IN THE FOOTSTEPS OF JOHN WESLEY POWELL

AN ALBUM OF COMPARATIVE PHOTOGRAPHS OF THE GREEN AND COLORADO RIVERS, 1871-72 AND 1968.

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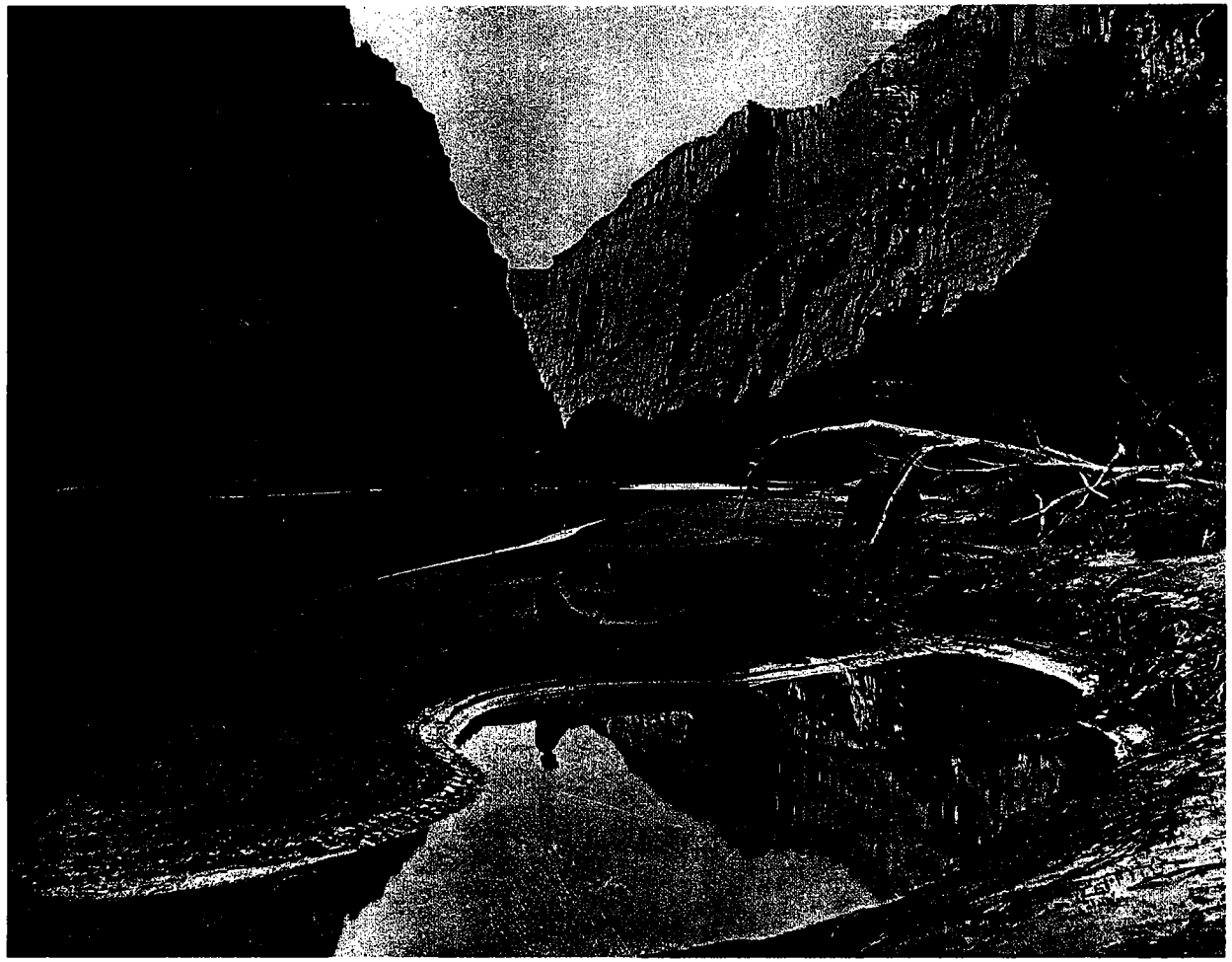

Gene Shoemaker (left) is plotting the position of Beaman's camera station 728 on Trin-Alcove Bend, 400 feet above the Green River. Hal Stephens photographs the scene. Often a panorama of pictures is recorded from high vantage points for later reference as is done in this instance.

