

THE GRAND CANON



The First Edition of *THE GRAND CANON* included many pages of graphical material, designed to increase the visual appeal of the bibliography and to introduce its users to some of the topics contained therein. A selection of these graphical pages comprises this Pictorial Introduction. Included among them are pages that were designed as frontispieces to the 32 separate parts of the bibliography. Some of these pages were organized as part of spreads of two or more pages.

Redesigning *THE GRAND CANON* removed these graphical pages to provide greater ease in navigating through the bibliography. The information contained in them is restored through the creation of this independent Pictorial Introduction, with minor edits.

Hopefully this is an interesting, casual way to draw attention to the enormously wonderful diversity of human affairs in the Grand Canyon and lower Colorado River regions — and the nearly 500 years of published materials that provide the evidentiary record of those activities.

original frontispiece for the volume



*"... many of the mountains,
plateaus, valleys, cañons, and streams
were unknown and unnamed."*

— John Wesley Powell



About the Frontispiece

Major Powell led the first geographical and geological exploration of the Green and Colorado Rivers through the canyon lands in 1869. Partly as the result of his accounts of the expedition, embellished for more popular reading, artists sometimes romantically misportrayed the explorers' river journey through canyon defiles.

Quotation:

John Wesley Powell, *Exploration of the Colorado River of the West and its Tributaries* (Government Printing Office, Washington, 1875), p. x.

Illustrations:

John Wesley Powell photographic portrait when aged 40, shortly after his explorations of the Colorado River. (*National Park Service, Grand Canyon National Park*)

"Cañon of the Colorado", engraving by G. D. in *Harper's Introductory Geography; with Maps and Illustrations Prepared Expressly for This Work by Eminent American Artists* (Harper and Brothers, New York, 1873), p. 72.

❖ The frontispieces that face off each part of the bibliography are added principally for their general interest, occasionally for entertainment. The illustrations have been chosen to side-step many of the worn-in items that have been so often used to portray the Grand Canyon and Colorado River, or at least to put new faces on a few that are familiar. Some of them focus on details rather than an oft-repeated whole. In some fashion each frontispiece has some historical reflection on that part of the bibliography, cast sometimes whimsically, ironically or symbolically. Historical elements touching on other parts of the bibliography may also be introduced, either among the illustrations or in the accompanying legends. They may lead to other things within the bibliography; in so doing they encourage the reader to further explore the content of this work. In sum the frontispieces portray the topical breadth and interpretive depth of *THE GRAND CANON*.

THE
GRAND
CANON



BIBLIOGRAPHIES, INDICES AND
RELATED WORKS

Grand Canyon, 1540

como don pedro de touar no llebo mas comiçion bolbio de alli y dio esta notiçia al general que luego despacho alla a don garçi lopes de cardenas con hasta doçe companeros para ber este rio que como llego a tusayan siendo bien reçevido y hospedado de los naturales le dieron guias para proseguir sus jornadas y salieron de alli cargados de bastimentos por que auian de yr por tierra despoblada hasta el poblado que los indios deçian que eran mas de ueinte jornadas pues como ubieron andado neinte jornadas llegaron a las barrancas del rio que puestos a el bado de ellas parecia al otro bordo que auia mas de tres o quatro leguas por el ayre esta tierra era alta y llena de pinales bajos y encorbados frigidissima debajo del norte que con ser en tiempo caliente no se podia biuir de frio en esta barranca estubieron tres dias buscando la bajada para el rio que parecia de lo alto tendria una braçada de trabesia el agua y por la notiçia de los indios tendria media legua de ancho fue la baxada cosa imposible porque acabo de estos tres dias pareçiendoles una parte la menos dificultosa se pusieron a abajar por mas ligeros el capitan melgosa y un juan galeras y otro companero y tadaron baxando a bista de ellos de los de arriba hasta que los perdieron de uista los bultos quel biso no los alcansaba aber y bolbieron a ora de las quatro de la tarde que no pudieron acabar de bajar por grandes dificultades que hallaron porque lo que arriba parecia façil no lo era antes muy aspero y agro dixerón que auian baxado la terçia parte y que desde donde llegaron parecia el rio muy grande y que conforme a lo que bieron era berdad tener la anchura que los indios deçian de lo alto determinaban unos peñol sillas desgarrados de la baranca a el parecer de un estado de hombre juran los que baxaron que llegaron a ellos que eran mayores que la torre mayor de seulla no caminaron mas arrimados a la barranca de el rio porque no auia agua y hasta alli cada dia se desbiaban sobre tarde una legua o dos la tierra adentro en busca de las aguas y como andubiesen otras quatro jornadas las guias dixerón

que no era posible pasar adelante porque no auia agua en tres ni quatro jornadas porque ellos quando caminauan por alli sacaban mugeres cargadas de agua en calabazos y que en aquellas jornadas enterraban los calabazos del agua para la buelta y que lo que caminaban los nuestros en dos dias lo caminaban ellos en uno.

The purpose of all bibliographies is to document work, whether that of individuals, institutions, or agencies. The earliest known written record of the Grand Canyon was as a result of the official activities of a foreign government, a colonial Spanish expeditionary force in New Spain. A contingent of this army, about thirteen men under García López de Cárdenas, was led by Hopi guides in 1540 to the southern part of the canyon rim. Three of them – Pablo de Melgosa, Juan Galeros, and a third whose name is not recorded – attempted to descend to the Colorado River but failed, the vast proportions of the canyon having been greatly underestimated. The account was not written down until 1563 probably, retranscribed in 1596, and not published in either the original Spanish or in English translation until 1896 (the original is lost). The facsimile above depicts the Spanish transcription published by George Parker Winship in 1896.

BIBLIOGRAPHY OF THE GRAND
CANYON REGION

"Relacion de la Jornada de Cibola Conpuesta por Pedro de Casteñada de Naçera." The original of this narrative is in the Lenox Library, New York. A fine translation, with critical notes, by GEORGE PARKER WINSHIP, is in the Fourteenth Annual Report of the Bureau of Ethnology.

"Report upon the Colorado River of the West," by Lieutenant JOSEPH C. IVES. Executive Document No. 90, published by order of the Secretary of War, 1861.

"U. S. Geographical Surveys West of the 100th Meridian," by Captain GEO. M. WHEELER. Vol. I., Geographical Report, pp. 156 to 171, with many plates, devoted to the Exploration of Colorado River and the lower portion of the Grand Canyon.

"Explorations of the Colorado River of the West, 1869-72," by Major J. W. POWELL. U. S. Government Printing Office.

"The Journeyings of F. Francisco Silvestre Velez Escalante from Santa Fé to Utah Lake," etc. In Simpson's "Across the Great Basin in 1859."

"On the Trail of a Spanish Pioneer." The Diary and Itinerary of Francisco Garces. Translated by ELLIOTT COUES. 2 Vols. F. P. Harper, New York.

"Explorations in Texas, New Mexico, California," etc., by J. R. BARTLETT, U. S. Commissioner of the Mexican Boundary Commission, New York, 1856.

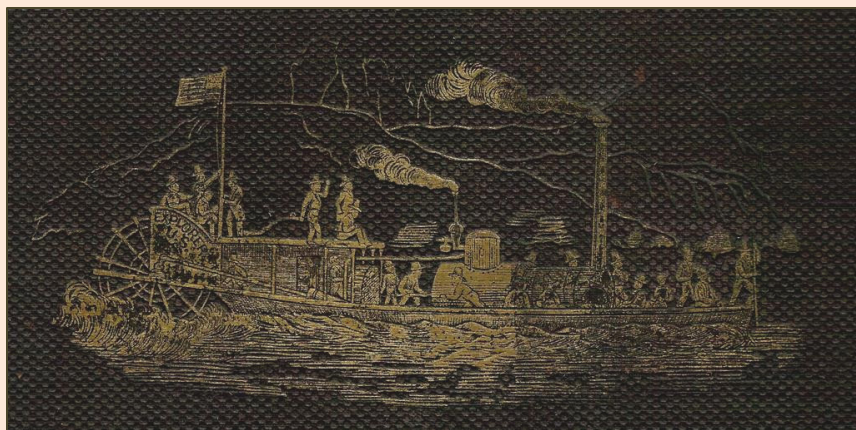
"Military Reconnoissance from Ft. Leavenworth to San Diego, by Lieutenant-Colonel W. H. EMORY.

The earliest published bibliography compiled specifically for the Grand Canyon region appeared in George Wharton James's *In and Around the Grand Canyon* (Little, Brown, and Co., Boston, 1900). Above is shown the first page of this haphazard compilation.

THE
GRAND
CANON



GENERAL PUBLICATIONS
COMMONPLACE, POPULAR, HISTORICAL,
GEOGRAPHICAL, AND BIOGRAPHICAL WORKS
CONCERNING THE GRAND CANYON AND
LOWER COLORADO RIVER REGIONS



The first explorations on the Colorado River took place from both downstream and upstream – Joseph C. Ives' army expedition from the Colorado delta in 1857–1858 (*above*), and John Wesley Powell's boating voyage from the Green River in 1869 (*below*). One of the most-quoted passages in Colorado River literature is that of the Powell party's entry into the Upper Granite Gorge of the Grand Canyon (*right*). Almost none of the quotationists have, however, given a precise bibliographical credit or have shown the passage in facsimile.

(*top left*) An illustration of the *Explorer* on the Colorado. J. C. Ives, *Report Upon the Exploration of the Colorado River of the West* (Government Printing Office, Washington, 1861), front cover (*detail*), embossed cloth, gilt.

(*top right*) Detail from "Mojave Cañon", Sketch by H. B. Möllhausen; lithograph by J. J. Young (Ives, *Report*, General Report Plate III).

CHAPTER VIII.

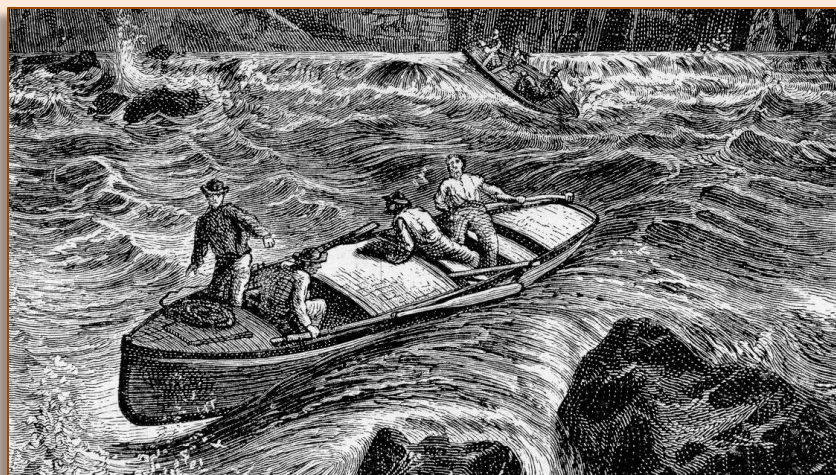
THE GRAND CAÑON OF THE COLORADO.

August 13.—We are now ready to start on our way down the Great Unknown. Our boats, tied to a common stake, are chafing each other, as they are tossed by the fretful river. They ride high and buoyant, for their loads are lighter than we could desire. We have but a month's rations remaining. The flour has been resifted through the mosquito net sieve; the spoiled bacon has been dried, and the worst of it boiled; the few pounds of dried apples have been spread in the sun, and reshrunk to their normal bulk; the sugar has all melted, and gone on its way down the river; but we have a large sack of coffee. The lighting of the boats has this advantage: they will ride the waves better, and we shall have but little to carry when we make a portage.

We are three quarters of a mile in the depths of the earth, and the great river shrinks into insignificance, as it dashes its angry waves against the walls and cliffs, that rise to the world above; they are but puny ripples, and we but pigmies, running up and down the sands, or lost among the boulders.

We have an unknown distance yet to run; an unknown river yet to explore. What falls there are, we know not; what rocks beset the channel, we know not; what walls rise over the river, we know not. Ah, well! we may conjecture many things. The men talk as cheerfully as ever; jests are bandied about freely this morning; but to me the cheer is somber and the jests are ghastly.

With some eagerness, and some anxiety, and some misgiving, we enter the cañon below, and are carried along by the swift water through walls which rise from its very edge. They have the same structure as we noticed yesterday—tiers of irregular shelves below, and, above these, steep slopes to the foot of marble cliffs. We run six miles in a little more than half an



(*above*) John Wesley Powell, *Exploration of the Colorado River of the West and Its Tributaries* (Government Printing Office, Washington, 1875), p. 80.

(*left*) "Running a Rapid", By W.L.S.; engraving by R. A. Muller (Powell, *Exploration*, Figure 28, facing p. 82) (*detail*).

THE
GRAND
CANON



THE NEW YORK TIMES

MAJOR POWELL'S PARTY PERISHES IN THE COLORADO. 19 Drown. John Sumner Is The Sole Survivor.

THE POWELL PARTY.

How the Hawk Grew in the Hands of
Nevada Hunters.

From the Denver (Colorado) News, July 6.

The Omaha Republican of the 21 and 22 inst. contains a very lengthy but rather unintelligible account of the disaster, which it obtained from Wm. RILKY, a trapper who has spent several years in the Rocky Mountains, and who had just arrived at Omaha over the Pacific Railroad. He says he met JOHN C. SUMNER at Fort Bridger, (no date given,) and from him learned the destruction of the party, of which he was the sole survivor.

Saturday evening came the following in the news report dated at Chicago:

"JOHN S. RISON, sole survivor of the Major Powell exploring expedition, which went from this State, arrived at Springfield to-day, and confirms the report of the drowning of the whole expedition, consisting of twenty men, by the swamping of their boats in the rapids of the Colorado River."

This was supplemented with the assurance that "Mr. RISON is an honest, plain, candid man, and told his story in a straightforward manner." It is unnecessary to contradict his statements. They are all false. RISON ought to be hung, and Governor PALMER will be derelict in duty if he suffers him to go unpunished.

In answer to an inquiry addressed to Fort Bridger, the operator at that place says:

"No man came to Bridger from the Powell expedition. The report originated from the drowning of Mr. Hook in Green River. There are some big liars in this country, and they wanted to tell something, so got up the story. The first we heard of it was from Granger's. The report was that all the party were drowned but one, and that he came into Bridger and reported. No such man ever came in here; at least there is not a man in the past that has ever seen or heard of any of POWELL's party since they left Bridger last Spring."

The entire report, from all sources, is a gigantic and cruel hoax, based upon the following:

"H. M. HOOK, first Mayor of Cheyenne, was lately drowned in the Green River, Utah, about 150 miles from the Union Pacific Railroad. Hook, with a party of men, were going down with skiffs, and at this point all their boats."

The "Sole Survivor" of the Powell Expedition Arrested and Lodged in Jail.

From the Springfield (Ill.) Journal, July 10.

JOHN A. RIDSON, alias Miller, alias Clark, stole a horse from Mr. WILLIAM BOWMAN, of Lincoln, on Wednesday night of this week. He is undoubtedly the same man who claimed to be the "sole survivor" of the Powell expedition, an account of which has been extensively published lately. When he left this city a few days ago to go to his home in LaSalle, he stopped at Lincoln and went to work for Mr. BOWMAN, from whom he stole the horse the following night. He then went a little distance further, and stopped at the house of J. C. JONES, stole a blanket, overcoat, quilt and shawl, and started to ride to Bloomington. Arriving at Lawndale, he found the Kickapoo too high to cross, and left the horse and proceeded forward on foot to Atlanta, where he was captured the following day with the stolen articles in his possession. Deputy Sheriff LARSON brought him back to Lincoln, where he had an examination, and was bound over in \$500 bonds, which he was not able to furnish, and yesterday was brought here by Sheriff JACKSON, of Logan County, for safe-keeping.

Certain circumstances connected with the fellow, his manners and appearance, caused suspicion to be aroused that he was the "sole survivor," and, upon being confronted by Mr. COXSON, of Lincoln, who was Deputy Warden of the Penitentiary in 1889, was identified as JOHN A. RIDSON, alias Clark, who at that time served a term for stealing a horse in LaSalle County. He, however, declared he knew nothing of the matter until he arrived here, when he acknowledged himself to be the man who has been playing the part of the "sole survivor," and he has also been recognized by different parties who heard his account of the loss of the expedition a few days since.

THE POWELL PARTY.

How the Hawk Grew in the Hands of
Nevada Hunters.

From the Denver (Colorado) News, July 6.

The Omaha Republican of the 21 and 22 inst. contains a very lengthy but rather unintelligible account of the disaster, which it obtained from Wm. RILKY, a trapper who has spent several years in the Rocky Mountains, and who had just arrived at Omaha over the Pacific Railroad. He says he met JOHN C. SUMNER at Fort Bridger, (no date given,) and from him learned the destruction of the party, of which he was the sole survivor.

The New York Times

July 13, 1869. Page 5.

FROM THE OUTSET of explorations on the Colorado River and its tributaries, whether by prospectors, trappers, or bona fide explorers, mishap and death were present. In 1869, while John Wesley Powell's government-supported expedition of exploration was descending the Green and Colorado Rivers, news came of the disastrous drowning of the entire party but one. Newspapers across the country reported the disaster—and the subsequent revelation of a hoax. Just as newsworthy was the arrest of the perpetrator, John A. Ridson, or Risdon, alias Miller, alias Clark, in Lincoln, Illinois—not for the hoax but as a horse thief and a petty thief.

Until recently, the rich historical resources of *The New York Times* were widely available, but only on microfilm, an example of which is shown here. Blemishes and poor reading quality were just as much due to rough treatment of the films as they were the quality of the original images. The advent of digital resources has allowed for significant improvements in the quality of reproductions. But readers should remember that for a good part of the 20th century this represented the ways and means of historical researchers.

THE
GRAND
CANON



MEMORIALS


+ Arlington National Cemetery +

JOHN WESLEY POWELL — EMMA DEAN POWELL

AND

WILLIAM OWEN O'NEILL



The final resting places of J. W. Powell (1834–1902) and his wife, Emma (1835–1924), and of “Buckey” O’Neill (1860–1898) are near each other in the original section of Arlington National Cemetery, in Arlington, Virginia. Major Powell was a wounded veteran of the Civil War; Captain O’Neill, one of Colonel Theodore Roosevelt’s “Rough Riders” and once mayor of Prescott, Arizona, was killed in action at San Juan Hill, Cuba, during the Spanish–American War. Powell of course was the champion of the Colorado River. O’Neill was instrumental in early settling and development at Grand Canyon. 





In Memory



Pioneers Cemetery Grand Canyon National Park

(National Park Service, Grand Canyon National Park)



Flagstaff Cemetery Flagstaff, Arizona

(Earle Spamer photos, 4 October 2007)



On June 30, 1956, two eastbound commercial airliners collided over the eastern Grand Canyon and plummeted into the chasm. It was the world's worst aircraft disaster at the time, 128 persons losing their lives, and the impetus for creating the modern air traffic control system we have today. Many of the remains from United Airlines flight 718 were placed in a common burial at the entrance to Pioneers Cemetery at Grand Canyon; and for some reason photographs of this memorial are most often used to commemorate all those who lost their lives. On the other hand, the remains recovered from TWA flight 2 were placed in a common burial in Flagstaff Cemetery, with few remembrances today, at least in print. Of all those who perished, few remains were identified and returned to kin and homes.

Throughout this bibliography are items that report contemporary activities regarding the accident and recovery of remains, as well as items that include notes pertaining to air traffic safety, and to ongoing investigations of the crash sites immediately west and southwest of the confluence of the Little Colorado River.

THE
GRAND
CANON



MEDIA FOR VISION-IMPAIRED USERS

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Transliteration of texts that appear as the Frontispiece to Part 5

TACTILE MEDIA SUCH AS BRAILLE ARE REGRETFULLY NOT AS EASILY AVAILABLE AS ARE EVEN LARGE-TYPE MATERIALS FOR THOSE WITH LIMITED VISION. NONETHELESS SOME PUBLICATIONS HAVE BEEN RENDERED INTO THESE MEDIA, AND THOSE THAT HAVE BEEN LOCATED ARE INCLUDED HERE.

MOON TYPE IS ANOTHER TACTILE MEDIUM, OF WHICH NOTICES OF MATERIALS PERTAINING TO THE GRAND CANYON REGION ARE CITED HEREIN.

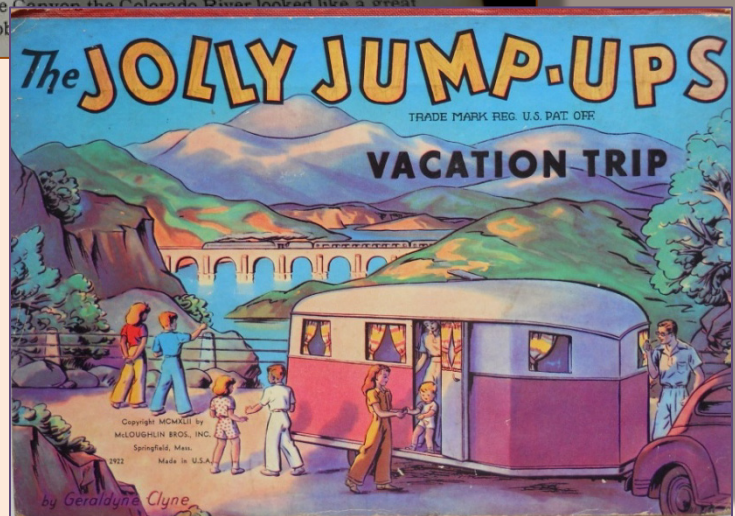
THE
GRAND
CANON



WORKS FOR AND BY YOUTH



beauty and charm, it was easily the most inspiring sight they had ever seen. From the rim of the Canyon the Colorado River looked like a great ribbon.



One of the joys of young-reader products is whimsy. One might be hard pressed to conceive how a three-dimensional “pop-up” Grand Canyon could be created on paper, yet here it is in Geraldine Clyne’s 1942 gem, *The Jolly Jump-Ups Vacation Trip*. When the panel is opened, even the mounted trail groups pop up in relief as they weave their ways down Grand Canyon-scale pyramid blocks, and the Colorado River winds into the deep shadows of the Great Unknown. While the timing of the theme of vacation touring was inopportune, with the coming of war-time rationing and curtailed travel, one may see a few moments of reflection in an adult reading the stories to a child. On the other hand, one may also imagine a child’s more immediate frustration when a little brother or sister’s eager hands grasp hold of the delicate paper pop-ups!

Geraldine Clyne, *The Jolly Jump-Ups Vacation Trip* (McLoughlin Brothers, Inc., Springfield, Massachusetts, 1942), [12] pp. [6 pop-up stories with text on boards].

THE
GRAND
CANON



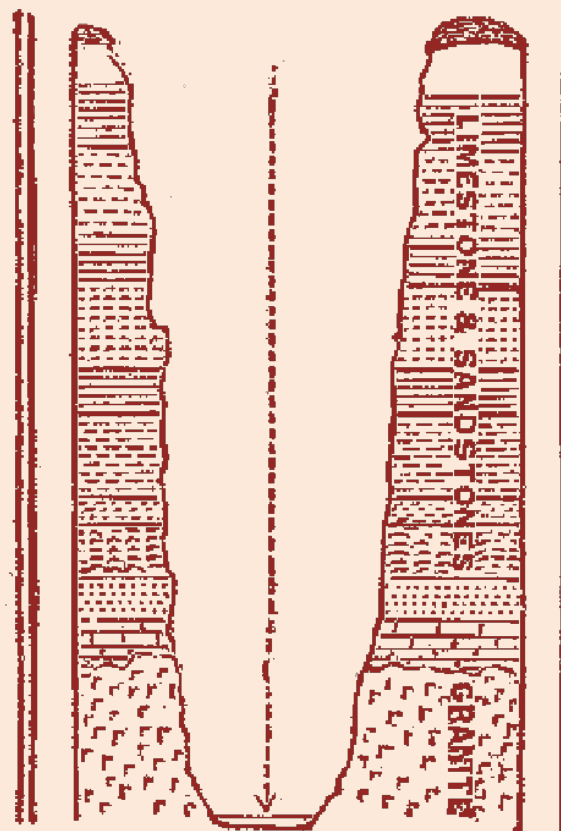
FICTION

John Wesley Powell Answers a Question from the Audience

‘Yes indeed . . .



**‘had to dig it all out
just to see the
insides!’**



**A SECTION OF COLO-
RADO CANYON.**

*With appreciation to
Captain John Hance*

(Top) “Climbing the Grand Cañon.” Sketch by Thomas Moran. Engraving by F. S. King. John Wesley Powell, *Exploration of the Colorado River of the West and its Tributaries. Explored in 1869, 1870, 1871, and 1872, under the direction of the Secretary of the Smithsonian Institution* (U.S. Government Printing Office, Washington, 1875), Figure 34 (detail).

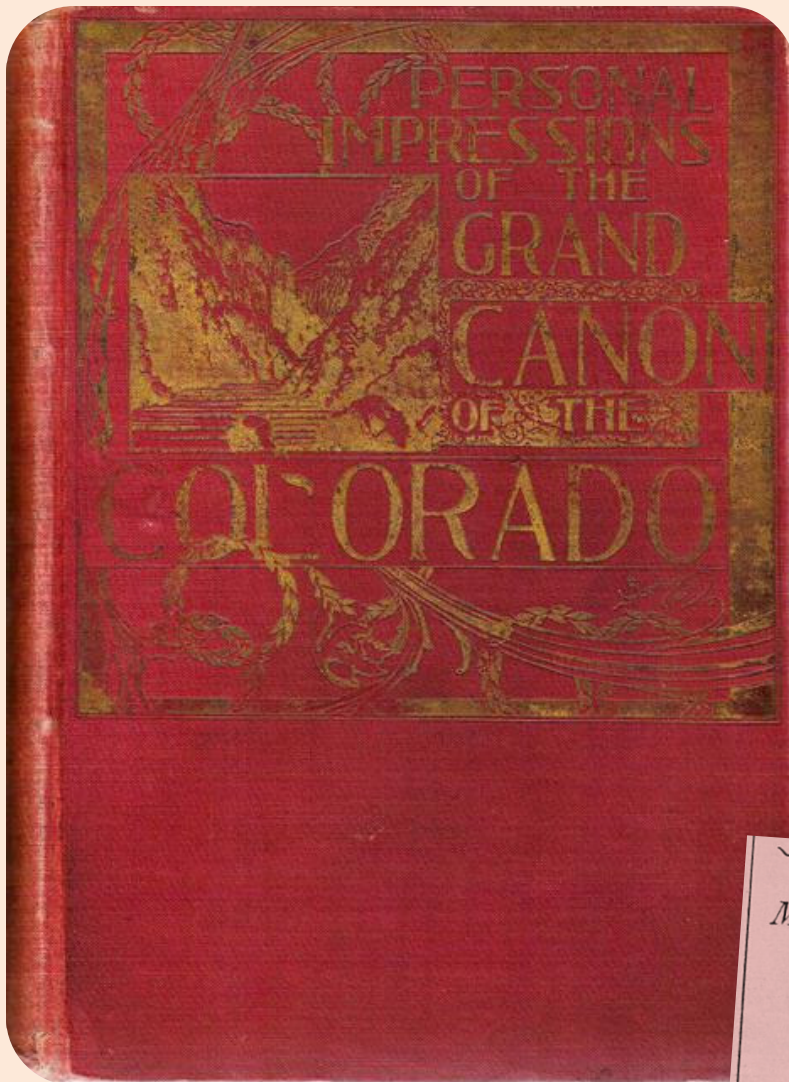
(Bottom) “A Section of Colorado Canyon.” Albert D. Richardson, *Beyond the Mississippi: From the Great River To the Great Ocean* (American Publishing Co., Hartford, Connecticut, 1867), p. 472. (Adapted.) The stratigraphic column portrayed here was taken from the seminal geological survey of Grand Canyon by John Strong Newberry, attached to the Ives expedition of 1858; a schematic rendering as viewed at Diamond Creek.

THE
GRAND
CANON



VERSE

Plain Humor



Verse by impish "Kansas Tourists" written in John Hance's guestbook — inspired by another one of Hance's tales?

G. K. Woods (compiler), *Personal Impressions of the Grand Cañon of the Colorado River Near Flagstaff, Arizona, As Seen Through Nearly Two Thousand Eyes, and Written in the Private Visitors' Book of the World-Famous Guide Capt. John Hance, Guide, Story-Teller, and Path-Finder* (Whitaker and Ray Co., San Francisco, for G. K. Woods, Flagstaff, A.T., 1899), p. 103.

