ARIZONA HIGHWAYS

JUNE 1958
FORTY CENTS

IN THIS ISSUE:

"Flying the Colorado River"

ARIZONA HIGHWAYS

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LEGEND

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FRONT COVER

AIR VIEW—"COLORADO RIVER IN THE GRAND CANYON" BY NAURICE KOONCE. 5x7 Anscochrome; f.7 at 1/475th sec.; Symmar 210mm lens; 9:00 A.M., bright day. This scene was photographed looking south to the South Rim of the Grand Canyon. At this point the Colorado appears calm just before it begins its plunge through the Grand Canyon proper.

OPPOSITE PAGE

"GLEN CANYON DAM—ARTIST'S VERSION." This is an artist's interpretation of how Glen Canyon Dam will look when it is completed, possibly in 1964. Our reproduction combines a black and white photograph of the dam site by Harold Gill and coloring by Elmer Urban. Glen Canyon Dam site is on the Colorado River in northeastern Arizona, 370 miles upstream from Hoover Dam, 13 miles downstream from the Utah-Arizona state line and 16 miles upstream from Lee's Ferry, the division point between the upper and lower Colorado River basins. The dam site is 135 miles from Flagstaff, Arizona, and 72 miles from Kanab, Utah.

THE COLORADO

★ MUDDY AND MAGNIFICENT
★ ★ MIGHTY AND MAJESTIC

The Colorado is one of the great rivers of America. It drains 242,000 square miles of western landscape, one-twelfth of the United States, and while its annual flow is small compared to other large rivers of America, it carries a lot of water from the mountains to the sea. The use to which that water has been put, and will be put, by the vision and ingenuity of man, is one of the truly heroic chapters in the epic we call America.

The Colorado can be a torpid, muddy laggard dozing in the sun, or an angry monster roaring with thunderous fury, chewing away millions of tons of the good earth as it plunges recklessly down, down toward the impatient sea.

We devote our pages this month to the Colorado, and we believe you'll find them interesting. We accompany photographer Naurice Koonce on a flying trip of the river beginning where it begins in the high Rockies of Colorado and ending where it ends in the baked mud flats of Mexico and the Gulf of California. Naurice's presentation is a notable one and portrays the river better than we have ever seen it portrayed before.

Other articles herein tell of man's conquest of the Colorado and how it has been put to work for the benefit of the people of the West; how lakes formed by the river are becoming part of America's great playground; how the river has always been a challenge to man to run its roaring rapids; and how progress is being made on the construction of Glen Canyon Dam.

A lot of millions of dollars and a lot of time have been spent to gentle Old Red. Every cent and every minute spent in the process has been worth it. . . .R.C.

★ ★ ★ ★ ★

COLOR CLASSICS FROM ARIZONA HIGHWAYS

This Issue

35mm. slides in 2" mounts, 1 to 15 slides, 40¢ each; 16 to 49 slides, 35¢ each; 50 or more, 3 for $1.00.

GC-65 Air View—Colorado River in the Grand Canyon, cov. 1; D-2 Glen Canyon Dam—Artist's Version, cov. 2; D-3 Air View—Davis Dam, cov. 3; RI-9 Goosenecks of the San Juan, cov. 4; CO-7 Granby Reservoir—Northcentral Colorado, p. 17; CO-8 The Colorado River—Grand Junction, Colorado, p. 17; CO-9 Glenwood Springs, Colorado—and the Colorado River—p. 18; CO-10 Moab, Utah, On the Colorado, p. 19; CO-11 Through the Badlands of Utah, p. 19; HD-8 Air Panorama—Hoover Dam and Lake Mead, center spread; D-4 Parker Dam and Lake Havasu, p. 22; CO-12 Canal System near Yuma, p. 22; CO-13 Yuma Crossing, p. 23; CO-14 Diversion Dam on Colorado near Yuma, p. 23; CO-15 The Colorado near Gulf of California, p. 24.


