" and requires additional fees. Shopping for a rubber tomahawk on the South Rim, on the other hand, does not. Does this policy appropriately reflect the guiding principles of the National Park Service?



Jeri Ledbetter

DAVID EDWARDS, Plaintiff

vs.

BRUCE BABBITT,

in his official capacity as Secretary of Interior;
DEPARTMENT OF THE INTERIOR;

ROGER KENNEDY,

in his official capacity as Director of the National Park Service;
and NATIONAL PARK SERVICE, Defendants

Guides Defending Constitutional Rights, a non-profit organization, has filed a lawsuit in Federal District Court.

The case challenges mandated drug testing of Grand Canyon river guides as being in violation of constitutional protections, as it is being required without probable cause or reasonable suspicion. First court hearing will be April 4th to plan information exchange. We expect the first hearing on merits of the case to follow within 3-4 weeks.

Expenses are mounting quickly for this important legal action; please consider sending a contribution to:

Guides Defending Constitutional Rights
Box 1123, Flagstaff, Arizona 86002



Swimming in the Colorado River

Just an idea to think about. What if you told passengers that when they fell in the river, that they should swim head first through the big waves and swirly waters? It sounds crazy, but I believe it is a safer way to be in the river. Swimming forward will build momentum and help the swimmer go through some of these big waves and eddy lines. Swimmers can get to the boat and/or shore quicker than just floating. Also, when swimming rapids, people can get sucked under by whirlpools; although not particularly dangerous, this can be terrifying. Swimming forward and being flat can keep feet from being sucked down by whirlpools. For the few rocky rapids, a swimmer can quickly switch to the feet first position to fend off rocks. I swam head first through Hermit last year and barely got my head wet. Try it out and see what you think!



Jon Hirsh

Poncho's Basket

Of all the artifacts made by prehistoric peoples of the Southwest, no single class of items is as useful for tracing the development and movement of prehistoric cultures as basketry. Baskets are inherently functional as well as naturally adapted to artistic embellishment. The three basic techniques used in basketry production—twining, coiling, plaiting—were employed selectively by various cultural groups and embellished in a variety of ways by each. Specific techniques of twisting and binding fibers were handed down from mothers and aunts to daughters and nieces over generations, a fact that allows archeologists to trace culturally-specific basketry traditions through time and space.

For these reasons, I was excited and delighted when Grand Canyon river guide Barbara "Smitty" Smith told me about an almost complete basket that had been found by one of her passengers near Deer Creek in the summer of 1992. A female passenger was hiking around on a steep talus slope after a severe rainstorm near the popular river camp known as Poncho's Kitchen when she encountered the basket lying out on a slope. From the fresh appearance of the basket, it was obvious that it had been flushed-out from some sheltered upslope location by the recent rain. The passenger took the artifact back to camp. After some discussion, the crew convinced her to return it to where it had been found. Smitty accompanied her to the spot. Since it had been found in a very exposed location, and the original source of the artifact could not be determined, Smitty decided to cache the basket in a dry location under a nearby rock.

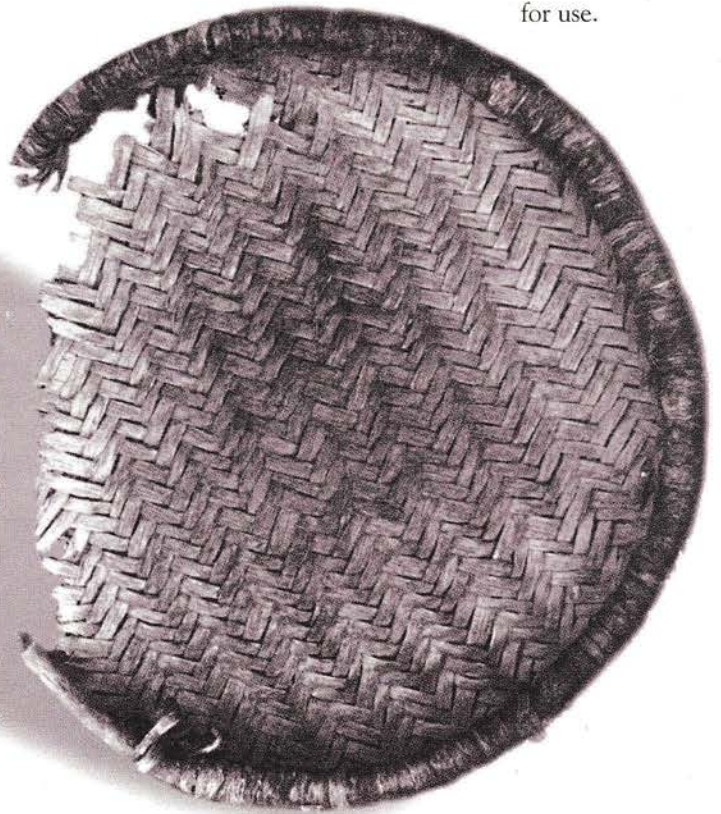
Smitty returned to check on the basket a couple of times during the ensuing year and noted that it was becoming progressively darker and more brittle. Concerned that the basket would eventually disintegrate if left in its current location, Smitty decided to tell me about it in hopes that I would study it and learn something valuable about the past. I am eternally grateful to Smitty for her concern and foresight, because this artifact—which I have nicknamed "Poncho's basket"—has indeed proven to be a very unusual and interesting addition to our inventory of prehistoric Grand Canyon artifacts. As with many serendipitous discoveries, it has also raised significant new questions and made an unexpected contribution to our understanding of Grand Canyon prehistory.

The number of prehistoric baskets recovered from Grand Canyon to date is exceedingly small. An inventory of basketry artifacts in the Grand Canyon Museum Collection revealed a grand total of 50 basketry items, of which 33 were modern baskets. Of the remaining 17

prehistoric items, seven were fragments collected outside of Grand Canyon National Park. The remaining 10 items include four small fragments and five partial or almost whole baskets. Only one is truly intact.

Poncho's basket is a type known as a "twilled ring basket" which was commonly manufactured by ancestral Pueblo peoples (Anasazi). Twilling is a type of plaiting (weaving) in which the woven elements cross over and under multiple strands at a time, producing an attractive herringbone pattern. Poncho's basket is manufactured with a 3/3 twill technique, which means that the plaited elements cross over and under 3 strands at a time. Two of the ten previously collected prehistoric basketry samples from Grand Canyon are plaited, but none are as finely crafted as Poncho's nor do they employ the 3/3 twill technique.

The construction of Poncho's basket followed the typical Puebloan pattern: a flat plaited mat was produced without finished edges and subjected to prolonged immersion in water to make it pliable. The mat was then molded to a desired shape (tray or bowl) and pushed through and around a prepared hoop of Squaw Bush (*Rhus* sp.) or willow (*Salix* sp.). Terminal elements of the plaited mat were attached to the hoop by a technique called twining, in which a single cord is woven back and forth around the stationary plaited elements. The excess matting was then trimmed off and the basket was ready for use.



The type of basket and manufacturing technique of this basket strongly pointed towards production by ancestral Puebloans, but its surprisingly fresh appearance suggested that it might be much younger than the widespread Pueblo II occupation of Grand Canyon. If the basket was less than 600 or 700 years old, then it might have been a trade item for late prehistoric Havasupai or Southern Paiute occupants of the Canyon. The only way to find out was to submit a small sample for radiocarbon dating. There was one major problem: how to pay for it. Radiocarbon dating is expensive, especially when using a technique called accelerator mass spectrometry (AMS) which requires only a very small piece of organic material for dating. A standard AMS date costs \$600-\$800 per sample, depending on the laboratory (there are only a handful of radiocarbon labs in the world that can process AMS dates). National Park Service budget constraints were so severe that no funding could be procured.

In September 1995, I had the pleasure to accompany a Grand Canyon Field Institute river trip, chartered through Canyon Explorations. While standing near the Nankoweap granaries, I mentioned to the group that the granaries had received little study from professional archeologists, other than a cursory evaluation of construction methods and direct observations of what little remained of their contents. Our conversation then turned to the general state of research in national parks. While bemoaning the lack of financial support for research in the parks, I used the basket as an example of how a little funding could go far towards answering significant questions about the prehistory of Grand Canyon. Unbeknownst to me, that casual remark lit a fire in the hearts and minds of my companions. At the end of the trip, they announced that they had collected more than enough donations from trip participants and crew to cover the cost of dating Poncho's basket! Their generosity moved me to tears.

Due to unforeseen bureaucratic black holes, it took a while for the money to be deposited in a donation account, set up by Grand Canyon Association specifically to fund archeological research at Grand Canyon National Park. Finally, late last spring, the money and a small piece of Poncho's basket was transferred to Beta Analytic, Inc., a commercial radiocarbon laboratory in Florida. They in turn shipped the sample to Zurich, Switzerland, for AMS processing. Three months later we got the results: 750 ± 50 BP (years before present). When calibrated to calendar years with a 95% probability, this date translates to AD 1215-1305. The date was exactly what I had NOT expected. Standard interpretations of Grand Canyon prehistory tell us that the Canyon was occupied by Puebloan peoples until about AD 1150-1200, at which point they "abandoned" the Canyon, presumably moving southeast into the Little

Colorado drainage area. A few sites in the eastern Canyon have been dated as late as AD 1225, but these are considered exceptions. As far as we know, these late sites are confined to the Canyon's eastern most areas. Following an occupational hiatus of about a century, or sometime after AD 1300, ancestors of the Havasupai/Walapai and Southern Paiute Indians moved into the canyon from the west and northwest respectively. This is the standard archeological reconstruction of past events.

Of course, modern-day tribes in this area have their own ideas about the nature and timing of past events. The Hopi maintain that they never abandoned the Canyon, they just changed the way in which they used it. The Havasupai and Walapai, on the other hand, claim association with Grand Canyon since the beginning of time.

While one mid-13th century date on a single basket cannot resolve or prove anything conclusively, it does lead us down some interesting new avenues. For one thing, it strongly suggests that people were still in the Canyon during the so-called 13th-century abandonment. Whether it be Puebloan farmers camped at the nearby "Back Eddy Ruin," or Puebloan traders passing through, or Havasupai using Puebloan baskets, we cannot say for sure. The date strongly supports a Puebloan origin for this basket, however, because twilled-ring baskets are the most common form of basketry among the Puebloan peoples during P III times (AD 1150- 1300), and prehistoric Great Basin cultures did not employ this technique.

In addition to the dating of this basket, this study highlights an important point: even after thirty years of systematic investigation by National Park Service archeologists and other researchers, our understanding of Grand Canyon prehistory is far from complete. The discoveries and active participation of our visitors have made and continue to make significant contributions towards furthering our understanding of the past.

Helen Fairley



ACKNOWLEDGMENTS: Our knowledge of this basket would be non-existent if not for the anonymous passenger on the Arizona River Runners trip and her foresighted guide, Barbara "Smitty" Smith. The concern and generosity of all members of the Grand Canyon Field Institute's September 1995 Colorado River expedition made it possible for us to date and analyze the basket, thereby establishing its proper place in Grand Canyon prehistory. A special thank you is due to Mr. Chris Herbert, past president and current member of the Grand Canyon Association Board of Directors, and a member of the 1995 river expedition, whose inspiration, enthusiasm, and personal generosity lit the spark that made the rest of this story possible.

Matkatamiba

A place so tranquil
where beauty abounds
the chirgling of water
makes musical sounds,
large pools make low notes
from small ones come high
the canyon wren sings them
up toward the sky.

Cicada on tree branch
buzzing in wait
resonations of love
sent out for a mate.

We all lay about
in peaceful division,
memories are stored
to recall and envision.

A warm breeze is led
up this canyon of narrow
it follows the flight
of a cliff dwelling sparrow.

Our books lower slowly
from hands down to chest
eyelids then follow
and close for a rest.

We rest and we rest
our naps well deserved
then awaken to footsteps
in gravel disturbed

We open our eyes
and continue our dream
while adventuresome
folks return from upstream

Matkatamiba,
nature pristine,
where we can go
our souls for to clean.

The time has now come
to leave this great place,
but remember it well
when back home in the race.

Chet Collins 1995

Grand Canyon A Brief History of the River

Does a river flow backwards like the blues
or blue memory of life as a child, kicking
out the rocks on every skinned-knee path
and lulling sleep on soft mother's lap?
Does the water conquer or divide? Is
there a sum of parts to swim? Whitewater
reveals only what it hides and dams stay dumb.

Every stone has a story it won't tell:
the cold truth of our own indifference
to what cannot be plundered or pursued.
A lake named Powell is like a bank named
Marx, the rapids now as still as the cool
glow of the television in Tucson
they've surrendered their lives to.

Yangtze or Penobscot, Bio-Bio
or Colorado, the same stream cannot
be drowned in twice. It moves wherever
you move, and you both move. Not just
in Lost Yak or Cataract, Tiger's Leap
or Lava, but inside the monotonous
crush of millennia, inside out.

The river is not there for you. If
you point and say, There is the river,
you lie. The river swims, with no mind
and all grace, out of the sun and into
the moon, swims over your rock bones, your
marrow of pool and drop, love and lack,
wet memory of fear and hope, and hope.

David Breskin

River Fog

The fog is a confused river.

It rushes in from the sea,
And rolls down the mountain.

River and fog immerse everything,
In their path.

Travis Winn

(son of Peter Winn, currently in 6th grade.)

(Travis, not Peter)

Kilroy

Lunch was on a small beach
to which the river had thrown
a great pile of sand and was
now taking it back again
for its angle of repose
was unstable. Touch its slope
and it slumped, falling away
in eroded sheers and clefts,
a miniature of the canyon
itself, leaving layers of
sandstone, limestone, and shale:
Kaibab, Toroweap, Coconino,
Hermit Shale, Supai, Redwall...
etcetera, etcetera,
an inch to half a foot deep.

On top, in the smooth surface
of this unstable plateau,
Harry reached with a long stick to
draw a great-nosed face with two
hands clinging to a line, an
outsized "Kilroy was here!" in the
Grand Canyon of the Colorado.

It was a harmless joke. Harry
was a no-impact person
and knew the evening wind
would erase his Kilroy and leave
no mark of our being there.
We were only travelers,
like Kilroy himself, and didn't
want to anger the land
we were passing through.

The Anasazi before us were
more serious about staying.
They pecked their images
into stone, claiming it with
circles, coils, stick figures with
two and one half legs, and handprints
the size of a raccoon's paw.

Time has taught the Anasazi
the humility of oblivion,
but not everyone seems to
understand. Above Lee's Ferry
someone who would not listen
to the winds of history
built a Kilroy in concrete.

John Van Peenen

A Solstice Wish for Whale

It has been about a year and a half since Whale died, and I am still having a rough time dealing with him being gone. I ran trips with him for a few years in the mid '80s. He was a huge force in my life. Actually, I still see him in so many people---his eyes, a look, an attitude? I can't say what it is but... .Anyways, I wrote this during the Winter Solstice. Maybe by sharing some thoughts with other people, missing Whale won't hurt so much.....

Warm breeze
my head on your chest
I'd swear you are purring---again
Stars overhead---I like this place
the canyon walls are shaped like a fish's mouth
and the stars are in a deep ocean.

Days are warm sand, red walls,
The water dances in your clear blue eyes,
I can smell the willows, the river
I flit about like a little bird, cheery, silly, happy,
You are the base part in a song, solid, constant, steady.

Remember House Rock Valley?
It is still so clear in my mind,
Sweet magic. Spring or summer flowers on the edge of the great canyon,
bright flowers, the manifestation of love,
we loved.

I miss you now,
tears,
sadness.
Sometimes the memories bring you so clear and close,
I can smell you and feel your beard tickle my nose.

Did I ever tell you how much you shaped me? changed me? affected me?

I miss you now.

And I wish,
I could give to you,
a solstice kiss.

Lynn Zonge

Whale, and the Whale Foundation, have a home page now.
<http://members.aol.com/TheGrusys/whale.html>
Stop by for a visit.

