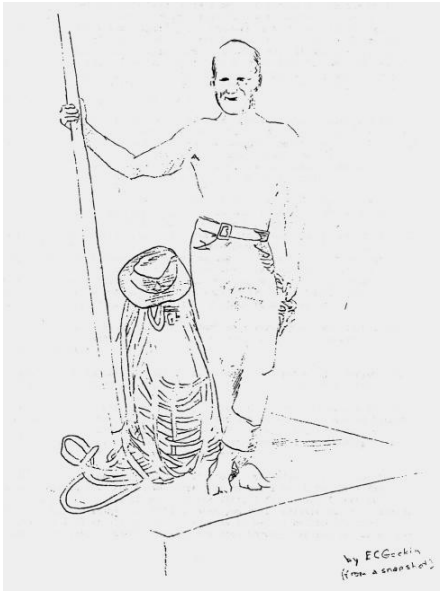
THE 1935 FAIRCHILD AERIAL SURVEYS OF LOWER GRAND CANYON



STARRING:
FRANK B. DODGE (rowing the *Fairchild)*

Featuring:
OWEN R. CLARK (rowing the *Collier)*;
&
MERRILL F. SPENCER (rowing the *Eliel*)

Introducing:
A. R. Eustace & **James Smith** (rowing the Unnamed)
— and never heard from again!

Richard "Q" Quartaroli, GTS, March 31, 2018

Dodge, #31 in 1923

Clark, #52 in 1937

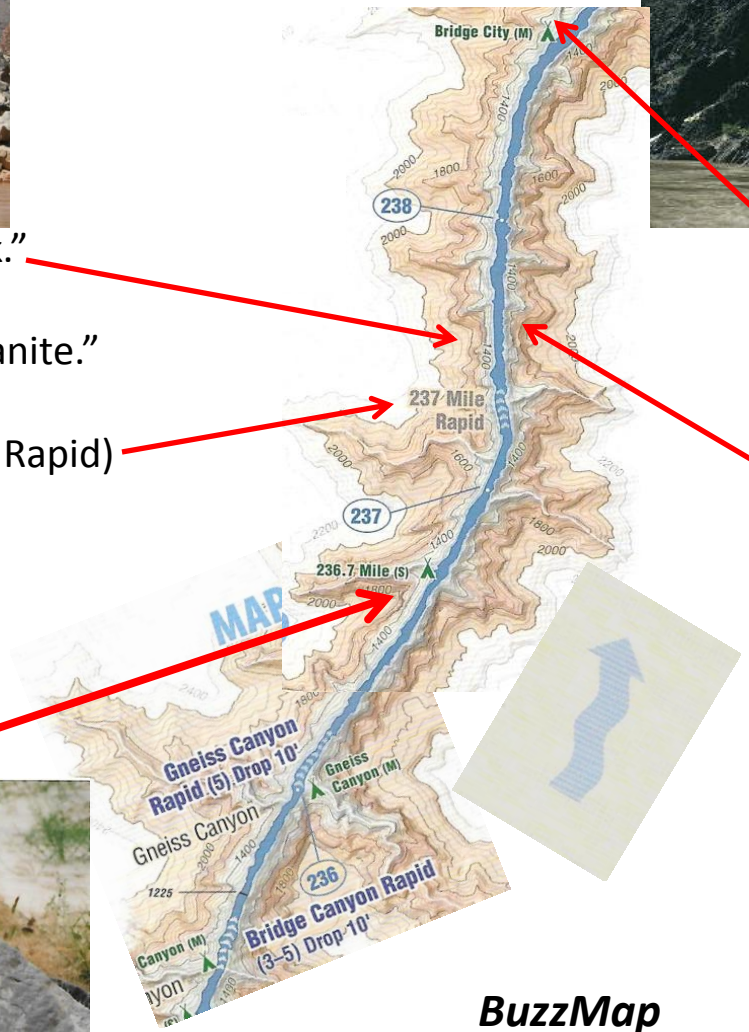
Spencer, #53 in 1937

"Fairchild Aerial Surveys" pictograph
Eric Keefer photo, ca. 1997

“Fairchild Aerial Surveys” pictograph **ENHANCED**
Eric Keefer photo, ca. 1997

"Deposit of red hematitic rock."
— Hamblin & Rigby, 1969
"A zone of hematite staining of granite."
— Karl Karlstrom, 2018
~ CRM 237.4, left (below 237 Mile Rapid)
Wayne Ranney photo

Bridge Canyon Damsite
survey camp
Katie Lee photo, 1953
NAU.PH.2014.22.3.2.43



Explosives magazine at site of proposed Bridge Canyon Dam, mile 237.5 on right. (Duwain Whitis)

Duwain Whitis photo
from *Guide to the CR in the GC, LF to SC*
6th ed., 2016

"Fairchild" pictograph
@ 236.7 Mile camp
Eric Keefer photo

BuzzMap
Grand Canyon, 2017
parts of "Maps 38 and 39"
courtesy Buzz and Loie

FAIRCHILD AERIAL SURVEYS, INC.

SHERMAN FAIRCHILD, founder, developed a camera that was fast enough to produce aerial surveillance photographs with minimal distortion during World War I.

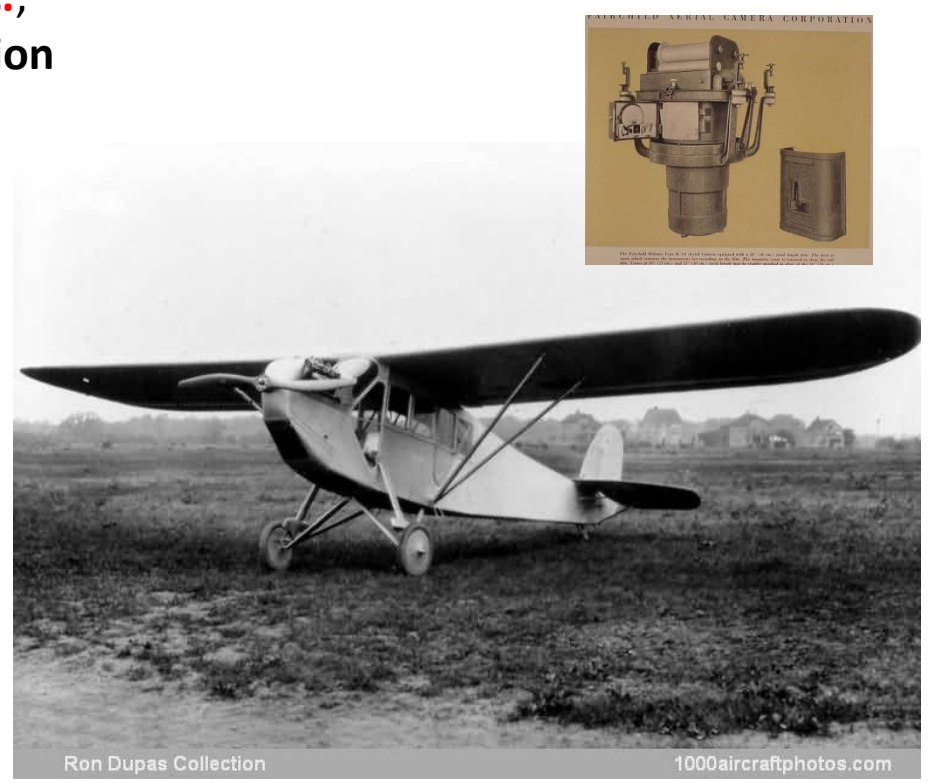
Founded over 70 companies, among which, for our purposes here:

1920: **Fairchild Aerial Camera Corporation** (later Fairchild Camera and Instrument);

1921: **Fairchild Aerial Surveys, Inc.**;

1925: **Fairchild Aviation Corporation**

https://alchetron.com/Sherman-Fairchild



RON DUPAS COLLECTION

No. 4444. Fairchild FC-1 (c/n 1)

Photographed ca. 1926, courtesy The Fairchild Corporation

http://1000aircraftphotos.com/Fairchild/4444.htm

WHAT'S GOING ON AT THE TIME?

1929 Oct. 24: **Stock Market Crash**

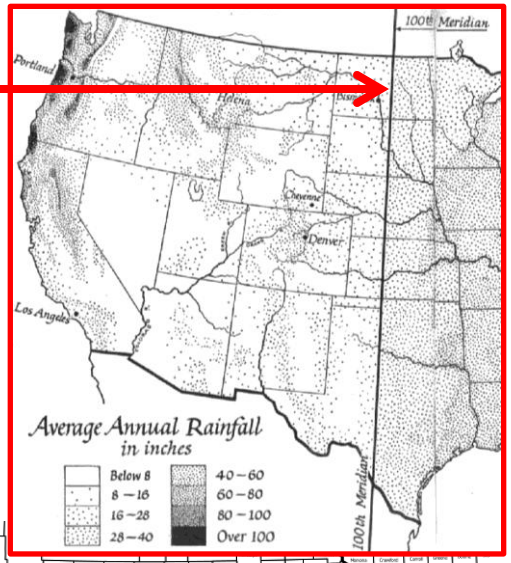
1929 - ~1941: **Great Depression**

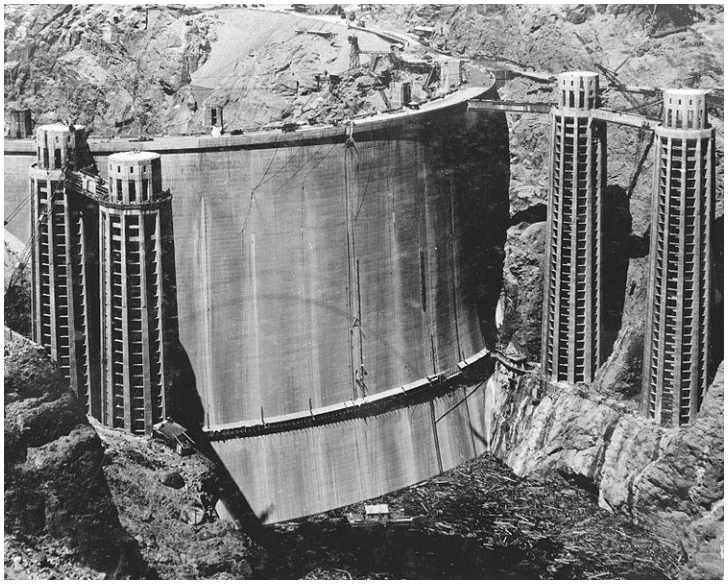
1931 Mar. – 1935 Sep. 30: **Boulder/Hoover Dam** being built

1930s ("Dirty Thirties"): **Dust Bowl** (drought 1934, 1936, 1939-40)
West of the 100th Meridian on the High Plains to the Rocky Mtns.

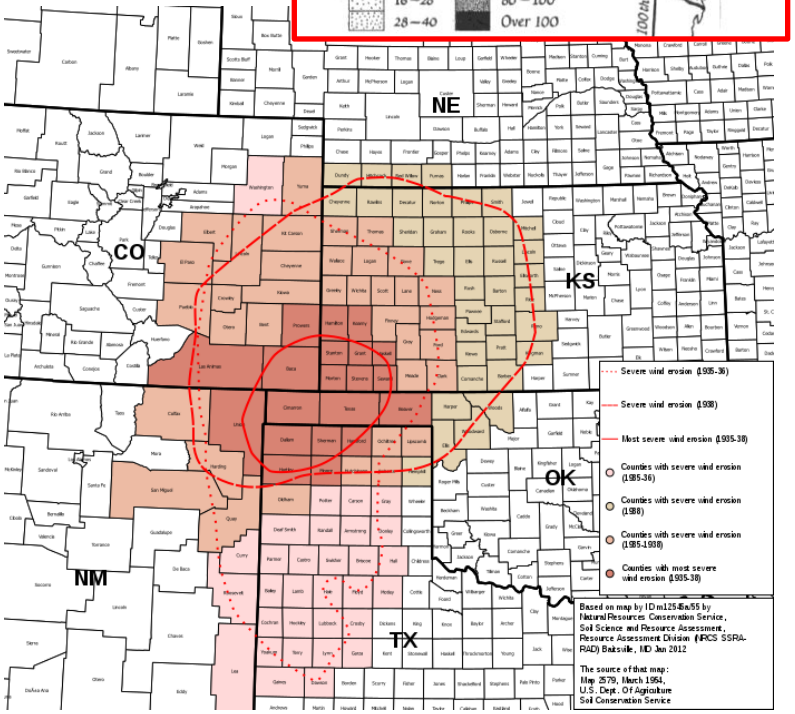
1935 Apr. 27: Soil Conservation Act created **Soil Conservation Service**
(from the Soil Erosion Service)

100th Meridian or
"Line of Aridity"

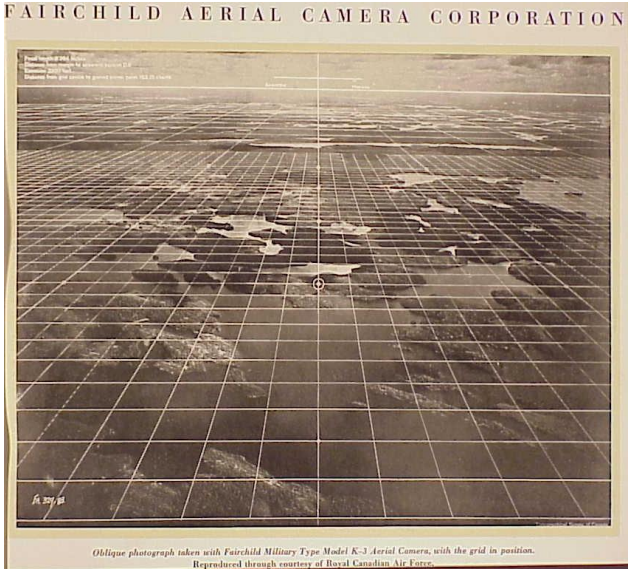




The upstream face of the dam and appurtenant works as seen from high point upstream on the AZ rim of Black Canyon. Water surface elev. 790', **May 22, 1935**.
http://www.usbr.gov/lc/region/g5000/photolab/gallery_detail.cfm?PICIDTYPE=7926