May 31, 1897.

KANSAS TOURISTS.

We hope when next
We visit the cañons,
To find John and
. Peck dearer companions.

May she put on a dress,
To cover her pants,
And change her name
To Mrs. John Hance.

May they be supplied
With plenty of bedding,
When we all come to dance,
At the Hance-Peck wedding.

John, if ever inclined
To go on a tippie,
Just go to the cañon,
And behold Peck's nipple.

THE
GRAND
CANON



TRAVEL AND TRAIL GUIDES

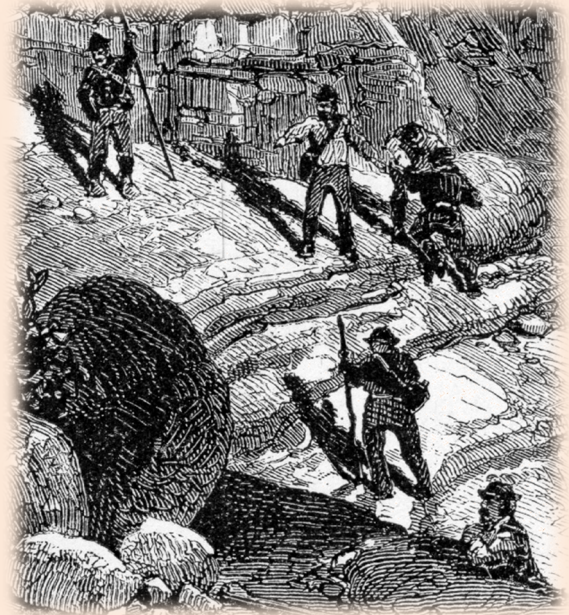


“Peach Springs Stage Office”

F. Frédéric Moreau, *Aux États-Unis; Notes de Voyage* (Librairie Plon [E. Plon, Nourrit et Cie], Paris, 1888), “Croquis de l’Auteur” [frontispiece] (detail). Lithograph.

“Climbing the Grand Cañon.”

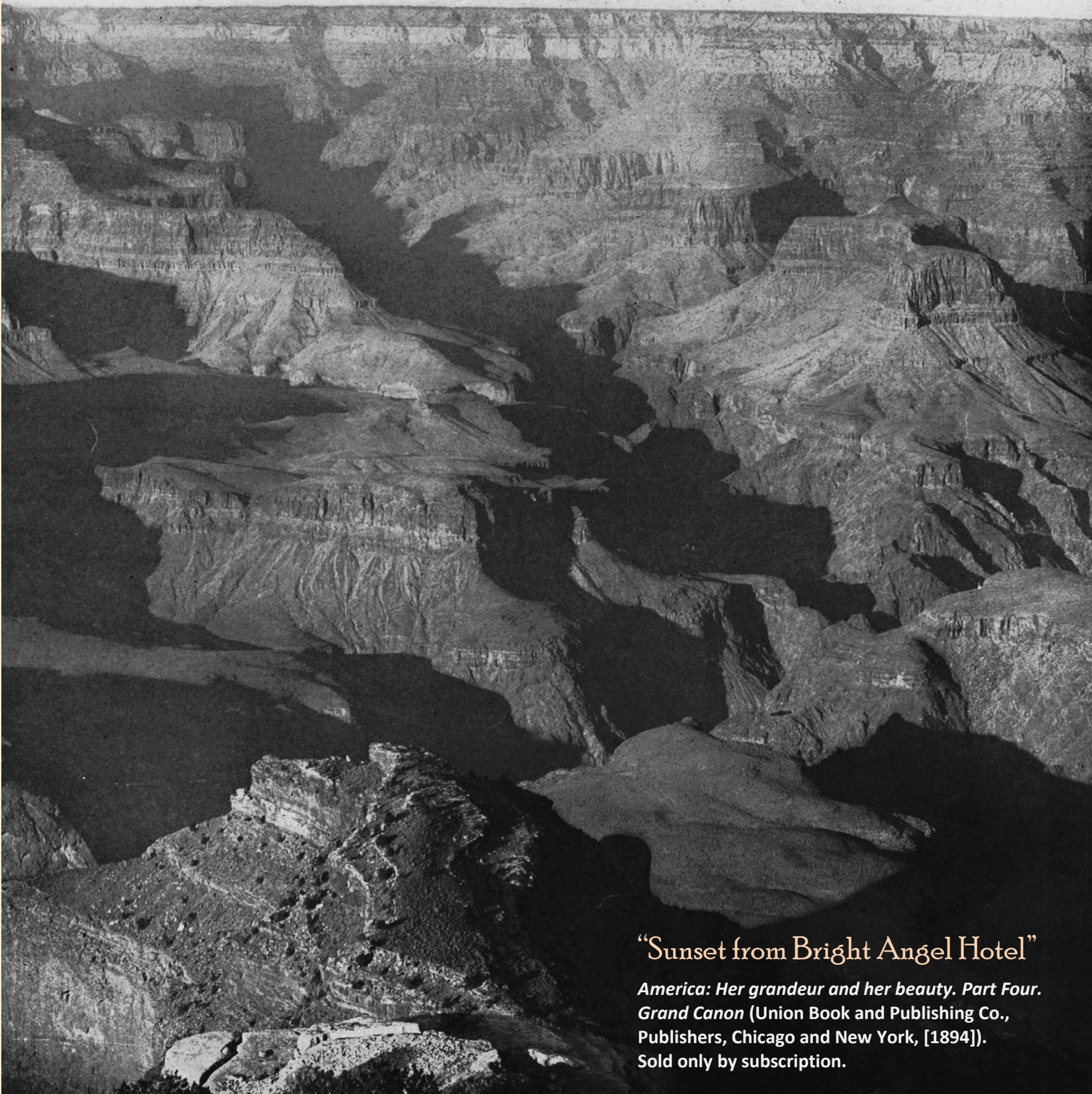
Sketch by Thomas Moran. Engraving by F. S. King. John Wesley Powell, *Exploration of the Colorado River of the West and its tributaries. Explored in 1869, 1870, 1871, and 1872, under the direction of the Secretary of the Smithsonian Institution* (U.S. Government Printing Office, Washington, 1875), Figure 34 (detail).



“Bright Angel Hotel” Grand Canyon

America: Her Grandeur and Her Beauty. Part Four. Grand Canon. Union Book and Publishing Co. (Chicago and New York [1894]). One of the earliest general-travel publications for Grand Canyon.

THE GRAND CAÑON IN ARIZONA



“Sunset from Bright Angel Hotel”

*America: Her grandeur and her beauty. Part Four.
Grand Canon (Union Book and Publishing Co.,
Publishers, Chicago and New York, [1894]).
Sold only by subscription.*

THE
GRAND
CANON



COLORADO RIVER GUIDES

Row Away From the Rocks



Always sage advice (and the title of a book cited in this bibliography), this scene of lonely corroboration from the Powell expedition is nearly lost in gray grandeur. While modern river guidebooks cannot serve for navigation in the ever-changing regime of water flow and shifting debris fields, they do function as guide posts, alerting river travelers of things to come—of which Powell's party, of course, had no idea on the 1869 Colorado. This was in fact the region where (some had heard) the river disappeared into subterranean passages, and death awaited foolish wayfarers.

"Granite Falls. – Kaibab Division. – Grand Cañon."

Sketch by Thomas Moran
Engraving by H. H. Nichols

Clarence E. Dutton, *Tertiary History of the Grand Cañon District* (U.S. Geological Survey Monograph 2, 1882), Plate XXXI.





The Nellie Powell

During the 1871–1872 second Powell Expedition on the Colorado River, the travelers wintered over in Kanab, Utah, having stored their boats near the mouth of the Paria River, where Lees Ferry would soon become an important link for travelers between Utah and Arizona, established by Mormon expansionists. When Powell and party set out again into the Grand Canyon, they left behind one boat, the *Nellie Powell*. It survived throughout the time that the ferry was an active locale. In 1938, a set brush fire burned the field where the boat had been; this fragment is all that remains. The photograph here pictures it in the Grand Canyon National Park Museum collections in 2010.

(National Park Service, Grand Canyon National Park. Michael Quinn photo.)

THE
GRAND
CANON

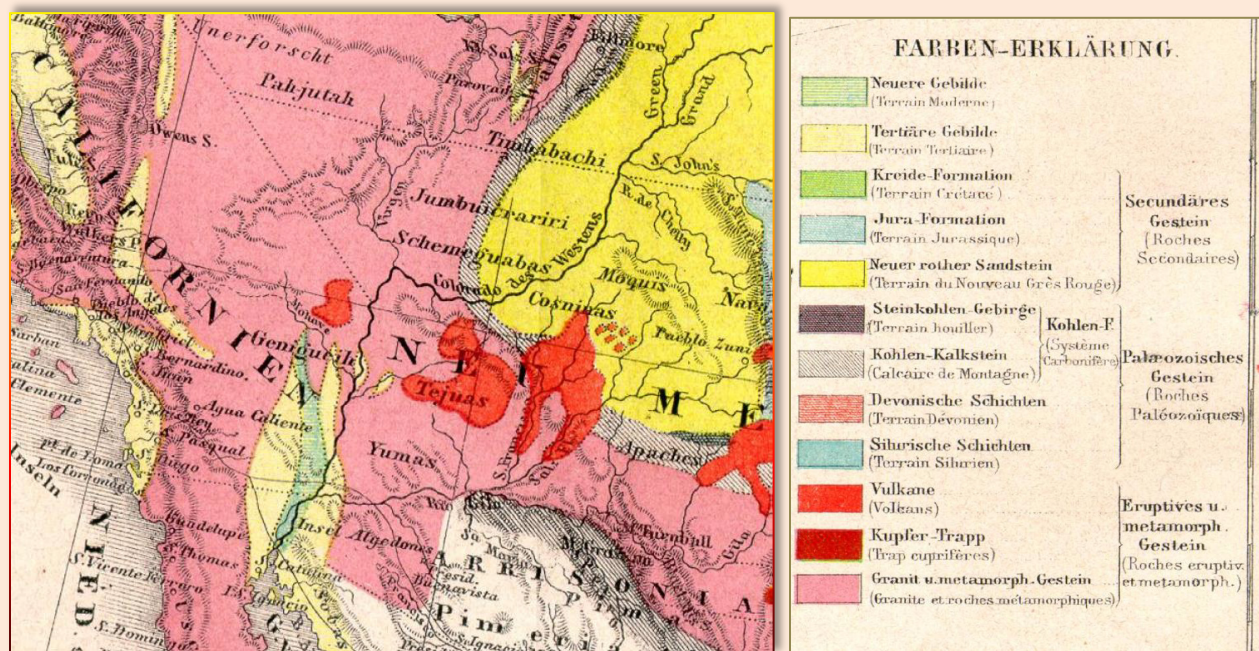


LOWER COLORADO RIVER REGION
NATURAL HISTORY, ENVIRONMENT, AND
SPECIAL SCIENTIFIC OR TECHNICAL ISSUES



FIG. 83.—Section of the valley of the Grand Wash near Colorado River; distant view from the north.

A. R. Marvine, Report on the Geology of Route from St. George, Utah, to Gila River, Arizona. Examined in 1871. In: U.S. Army, Engineer Department, Report upon Geographical and Geological Explorations and Surveys West of the One Hundredth Meridian, in charge of First Lieut. Geo. M. Wheeler . . . Vol. III.—Geology. Part II. Washington: U.S. Government Printing Office, 1875), p. 196.



An early geologic map of the United States by Jules Marcou, 1855, predates the earliest scientific explorations conducted in the Colorado River region of the American Southwest. This detail from Marcou's map depicts the Colorado River corridor fairly in its entirety, which naturally is largely subjective in its display of rock types throughout the region. It is based upon extrapolations from few observations in the field; and the course of the Colorado, too, at this time remained to be determined through the canyonbound regions of today's Arizona and Utah. Note that the territory of New Mexico includes what today is southern Nevada as well as Arizona. Note also that the map labels areas thought to be inhabited by certain groups of Native Americans, and that the mostly geologically unmapped region south of the Rio Gila is labeled "Arrisonia" and "Pimeria Alta".

"Geologische Karte der Vereinigten Staaten und Britischen Provinzen von Nord-Amerika. Von Jules Marcou. Juli 1855." Colored geologic map, scale (in original) 1:14,000,000, "Lith. Anst. v. f. Hellfarth in Gotha". In Jules Marcou, "Über die Geologie der Vereinigten Staaten und der englischen Provinzen von Nord-Amerika", *Mittheilungen aus Justus Perthes' Geographischer Anstalt über Wichtige Neue Erforschungen auf dem Gesamtgebiete der Geographie von Dr. A. Petermann* [Petermanns Geographische Mittheilungen] (July 1855), Tafel 15 (details).

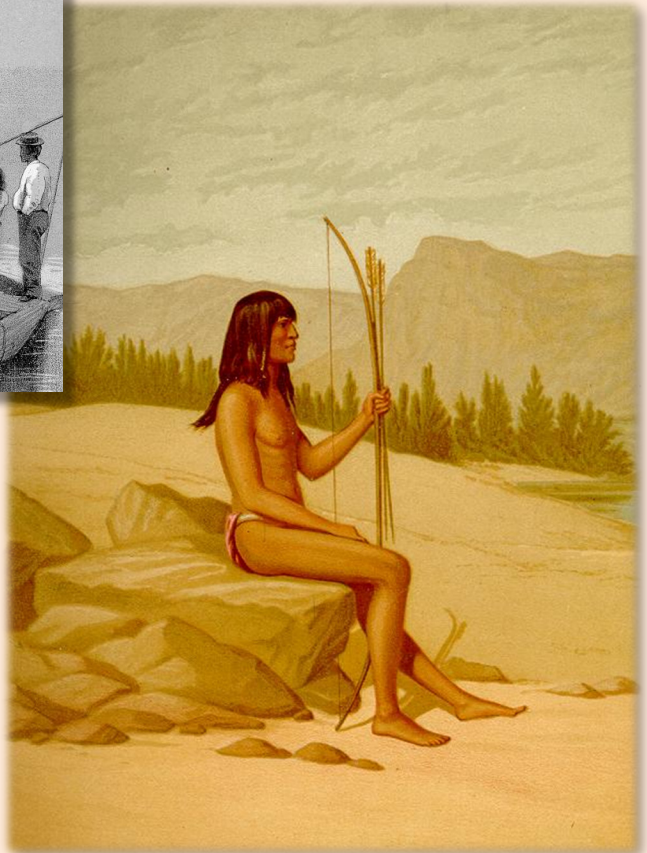


“The Start of the River Party from Camp Mohave, Arizona. (Explorations of 1871.)” Lithograph *after* a photograph.

U.S. Army Engineer Department, *Report upon United States Geographical Surveys West of the One Hundredth Meridian, in charge of Capt. Geo. M. Wheeler Vol. I.—Geographical Report* (U.S. Government Printing Office, Washington, 1889), Plate XVI.

“Miamun—A Mohave Indian of the River Party. 1871 .” Lithograph, hand-tinted.

U.S. Army Engineer Department, *Report upon United States Geographical Surveys West of the One Hundredth Meridian, in charge of Capt. Geo. M. Wheeler Vol. I.—Geographical Report* (U.S. Government Printing Office, Washington, 1889), Plate XVIII.



THE
GRAND
CANON



LOWER COLORADO RIVER REGION
WATER SUPPLY AND MANAGEMENT, AND RELATED
ISSUES IN THE REGION BELOW GRAND CANYON
—
INCLUDING PROPOSED AND COMPLETED ENGINEERING
PROJECTS ALONG THE COLORADO RIVER FROM
GLEN CANYON TO MEXICO



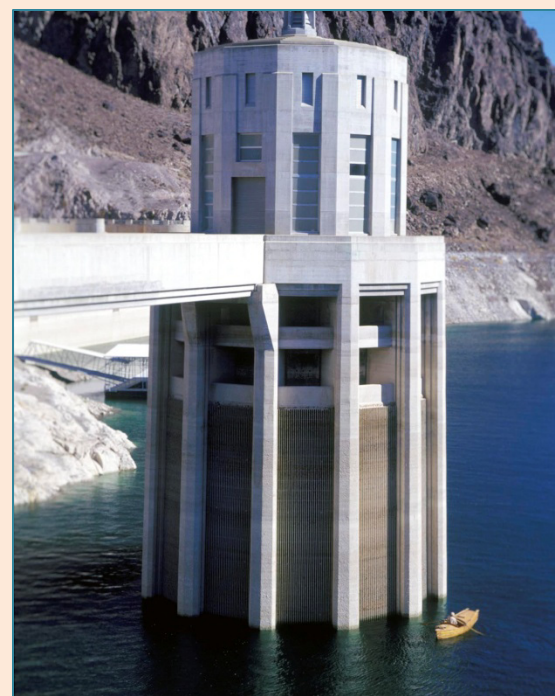
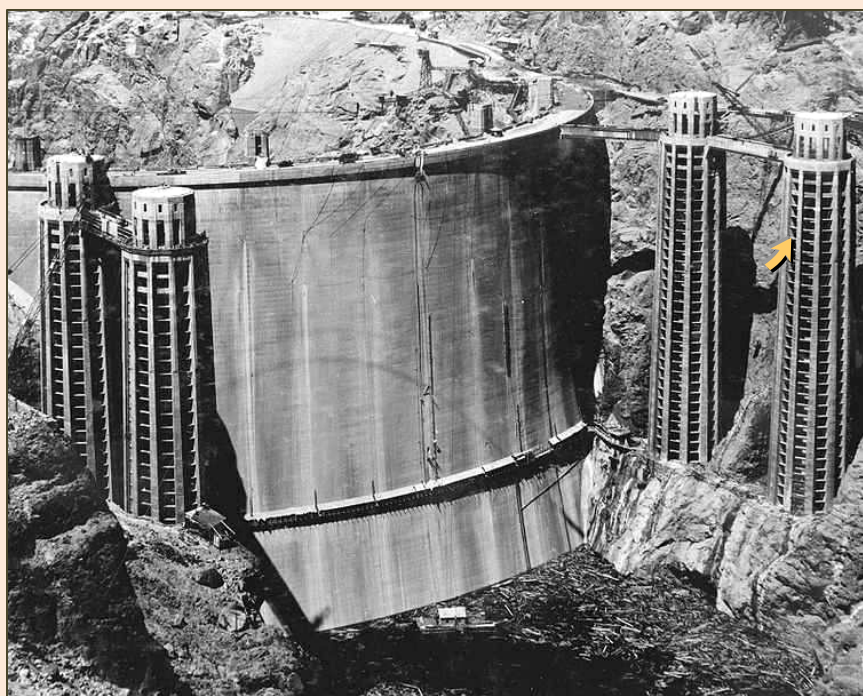
(Once)

A Highway to the Sea

Aerial view of Hoover Dam in the Colorado River astride the boundary between Arizona (foreground) and Nevada, looking westward. Most clearly visible are the Arizona spillway (by the parking lot), the Arizona highway's snaking approach to the dam, and the four intake towers in Lake Mead. Also visible are the Bureau of Reclamation's visitors center (the white and copper-colored cylindrical structures on the far (Nevada) side). The Colorado River downstream is not visible from this vantage but the penstock outlet works on the Nevada wall can be seen near the base of the cliff.

(Photo 2 March 1998.)

All photos U.S. Bureau of Reclamation

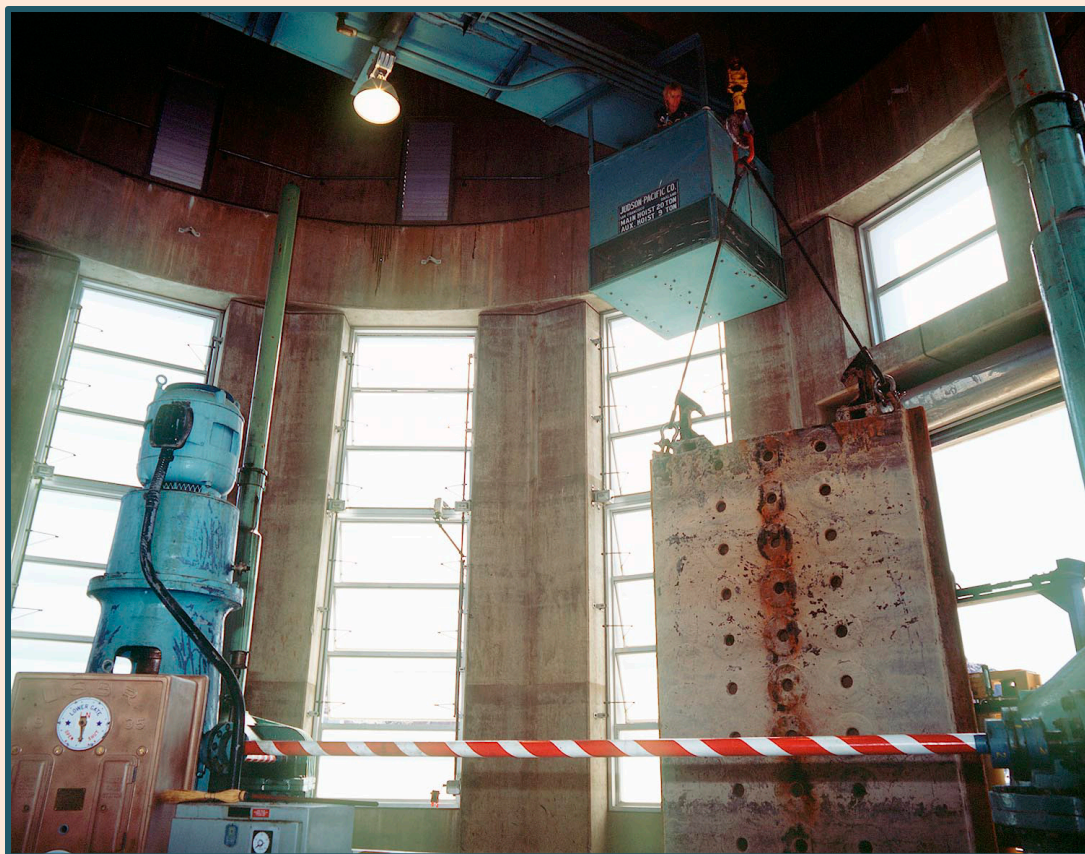


(Left) The nearly finished Hoover Dam and intake towers brood over a rising Lake Mead, 1935. Note the driftwood and construction debris ponded in slackwater beside the barge. (The location of the yellow arrow denotes the position of the boat in the photo at right.) [What is inside the intake tower? See overleaf of Part 12 title-sheet.]

(Right) On 19 June 2002* Brad Dimock rows past the upstream Nevada intake tower in his self-built replica of a boat used by Haldane "Buzz" Holmstrom, who in October and November 1937 had rowed the Green and Colorado Rivers all the way to the back of Hoover Dam. In 2002 Dimock retraced the Grand Canyon–Lake Mead leg of that trip and reenacted Holmstrom's historical physical bump against the dam, ending the journey. Dimock's approach to the dam was with permission and in the presence of Bureau of Reclamation personnel. With Vince Welch and Cort Conley, Dimock wrote a biography of Holmstrom, *The Doing of the Thing: The Brief Brilliant Whitewater Career of Buzz Holmstrom* (Fretwater Press, Flagstaff, 1998) [see Item no. 2.6802 herein].

USBR photo by Andy Pernick, http://www.usbr.gov/lc/region/g5000/photolab/gallery_detail.cfm?PICIDTYPE=3942.
Access photo database at <http://www.usbr.gov/lc/region/g5000/photolab/photostart.cfm> (last accessed 4 January 2012).

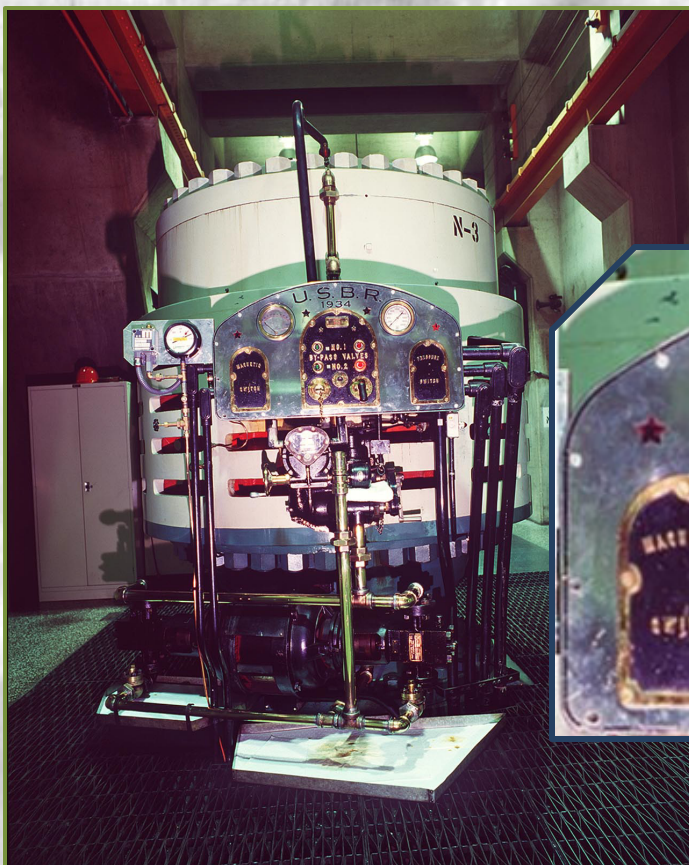
* Date from Bureau of Reclamation photo database. Dimock recalls it was a couple of months later (fide Brad Dimock, 4 January 2012).



Hoover Dam Inside the Upstream Nevada Intake Tower

This view was taken during maintenance on the intake tower, 27 September 2001, with one of the stoplogs suspended from crane. Note the original control indicator (*inset*), its casing marked in raised letters, "U.S.B.R. 1935".

(U.S. Bureau of Reclamation photo)



See next page for legends

◀ Overleaf

(top left) Maintenance on stoplog in upstream Nevada intake tower. 27 September 2001

(center and top right) A submersible remote-operating vehicle in use during inspection of one of the Nevada intake towers. 16 November 2001

(bottom) Bypass tube activator. 27 February 1998. *Inset* shows the original control panel, 1934

(background) An Arizona bypass tube in operation. 30 September 2009

(All photos U.S. Bureau of Reclamation)



HOOVER DAM AND LAKE MEAD

BLACK CANYON, ARIZONA-NEVADA

Hoover Dam Bypass highway and bridge under construction

U.S. Bureau of Reclamation Photo
9 June 2004

THE
GRAND
CANON



ADMINISTRATION AND MANAGEMENT ISSUES
IN THE GRAND CANYON AND
LOWER COLORADO RIVER REGIONS

Oh, Ranger!



All photos
National Park Service, Grand Canyon National Park

National Park rangers are one of the beloved American images, and ranger-led tours and talks are popular and expected administrative duties for the visiting public. While women rangers were unusual in the early years of the Park Service, they were present even during the earlier park days at Grand Canyon. *At left*, ranger-naturalist Polly Patraw speaks to a group on an auto caravan trip along the East Rim Drive in June 1931. *Below*, three quarters of a century later a ranger discusses the ceremonial purposes of an ancient American Indian kiva, excavated at the Tusayan Ruin Museum site near Desert View.



For 38 years John Riffe (*left*) was the lone ranger at Tuweep, the remote Toroweap section on the northwestern corner of Grand Canyon National Park. A rangeman and pilot both, he worked the land and loved it, to his last day. It was the only job he ever had with the Park Service. He was charged with overseeing thousands of acres of national park lands, often by air, a unique responsibility in a vast landscape. He was a steadfast friend to nearby ranchers, dependable aid to wandering travelers, and the well-deserved subject of Jean Luttrell's biography, *John H. Riffe: The Last Old Time Ranger*. The Park Service accorded him a lasting honor, allowing his remains to be buried near Tuweep Ranger Station.

Oh, Ranger! is the title of a book on the national parks by Horace M. Albright and Frank J. Taylor, in print through multiple editions during the Depression era and later in reprinted form.

“...we crane over its terrible brink and gaze upon the
water of the river full 3,000 feet below.”

Toroweap

“Inner Gorge at Toroweap
— Looking East.”

Jack Hillers photograph.
Heliotype Printing Co., Boston.

Clarence E. Dutton, *Tertiary History of the
Grand Cañon District* (U.S. Geological
Survey, Monograph 2), Plate XVII.