State of the Beaches

Launching Adopt-a-Beach, 1997

By now those of you who adopted a beach to monitor last season have received a copy of our final report for the '96 season. Hopefully you saw the article in the most recent bqr that summarized results and showcased 3 of the 44 beaches guides monitored last year.

The photos shown here highlight the need to keep doing this program. Revised runoff forecasts in February caused the release of a constant 27,000 cfs for several weeks, followed by a constant 24,000 cfs for several more. A couple of guides took photos of our beaches during this time, which show the highly erosive effects of these flows...many of the high level beaches built by last year's experimental flood flow appear to be hit fairly hard.

People in the scientific community are very interested in our program and the unique information it provides.

You can sign up to photograph and monitor a beach this season by coming the GTS April 5-6 or calling the GCRG office. If you can't do the actual monitoring, you can greatly help out by donating \$100 per beach to GCRG to help fund the program. (see space on membership form on last page of this issue)

Adopt a Beach originated with the idea that the extensive on-the-ground experience of river guides can contribute to the scientific and monitoring work on the canyon's sand bars. As you may know, we selected 44 commonly used sand bar campsites in 3 critical reaches of the canyon where campsite beaches are scarce, highly eroded and/or highly visited. River guides photograph and monitor changes to these beaches, and answer questions like: how is this beach doing? is it bigger, smaller, wider, thicker? what processes seem to be changing it? how campable is it? It's a way of collectively keeping our finger on the pulse of a resource we care a lot about.

So, do it. Adopt a beach by calling us for a camera or sending us \$100/beach to make this thing go. Thanks for your support!

Andre Potochnik,
Kate Thompson,
Kelly Burke
Tom Moody



Owl Eyes Camp, about 16,000cfs, June 1st, 1996—new beach built from 45,000 cfs flood flow



Owl Eyes Camp at 27,000 February 27, 1997—after 10 days of 27,000cfs constant flows. "Where'd it go?"

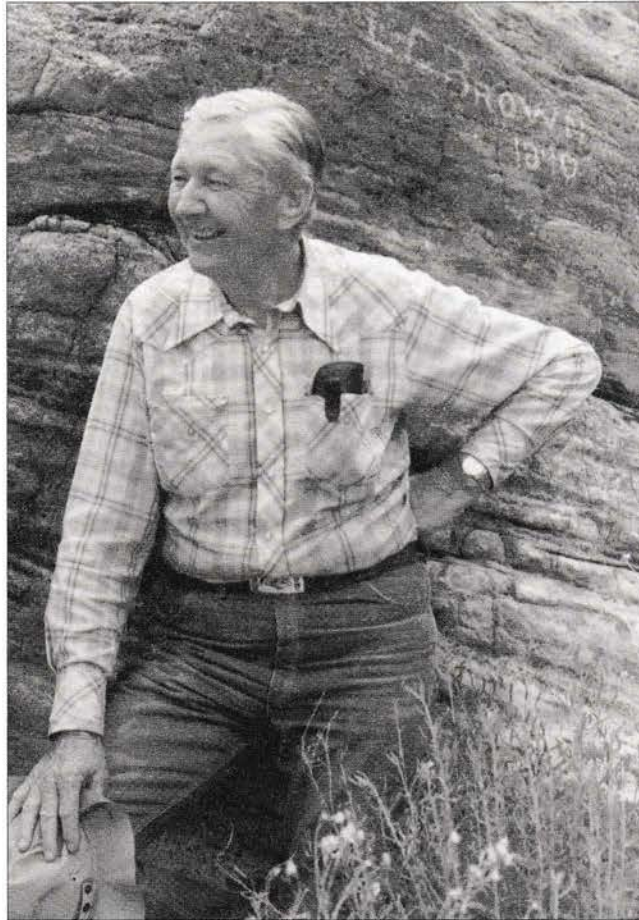
My High Water Experience in Marble and Grand Canyons

When I first started matching old photographs in Grand Canyon during the mid-1980s, people kept telling me I had to go see P.T. Reilly. I finally did, and my life is the better for it. P.T. Reilly took some of the best photographs of Grand Canyon, and he loaned me a considerable number to match. He also convinced me that he was a credible observer of natural conditions along the Colorado River, which eventually led me to talk to other pre-dam river runners, culminating in the Old Timer's Trip in 1994. When I was preparing my book on the Stanton photographs, I asked P.T. to contribute two short pieces on his experiences in Grand Canyon. Because of space limitations, only one, his story of searching for the site of the Hansbrough-Richards drownings, made it into the book. Susie Reilly has graciously allowed me to share the second one with you. It is particularly relevant in this time of experimental floods to read what water level P.T. thought was the best to run in Grand Canyon. — Bob Webb

I was fortunate that much of my river-running career occurred before the building of Glen Canyon Dam. This span, between 1947 and 1964, included the highest flows on the Colorado River since 1927. Rapids change considerably from low to high water and I feel fortunate to have experienced the high water that I did before Glen Canyon Dam provided a low, regulated discharge.

I began rowing for Norman Nevills in 1948, and I led my first party in 1953 and my last in 1964. I made additional trips as a guest in 1982 and 1984; the 1982 trip was my only one on an inflatable raft. During these years I made four runs when the flow exceeded 100,000 cfs — in 1949, 1952, 1957, and 1958. The highest flow since 1927 occurred on June 12, 1957, when the Lee's Ferry gage recorded 126,000 cfs. My party was the only oar-powered one in Marble Canyon when the flood peaked. That night we were camped on the left bank at mile 43.65 and the water came with a rush about 9 P.M. The flow had receded about a foot next morning. These instances cannot be experienced by today's traveler, so I will recall a few observations that are not likely to be repeated in our lifetimes.

Boating on high water in Marble and Grand Canyons was not always pleasant. High water effectively removes the better campsites and often the substitutes were little more than intermediate patches of sand widely scattered among the boulders. There were no



The late great P.T. Reilly
Photo courtesy Susie Reilly

beaches. Character change of rapids in exceptionally high water is amazing, but one has to witness the various rapids at such flows to appreciate this fact.

Badger Creek and Soap Creek Rapids are millponds at 118,000 cfs, but Boulder Narrows (mile 18.5) becomes a fearsome place. The huge midstream boulder is covered, but an impressive hole forms on the downstream side. We landed on the left and climbed up on that part of the broken boulder that remained along the left bank after the split. We saw large logs, oil drums, and other objects take the plunge. After an interminable period, some bobbed to the surface about 200 yards downstream, but others

were not seen again.

The rapids at mile 24.5 and 24.9 generally hold their character from low to high water, but most of the major rapids become fast-water chutes with no waves. There was only a slick bulge over the midstream rock at President Harding Rapid (mile 43.7). Little Nankowep and Nankowep Rapids had a condition that I have never seen duplicated. There was a series of heavy laterals in the center and on the right at Little

Nankoweap Rapid (mile 51.8). These rolling waves built up on a cycle of roughly ten seconds, then crashed together in the center. A large, broken lateral about 40 feet long then formed and traveled downstream before breaking to the right. It was accompanied by a whirlpool that could have been described by Edgar Allan Poe. It was the largest I have ever seen, approximately 25 to 30 feet in diameter with twisting, ringed sides. As I rowed furiously to get clear, a log about 8 to 10 inches in diameter by nearly 20 feet long was swept into the whirlpool within 50 feet of my boat. It turned on end and the high end was drawn below the surface. I never did see the log surface as the current veered and I was able to land just below the mouth of Little Nankoweap Creek. Until I saw this monster, the largest whirlpool I had seen on the Colorado was 4 to 6 feet deep. The situation at Nankoweap Rapid (mile 52.2) also was strange; close to the right shore was a small rapid traveling upstream at about 15 miles per hour. It was very swift water and I estimated the waves as being about 3 to 4 feet from trough to crest.

There was little change in Kwagunt Rapid (mile 56) between low and high water. The heaviest water consisted of about 1,000 feet of 5-foot waves down the left-hand side. It was a mild ride that I rated a 3 on a scale of 1 to 10. The murky lagoon at the mouth of the Little Colorado River was about 200 feet wide and the island was completely covered. Ben Beamer's cabin was some 10 feet above the lagoon under an overhanging ledge of Tapeats Sandstone.

Lava Canyon Rapid (mile 65.5) was unbelievable. The waves were quite large, breaking from both sides in a great herringbone pattern. Near its head was a large lateral that I guessed was 10 feet high by 40 feet long, breaking parallel to the tongue. I took on two inches of water and rated the rapid at 7-1/2. An even wilder ride was encountered in a heavy rapid that began at mile 67.0 and extended nearly three-quarters of a mile downstream. The waves were about 10 feet high and breaking. As appeared to hold true in this high water, the main stem was weaving back and forth. The boatmen got a good workout as this ride extended from Espejo Creek past Comanche Creek. I looked back for the first time and saw one of the boats "walking on her tail." I regret not having photographed this scene.

At the old Nevills camp on the left at the head of Tanner Rapid (mile 68.5) there was a minor rapid that I rated a 4. Running Tanner required maneuvering from one side to the other, and at its foot we banged into another rapid of similar intensity. There was little difference between the low- and high-water runs at Unkar Rapid (mile 72.6); all the heavy water was down the left at high water and it was easy to power down the right-hand side. At mile 75, there was a minor rapid that I rated at 4; then we landed on the left at the head of the

real 75-Mile Rapid (mile 75.4). This rapid was normal except for some heavy broken water over the boulders on the fan. We ran the rapid with all hands and I rated it 5.

Hance Rapid (mile 76.8) was rough but runnable. Both large rocks at the head were completely covered. Sockdologer and Grapevine Rapids were merely smooth, fast chutes. The largest rapid at high water between Hance Rapid and Bright Angel Creek was at mile 87.5 and I rated it a 4. The USGS river gagers were in the cable car taking their daily reading, and they said the river was running 103,200 cfs. We landed at the Bright Angel beach one hour and thirty-two minutes after leaving Hance, perhaps the fastest this leg has ever been covered by oars. It certainly was the fastest that I ever ran it.

Horn Creek, Granite, and Hermit Rapids appear to be major ones at any stage. I rated the first two at 7; Hermit rated an 8. The water at Boucher Rapid (mile 96.7) was running nearly over the fan. Tuna Creek, Agate, Turquoise, Sapphire, Ruby, and Serpentine Rapids were practically continuous. Waltenburg Rapid (mile 112.2) was completely filled in with no waves more than two-feet high, and the large mid-channel bedrock at the head of the rapid was covered, its presence indicated by a large hole and boil. At Royal Arch Creek (mile 116.6), we distinctly heard the rumble of rocks being rolled along the bottom. Specter Rapid (129.0) had a nasty twister that caused me to rate it at 6.

Dubendorff Rapid (mile 131.8) was very impressive at this stage. The water was backed into Galloway Canyon, then it drove diagonally across the fan into the main current. There was a large hole extending 40 feet across the approach with a continually breaking wave. We once again heard the dull rumble of boulders being rolled along the bottom, louder here than at Hermit or Royal Arch Creeks. It was a tough run and fully deserved a rating of 9. Granite Narrows (mile 135), was very impressive. The entire river in flood was compressed into an opening in the granite less than 60 feet wide. Boils and changing cross-currents constantly diffused the pattern and a person running oars had to be ready for anything. We made the passage with bumps and scrapes but without serious incident.

The pool into which Deer Creek Falls (mile 136.1) plunges was completely engulfed by the river and we rowed over the normally dry fan. There was an impressive hole about 10 feet deep by 40 feet long at 138-Mile Rapid that could easily trap an unwary boatman. Upset Rapid (mile 149.7) was only smooth, fast water. I timed us between known mile points to find we were going eight miles per hour.

Lava Falls Rapid (mile 179.3) is not as tough as it was before the 1955 flood poured down Prospect Wash. At that time, tons of black boulders washed from

Prospect Creek into the rapid, filled in many holes, and gave the torrent a completely different character. It still is the toughest rapid on the river, but now Lava can be run in 16-foot dories at flows from 28,000 to 45,000 cfs. Below and above this discharge range, the rapid presents a different, ever-changing appearance. I have been fortunate to have seen Lava Falls from less than 10,000 to over 100,000 cfs, and it is difficult to believe it is the same place. After Lava Falls, any river trip seems to go flat.

However, there are a couple of places below Lava Falls that at certain stages of water present real hazards any boatman should avoid. The first is a rocky point projecting into the river at the foot of 205-Mile Rapid. The full force of the river bangs into the point, but an alert boatman can easily avoid it by rowing left. One of my boatmen got trapped here in 1955 and again in 1962. At mile 232.4, the river falls only six feet, yet 232-Mile Rapid has a major hazard for oar-powered boats at flows of less than 30,000 cfs. There is a sharp, snag-like needle into which the current drives right at the foot of the tailwaves. I have seen unwary boatmen driven into this needle, or upon it, at certain stages.

But I also experienced lower flows during the pre-dam days and some of those extremes can be repeated. Boating problems between the extremes are quite different and a capable boatman should be able to handle them all. In my opinion, our 1962 trip provided the best flow for river running that I ever encountered; from June 25 through July 14 we averaged 45,500 cfs per day. This water level was pure pleasure.

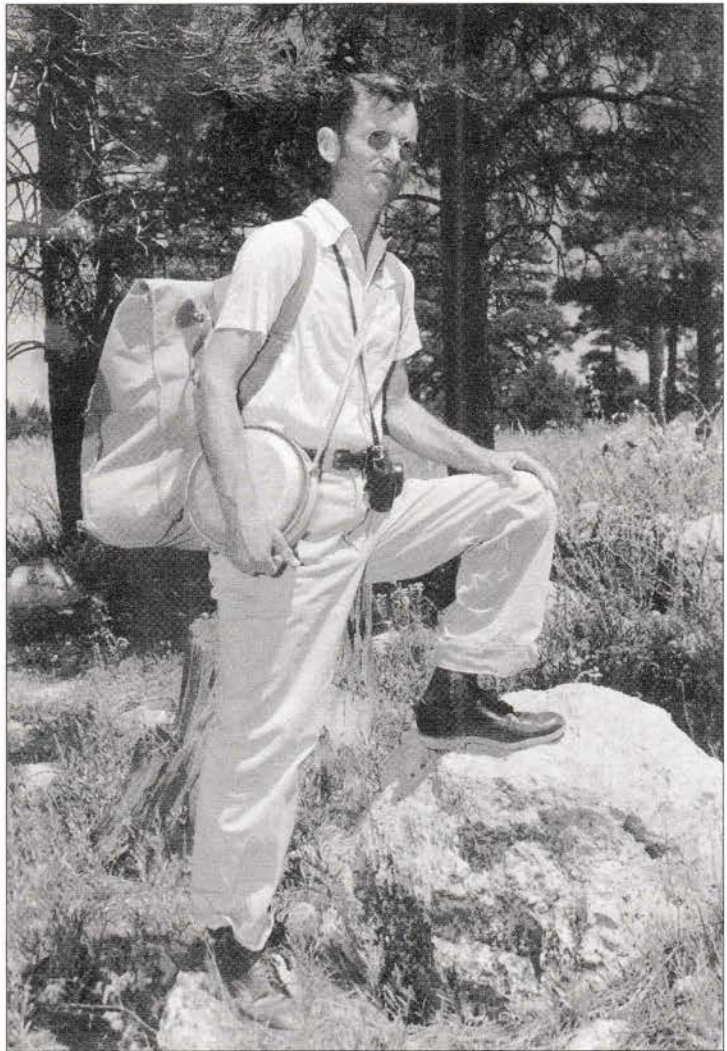
On May 12, 1964, my party was in camp below Whitmore Wash (mile 188.3) when an airplane pilot dropped us a note telling us that the gates of Glen Canyon Dam had been closed on May 11, 1964, and the flow had been reduced to 1,000 cfs. This had occurred the previous morning. The thoughtful pilot had added "Lees Ferry runoff this morning 9,000 cfs," which enabled us to determine how rapidly the river was falling. We broke camp and re-embarked immediately, gaining another 12 miles before we camped and ate a cold supper. Up at daylight, and knowing that a tough day was ahead of us, we ate a good breakfast. On May 13 we rowed 39 miles in 11 hours 15 minutes, and camped at Separation Canyon (mile 239.6). This run included stops amounting to 2 hours 44 minutes, giving us an actual running time of 8 hours 31 minutes. An early start helped us reach Emery Falls (on Lake Mead at mile 274.3) before the search plane spotted us the following morning.