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Rock Springs
Green R.
FLAMING GORGE DAM
Under Const.
Yampa River
White R.
Vernal
Salt Lake City
Strawberry R.
ROCKY MOUNTAIN NAT'L PARK
Grand Lake
Denver
Glenwood Springs
Colo. R.
Grand Jct.
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Gunnison
CURECANI DAM SITE
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UTAH
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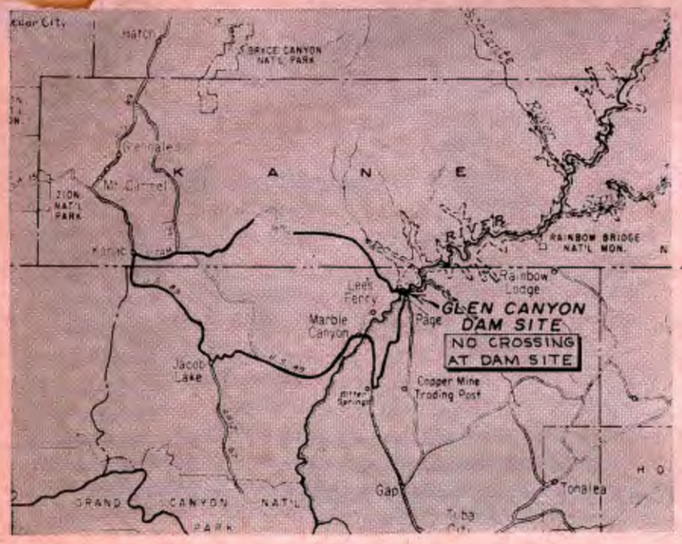
Hobbs
El Paso
Rio Grande
NEW MEXICO
MEXICO
BAJA
Gulf of California
Map Prepared
ESPECIALLY FOR ARIZONA HIGHWAYS
by George M. Avey
Base relief map copyright 1953 by Jeppeson & Co.



GLEN CANYON DAM

BY L. F. WYLIE
Project Construction Engineer
GLEN CANYON DAM

PHOTOGRAPHS: U.S. BUREAU OF RECLAMATION

Sometime in 1964, perhaps earlier with good luck, Merritt-Chapman & Scott Corporation, of New York City, working under a contract with the Bureau of Reclamation, will pour the last bucket of concrete to mark the completion of Glen Canyon Dam. This is a high concrete dam across the Colorado River in Northern Arizona. The Glen Canyon Dam will serve as the key structure of the $990 million Upper Colorado River Development program which will be built during the next twenty-five years. It is the key structure, in that all participating projects which will furnish vital water to reclaim new lands and provide supplemental water for lands already under the plow, cannot be built until the Colorado River has been harnessed by a large storage and electric power generating project somewhere in the Upper Colorado River drainage. Although Congress authorized the construction of eleven of these participating units throughout the Upper River Basin, the lawmakers were careful not to restrict the future development of water resources to these eleven.

Aerial view of Glen Canyon Dam site shows excavation for spillway and keyway. The left end of the Beehive (local landmark) has been cut away to make room for a 1,000-ft. track on which cableway towers will move. Thin line across photo is a 1,280-ft. walkway over the canyon. View looking downstream.

More participating projects may come about as the feasibility reports are compiled and the projects authorized by the Congress.

A look at a general topographic map of the Colorado River Basin shows that an area about 1/12th the size of the entire United States drains water into the Colorado River drainage system. This area reaches westward from the Continental Divide—beginning in Wyoming and stretching south into Mexico.

The upper portion of this basin (the drainage above Lee's Ferry) might be compared to a funnel, collecting water over a wide area, then channel it all through the neck. The lower portion of Glen Canyon in this basin was selected as the best location for maximum control of water flowing through the neck of this vast funnel.

The Glen Canyon project becomes the key to Upper Colorado River development because it is at this point that the river will be additionally controlled to guarantee a constant release of water and for construction of a giant hydroelectric plant. Water stored behind this dam, and three other smaller storage dams in the basin, will make certain of delivery of water to the lower basin while at the same time water can be depleted from the river supply for irrigation, industrial and municipal water needs in the upper basin.

Under Reclamation development, all Federal money expended for hydroelectric projects is repaid back to the Federal treasury, with interest, over an amortization period of fifty years. Revenues from the sale of electric energy from Glen Canyon Dam powerplant will pay for a major portion of the $990 million initial investment authorized by Congress in 1956—plus a great share of any projects which might be authorized in the future.