Quotation: Dutton, at Toroweap, p. 87.



THE
GRAND
CANON



SOCIOLOGY, RECREATION, EDUCATION,
ECONOMICS AND RELATED ISSUES
IN THE
GRAND CANYON-LAKE MEAD REGION

“Kanab Cañon. – Near the Junction.”

Sketch by Thomas Moran
Engraving by H. H. Nichols



Clarence E. Dutton, *Tertiary History of the Grand Cañon District* (U.S. Geological Survey Monograph 2, 1882), Plate XXV.

Note in the enlarged inset that the engraver contributed some peculiar perspective to the one boat seen from aft; an improbable, Escheresque piece of boat building.

A symbolic view of journey's end for the second Powell expedition in 1872, the boats dragged part way into Kanab Creek from the Colorado River, emptied, and left to the elements and ages. But this was actually the *beginning* for thousands of journeys into Powell's "Great Unknown" of the Grand Canyon. His reports, publications, and lectures would fix the canyonlands and the Colorado River into the minds of geographers, legislators, citizens and adventurers the world over. A century later, Colorado River trips through Grand Canyon were reaching a point of crowding that the issue became the subject of studies on the sociological qualities of river trips and about group and human-environmental interactions along the river. These led as well to the creation of special-needs river trips, offered to individuals with physical, medical, or social concerns who otherwise may never have had – or imagined they could have – the experience of living in a near wilderness, participants on Powell's whitewater trail of adventure. And within the community of Colorado River boatmen also arose attention to emotional and general health concerns, with the establishment of The Whale Foundation offering these men and women assistance, support and education.

THE
GRAND
CANON

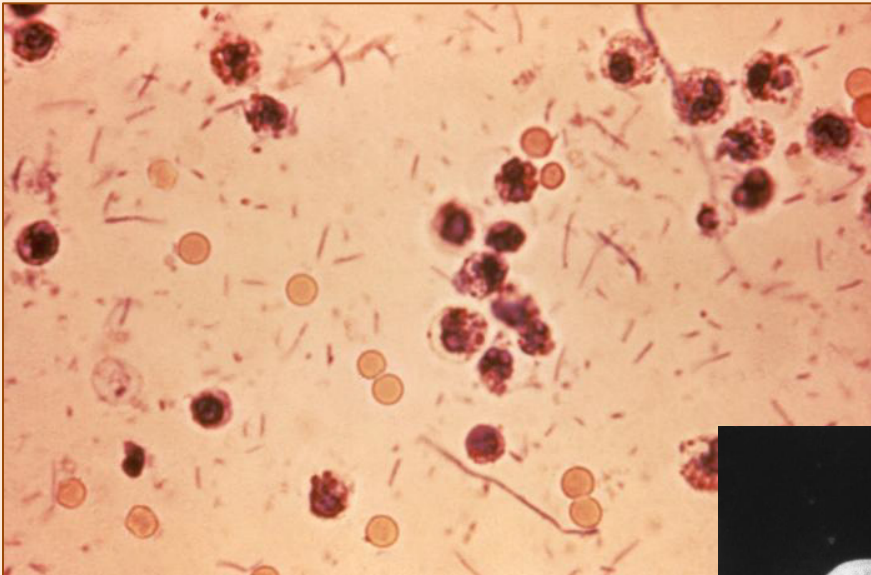


HEALTH AND SAFETY IN THE
GRAND CANYON-LAKE MEAD REGION

NOT WANTED!

INFAMOUS COLORADO RIVER RUNNERS

With an increase in the number of people running on the Colorado River through Grand Canyon during the later part of the 20th century, unexpected (and avoidable) outbreaks of intestinal illnesses were reported; if not with regularity then with some certainty due to the close quarters of river trips and casual attention to cleanliness. *Shigella* and *Giardia* are two kinds of infectious organisms that have been encountered on river trips, resulting usually in bouts of fever and diarrhea. Increased federal, state, and county agency oversight and training for boat crews of commercial river-running companies, and fastidious attention to clean food preparation and waste management during river trips, has reduced reported incidents of illness. +



(above) Photomicrograph of stool exudates from a patient with shigellosis or so-called “Shigella dysentery”. The bacterium is *Shigella*, which many researchers today consider to be more properly related to *Escherichia*, of which *E. coli* is the most commonly recognized in public venues.

(right) Scanning electron microscope image of *Giardia lamblia*, a flagellated protozoan parasite that lives in the intestines of infected animals, including humans, before being passed back into the environment to reinfect another host.

(Images: U.S. Department of Health and Human Services, Center for Disease Control and Prevention, Public Health Image Library)



▲ TREAT YOUR WATER – WASH YOUR HANDS ▲



In 1948 this Arizona Helicopter Service aircraft crashed with relatively minor damage while enroute to Supai, in Havasu Canyon. This is a testimonial to just how early commercial air service in the Grand Canyon came about. In this bibliography, Item no. 2.12882 takes note of this air service starting commercial tours in the canyon. Today, the air-tour industry is a prominent fixture in the Grand Canyon region, with frequent air tours over the canyon chiefly from Tusayan, Arizona, and Las Vegas, Nevada.

(National Park Service, Grand Canyon National Park)



The most well-known and far-reaching Grand Canyon accident was the collision of two commercial airliners at an altitude of 21,000 feet over the eastern part of the canyon, on June 30, 1956. The accident was the result of a chain of circumstances, including a late departure of one of the airliners, and the absence of air traffic control over most of the country. The accident instigated the creation of modern air traffic control. One hundred twenty-eight people perished.

United Airlines Flight 718, flying the Douglas DC-7 *City of Vancouver* (N6324C) was enroute to Chicago from Los Angeles. Trans World Airlines flight 2, flying the Lockheed L-1049 Super Constellation *Star of the Seine* (N6902C) was enroute to Kansas City also from Los Angeles. After colliding, the two aircraft fell uncontrolled into the canyon west and southwest of the confluence of the Little Colorado River. The DC-7 crashed into the south wall of Chuar Butte; the Super Constellation crashed near the base of the northeast slope of Temple Butte.

This bibliography contains numerous articles and books that relate aspects of the accident and later investigations. In the 1970s the National Park Service had removed most of the wreckage, although fragments and the occasional personal object may still be encountered. Most of the remains of the victims were placed in common burials; the United passengers at Pioneers Cemetery, Grand Canyon National Park, and the TWA passengers at Flagstaff Cemetery, Flagstaff, Arizona.

Artist's depiction based on forensic crash studies, from Wikimedia Commons under the GNU Free Documentation License, accessed 24 March 2012. http://commons.wikimedia.org/wiki/File:1956_Grand_Canyon_mid-air_collision.png

THE
GRAND
CANON



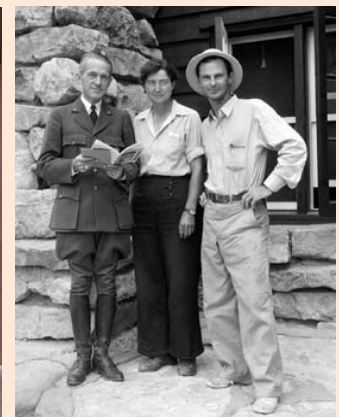
ARCHAEOLOGY AND CULTURAL
PRESERVATION IN THE
GRAND CANYON REGION

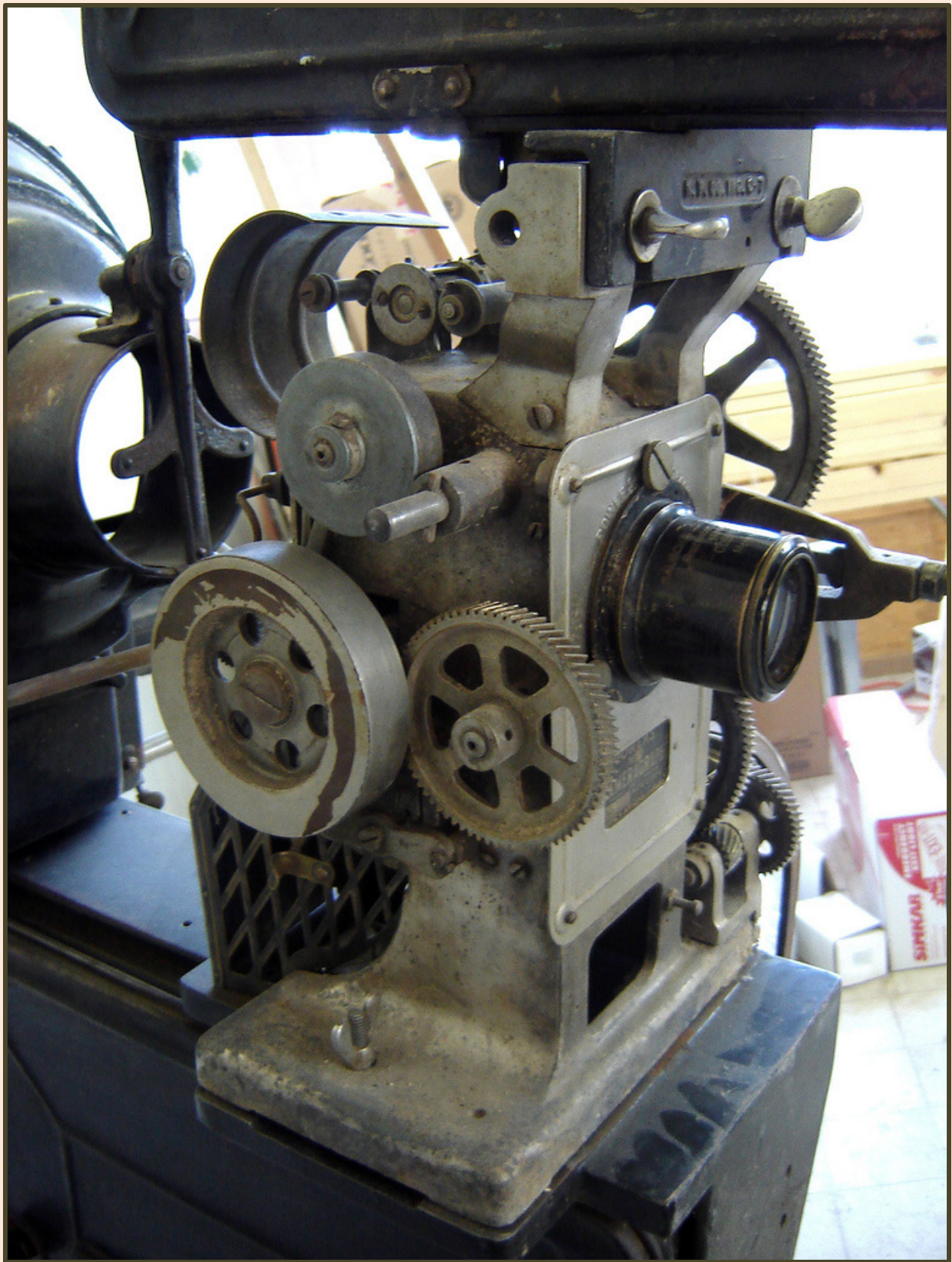
CULTURAL PRESERVATION



Archaeological sites abound in the Grand Canyon; a few have been studied and prepared for public exhibition. (*Top left*) Walhalla Glades site on the North Rim at the Walhalla Overlook near Cape Royal; (*top right*) Bright Angel site overlooking the Colorado River near the mouth of Bright Angel Creek. One of the more recognizable artifacts found in the Grand Canyon are split-twig figurines (*center*), which were kinds of hunting charms, although no one can miss the exquisite charm of a well decorated pottery bowl (*left*). Not all historical relics are ancient; the park is also charged with protecting its 20th century history, too. *Below* is the

WEN, one of the boats made by Norman Nevills for his new commercial river-running business on the Colorado. In 1938, in the *WEN* and two other boats, academic botanists Elzada U. Clover and Lois Jotter were the first women to travel the river, participants in Nevills' first commercial trip. At *right* Clover poses with Nevills (wearing *hat*) and Miner Tillotson, Grand Canyon National Park's super-intendent.





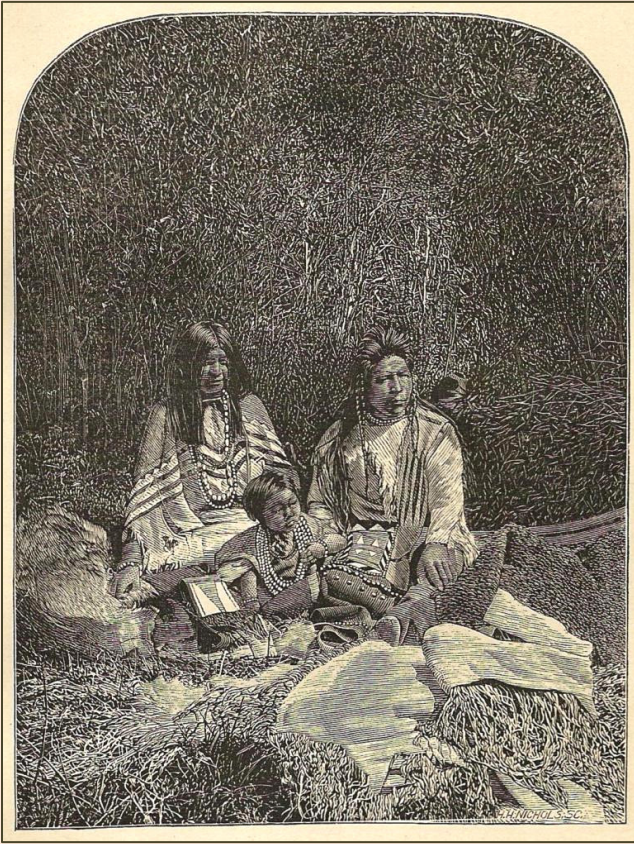
The original 35mm carbon-arc Powers Peerless movie projector used at Kolb Studio from 1915 to the early 1960s to display the Kolb Brothers' film of their 1911–1912 expedition on the Colorado River. The single lens was manufactured by Bausch & Lomb. The projector is now in the Grand Canyon National Park Museum Collection.

(National Park Service, Grand Canyon National Park)

THE
GRAND
CANON



NATIVE AMERICANS IN THE
GRAND CANYON REGION



“Sai’-ar, the interpreter, and his family”

Engraving by H. H. Nichols *after* a photograph by J. K. Hillers, 1874
(Uintah Valley, Utah)

This illustration from John Wesley Powell’s record of his explorations in the Colorado River country foretells his growing mastery of ethnological studies of the American Indians, particularly in the Southwest, his own expertise developing through repeated encounters with Ute and Paiute people. These interests evolved into his directorship of the Smithsonian Institution’s Bureau of American Ethnology. Interestingly, Powell’s account does not otherwise mention Sai’-ar nor the linguistic assistants of his early encounters.

John Wesley Powell, *Exploration of the Colorado River of the West and Its Tributaries* (Government Printing Office, Washington, 1875), Figure 13 (facing p. 42).



“Havasupai Indians Man and Wife (with Cradle)”

This photograph, circa 1900, is part of a commercially produced series by F. H. Maude, Los Angeles; awkwardly hand-colored.

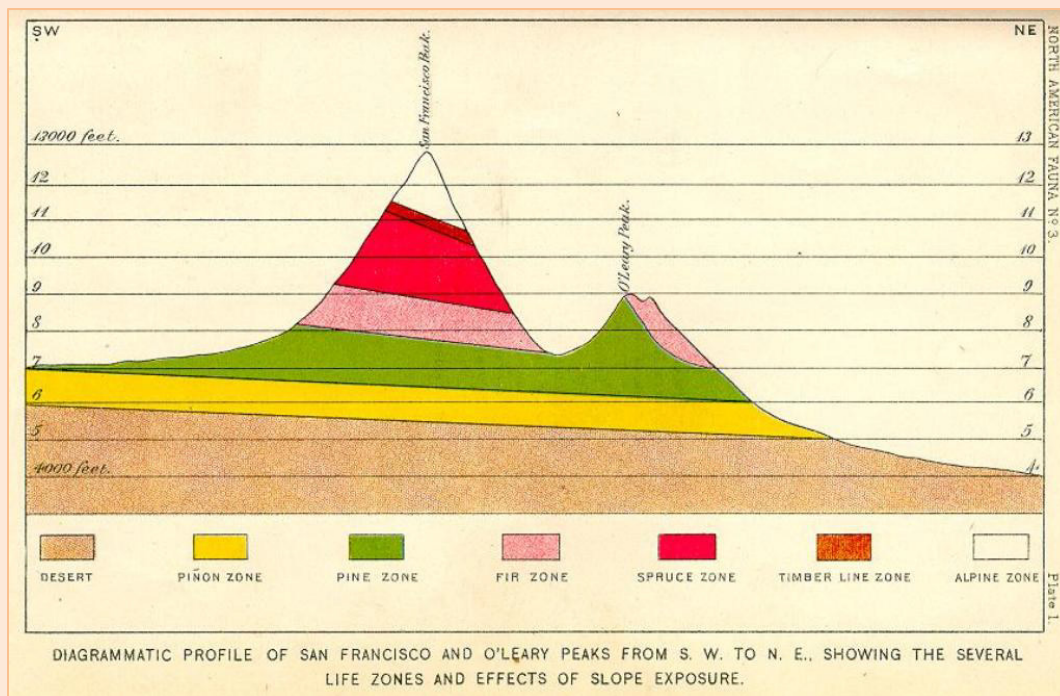
A number of Maude photographs, with copyrights indicated for 1899, also were used in George Wharton James’s *In and Around the Grand Canyon*, first published in 1900 by Little, Brown, and Company (Boston).

(National Park Service, Grand Canyon National Park)

THE
GRAND
CANON

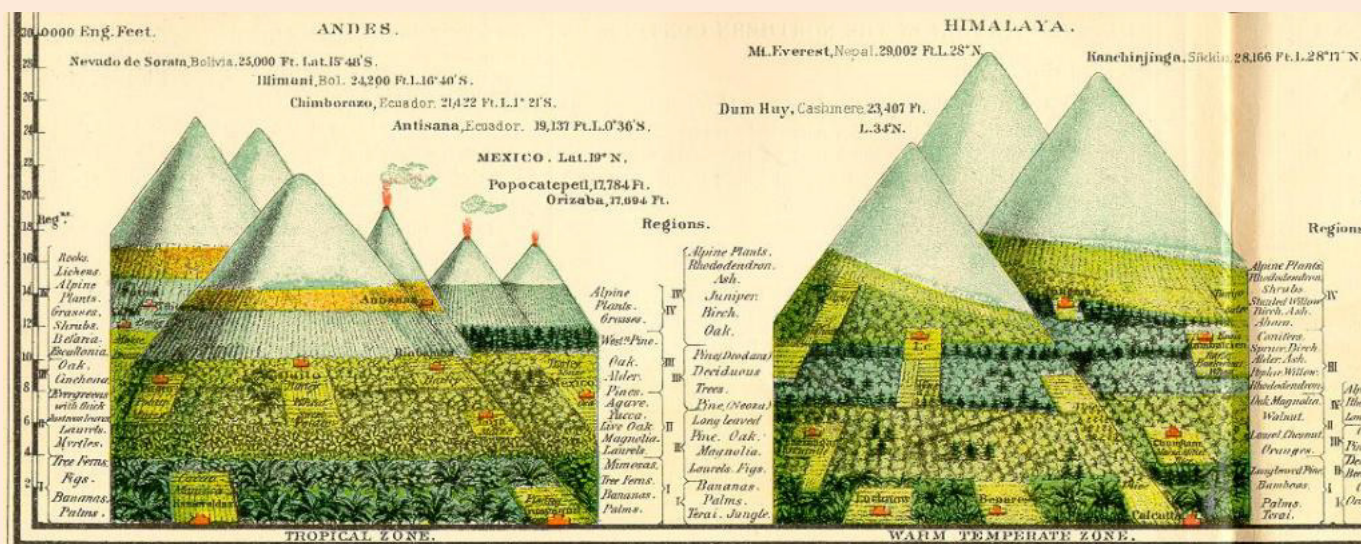


PHYSICAL ENVIRONMENT OF THE
GRAND CANYON REGION



C. Hart Merriam, Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado in Arizona. U.S. Department of Agriculture, *North American Fauna*, no. 3 (1890), Plate I.

C. Hart Merriam is often credited, correctly, for having demonstrated the principle of life zones as a function of slope exposures and thus of localized climatic conditions. In 1889 he was the first to empirically study the principle in the field, in the San Francisco Peaks region of northern Arizona, including a venture into the Grand Canyon on the [Old] Hance Trail. Many publications repeat this credit to Merriam, but one should be aware that the premise was not wholly new to environmental observers, as shown by these contrasting examples (*below*) by Arnold Guyot of Princeton University, which preceded Merriam's work by two decades. Guyot was a geologist and an early climatologist whose accomplishments led to the establishment of the U.S. Weather Bureau.



"Vertical Distribution of Plants in Various Latitudes." Arnold Guyot, *Physical Geography* (Charles Scribner's Sons, New York, 1873), pp. 101-102 (detail).



Winter inversion viewed from Lipan Point, East Rim Drive, Grand Canyon National Park.

(National Park Service, Grand Canyon National Park. Photo by Michael Quinn.)

THE
GRAND
CANON



BIOLOGY AND BIOENVIRONMENT OF THE
GRAND CANYON REGION

Abert's Squirrel



"*Sciurus aberti*". Drawing by Richard H. Kern. Lithograph by Ackerman, New York (hand-tinted).

Samuel F. Woodhouse, "Report of the Natural History of the Country Passed Over by the Exploring Expedition Under the Command of Brevet Captain L. Sitgreaves, U.S. Topographical Engineers, During the Year 1851", in L. Sitgreaves, Report of an Expedition Down the Zuni and Colorado Rivers. U.S. 32nd Congress, 2nd Session, Senate Executive Document 59, 1853, pp. 31-152. (Mammals Plate 6.)

The ecology of the Kaibab Plateau on Grand Canyon's North Rim is an enticing historical and scientific story. A panoply of biological, climatic, evolutionary, and human-history vectors converge here. The Abert's squirrel (*above*), found widely in the West, was first scientifically described from a specimen taken in the San Francisco Peaks area of Arizona during the Sitgreaves Expedition of 1851. A "cousin", the white-tailed Kaibab squirrel endemic to the Kaibab Plateau (*below*), is considered by some systematists to be either a subspecies of the Abert squirrel, as *S. aberti kaibabensis*, or a separate species, *S. kaibabensis*.

In the 20th century a federally organized game-management debacle all but eliminated the natural predators of the Kaibab), leading to widespread famine among the deer as the result of overpopulation and grazed defoliation of food plants. While the extirpation program was widely acclaimed at the time, and notably featured in the writings of author and novelist Zane Grey and items about "Uncle Jim" Owens, it is today a classic case study in environmental management worldwide.

Kaibab Squirrel



(National Park Service, Grand Canyon National Park)



“DeMotte Park.”

Centerpiece of the Kaibab Plateau. By Thomas Moran. Engraving by H. H. Nichols.

Clarence E. Dutton, *Tertiary History of the Grand Cañon District* (U.S. Geological Survey Monograph 2, 1882), Plate 26.



... but what if the wildlife approaches and feeds itself?

At “Grand Canyon West”, the touristy attraction on the Hualapai Indian Reservation, visitors at Guano Point are offered a “barbeque” lunch. When we seated at a lone picnic table on the rim away from the crowd, this butterfly immediately flew in and, without so much as hovering, set down to feed from the plate.

(Earle Spamer photo, 3 October 2007)

(right) An instructional sign at Grand Canyon National Park, on the rim outside Bright Angel Lodge, a long-time feeding “trouble spot” due largely to the abundance of rock squirrels.

(Earle Spamer photo, 6 October 2007)



THE
GRAND
CANON



GLEN CANYON ENVIRONMENTAL STUDIES
PROGRAM



Vasey's Paradise on the Colorado River, Marble Canyon, Grand Canyon National Park – home of the Kanab ambersnail, an endangered species first scientifically described in 1948 from a few specimens collected near Kanab, Utah, in 1909. The population living at Vasey's Paradise is the only naturally occurring population of this land snail surviving in an environment largely unaffected by human activities. It was discovered living here in 1991 as the result of one of the research trips conducted under the Glen Canyon Environmental Studies program.



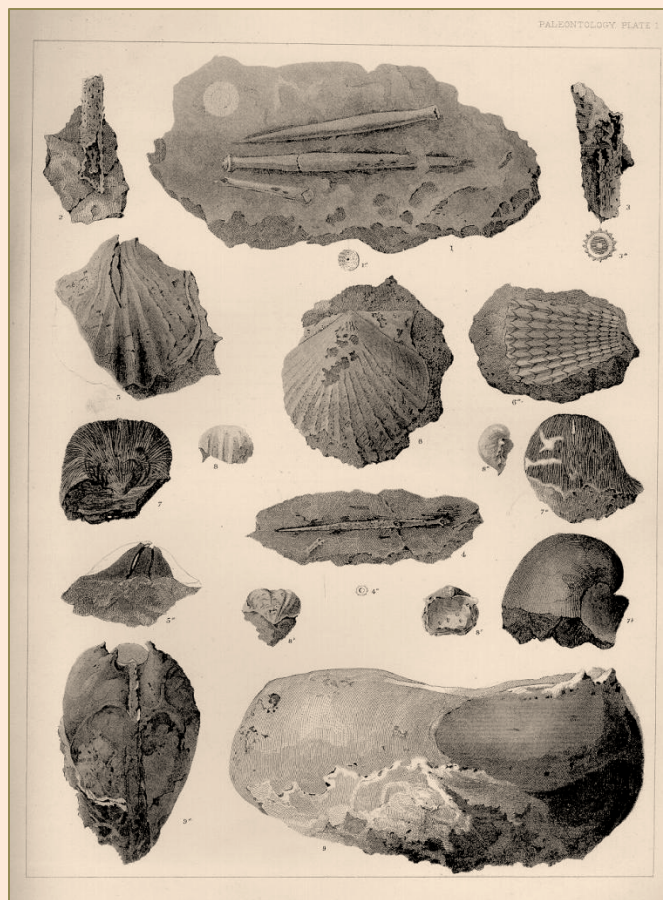
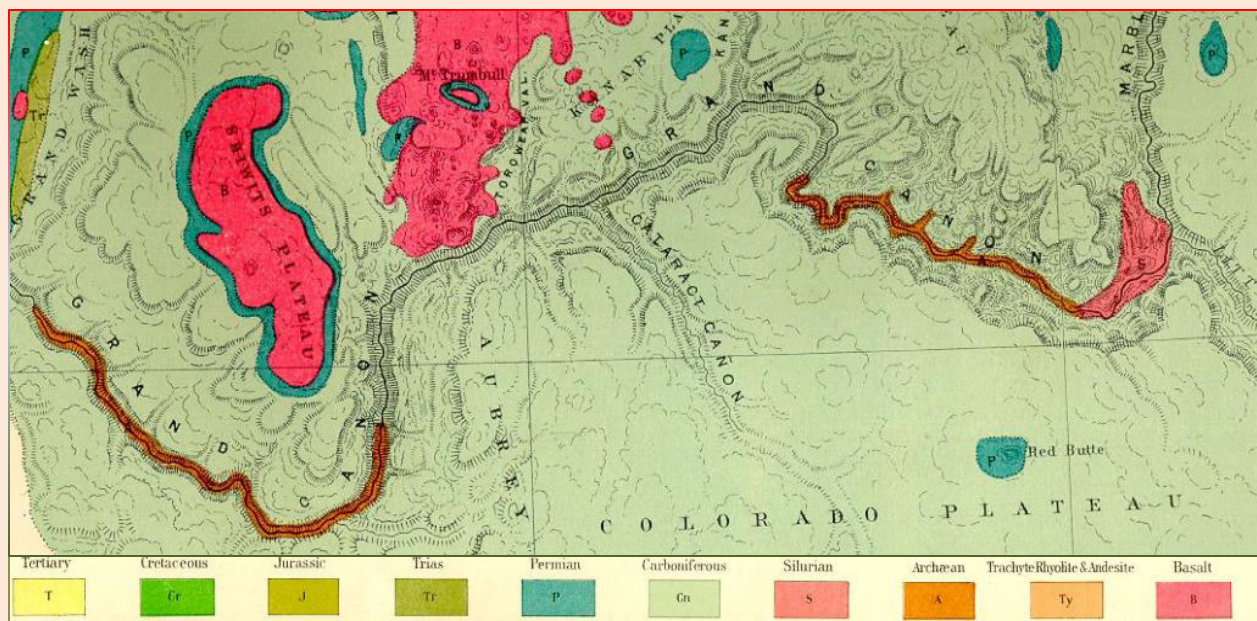
Kanab ambersnail,
about actual size

*Vasey's Paradise photo by Earle Spamer, 25 July 1991, during a GCES research trip.
Kanab Ambersnail photo, U.S. Geological Survey, taken at Vasey's Paradise, date unknown.*

THE
GRAND
CANON



GEOLOGY AND PALEONTOLOGY OF THE
GRAND CANYON REGION



The first geological explorations of the lower Colorado River region, including the Grand Canyon, took place during the Ives expedition in 1858 and the Powell expedition in 1869. Geologist John Strong Newberry, who accompanied the Ives party as naturalist and physician, gathered the first fossils from the region (*left*), which were described in his report of 1861. During the expansionist years of the federal geological surveys a decade after the Powell expedition, Clarence E. Dutton mapped out the first reasonably comprehensive geological charts for the Grand Canyon (*top*).