P. T. Reilly

Happy Birthday, Harvey Butchart

The legendary Grand Canyon hiker and explorer celebrates his 90th birthday on May 10, 1997. Northern Arizona University's Cline Library will be hosting a tribute to Dr. Butchart on Saturday, April 26 at 2:30 PM in the Cline Library Assembly Hall. Bob Packard and Everett Walter are scheduled to speak about Butchart's hiking activities as well as his career as a mathematics professor at NAU. A scrapbook of memorabilia will be assembled to present to Harvey; if you would like to contribute a story, photograph, or letter (8-1/2 x 11" format), please send or deliver it to Diane Grua, Cline Library-SCA, NAU Box 6022, Flagstaff, AZ 86011; fax is 520/523-3770, e-mail Diane.Grua@nau.edu. For more information, contact the Cline Library Special Collections and Archives Department at 520/523-5551.



Harvey hiking in the early '50s. NAU Archives

This Old Continent: Constructing the Basement to North America

Metamorphic rocks are hard to work on and even harder to describe using common language. My goal in this article is to encourage you to pick up the new map, learn more about geology and the cryptic language of metamorphic petrology/ductile structural geology, and to improve my own ability to communicate complicated ideas simply and effectively. The BQR first saw metaspeak in a 1992 article by me and Karl Karlstrom. Unfortunately it's out of print—if you don't still have yours, find a friend who does. Another extremely valuable resource would be any dictionary of geological terms. I have added a short glossary of terms at the end of this article but will try to communicate the meaning of two-bit words in the context of a sentence. Words in bold face are defined at the end of the article. For those of you who want no-holds-barred technical beta, or if you suffer from insomnia, I recommend: Ilg and others (1996) and Hawkins and others (1996)—write me for copies at Box 85, Glorieta, NM 87535. Metamorphic pressure and temperature data are from Mike Williams (U. Mass) and rock ages are from David Hawkins (MIT). Finally, thanks to Karl Karlstrom for introducing me to the "Granite Gorge Metamorphic Suite".

The illustrations are from the new Geologic Map of Grand Canyon, available from Museum of Northern Arizona or the Grand Canyon Association—the colors I refer to are those on the map.

Canadian geologist Paul Hoffman titled a 1988 article *United Plates of America: Birth of a Craton*. The title suggests that continents, like nation states, are dynamic bodies, growing and shrinking through time. His article describes the means by which the North American **craton** formed, via plate convergence, collision, and subduction, by amassing fragments of continental material (similar to Borneo, Japan, Papua-New Guinea) and island arc chains (similar to Sumatra-Java, Aleutians) at its edges. The Grand Canyon reveals a bit of this story.

Fortunately, the Colorado Plateau has behaved as a crustal "knot" since Grand Canyon Supergroup time (ca. 1300-800 Ma; Ma=million years ago), that is, it has been largely immune to crustal-scale deformation. The shortening (crunching) deformation associated with the formation of the Rocky Mountains to the north and the extensional (stretching) deformation associated with the Rio Grande Rift to the east and the Basin and Range

Province to the south and west did not significantly affect the Colorado Plateau region. Thus, features observable today indicate that the rocks were initially deposited in a submarine setting about 1.6-1.8 Ga, (giga-annum, or billion years) specifically in an island-arc environment similar to the Indonesia region. The rocks were assembled onto North America during a mountain building episode called the Yavapai **Orogeny** 1.7 Ga ago. However, during their assembly to North America they were buried by thrusting and folding to depths of 15-20 kilometers and heated up to 550-700 degrees Celsius, fundamentally changing (meta) their form (morph). The basement rocks then remained at depth from 1.7-1.4 Ga (300 million years). At 1.4 Ga a big thermal disturbance in the **mantle** melted big portions of the lower **crust** producing large **plutons**, or magma bodies, like the Quartermaster pluton (river mile 260). This same event caused the buoyant rise of the basement rocks (hot rock, like hot air, rises). As they slowly rose, some 15 to 20 kilometers of overlying rock were slowly eroded away. The basement rocks were finally exposed at the surface about 1.3 Ga, just before the Grand Canyon Supergroup rocks were deposited, and have remained essentially unchanged since.

The Colorado River carved down into the **Proterozoic** basement of the Colorado Plateau forming the Granite Gorges of the Grand Canyon. The great clarity of rock exposure in the gorges allow an unprecedented opportunity to study the results, and understand the processes, of continents in general and of the growth of North America in particular. Although the rocks of

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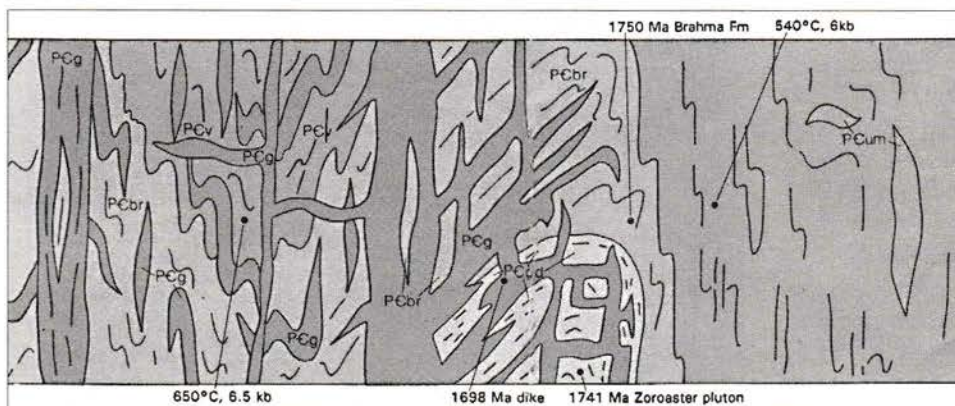


Figure 1. The 1.74 Ga Zoroaster pluton intruded 1.75 Ga Brahma rocks, was deformed into a large concave-down fold (called an antiform) at 1.70 Ga and was intruded by pegmatites at 1.68 Ga. The history of the Zoroaster area is similar to the history of all the basement rocks east of the Crystal Rapid. The duration of this history is about 60 million years, or about the amount of time that has passed since the dinosaurs went extinct.

the Granite Gorge Metamorphic Suite (GGMS) and the plutonic rocks that were injected into them make up a small part of the Colorado Plateau, similar rocks form the basement to all continents. If you could dig down through the relatively flat lying surface rocks in Kansas or the ice of Antarctica, for example, you would find essentially the same rocks as those exposed in the Granite Gorges.

Rock Types

Six Proterozoic rock types have been mapped in the new 1:62,500 scale map: the three metamorphic units of the GGMS and three distinct plutonic rock groups. Rocks of the GGMS include a new unit called the Rama Schist and Gneiss (Ilg and others, 1996; shown in blue on the map and cross section), the Brahma Schist and Amphibolite (Maxson, 1936; green on the map), and the Vishnu Schist of Walcott (1894; orange on the map). The GGMS rocks were intruded by 1.74-1.71 Ga island arc-related plutons (pink on the map) similar to those forming under Sumatra today. Later, when the island arcs were buried and heated as they crashed into North America, they partly melted and squeezed into cracks and weaknesses, forming the 1.7-1.68 Ga pegmatite dikes that lace the canyon walls (red-orange on the map). The GGMS rocks were originally submarine volcanic rocks (Rama and Brahma) and fine grained submarine sedimentary rocks (Vishnu).

Granite Gorge Metamorphic Suite

Rama rocks are metamorphosed rhyolite to andesite flows and ash deposits similar to those that erupted from Mount Saint Helens in 1980. The best and most easily accessible example of Rama rocks is just above 127-Mile Rapid on river right in the Middle Granite Gorge (reddish color, not the black Brahma rocks)

Brahma rocks are metamorphosed basalts similar to the lava flows in Hawaii and Iceland. The best examples of Brahma pillow basalts are about 3 miles up Shinumo Creek and in "Pillow Basalt" canyon just below Travertine Grotto on the right. Other good Brahma rock examples are at Schist Camp (upper end of the beach), the upper beach at Blacktail, or up Specter Chasm.

Vishnu rocks are metamorphosed volcanic arc basin sediments similar to those being shed from the islands in the Indonesia archipelago. Most of the gray rocks of the Upper Gorge are Vishnu rocks. Relict bedding is preserved in Vishnu Canyon across from Grapevine Camp, between Lower Bass Camp and 110-Mile Camp and especially up Waltenberg and Hakatai Canyons.

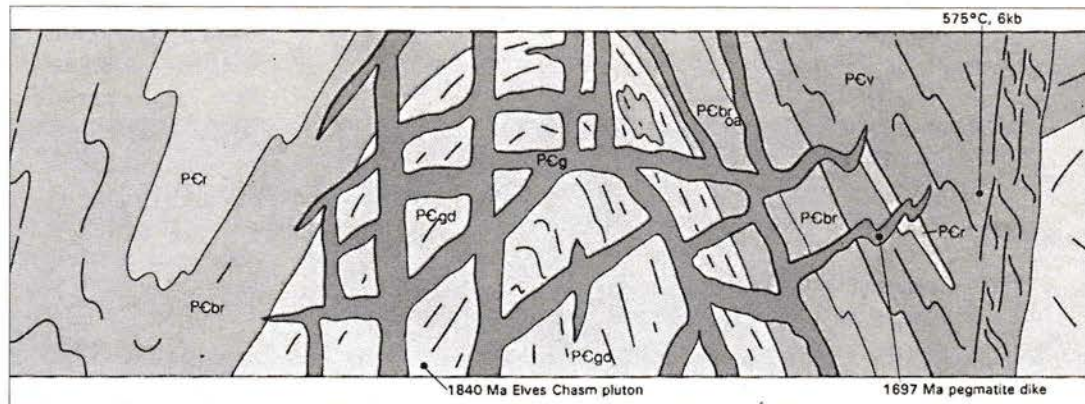


Figure 2. The 1.84 Ga Elves Chasm pluton is about 100 million years older than any rock in the Southwest. The strange metamorphosed soil layer is found between the Elves Chasm pluton and Brahma Schist. The pluton is exposed along the river from mile 113 to mile 126.5 in the Middle Gorge (except at Blacktail). We just learned about the Middle Gorge exposure on our last trip so it doesn't show up on the map.

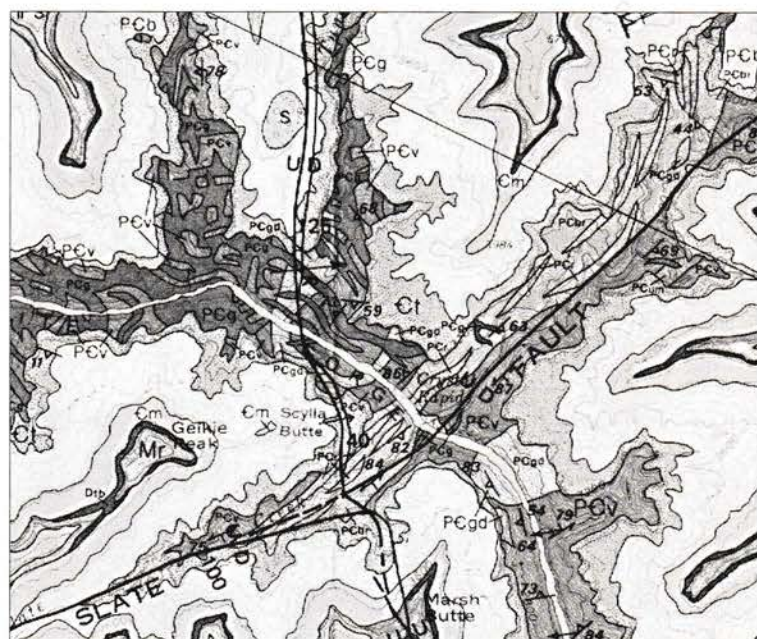


Figure 3. The Crystal shear zone at Crystal Rapid may be the boundary or "suture" between two ancient volcanic arcs. This is the first recognizable arc boundary in the basement rocks of the Southwest. We have not yet dated GGMS rocks west of Crystal but we suspect they may be as old as the Elves Chasm pluton.

Plutons

GGMS rocks were intruded by arc plutons including the Zoroaster, Pipe Creek, Horn Creek, 96-Mile, Crystal, Trinity, and Ruby plutons. These plutons intruded as large, thick sheets and, as the cross section shows, some were incorporated into large folds during the "big crunch" at 1.7 Ga. The best example of a folded arc pluton is the Zoroaster pluton. The big amphitheater wall between Zoroaster Rapid and Cremation Canyon is a cross-sectional view of Zoroaster antiform (Figure 1).

Pegmatite Dikes

As the volcanic arcs were “wrapping” onto the Wyoming Archean core (Karl Karlstrom makes an analogy of a series of boats successfully wrapping in Bedrock Rapid), they were shortened by as much as 500% resulting in crustal thickening and many folds (e.g. Sockdolager, Zoroaster, Trinity folds; Figures 1 and 2) and shear zones (Figure 3). Rocks deposited at the surface found themselves as deep as 20 kilometers. Deeper rocks melted and moved up through the crust as magma, bringing, or “advecting” their heat with them. The pegmatites we now see in the walls of the canyon (reddish orange on the map) may only represent a small fraction of the total magma that moved through the crust. The advected heat of the pegmatites combined with the mantle heat conducted from below, melted the GGMS rocks in several areas. The migmatites (small-

scale mixtures of Vishnu rocks and pegmatites) from Hance to Grapevine, and those from Cremation to 96-Mile Canyon record peak temperatures of up to 750° Celsius and they show the effects of melting at 1.7 Ga. If you look closely at the centimeter-scale pegmatite blobs, you will see dark rims around them. These rims contain the harder-to-melt minerals like biotite. The quartz and feldspar melted and segregated to form the small pegmatite blobs.

Shear Zones

The Upper Gorge is segmented into several blocks by shear zones. Shear zones are zones of very high strain and are simply the deeper equivalent of brittle faults. As you move from the brittle (i.e. breaking) upper crust to the plastic (flowing) middle and lower crust, high strain is more diffuse and occurs in zones rather than along discrete fault planes. As you float downstream you cross shear zones at Vishnu, Bright Angel, 96-Mile, Crystal (Figure 3), and Lower Bass Camp. The shear zones separate blocks which record different pressures and temperatures. One of the most dramatic breaks occurs at 96-Mile Canyon. Rocks upstream were heated to 750° C and were buried to about 20 kilometers. From Schist Camp to Crystal, rocks were “only” heated to 550 degrees C and buried to about 12 kilometers. We think the Boucher area is the best area to work out the earliest history of the crunch because the rocks there didn’t get hot enough to destroy many of the early deformation fabrics.

The oldest rocks in Grand Canyon

One of the most interesting finds of our work is that the Elves Chasm pluton is 1.84 Ga. This is about a 100 million years older than any other rock in the southwestern US. Characteristics such as: the old age of the Elves pluton, chemical evidence, garnets that record 3 or more growth stages (compared to 1 or 2 growth stages east of Crystal), and strange rocks that may indicate a metamorphosed soil layer just below Waltenberg, in 115-Mile Canyon, in Blacktail Canyon, and in the Middle Gorge suggest that the rocks west of Crystal Creek might be part of a volcanic arc 100 million years older than the rest of the basement to the SW.

If we are correct in our thinking, the Crystal shear zone would be the first “suture” or relict subduction zone recognized in the Proterozoic rocks of the west. Next time you run Crystal, you might be crossing from one volcanic arc to another, much older arc. Try not to get subducted.