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Foreword

The pioneering photographs of the second Powell expedition, taken by E.O. Beaman, James Fennemore, and then Jack Hillers in Grand Canyon, have not received adequate attention from historians of the West. To be sure, Powell did use both photographs and engravings taken from the photographs in the early accounts of his discoveries. However, several years later, he returned to the Canyon country with two of the most gifted artists of the nineteenth century: Thomas Moran and William Henry Holmes. And it is the great panoramic views of Moran and Holmes, instead of the photographs, that have become synonomous with the romance of John Wesley Powell and the canyons of the Colorado.

The authors have performed an important service to history by gathering the remaining photographic plates of the Powell expedition from old files and museum basements, bringing them together in chronological sequence, and explaining to us the near-heroic physical feats involved in lugging a ton or more of wet-plate materials, chemicals, and darkroom equipment through the depths of the Colorado canyons.

But this book is more than history; it honors the spirit of John Wesley Powell by putting those old glass plates into the service of modern geological inquiry. The authors set out to relocate the exact sites from which the photographs were originally taken, and then to shoot identical views. Some of the record has of course been obliterated by the works of man, specifically the great dams at Flaming Gorge and Glen Canyon. But in long stretches between the dams and reservoirs, the river still flows through landscapes largely undisturbed since the days of the Powell expedition. And in these sections of the river, the authors have provided us an unprecedented record of exactly what happens in a century of geological time.

The answer, in the unblinking black and white objectivity of the photograph, is . . . not very much. Here and there a boulder has fallen from a ledge, rock has spalled from a cliff face, some rock edges appear a little more rounded. The river tributaries, accumulating and carrying the erosional debris of thousands of square miles, tell us a somewhat more dynamic story. Here and there a side canyon, clean in the 1871 photograph, is now choked with boulders carried down by a sudden flash flood. At Warm Springs Rapid on the Yampa River, the photographs show us how a tributary, dumping its load in the river, has created a larger rapid.

Along the river itself, we see more change along banks and sandbars where the river relentlessly shifts, sorts, and reshapes its load of rocks and sand. But even in these remote reaches, the most obvious change is man-caused; the dense thickets of tamarisk lining the river banks were nowhere in sight when Powell's exploring parties passed through. Tamarisk, a Middle Eastern exotic planted for windbreaks in the Imperial Valley around 1900, has now spread throughout the entire Colorado River system.

On rare occasions, a lucky visitor will witness the changes that these pictures document. In October of 1980, I was with a group climbing out of Marble Canyon from President Harding Rapid up to Eminence Break. Suddenly the morning stillness was broken by a muffled explosion, and we looked down to see a huge cloud of dust rising from a rock slide breaking out of the red wall and cascading onto a talus slope at river's edge.

However, for our purposes, and on our time scale, the reassuring testimony of the century of time captured in this book is that the canyons of the Colorado are virtually eternal. What does it matter that in some time unfathomable to us the canyons will finally erode away? The task for us, in the meantime, is to keep the works of man out of the process, leaving time and the river to their geological destiny.

Bruce Babbitt
June 2, 1987

Acknowledgments

Many highly talented people at the Flagstaff Field Center of the U.S. Geological Survey (USGS) and elsewhere contributed substantially to the preparation of this album.

James W. Van Divier, Roger Carroll, Ramon Sabala, and Hugh Thomas (all USGS) retouched the Beaman and Hillers copy negatives and prints, skillfully removing spots, blemishes, and evidences of cracks that appeared in some of the historic plates. Their contributions to the enhancement of these photographs are much appreciated.

The film positives provided by the U.S. National Archives were copied onto 8″ x 10″ negative material by Karl Zeller. Ramona Boudreau also demonstrated superb photographic skill in matching and processing the Beaman and Hillers photographs. (Both Karl and Ramona are with the USGS.) Their work is gratefully appreciated.

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Arthur M. Phillips III, Curator of Botany for the Museum of Northern Arizona, Flagstaff, examined the vegetation seen in the photographs to verify or correct the field identifications. The authors gratefully acknowledge Dr. Phillips's contribution.