Planning engineers established the most suitable site for the dam at a point thirteen miles downstream from the Utah-Arizona state line, and fifteen miles upstream from Lee's Ferry, located near the confluence of the Paria and the Colorado Rivers.

The early contracts on the project included agreements for exploratory drilling, bridge building, tunnel drilling and highway access construction. It was important that these preliminary contracts be awarded as soon as possible because the process of getting ready to build a dam is long and involved—particularly in an area as remote and inaccessible as the Glen Canyon Dam site.

Access roads have now been largely completed and heavy steel rigging has begun on the highway bridge spanning the Colorado River gorge 870 feet downstream from the dam axis. By the end of this year, when the highway bridge has been opened to heavy truck traffic for the movement of men and materials, the first major phase of the construction program will have been completed.

GLEN CANYON DAM AND POWERPLANT

When completed in 1964, Glen Canyon Dam will reach 580 feet above the Colorado River, 700 feet above the bedrock, and will be the second highest dam in the United States. Hoover Dam is the highest in the nation, rising 726 feet above bedrock.

Compared with the great dams of the world, Glen Canyon will be the third highest, with the giant Mauvoisin Dam in Switzerland, 780 feet above bedrock, in first place. With the future completion of the Grand Dixence Dam in Switzerland, now in the first stages of construction, Glen Canyon will be relegated to the fourth highest dam in the world. This newest Swiss structure will rise 921 feet above the bedrock.

Glen Canyon Dam and powerplant will contain 5½ million cubic yards of concrete, requiring 3 million barrels of cement, and 220,000 tons of pozzolan, a silicous volcanic ash used with cement as an economy measure. Of the 5½ million cubic yards of concrete 5,063,000 yards will go into the dam, and 430,000 cubic yards will be used to construct the powerhouse. In addition, the dam will contain 35,340 tons of reinforcing steel, penstock and outlet pipe, and other types of steel structures.

The dam will be 1,500 feet across the crest and 1,200 feet in straight line from rim-to-rim at the abutments.

During the construction period, Merritt-Chapman & Scott Corporation—the prime contractor for the dam and powerhouse—will excavate more than 4½ million cubic yards of earth and rock for the dam, powerplant, open cuts for the spillway and keyways, spillway and water diversion tunnels.

The dam will measure 300 feet thick at the base and thirty-five feet thick at the crest. It is a high concrete, gravity arch structure, and in its configuration will most closely resemble Hungry Horse Dam on the Flathead River in Montana, although Glen Canyon will be a larger dam.

The powerplant, to be located 300 feet downstream from the toe of the dam, will be 693 feet long, 127½ feet wide and 196 feet high. A battery of eight 155,500 horsepower turbines will drive the same number of generators with an installed capacity of 112,500 kilowatts each. The installed capacity of the entire powerplant will be 900,000 kilowatts, the seventh largest in the world, and will provide about 80% of the electrical energy output presently authorized for the Upper Colorado River development.

Prime contractor for the construction of Glen Canyon Dam and powerplant is Merritt-Chapman & Scott Corporation, of New York City. This firm was awarded the construction contract on their low bid of $107,955,522. The construction contract does not include the purchasing of concrete and pozzolan, generators, turbines or transmission facilities.

With the completion of the two diversion tunnels, one on each side of the canyon wall, this firm will erect a 200 ft. high earth coffer dam upstream from the main dam to divert water around the construction area. A second earth dam will be erected downstream to keep the water from backing up into the excavation site. The bed of the Colorado River will then be excavated down to bedrock, varying from 80 to 120 feet below the river, where concrete for the dam will be poured and anchored.

MCS officials say the coffer dams should be closed to divert water around the construction site about November, 1959. The first concrete for the dam will be poured about a year later.