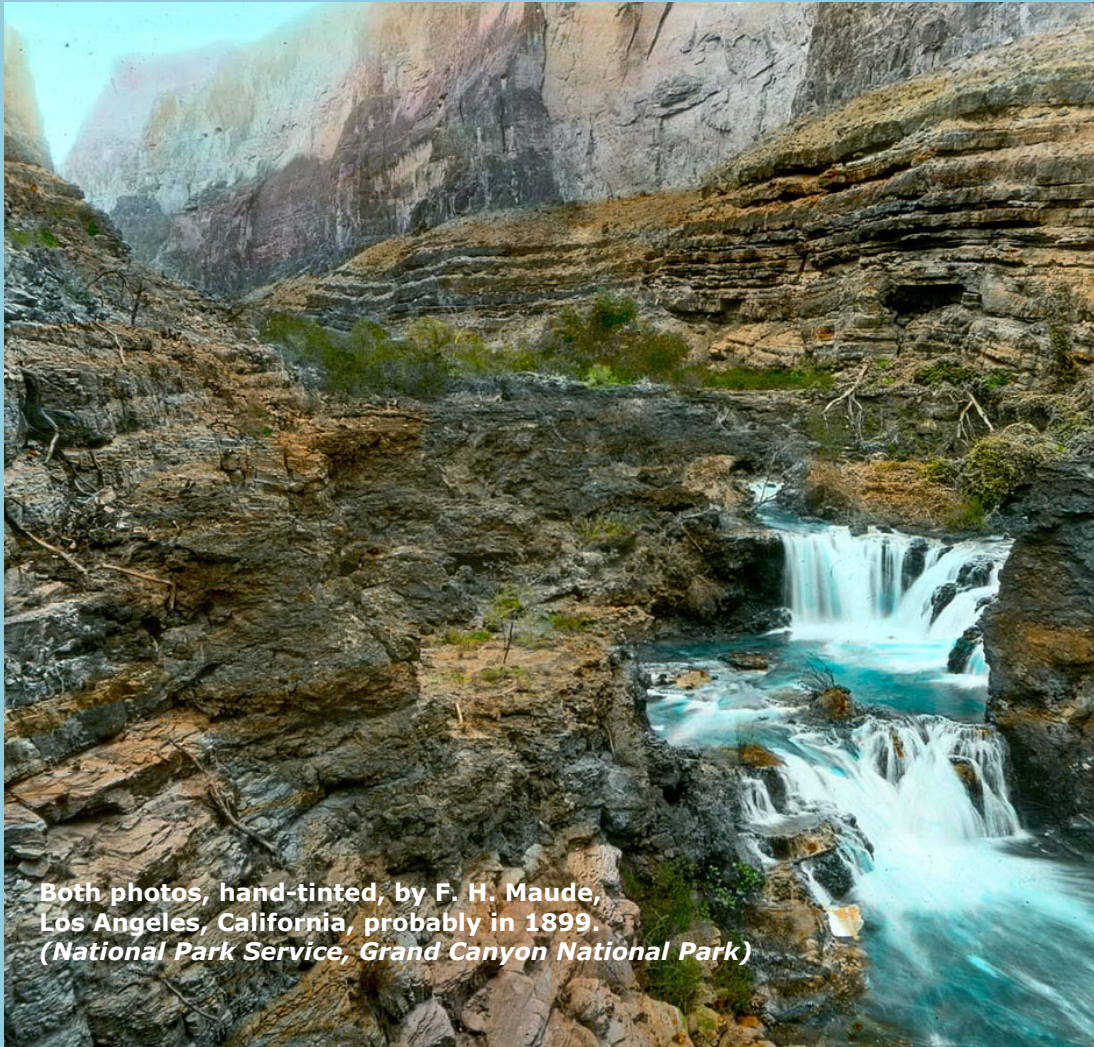
(*top*) Grand Canyon area detail and key from "Geological Map of the Western Part of the Plateau Province", in Clarence E. Dutton, *Atlas to Accompany the Monograph on the Tertiary History of the Grand Cañon District* (U.S. Geological Survey, Monograph 2, 1882), Sheet II. (Julius Bien and Co., Lithographers, New York.)

(*left*) Paleontology Plate I. John Strong Newberry, "Geological Report", in Joseph C. Ives, Report Upon the Colorado River of the West (Government Printing Office, Washington, D.C.), Part III.

In the 20th century rich Pleistocene Period deposits were discovered in caves and sheltered areas of the Grand Canyon, providing perspectives life and of climatic conditions during and before the latest Ice Age in this part of North America. At *right* is a skull of the extinct Harrington's mountain goat, *Oreamnos harringtoni*.

National Park Service, Grand Canyon National Park



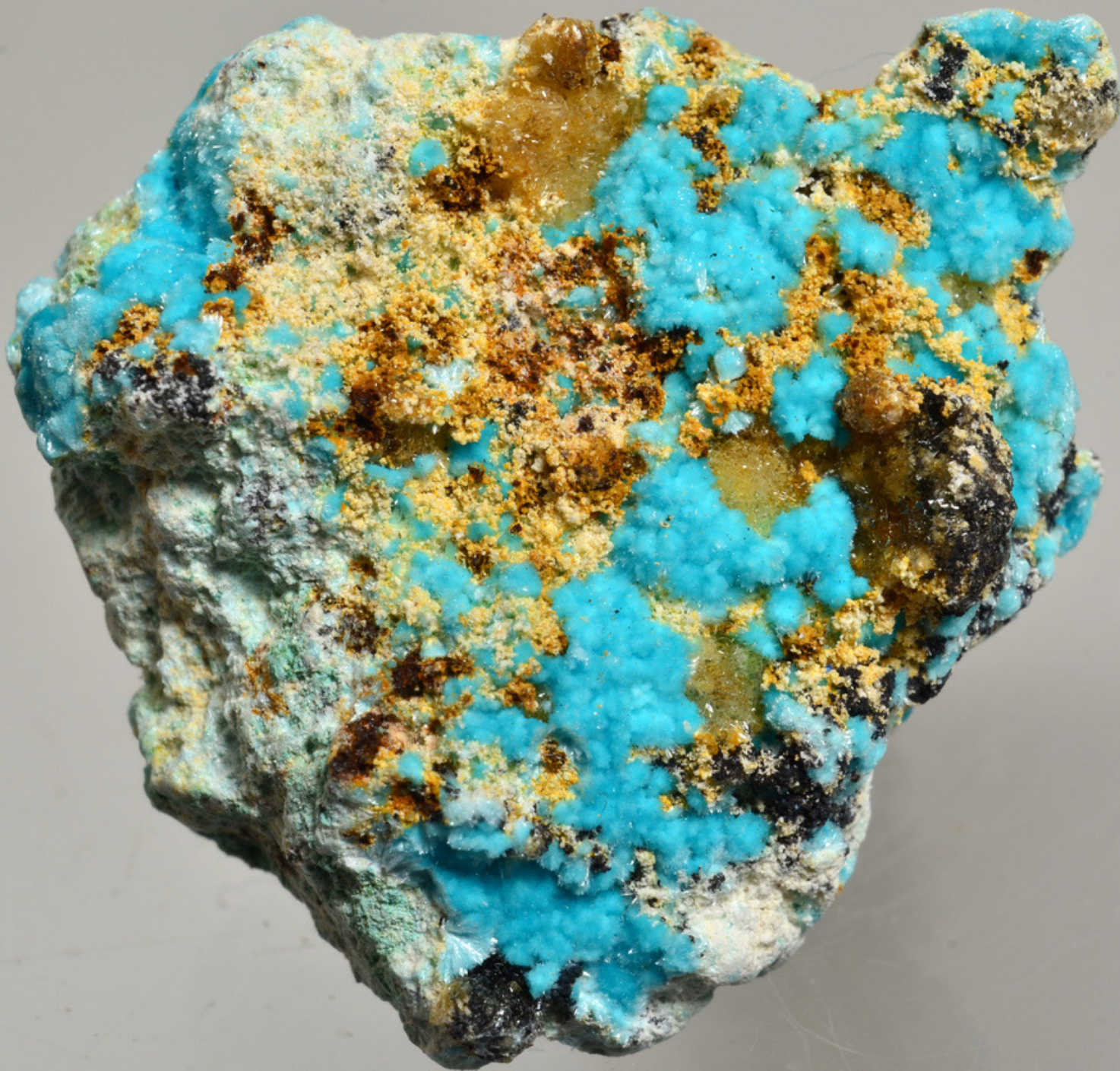


Both photos, hand-tinted, by F. H. Maude, Los Angeles, California, probably in 1899. (National Park Service, Grand Canyon National Park)

Ground water is one of the precious resources of the Grand Canyon. There are relatively few perennial streams here (other than the Colorado River); all have sources in groundwater recharge areas that release into the canyon through springs. Havasu Creek (*top left*) is the principal perennial stream on the South Rim, the lifesource of the Havasupai Tribe who live now on the Havasupai Indian Reservation; the village of Supai lies deep in Havasu Canyon. While geologically and environmentally important to the Havasupai people, Havasu Creek also holds deep cultural roots in Havasupai life. Today there are considerable concerns relating to Grand Canyon springs, which may suffer as-yet unknown adverse effects as the result of uranium mining activities on the rims of Grand Canyon, and new sources of groundwater withdrawal for planned residential and tourism growth such as at the South Rim's nearby tourism-based community of Tusayan.



Havasupai Creek is heavily charged with minerals, lending to it a well-known beauty that gives the Havasupai people their name, the People of the Blue-Green Water. *At bottom left* is a historic view of a now-unknown young Anglo girl perched atop a travertine stalagmite along Havasu Creek. Tendrils of travertine stalactites, some of which enrobe once-living plants, offer a peculiar stone beauty to the scene.



GRANDVIEWITE

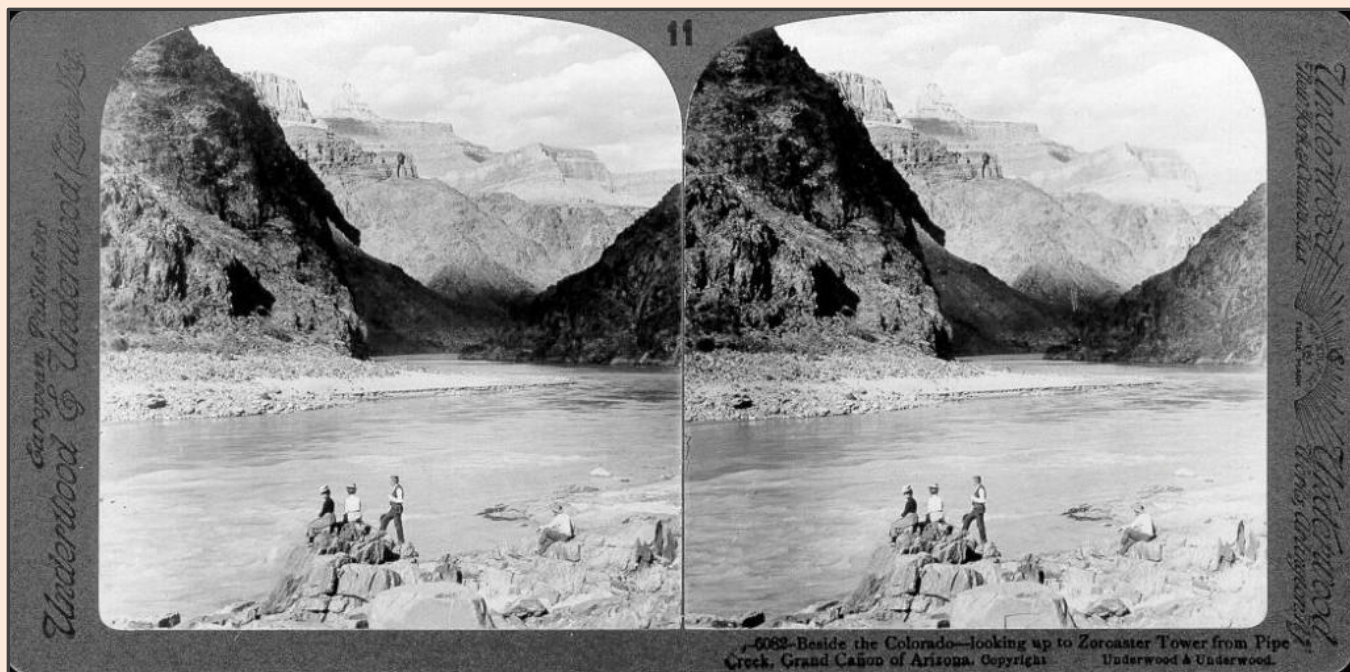
This mineral was first described from a specimen from the Last Chance Mine on the Grandview Trail, Grand Canyon (see Item no. 21.4820). It occurs as a secondary mineral to copper, which was the principal ore mined from the Last Chance prospect. Oddly enough, grandviewite was not recognized until 2008 and was first published in the *Australian Journal of Mineralogy*. It has very delicate radial crystals (seen more massively in this specimen), and the mineral is very soft, with a hardness of 2 on the one-to-ten Moh's Scale. This specimen is in the Grand Canyon National Park Museum collections.

(National Park Service, Grand Canyon National Park)

THE
GRAND
CANON



HYDROGEOLOGY OF THE COLORADO RIVER
IN THE GRAND CANYON



(ABOVE) Stereoview of the Colorado River at the bottom of Bright Angel Trail at the mouth of Pipe Creek. View upstream toward pyramidal Zoroaster Temple on the skyline. Boulders of the toe of Bright Angel Creek delta are seen on the opposite shore, covered partly by river sands.

The Grand Cañon of Arizona Through the Stereoscope (Underwood and Underwood, New York and London, 1904).

(RIGHT) "Rock Carved by the Colorado." (Heliotype.) Water-sculpted fluting in metamorphic rock from the Lower Granite Gorge of Grand Canyon, an erosional effect of the river's abrasive load of suspended sediment.

U.S. Army, Engineer Department, *Report upon Geographical and Geological Explorations and Surveys West of the One Hundredth Meridian, in charge of First Lieut. Geo. M. Wheeler. Vol. III.—Geology* (Government Printing Office, Washington, D.C.), Plate 10.



The Colorado River Region and John Wesley Powell

A. John Wesley Powell: Pioneer Statesman of Federal Science

By MARY C. RABBITT

B. Stratified Rocks of the Grand Canyon

By EDWIN D. MCKEE

C. Geologic History of the Colorado River

By CHARLES B. HUNT

D. The Rapids and the Pools—Grand Canyon

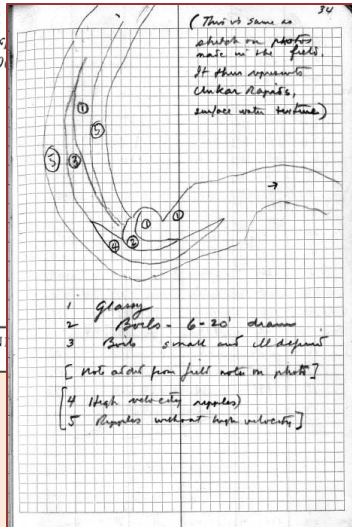
[Item no. 22.266]

By LUNA B. LEOPOLD

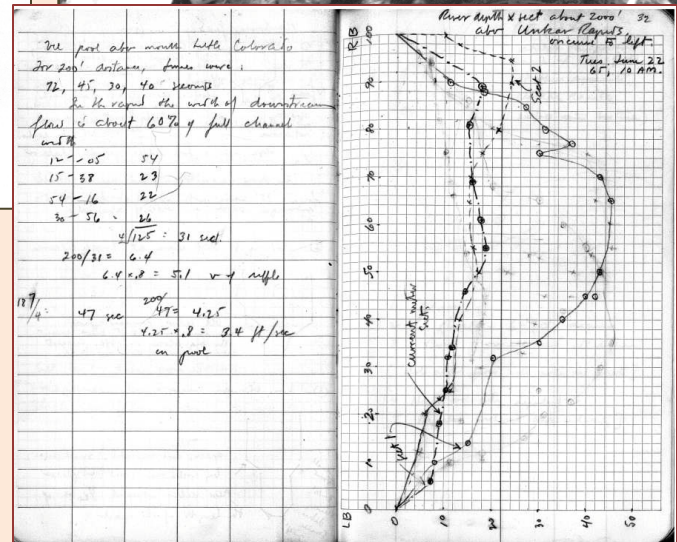
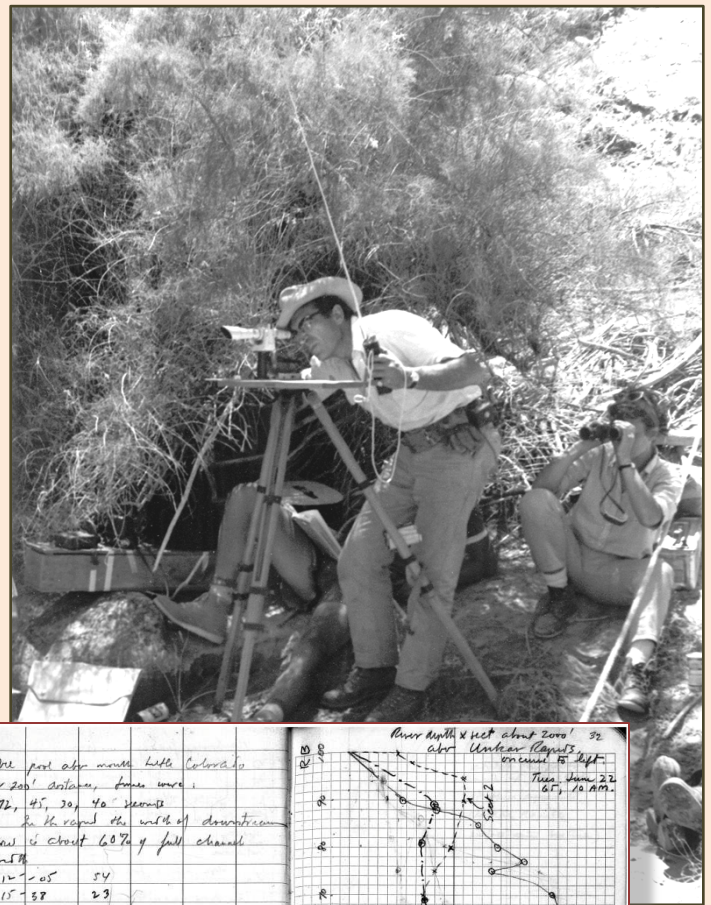
GEOLOGICAL SURVEY PROFESSIONAL PAPER 669

A collection of papers honoring
the 100th anniversary of his ex-
ploration of the Colorado River, 1869–1969

UNITED STATES GOVERNMENT



1969



The Rapids and the Pools

"It was just above Unkar Rapids that I decided to make a cross profile and velocity measurements. To record boat position one man on board held a stadia rod and I set up plane table and alidade on the right bank. Thus I could short distance by stadia. We had trouble getting the electrical system through the current meter cable—again a problem of being furnished old and decrepit gear from a local [U.S. Geological] Survey office. I vowed we would get a new reel and cable dropped to us by parachute.

"Smuss [Sylvester Allen] ran the boat—it was all he could do to keep the boat holding its own against the current even with the motor roaring at wide open throttle. Depth readings were obtained by cable and weight and a bed velocity recorded as well as surface velocity. Interestingly both at the bed and at the surface the readings were the same! 11.5 feet per second. This tells me something about what must happen in a big rapid. The main current must keep plunging downward as it comes off the lip of the shallow rapid, and creates strong bed current."

* * * * *

[Farther downstream] "The De Haviland came over early, and above camp we climbed out on a set of minor hills where the parachute drops were to be made. There were 4 drops—the one with a case of beer the parachute failed to open. Half the cans were wrecked on the rocks. So also the lettuce arrived self shredded from the free fall. A new reel and cable for the current meter landed safely." (Leopold, *Journal*, Vol. 7.)

Luna Bergere Leopold (1915-2006), a son of prominent conservationist Aldo Leopold (1887-1948), worked during seven decades to bring the field of hydrology and fluvial geomorphology into the conscience of urban planners and those who would restructure the flow of rivers and streams. He surveyed the Colorado River after the closing of Glen Canyon Dam, traversing Grand Canyon in 1965. From this work he was the first to scientifically analyze the hydrology of Grand Canyon's rapids [see title-page at top left]. Shown above are a photo of Leopold surveying above Unkar Rapid, which serves as a frontispiece to Vol. 7 of his manuscript *Journal*; pages depicting the Unkar survey data from Vol. 37 of his field notes; and a corresponding passage quoted from his *Journal*; all from his papers in the American Philosophical Society, Philadelphia.

(American Philosophical Society, Luna Bergere Leopold Papers)

THE
GRAND
CANON



GEOLOGICAL FIELD GUIDES FOR THE
GRAND CANYON REGION

FLAGSTAFF TO THE GRAND CANYON.

Starting northward from Flagstaff the route bends to the left, so as to pass around the western base of the San Francisco Mountain, and then threads its way among buttes and tables of lava to Hull Spring. Kendrick Peak, a weathered cone of basic lava, is seen at the west. Several of the cinder cones retain perfect craters, and in one of these is a lakelet. From Hull Spring to Canyon Spring the course lies chiefly on the Aubrey limestone, and it is from this rock that the Canyon is viewed. The depth of the gorge at this point is about 6,000 feet. The geologic section exhibited in its walls contains the following elements:

(1) Aubrey limestone, 750 feet (225 m.).

(2) Aubrey sandstone, 250 feet (75 m.).

These together constitute the first cliff.

(3) Aubrey shale (arenaceous), 1,000 feet (300 m.).

(4) Red Wall series, chiefly massive limestones, 2,000 feet (600 m.).

The summit of this constitutes the principal terrace in the canyon, and its edge the principal cliff. It belongs chiefly to the Carboniferous system, but its basal portion represents also Devonian and Silurian time.

(5) Mottled shales and limestones (Upper Cambrian), 1,000 feet (300 m.).

(6) Tonto sandstone (Upper Cambrian), 300 feet (90 m.).

The summit of this constitutes the third terrace, usually narrow. Its base rests unconformably on all lower rocks, and is here nearly 1,000 feet (300 m.) above the water of the river. The interval is occupied in part by the Grand Canyon and Chuar systems, which are highly inclined, and by crystalline schists appearing unconformably beneath them.

To the ethnologist this region is of especial interest by reason of the opportunities afforded to study the institutions, arts, architecture, and ruins of Pueblo Indians. The train passes within sight of three of their villages, Santo Domingo, Isleta, and Laguna, and the whole region abounds with the ruins of towns and cliff-dwellings. Isleta is the largest of the Pueblo villages, and despite some centuries of contact with Spanish settlers, preserves the aboriginal institutions, arts, and architecture. Near Flagstaff is an interesting group of cliff-dwellings—rooms constructed under an overhanging ledge of Aubrey limestone, and a unique locality where cave-like rooms are excavated in volcanic tuff.

The details of the excursion have not been completely arranged as this text goes to press, but it is hoped to make visits to Isleta, and to the ruins of cliff-dwellings and cave dwellings.

Above is the single page from the field trip guidebook that describes the portion of the trip from Flagstaff to the canyon; hardly detailed. But the trip, on the other hand, was arranged and conducted by eminent geologists including two of the greatest geologists of the West, John Wesley Powell and Grove Karl Gilbert.

The documentary volume for the 5th IGC, published in 1893, included a slightly more informative description of the features of the side trip; with the reminiscence on the first page (right) about the absence of tents as expected, and exposures to “storms of rain, snow, and wind”.

(above) S. F. Emmons (ed.), *Geological Guide Book of the Western Excursion* ([Fifth International Congress of Geologists], Washington, D.C., 1891), p. 156.

(right) *Congrès Géologique International, Compte Rendu de la 5^{me} Session, Washington, 1891* (Imprimerie du Gouvernement, [Washington], 1893), p. 472.

5th International Geological Congress 1891

The field trip is the one most important instructional element to all students of geology, whether new to the study or long established in academia or profession. And the geological field guide is a staple of conducted trips to field areas of special interest.

In 1891, the 5th International Geological Congress convened in Washington, D.C., and afterward sponsored an ambitious rail trip to the Rocky Mountains, with a branch excursion of more than 800 miles from Denver to the Grand Canyon of Arizona. This was the first internationally attended geological field trip to the Grand Canyon.

The railroad had not yet been built from the main line to the canyon, so the field trip participants debarked in Flagstaff and rode stages to the South Rim, where they were guests at the rudimentary tent hotel of John Hance at the head of Red Canyon, which they enthusiastically, if temporarily, renamed Congress Canyon.

FLAGSTAFF TO THE GRAND CANYON.⁹⁹

By G. K. GILBERT.

Flagstaff stands at the southern base of San Francisco Mountain. The road to the brink of the Grand canyon curves eastward about the mountain and then takes a northerly course. In the vicinity of the mountain are a great number of basaltic cinder cones from 500 to 1,500 feet (150 to 450 m.) in height, and most of these are so newly formed that their craters are well preserved. A few are not yet clothed with vegetation, and one, Sunset peak, is associated with a black lava field equally barren. The sides of this cone are of black lapilli, but its crest is tipped with red in a way to suggest that it catches the last rays of the setting sun. In the crest of another cone are artificial caves dug by Indians to serve as dwellings, but long abandoned.

The general altitude of the plateau is 7,000 feet (2,100 m.), and it is beautified by forests of pine, which give peculiar delight to eyes wearied with treeless plains and mesas, but water is nevertheless scanty. There are no streams, and springs are rare. Hull spring, the first one seen by the party, is a day's journey from Flagstaff and determines a point of encampment. The degradation of the country has here progressed several hundred feet since the spreading of a great field of basaltic lava, and the beds of resistant basalt cap a mesa facing toward the north. Beneath are soft shales of Permian age, and the water stored in the crevices of the basalt escapes slowly at the plane of contact.

The sloping Permian outcrop is sheathed by fragments of the basalt, which breaks away in huge blocks as it is sapped. One of these blocks, separated from the main cliff by a chasm a hundred yards across, was chosen as the site of an Indian village and covered with stone houses. The ruined walls remain, with fragments of pottery, and chips of flint and obsidian.

From Hull spring northward the road descends below the zone of trees and for 20 miles (30 km.) traverses a prairie floored by Aubrey limestone. Continuing on the same terrane, it then rises again into the zone of pine forest, and there remains till the brink of the canyon is reached. This timbered upland is the Cosnino plateau, the companion and counterpart of the Kaibab plateau north of the river. Indeed the two are parts of one uplift divided by the corradine river.

⁹⁹The prophecy of “tents” was not verified; the party bivouacked, and was so unfortunate as to encounter storms of rain, snow, and wind.

THE COCONINO SUN.

VOL. IX. FLAGSTAFF, ARIZONA TERRITORY, SATURDAY, SEPTEMBER 26, 1891. NO. 2

GEOLOGISTS VISIT FLAGSTAFF

The Members of the International Congress of Geologists View the Wonders of the Grand Canyon and the Cliff and Cave Dwellers

On Wednesday evening a party of thirty-six members of the International Congress of Geologists arrived in Flagstaff for the purpose of visiting the Grand Canon of the Colorado and cave and cliff dwellers.