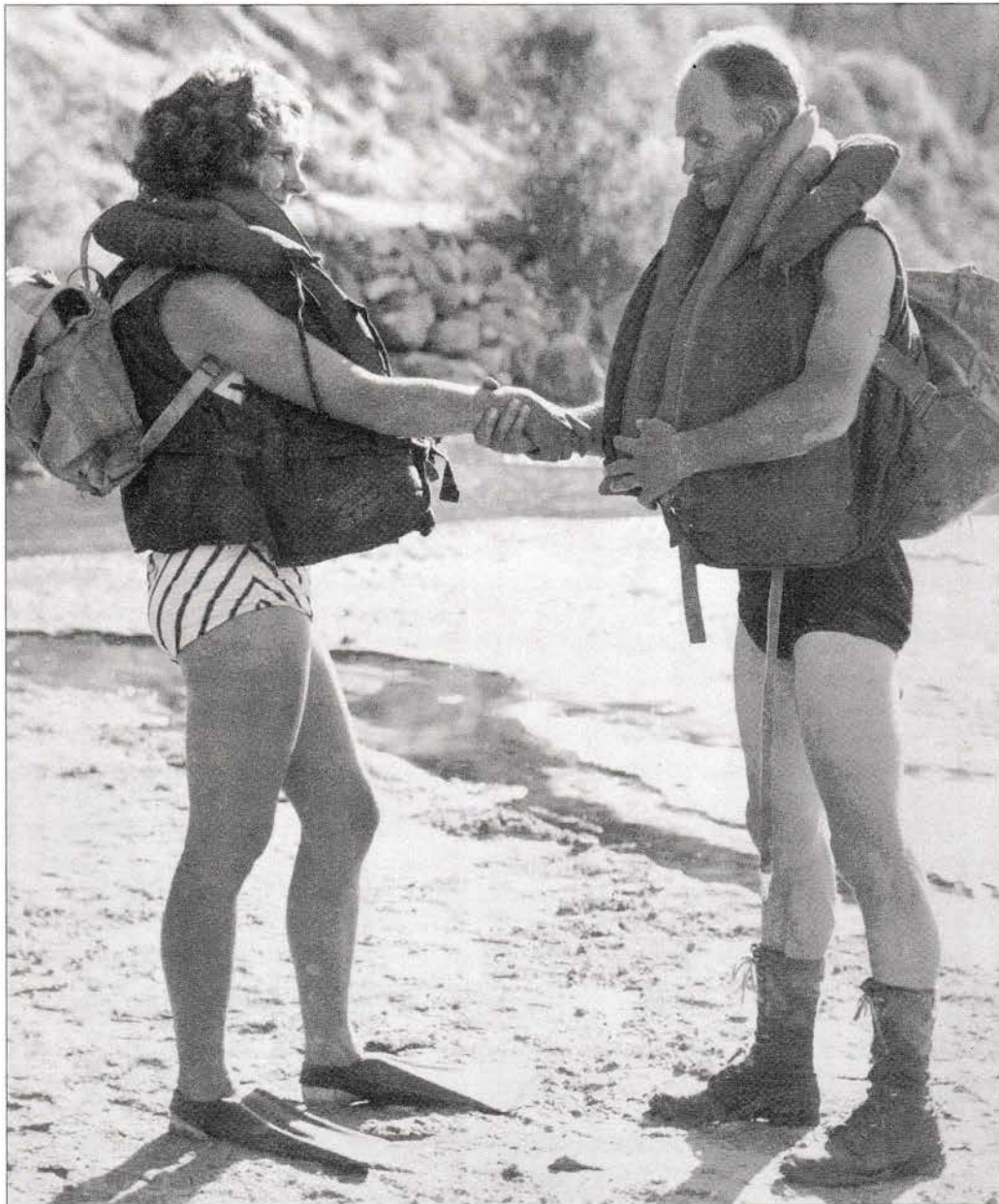


Brad Ilg

Glossary

- Andesite**—An extrusive (erupted) igneous rock that is rich in hornblende, quartz, and feldspar. The San Francisco Peaks and Mount St. Helens are examples of andesitic volcanoes.
- Basalt**—An extrusive (erupted) igneous rock that is rich in pyroxene, olivine, and plagioclase. Sunset Crater is formed of basalt.
- Craton**—A part of the earth's crust that has been stable and undeformed for a long time.
- Crust**—The outer most layer of the earth.
- Mantle**—The layer of the earth below the crust and above the core.
- Orogeny**—Mountain building episode. The orogeny that deformed the GGMS rocks was probably more like the Andean orogeny than the Himalayan orogeny. The Andean orogeny is characterized by an ocean crust subducting under continental crust, the Himalayan case by continent-continent collision.
- Pegmatite**—A vein with big crystals. Big crystals mean the magma had a long time to cool.
- Pluton**—A molten mass of rock that cools and crystallizes beneath the surface of the earth.
- Proterozoic**—At a coarse time scale the earth can be divided into the Archean (4.5-2.5 Ga) and Proterozoic (2.5 Ga- 540 Ma) Eras which make up about 90% of earth history and the Phanerozoic Eon (540 Ma-present). The Archean makes up nearly half of earth history yet there are no rocks of this age in the Grand Canyon.
- Rhyolite**—An extrusive (erupted) igneous rock that is rich in quartz and feldspar. It is usually pink in color. Rhyolite is more viscous than other lavas and therefore tends to form very explosive eruptions (Yellowstone caldera for example).

Belknap Collection

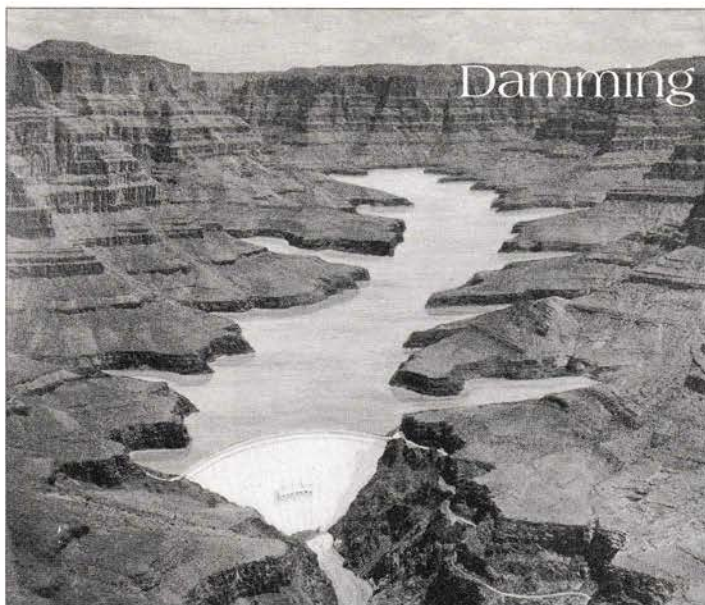


Bill Belknap photo. Courtesy Georgie Clark Collection, NAU PH 91.13.6 Cline Library

Recently, Loie Belknap Evans and Buzz Belknap donated their father's extensive and magnificent collection of photographs to the Northern Arizona University Cline Library, Special Collections and Archives Department. We've all seen the classic Bill Belknap photographs that grace the pages of the Belknap river guides as well as those in a variety of other publications. Well, there are literally thousands of others, ranging from the Boulder City region, where Bill and Fran made their home, to the Grand Canyon (including the jet boat and low-water sportyak trips), elsewhere on the Colorado, and the Green. The Southwestern Foundation for Education and Historical Preservation, which also funds the GCRG Oral History Project, is providing support to catalog this priceless collection.

If you are interested in volunteering to help identify images, please contact Vicki Rosen, the archivist for the project, at 520/523-5551. Volunteers will be asked to fill out a simple application and commit to a minimum of ten hours total. Please note that the collection will not be available for general viewing until it is cataloged, a process which will take several months. An exhibit and opening are planned for late summer of 1997. In addition, as images are cataloged, many will be added to the Cline Library website at <http://www.nau.edu/~cline/speccoll/imagedb.html>





Grand Canyon

Bridge Canyon Dam as it might have looked

In the early 1920s the United States Geological Survey explored the Green, San Juan and Colorado Rivers, designating sites for an unbroken string of dams from the mountains of Colorado and Wyoming to the last canyons of the Colorado River along the California/Arizona border. Boulder Canyon Dam, later renamed Hoover Dam, was the first one built, back in the early '30s. Having proved their ability to do something that monumental, and having whetted their appetites for it, the Bureau of Reclamation began planning many more dams upstream. Several were in the Upper Basin, north of the Utah/Arizona border. Two more big ones, however, were proposed for the Lower Basin, both in Grand Canyon—one at the head of Lake Mead near Bridge Canyon, and one in the high Redwall Limestone walls of Marble Canyon. The choice was narrowed down to two potential dam sites by the 1940s—one just above Redwall Cavern, and another slightly taller site a ways above Buck Farm Canyon.

From the base of the lower Marble Canyon dam site to the top of the projected reservoir of the Bridge Canyon Dam, the river would drop nearly one thousand feet. Enough hydrologic head (drop in elevation) for two more good-sized dams. Only one thing stood in the way of building these additional two as well—Grand Canyon National Park. (At that time, Grand Canyon National Park began at Nankoweap Canyon on the north side, Little Colorado on the south; and ended at Tapeats Creek on the north, Havasu Creek on the south) The Bureau knew they couldn't build a dam or a major reservoir within a park without an act of congress. Instead, they developed a plan to circumvent the park while still using the hydrologic head within the park.

The Bureau planned to do this by diverting some 90% of the Colorado River's water through a 38-mile long

tunnel from the base of Marble Canyon Dam to western Grand Canyon below Deer Creek, where the northern shoreline was in Kaibab National Forest. A powerhouse placed at river level could then operate with some 1,300 feet of pressure spinning the turbines.

The tunnel would pass just beneath upper Tapeats Creek, where a major tunneling operation would be based. Deregulation pools (depending on which of four different plans might be adopted) would be formed behind a large dam in upper Deer Creek, in the dry lake beds above the Deer Creek Valley, the canyon above Fishtail, or behind a 450 foot dam in Kanab Creek. The Kanab Dam would have the added benefit of stopping Kanab Creek's muddy waters from silting in both the powerhouse and the Bridge Canyon Reservoir.

A minimum of 1,000 cfs would be allowed to run through Grand Canyon National Park—"a scenic trickle"—so there would be a powerhouse at the dam as well. The 36-foot diameter tunnel would only be able to carry around 12,000 cfs, so at times there would be considerable releases at the dam.

Another tunnel was proposed by the residents of Phoenix—it would run southward to the Verde River Valley, thus supplying irrigation water to the Valley of the Sun. This concept, for one reason or another, never caught on with the Bureau.

The Marble Canyon Dam would not be one of the really big ones—the crest of the thin arch concrete dam would be just over 300 feet above the river, backing the reservoir up to the very foot of Glen Canyon Dam. Its capacity would be a meager 363,000 acre-feet (compared to 23 million acre feet at Glen Canyon Dam). With such small capacity, a silt control dam would need to be built in the Paria Canyon. A site was chosen just below Buckskin Gulch for a 380 foot dam, spectacular for its narrowness—70 feet wide at the base and 120 feet wide at the top of the inner gorge. Like the Coconino Dam on the Little Colorado, it was estimated to hold 100 years worth of silt. (That figure includes deltaic deposits above the crest of the dam!)

Even with the silt trap on the Paria, Edward P. Marsh of the Federal Power Commission reckoned that in 104 years the Marble Canyon reservoir would be filled with sediment.

The entire project carried a price tag of over a billion dollars in 1950s, back when a billion was worth something. By the time the final report was submitted in 1964, the Kanab Tunnel had been dropped, bringing costs down considerably. The power plant at the base of the dam would have a capacity of 600,000 kilowatts, producing 2.3 billion kilowatt hours per year. With a 100-year 3% interest loan from the government, the project was then estimated to have a 1.7:1 cost benefit ratio.



Glenn Rink and Brad Dimock

Meanwhile, Downstream...

In our last issue we printed Neil Murdock's reminiscences of the Bridge Canyon Dam Project in the early 1940s. During the course of planning for that dam, the Bureau of Reclamation considered several other projects it considered essential to make the dam viable.

Although it would have been a high dam at over 700 feet, its narrow reservoir would only hold 3.7 million acre feet of water (or silt)—16 % of what Glen Canyon Dam now holds. Hence siltation would be a serious threat to the dam. In the 1940s, with no dams upstream, silt retention dams were planned on the silty San Juan and Little Colorado Rivers. On the San Juan a high dam at Lime Ridge would have backed up a substantial reservoir over Bluff and Montezuma Creek, capturing the heavy silt loads of the San Juan and Chinle Creek. Once the dam at Glen Canyon was built, however, the Bluff dam was dropped from the project.

On the Little Colorado River a high, narrow dam was planned nine miles below Cameron. Called the Coconino Dam, this 250 foot high structure would have backed water over Cameron and well up into the Little Colorado Valley and Wupatki National Monument. It was estimated this would hold one hundred years worth of silt.

In addition to the upstream dams, the Bureau investigated the feasibility of a tunnel from the reservoir to supply water to some point in central Arizona. The extreme cost and impracticality of this idea caused it to be dropped in favor of pumping stations downstream.

Railroad lines were planned beginning at Peach

Springs and winding into the damsite with spur lines to a construction camp/permanent town on the Tonto Platform above the dam, and to a gravel quarry at the confluence of Diamond Creek and Peach Springs Wash. The rail plans were eventually dropped, as the construction of Glen Canyon Dam proved rail access was not essential. Instead, a 25 mile paved road would wind down through Hindu Canyon and Bridge Canyon, passing through a 4,100 foot tunnel on its way to the dam.

By the early 1960s the project had been pared down to a 736 foot dam at the Lower Gneiss Site, with road access and a town on the Tonto, and the 250 foot dam on the Little Colorado at the Coconino site. The cost of just over a half billion dollars would be repaid to the government at 3% interest over 100 years. Power revenue, fishing and recreation revenue would double the annual payments. With a 2:1 cost benefit ratio, the project seemed a shoe-in.