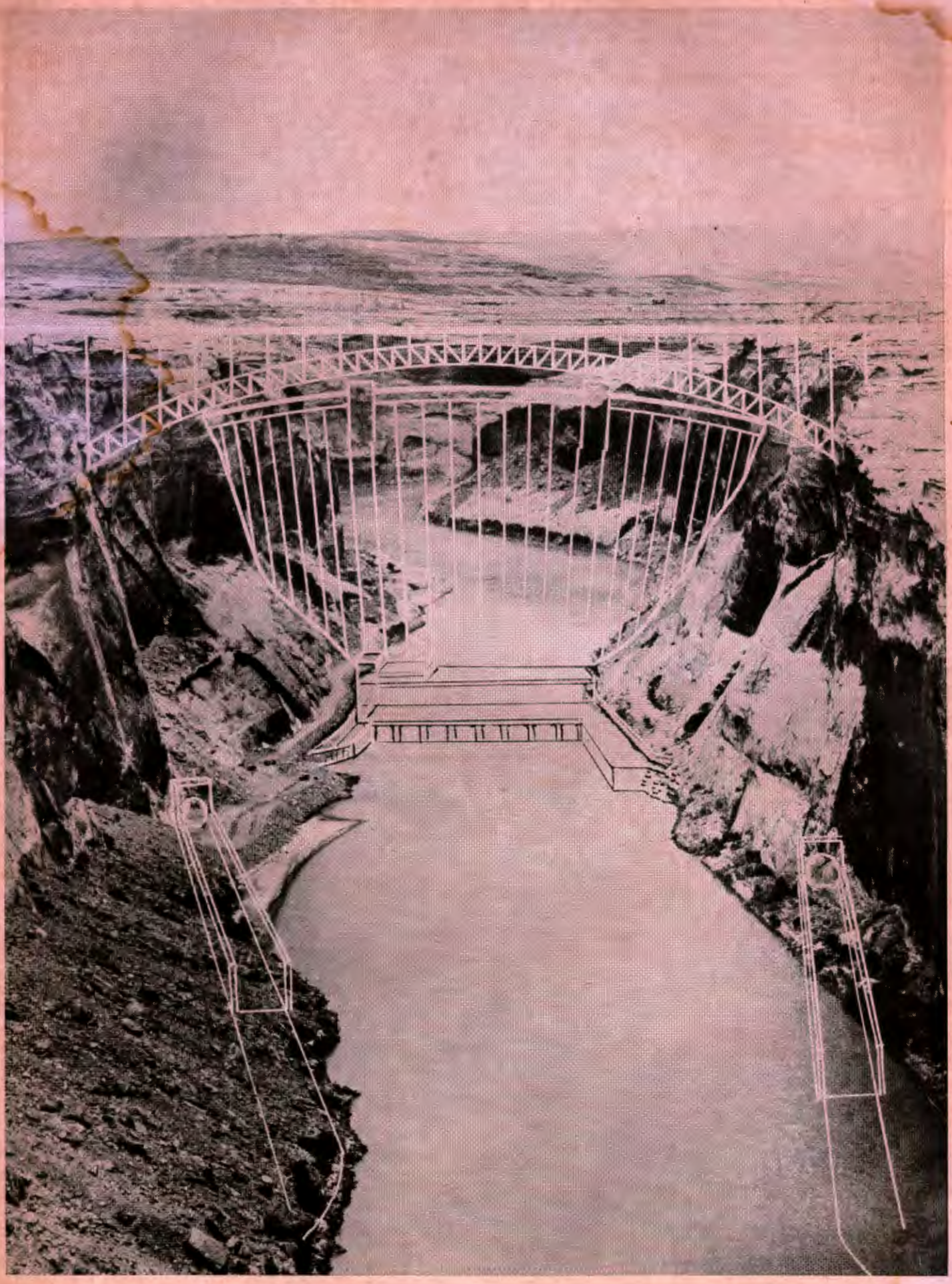
A maximum work force of about 3,000 is estimated for the peak construction period of the dam and powerplant.

THE RESERVOIR

Impounded waters behind Glen Canyon Dam when the reservoir is full will reach 186 miles up the Colorado River, almost to the mouth of the Green River in Southeastern Utah. The lake will also extend seventy-one miles up the San Juan River in New Mexico.