The party traveled in the Pullman Palace cars Greylock and Corinthia and were in charge of Mr. Luther L. Holden of Boston, representing Messrs. Raymond & Whitcomb, who had charge of the excursion. The party left Washington, D. C., on Wednesday September 2, and have visited Chicago, St. Paul, Yellowstone National Park, Butte, Montana, Salt Lake City, Utah, Denver, Leadville and other mining points of interest in Colorado.

The excursion numbered on leaving Washington ninety-one members, and as the trip to the Grand Canyon was not originally intended thirty-six members of the Congress only could make the trip.

The following members of the Congress made the trip to the Grand Canyon, leaving here Thursday morning, and they will be absent five days: Dr. Alfred Bergeat, Munich, Germany; Mr. Henry M. Cadell, Bo'ness, Scotland; Mr. James C. Christie, Old Catheart, Scotland; Prof. Dr. Herman Credner, Leipzig, Germany; Prof. Dr. Rudolf Credner, Greifswald, Germany; Dr. Carl Diener, Vienna, Austria; Dr. F. Frech, Halle, Germany; Mr. G. K. Gilbert, Washington, D. C.; Prof. H. Golliez, Lausanne, Switzerland; Mr. Alfred Harker, Cambridge, England; Mr. Hobson Bernard, Manchester, England; Prof. T. McKenny Hughes, Cambridge, England; Mrs. Mary Caroline Hughes, Cambridge, England; Warren Johnson, U. S. G. S.; Prof. Dr. Emanuel Kayser, Marburg, Germany; Prof. Max Lohest, Liege, Belgium; Mr. Emm. de Margerie, Paris, France; Fred. K. Mixer, Denver, Col; Herr Felix Plieninger, Munich, Germany; Major Powell, U. S. G. S.; Herr Julius Romberg, Berlin, Germany; Dr. August Rothpletz, Munich, Germany; Dr. Xavier Stainier, Brussels, Belgium; Prof. August Streng, Strassburg, Germany; Dr. Emil Tietze,

Vienna, Austria; Dr. Arnold Ulrich, Strassburg, Germany; Dr. G. Von den Borne, Halle, Germany; M. E. Van den Broeck, Brussels, Belgium; Prof. Dr. Johannes Walther, Jena, Germany; Dr. Bruno Weigand, Strassburg, Germany; Prof. George H. Williams, Baltimore, Maryland; Dr. Baron Sidney von Wohrmann, Livonia, Russia; Dr. E. A. Wulfing, Tübingen, Germany; Prof. Dr. von F. Zittel, Munich, Germany.

Major Powell, of the U. S. Geological Survey, and Major D. M. Riordan, of the Arizona Lumber and Timber Co., of this place, took charge of the party here and conducted them to the Grand Canyon. On their return they will visit the cave and cliff dwellers.

The party embraces many scientists of world wide reputation and is the most notable body of scientific men who have ever visited the United States. Among the men who stand highest in their profession are Prof. Dr. Herman Credner, of the University of Leipzig, Germany; Prof. Dr. Rudolf Credner, of the University of Greifswald, Germany; Prof. H. Golliz, Lausanne, Switzerland; Prof. T. McKenny Hughes, of Cambridge University, England; Prof. Hughes is accompanied by his wife. Prof. Emanuel Kayser, of Marburg, Germany; Prof. Max Lohest, of Liege, Belgium; Prof. August Streng, Strassburg, Germany; Dr. Emil Tietz [sic], Vienna, Austria; Prof. Dr. Johannes Walther, Jena, Germany; Prof. George H. Williams, of John[s] Hopkins University, Baltimore; Major Powell, Warren Johnson and G. K. Gilbert, of the United States Geological Survey.

The fifth meeting of the International Congress was held in Washington, D. C., on August last. The meetings are held every three years and the next meeting will be held in Zurich, Switzerland, in August, 1894, and, by special invitation of the Czar of Russia the seventh session of the congress will be held in St. Petersburg [sic].

Seven of the party will go to California from this point, among them Dr. Walther, who has written several valuable works on deserts, will study the Colorado desert, and extend his trip through Southern Arizona to El Paso, Texas. He will be accompanied by Dr. Von den Borne.

The visit of this body of eminent men to this section is an interesting event in its history, and one from which it can and will profit in the near future.

Geologists Back from the Canyon.

The thirty-six members of the Fifth International Congress of Geologists, who went to the Grand Canyon on Thursday morning, returned last night, being just seven days in making the trip. Notwithstanding the unfavorable weather in that region at this time of the year, the party were highly pleased with the result of their labor. They left this morning for a trip to the Cliff Dwellers, accompanied by a number of Flagstaff citizens. Among those from Flagstaff who went with the geologists to the Canyon were: Dr. Brannen, Niles Cameron, Ed. Gale, R. A. Ferguson, Wm. Moats, A. C. Morse, D. M. Riordan, and Dr. and Mrs. Powers, of Los Angeles, Cal.

The party will leave this afternoon for Washington, on their private cars, in charge of Luther L. Holden, of Boston, representing Raymond & Whitcomb.

Page 3

[References to the "Cliff Dwellers" in these articles pertain to the archaeological ruins in Walnut Canyon, near Flagstaff; today's Walnut Canyon National Monument.]

"A remarkable peculiarity of [the Rocky Mountain] excursion was the fact that it was made at the expense of the visitors, the hosts charging each of them \$265."

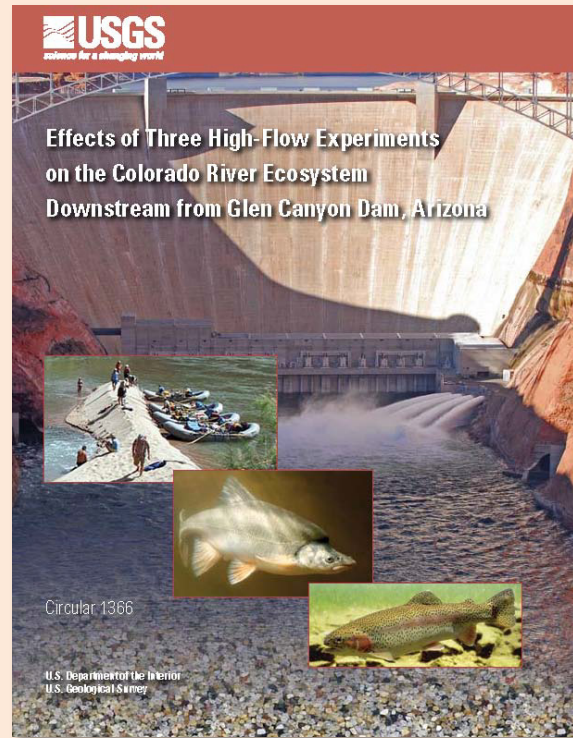
Anonymous, "The International Geological Congress", *American Naturalist*, Vol. 25 (October, 1891), p. 950.

[The Colorado River trips through Grand Canyon associated with the 28th International Geological Congress (Washington, 1989) cost its participants over \$1,000 each, excluding travel costs to their meeting point in Las Vegas, Nevada.]

THE
GRAND
CANON

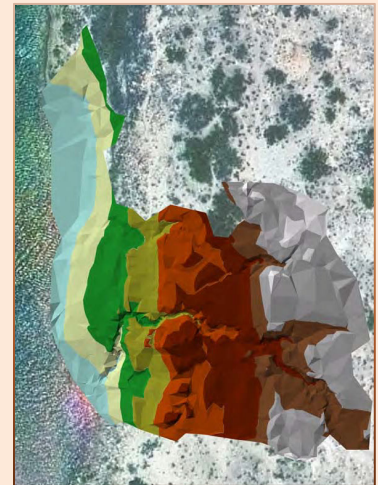


GEOLOGIC AND SPECIAL TOPOGRAPHIC MAPS
INCLUDING THE
GRAND CANYON REGION



Geologic mapping in the Grand Canyon transformed itself during the latter part of the 20th century, not only in style but in purpose. No longer just the precise plotting of the kinds of rock outcrops and geologic structures, multidisciplinary techniques and objectives engage to describe, for example, the placement of sedimentary features and the effects of hydrologic regimes on those features and human occupational sites there. At *upper left* is a geologic map near the Palisades Creek area on the Colorado River in Grand Canyon; and at *center right* is a digital elevation model of part of this area. The area holds significant interest for studies of natural gullying and associated impacts on archaeological sites.

Effects of the flows of the river from Glen Canyon Dam have impacted the geological and biological character of the river corridor; studies of man-made flooding have been implemented to establish the means by which to restore some of the natural pre-dam conditions of the riverine environment



(*upper right*). This reflects the changed mission of the U.S. Geological Survey, too, which now also studies the biological characters of the geological landscapes. For example, numerous Survey studies focus on the critical habitat of the endangered humpback chub (*left*, sources on which will be found, topically, in Part 19 of this bibliography). Throughout, geological maps convey details of observations and effects.

(upper left) Richard Hereford, Map Showing Surficial Geology and Geomorphology of the Palisades Creek Area, Grand Canyon National Park, Arizona. U.S. Geological Survey, *Miscellaneous Investigations Map I-2449*, 1996.

(upper right) Cover. Theodore S. Melis (ed.), *Effects of Three High-Flow Experiments on the Colorado River Ecosystem Downstream from Glen Canyon Dam, Arizona*. U.S. Geological Survey, *Circular 1366*, 2011.

(center right) Joseph E. Hazel, Jr., Matt A. Kaplinski, Roderic Parnell, and Helen C. Fairley, *Aggradation and Degradation of the Palisades Gully Network, 1996 to 2005, with Emphasis on the November 2004 High-Flow Experiment*, Grand Canyon National Park, Arizona. U.S. Geological Survey *Open-File Report 2008-1264*, 2008.

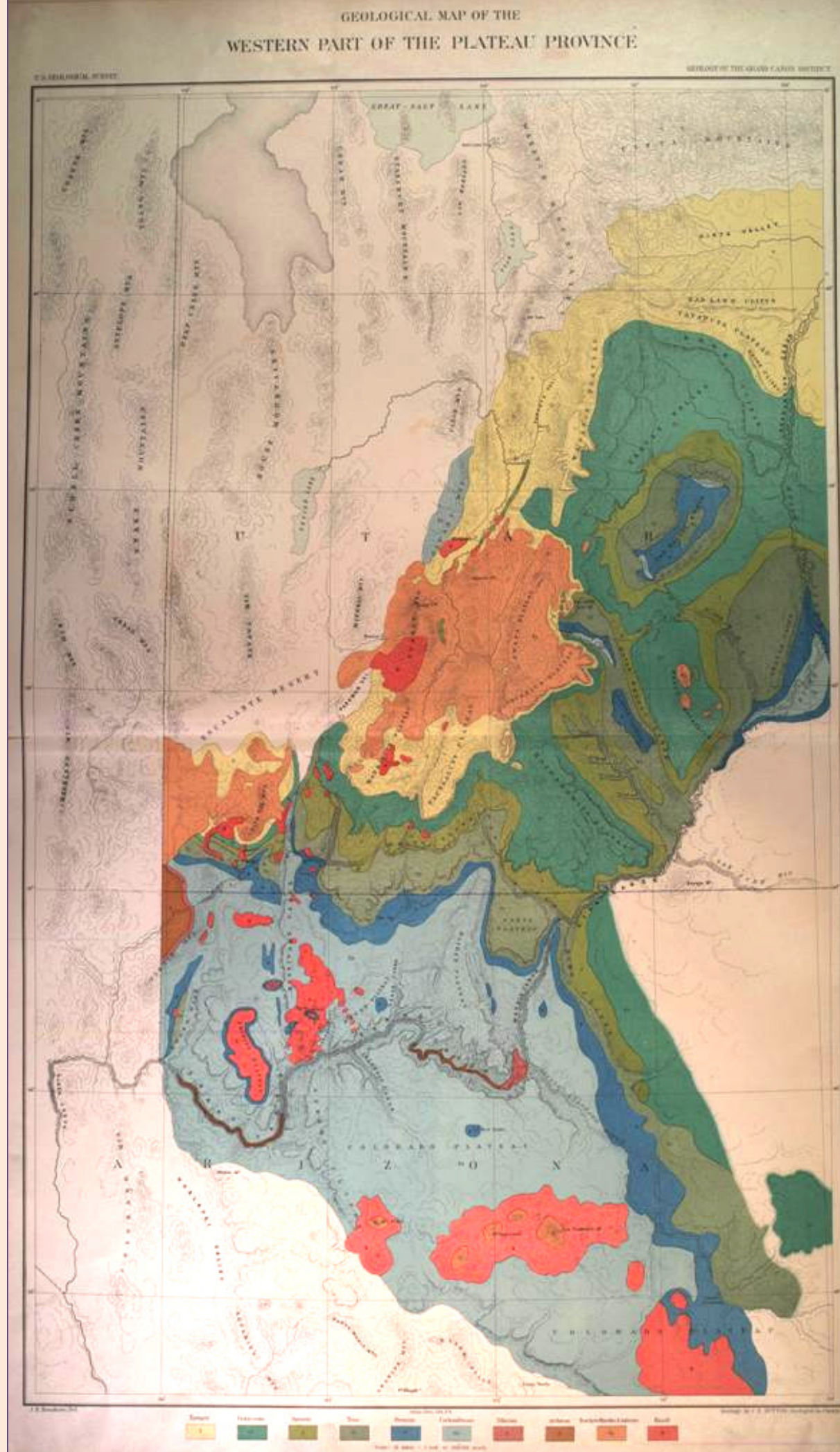
(lower left) Humpback chub, photo by George Andrejko, U.S. Geological Survey, in U.S. Geological Survey Circular 1366, p. 7 [see above for full citation].

“Geological Map of the Western Part of the Plateau Province”

The first comprehensive geologic map of the “Great Stairway” region of Utah and Arizona, embracing the Grand Canyon and the San Francisco Peaks.

Clarence E. Dutton, *Atlas to Accompany the Tertiary History of the Grand Cañon District* (U.S. Geological Survey Monograph 2, 1882), Atlas, Sheet 2. Double-folio.

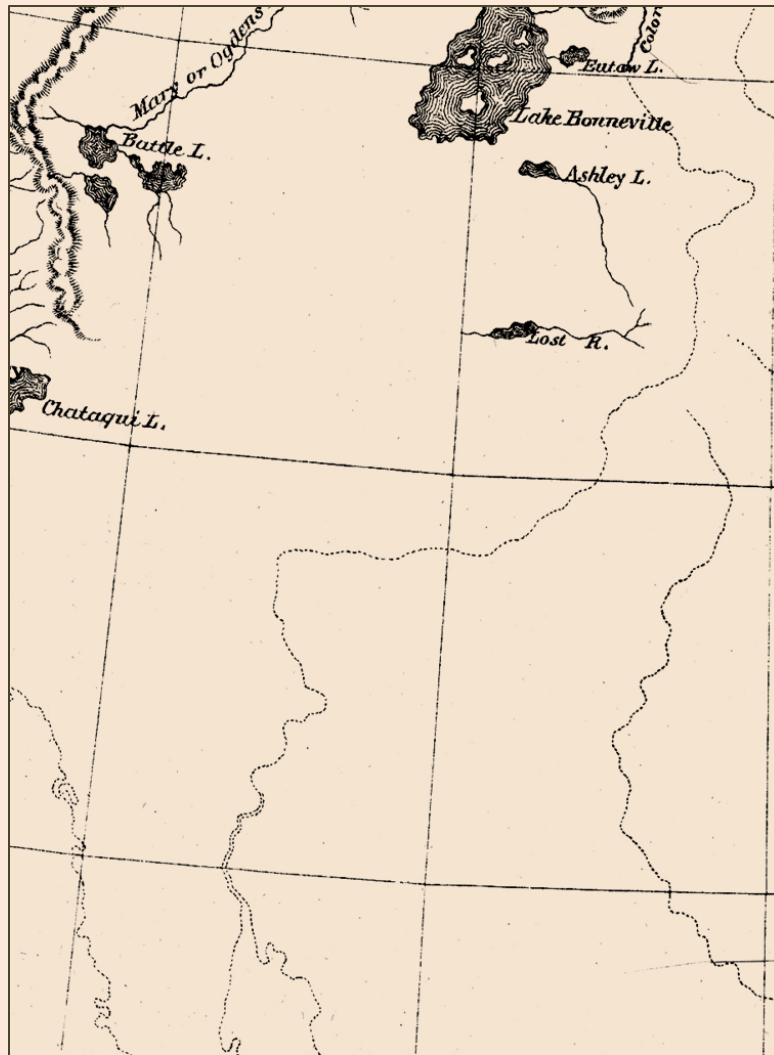
Geology by C. E. Dutton; J. H. Renshaw, del.; lithographed by Julius Bien and Co., New York.



THE
GRAND
CANON



GENERAL MAPS



About as Unknown As It Gets (Short of Blank)

“Reduced Map of the Territory West of the Rocky Mountains By Capt. B. L. E. Bonneville U.S.A. 1837” (*detail*). Lithographed by J. Bien, New York.

This portion of an 1837 map by Capt. Benjamin Louis Eulalie de Bonneville, U.S. Army, one-time fur-trapper, embraces the region between the upper Gulf of California on the south and the present state of Utah on the north. While the lower Colorado River is fairly sketched, it becomes very generalized—guessed—in the reach through the canyonlands that lie in between. Perceptions such as this reflected not only the imprecise geographical understanding of the region but contributed to hearsay and legend. Note, too, the traditional, assumed proximity of the Colorado River’s course to that of the Rio Grande (flowing toward the southeast). Not until the expeditions of Sitgreaves (1851), Ives (1858), and Powell (1869) would the area start to be mapped with any kind of accuracy and precision.

Reproduced in: U.S. War Department, “Topographical Maps, Profiles, and Sketches, To Illustrate the Various Reports of Surveys for Railroad Routes from the Mississippi River to the Pacific Ocean.” Volume XI in *Reports of Explorations and Surveys, To Ascertain the Most Practicable and Economical Route For a Railroad From the Mississippi River to the Pacific Ocean. Made Under the Direction of the Secretary of War, in 1853-6. According to Acts of Congress of March 3, 1853, May 31, 1854 and August 5, 1854* (Beverly Tucker, Printer, Washington, 1859), U.S. 33rd Congress, 2nd Session, Senate Executive Document 78 [1855]. Plate 4 (*detail*).



Detail from "Map Drawn to illustrate the travels & from the Documents of the Abbe Domenech showing the actual situation of the Indian Tribes of North America [sic] and the road described by the author[.] P. Bineteau geographer del. 1860". "Gravé chez Erhard/42 R. Bonaparte". "Imp Bineteau R. Antoine Dubois 6". Original is hand-tinted. Original map scale 25 French Leagues/cm, or ca. 170 miles/inch.

Abbé Em. Domenech, *Seven Years' Residence in the Great Deserts of North America*. Vol. I (Longman, Green, Longman, and Roberts, London, 1860).

THE
GRAND
CANON



AUDIO-VISUAL WORKS

GRAND CANYON



COLORADO RIVER

(top left) *The Grand Cañon of Arizona; Through the Stereoscope; The Underwood Patent Map System Combined with Eighteen Original Stereoscopic Photographs* (Underwood and Underwood, New York, London, Ottawa (Kansas), San Francisco, Toronto, and Bombay, 1904), 18 stereoviews in slipcase, text 64 pp. [by Frederick S. Dellenbaugh], 2 maps (map 2 is fold-out).

(top right) *Fifty-six Scenes of the Grand Canyon of Arizona in Three Dimension Photography*. Fred Harvey (Tru-Vue, Inc., Rock Island, Illinois, no date), four reels of filmstrips and Tru-Vue viewer, boxed.

(bottom right) *The World Parade; Grand Canyon* (Castle Films, Inc., no date), 16-mm Headline Edition film, black-and-white, no sound, no. 238.

(bottom left) *Grand Canyon Nat'l Park; East Rim Drive; Arizona* (Sawyer's, Portland, Oregon, no date), View-Master, 7 More Wonders of the World series, no. 29. [Rotary color stereoscopic view reel and sleeve, and View-Master viewer shown.]

THE
GRAND
CANON



AUDIO WORKS AND MUSICAL SCORES

Ferde Grofé



(Library of Congress)

Although the musical record for the Grand Canyon and the Colorado River has seen more contributions in the later part of the 20th century, without a doubt the greatest of Grand Canyon composers was Ferde Grofé (1892–1972). Born Ferdinand Rudolph von Grofé in New York, he was brought up in a musical family but left home at age 14. In 1916 he visited the Grand Canyon and was inspired to put his experiences to music, though he did not get to this for more than a decade. His efforts, though, became his best-known piece, the *Grand Canyon Suite* (1929–1931). Composed of five captivating movements, it was first performed under Paul Whiteman at the Studebaker Theater in Chicago on 22 November 1931. Grofé later rescored it for full orchestra, which was performed in 1934. The movements are “Sunrise”, “Painted Desert”, “On the Trail”, “Sunset” and “Cloudburst”. And it is “On the Trail”, begun with an imaginative musical bray, that is probably the most immediately recognized even today. Its melody and clippity-cloppy cadence of a mule on the trail has been borrowed for tone poems in film and television soundtracks, even for commercial venues. 🎵

THE
GRAND
CANON



MISCELLANEOUS IMAGERY IN THE
GRAND CANYON AND
LOWER COLORADO RIVER REGIONS



"Grand Canyon of the Colorado[,] Arizona."

The Grand Canyon has long been used as an advertising backdrop. This brochure is actually a promotion for Doan's Kidney Pills and related patent medicinal products, thinly disguised as a directory of U.S. cities. The fashionable young tourists are a vehicle by which readers are imaginatively drawn into the couple's places; otherwise, the canyon is not mentioned inside.

Doan's Directory of the U.S. with Latest Census of Large Cities 1913 [-] 1914. Foster-Milburn Co. (Buffalo, New York, 1913), cover.



HOLD IT!

At last we reach a huge pile of drift wood. Our rolls of blankets, two guns, and a barometer were in the open compartment of the boat, and, when it went over, these were thrown out. The guns and barometer are lost, but I succeeded in catching one of the rolls of blankets, as it drifted by, when we were swimming to shore; the other two are lost, and sometimes hereafter we may sleep cold.

A huge fire is built on the bank, our clothing is spread to dry, and then from the drift logs we select one from which we think oars can be made, and the remainder of the day is spent in sawing them out.

An illustration from the second Powell expedition down the Green and Colorado Rivers. (We know it portrays the second expedition because of the camera present [right].) Powell's memoir, however, was written as though it was from the first expedition, in 1869; and it has never been satisfactorily explained why he so ignored the travels, and members, of the second river trip of 1871 and 1872.)

What even greater views might we imagine today from the second expedition, had convenient photographic methods been available in 1872 rather than the cumbersome, balky, and technical methods of wet-plate photography. Although the legend for this illustration captures the scene of a major geographical feature along the Green River in Utah, the artist portrays in secondary detail the repairing of boats and camp activities.

John Wesley Powell, *Exploration of the Colorado River of the West and Its Tributaries* (Government Printing Office, Washington, 1875), p. 49.

"Gunnison's Butte at the foot of Gray Cañon." Engraving by F. S. King. John Wesley Powell, *Exploration of the Colorado River of the West and Its Tributaries* (Government Printing Office, Washington, 1875), Figure 18 (detail).

THE
GRAND
CANON



COMPUTER AND INTERACTIVE MEDIA

Adair, E. A.
 1892 A trip to the Grand Canyon. *Juvenile Instructor*, 27:582.

Adams, Ansel
 1974 Images 1923-1974. Boston: New York Graphic Society, 128 pp. (see "Grand Canyon of the Colorado River. c. 1942," p. 61).
 1976 Photographs of the Southwest; selected photographs made from 1928 to 1968 in Arizona, California, Colorado, New Mexico, Texas and Utah, with a statement by the photographer, and An essay on the land, by L. C. Powell. Boston: New York Graphic Society, 128 pp.

Adams, H. C.
 1921 Grand Canyon bridge. *Natl. Geographic Mag.*, 39:644-650.

Adams, Samuel
 1870 . . . Communication from Captain Samuel Adams relative to the exploration of the Colorado River and its tributaries. U.S. House of Representatives, 41st Congress, 3rd Session, Miscellaneous Document 12, 20 pp.; to accompany bill H. R. 2565.
 1888 Report of Captain Samuel Adams to the War Department. *Vedette*, 9:4-7.

Ahrendt, Bill
 1988 Steamboats on the Colorado. *Arizona Highways*, 64(7):17-19. (Eighth in historical paintings by Bill Ahrendt.)

Aitchison, Stewart, and Grubbs, Bruce
 See Special Section 1.

Alarcón, Hernando
 1556 Relatione della Navigazione & scoperta che si fece in ordine dello Illustrissimo Signor Don Antonio di Mendoza Vice Re della nuoua Spagna, data da Ramusio, Giovanni Batista, Terzo volume delle navigationi et viaggi. Venice: folios.
 1600 The relation of the nauigation and discovery in order of the right honourable Lord Don Antonio di Mendoza vizroy of New Spaine, dated in Hakluyt, Richard, The principle navigationis, voyages, traffiques and discoveries of the also reprinted in Hakluyt Society Publications, Glasgow, Extra Series, 9:279-318 [1904].

Albright, Horace M.
 See Special Section 1.

Albright, Horace M., and Taylor, F. J.
 1937 "Oh, Ranger!" New York: Dodd, Mead and Co., 272 pp.
 1972 "Oh, Ranger!" Riverside, Conn.: Chatham Press, 1972. National Park Service Centennial Edition, 239 pp.

Albright, Horace M.; Dickenson, Russell E.; and Mott, William Penn, Jr.
 1987 National Park Service; the story behind the scenery (Moore, Mary Lu, ed.). Las Vegas, Nev.: KC Publications, Inc., 96 pp.



An extract directly from the ASCII-format digital version of the 2nd edition of *Bibliography of the Grand Canyon and the Lower Colorado River* (Grand Canyon Natural History Association Monograph 8, 1990). The display here mimics that of an old monochrome, green-phosphor computer monitor. A number of diskettes were produced in addition to the loose-leaf inkprint and microfiche versions, specifically targeted to libraries that then were in the midst of the brief enthusiasm for space-saving, searchable digital files. The digital version was indeed searchable, but only one part of the bibliography at a time. While the format was inherently useful, an unaesthetic on-screen layout, the loss of italicization, and minor bumps such as rough breaks and characters with diacritical marks being substituted with odd symbols – and the fading enthusiasm for such products – all contributed to a meager distribution of the disk-based product. **Inset:** One of the set of five 5¼-inch diskettes, 1990 ed.

THE
GRAND
CANON



BOOK REVIEWS AND SIMILAR NOTICES FOR
PUBLICATIONS ABOUT THE
GRAND CANYON OR
LOWER COLORADO RIVER REGIONS

“Bad Commentators spoil the best of books”

— Benjamin Franklin

Poor Richard, 1735. An Almanack For the Year of Christ 1735 . . .

By Richard Saunders, Philom. [pseud.]

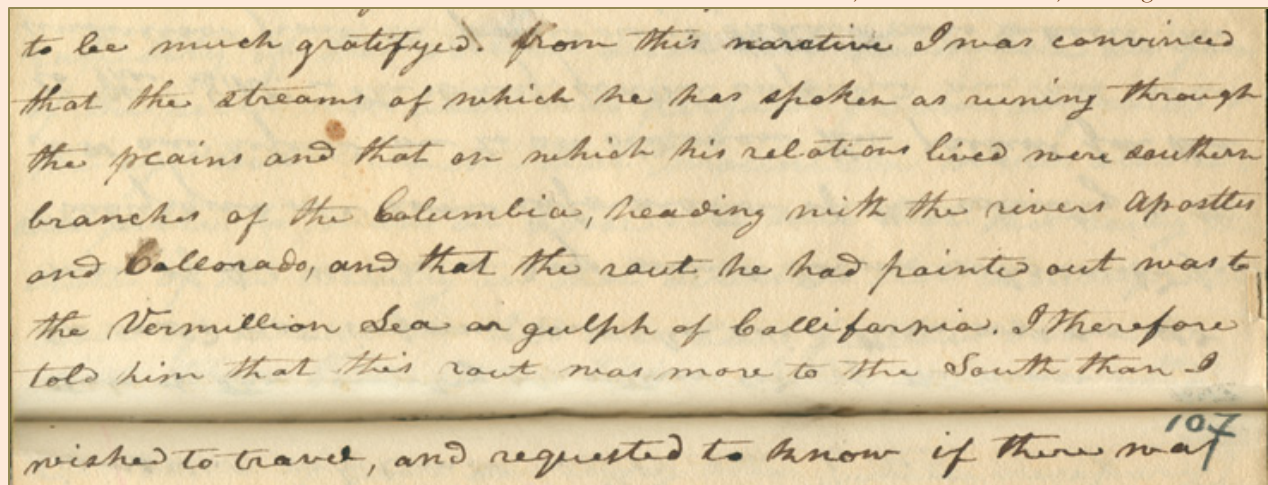
Philadelphia: Printed and sold by B. Franklin

Books are the foundation of learning and of knowledge of the world; poor as some may be, they still open minds and imaginations. We might have been enlightened in unexpected ways had Benjamin Franklin and his contemporaries known more than the barest geography of the land then known as New Spain, known to them in scattered books. Imagine what these men might have written about the scenes in this land, which were still unknown to most of the world. Franklin was, though, at least familiar with Miguel Venegas’s “Report on California”, probably from a recently published English translation, though he writes of the original published in Madrid* (see in the present bibliography under Venegas). There were hints of a quite different land than that frequented by those whose travels were limited to the lands just on either side of the Atlantic Ocean.