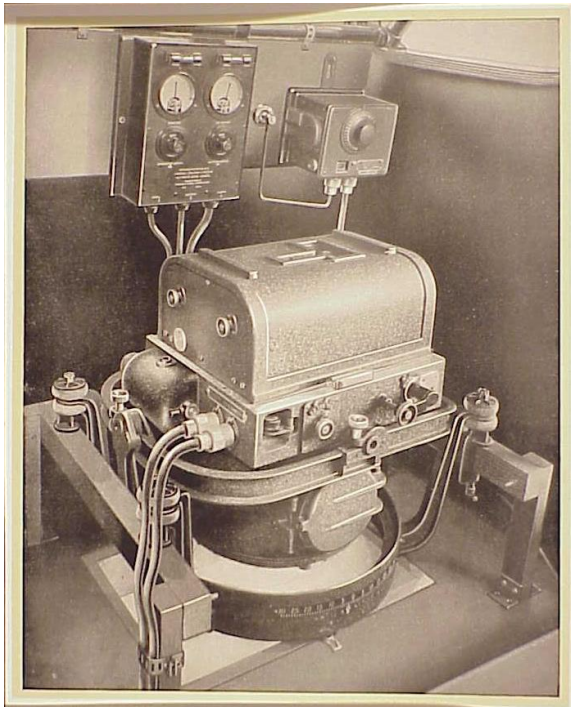


By Soil Science and Resource Assessment, Resource Assessment Division (NRCS SSRA-RAD) (Division of the U.S. Dept. Of Agriculture) - Based on map by ID m12545a/55 by Natural Resources Conservation Service, Soil Science and Resource Assessment, Resource Assessment Division (NRCS SSRA - RAD) Baitsville, MD, Jan 2012. The source of that map: Map 2579, March 1954, U.S. Dept. Of Agriculture Soil Conservation Service
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/about/history/?cid=stelprdb1049437,
Public Domain, https://commons.wikimedia.org/w/index.php?curid=55035567



Oblique photograph taken with Fairchild Military Type Model K-3 Aerial Camera, with the grid in position.
Reproduced through courtesy of Royal Canadian Air Force.

Fairchild Aerial Surveys, Inc.
contracted in **1935** by the
Soil Conservation Service
to do aerial surveying
and mapping of
Lower Grand Canyon
and **Lake Mead…**



Oblique Aerial Mapping View, illustrating method of oblique photographing for mapping purposes. The relative

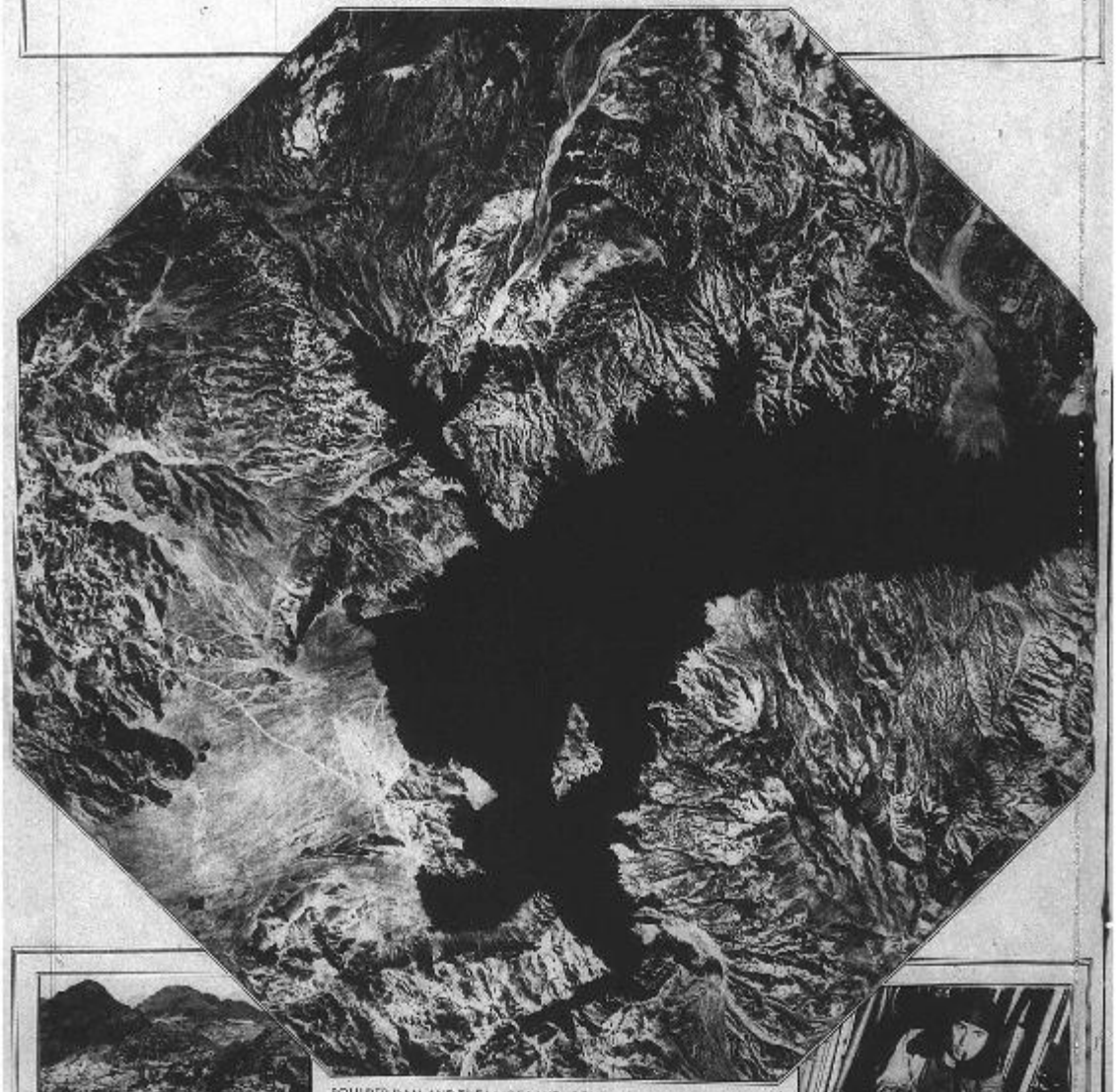
"…undertaken specifically to establish an adequate basis for future measurements of the loss of storage capacity expected from the heavy load of sediment borne into the reservoir by the Colorado River."

--Carl B. Brown
"Mapping Lake Mead"
Geographical Review
31(3)(Jul. 1941):385-405

The New York Times

THE WORLD'S LARGEST DAM

Photographed by the World's Largest Camera



BOULDER DAM AND THE HUGE LAKE ABOVE, PHOTOGRAPHED FROM A HEIGHT OF 20,000 FEET EARLY IN AUGUST, WHEN THE RESERVOIR REACHED ITS HIGHEST LEVEL FOR THE YEAR

Probably the largest vertical photograph ever made, this picture covers an area of more than 200 square miles. Picture of the lake here [illegible] built for the United States Coast and Geodetic Survey with the cooperation of the Bureau of Standards and

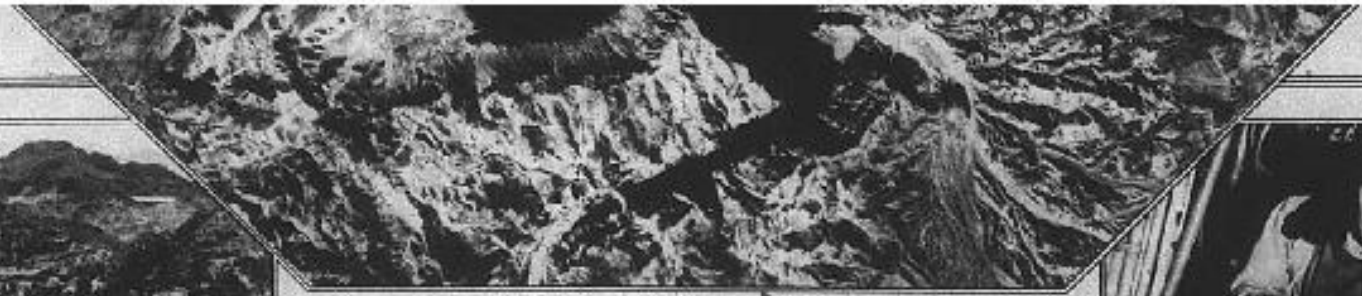
Rotogravure Picture Section

The New York Times

Sunday, September 1, 1935

THE WORLD'S LARGEST DAM

Photographed by the World's Largest Camera



BOULDER DAM AND THE HUGE LAKE ABOVE IT PHOTOGRAPHED FROM A HEIGHT OF 20,000 FEET EARLY IN AUGUST WHEN THE RESERVOIR REACHED ITS HIGHEST LEVEL FOR THE YEAR

BOULDER DAM AS IT APPEARS FROM THE GROUND: A PHOTOGRAPH OF THE DAM
Taken From a Side of the Canyon, With the Waters of the Lake Rising at the Right of the Picture.
(Photo by U. S. Bureau of Reclamation.)

Probably the largest vertical photograph ever made, this picture covers an area of more than 200 square miles. Pictures of the lake have been taken regularly for the United States Government each time the water rose 20 feet since the dam started to fill. The photographs are being used to make an exhaustive silt study in the program of soil erosion control to protect the life of the reservoir.

In the photograph Boulder Dam itself appears as a semi-circle near the bottom, with the huge reservoir, the greatest man-made lake ever created, in the centre of the picture.

The newly developed aerial camera, built for the United States Coast and Geodetic Survey with the cooperation of the Bureau of Standards and the Fairchild Aerial Camera Corporation, weighs 275 pounds and has ten lenses mounted in two sets of five. A master electric trigger snaps the ten lens shutters simultaneously, exposing ten negatives which make a complete overlapping octagonal print measuring 32 by 32 inches.

Capable of covering 760 square miles at an altitude of 30,000 feet, the camera is expected to prove invaluable in bringing the last unknown wildernesses within the range of study of scientists.

(Photo © Fairchild Aerial Surveys)

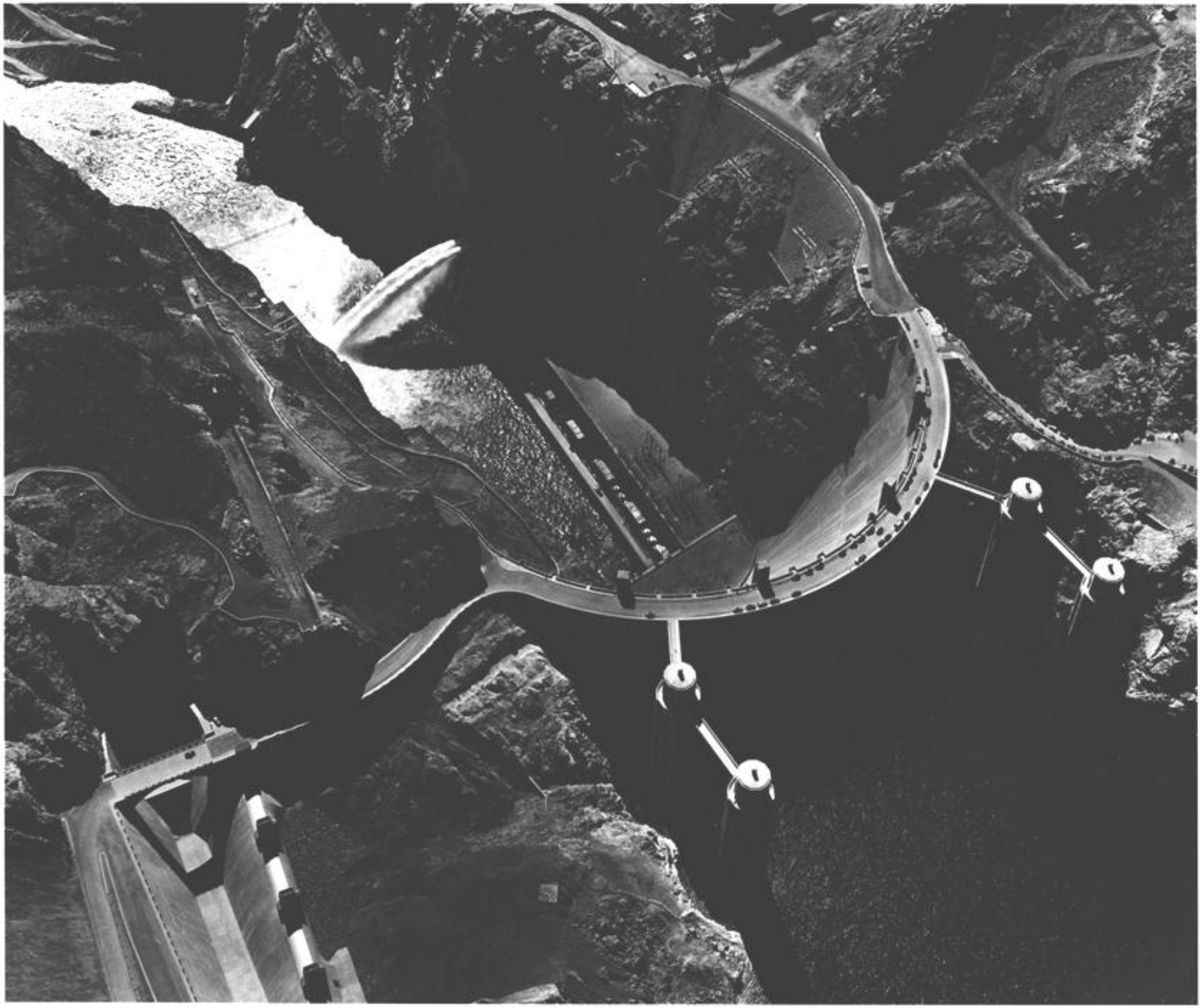
THE MAN WHO MADE THE PICTURE: WILLIAM WEEDEN
Demonstrates How He Operates the Aerial Camera at High Altitudes as He Holds an Oxygen Tube in His Mouth.
(Times Wide World Photos, Los Angeles Herald.)