Storage capacity of the reservoir will be 28,048,000

Artist's sketch shows profile of Glen Canyon Dam, powerplant and Colorado River Bridge. Photograph was taken 2,000 yards downstream from the site of the dam. Bridge will be 870 feet below dam. When completed, dam will rise 580 feet above river.



acre-feet of water, the third largest in the world and second largest in the United States. Wainganga Reservoir in India is the largest in the world with a storage capacity of 33,000,000 acre-feet, with Lake Mead in second place with 29,830,000 acre-feet of storage capacity.

The reservoir will vary in width from ½ mile to 1½ miles. Surface area of the lake will cover 164,000 acres or 256 square miles. A comparison shows that enough water can be impounded behind Glen Canyon Dam to cover the entire State of New York to a depth of one foot.

The lower end of Glen Canyon provides an excellent site for a storage reservoir in that the massive Jurassic Navajo sandstone walls rise nearly vertically for 700 feet above the river. The bulk of the water to be stored will be confined to the main canyon area and will not inundate large areas of otherwise useful range land.

Recreational facilities and sites surrounding the reservoir will be developed by the National Park Service and other Federal agencies. A master plan is even now being formulated to provide the public with a national recreational playground after the completion of the Glen Canyon Dam project.

COLORADO RIVER BRIDGE

A 1,271 ft. highway bridge spanning the Colorado River at the Glen Canyon Dam site will serve as the connecting link in a 101-mile scenic loop from Bitter Springs, Arizona, to Kanab, Utah. This route has been designated as the alternate U.S. Highway 89.

Currently under construction by the Kiewit-Judson Pacific Murphy Company of Emeryville, California, the bridge will span the river 870 feet downstream from the axis of the dam. It will be the longest and second highest single-span steel arch bridge in the United States. It will stand 700 feet above the Colorado River. A thirty-ft. roadway and two four-ft. sidewalks will make up the deck of the bridge. Parking areas will be provided at each end and visitors will be able to walk to the center of the canyon for an unobstructed view of the Glen Canyon Dam construction.

The contractor began erection of heavy steel in April of this year and should open the span to traffic by the end of the year. Utah sources of highway traffic statistics have estimated that 1½ million visitors may be attracted to the dam site each year with the completion of the 101-mile scenic loop.

TUNNELS

The first major undertaking in the actual construction of a dam is the control and diversion of the water around the construction site. This will be accomplished at Glen Canyon by the construction of two water diversion tunnels, one on each canyon wall.

Drilling operations have been completed on the right diversion tunnel, (right and left determined as you face downstream). It measures 43½ feet in diameter at the upper portal, 46½ feet at the lower portal, and is 2,768 feet in length. A similar size bore, thirty feet higher on the canyon wall, is now being driven 2,900 feet through the left side of the canyon.

Also under construction is an access tunnel to be used for operation of the powerhouse. Beginning at the bottom of the gorge at the location of the plant, the tunnel will emerge on the canyon rim almost two miles downstream.

The Glen Canyon project will require almost 18,000 feet of various sized tunnels before completion of the dam and powerplant.

THE CITY OF PAGE

Located atop Manson Mesa about two miles from the dam site, the city of Page, Arizona, will provide housing and other community services of the contractor and government employees engaged in construction of the project.

The town is named for the late John C. Page, who served the American people as Commissioner of Reclamation from 1937 to 1943 when he retired because of ill health. He was a pioneer in the development of Colorado River water use and served the Bureau of Reclamation as a consulting engineer almost until the time of his death in 1955.

City streets have been cut from the sagebrush, with work on the municipal water and sewer systems already underway. Construction has been started on a sewage treatment plant, as well as a water treatment plant for the city supply to be pumped from the Colorado River.

Construction of buildings for the operation of business, service and other establishments to serve the community is in progress. These buildings will be built with private capital since the entire town eventually will be sold to private interests.

School instruction in the Page Accommodation School began last September with five teachers and an enrollment of 150 students. By the end of this school year there may be as many as 500 students enrolled in classes from the first grade through high school.

During the peak construction period, Page may reach a population of 10,000 people, the permanent population after the completion of the dam and powerplant may be considerable under this figure, depending on the future developments in the area.