* B. Franklin to John Pringle (London, 27 May 1762); original in Princeton University

In 1803 Thomas Jefferson issued detailed instructions to Meriwether Lewis prior to the transcontinental expedition into Louisiana Territory in search of a river-dominant path to the Pacific Ocean, an exploration commanded by Lewis and by William Clark in 1803–1806. Jefferson’s orders (see herein under Jefferson and other notes under Lewis) offer up to us a tantalizing prospect of what discoveries or disasters might have been had Lewis and Clark turned southward. This bibliography has various comments or surprising connections to the history of the Lewis and Clark expedition as well. Search for “Lewis and Clark”.

And *here* is Meriwether Lewis’s eventual dismissal of the Colorado River, in his own hand, 14 August 1805:



Lewis and Clark Journals, Codex F. (American Philosophical Society)

from this narrative I was convinced that the streams of which he has spoken as running through the plains and that on which his relations lived were southern branches of the Columbia, heading with the rivers Apostles and Colorado, and that the rout he had painted out was to the Vermillion Sea or gulph of Callifornia. I therefore told him that this rout was more to the South than I wished to travel, . . .

Heading westward, Lewis and Clark’s party had just passed over the Continental Divide at Lemhi Pass in today’s Idaho, where Lewis’s informant was Cameahwait, a Shoshone chief. The river “Apostles” was the conjectural, nonexistent Rio de los Apostolos, which was believed to drain the western slope of the Rockies. Further conjecture of the time called for a single, contained mountainous source area for all of the major waterways of the West. Regardless, the Colorado does not head in this region as supposed by Lewis and by the geographical sources known to him and to Thomas Jefferson—books and maps held to be in some measure, uncritically, reliable.

THE
GRAND
CANON



NEWSPAPER GUIDE



The Guide is the informational newspaper distributed to all visitors to Grand Canyon National Park, published by the National Park Service with the cooperation of the Grand Canyon Association, the park's not-for-profit partner. The various editions serve a diverse profile of the visiting public; those shown here are (clockwise from upper left) in English, Spanish, Korean, Japanese, Italian, German, French, and Chinese. *The Guide* has been distributed under various names and mastheads and in various formats. These smaller-format, paper-saving versions are from 2009; today *The Guide* is also available as PDF downloads. The linguistic diversity is a reflection of the widespread, international recognition and popularity of the Grand Canyon.

Contenuto:
 Orario dell'alba e del tramonto . . . 2
Cartina 5, 6-7, 8, 11
 South Rim 3-7
 North Rim 8-9
 Escursioni/ Trekking 10-11
 Geologia 12

Che ore sono?

La maggior parte dell'Arizona, incluso il Parco Nazionale del Grand Canyon, mantiene l'ora standard sulle **Montagne Rocciose (MST)** tutto l'anno. Da marzo ad Ottobre, lo stato dell'Arizona è nello stesso fuso orario della California e del Nevada. Da novembre a febbraio, l'Arizona appartiene allo stesso fuso orario degli stati del Colorado, New Mexico e Utah.

Emergenza: 911

Disponibile 24 ore su 24
Comporre il 911 da qualsiasi
telefono
Dal telefono dell'albergo
comporre 9-911

 **State pensando di fare trekking?**

...ano gradire il nostro patrimonio.

THE
GRAND
CANON



MARGINALIA



Commemorative insignia manufactured
aboard the
U.S.S. *Grand Canyon*
(AD 28, AR 28)

brass, and brass on wood
diameter 6½ inches
weight approx. 4 pounds

U.S.S. *Grand Canyon* was the only naval
vessel named for the Grand Canyon.
She was built as a Shenandoah class
destroyer tender (designation AD 28)
and later was reclassified a repair vessel
(AR 28)

commissioned 5 April 1946
decommissioned 1 September 1978
sold for scrapping June 1980

Commemorative insignia
such as these were made
aboard many naval vessels,
given to crew members
and visiting dignitaries.
Most were fashioned of
plaster, but U.S.S. *Grand
Canyon*, a repair and
manufactory vessel, had its
own foundry, thus the
crew had the means to cast
brass insignia. As such,
brass medallions are met
much less frequently
among these kinds of naval
memorabilia. (It is not
known whether the wooden
plaque on which the AR 28
medallion is mounted,
right, was original or added
later.)

(Author's collection)



THE
GRAND
CANON



OTHER PICTORIAL PIECES FROM THE
1ST EDITION



(U.S. Department of the Interior, Washington, D.C.)

The Chasm of the Colorado

Thomas Moran, 1873-1874

"Leave it as it is."

Theodore Roosevelt

Grand Canyon, May 6, 1903

PRESIDENT PASSES THROUGH FLAGSTAFF

On His Way to the Grand Canyon Wednesday Morning—
Early Watchers Disappointed

FLAGSTAFF'S PATRIOTIC PEOPLE
FOLLOW HIM IN GOODLY NUMBER

To Do Honor to the Nation's Chief Executive—President Presents
Diplomas to Flagstaff High School Graduates—The
Citizens of Flagstaff Present Beautiful
and Costly Navajo Blanket.

"I shall not try to greet in particular the members of my regiment now. I shall see them at half past five in my car. I have come here to see the Grand Canyon of Arizona, because in that canyon Arizona has a natural wonder, which, so far as I know, is in kind absolutely unparalleled throughout the rest of the world. (Applause.) I shall not attempt to describe it, because I cannot. I could not choose words that would convey or that could convey to any outsider what that canyon is. I want to ask you to do one thing in connection with it in your

own interest and in the interest of the country—to keep this great wonder of nature as it now is. (Applause.) I was delighted to learn of the wisdom of the Santa Fe railroad people in deciding not to build their hotel on the brink of the canyon. I hope you will not have a building of any kind, not a summer cottage, a hotel or anything else to mar the wonderful grandeur, the sublimity, the loneliness and beauty of the canyon. Leave it as it is. Man cannot improve on it; not a bit. The ages have been at work on it and man can only mar it. What you can do is to keep it for your children and your children's children and for all who come after you, as one of the great sights which every American, if he can travel at all, should see.

Keep the Grand Canyon of Arizona as it is. We have gotten past the stage, my fellow citizens, when we are to be pardoned if we simply treat any part of our country as something to be skinned for two or three years for the use of the present generation. Whether it is the forest, the water, the scenery, whatever it is, handle it so that your children's children will get the benefit of it. Handle it that way. If irrigation, apply it under circumstances that will make it of benefit, not to the speculators to get profit out of it for two or three years, but handle it so that it will be of use to the homemaker; to the man who comes to live here and to have his children stay after him; handle it so as to be of use to him and those who come after him. Keep the forests in the same way. Preserve them for that use, but use them so that they will not be squandered; will not be wasted; so that they will be of benefit to the Arizona of 1932 as well as the Arizona of 1903.

Excerpt from Roosevelt's speech, in *The Coconino Sun* (Flagstaff), Vol. 20, no. 19 (May 9), pp. 1-2; transcribed by a reporter on the scene.

The complete text of the speech is on the following pages.

Mr. Governor, and you my Fellow Citizens, My Fellow Americans, Men and Women of Arizona:

I am glad to be in Arizona today. It was from Arizona that so many gallant men came into the regiment which I had the honor to command. Arizona sent men who won glory on hard-fought fields, and men to whom came a glorious and an honorable death fighting for the flag of their country, and as long as I live it will be to me an inspiration to have served with Bucky [sic] O'Neill. (Applause.) I have met so many comrades whom I prize for whom I feel only respect and admiration, and I shall not particularize among them except to say that there is no one for whom I feel more of respect than for your governor. (Applause.) I remember when I first joined the regiment that all of us were new to one another, but as soon as I saw the colonel (he was then major) I made up my mind I could tie to him. (Cries of 'Good!' Applause.)



President Roosevelt, 1904
Photo by Pach Brothers [New York]
(Library of Congress)

It is a pleasure to be in Arizona. I have never been in it before. Arizona is one of the regions from which I expect most development through the wise action of the national congress in passing the irrigation act. (Applause.) The first and biggest experiment now in view under that act is the one that we are trying in Arizona. I look forward to the effects of irrigation partly as applied through the government, still more as applied by individuals, and especially by associations of individuals, profiting by the example of the government and possibly by help from it—I look forward to the effects of irrigation as being of greater consequence to all this region of country in the next fifty years than any other movement whatsoever. I think that irrigation counts for more toward the achieving of the permanent good results for the community.

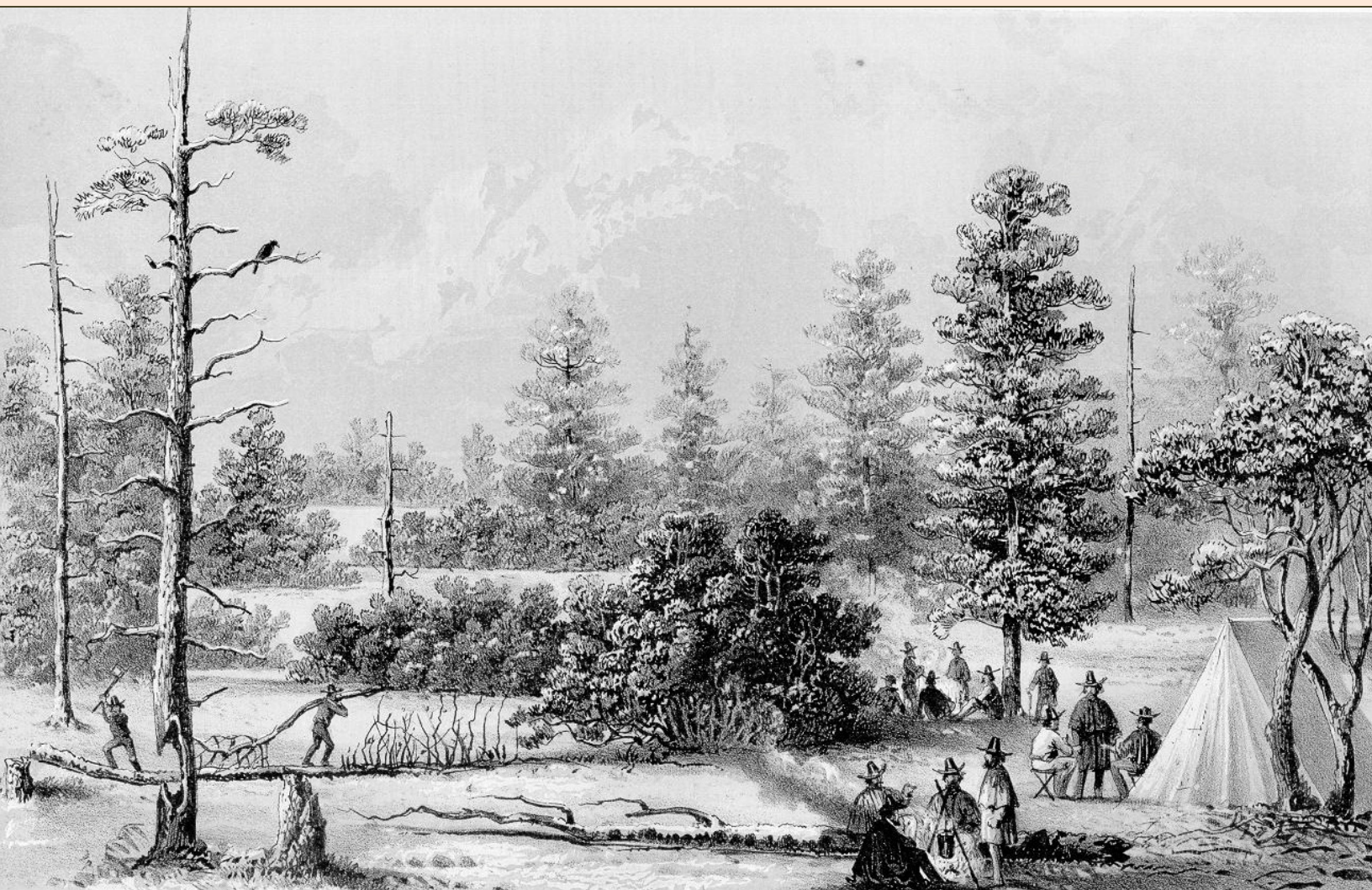
I shall not try to greet in particular the members of my regiment now. I shall see them at half past five in my car. I have come here to see the Grand Canyon of Arizona, because in that canyon Arizona has a natural wonder, which, so far as I know, is in kind absolutely unparalleled throughout the rest of the world. (Applause.) I shall not attempt to describe it, because I cannot. I could not choose words that would convey or that could convey to any

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Keep the Grand Canyon of Arizona as it is. We have gotten past the stage, my fellow citizens, when we are to be pardoned if we simply treat any part of our country as something to be skinned for two or three years for the use of the present generation. Whether it is the forest, the water, the scenery, whatever it is, handle it so that your children's children will get the benefit of it. Handle it that way. If irrigation, apply it under circumstances that will make it of benefit, not to the speculators to get profit out of it for two or three years, but handle it so that it will be of use to the homemaker; to the man who comes to live here and to have his children stay after him; handle it so as to be of use to him and those who come after him. Keep the forests in the same way. Preserve them for that use, but use them so that they will not be squandered; will not be wasted; so that they will be of benefit to the Arizona of 1952 as well as the Arizona of 1903.

I want to say a word of welcome to the Indians here. In my regiment I had a good many Indians. They were good enough to fight and to die, and they are good enough to have me treat them exactly as square as any white man. There are a good many problems in connection with the Indians. You have got to save them from corruption, save them from brutality, and I regret to say that at times we have to save them from the unregulated Eastern philanthropist, because in everything we have to remember that although perhaps the worst quality in which to approach any question is hardness of heart, I do not know that it does so much damage as selfishness of head. All I ask is a square deal for every man. Give him a fair chance; do not let him wrong anyone, and do not let him be wronged. Help as far as you can, without hurting in helping him, for the only way to help a man in the end is to help a man to help himself. Never forget that you have to have two sets of qualities; the qualities that we include under the names of decency, honesty, morality,

that make a man a decent husband, a good father, a good neighbor, fair and square in his dealings with all men, and in his dealings with the state: and then, furthermore, the qualities that have to be shown by every man who is to do this work in the world. Virtue is good, but the virtue that sits at home in its own parlor and talks about how bad the world is, never did anything and never will. I want to see the qualities that the men of '61 to '65 had, my comrades. You had to have a man patriotic in those days, but it did not make any difference how patriotic he was, if he did not fight he was no good. So it is with citizenship. I want to see decency and then I want to see the hardy virtues; the virtues we speak of when we describe anyone as a good man. I am glad to see you today. I wish you well with all my heart. I know that your future will justify all the hopes we have. (Cheers and applause.) ❖ ❖ ❖



“Camp — Colorado Plateau.”

Sketch by Balduin Möllhausen. Lithograph by J. J. Young.

Lithographers of Sarony, Major and Knapp, New York.

Joseph C. Ives, *Report Upon the Colorado River of the West, Explored in 1857 and 1858 . . .* (U.S. Government Printing Office, Washington, 1861), General Report, Plate VII.

SKY CANYON EARTH

[The brilliant star Vega seems] to descend in a gentle curve, as though the bright sky in which the stars are set was spread across the cañon, resting on either wall, and swayed down by its own weight. The stars appear to be in the cañon.

... it seems a long way up to the world of sunshine and open sky, and a long way down to the bottom of the cañon glooms.

... you can hardly cast aside the belief that they are works of Titanic art.

John Wesley Powell

Exploration of the Colorado River of the West and Its Tributaries
(Government Printing Office, 1875),
pp. 23, 29, 174

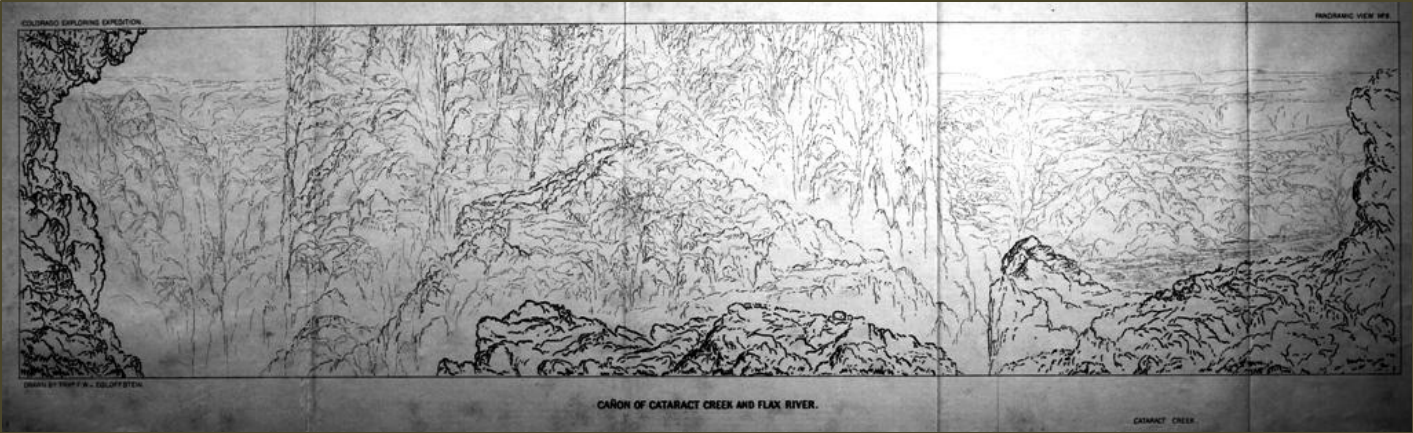
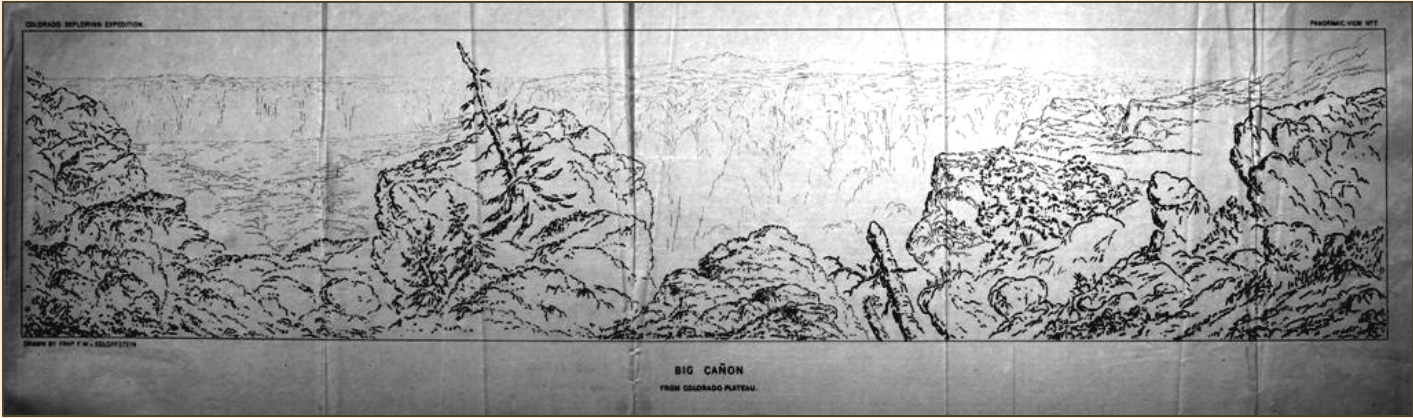
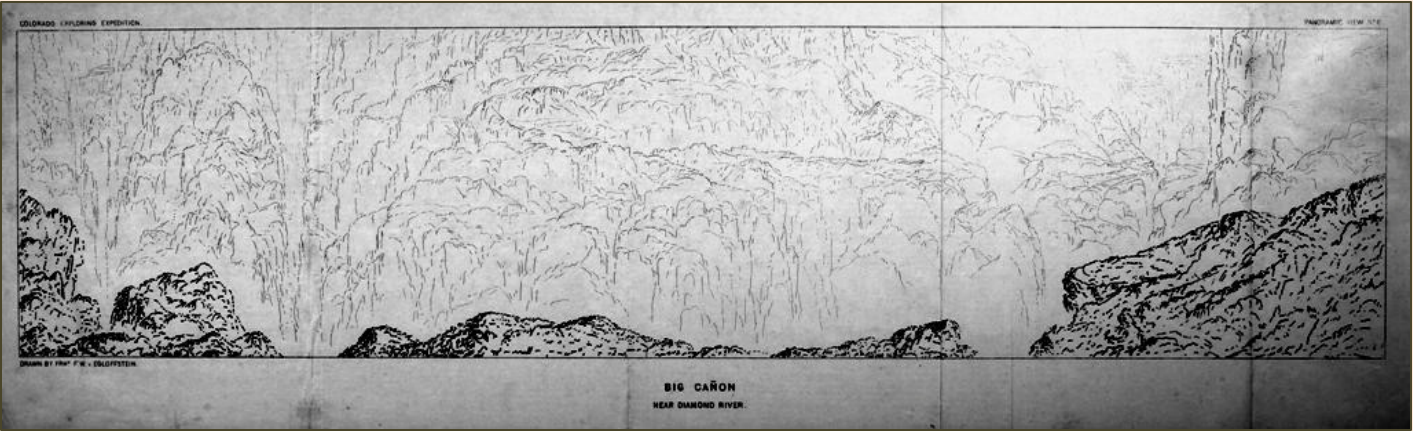
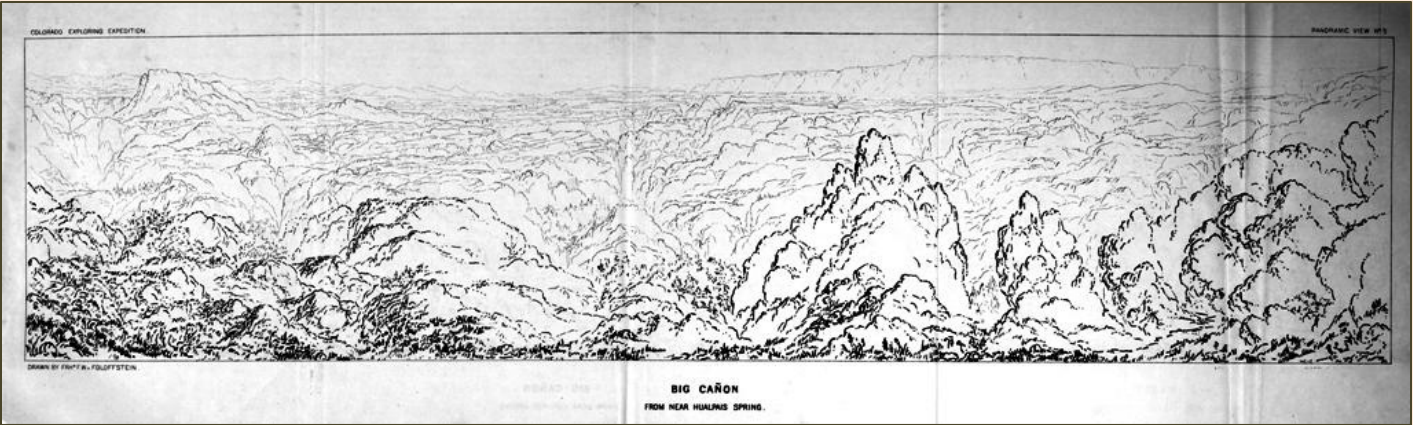


"Black Cañon."

[Near the site of present-day Hoover Dam.]
By F. W. Egloffstein, from a sketch by Lieut. Ives.

Joseph C. Ives, *Report Upon the Colorado River of the West* . . . (Government Printing Office, Washington, 1861). General Report, Plate V.

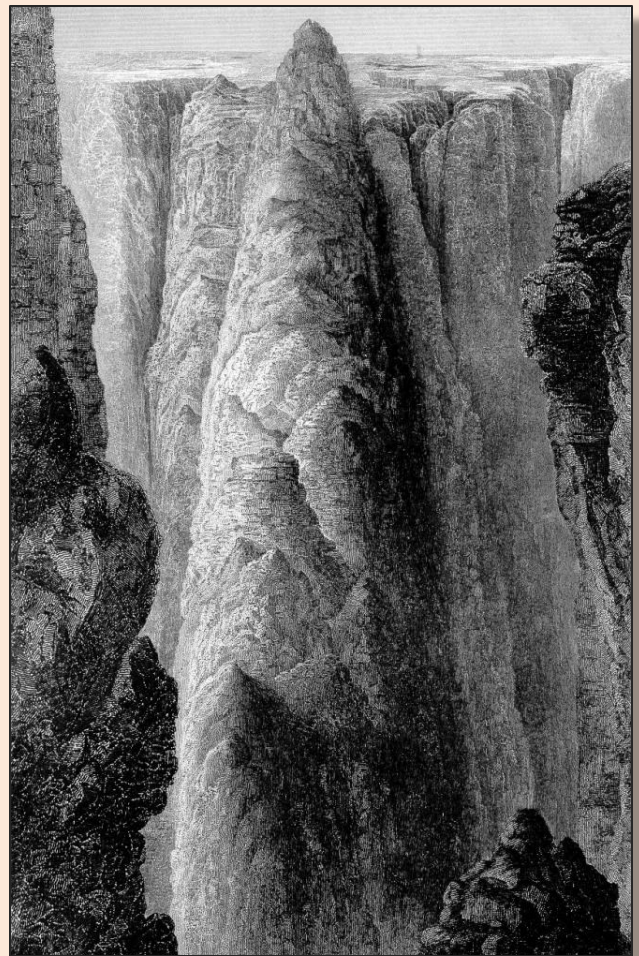
F. W. von EGLOFFSTEIN DRAWS THE CANYON, 1858



“It is somewhat unfortunate that there is a prevalent idea that in some way an essential part of the grandeur of the Grand Cañon is the narrowness of its defiles. Much color has been given to this notion by the first illustrations of the cañon from the pencil of Egloffstein in the celebrated report of Lieutenant Ives. Never was a great subject more artistically misrepresented or more charmingly belittled. Nowhere in the Kaibab section is any such extreme narrowness observable, and even in the Uinkaret section the width of the great inner gorge is a little greater than the depth.”

Clarence E. Dutton, *Tertiary History of the Grand Cañon District* (U.S. Geological Survey, Monograph 2, 1882), p. 144.

“Big Cañon.” Sketch by F.W. von Egloffstein; lithograph by J.J. Young. Joseph C. Ives, *Report Upon the Colorado River of the West . . .* (Government Printing Office, Washington, 1861), General Report, Plate IX.



◀ FACING PAGE

Panoramic views of the Grand Canyon, “Drawn by Frhr. F. W. v. Egloffstein”. Lithographs.

These four large fold-out illustrations have long been criticized as awkward or weird portrayals of the Grand Canyon—Farquhar called them “invariably deplorable”^{*}—they certainly are more mnemonic than they are realistic. Egloffstein’s topographic maps of the lower Colorado River and Grand Canyon regions, on the other hand, are brilliant renditions, which were acknowledged even shortly after they were published as a marvelous new approach to illustrating topography on flat sheets. Had Egloffstein’s sceneries been an embarrassment to the assertive commander of the exploring expedition, Lt. Joseph C. Ives, perhaps they would not have been included in his official government report—unless the social-climbing Ives thought it best to retain the artwork in light of having appointed Egloffstein, of a baronical family in Germany, as the mission’s topographer. All of these aspects find their ways into various items cited in this bibliography.