Giant Camera to Aid War on Soil Erosion

The world's largest aerial camera is in Los Angeles. Shown here with it are William Weber, aerial photographer, left, and E. R. Polley, executive of firm which under government contract is making soil erosion survey of 85,000-mile area in Southwest. Wide World photo

Los Angeles Times
July 22, 1935

Huge Aerial Eye Built to Survey Vast Area



BOULDER CITY, NEVADA

←|→ BOULDER DAM

21 APRIL 1937

Boulder Dam was the largest federal public works project initiated by the Roosevelt administration during the Great Depression. It spans Black Canyon on the Colorado River, near the Arizona-Nevada border. The dam's construction was an epic in itself, requiring 6.5 million pounds of explosives and 4.4 million cubic yards of concrete. Novelist Frank Waters described Boulder as "the Great Pyramid of the American Desert" and "a visual symphony written in steel and concrete." It was the tallest dam in the world when completed in 1935, measuring 726.4 feet from its base and 1,244 feet along the crest. The dam was renamed in 1947 in honor of Herbert Hoover. These images reveal the splendid abstract forms of the dam and its quartet of intake towers —each 33 stories tall. In both of these views, immense plumes of water jet out of the upper outlet gates. A Fairchild FC-2 flies a mapping job high above the dam and Lake Mead in the second.

A **Fairchild FC-2** flies a mapping job high above **Hoover Dam** and **Lake Mead**

LAKE MEAD

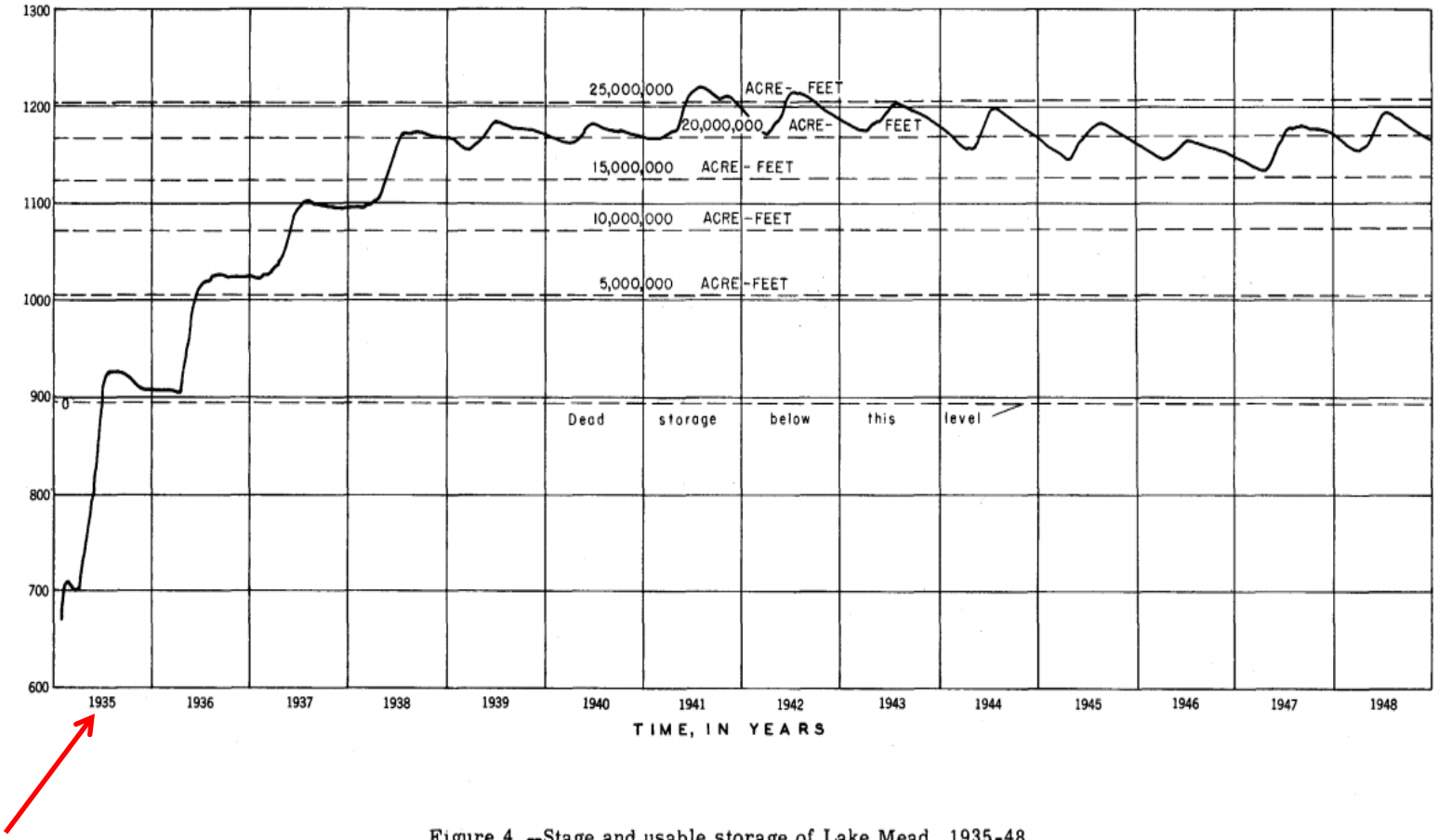
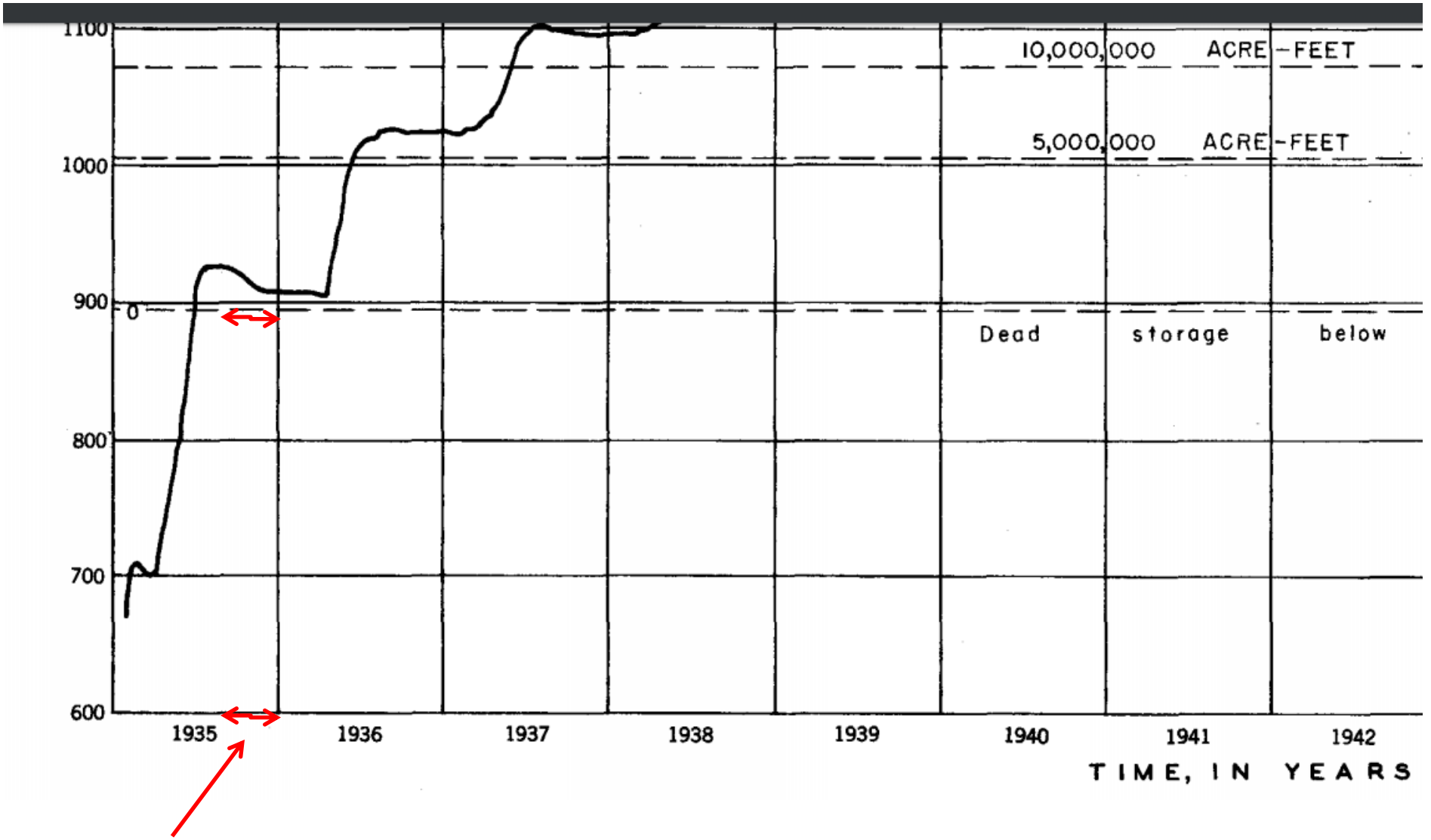


Figure 4.—Stage and usable storage of Lake Mead, 1935-48.

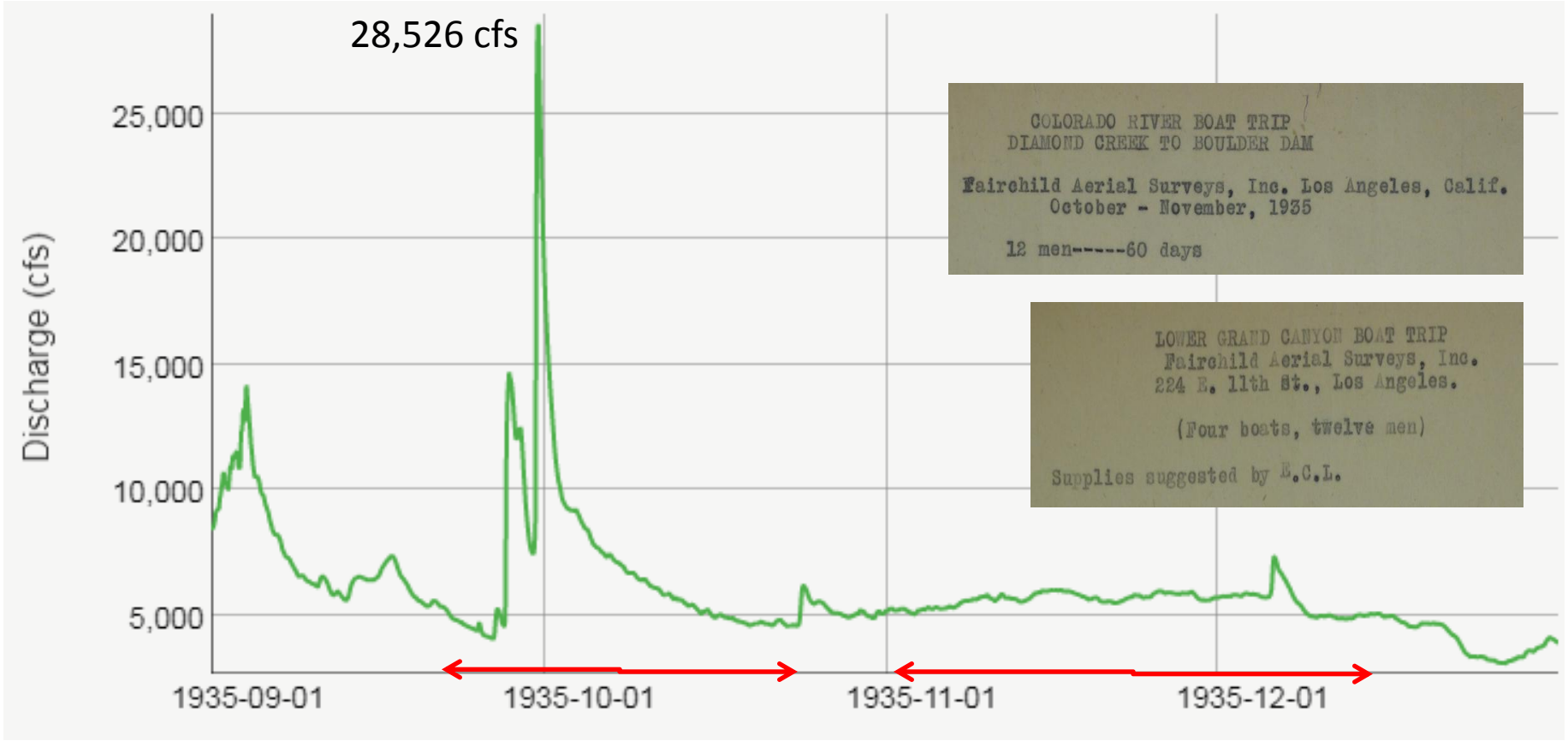

1100
1000
900
800
700
600
10,000,000 ACRE-FEET
5,000,000 ACRE-FEET
0
Dead storage below
1935
1936
1937
1938
1939
1940
1941
1942
TIME, IN YEARS

Colorado River near Grand Canyon, AZ

09402500 Gage near Phantom Ranch

Sept. 1 – Dec. 31, 1935

Graph from: gcmrc.org



1st trip, 30 days, Sep. 21 to ~Oct. 20
(or Sep. 23 to Oct. 23)