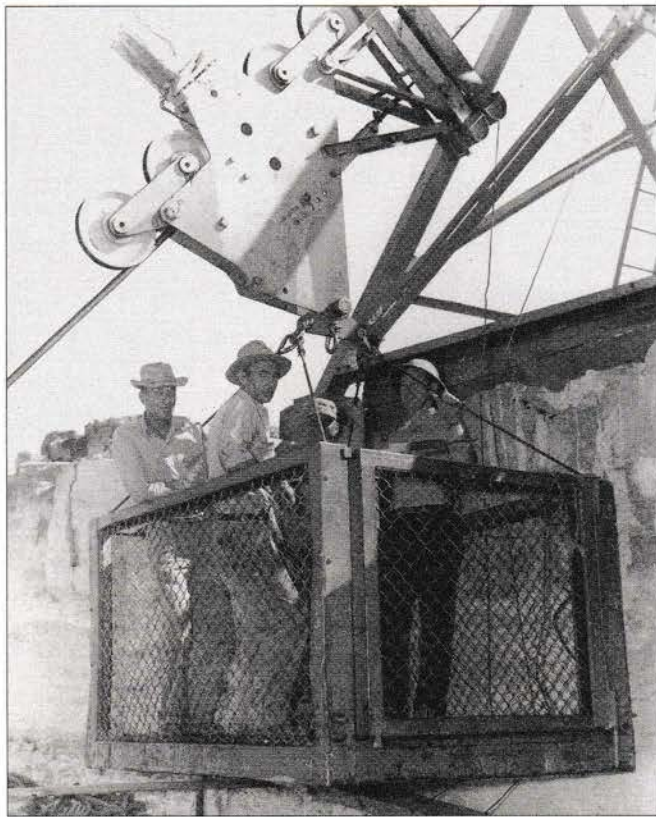
The mouth of Havasu Creek would be under 89 feet of water, and the head of the reservoir would be somewhere just below Deer Creek—right at the powerhouse fed by the 38-mile tunnel from the Marble Canyon Dam



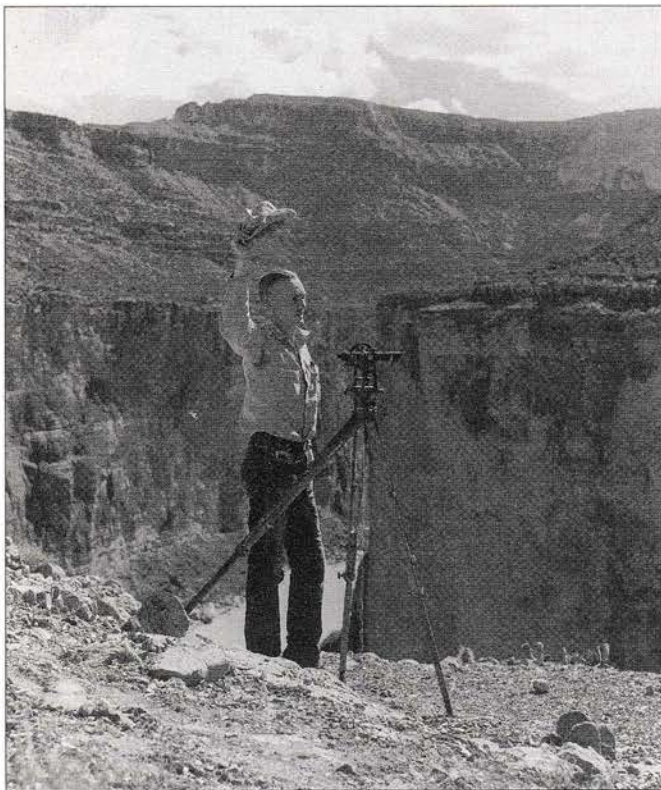
Glenn Rink and Brad Dimock.



Arizona Boyle Brothers drilled the floor of the Coconino Damsite in the fall of 1946. Both the bridge and their campsite are still intact on the south rim of the Little Colorado near Cameron.



Al Love, Harry Kennell, Paul Whipple and Bill Williams in the skip, ready to drop down to the Redwall



Tom Schlichting with transit atop the Redwall

My curiosity about the Marble Canyon damsites was piqued when I surveyed archaeological sites with the National Park Service in 1990. Much has been written about the political climate during the time construction of Marble Canyon Dam was considered. But when, I wondered, were these sites worked, and by whom? What was the worker's life like? And why were so many rock anchors scattered up and down on both sides of the river?

I have answered some of the questions to my satisfaction but not the difficult one pertaining to the worker's lifestyle—if anyone has any leads to folks who may have worked on these sites, please let me know.

The Fifties: The Bureau of Reclamation

Marble Canyon damsite was "one of the most inaccessible damsites ever explored by Bureau of Reclamation engineers." Bert Lucas was the engineer in charge of Bureau investigations at the two proposed sites in Marble Canyon, at river miles 32.8 (upper) and 39.5 (lower). Paul Whipple, I believe, was the drilling foreman. Tom Schlichting, a Bureau surveyor, was one of the first men to climb down to the river from the outer rim. Engineers figured the easiest way to the site was via cable from the rim. First they built a mule trail from the rim down Shinumo Creek to the top of the Redwall above Redwall Cavern. (This trail is still quite passable and accessible from the river at Fence Fault. It makes a nice off-season hike heading upstream to overlook Silver Grotto, or downstream to the old Bureau camp above Redwall Cavern.) Later, during the construction of the dam, at a projected cost of over six and a half million dollars, this route would have been made into a winding road for access to the dam.

In 1949 the Bureau asked for bids to build this cableway. They brought materials down the Shinumo pack trail to construct it. Two trams were constructed—one lowered men and equipment from the rim to the camp on top of the Redwall Limestone—a second went from there to a point upstream of Redwall Cavern on river right. I'm not sure why the Redwall route visible on river left a bit upstream was built—perhaps to access the river during construction of the lower tram terminus. Camps were established both on the rim and atop the Redwall Limestone.

A diamond drilling program was started in June 1950, and completed in January 1951 at the upper site near Redwall Cavern. The single drill rig was operated on a two shift basis, crews working a ten-day-on-four-day-off schedule. Thirty two holes were drilled in the river bed between 44 and 931 feet deep, for a total of 3705 linear feet. At the same time, two 50 foot drifts were excavated for the abutments. The drift in the left wall was begun in September. Finishing it in November they crossed to the right bank and started on the right drift. They finished in January.

The engineers used two long, flat bottomed aluminum barges

Canyon Damsites



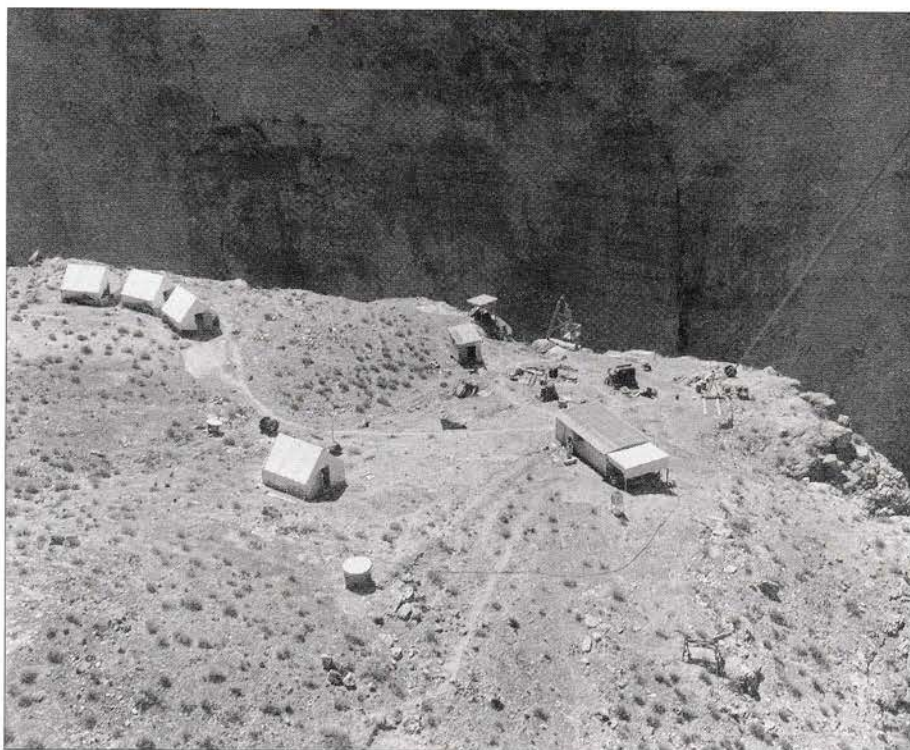
Foreman Paul Whipple in the hoist house



Coming up from the river

lashed together as the drilling platform. Two smaller boats, one on each side, powered with outboard motors, positioned the drilling barge. It stands to reason they would tie the rig securely off to the sides for drilling, which explains all the shoreline anchors. At some point there was at least one more of these long aluminum barges, and there are rumors of three of them being used as a helipad in the 1960s.

An interesting aside on these barges: two of them remained sunken on the right bank at the lower damsite for years—a third escaped and was wedged behind a lava outcrop below mile 203 on the left. In 1974 Tour West received a contract to remove them. At the lower damsite they dug the barges out and hacked one to bits with axes, loading it on their motor rig. They inflated a 33' rubber side tube in the other and towed it out. Things went fine until Bedrock, when the motor rig went right and their



View from the skip, approaching the lower camp. Cable barely visible on right



Crew moving drilling machine onto barge

trailer went left. But that's another story.

The two smaller boats still lie hidden in the mud and tamarisks on river right, a half mile below the lower damsite.

Drilling began on the lower site on August 31, 1951 and was finished on May 12, 1952. As at the upper site, two cableways were constructed. The upper cable stretched 3400 feet from the rim to the camp atop the Redwall. It must have been one of the longest cableways of its day. There was a hoist house on the rim where the cable operator sat and the cable wound onto a large spool. The lower cable went from the camp on the Redwall to a point on the shore across the river, where the remains of the two boats lie today.

This lower site had some problems—due to joints in the rock that ran parallel to the river, more striping (removal of rock) would be required. This was far outweighed by the advantages however—an additional thirty feet of hydrologic head would generate an additional \$3,000,000 in annual revenue, and the



Drilling barge being moved

water storage at the lower site was some 45% greater than at the upper.

They drilled 35 holes into the riverbed from 35 to 435 feet deep—a total of 5480 feet of drilling. They excavated a drift on the left side of the river that was 100 feet deep and one 75 feet deep across the river. In the '60's the Arizona Power Authority would deepen these and blast additional ones.

John Santa, Bureau photographer, and Bill Williams, Bureau Public Affairs person, along with Allen and Jan Macauley, freelance film makers, made a trip to the lower site in late summer of 1951 and gathered material to publicize the project. Santa took pictures of their visit to Bert Loper's boat below mile 41. The boat looked pretty good then, Bert having died just two years earlier. That November Rachel Loper, Bert's widow, came down the cableway and was ferried to the boat. She laid a small marker by it and was able, finally, to say some sort of goodbye to Bert.

Bill Williams was a weak old man when I talked with him a few years ago, but his eyes lit up when I asked him if riding down the cable was scary. "Oh, the first time," he replied.

It was during that period that the incident with the Chinese cook from Flagstaff took place. I have heard several versions, but the common thread is that the recruited cook refused to ride the cable to the job site. After much drinking he was either persuaded to get on the skip or was trundled on, unconscious. Once in the canyon, he decided to take the job after all.

That's about all I've been able to find on the work in the '50s. I'm not sure when or why the tent cabin site at the mouth of Spook Canyon (just below Bert Loper's boat) was used, but a photo of the boats and tent there match the 1950s equipment.

The Sixties: The Arizona Power Authority

Arizonans were upset that most of the benefits from the existing federal projects were going to other states. Like a child that feels it isn't getting its share of candy, Arizona wanted its very own dam. The Marble Canyon dam site and reservoir lie wholly within Arizona's boundaries and Arizonans saw this dam as an opportunity to exert some independence from the Federal government.

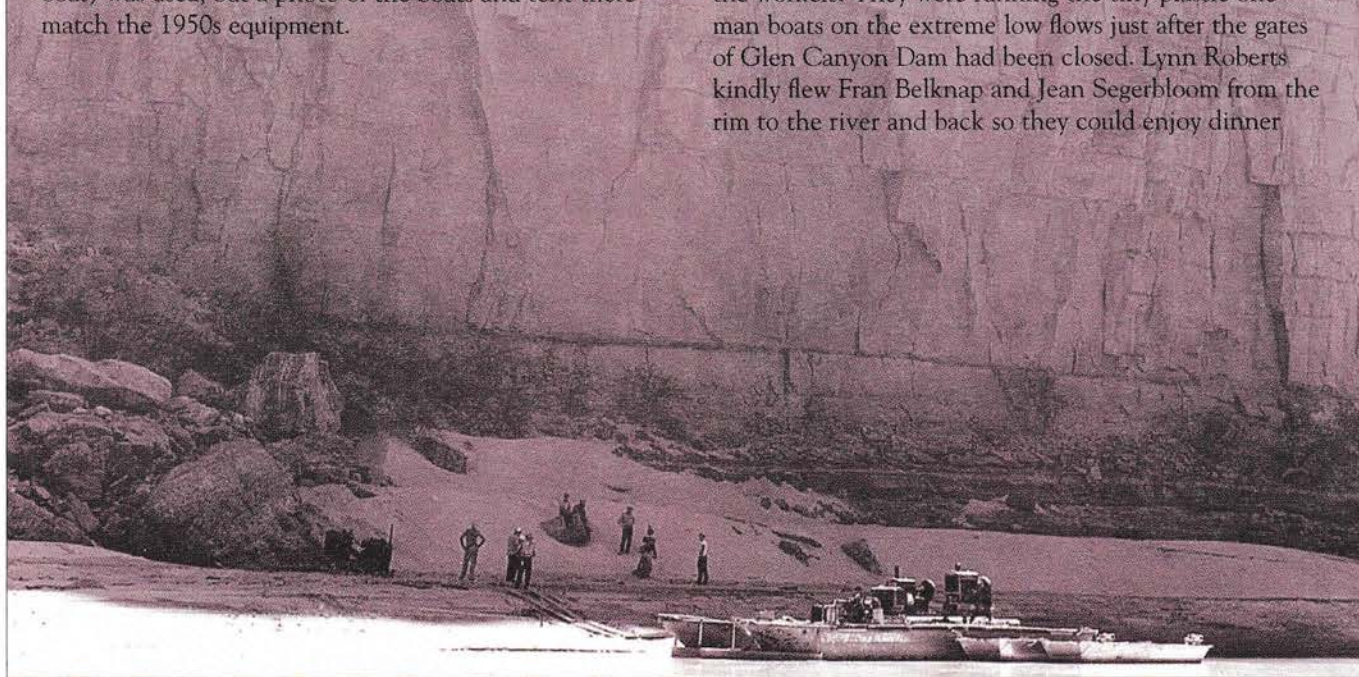
In the 1960s the Arizona Power Authority (APA) became involved when they requested studies from Arizona Game and Fish and the National Park Service. In addition, they commissioned an extensive feasibility study at the damsite itself.

Arthur Paul Geuss of Harza Engineering, Chicago, designed the project for APA. Bob Euler was hired in 1960 to look for archaeological sites on a river trip with Jerry Sanderson. This was Euler's first of 40 trips down the river and his introduction to Grand Canyon, where he was to spend much of his professional life.

The APA established a trailer camp on the rim at Buck Farm Point and pilot Lynn Roberts helicoptered men and equipment to work every day. They used ten foot aluminum boats to get across, up and down the river. They drilled and excavated drifts and drilled proposed quarry sites at the top of the Redwall. They stored their drill cores at Marble Canyon Lodge.

The helicopter ran out of gas one day in the inner gorge and Roberts had to make an emergency landing next to the river. They must have had fun getting a can of gas to the stranded ship.

In 1964 Dock Marston's sportyak trip stopped to visit the workers. They were running the tiny plastic one-man boats on the extreme low flows just after the gates of Glen Canyon Dam had been closed. Lynn Roberts kindly flew Fran Belknap and Jean Segerbloom from the rim to the river and back so they could enjoy dinner



Unloading equipment at the test site

with their boating husbands.

In 1965 Bob Littleton, Bureau Regional Geologist at the time, jet boated the river in thirteen days in order to make a recommendation about the Marble Canyon damsite. His observation was that the site would "never hold water" due to the solution caves in the limestone upstream. Happily for those who prefer a natural Marble Canyon over a reservoir and subsidized power, we never had to find out if Bob was right.

Glenn Rink.