THE LONG RANGE LOOK

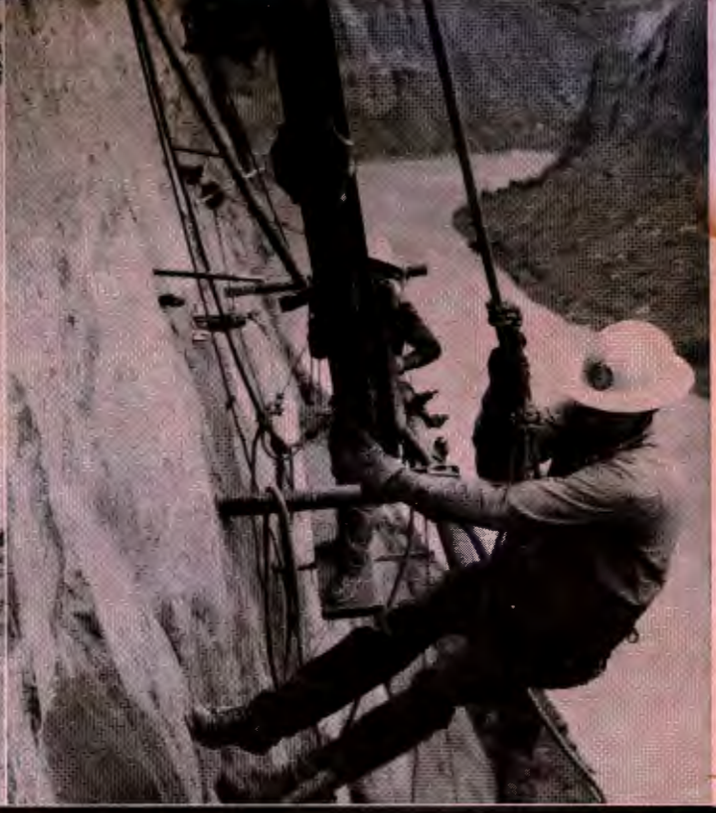
Benefits to be derived from the construction of Glen Canyon Dam will be spread among a great many people, will be varied in nature and certainly accrue over a long period of time.

Aside from the immediate economic impact of the project, the Great Southwest will be given an added potential for industrial expansion, with the resulting social growth.

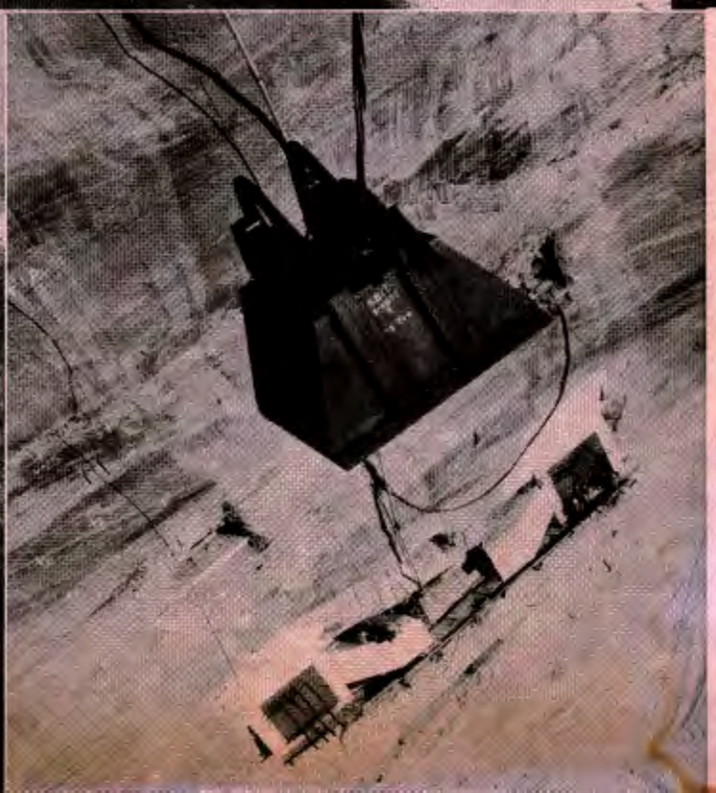
The new lands brought under irrigation with the development of the eleven participating projects, as well as others which may be authorized in the future, will all be needed during the next decade to help feed and cloth a growing population. If our present trend continues, established now as growing at a rate of fifty million every seventeen years, we can foresee the time when our agriculture must expand to meet a shortage of foodstuffs and fiber materials.