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Our first draft reflected the geologic nomenclature of 1968. The authors are indebted to Marjorie E. Mac Lachlan (USGS, Denver) for updating it.

The many drafts were typed by Virginia M. Hall (USGS), whose accuracy and efficiency continue to impress us. Our heartfelt thanks go to her.

Above all, our thanks go the crew members who accompanied us on the expedition and lent valuable assistance.

First Segment:	Patrick Shoemaker, camp assistant
Second Segment:	E. C. Morris (USGS), geologist
	Phil Hayes (USGS), geologist
	Elmer Santos (USGS), geologist

	Carolyn S. Shoemaker, cook
	Patrick Shoemaker, camp assistant
	Elliot Morris, camp assistant
Third Segment:	Orson Anderson (UCLA), physicist
	Chester Anderson, boatman
	Carolyn S. Shoemaker, cook
	Patrick Shoemaker, camp assistant
	Linda Shoemaker
Fourth Segment:	Felix Mutschler, geologist
	Thor Karlstrom (USGS), geologist
	Karl Karlstrom, cook
	Patrick Shoemaker, camp assistant
	Richard Chidester, camp assistant
Fifth Segment:	George Simmons (USGS), geologist and boatman
	Dave Gaskill (USGS), geologist and boatman
	L. T. Silver, professor of geology, California Institute of Technology, Pasadena
	Bruce Julian, graduate student, California Institute of Technology
	Joan Anderman, cook
	Henry Toll, physician and boatman
	Tad Nichols, photographer
	Erling Jensen, Nichols's assistant
Sixth Segment:	George Simmons (USGS), geologist and boatman
	Dave Gaskill (USGS), geologist and boatman
	Maurice Brock (USGS), geologist
	George Anderman, geologist
	Joan Anderman, cook
	L. T. Silver
	Bruce Julian
	George Ogura, physician
	Henry Toll, physician and boatman

We also thank Tad Nichols of Tucson, Arizona, who met our river party at the lower end of Cataract Canyon and, using his power boat, towed us many miles to Hite, Utah.

Introduction

Background of Powell's Second Expedition

Major John Wesley Powell made two voyages of exploration down the Green and Colorado rivers. Although the first trip in 1869 was more famous and widely publicized, the second traverse in 1871-72 was better documented and produced more scientific results.

Powell's Smithsonian Report of 1875—his official report—included material from both expeditions, but observations were given in diary format as though made during the 1869 trip. Members of the 1871-72 expedition were ignored in the 1875 report. Frederick S. Dellenbaugh, who became the unofficial chief chronicler and historian of the second expedition, published two books and many articles concerning it, yet he once found it necessary to obtain a letter from Powell certifying that he was indeed a member of the party.

The first expedition left Green River Station, Wyoming, in May 1869 and arrived a little over 100 days later at the mouth of the Virgin River in present-day Nevada, about a day's journey by boat from the lower end of the Grand Canyon. Major Powell was the only scientist in the ten-man group. Most of the party were mountain men and trappers whom he had recruited in Colorado the previous year. They had expected to supplement their food stores by hunting, but much of the canyonlands through which they passed proved to be nearly barren of game. Thus they were forced to depend largely on what they carried with them, chiefly flour and bacon that Powell had acquired as army rations. A disaster in Canyon of Lodore early in the trip resulted in the loss of one of their four boats—the one that contained much of their food. Consequently, the remainder of the voyage was extremely hurried; the men who remained with Powell probably were suffering from scurvy and were near starvation when they reached the mouth of the Virgin River.

Powell's observations and notes were far too sparse to meet his objective of plotting the course of the river and the topography of the adjacent country. The great haste required to complete this voyage of survival precluded his spending sufficient time to acquire scientific and topographic data. He was also unable to have photographs taken on the first expedition because he lacked the necessary funds. He had financed the trip out of his own pocket and with the meager funds appropriated by the Illinois Legislature.

Immediately following the first trip, Powell began seeking additional money and planning a second expedition over the same route. His dramatic journey in 1869 had catapulted him into national fame, and it was largely responsible for his obtaining funds from Congress to continue his scientific explorations. He spent much of 1870 exploring routes by which supplies could be carried to various points along the rivers