Put out flags/set survey signals; deposit food caches

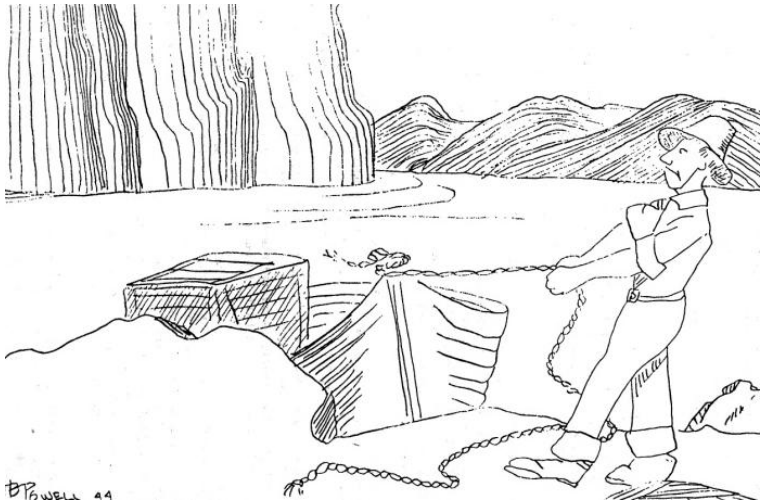
2nd trip, ~45 (or 42) days, Nov. 2 to Dec. 13

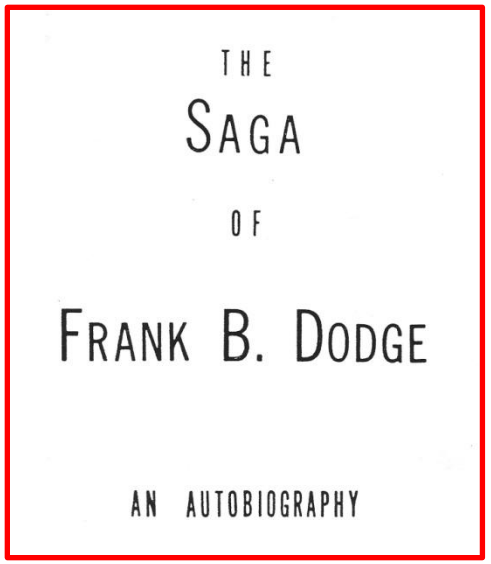
Took cross sections

FRANCIS "FRANK" BEVERLY DODGE (1891-1965)

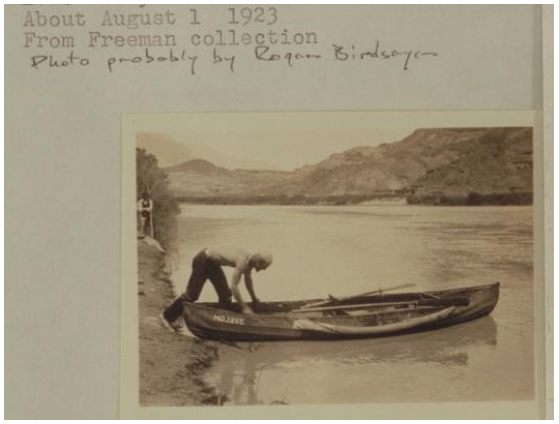
BOATMAN (#31 on Dock's list of First 100 thru GC on CR)
rowing ***FAIRCHILD*** (named after founder Sherman Fairchild)

1921: upstream into Glen Canyon w/ E. C. La Rue;
1923: USGS Birdseye Expedition, rodman (LF to Needles), boatman (to Cave Springs)
canvas boat *Mojave*, LF to Needles;
1927: boatman, Pathé Bray movie trip, *Pride/Bride of the Colorado*, GR/UT to Hermit;
1935 (Aug): upstream LF to Rainbow Bridge, several tour trips w/Doc Inglesby;
1935 (Sep-Dec): head boatman/trip leader, Fairchild Aerial Surveys, 2 trips DC to PF;
1937: head boatman ($300/month), Carnegie/CalTech, LF to PF;
Various dates: USGS gager, observer, laborer, recorder, mostly Lee's Ferry but also San Juan



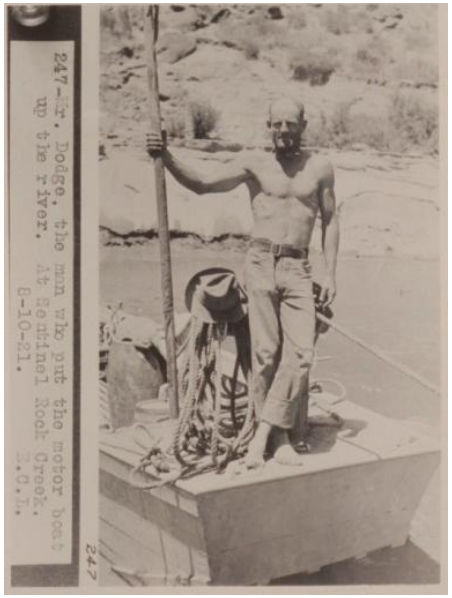


FRANK DODGE



1923, USGS, in the canvas boat *Mojave* (LF to Cave Springs Rapid)

@ Sentinel Rock Creek
Glen Canyon w/La Rue
Aug. 10, 1921, *Navajo*



The Thinker, 1937, NAU.PH.94.27.171

Photos from:
NAU Cline Library and
The Huntington Library

@ Travertine
1937, Carnegie-Caltech

1923 USGS Birdseye Expedition:
Lint, Blake, Word, Birdseye, Moore, Burchard, La Rue, Freeman, and Kolb
Not pictured: Frank Dodge

"If anybody wants to know why I'm not in the group picture, it's because I swam the river on some errand for Birdseye and while talking to Cockroft (Edison Co.) about it, he said 'Frank, want a cup of my fig wine?' I had a cup and then another and then reported back to Birdseye. When Birdseye became three Birdseyes, I hunted a shady spot and passed out. ***That was very potent wine or perhaps the heat had something to do with it."***

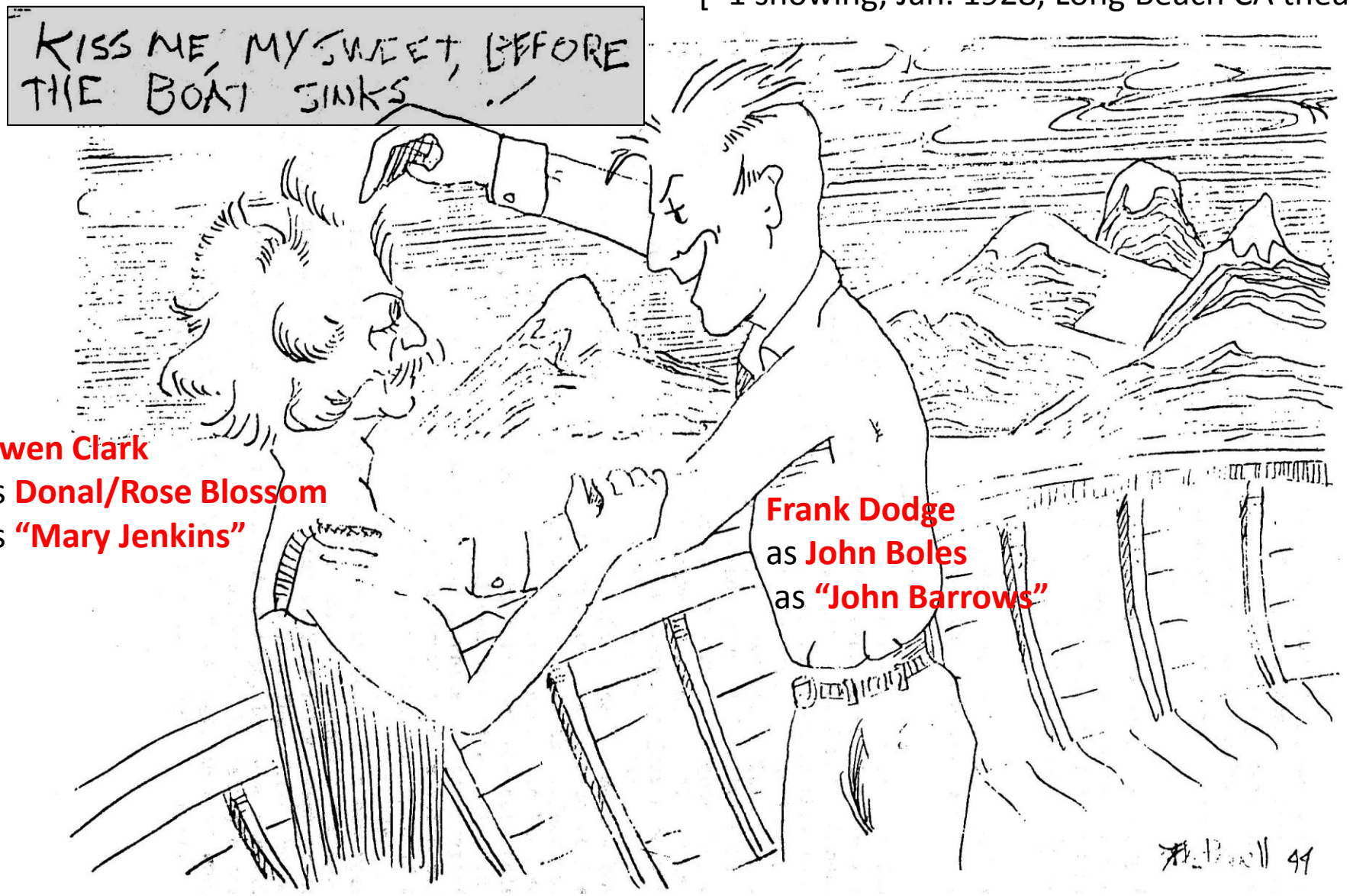
Frank Dodge (1923), in *The Saga of Frank B. Dodge*

1927 Pathé-Bray silent movie trip

Bride/Pride of the Colorado

GR UT to Hermit Rapid (w/Owen Clark)

[~1 showing, Jan. 1928, Long Beach CA theater]



Owen Clark
as **Donal/Rose Blossom**
as **"Mary Jenkins"**

Frank Dodge
as **John Boles**
as **"John Barrows"**

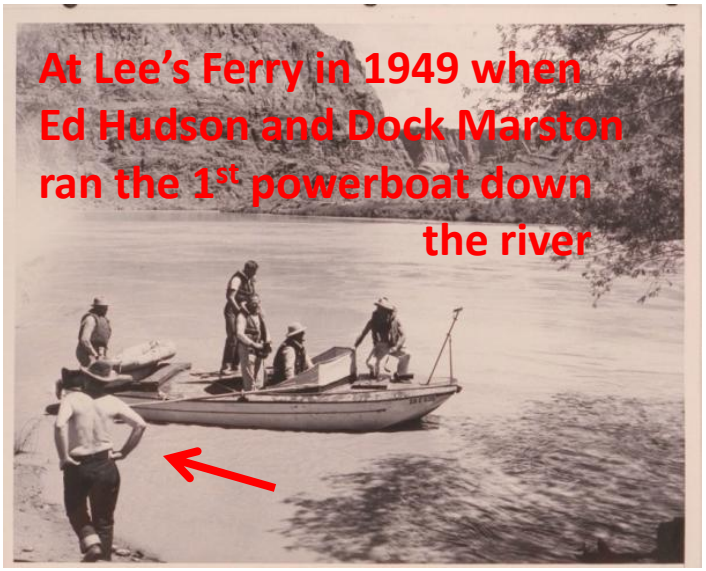
OWEN ROBERTS CLARK

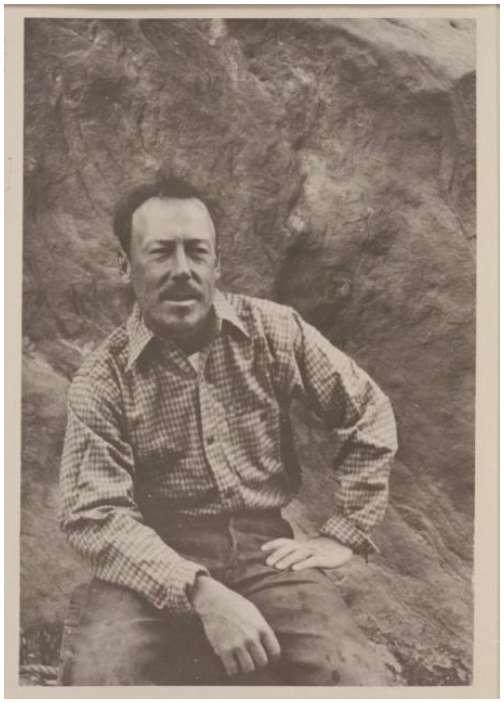
BOATMAN (#52 on Dock's list of First 100 thru GC on CR)
rowing ***COLLIER*** (named after Charles W. Collier,
photogrammetric inventor & with Soil Conservation Service)

1923-30 (not cont.): Lee's Ferry custodian (for Coconino County and USGS); gager/recorder/ hydrographer (Lee's Ferry, San Juan River, Grand Canyon);
1927: boatman, Pathé Bray movie trip, *Pride/Bride of the Colorado*, GR/UT to Hermit;
1935: boatman, Fairchild Aerial Surveys, 2 trips DC to PF;
1937: boatman ($250/month) & cook, Carnegie/CalTech, LF to PF

Dodge comments about Clark:

"Homely but worth more than all the rest combined."
"Was with me in 1927 w/Bray-Pathe outfit, last Fall on the Fairchild job, is the best man available. He is a fine camp cook."
"I'd hate to go through without Clark. He is a natural."





MERRILL F. SPENCER (1898-1992)

BOATMAN (#53 on Dock's list of First 100 thru GC on CR)
rowing ***ELIEL*** (named after Leon T. Eliel, photogrammetric eng. & VP)

1934 (Oct. 1-8): boatman (*Ethel*)/trip leader, LF to BA, vacation trip (w/a little illegal hunting) w/Harry Simpson, who lost boat (*Tally)* in Sockdolager;
1935: boatman, Fairchild Aerial Surveys, 2 trips DC to PF;
1937: boatman ($200/month), Carnegie/CalTech, LF to PF;
Various dates: USGS gager @ Lee's Ferry;
Johnson family (Lee's Ferry) relation

Dodge comments about Spencer:
"Spencer is the other man – had him on the Fairchild job. He is a good boatman and a hard worker. Both Clark and I have had more experience than Spencer, but then, so we've had more than any others I could get. He is good."

