

# The 1921 Survey of Cataract Canyon

by John Weisheit

## Background

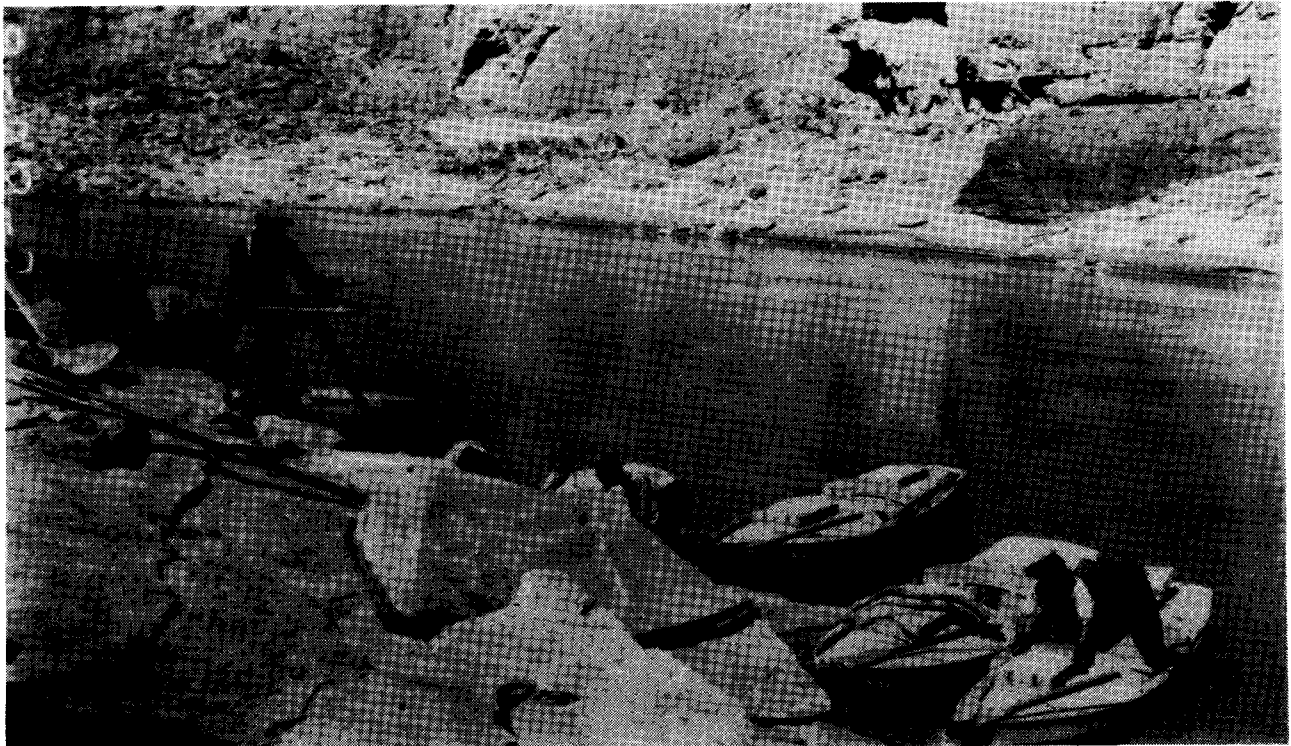
During the early 1920's, parts of the Colorado River system were surveyed by the United States Geological Survey (USGS). These surveys developed for two reasons: 1) Congress passed the Federal Power Act in 1920; 2) the city of Los Angeles and Southern California Edison Company filed applications with the Federal Power Commission for six dam sites on the Colorado River. The sites included Bull's Head Rock, Pyramid Canyon, Old Callville, Boulder Canyon, Grand Wash, and Lees Ferry.

The chief topographer for the dam surveys was Claude H. Birdseye. The chief hydrologist was Eugene C. LaRue, an employee of the United States Reclamation Service, which was originally a department of the USGS and is now known as the Bureau of Reclamation. The first surveys were proposed above the Lees Ferry Dam Site, and targeted the contour line at 3,900 feet above sea level (asl). The first assignment, which occurred in June and July of 1920, ran a line from Flagstaff, Arizona, to Lees Ferry, Arizona. Forthcoming river surveys would soon correlate with that bench marker. The lower section of Glen Canyon was surveyed by a Mr. Fowler. For instrumentation,

Fowler's team used a system called the Yoekel Precise Level. At first, Fowler's team used boats with outboard motors; however, due to the silt concentration of the river (15%), they found this form of propulsion unreliable and converted to motorized paddle wheels. The San Juan River survey was headed by Kelly W. Trimble and started in July of 1921, from Bluff, Utah. The Cataract Canyon survey started in September of 1921, from Green River, Utah, and was headed by William R. Chenoweth. For instrumentation, Trimble and Chenoweth used the plane table and alidade (see photo), making it possible to create a map on-the-spot. By October, all three surveys met in parts of Glen Canyon and eventually tied in with the established benchmark at Lees Ferry.