Bert Lucas, Jan and Allen Macauley, at Loper's boat, 1951

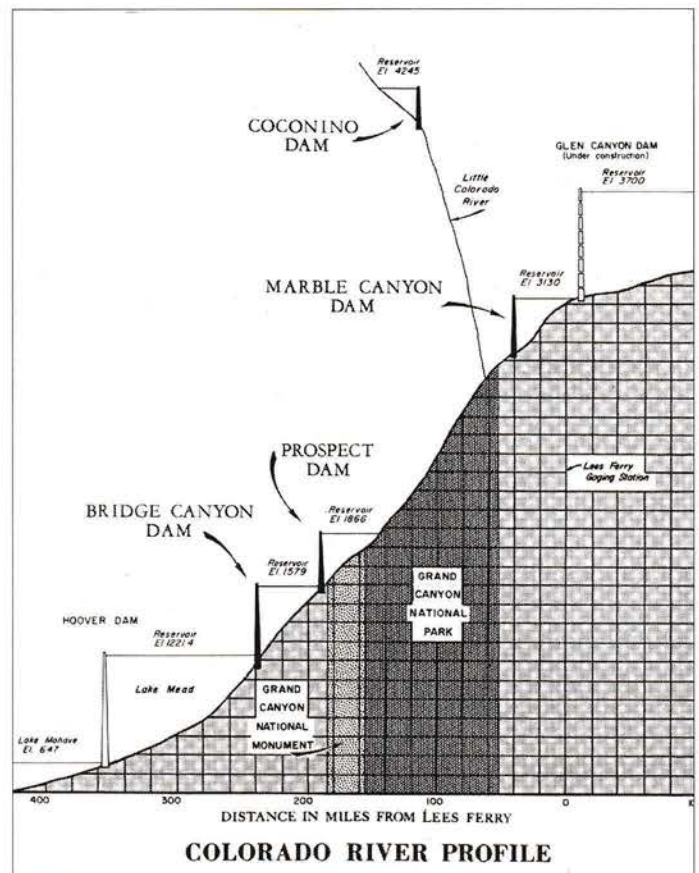
Photos of Marble Canyon Damsite work by John Santa
All photos in these dam stories courtesy
Bureau of Reclamation.

The Arizona Power Authority (below) had no qualms about putting in the Prospect Dam at Lava as well—most of its effects would have been in Grand Canyon National Monument, downstream of the National Park

It's interesting to note some of the concerns Arizona Game and Fish had for the Marble Canyon Dam project, some of them ahead of their time, some behind.

They felt, for instance, that, "It may be inadvisable to permit access below Marble because of the dangerous rapids and inaccessibility to the river at any point between Marble and Phantom Ranch." They also recommended "...the licensee shall...limit the variations in the rate of release from Bridge and Marble dams to no more than that necessary to provide for the safety of those who will be on the river below." Also, "The licensee shall limit the fluctuation of the project reservoir in order to permit successful fish spawning, during a two week period in April or May..." and "shall provide for minimum instantaneous releases at Bridge and Marble Canyon Dams of not less than 4500 second feet..."

I found the National Park Service report in the Bureau of Reclamation in Boulder City, Nevada. The report states that "There will be further reduction in the silt content of the Colorado River, which is a primary cutting agent in the rushing waters, and this is considered an adverse effect." A penciled note in the margin comments, "to whom?" The NPS also reported that "Vasey's Paradise... would be lost." In the Bureau copy someone had penciled, "Nobody sees it." Bureau employees had the fervor, and many still feel maligned and defensive about their dam building roles, "for the good of the people."



the rescue of the *Esmeralda* continued from page 1

It's a 160 horse power, I believe, Gray marine engine, that was in the *Esmeralda*, and it would not develop full rpm nor full power, and they were a little bit befuddled. It sounded like it had a blown valve, but whatever the reason was, they elected to abandon it. Ed Hudson, and I believe his son, left a big SOS sign on a sandbar in the Granite Gorge and were either contacted by radio by Dock Marston, or else were seen by someone who saw the SOS and Ed and his son were taken to the South Rim by helicopter—which again was not all that common at that particular era.

Roy Webb: Right at Tuna, right about Mile 100 or so, is where they abandoned it. Ed Hudson's in the *Esmeralda*, and he loses control and bangs into the wall and Dock Marston is in his *Criscraft*, and he sees what's happenin', so he kind of turns it around. And in the meantime, Willie Taylor had gotten thrown off the boat, and so Marston sees him off the boat and he picks up a rope and throws it to him, and then he sees the *Esmeralda* in trouble, so he spins the wheel and guns the engine, and Taylor's struggling with the rope, and he's gotten it wrapped it around his neck, and Marston guns the engine and there they go, they're draggin' Willie underwater with the rope around his neck. So that area right there is called "Willie's Necktie." And so then he finally realized, he got up to the *Esmeralda* and he turned around, and there's Taylor with the rope around his neck, and he's floatin' around in the water, and so he pulled it off of him, he had a big bruise all around his neck.

Actually, it didn't sound like he really [damaged the *Esmeralda*] that much, but he banged it up, and he thought it was wounded mortally. And Hudson was kind of an emotional sort of guy. He'd put a lot of work into this boat, too, and a lot of money. He'd modified it a couple of times, he'd put a bigger engine in and everything, and was real committed to this run, but somehow he thought that this was the end of the *Esmeralda*. And Dock Marston was just standing there saying, "No, there's nothing wrong with this boat. What are you doin'?" He was just aghast that Hudson was gonna abandon this perfectly good boat. And Hudson just said, basically, "It's my boat, and so we'll commit it to the river," in this real emotional scene. And as Bob described, that's exactly what they did—pushed it off shore. It sounds like they didn't even unload it.

They didn't, they didn't. Everything was there. It's



Getting the *Esmeralda* to water. 11:45, July 21, 1950
Courtesy P. T. Reilly Collection, Cline Library

just like somebody's house—everything was there.

Roy Webb: There was some rumor that Hudson was kind of secretly relieved. And indeed, he never came back. He was never on the river again.

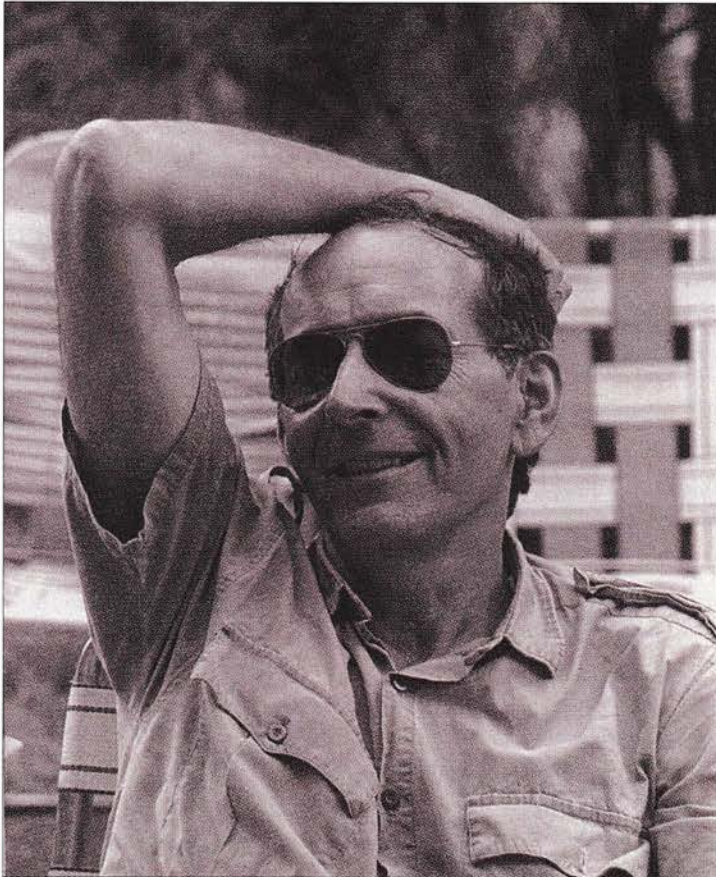
Then Dock headed on down the river. Ed Hudson told the Park Service that they cast the *Esmeralda* loose—which they did, they put it out in the river and cast it down the river—and said, "If it ever shows up in Lake Mead, why, it's yours." Well, eddies along the river collect everything from boats to bodies and driftwood and everything in between.

Beer.

Beer cans, whatever you want. But the *Esmeralda* washed up on the right side of the Canyon up there [around Forster].

As we came on the 1950 trip, it was my first trip through the Canyon. We picked up Pat Reilly as an extra boatman at Phantom Ranch, so there were really five boatmen in four cataract boats: Frank Wright, Jim Rigg, Don Smith was a boatman, and myself, and then there was Pat Reilly. We were takin' turns after the first day or so out of Phantom Ranch. But we come around

the corner, and high and dry about fifty yards from the Colorado River was the *Esmeralda* sitting upright, facing the Colorado River. We of course immediately clamored, because after all, anything that you can salvage, you try to salvage along the river. And we went up to the boat, and just swarmed over it, is really what people did. We had a party of about twelve of us, as I recall. The keys were in the engine, everything looked fine, it looked shipshape. There were just a couple of little dings on the hull where it bounced off rocks as it had been abandoned—nothing that leaked, and nothing that we ever repaired. It was very minimal damage, a good hull. Jim



Bob Rigg

turned on the engine and sure enough, in about ten or fifteen seconds—I mean, just literally, immediately—took off and cranked up. We began to look at each other and thought about the possibility of gettin' the *Esmeralda* out of the Grand Canyon, and if not, why not? I mean, no guts at all—without a little bit of guts, why, you don't run rivers. We fiddled with it, it didn't sound quite right, but we thought we could get it on down the river. The river had dropped considerably since Hudson and Marston had gone through—witness where the *Esmeralda* was.

We turned it on its side. At least half of the passengers were women, or more probably six or seven women—great gals. And boy, I tell ya', they all pitched in, we heaved and hawed and hoed. Major Bill Matthews took some of the films of that trip. We got logs and just rolled it down, log after log. It took maybe twenty or thirty minutes to get it down to the edge of the river, put it in the river, set it and roll it back upright. Everything really was in pretty good shape. All of the logs were there, as far as the cache for gasoline on down the river. The gas cache, maps, tools. They apparently abandoned it without really lookin' at the engine to see what was the matter. Jim cranked it up in a little bit of eddy there. We were able to get on the River and it worked pretty darned good, you know. That sure beat the heck out of rowin' (laughter), so off we went. The *Esmeralda* took off down the river. The rest of us piled back in the cataract boats and tried to keep up. And Jim was up and down the river and entertaining us, goofin' around, tryin' to figure out what might be the matter, workin' on the carburetor and everything else. We still thought it was probably a valve.

That evening we pulled into camp, and I cannot tell you where, but it was on down the river a few miles. We spent about ten days or so on the lower half. Couldn't go too far any one day. That evening, with the tool box and everything that was already there, we pulled the pump, we pulled the head, to see what was going. It was a simple thing to do, a flat head. Frank's eyes and Jim's eyes just lit up when they pulled the head off and looked down here, and here's a broken gasket between the third and fourth cylinder. And just a little section, about one inch. It wasn't very wide, not over a quarter-inch wide—very narrow between the cylinders. And you know, they were airplane mechanics, and Smith was a plumber. Jim was a mechanic, Frank was a very well-versed mechanic. We'd all been in aviation, we were all pilots, I guess. We knew at least "gee and haw" on those things, and it wasn't thirty minutes until Frank had cut out a little piece of head gasket from the engine of the head gasket, and fit it to form. We put little jagged edges, pointed edges on each side, and wrapped [it] up. We had a piece of foil from a piece of chewing gum that he had there. Wrapped it around it, and put the gasket on the head, put the head back on, and we cranked up the engine and it ran perfect. We took it on out, took it clear across the lake. We pulled the cataract boats down to Pearce's Ferry and took the *Esmeralda* and went on across the lake.

So that was the rescue of the *Esmeralda*. When we came out at 205, it was quite a temptation to go back up 205, because it was fairly low, and there was not much of a drop and the waves were quite small. The only reason we didn't take the *Esmeralda*, or Jim didn't run the *Esmeralda* back up, is we were comin' down with the

cataract boats, and we didn't really want to take a chance of blowin' the gasket out again. But I'm confident we could have gone up 205, and we didn't have anything between there and Lava that would have stopped us from taking the *Esmeralda* up the river, which was Ed Hudson's goal. So we claimed to be the first group that ever went through with four boats and came out with five. [laughter] We went clear across to Boulder City with it, and Jim called Ed Hudson, and all Ed Hudson could say [was], "Oh, my God, is my face red!" That was Ed Hudson's comment on the *Esmeralda*. From then on it was, whose boat was it, who did it really belong to? They tried to keep the *Esmeralda*, but the Park Service was adamant that it was gonna be their boat. They tried to pull the strings, you know, about who does what on the river—and they still do, and I don't think that their intelligence function has gone up very great since that.

So if you go to the South Rim, take a look at the *Esmeralda*. It's kind of a slim-built thing, but it really splattered a lot of water, and it was a great boat.

That sort of whetted our interest in power boats, and it was 1952 then when we ran Criscraft cabin cruisers for the first time. We ran those from '52 to '57 or '8, I guess.

Didn't you have a funny little run at Bedrock in one of those?

Well, I lost the steering one time goin' through Bedrock. I came down the tongue, and Bedrock didn't have the change that it has now, but we changed the positive steering system, which went bolts and nuts and pipes to the rudder, to a fast response aviation-type aileron thing, where you turn your wheel 180 degrees and you can get 180 degrees of rudder. You can turn it the whole swing within just a matter of a half a turn or so. We were hoping to get faster response. The ones that Criscraft made, you had to make sometimes about fifteen turns before you get to the other side and back the same way. You know how it is in Granite Narrows in turbulent water, and we were in big water and turbulent water a lot, and we just couldn't turn the darned thing fast enough to keep off the walls sometimes. And we did flounder, I guess, once or twice—just put it right in the wall, couldn't stop, couldn't do anything about it. Nothing was ever damaged—just a hell of a bang—but no damage.

Anyway, we changed it and used a cable system like they have on the ailerons on an airplane. I came into Bedrock, and settin' off there, pointin' a little bit to the side, and I thought, "Well, just give it a little bit of a goose and turn the wheel at the same time," and I did that, and no sooner I did that, than I pulled the pulleys, so that the cable with the pulleys just pulled completely loose, and I was rudderless—couldn't guide the darn thing. So I throttled back, grabbed the cables going down on each side, and I was able to get the rudder adjusted to what I felt was a better position, and give it

some gas and to go that way, and you had to pull the power off and take your hands and jockey the cables back and forth to get the rudder goin' a different direction—and this is all the way through Bedrock. I don't think I missed Bedrock by twelve inches. I mean, it was right out here in big water, really frothing at us. But we didn't hit anything, never dinged a prop on it or anything, but I thought I'd bought a piece of real estate in the middle of Bedrock Rapids for a few minutes.

We got along with the Criscraft pretty well, actually. I went through here two and a half times before I changed a prop one time. That shows you some reasonableness of lack of contact of rocks, and lack of contact with driftwood. Driftwood was the biggest hazard on props. But the Criscrafts and the *Esmeralda*, they were fun boats. Dock Marston sure took down a bunch of different powered outfits. It's a good way to see the river, it was kinda fun.

With the high water coming up next year, I know where there's a Criscraft cabin cruiser that's well-preserved. [laughter] Keep me in mind. We'll resurrect it if you think you'd like to take one down sometime.

All in favor?

Aye!

Opposed? [no response] Carried!

We'll go, we'll do it!