TOP TO BOTTOM:

“Big Cañon from near Hualpais Spring.” (*Panoramic View No. 5*)

“Big Cañon near Diamond River.” (*Panoramic View No. 6*)

“Big Cañon from Colorado Plateau.” (*Panoramic View No. 7*)

“Cañon of Cataract Creek and Flax River.” (*Panoramic View No. 8*)

Joseph C. Ives, *Report upon the Colorado River of the West, Explored in 1857 and 1858 by Lieutenant Joseph C. Ives, Corps of Topographical Engineers . . .* (Government Printing Office, Washington, 1861).

^{*} Francis P. Farquhar, *The Books of the Colorado River and the Grand Canyon: A Selective Bibliography* (Glen Dawson, Los Angeles, 1953), p. 18.

“Surely no other region in the world . . . can exhibit
anything comparable to it.”

— Clarence Edward Dutton

Tertiary History of the Grand Cañon District
U.S. Geological Survey Monograph 2 (1882), p. 46



THE TRANSEPT, KAIBAB DIVISION, GRAND CAÑON
AN AMPHITHEATER OF THE SECOND ORDER

BY THOMAS MORAN
LITHOGRAPH BY JULIUS BIEN AND CO., NEW YORK

Double-folio sheet as published in Clarence E. Dutton, *Atlas to Accompany the Monograph of the Tertiary History of the Grand Cañon District* (U.S. Geological Survey, Monograph 2, Atlas, 1882), Sheet XVIII. (*Academy of Natural Sciences of Philadelphia*)

The legend from the List of Atlas Sheets reads: **“The Transept. View of a lateral gorge opening into one of the branches of the Bright Angel Amphitheater in the Kaibab.”**

“The marvellous story of Cardinas [Cardañas], that had formed for so long a time the only record concerning this rather mythical locality, was rather magnified than detracted from by the accounts of one or two trappers, who professed to have seen the cañon, and propagated among their prairie companions incredible accounts of the stupendous character of the formation, and it became a matter of interest to have this region explored, and to lay down the positions of the Colorado and its tributaries along the unknown belt of country north of the 35th parallel.”

Joseph C. Ives

Report Upon the Colorado River of the West . . .
(Government Printing Office, 1861), General Report, p. 21.

“The conditions necessary to the formation of
cañons are exceptional in the world’s history.”

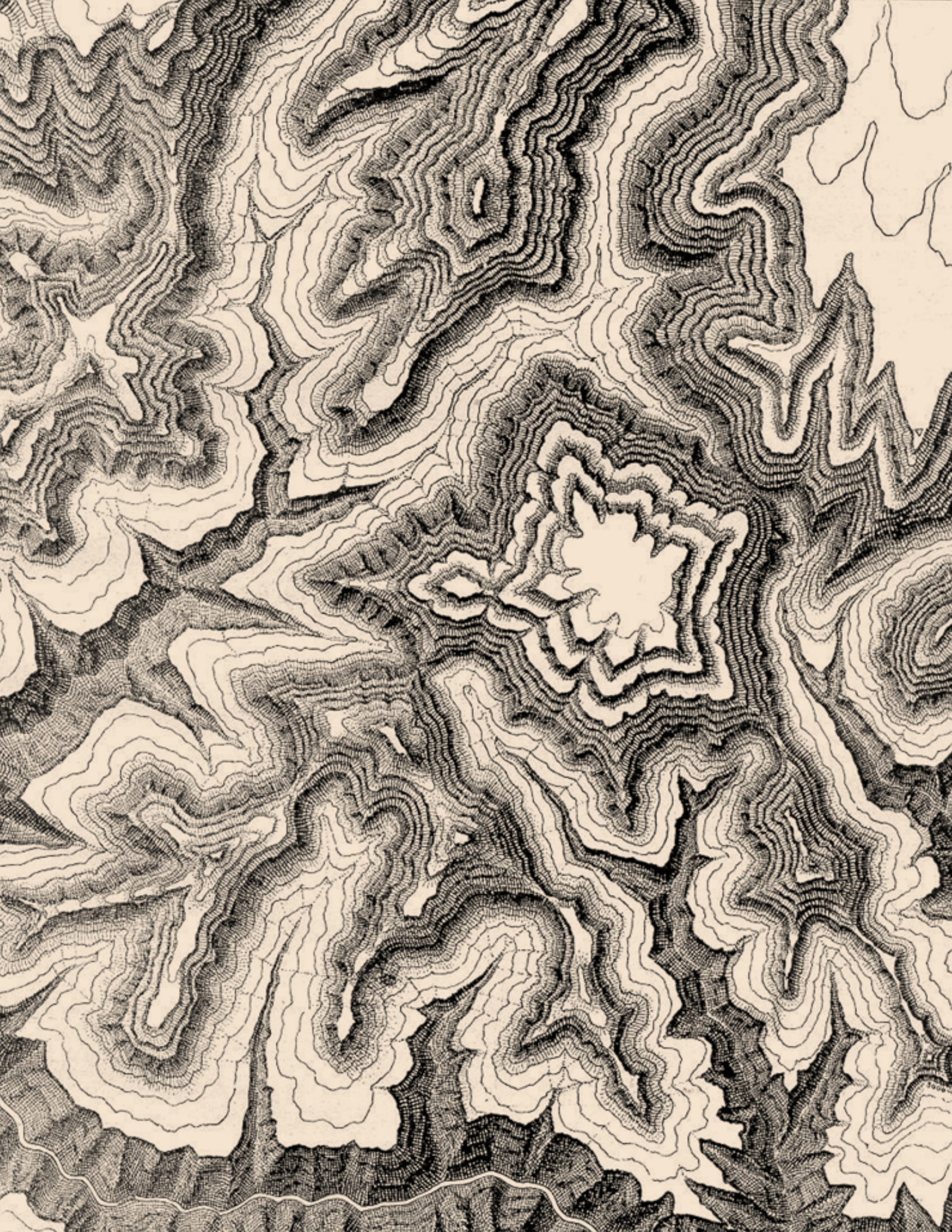
John Wesley Powell

Exploration of the Colorado River of the West and its Tributaries
(Government Printing Office, 1875), p. 214.

Facing Page ►

The mostly horizontal strata of the Grand Canyon produce an appealing symmetry to
its eroded forms, well illustrated on maps.

“Rounded Inward Curves and Projecting Cusps of the Walls”, Clarence E. Dutton, *Tertiary History of the Grand
Cañon District* (U.S. Geological Survey, Monograph 2, 1882), Plate XLII.



“As they will describe it back home.”



John T. McCutcheon, "Doing the Grand Canyon", *Appleton's Magazine*, Vol. 13, no. 6 (1909), p. 645.

“The Grand Cañon is fortunately indescribable”

— Anonymous

“From an Oxford Notebook”
The Observatory (London), Vol. 27 (1904), p. 420

Water Pocket on the Esplanade



THE GRAND CAÑON AT THE FOOT OF THE TOROWEAP — LOOKING EAST

[DETAIL]

BY WILLIAM H. HOLMES
LITHOGRAPH BY JULIUS BIEN AND CO., NEW YORK

From a double-folio sheet as published in Clarence E. Dutton, *Atlas to Accompany the Monograph of the Tertiary History of the Grand Cañon District* (U.S. Geological Survey, Monograph 2, Atlas, 1882), Sheet VI. (*Academy of Natural Sciences of Philadelphia*)



Raising the Flag

Hoover Dam

1 May 1996

The world's largest flag, commissioned by "Ski" Demski (*died 2002*) and sewn in Pennsylvania, has been displayed in numerous venues. It was hoisted on Hoover Dam to commemorate the crossing of the dam by the Olympic relay torch.

The flag measures 505 × 255 feet; weighs 3000 pounds. Each star is 17 feet.

(Photos U.S. Bureau of Reclamation)

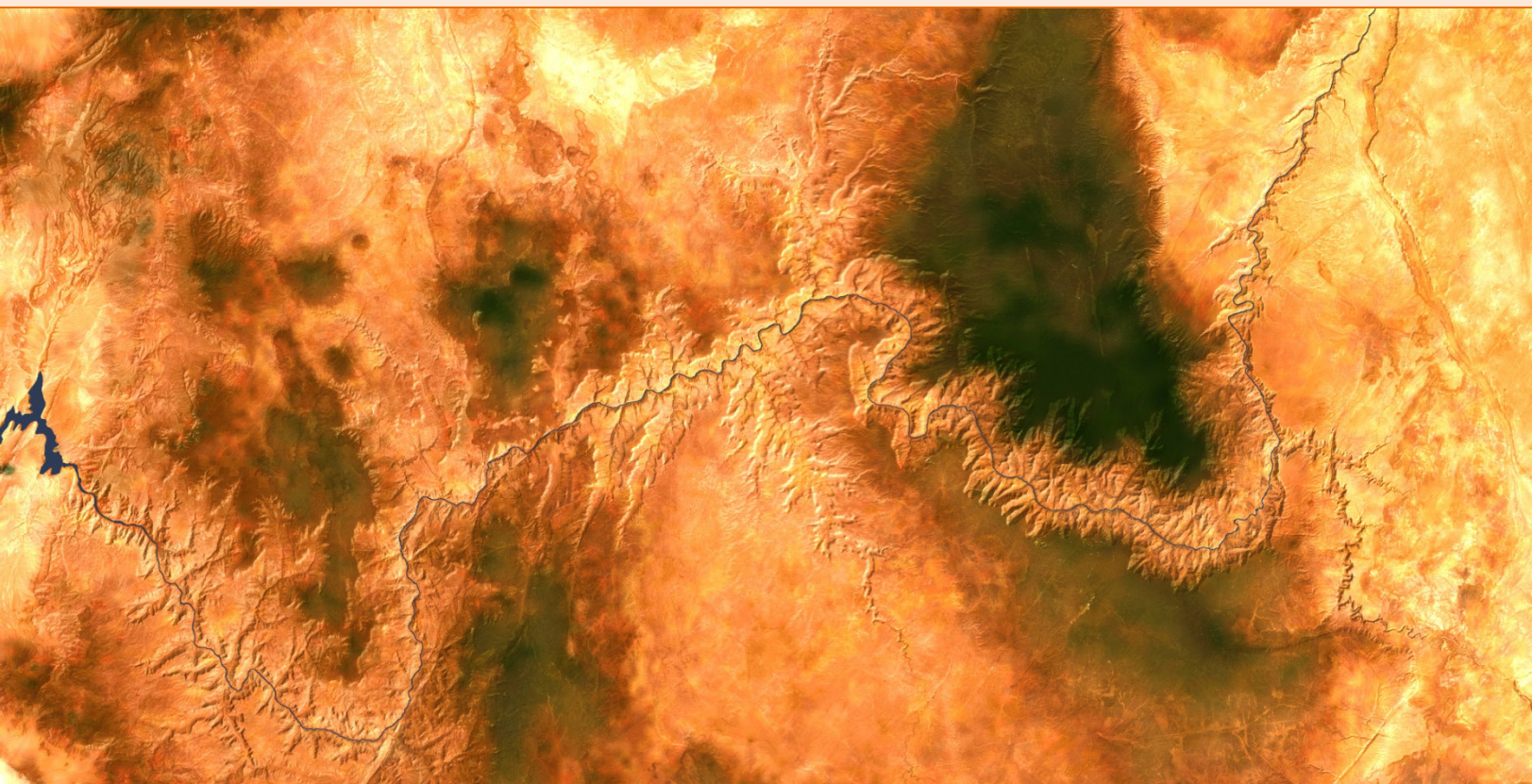




LOOKING DOWN ON THE GRAND CANYON – THEN AND NOW

(ABOVE) **Parts of Northern and North Western Arizona and Southern Utah, Atlas Sheet No. 67**, by G. K. Gilbert, A. R. Marvin, and E. E. Howell, based in part upon data cobbled together from “Mr. J. W. Powell in charge of the Colorado River Exploring Expedition” and the “Colorado River Exploring Expedition under Lt. Ives.” George M. Wheeler, *Geological Atlas Projected To Illustrate Geographical Explorations and Surveys West of the 100th Meridian of Longitude, under the Command of First Lieut. Geo. M. Wheeler*. U.S. Geological and Geographical Surveys West of the 100th Meridian (New York, 1876), Sheet 67 (detail). (*The American Philosophical Society*)

(BELOW) **False-color satellite imagery of the greater Grand Canyon region, on the Colorado River between a point several miles downstream from Lees Ferry (upper right) to the Grand Wash Cliffs and eastern Lake Mead (left).** Dark-green areas indicate heavier vegetation; Kaibab Plateau is prominent. (U.S. Geological Survey)



Moving Fish Then . . .



The artificial stocking of trout into perennial streams of the Grand Canyon was an early effort to establish and promote fisheries. This view shows a park ranger on the Clear Creek Trail with canisters of trout fry. The effort was repeated when flash floods swept populations away. Today, the trout of side streams of the canyon are considered an invasive species not naturally belonging in the national park. In the mainstem Colorado River, however, trout populations survive from individuals that are stocked in the "Lees Ferry" reach of the river between Glen Canyon Dam and Lees Ferry, within the Glen Canyon National Recreation Area, where a recreational fishery is widely promoted.

... and Now



The humpback chub is an endangered fish that once was widespread in the Colorado River. Since the building of Glen Canyon Dam, the physical conditions favored by the chubs have reduced their populations in Grand Canyon, where now it is chiefly resident in the perennial portion of the Little Colorado River. Recent efforts have been underway to translocate chubs to favorable locales elsewhere in Grand Canyon; particularly Shinumo and Havasu Creeks. This photo was taken on 23 June 2010 when a second spawning group was taken to Shinumo Creek. The photo description notes further, "Prior to the translocation, a 13-person crew led by [Grand Canyon National Park] fisheries biologist Brian Healy spent six days surveying the translocation reaches of Shinumo Creek to get population estimates of [previously placed] humpback chub and other native fish, and removing nonnative rainbow trout."

The Grand Canon



In Perspective

“I should be exceding glad, Sir, if you could be prevaild on to furnish me with a Catalogue of your Publications. Those of them that I am posses’d of are some of the most Ageeable Ornaments of my Library.”

—Mather Byles to Benjamin Franklin, [1775–1776]

The Papers of Benjamin Franklin, www.franklinpapers.org, sponsored by
The American Philosophical Society and Yale University,
digital edition by the Packard Humanities Institute
(original document in New England Historic Genealogical Society, Boston)

“. . . all is there that ought to be, it matters little how much is there that ought not : the excess may help, but cannot hurt”

“The grand canon of composition and construction” in law proceedings.

—*Encyclopædia Britannica* (1842), Volume 2, p. 545

“Seems rather pointless to write this to you. I have no reason other than it might fit into some one’s story some time.”

—Robert N. Atmore

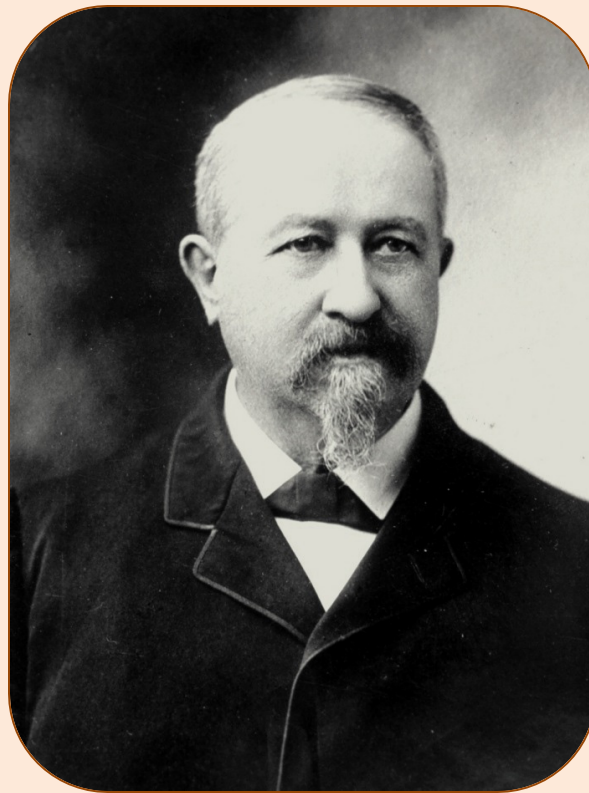
Letter to the Editor
The Desert Magazine, Vol. 9, no. 3 (January 1946), p. 31. [Item no. [17.1151](#)]

“. . . the conscientious bibliographer must record impartially both treasures and trash, the enduring and the ephemeral.”

—Louise M. Hinchliffe

Librarian, Grand Canyon National Park Research Library (*retired*)

Foreword, in Earle E. Spamer,
Bibliography of the Grand Canyon and the Lower Colorado River, 2nd edition
Grand Canyon Natural History Association Monograph 8 (1990), p. vi. [Item no. [2.3411](#)]



(U.S. Geological Survey)

Clarence Edward Dutton

(1841–1912)

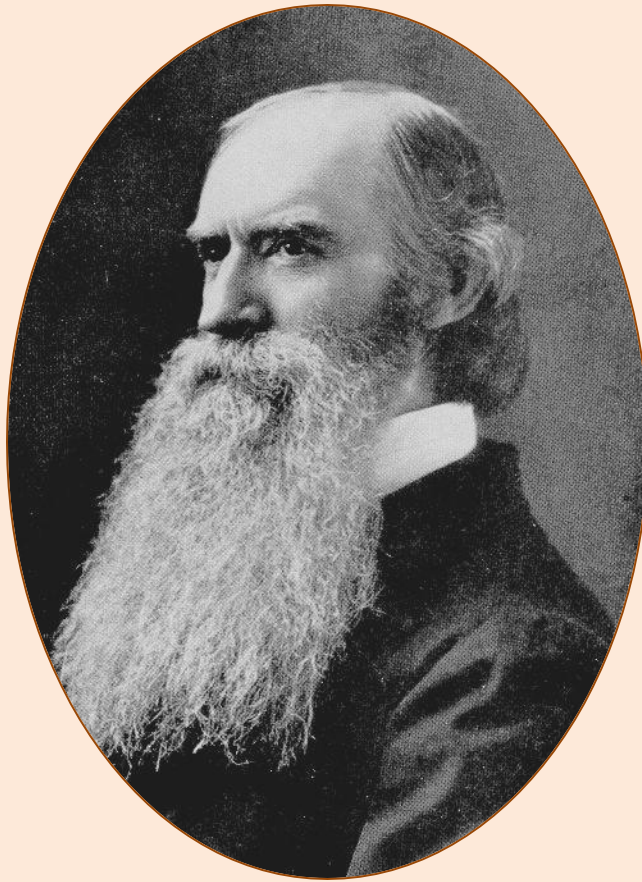
WHEREAS John Wesley Powell captured the Colorado River's canyons for the world to imagine, it was C. E. Dutton who first fashioned their history. His monumental *Tertiary History of the Grand Cañon District*, with its folio *Atlas* and illustrations by eminent artists, sculpted the "great stairway"* of strata that spans the plateaus of Utah and Arizona, the Grand Canyon ultimately exposing the cellar of the Grand Canyon's inner gorge. There he read the dynamic, grand history of the Tertiary Period when the landscape was formed. But its age in years was then unknown, as geological ages were worldwide, before the discovery of radioactivity and radiometric dating of rocks. His final words in the *Tertiary History*:

No doubt the question will often be asked, how long has been the time occupied in the excavation of the Grand Cañon? Unfortunately there is no mystery more inscrutable than the duration of geological time. On this point geologists have obtained no satisfactory results in any part of the world. Whatever periods may have been assigned to the antiquity of past events have been assigned provisionally only, and the inferences are almost purely hypothetical. In the Plateau Country Nature has, in some respects, been more communicative than in other regions, and has answered many questions far more fully and graciously. But here, as elsewhere, whenever we interrogate her about time other than relative, her lips are sternly closed, and her face becomes as the face of the Sphinx.†

The answer to the question is, perplexingly, still a matter of conjecture.

*Clarence E. Dutton, *Tertiary History of the Grand Cañon District* (U.S. Geological Survey, Monograph 2, 1882), pp. vii, 2, 43, 52. It was Dutton who devised the metaphorical "great stairway" of plateaus that fills much of the Colorado Plateau. The term, however, seems to have since been corrupted, often repeated with loss of attribution as the "grand staircase".

†Dutton, p. 260.



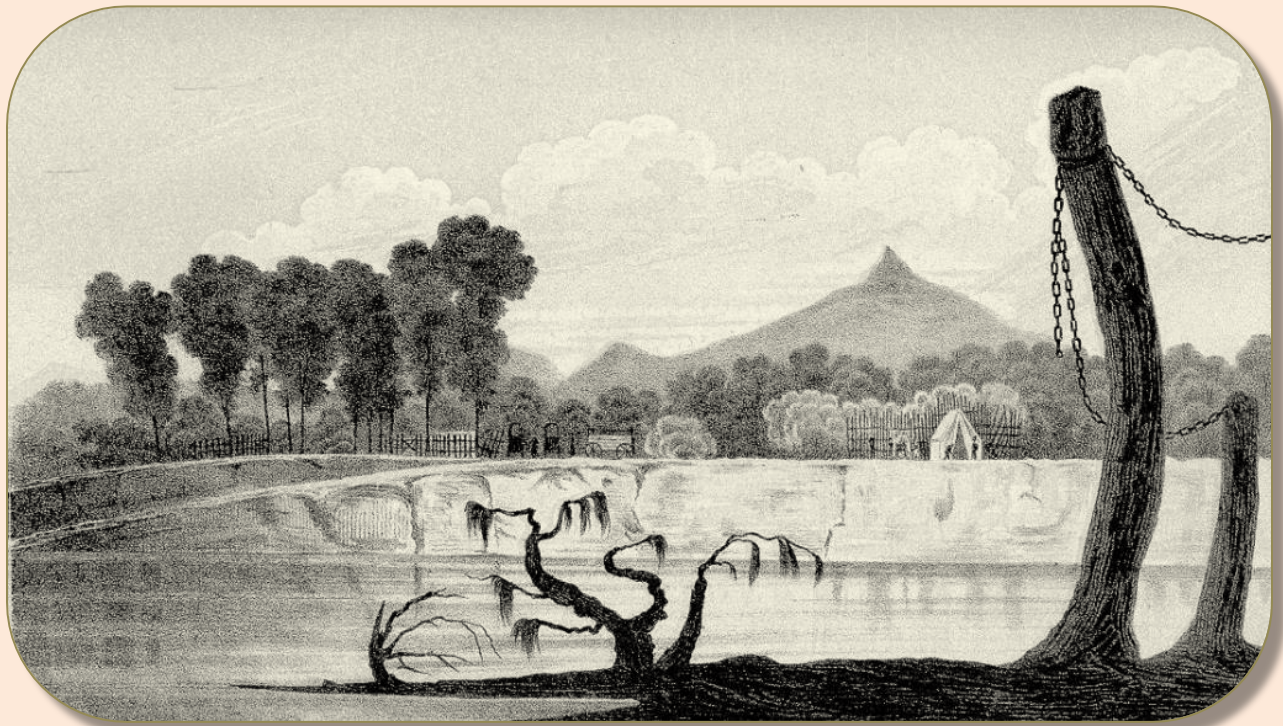
John Strong Newberry
(1822–1892)

TOO OFTEN, it seems, J. S. Newberry is overshadowed in the early Grand Canyon literature by the tremendous accomplishments of John Wesley Powell and Clarence Edward Dutton. True, these other men's work took great strides toward understanding the geology and physical geography of the Grand Canyon region; indeed, the whole Colorado Plateau. Yet it was Newberry, in 1858, who first recognized that the canyon landscapes were the result principally of running, if ephemeral, water. It was a leap away from catastrophic landscape interpretations—undefined “upheavals” usually, or great “renting” of the land—that powered a geological genre whose practitioners were at a loss to comprehend great physical changes during a timeframe that was on the order of thousands of years, not millions. Newberry had accompanied the Ives Expedition on the Colorado River as a physician, but his Geological Report laid the way for Powell, Dutton, and generations of geologists and geographers to come.

Portrait from Charles A. White, Biographical Memoir of John Strong Newberry, 1822-1892. U.S. National Academy of Sciences, Biographical Memoirs, Vol. 6 (1909), frontispiece. [Also as a preprint, 1906.]

AMERICAN EXPLORATION

of the



COLORADO RIVER & GRAND CANYON

"Camp Yuma. Big Colorado below the mouth of the Gila." Lithograph by Ackerman, New York.

Lorenzo Sitgreaves, *Report of an Expedition down the Zuni and Colorado Rivers* (U.S. 32nd Congress, 2nd Session, Senate Executive Document 59, 1853), Plate 23.



Lith. by W. H. Rease 4th & Chestnut St. Phil.

PENN STEAM ENGINE & BOILER WORKS

FOOT OF PALMER STREET KENSINGTON, PHILADELPHIA.

REANEY NEAFIE & CO.

ENGINEERS MACHINISTS BOILER MAKERS BLACK SMITHS & FOUNDERS

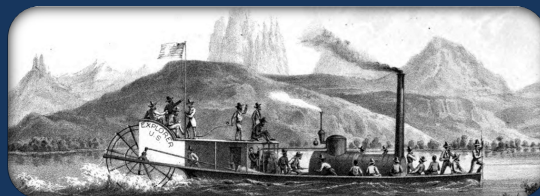
Manufacturers of high & low pressure Marine & Stationary Engines, Boilers of all descriptions, Propellers, Iron Boats, Water Tanks, heavy & light Forgings, Iron & Brass Casting.

Copper Smelting, Pattern Making & an extensive assortment of Patterns of all kinds always on hand.

Having Extensive Wharves & Dockrooms, are always prepared to build & repair Engines & Steamers at the shortest notice. Every Facility offered for lifting heavy and light weights.

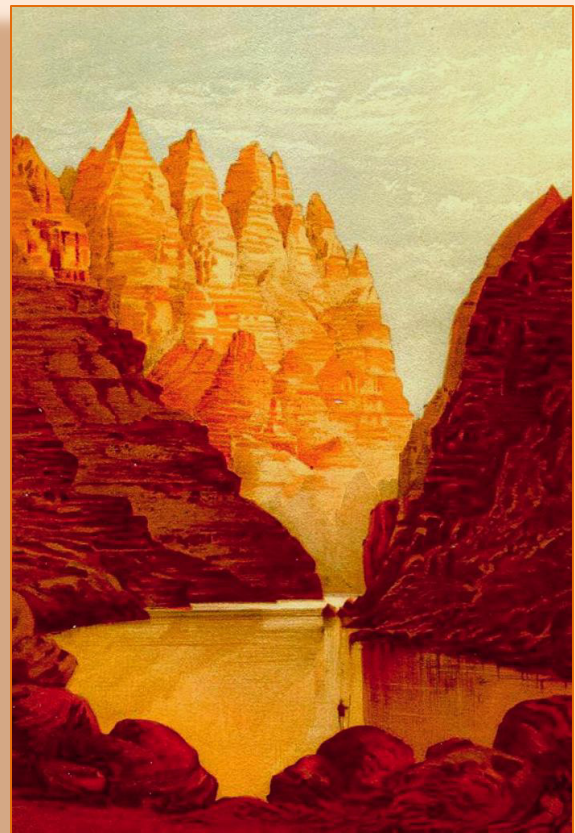
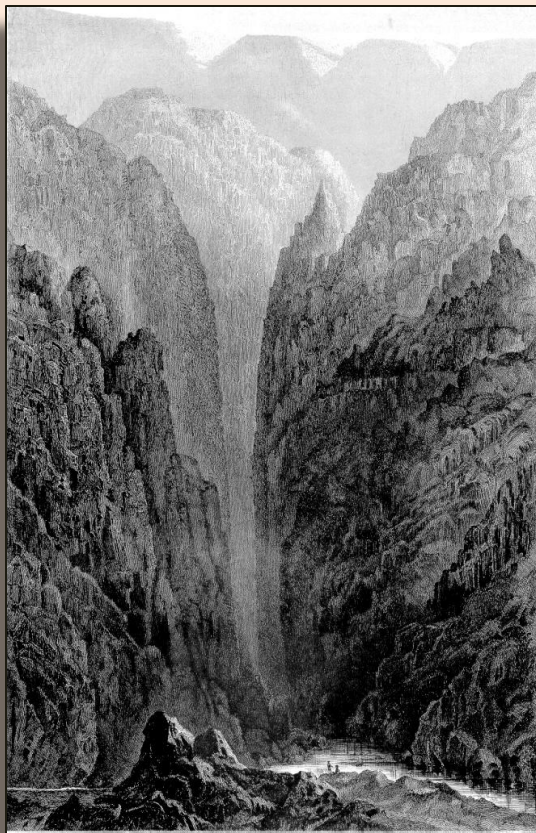
Thomas Reaney Jacob G. Neafie John V. Levey.