## Cataract Canyon Survey

The survey in Cataract Canyon consisted of the following individuals: William R. Chenoweth, topographical engineer; Sidney Paige, geologist; E.C. LaRue, chief hydraulic engineer; Leigh Lint, rodman; Harry Tasker, rodman; Frank Stouidt, recorder; John Clogston, chef; Ellsworth Kolb, lead boatman; Emery Kolb, photographer; Henry Rauch, photographic assistant. The survey through Cataract Canyon was a joint effort with Southern California Edison. The boats were appropriately named *Edison*, *L.A.*, and *Static*. The *Static* had a mounted transom



Chenowith with plane table and alidade  
Photograph by E. C. Larue

Possibly at 30 Mile Dam Site  
Coutesy of U.S.G.S., Denver

for an outboard motor to assist its progress across the flat water to The Confluence. This motor was quite possibly the first outboard motor used through Stillwater and Labyrinth canyons. A tethered line was used to tow the other boats. Later, Chenoweth decided that tying the rafts together side-by-side was more practical (as practiced by modern boatmen in similar situations). Emery Kolb and Henry Rauch actually participated on this expedition as "free-lance photographers". They were essentially guided by their own agenda, especially before entering Cataract Canyon. Emery used the "Edith," which was the boat he piloted in 1911 through the canyons of the Colorado Plateau.

1921 was an interesting year to survey the canyon, as the Colorado River peaked at its highest flow thus far for the 20th century. A modified report placed the discharge at Lees Ferry on June 18, 1921, at 220,000 cfs. However, when the Cataract Canyon survey reached The Confluence on September 6, 1921, the Colorado River flowed at a tame 8,320 cfs. Trip photography shows incredibly high beach dunes and driftwood piles.

Two possible dam sites in Cataract Canyon were determined by LaRue during the course of the survey. Interestingly, he did not find a suitable site until the Colorado River left the Paradox Basin. The Basin is a geological sub-province with a Pennsylvanian stratigraphy of sea water evaporates (anhydrates). The dam sites were called Mille Crag Bend and 30 Mile (30 miles below The Confluence), otherwise known as Dark Canyon. On a previous expedition (1914), LaRue investigated a dam site 1/2 mile below The Confluence, which he called the Junction site. A floating steam-powered drill rig was used to determine the thickness of the river sediments to bedrock. Flood waters forced abandonment of the drilling procedure which attained a depth of 124 feet without reaching bedrock. The low water elevation of the river at The Confluence is 3,880 feet asl.

For Cataract Canyon the survey logged 39 miles from The Confluence to Mille Crag Bend with a total of 49 rapids which were titled by number, and an average gradient drop of 11 feet per mile. Rapid #45, formed by debris flows from Dark Canyon, had a measured section with the greatest gradient drop of any rapid on the Colorado River within the Colorado Plateau. Rapid #45 is now 186 feet below Lake Powell's high pool elevation of 3,700 feet asl. It was at Rapid #45 that lead boatman, Ellsworth Kolb, ran a boat between rocks,

resulting in a two-day delay. LaRue reported that Rapid #47 was formed by bedrock rather than by debris flow.

### Conclusion

Other USGS river surveys were completed in subsequent years. They include the 1922 Green River survey from Green River, Wyoming, to Green River, Utah, headed again by Kelly Trimble with Bert Loper as lead boatman. Loper was also with LaRue during the 1914 Junction dam site testing. The Grand Canyon was surveyed in 1923 by Claude Birdseye with Emery Kolb as lead boatman. LaRue was also on the Grand Canyon trip. Ironically, Hoover Dam (Black Canyon site) near Las Vegas, Nevada, was chosen as the first arch gravity dam on the Colorado River. Glen Canyon Dam was constructed 15 miles rather than 4 or 8.5 miles above Lees Ferry as recommended by LaRue. Dams were constructed at neither of the Cataract sites, which was fortunate for the town of Moab, since the impounded waters would have flooded the community. I think that Harry Tasker, rodman for the Cataract Canyon survey, summed up the experience well: "Some come here to see the work of God, but I come here to hold a rod."

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## From Canyonlands Field Institute

by Rebecca Martin

Canyonlands Field Institute (CFI), in Moab, has a number of 1994 course offerings specifically designed for professional guides. These include a variety of Safety and Medical certification courses, different levels of River Rescue training and Multi-Agency Guide Training options in addition to our regularly scheduled courses covering topics pertinent to programs on the Colorado Plateau. CFI is currently placing an emphasis on training options designed to reach "influencers," e.g., professional guides, trainers, and educational personnel, who are in positions to reach the increasing numbers of visitors who are visiting the Colorado Plateau. To help make this training available, scholarships are being offered for most guide training courses.

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