"I was picking him to be my third boatman. He is fairly good with a boat and extra fine with camp chores. Does not have to be pushed. Is not a Communist, is pleasant, open minded and easy to get along with. Would work well under myself or Clark."

THE REST OF THE RIVER CREW:

A. R. EUSTACE, BOATMAN (Lee's Ferry, AZ)

JAMES SMITH, radio operator, became BOATMAN (Pasadena, CA)

Edward A. Schuch, chief photogrammetric eng., S.C.S. (took boat photos)

F. H. Woody, civil engineer (Los Angeles , CA)

W. B. Wisenand (Whisenand?), civil engineer (Los Angeles , CA) (has photo album)

Newton Milley, surveyor? (Matheson, CA)

Clyde Wainright, surveyor (Phoenix, AZ)

Wayne Yates, guide (St. Thomas, NV)

[2 more men joined 2nd trip, govt. men who had been on Miss. R.]

MAYBE ON THE RIVER CREW:

Leon T. Eliel, photogrammetric engineer (Fairchild Aerial Surveys, Inc.)

OFF-RIVER PLANNING AND LOGISTICS:

Eugene C. La Rue, consulting engineer (Pasadena, CA)

[Geologist on the 1923 USGS river expedition;
#33 on Dock's list]

[Dodge may have forgotten the 4th boatman's name – news article has it as **A. R. Eustace**; Dodge may have been confused by Dock's request for info about Harry Simpson, who was with Merrill Spencer in '34, Lee's Ferry to Bright Angel.]

[Owen Clark told Dock that there were **3 boats on the 1st trip** and **4 boats on the 2nd**.]

Letter, Frank Dodge to Dock Marston, July 17, 1951

"I'd forgotten ~~Simpson's~~ [Eustace's] name but how well I do remember him!

"Previous to the take off at Diamond Creek for the Fairchild Survey, I was sitting in my cabin at Lees Ferry when Spencer and Simpson drove up.

"Now I had Owen C. and Spencer lined up for my boatmen but still needed another for the fourth boat and did not know exactly where to look for one in that desert locale.

"When Spencer sort of shoved ~~Simpson~~ [Eustace] to the fore and asked, Why don't I try this guy. I asked what his qualifications were. Well, he said he'd never seen anything as rough as the Colorado but had played with boats off and on during a life time and if I wanted, he would be glad to go down to the river and demonstrate.

"Well, if I'd just done that I'd have saved hurting a man's feelings and some submerged laughs on my part.

"It being only about 55 miles between Diamond and Pierce Ferry (2 trips) I was willing to take a chance." (cont….)

(…cont.) *"As we took off at Diamond C. in this order – me, Owen, Spencer and ~~Simpson~~ [Eustace] – I stuck around in order to see what my fourth boatman was like.*

"God help me if he didn't crawl on hands and knees from the bow across the forward deck and fall into the cockpit where he began fumbling with the oars. When he got these straightened out he began to look from right to left and left to right at the oar blades. By this time he was up river in a back eddy so I called to him to do this & that and every time he was to start, he'd have to sit awhile and ponder the move, exactly like an old man starting to drive his first car.

*"During the forenoon I stayed with him and after lunch had to relieve him. Luckily the radio operator was a young Cal. Tech student [**James Smith**] and could manipulate oars good enough and very willing to take over the boat.*

"Poor ~~Simpson~~ [Eustace] was put to back packing for one of the two survey crews.

"Every time he could get me aside he'd say, 'Dodge, if you'd only give me a chance, I know I can make good, you've just not given me a chance.'"

Letter, Frank Dodge to Dock Marston, July 17, 1951

"Our survey parties which daily scrambled up to the first bench about a thousand feet above the river…made it safely over a period of three months without resorting to any special climbing paraphernalia other than strong finger nails." Leon T. Eliel

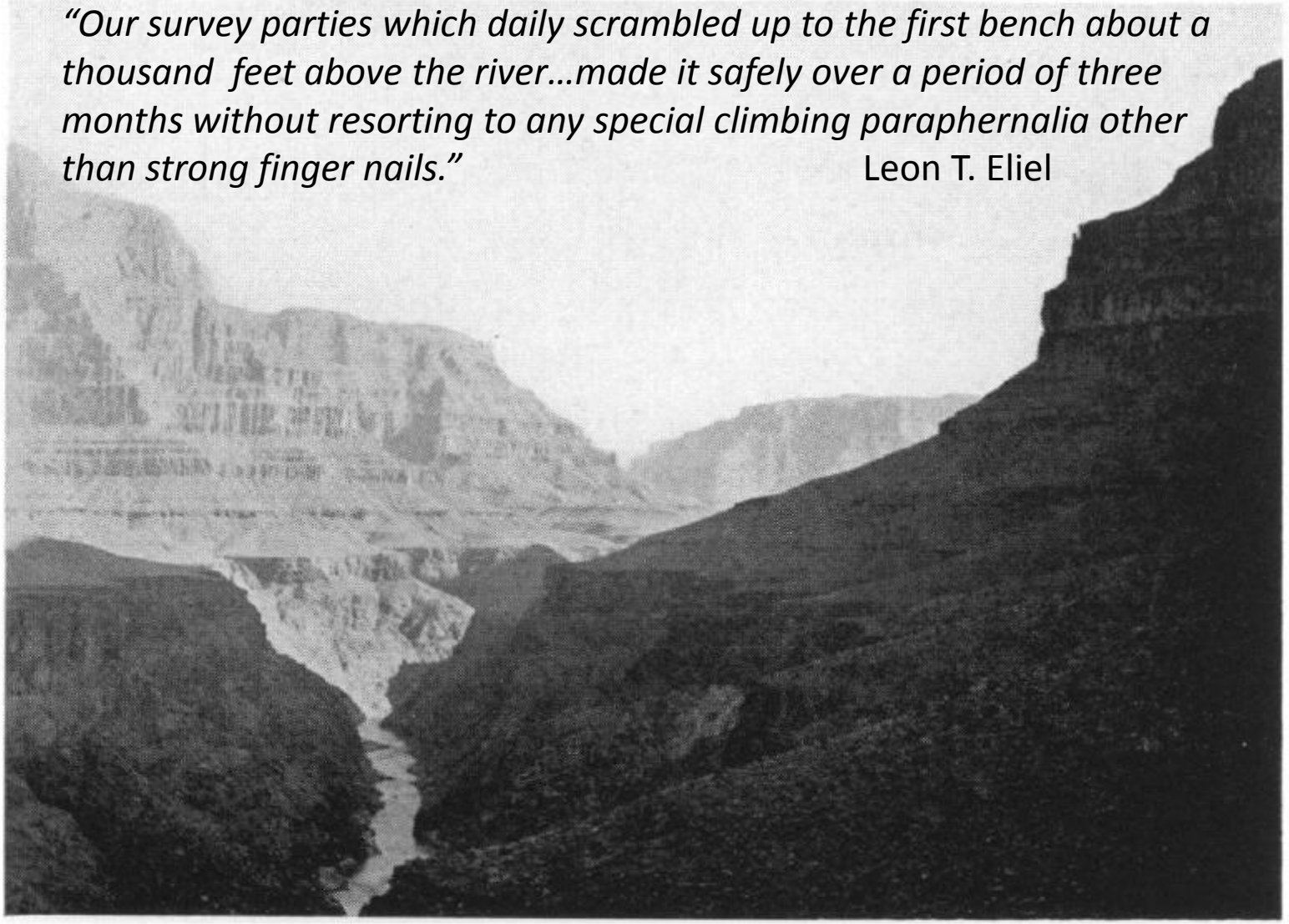
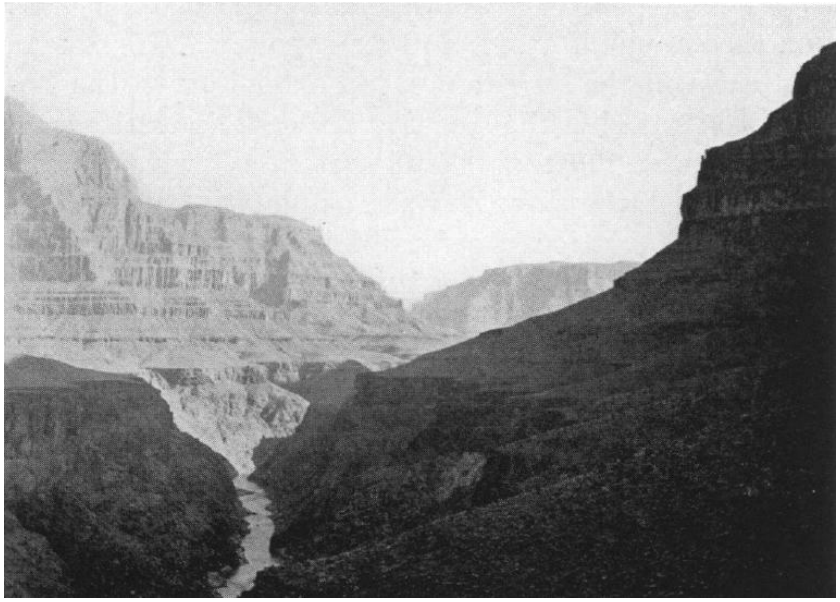


FIG. 4—The Tonto platform in the Lower Grand Canyon near the upper end of Lake Mead. Much of the triangulation was established on this platform. Granite Gorge in the lower left foreground. (Photograph by E. A. Schuch.)



Frank Dodge (1935)
The Saga of Frank B. Dodge

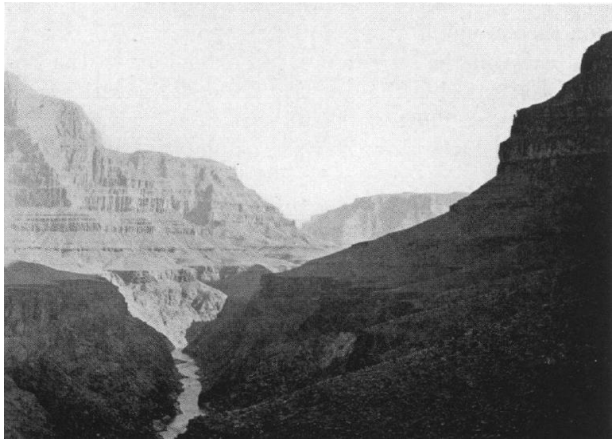
*"In **September 1935, Fairchild Aerial Surveys** (L.A.) were ready to tie their photos to their ground control and needed a boat party to **traverse the river below Diamond Creek and above Pierce Ferry**. I was hired as head boatman, went to L.A. where **four boats** were building under **LaRue**'s supervision and helped organize the party.*

*"We arrived in Peach Springs soon after, got the boats to the river by Indian wagons and over the worst road I'd ever seen and took off for **30 days** on the river over a stretch of **55 miles**.*

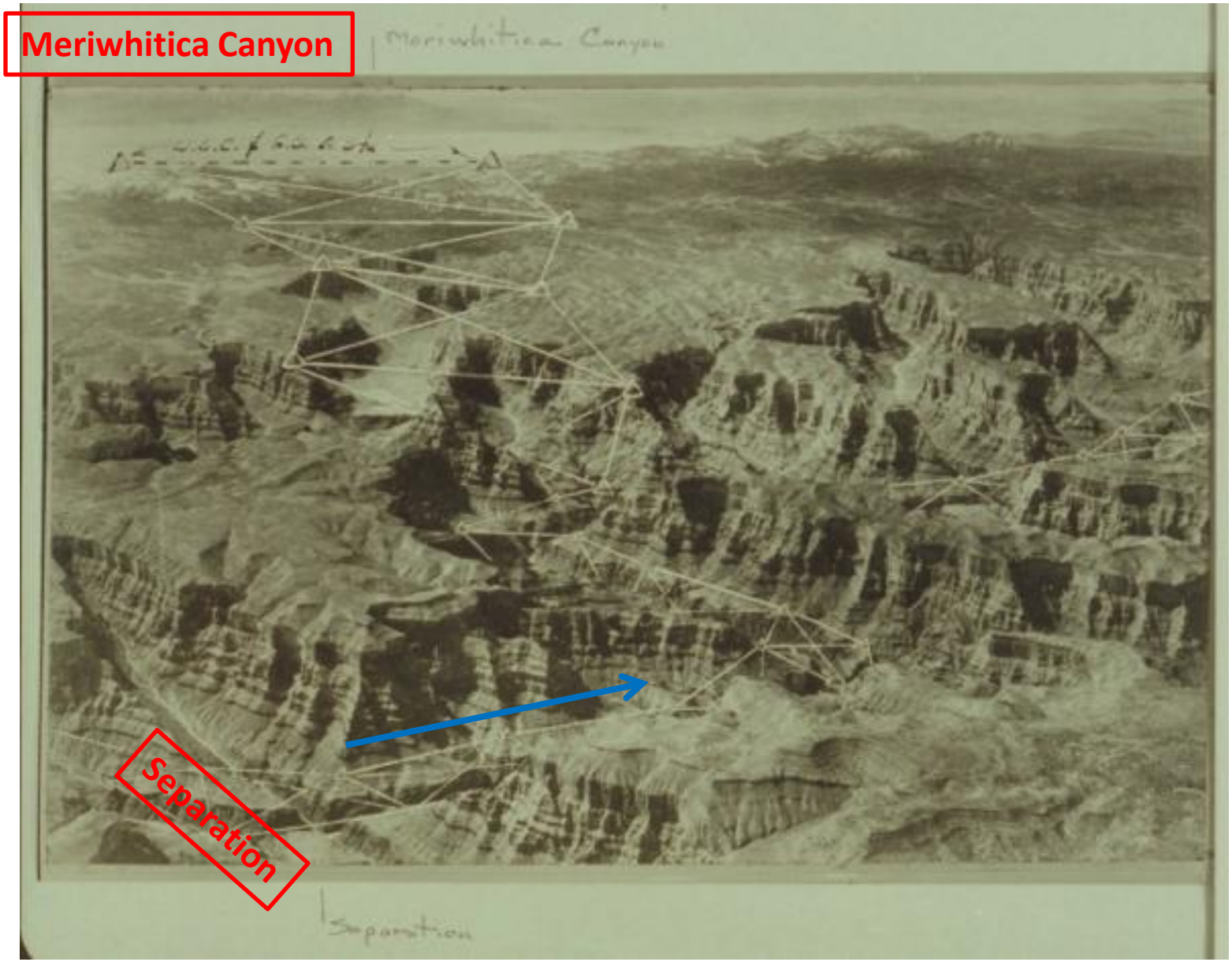
*"There were **two transitmen** and **two back packers apiece for them** – then I had **Owen Clark** again as a boatman and **two unknowns, Spencer and another fellow I picked up here**; also there were **two army engineers with a lot of high-falutin ideas** of what they were going to do on the river which turned out to be nothing more or less than to entertain us with their comedy.* (cont…)