BEGINS HERE



THE EXPLORER

[AT ABOUT THE SAME SCALE AS THE FOREGROUND OF LITHOGRAPH ABOVE]



Top "Aftonrodnadens sista återsken på Palissaderna. Från Point Royal." [Twilight's last reflection on the Palisades. From Point Royal.] Watercolor by Sven Hedin. Lithograph by A. Börtzells, Stockholm.

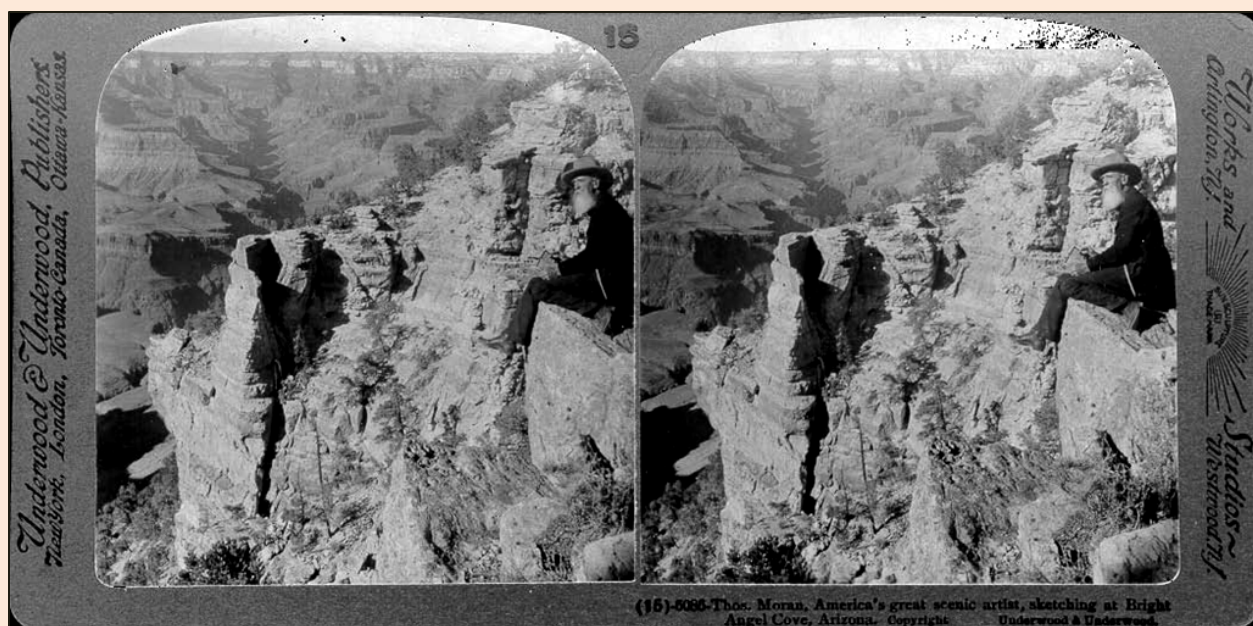
Sven Hedin, *Grand Canyon* (Albert Bonniers Förlag, Stockholm, 1925), facing p. 208.

Lower Left "Big Cañon at Mouth of Diamond River." Sketch by F. W. von Egloffstein; lithograph by J. J. Young.

Joseph C. Ives, *Report upon the Colorado River of the West, Explored in 1857 and 1858 . . .* (Government Printing Office, Washington), General Report, Plate VI.

Lower Right "Mouth of the Lower Grand Cañon of the Colorado River. 1871." Hand-tinted lithograph.

Report upon United States Geographical Surveys West of the One Hundredth Meridian, in charge of Capt. Geo. M. Wheeler . . . Vol. I.—Geographical Report (Government Printing Office, Washington, 1889), Plate XX.

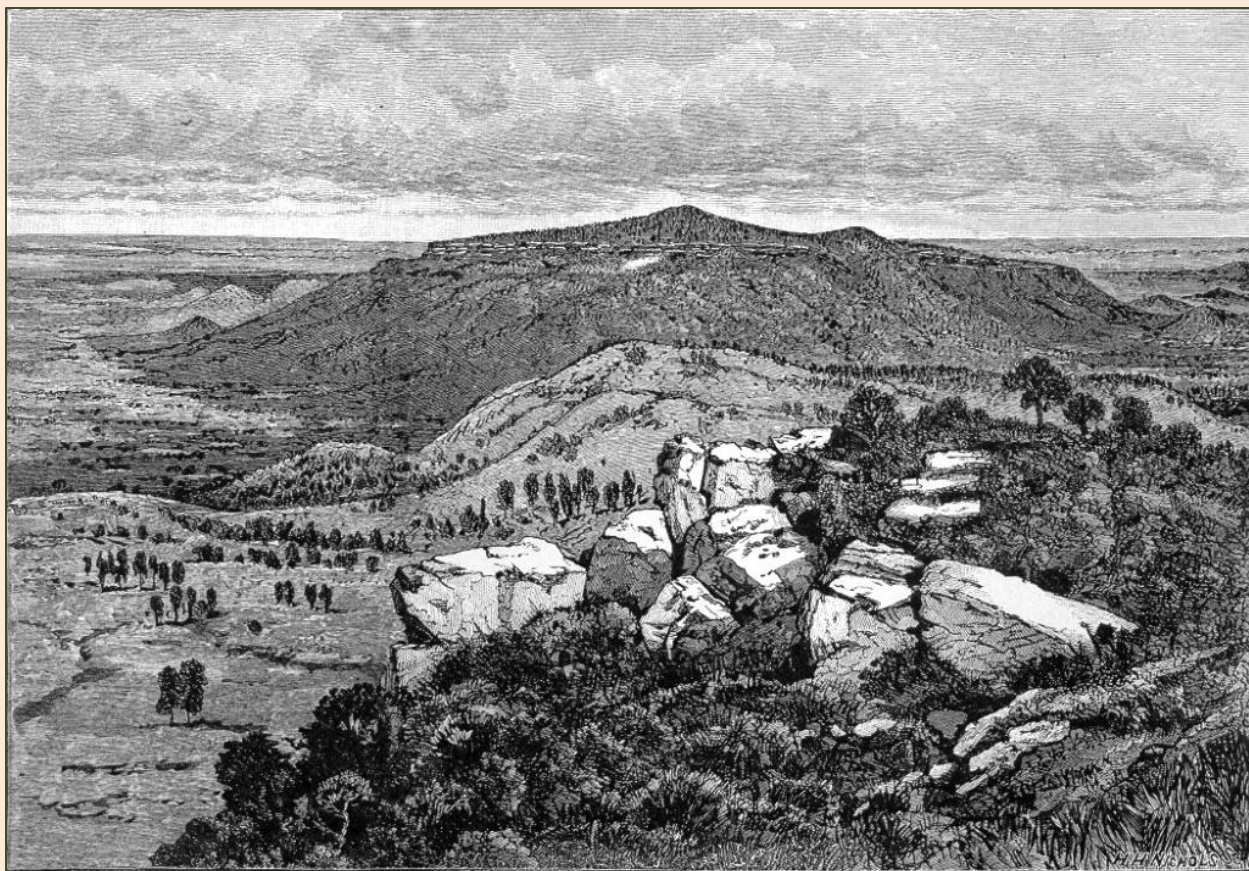


❖ (ABOVE) "Thomas Moran, America's great scenic artist, sketching at Bright Angel Cove, Arizona", stereoview no. 15. The scene is on the South Rim near El Tovar Hotel.

The Grand Cañon of Arizona; through the stereoscope; the Underwood patent map system combined with eighteen original stereoscopic photographs (Underwood & Underwood, New York, London, Ottawa (Kansas), San Francisco, Toronto, and Bombay, 1904 and later dates). [Item no. 2.6443. See also [the frontispiece to Part 26.](#)]

❖ (BELOW) "Descending into Grand View Trail by a short, steep mining path, Grand Cañon of Arizona", stereoview no. 8. The Grandview Mine was a copper mine operated by Peter D. Berry and others. [See item no. 21.297 for a history of Grand Canyon mines.]





“Mount Trumbull. — From Mount Logan.”

Engraving by H. H. Nichols

Mounts Trumbull and Logan lie on the North Rim in the western part of the Grand Canyon district, on the Uinkaret Plateau, an area known for its volcanic features. Throughout this bibliography are references to Mount Trumbull (also Mt. Trumbull), a search will reveal numerous items relating to geology and history alike. The area is also known for its early lumbering activities, which involved the import of a portable, steam-powered sawmill and the harvesting of timbers for the Mormon temple in nearby St. George, Utah. Mount Trumbull was named by John Wesley Powell for Senator Lyman Trumbull of Powell's home state of Illinois, and Mount Logan for Illinois Senator John A. Logan, a Civil War general.

Clarence E. Dutton, *Tertiary History of the Grand Cañon District* (U.S. Geological Survey, Monograph 2, 1882), Plate XX.

“The Wreck at Disaster Falls”



A metaphorical expression of the loss of our global electronic resources.

Sketch by Thomas Moran. Engraving by Bogert.
A scene in Lodore Canyon on the Green River, Utah.

John Wesley Powell, *Exploration of the Colorado River of the West and Its Tributaries* (Government Printing Office, Washington, 1875), Figure 10 (detail).

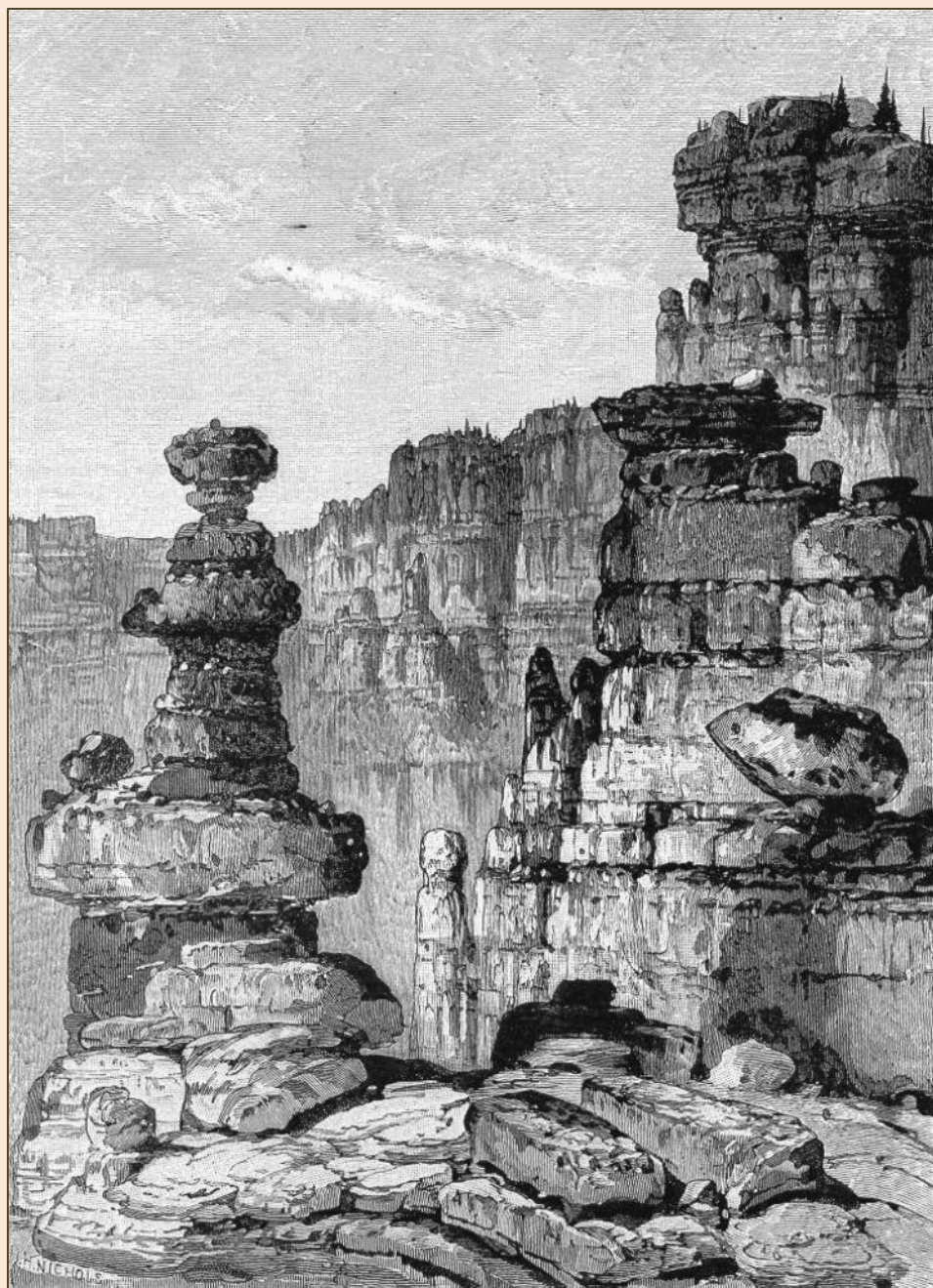


Computers and the Web on the Colorado River

In 1923, radio was an experimental novelty on a Colorado River trip through Grand Canyon. U.S. Geological Survey damsite surveyors kept in touch with the outside world, even learning of the death of President Warren G. Harding while in Marble Canyon, hence the naming of President Harding Rapid. Some six decades later, after personal computers were developed, it was reasonable to expect that they, too, would be useful tools even at the bottom of the Grand Canyon, despite some early technological limitations. By the turn to the 21st century, satellite communications made even routine web “chats” possible during river trips; and more computers were available that could withstand punishing treatment.

This photo taken on the evening of 30 May 1994 shows Alan Haden of the Glen Canyon Environmental Studies project sitting aboard his boat with a laptop computer, collating data gathered during the day’s work. Surely this was among the earliest computers ever to be used on the Colorado River in Grand Canyon. This science trip collected data during a controlled steady flow of water from Glen Canyon Dam. The study investigated “photosynthetically available radiation”, the amount of sunlight that reaches specific depths, and how the dam-controlled regime of the river may affect the production of plant food resources for Colorado River organisms.

(Earle Spamer photo, Tuckup Canyon, Colorado River Mile 165)



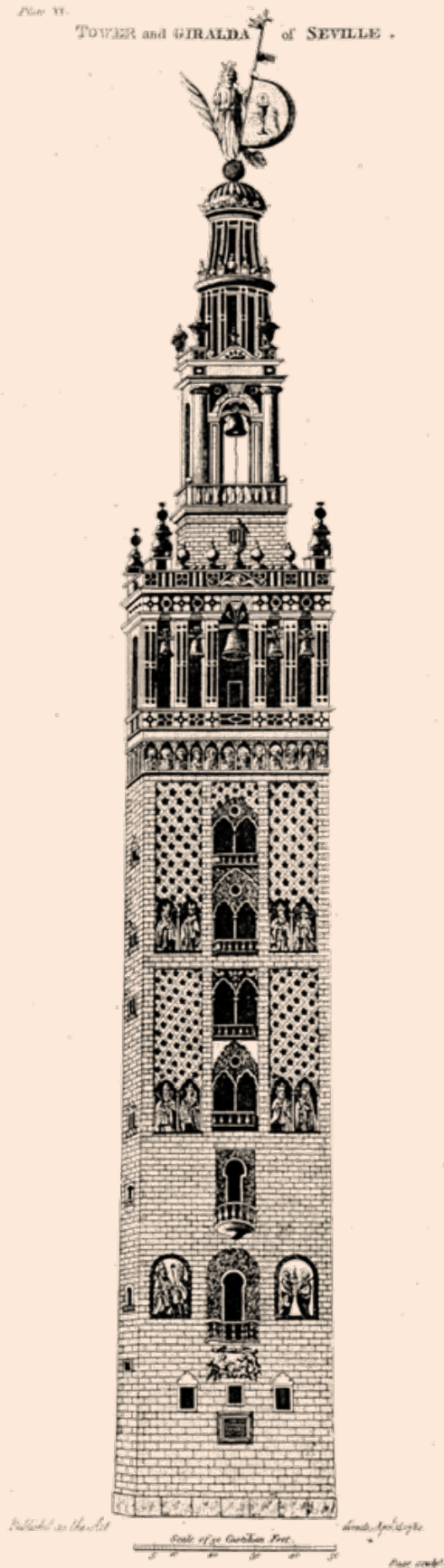
“Pinnacles. — Kaibab.”

Engraving by H. H. Nichols

Clarence E. Dutton, *Tertiary History of the Grand Cañon District* (U.S. Geological Survey, Monograph 2, 1882), Plate XXXII.

Plate VI.

TOWER and GIRALDA of SEVILLE .



❖ "Tower and Giralda of Seville."

This view depicts the Tower of Seville, the earliest size-comparison to features seen in the Grand Canyon. This illustration was made some two centuries after the first Spanish visit to the canyon, when it was taller than the incursionists of 1540 would have known it, now with the addition of a bell tower. The scale at bottom is 50 Castilian feet; one Castilian foot equals 0.28 meter, or about 11 inches.

John Talbot Dillon, *Travels through Spain, With a View To Illustrate the Natural History and Physical Geography of That Kingdom, in a Series of Letters* (Printed for G. Robinson, London, and for Pearson and Rollason, Birmingham, 1780), Plate VI.

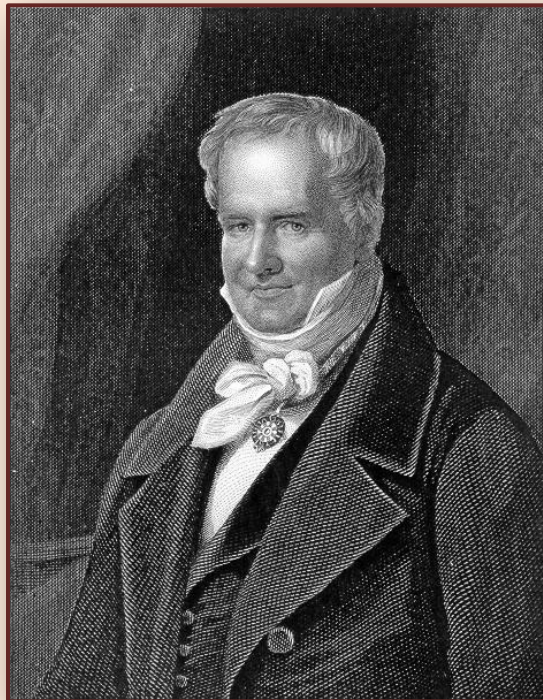
(Academy of Natural Sciences of Philadelphia)



“Bird's-eye view of cliffs of erosion, showing the Shin-ar'ump Cliffs, Vermilion Cliffs, and Gray Cliffs, in order from right to left.” Engraving by H. H. Nichols.

John Wesley Powell, *Exploration of the Colorado River of the West and Its Tributaries* (Washington, Government Printing Office, 1875), Figure 74.

Alexander von Humboldt



The One Writer Who *Should* Have Seen the Grand Canyon

Around the turn to the 19th century, the Prussian polymath and explorer Friedrich Wilhelm Heinrich Alexander von Humboldt (1769–1859) traveled extensively in South and Central America and the Caribbean, then visited Washington and Philadelphia with triumphal celebrations in 1804. He had circled through the Mexican interior in 1803 and, although having not traveled farther north, he included in his writings notes on the geography of the American Southwest. Probably no other scientific explorer of his day was more qualified to appreciate the landscapes that he would have encountered had his journeys gone into the northern hinterlands of old New Spain.

Portrait Alexander von Humboldt, *Cosmos: A Sketch of a Physical Description of the Universe*, Translated from the German by E. C. Otte (Bell and Daldy, London, 1871), Vol. I, *frontispiece*. (*Kosmos*, in the original German, was first published in 1845–1847, passed through new editions, and has been widely reprinted and translated.)

Alex. Humboldt

Signature Humboldt to Giovanni Fabbroni, 17 August 1816. (American Philosophical Society)



**"The Grand Cañon at the Foot of the Toroweap
—Looking East."**

**By William H. Holmes. Lithograph by Julius Bien & Co.,
New York.**

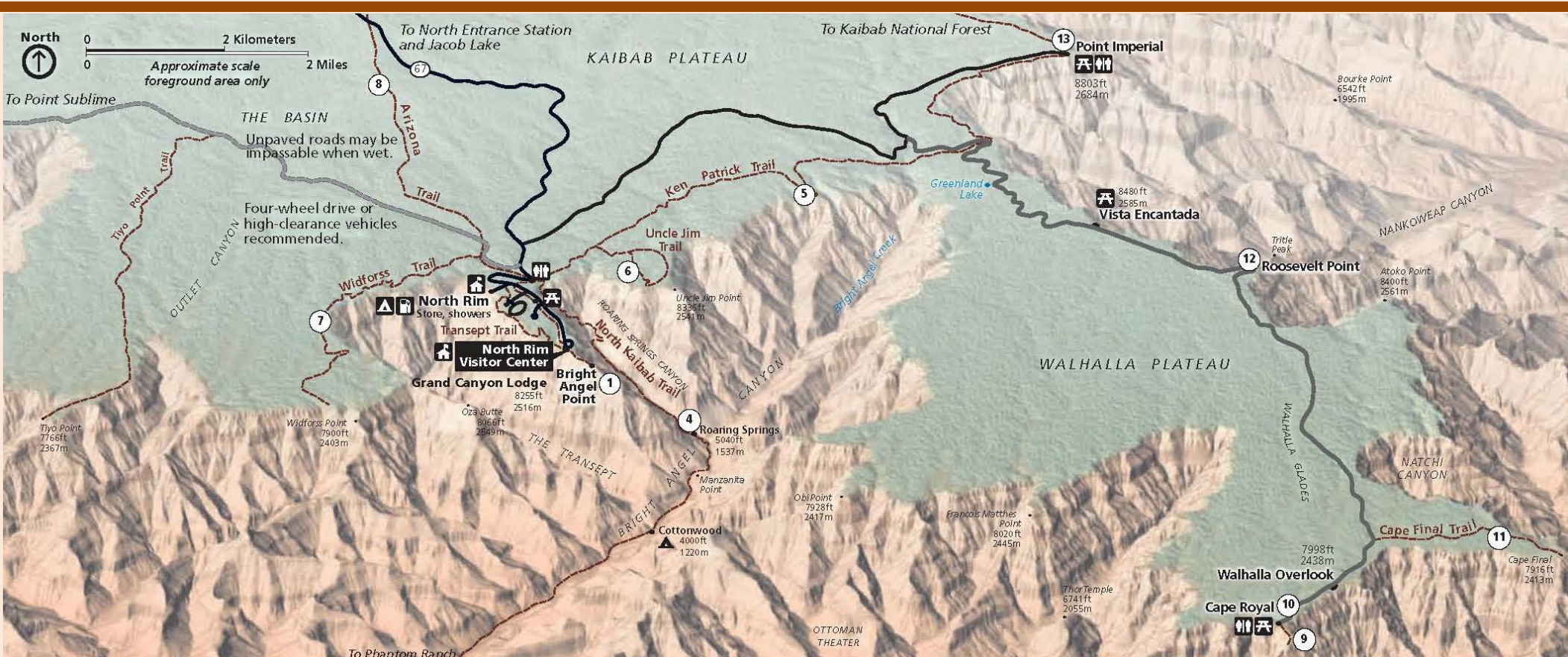
*Clarence E. Dutton, *Atlas to Accompany the Tertiary History of the Grand Cañon
District* (U.S. Geological Survey, Monograph 2, Atlas, 1882), Sheet VI (detail)*

Eastern Grand Canyon Panoramic Map

National Park Service

[Detail from Grand Canyon National Park brochure (Government Printing Office, Washington, various dates)]





North Rim Grand Canyon Panoramic Map

National Park Service

[Detail from North Rim edition of *The Guide* (National Park Service, Grand Canyon National Park, 2011)]

THE ARIZONA CHAMPION

PEACH SPRINGS, MOHAVE COUNTY, A. T.

SATURDAY, OCT. 6, 1883

The German visitors to the Grand Canon this week, reported on their return that they saw more than they expected, in fact the scenery at the Canon can be ranked among the most beautiful in nature's category. They spoke in the highest terms of the courtesies extended to them during their journey and at the Canon, by Messrs. Farlee & Young. The following are the names of the gentlemen composing the party: Dr. Edward Lasker, Imperial German parliament, Berlin. Dr. Paul Linden, Berlin; Dr. George Siemens, director German bank, Berlin; Herr Theodore Spaeth privy councillor, Speyer; Herr Adolph Froehlich, bank president, Rweibrucken; Dr. Richard Oberlander, editor Welt Post and special correspondent Frankfort Zeitung, Lepsic; Herr Udo Brachvogel, editor N. Y. Bellerishtiches Journal and special correspondent Ueber Land and Meer, New York; Mr. Jur. Ernst Magnus, Breslau, Dr. Med. Paul Waltskehl, Darmstadt; Herr Frederich Hess, proprietor California Democrat, San Francisco; C. B. Schmidt, commissioner emigration A. T. & S. F.; W. A. Holabird, tourist agent A. T. & S. F.

(Volume 1, No. 4, p. 3)

SATURDAY, OCT. 13, 1883

Quite a large number of strangers have visited our town this week, the most of them taking the trip to the Grand Canon.

(Volume 1, No. 5, p. 3)

In just a decade since John Wesley Powell's expeditions on the Colorado River, the Grand Canyon at Diamond Creek was already an international destination

TIMELESS



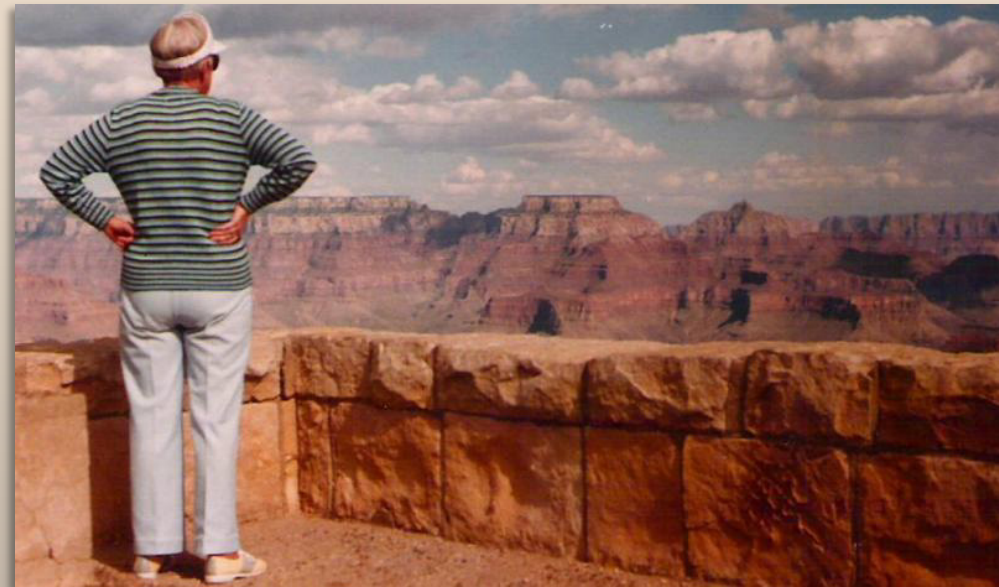
**1882 “The Transept, Kaibab Division, Grand Cañon
An Amphitheater of the Second Order”**

Thomas Moran in Clarence E. Dutton, *Atlas to Accompany the Monograph on the Tertiary History of the Grand Cañon District* (U.S. Geological Survey, Monograph 2, Atlas, 1882), Sheet XVIII ([detail, tinted here](#)). (Julius Bien and Co., Lithographers, New York)

1909 “In Silent Contemplation”

John T. McCutcheon, “Doing the Grand Canyon” *Appleton’s Magazine*, Vol. 13 (1909), p. 642

1984 Jeannette Spamer, Grand Canyon (Earle Spamer photo)



Coda :



"The start from Green River Station".
John Wesley Powell, *Exploration of the Colorado River of the West and its Tributaries*
(Government Printing Office, Washington, 1875), Figure 4.