Revealing the River

*The green rush of river below us
is silenced by this distance*

*two hours climbing
over the rubble of more infinite time,*

*and curve by curve the earth reveals herself
diminishing into the blue.*

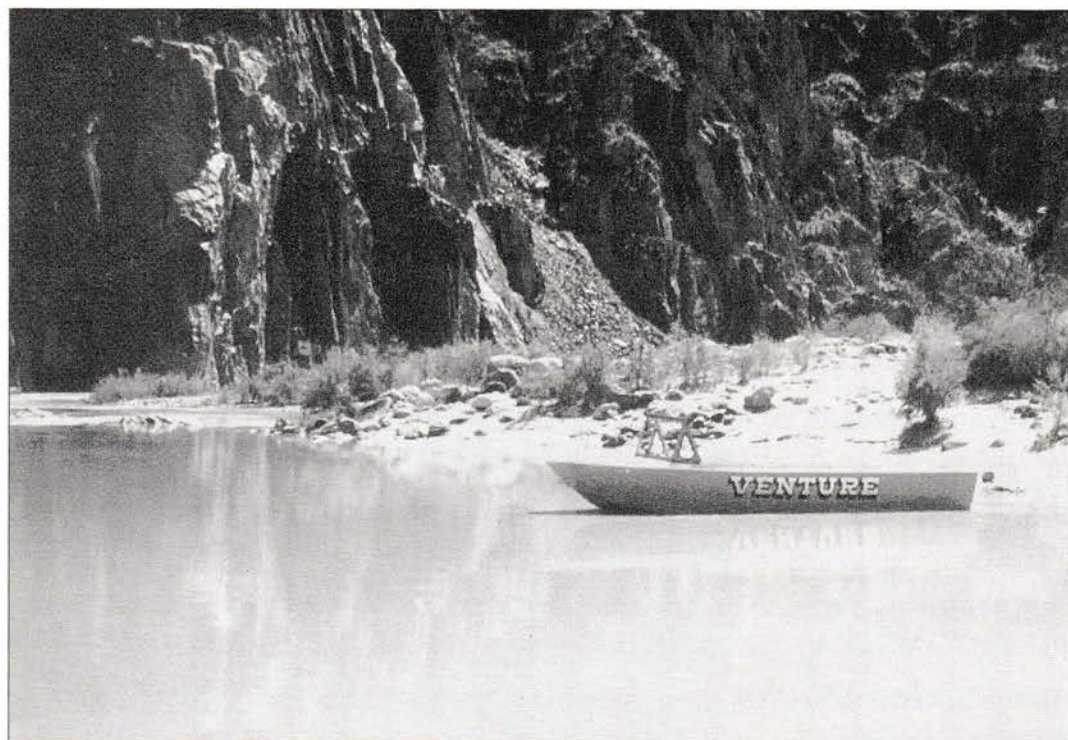
*Around me curves the Colorado in her chasm
before me is my homeland, blood-red, juniper spotted.*

*This golden sandstone lies at the top of the world
prey only to the eyes of crows, or tourist biplanes*

*I draw your cool, sunlit body into mine.
All this in an instant -*

*canyon, sky, river
your green eyes—reinscribed. sanctified.*

Cynthy Kaufman



The Venture languishing at Phantom

Woody Reiff photo

Well, I bought it from him and completely stripped it out and rebuilt it. He had two 425-horsepower Ford engines in it, with Berkeley jet drives in it, and I didn't think that I needed that much—couldn't carry that much fuel. So I built it up with a single engine, tested it out up on Utah Lake, and loaded it up with all my friends and everything, and it seemed to do pretty well, so we set it up to bring it down the Canyon here.

How big was your boat?

About 27 feet by about 9 feet wide, and a little over 3 feet high on the side. It was basically a flat bottom craft with a flaring "scow nose" at the bow for climbin' waves. All in all it was a pretty big boat. Funny, though, the first rapids we got to the old *Venture* seemed to shrink to the size of a bathtub.

Do you know what it weighed?

It was heavy—nearly as much as that cataract boat. (laughter) I have no idea how much it weighed. It was pretty heavy.

I got a permit from the Park Service and we started out, I think it was in July, on a five-day run to Temple Bar. There were seven of us—a family of three I'd taken on a raft trip, a couple friends from Salt Lake, and a Cross Tours boatman—Gordon McCoard. We started

out, everything was real good, had a lot of attention up there at the Ferry. One little problem we had, was despite all the testing I'd done earlier with a full load of people and food and gas and everything else, I couldn't get the old tub up on a plane. But I figured, "I'll burn off a little fuel, and eat a little food, and in a day or so it'll be just fine."

Drink a little beer?

[chuckles] Yeah. So anyway, we took off, and sure enough, about the first day out, things started pickin' up pretty well, and we were zippin' down the river and havin' a good time. We were running on about 12 to 15,000 cfs, and except for the cruddy water, everything was great. I got down to Hance Rapid and there was a lot of driftwood floating in the

river—it had been flooding a little bit—and tryin' to avoid it and everything. I hadn't had a real lot of trouble with it. It was pluggin' off my cooling system a little bit and I had to fix that a time or two. But as I entered Hance Rapid, just making a standard motorboat run across there, I sucked up a big chunk of driftwood into the impeller intake, and the engine was still runnin', everything was still going, but I lost about 75 percent of my power. I was still able to cut across the river okay, and make the right run, but I got a little bit too far left on the tail end of the rapid, and there was a big wave down there, and I tried to dodge back around it, but I couldn't quite make it, and I hit it on a 45 degree angle and put about a couple hundred gallons of water over the bow—which was no big deal, except it knocked my windshields out. [several chuckle]

Gordon ducked down when he saw the wave coming, and the window on his side smacked him alongside the head and split his ear just a little bit. He wasn't hurt too bad. My window hit the steering wheel and cracked in half and slid back on my arm and I cut my arm pretty good. When I looked in that cut I swear I could see my kneecap. I tossed the broken glass on the floor and kept on goin'.

The engine went out. I don't know quite why it went out, but anyway, I was dead in the water and couldn't get it started again. We jumped up on the bow with a couple of paddles and worked it over into a back-eddy and got

everything dried out and got my arm fixed up a little bit so that we could get goin' again.

There was a kayaking party just behind us, and I figured they'd be through pretty quick, and so we waited for them to come down. They had a doctor along. I waved them in, and they came over, and I told them that I'd cut my arm a little bit, and the doctor looked at it and he said, "Yeah, you did. I'd get that taken care of as quick as you can." I said, "Well, I was really hopin' that you could give me a bullet to bite on and you could maybe sew it up for me." He said, "Oh, I wouldn't dare touch it out here. Maybe in the office, but not out here." And I said, "Well, thanks a whole lot."

Now unknown to me another hard hull power trip had put in on the river the day after I did. Jimmy Jordan and Jim Rowland from Boulder City with two small outboard rigs—it was sure a surprise to see them come around the corner. Jordan had clipped a boulder in Hance and had cracked the stern of his boat. When he came down off plane it started fillin' with water—he gunned it across the river and rammed it up on a sand bar to keep it from sinkin'. They had no repair kit so I gave them my fiberglass repair material so they could fix it.

Anyway, we bundled things up and headed on down the river to Phantom. Took the tops off of the coolers, which were also seats, and blocked off the windshield frame so that any more water wouldn't come in. We had a pretty good run from there on down to Phantom Ranch.

My arm was in a sling, I couldn't move it real well, but I had a fellow from Jim Rowland's boat sittin' behind me, hangin' onto my belt, so that I could kinda operate the throttle a little bit and still steer with my left hand. We got down to Phantom, and then we all helicoptered out to get sewed up. I decided with the problem I had there, that I'd cut the trip off. It was just kind of an experimental trip, and I think some of the folks were relieved it was over. So anyway, we ended the trip there and everybody went their way.

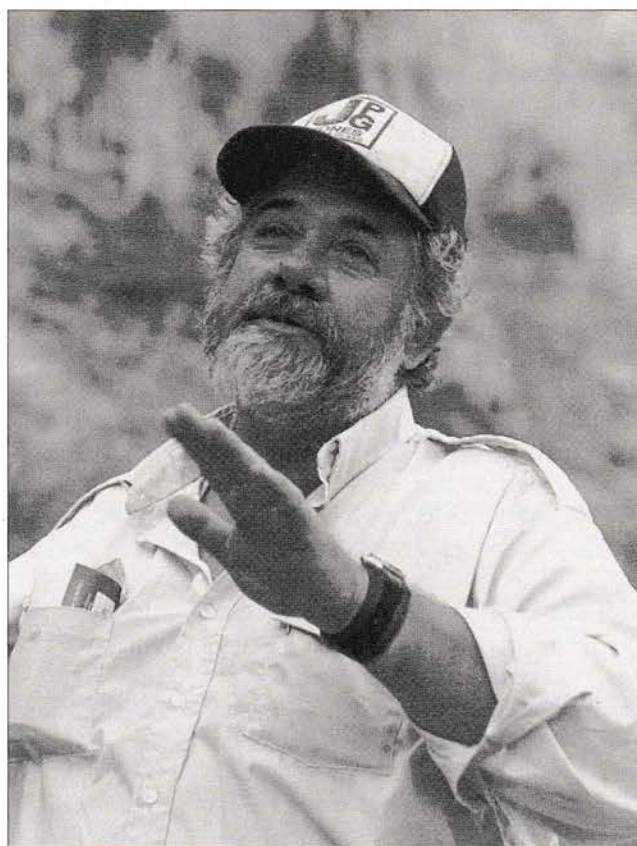
I wasn't real sure about what had happened with the driftwood in the impeller, and I thought maybe I had had some damage in the drive system. So I ordered some parts in, and it was gonna take a few days to get them in. As luck would have it, my brother-in-law was on a rubber boat trip down with Cross Tours, and he'd been doing a little work on the floorboards of his boat at Phantom and had a gas can fall off on his hand and smashed it pretty good, so he had to go out to the hospital. So I decided, "Well, I'm gonna give my arm a chance to recuperate a bit."

The next morning I hiked back down the trail and—it's amazin' how fast rumors get going—several of the people I met on the trail told me about a big jet boat that had exploded on the river and that people were all scattered up and down the Canyon. Another old fellow told

me about someone who was skiin' behind it through a rapid when it blew and it ripped his arm off. Even back at Lees Ferry later boatmen told me they'd heard I'd lost my arm.

So I took the rubber boat trip down—left my boat parked there at Phantom Ranch—and went on down the river with the rubber boat trip. When that was over, I went back to the South Rim where I had some parts for the jet drive delivered in, and hiked back down into Phantom with one of Cross Tours' mechanics, Sam Scott, and rebuilt the jet drive down there and then took off.

Well, I'd had both the original engines rebuilt, and they were supposed to be built to blueprint specifications for dependability. I don't remember exactly what rapid it was—goin' down below Phantom, it was a good time, we ran everything just fine, didn't have any big problem



with it—but I was cutting out across the tail of a little small riffle, and all of a sudden a rod let loose in the engine, and it blew a hole through the side of the engine, so I was shut down there. We paddled over to shore again, and evaluated the situation, and it was obvious that I couldn't repair the engine there, so we put out a fire signal and wrote some letters in the sand for a chopper. We were right on the flight line going into the South Rim of the Grand Canyon, and there were planes flying over about every fifteen minutes, but at that point

they were all looking at the end of the runway, and not down in the Canyon. It took us about two days to finally signal somebody, and they dropped down in the Canyon and flew over us, and pretty soon a helicopter came down and picked us up. We hadn't thought about it but there was no place for them to land, so we signalled to them to drop a ladder. They did and I told Sam to get aboard. He didn't like it much but he climbed up—about 10 feet—into the chopper. But when I got on the ladder, the pilot swung out over the river and started climbin'—talk about pucker factor!

We went to the South Rim and I chartered a flight home and got a spare engine, turned around and came back down, put it on a rubber boat trip that was leaving. [laughter] Then I went back down to the South Rim and bummed a ride with, I think Ron Smith, down at Phantom, to take me down to where my boat was, and I spent a few days pullin' that engine out, so that the new one comin' in, we could just set it right in place. When the other party got down there, we switched engines and I just decided I was gonna take it easy and float out with them.

Again, it just seemed like everything that was possible to go wrong with that outfit mechanically, did. I went through fuel pumps, I went through alternators, I went through starting motors. I mean, you go a million miles in a car and never have the trouble I had down there with that. It was just Murphy taking over, I guess, because everything was supposed to be new when I started out.

So we took off—and I was by myself at this point—and tried to catch up with the rubber boat party that dropped the engine off. I still had seats for windows so to see ahead I would stand up on the dashboard, hang onto the windshield and steer with my foot.

They got a little bit ahead of me and I was goin' down through Kanab Creek Rapid and somethin' started soundin' a little bit funny on the engine, and I turned around, and there was smoke comin' out of the (chuckles) engine compartment. It turned out that I split an oil filter. For some reason, there was too much pressure I guess. But anyway, blew all the oil out of the engine and it was in the bilge. I couldn't shut down until I got out of the rapid. Then I just kinda drifted until I got down to Olo Canyon, and pulled in down there. By that time, the engine was startin' to rattle just a little bit from lack of oil. [laughter] I didn't have any more oil to put in it, so I sat there at Olo Canyon for, oh, maybe two or three days, and every river party that'd come by, I'd flag 'em in and ask 'em if they had a spare can of oil. Most of the guys didn't, because they'd pre-oiled their gas up above. I even tried refining the oil in the bilge by filtering it and boiling off the water. That didn't work out too well. But I finally bummed enough oil to pretty much fill the engine back up again, and took off again down the river.

This time I made it down below Havasu, and I had a rod that started knocking a little bit. That was caused by the oil

failure. I decided that I'd better pull over and get some parts back in, so that I could fix the engine, because if the engine blew up, then I was gonna do the same thing that Hudson did [with the Esmeralda] and just shove it out in the current and let it go, because I was gonna be dead in the water at that time.

I sent a message out with a Fort Lee group to my wife at home to pick up a certain number of parts—I figured all I really needed was some bearings and a few minor things—and to have her take 'em down to St. George and put 'em on a charter flight in a rubber bag that had plenty of flotation, and fly out to where I was at and drop it in the river. Then I'd swim out and get it, take it in, and fix my boat and be on my way. [laughter] So I sat down underneath a ledge, down below Havasu for about three or four days, and I was waitin'. Any noise I heard, I figured that was the plane, but nothing ever came. I lived pretty good down there, though—every boating party comin' down the river, they'd kinda heard the saga of the adventure [laughter] and they thought that I was destitute or nuts or something, but anyway, they'd pass off pretty good steaks, a couple of six-packs here and there. I mean, I decided that, "Heck, I'm just gonna stay here! I'm livin' better down here than I was at home." [laughter]

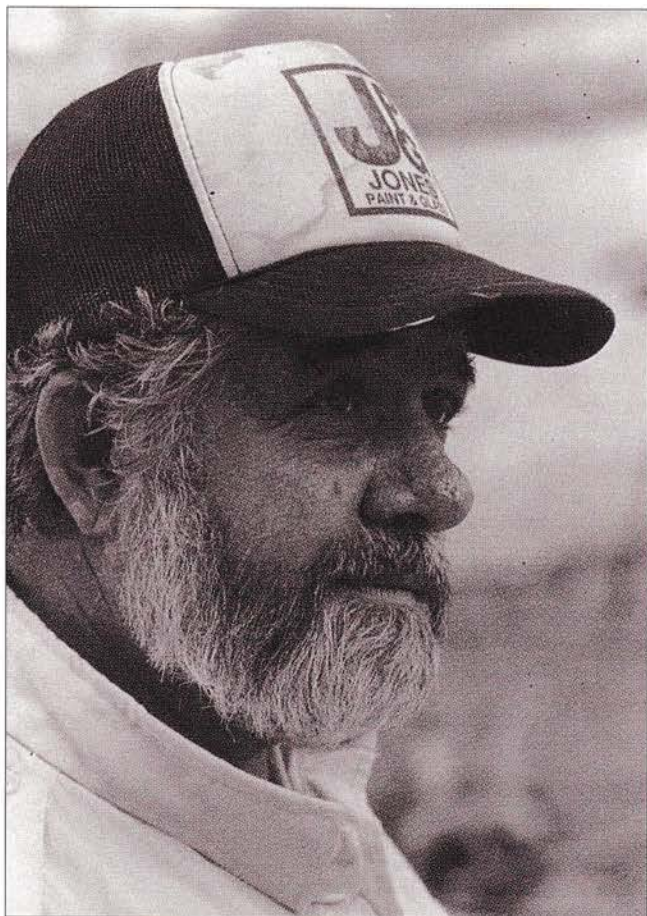
I'd been sleepin' on my boat until one night when it rained a little—I moved up under a ledge. That's probably the only lucky thing that happened on that trip, because a rockfall came down and hit the seat I'd been sleepin' on.

So anyway, a reasonable time passed, and my brother came down on a river trip, and he didn't know anything about bringin' any spare parts in, so then I figured that the message hadn't got out. I had started the trip with a 20-horse Merc that I used as a spare engine, hooked on a trolling bracket, just for emergencies. But one of the Quist boys had come by earlier, upstream. He had some trouble, and so I let him borrow my spare engine. When my brother got down there, I just decided, "Well, I'm goin' outta here one way or another." So we put a 20-horse motor on the back of that big ol' tub, and away we went. The bracket was so far down on the stern to let the motor reach the water that I had to stand on the jet pump outside the stern of the boat. I had to zigzag back and forth to see where I was going.