(…cont.) *"This was a **Soil Conservation** contract that Fairchild had – something like $70,000.00 worth and these army engineers were to investigate scouring, high and low water differences and other dope that if obtainable could only be had through the Survey. Anyway, their spanning and sounding gear stayed under the hatches while they stuck close to the camp fires and spieled story after story for our benefit. We also had a **young Cal.Tech. student [James Smith] as radio sender and receiver who was not only a nice kid but was able to take over one of the boats when one of my regular boatmen [A. R. Eustace] failed to be a boatman as he had said.***

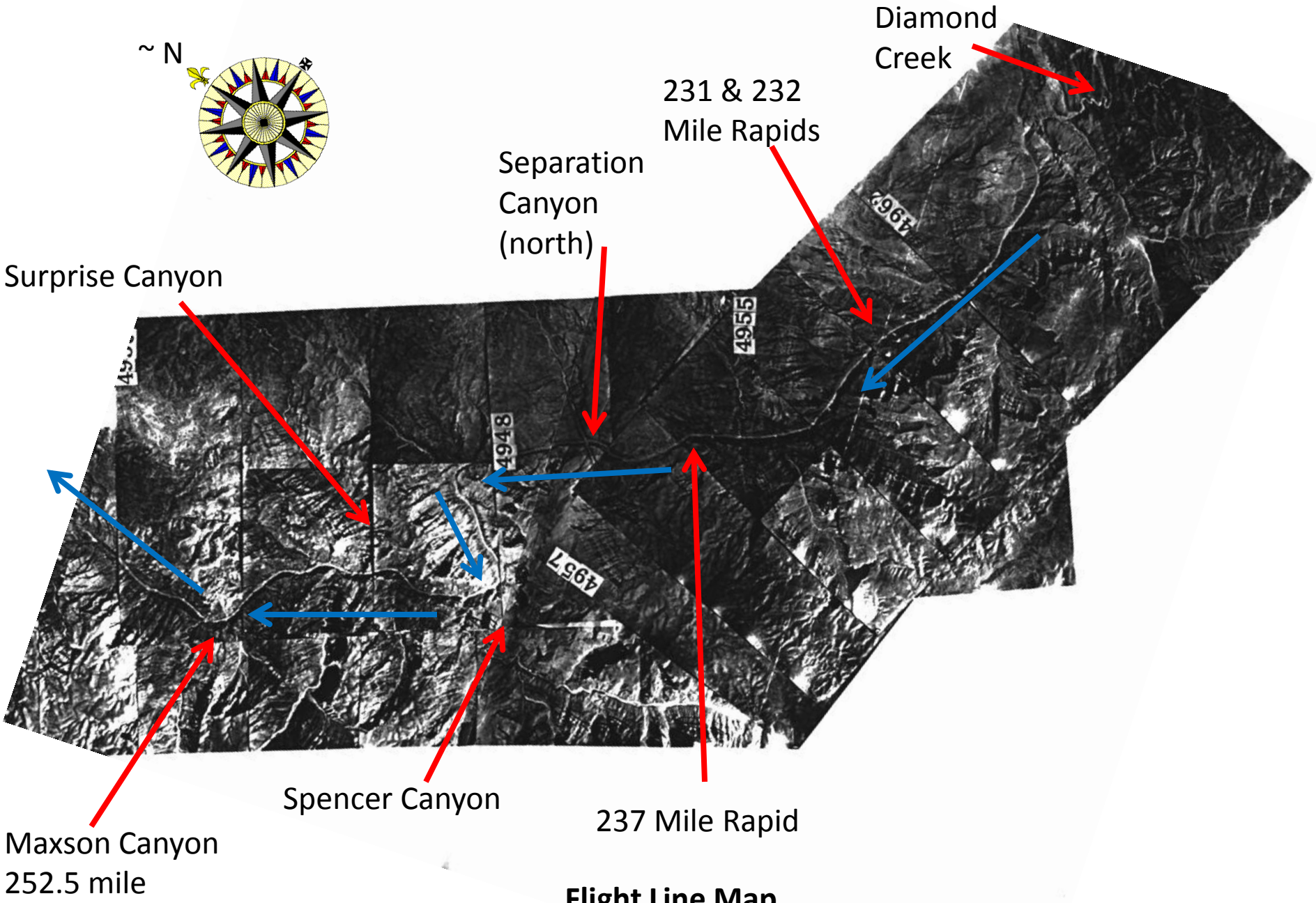
*"We planted **trig. [triangulation] stations** on top of the Tonto plateau on the first trip through and on the **second (45 days) tied these in to the photos**. This was a very pleasant job, and we used several types of bombs, rockets, etc., at nightfall to let the land worker know where camp was located. It took control to resist putting on a 4th of July celebration every night. We had enough Rockets to use about two each night, and it was a sight to see them rise up through the inner gorge to 800 or 1,000 ft. and explode in a shower of glory. Often in the afternoon I'd climb to the bench, join some party and scour the opposite bench for the other party, and this is where the small bombs came in. Sometimes one could pick them up without the fireworks but often not –then a joint explosion would be heard, a white puff of smoke appear, and we'd have them located."*



Frank Dodge (1935),
The Saga of Frank B. Dodge

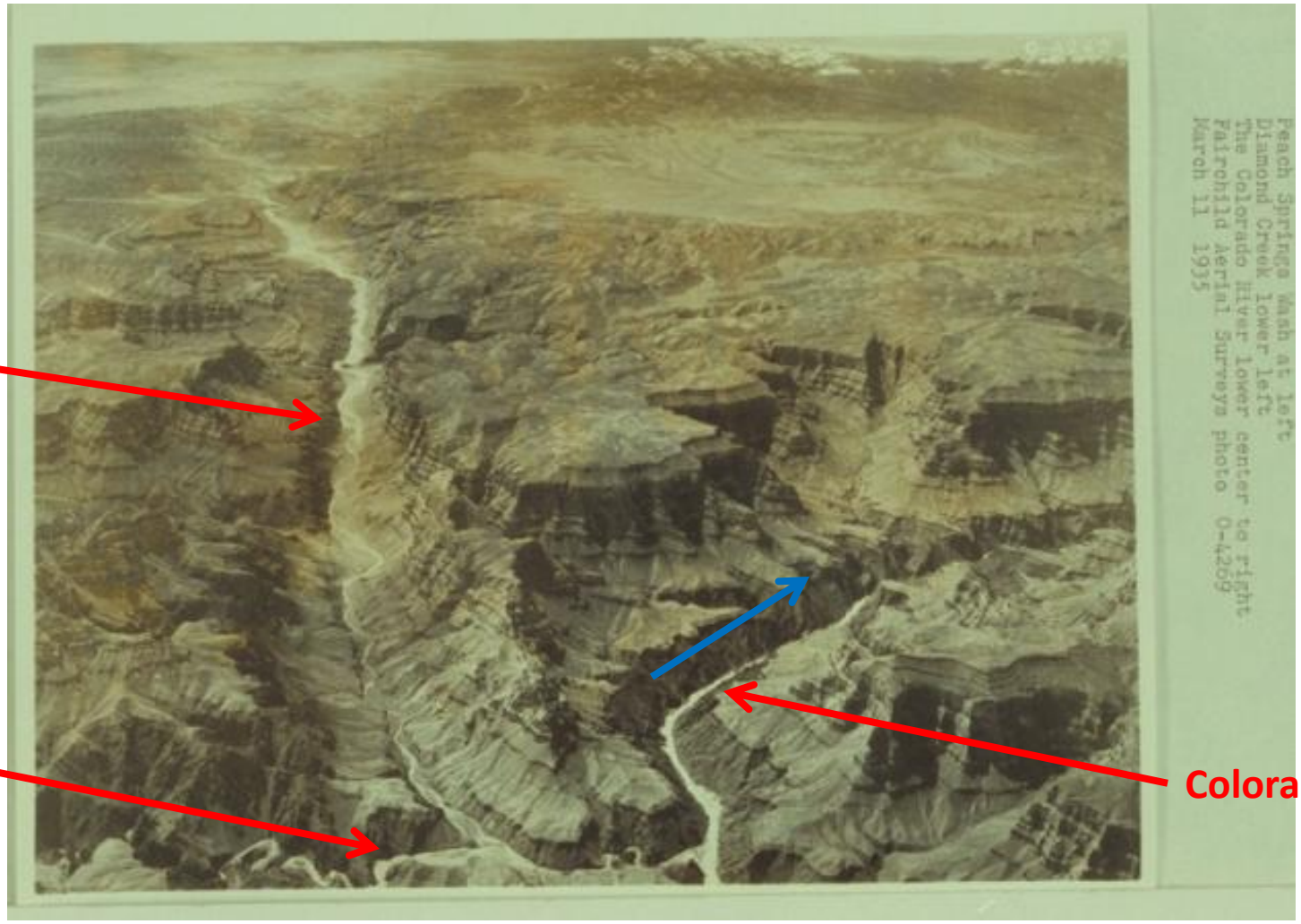


Triangulation brought in by Fairchild in 1935. Separation is at lower left.
Upper left is Meriwhitica Canyon. The spring makes the dark line under the triangulation line.
Copied from Whisenand's album of the 1935 Fairchild Survey.



Flight Line Map

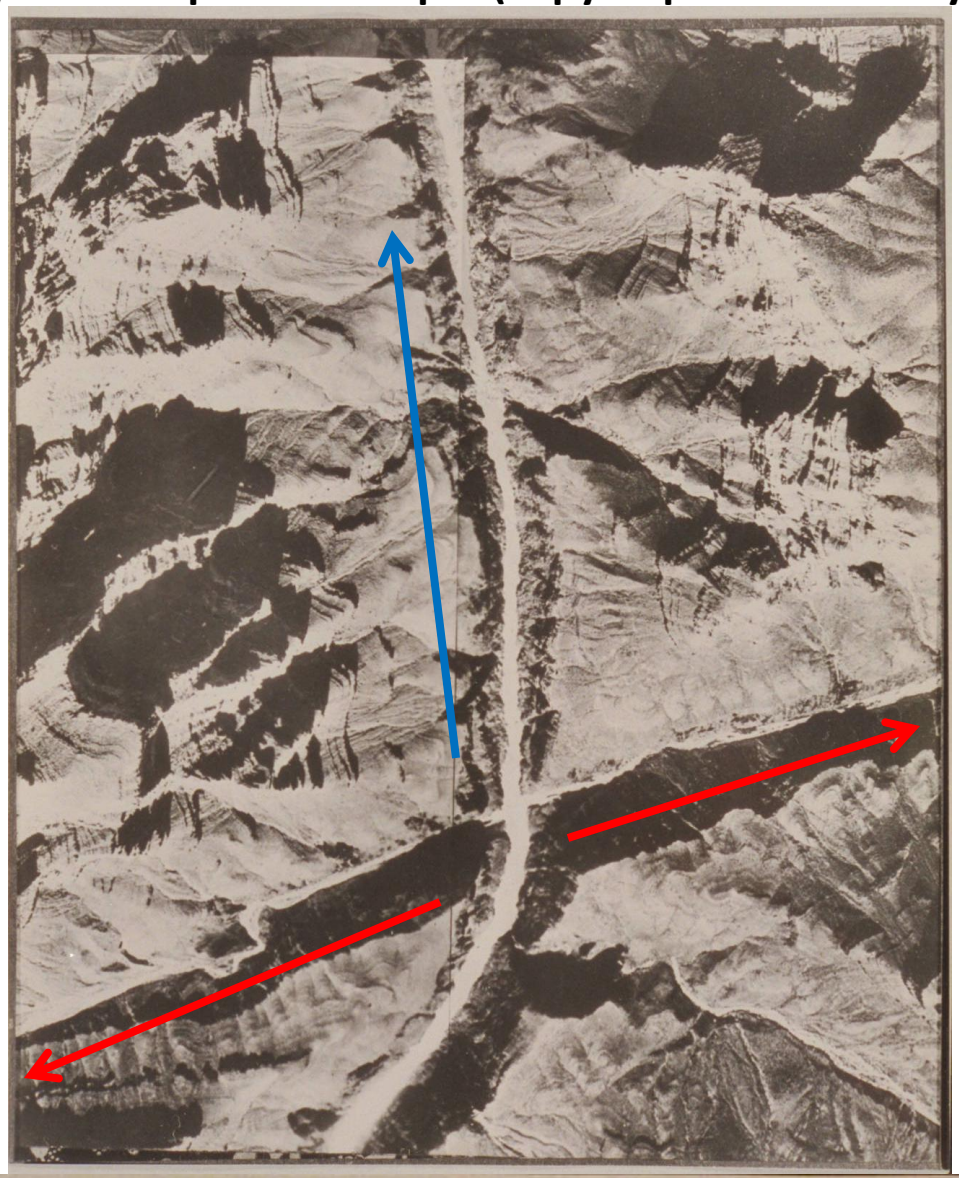
Whittier College, Fairchild Aerial Surveys Collection 4305



Peach Springs Wash at left
Diamond Creek lower left
The Colorado River lower center to right
Fairchild Aerial Surveys photo 0-4269
March 11 1935

Peach Springs Wash at left; Diamond Creek lower left. The Colorado River lower center to right.

The cross canyons at Separation Rapid (copy of print owned by Whisenand)



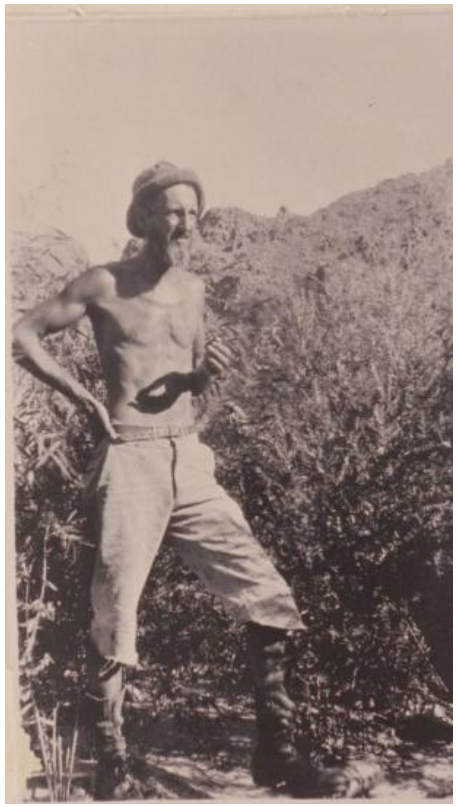
Separation Canyon (north)

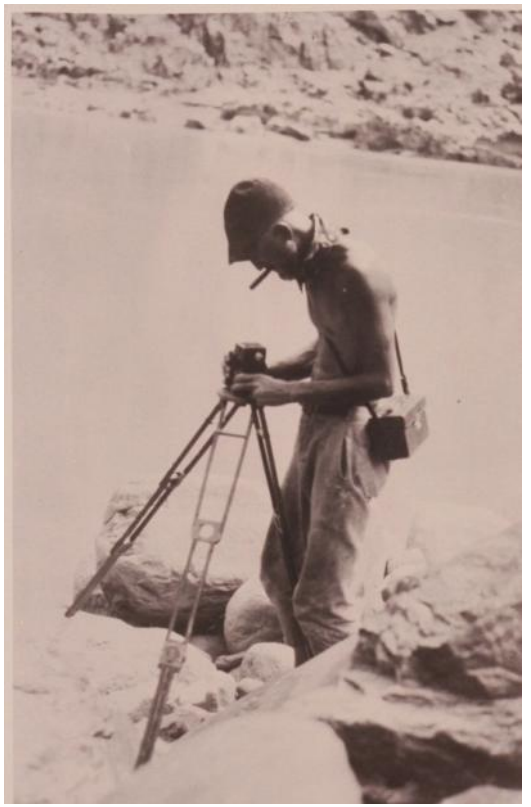
Separation Canyon (south)

The cross canyons at Separation Rapid
Photographed in 1935 by Fairchild Surveys.
Copy of print owned by Whisenand.

97/81
Large negative—
35 GDCN 239.23

Eugene Clyde La Rue, consulting engineer (Pasadena, CA)
[Geologist on the 1923 USGS river expedition;
#33 on Dock's list]



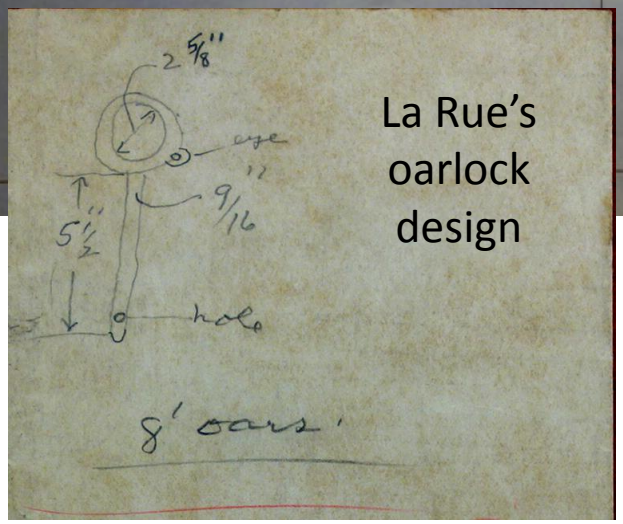


Lint, Blake, Word, Birdseye, Moore, Burchard, La Rue, Freeman, and Kolb
Not pictured: Frank Dodge

COLORADO RIVER BOAT
WEIGHT OF BOAT, 700 Lbs.
SAFE CARRYING CAPACITY, 1500 Lbs.
WEIGHT OF BOAT AND LOAD, 2200 Lbs.
SIDES, ½-INCH SPRUCE.
BOTTOM, ¾-INCH SPRUCE.
RIBS, OAK.

E. C. La Rue
CONSULTING ENGINEER
LOS ANGELES, CALIF.

700#
sides spruce
bottom spruce
ribs oak



La Rue's oarlock design

La Rue designed the 4 Fairchild boats,
built by **F. J. Pierce at the Pierce Boat Shop**, Pasadena, CA,
3 also used on the 1937 Carnegie-Caltech GC trip,
modified Stone-Galloway; hulls oak/Philippine mahogany;
16' long, 4' on the beam; 800#; $1350 --Dock Marston

E. C. La Rue Collection, The Huntington Library (courtesy Mari Carlos)

RIVER PERILS FACED TODAY

Colorado Gorge to Be Mapped

Twelve Men in Four Boats to Make Survey for Soil Erosion Work

The dangerous task of surveying the upper reaches of the Colorado River for the Federal Soil Conservation Service in its battle to prevent soil erosion and prevent silt from forming in Hoover Lake will begin today.

Twelve men wearing football helmets and padded life preservers will brave the hazards of the river in four boats which are to carry the men fifty-five miles on their map-making expedition.

The party, formed by the Fairchild Aerial Surveys, Inc., which recently completed a series of aerial photographs under contracts from the Federal government, will enter the Colorado gorge at Diamond Creek Wash and plans to emerge about sixty days later at Pierce's Ferry.

WILL COMPLETE MAP

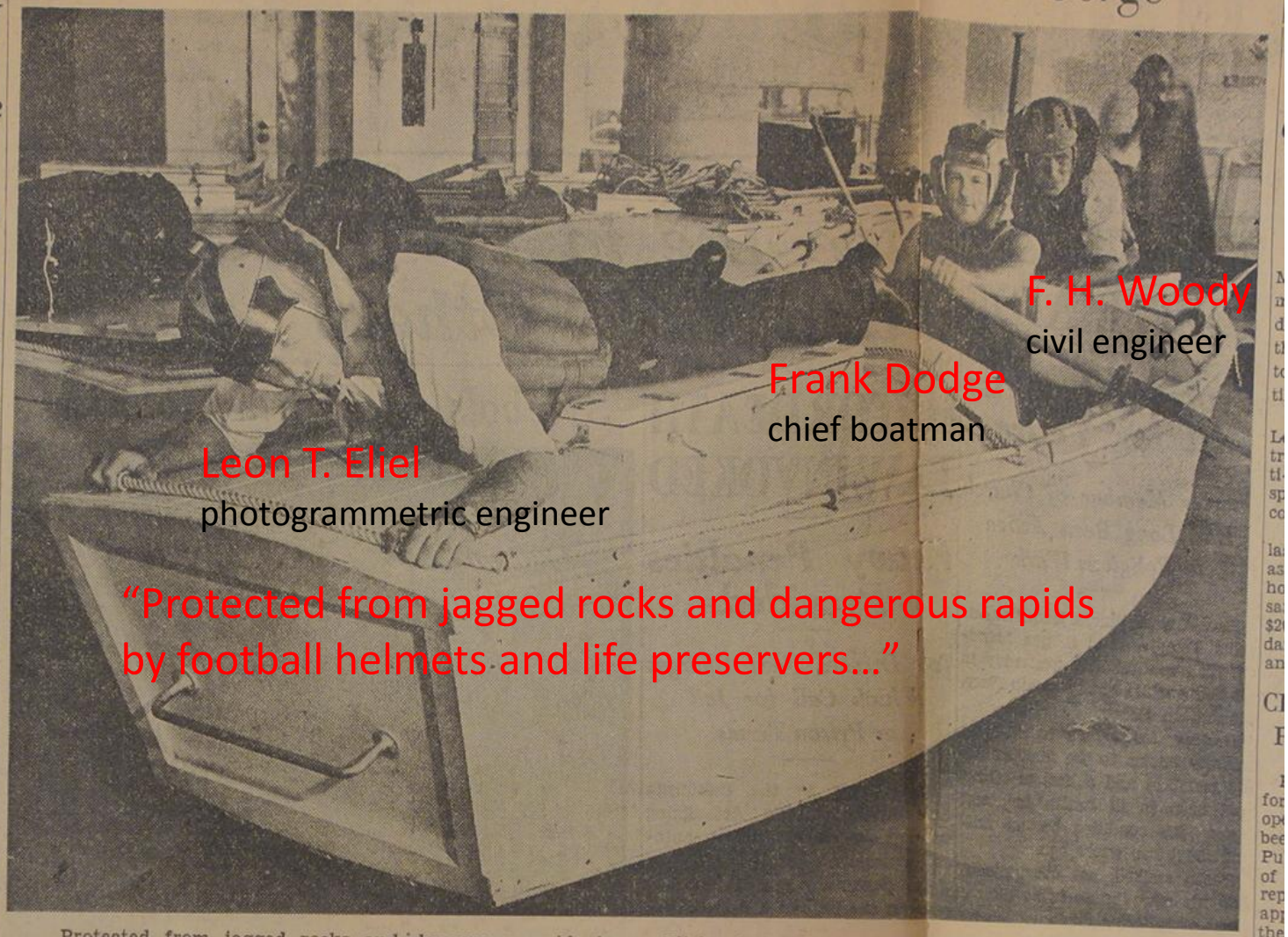
Upon completion of the work, the field work on the precise map of Hoover Dam Reservoir will be finished.

This map comprises a total of 350 square miles of probably the most difficult territory in the United States to map. The finished map must be delivered by September of next year.

Aerial photographs and ground control data will be combined in plotting complete contour maps.

"The flying survey has been completed and ground surveys have been

Survey Crew Ready to Enter Colorado River Gorge



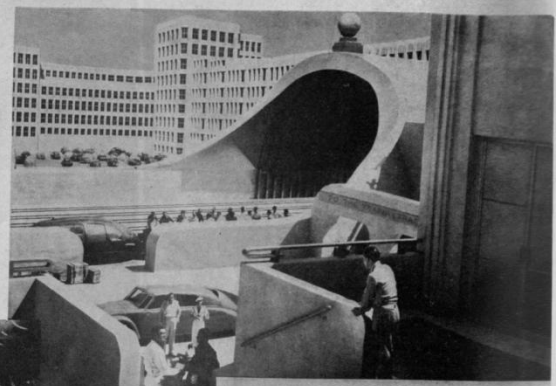
Protected from jagged rocks and dangerous rapids by football helmets and life preservers, members of the United States Soil Conservation Service today will begin a fifty-five-mile survey of the Colorado River gorge. Above are Leon T. Eliel, photogrammetric engineer, left, Frank Dodge, chief boatman at the oars, and F. H. Woody, civil engineer, demonstrate how each of four sturdy boats will be manned as they progress a mile a day stern first. Wide World photo

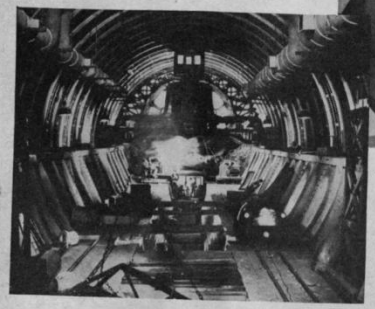
Los Angeles Times, Monday, September 23, 1935
E. C. La Rue Collection, The Huntington Library (courtesy Mari Carlos)

Popular Science Monthly
Dec. 1935, p. 32

Movie Forecasts Tunnel Under Atlantic

WHAT travel between America and Europe may be like, a half-century or more hence, is forecast in one of the latest motion-picture productions, which envisions the construction of a 3,000-mile submarine vehicular tube linking New York and London. To offset the objection that such a project would be fantastic under engineering methods developed up to the present time, the movie, "Transatlantic Tunnel," provides the builders with an imaginary new tool—a "radium drill," supposedly capable of liquefying rock. Streamline, hermetically sealed cars, impelled by electromagnets and traveling in a vacuum, according to the story, would whiz through the completed tube at such terrific speed that a passenger could breakfast in New York, keep a luncheon engagement in London, and get back to America for dinner.





TO ENGLAND UNDER THE SEA

Movie settings show ocean tunnel of the future. Above, the tube entrance. At left, the "radium drill" at work. At right, a tunnel car used by the workers

This glass globe is filled with bright paint to mark thugs

DARING SWIMMERS MAP RIVER GORGE

TO COMPLETE a map of Boulder Dam Reservoir, expert swimmers, wearing helmets and padded life preservers, have begun a perilous fifty-five-mile survey of the Colorado River gorge. They will fight swift currents and dodge jagged rocks in boats with watertight hatches and battering-ram sterns.

Boat drifting downstream stern first in Colorado River survey

BOMBS SMEAR BANDITS WITH TELLTALE PAINT

GLASS bombs resembling electric-lamp bulbs, filled with brightly colored paint, are a new British weapon against holdup men. Night watchmen and payroll messengers, carrying supplies of the bombs, are prepared to hurl them at fleeing suspects or escaping bandit cars. The resulting smear of yellow or red ocher paint makes it easy for police to trail the fugitives, and the firing of guns that might endanger passers-by in crowded streets and thoroughfares is avoided.

GUNNERS WIELD RATTLES IN SHAM WAR

A rattle being used by a British machine gunner in place of blank cartridges

SWINGING large wooden rattles, gas-masked gunners engaged in mock combat during recent British army maneuvers. The toy noise-makers simulated the sound of machine-gun fire and permitted economies in the use of blank cartridges. Ignoring its incongruity, umpires checked the theoretical effectiveness of the make-believe fire.