We got down to Lava Falls, and I still had.... I had taken the spark plug out of the cylinder that was knocking, and the engine would still run, but it wasn't running on eight cylinders. I figured, "Well, maybe we could conjure up enough power here to get down through Lava," which we did. I was gonna run it just like a rubber boat also. I'd heard that Jimmy Jordan, after he'd left me at Phantom, had gone through Lava Falls and swamped it and lost their whole outfit down there. It had washed ashore down near Whitmore and they'd burned it. So that didn't make me feel real good.

Anyway, we took off, and, you know, made the standard rubber boat run down through there again. The boat that I had was real buoyant and comin' down that little burble line, [I] figured on just dodgin' in behind the big old lava rock, and then cutting from right to left through the rapid, back it off on the throttle and just givin' it a little gas when I needed it, enough to clear the big boulder down at the bottom. The little wave that comes off of that lava rock up above the rapid pushed me clear out, almost to the middle of the hole. So I fired the old beast up and took it around, way over to the right. By the time I got headed back left again, I was almost in the rocks on the right-hand side. My brother decided he was gonna ride with me on that run, so I told him, "Just hang on, 'cause we're not gonna back off of anything. We're just gonna kick it in the rear end and go." So we went down through the rapid and I think about twice in there we became airborne comin' off of those big waves. But as luck would have it, we made it out of the bottom. The engine was really soundin' pretty bad by that time, so we shut it down so that I'd have a little power in the Lower Canyon if I needed it, put the old 20-horse back on, and away we went again.

So anyway, I couldn't get the engine fired up down in the lower Granite Gorge, to run those rapids, so I perched out on the stern of that old tub, hangin' onto



the 20-horse, and tryin' to hang on and keep from falling off. [laughter] Anyway, we eased it out of the bottom there, and finally, having left on a real good five-day trip, thirty-two days later I pulled it out at Temple Bar, but it was still floatin'. [laughter]

As far as I know, it was the last hard-hulled powerboat that ever went through the Canyon, and I think it was the biggest one, but I'm not 100 percent sure of that. When I was en route down the Canyon, I decided that the length of the boat was not right. I'd go over one wave and through the next one, so I was gonna shorten the thing up a little bit, or shorten up any future boats that I'd put together.

The Park Service had given me a special use permit, just like any of the other outfitters, but the next year when it came time to renew, they sent a letter of regret saying that they didn't think they wanted that kind of a boat in the Canyon. [laughter] I can't imagine why. But it was a good experience, anyway.

Did you try to uprun much when you were comin' down?

Well, I did a little bit. It'd go up everything just fine—everything that I tried. I didn't try any of the real big rapids, but one interesting little sidebar here: I came down past Deer Creek and one of our rubber boat trips was parked there, and they waved to me, and so I decided to go back up and talk to 'em. [I] came down through the rapid—I didn't see 'em until I was in the rapid—and then I came down and into this little riffle down here, and decided to turn around and go back up through and give everybody a show. I got in this riffle and started to turn around. I figured if I couldn't get all the way around, I'd just do a "Y" turn—back up, and come on up. And I got a little rock or something stuck in the reverse mechanism on the jet drive, and I couldn't get it in reverse, and I was going crosswise to the river, and I couldn't get the thing to completely turn around. I was headin' right for the rocks on the shore, and there was nothin' I could do. I just backed off on the throttle, and figured, "Oh, man, I'm gonna sink this thing right now." And I hit the rocks on the shore—some pretty good ones like that—a big ol' thick fiberglass hull, and she rode up on the rocks. I took a quick look under the deck to see if I could see any daylight shinin' through [chuckles] and it looked dark and didn't look like I'd torn anything up too bad, so I jumped over the side real quick and pushed the boat back into the water. The stern swung down and so I went on back up through the rapid, pretty slow, so that the nose was up out of the water, and put it up on the beach up there and checked it all out. Everything was okay, just took a little bit of paint off of it. It was a tough old bird.

What happened to it, do you still have it?

Well, it's a sad story. [laughter] I left the river running business and moved on to Houston, Texas, and

left it parked at a friend's place. My brother was starting out in the diving business, and he was training some divers to do salvage work, and so he called me up. I'd stripped out all the mechanical stuff there and was gonna rebuild it, but I never did get around to it. Anyway, it was just a hull, and he asked me if he could get ahold of it and use it as a training aid to train salvage divers how to lift a sunken boat. So I gave it to him, and I don't know what he did with it after that.

About a year ago somebody told me that there was an old sea plane sitting up at an airport at Bountiful, Utah, up north of Salt Lake, and I went out there to look at it—I was interested in a sea plane. And as I was driving home on a back road, I could see a big old orange boat. This boat was painted bright international orange, and I see this big old orange boat parked out in a chicken coop or something, out

behind this house. And I stopped and backed up. The name of my company was Venture Expeditions, and I had *Venture* painted on the side of this boat, and I'll be danged if the old *Venture* wasn't sittin' out under a chicken coop. [laughter] So I stopped there and talked to the people that owned the house, and it belonged to, at that time, this old lady's son. He'd got it from my brother, and he'd built a big old goofy lookin' cabin on it, and somehow or another—I don't know for what reason—but he cut the transom out of it and built a big well up inside to put an outboard motor in. And then it didn't work very well, so he just parked it out there in the field, and to this day, that's where it sits, I guess. [laughs]

Kind of a sad demise. I should have just shoved it off out here and let it have a Viking burial.



Businesses Offering Support

A few area businesses like to show their support for GCRG by offering discounts to members. Our non-profit status no longer allows us to tell you how much of a discount they offer, as that is construed as advertising, so you'll have to check with them. Thanks to all those below.

Expeditions Boating Gear 625 N. Beaver St., Flagstaff	779-3769	Deborah Fine Attorney at law 308 N. Agassiz, Flagstaff	779-1713
Canyon Supply Boating Gear 505 N. Beaver St. Flagstaff	779-0624	Teva Sport Sandals and Clothing	779-5938
The Summit Boating equipment	774-0724	Terri Merz, MFT 1850 East Flamingo Road #137 Las Vegas, NV 89119 Individual/Couples/Family counselling. Depression/Anxiety	702/892-0511
Chums/Hellowear Chums and Hello clothing. Call Lori for catalog	800/323-3707	Dr. Jim Marzolf, DDS Dentist 1419 N. Beaver Street, Flagstaff, AZ	779-2393
Mountain Sports river related items 1800 S. Milton Rd. Flagstaff	779-5156	Snook's Chiropractic 521 N. Beaver St. #2, Flagstaff	774-9071
Aspen Sports Outdoor gear 15 N San Francisco St, Flagstaff	779-1935	Fran Rohrig, NCMT, Swedish, Deep Tissue, & Reiki Master	527-0294
River Rat Raft and Bike Bikes and boats 4053 Pennsylvania Ave. Fair Oaks, CA 95628	916/966-6777	Dr. Mark Falcon, Chiropractor 1515 N.Main, Flagstaff	779-2742
Professional River Outfitters Equip. rentals Box 635 Flagstaff, AZ 86002	779-1512	Five Quail Books—West River books 8540 N Central Ave, #27, Phoenix	602/861-0548
Canyon R.E.O. River equipment rental Box 3493, Flagstaff, AZ 86003	774-3377	Willow Creek Books, Coffee and Outdoor Gear 263 S. 100 E. St., Kanab, UT	801/ 644-8884
Sunrise Leather, Paul Harris Birkenstock sandals. Call for catalog.	800/999-2575	Cliff Dwellers Lodge Good food Cliff Dwellers, AZ	355-2228
Yacht True Love Bill Beer, Skipper Virgin Island Champagne Cruises	809/775-6547	Mary Ellen Arndorfer, CPA Taxes 230 Buffalo Trail Flagstaff, AZ 86001	525-2585
Winter Sun Indian art &herbal medicine 107 N. San Francisco Suite #1, Flagstaff	774-2881	Laughing Bird Adventures Sea kayaking tours Belize, Honduras and the Caribbean.	800/238-4467

A post-script on the Venture:

Originally called the Rapid Eater #4, it was one of four identical hulls. Two of them were destroyed in attempts to run Cataract Canyon. Newland's #4 was used on several of the Friendship Cruises from Green River down to the Confluence and back up to Moab, in addition to his upruns. Although Newland claimed the first uprun, another fellow from Colorado (Bill Summerville?) claimed the same title.

I'd be interested in talking to anyone about the other three Rapid Eaters, and upruns of Cataract or Grand Canyon. Contact me:

John Cross II, 11101 N 5600 W, Highland, Utah 84003. 801/756-0632, fax 801/763-0015

John

Announcements

A PLACE OF SPIRIT: JOURNEY THROUGH THE GRAND CANYON is a photographic book bringing together 16 high profile women writers, each taking a Colorado River trip through the Grand Canyon. Each writer will write a 1,000 word essay from her river experience with all original photography by Kathleen Jo Ryan. Only two writers have been on the river before. A PLACE OF SPIRIT Will be published in Spring 1998 by Northland Publishing, Flagstaff, Arizona. The goal of the book is to show the reader, especially those who will never have an opportunity to trek or raft in the Canyon, an intimate experience of the Grand Canyon.

To underwrite the pre-publication costs, sponsorship funding is being secured. These funds pay for the most prominent writers, photography expense, trip expenses, and all other pre-publication costs. Sponsors are listed on the "Sponsor's Page" bound into the original book and offered promotional opportunities to maximize their participation. Sponsors to date include Mrs. Ann Harris, Chums and seven Grand Canyon river outfitters, sponsoring the river trips. Book sponsors are perceived as being at the core of a literary and artistic work with long lasting and prestigious visibility. For additional information please contact: Kathleen Jo Ryan, 360-678-2222.

Thanks to all: to Bob Webster for his drawing, to all you poets, photographers and writers, and to all of you who send us stuff. Don't ever stop. Printed with soy bean ink on recycled paper by really nice guys.

Care to join us?

If you're not a member yet and would like to be, or if your membership has lapsed, get with the program! Your membership dues help fund many of the worthwhile projects we are pursuing. And you get this fine journal to boot. Do it today.

General Member

Must love the Grand Canyon

Been on a trip? _____

With whom? _____

Guide Member

Must have worked in the River Industry

Company? _____

Year Began? _____

Number of trips? _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

\$25 1-year membership

\$100 5-year membership

\$277 Life membership (A buck a mile)

\$500 Benefactor*

\$1000 Patron (A grand, get it?)*

*benefactors and patrons get a life membership, a silver split twig figurine pendant, and our undying gratitude.

\$100 Adopt your very own Beach: _____

\$ _____ donation, for all the stuff you do.

\$16 Short sleeved T-shirt

Size _____

We don't

\$18 Long sleeved T-shirt

Size _____

exchange

\$24 Wallace Beery shirt

Size _____

mailing

\$10 Baseball Cap

lists with

\$10 GTS Kent Frost Poster

anyone.

Total enclosed _____

Period.

Early Work on Marble Canyon Dam

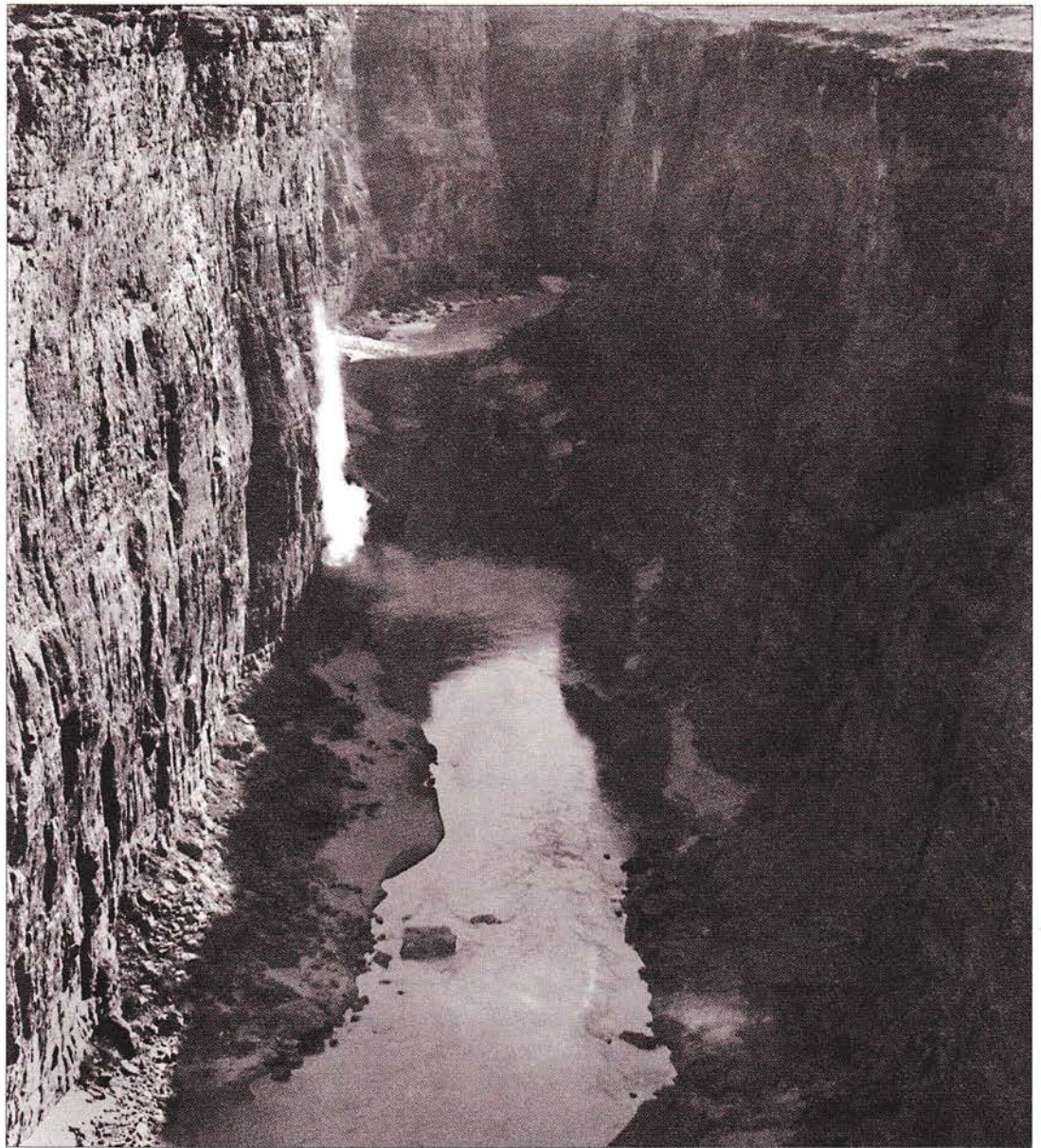
Everyone's seen at least one documentary of the beginning of some big dam. The panoramic view of the tranquil canyon. The mighty blast, with smoke and dust and rubble. Then the cut to scenes of bulldozers, cement hoppers, cranes and hundreds of men swarming over the site.

This is a scene from Marble Canyon in 1951—a scene that very nearly led to another documentary on another buried Canyon. On pages 24 through 30 of this issue is more of the story of the Marble Canyon and Bridge Canyon Dams—what the plans really were for the Colorado River in Grand Canyon.

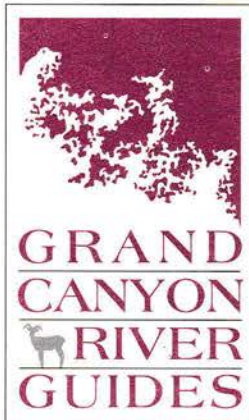


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Box 1934
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Blasting an exploratory tunnel at the lower Marble Canyon damsite, August 1951
Bureau of Reclamation photo



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