DARING SWIMMERS MAP RIVER GORGE

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Boat drifting downstream stern first in Colorado River survey

Boat drifting downstream stern first in Colorado River survey

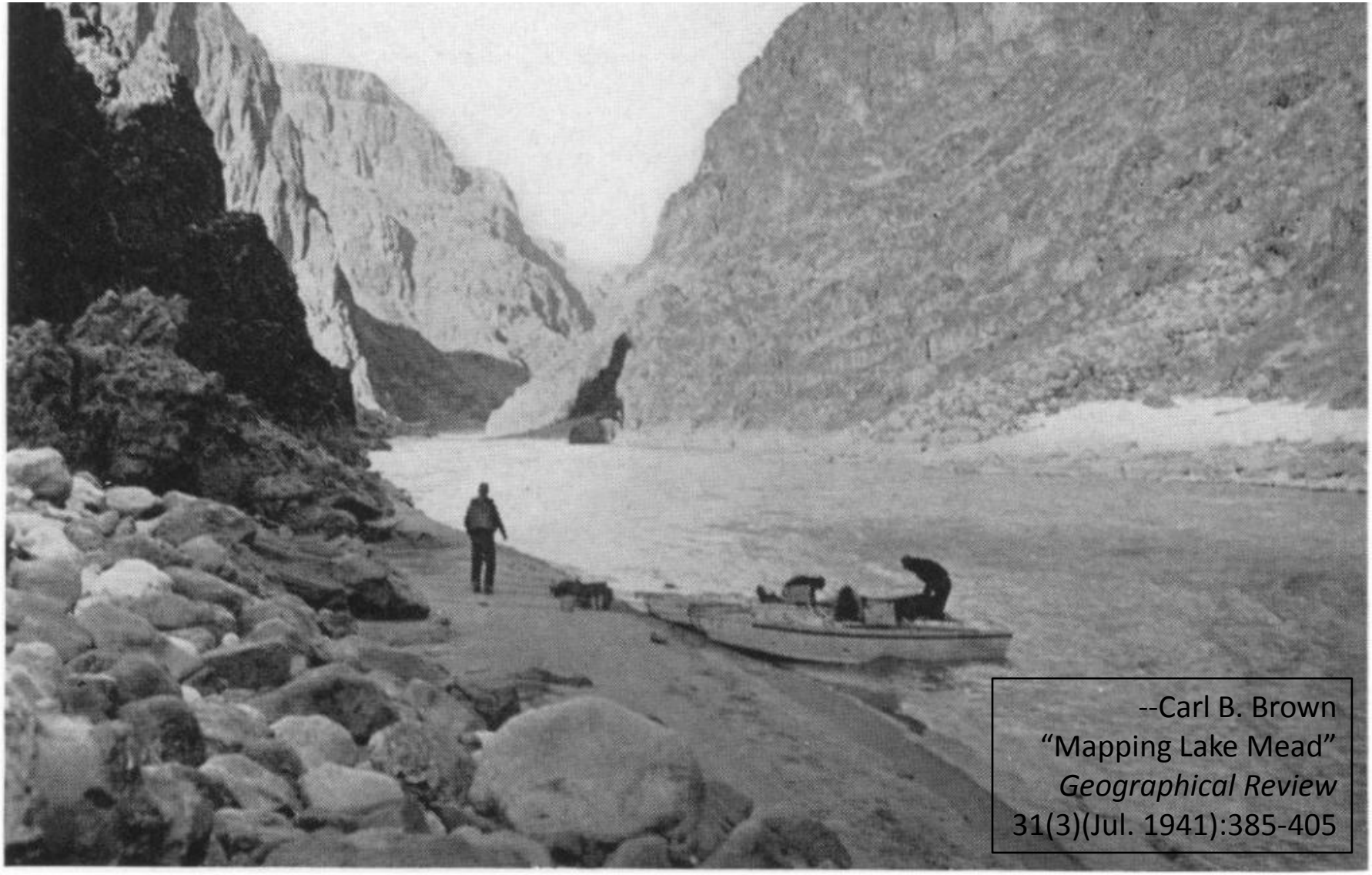


FIG. 6—Expedition landing to establish camp on narrow bench near the river

Rare photo of the 3-4 boats and probably 4 boatmen on the trip,
1 of only 2 photos I've discovered, and I don't think Dock Marston found any!

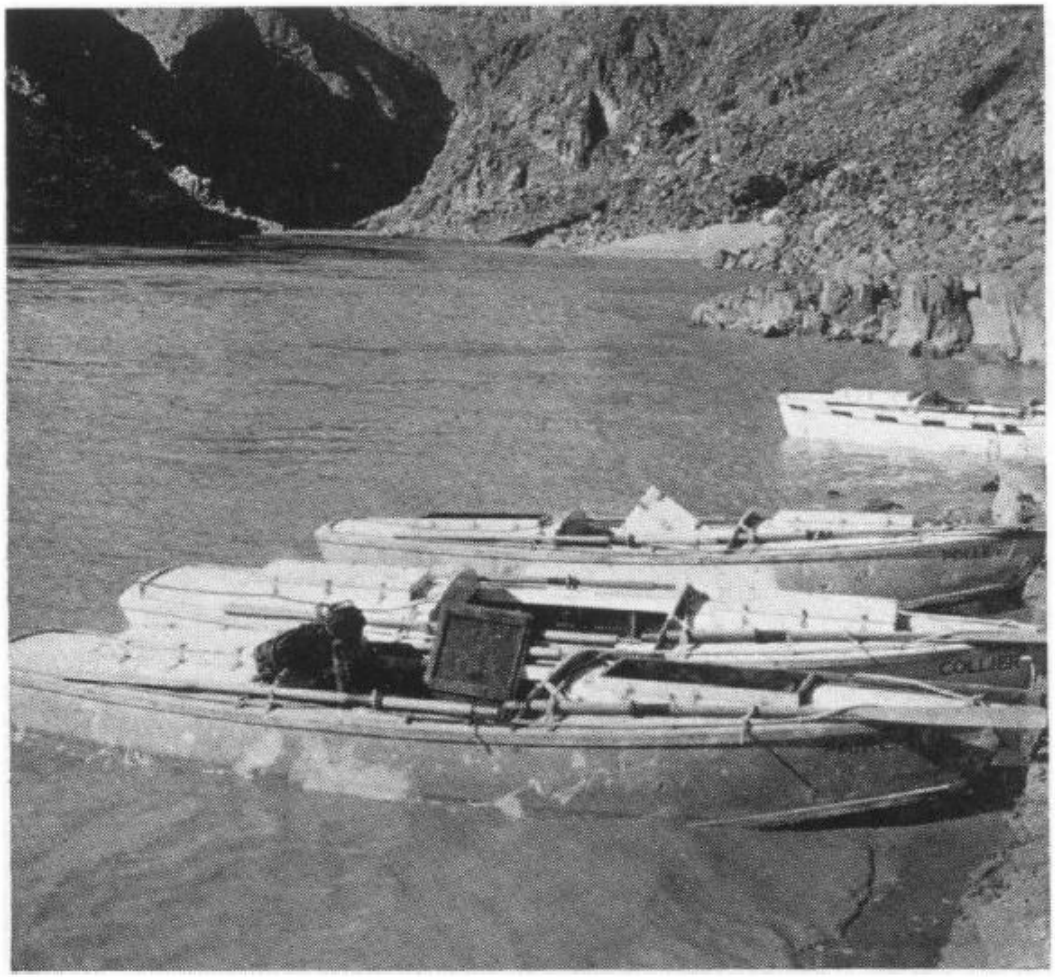


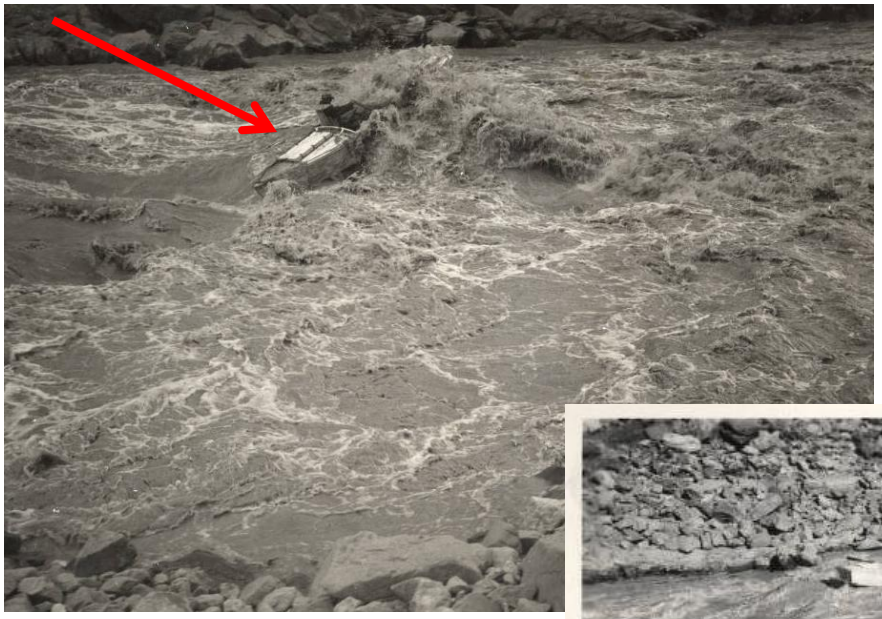
FIG. 8

--Carl B. Brown
"Mapping Lake Mead"
Geographical Review
31(3)(Jul. 1941):385-405

FIG. 8—Specially constructed boats used by the expedition down the Lower Grand Canyon. (Photograph by E. A. Schuch.)

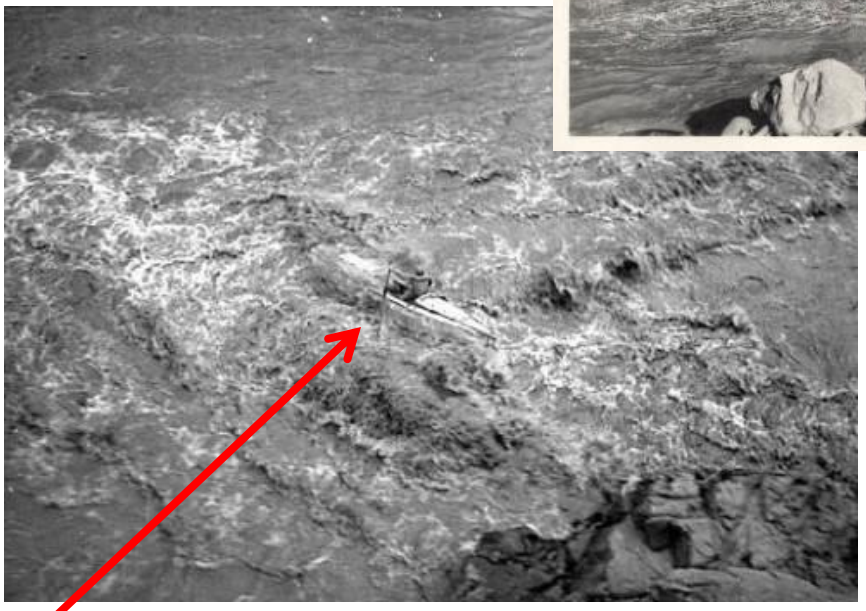
Rare photo of all 4 boats, 1 of only 2 photos I've discovered,
and I don't think Dock Marston found any!

Frank Dodge, 232 Mile, 1937, NAU.PH.94.27.152

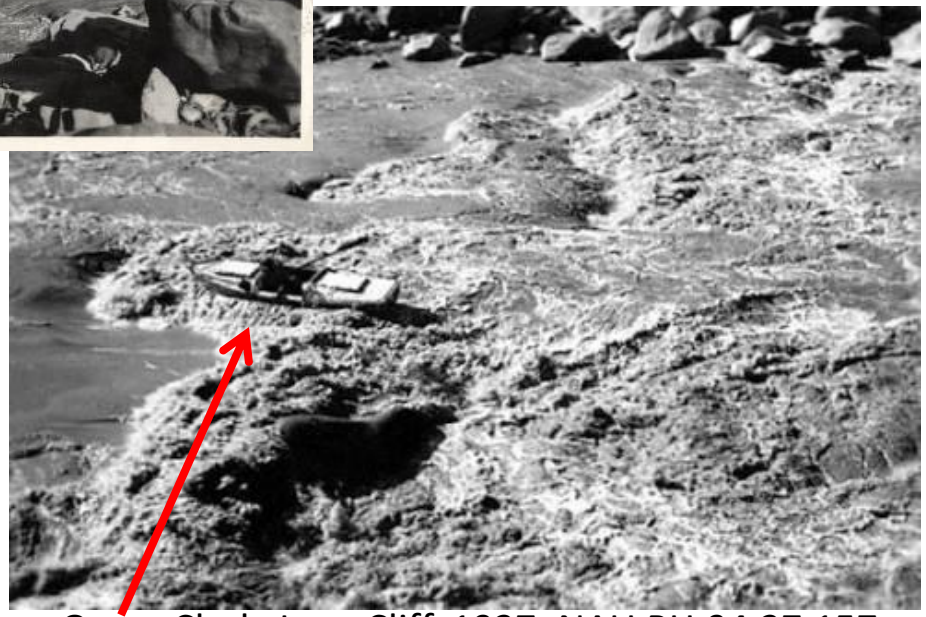


Frank Dodge, Lava Cliff, 1937, NAU.PH.94.27.156

Merrill Spencer, 224 Mile, 1937, NAU.PH.94.27.126



Owen Clark, Gneiss Creek, 1937, NAU.PH.94.27.151



Owen Clark, Lava Cliff, 1937, NAU.PH.94.27.157

Merrill Spencer, Owen Clark, and Frank Dodge
Scouting Lave Cliffs Rapid, 1937. NAU.PH.95.48.1245