The men who pioneered the early projects of fifty years ago, envisioned the day when the entire length of the Colorado River would be put to work for water storage and power generating projects to meet the demands of both the industrial and population expansion. They took the first step toward meeting this objective with the construction of Hoover Dam and the Lower Colorado River Development projects.

The second step is now in progress toward meeting those same objectives in the Upper Colorado River Basin with the construction of Glen Canyon Dam.



Men and equipment, engineering skill and long hours of work—so begins the story of Glen Canyon Dam. Crews now work two full shifts on diversion tunnels, spillway and keyway diversions.



The Colorado Is An Outlaw

By Frank Waters

INTRODUCTORY CHAPTER TO THE BOOK "THE COLORADO" IN THE RIVERS OF AMERICA SERIES PUBLISHED BY RINEHART AND COMPANY, INC., NEW YORK, N. Y.

Most rivers are confined to the needs and histories of men. Like roads, they seem inconsequential without their travelers. The Colorado is an outlaw. It belongs only to the ancient, eternal earth. As no other, it is savage and unpredictable of mood, peculiarly American in character. It has for its background the haunting sweep of illimitable horizons, the immensities of unbroken wilderness. From perpetually snow-capped peaks to stifling deserts below sea level, it cuts the deepest and truest cross section through the continent.

As the Rocky Mountains are the backbone of physical North America, the Colorado is the vertebral tube carrying the spinal fluid of the continent. From this viscous, reddish flow the river derives its name. Despite a score of other names, it has become known at last simply by its one unchanging color — in Spanish the *Rio Colorado*, the great Red River of the West.

Its landscapes are never anywhere urban or commercial, not even pastoral. They are purely mystical in tone. There are the wind-swept rocky wastes high above timberline, the sunless gloom of deep gorges. When the river does rise to the surface again it is upon the face of an earth whose expressions are never twice the same.

The black volcanic picachos creep closer in the moonlight, baring their saw-tooth fangs. By day the crinkled desert hills diminish and recede, or merely float, bottomless, upon the horizon. More often than not the mountains are mirages. Glistening salt beds and alkali flats turn into seas; uncovered veins of legendary native gold into mere banks of micaceous gravel.

In this shifting realm of the fantastic unreal only the river is permanent. It is the one enduring mesmer from whose spectral spell no man who has once seen it is ever quite freed.

Those who love it best are those who fear it most. For like all things touched with the sublime it carries a lurking horror, and its mysteries wear the mask of the commonplace. To allude to it as something more than a river would sound like a literary affectation only to the literary. The illiterate might well comprehend most fully all that it expresses. As from a Navajo sand painting or ceremonial blanket he would read the river's cryptic meaning in the earth it threads.

The dreamlike vacuousness, wild beauty and barbaric boldness of design form but the pattern of the warp which underlies the subtle, inimical resistance of the woof. Old, ancient America! With its own great spirit of place; with the shadows of aboriginal ghosts still gliding across it; and with its own demons not yet appeased — the haunting promise of the far-off, its tormenting unrest.

It is still a wilderness. To understand it you must think in new dimensions. You must feel in terms of depth as well as space, of eternity and not of time.

PHOTOGRAPH:
"Head of Lava Falls from
Toroweap Point"
WESTON AND JEANNE LEE

BUREAU OF RECLAMATION

When water began backing up behind Hoover Dam in February, 1935, the Colorado was conquered.

BY DEAC DUSHARME

For the last quarter of the nineteenth century farmers of the Southwest lived in mortal fear of the Colorado River—the very stream from which they drew their live-giving irrigation water. The fickle river sometimes dwindled to a mere trickle while the settlers' crops died from the burning drought. Or, sometimes, roaring floods cascaded down the river channel, sweeping away the canals and diversion works that had been built with so much painstaking effort.

By the turn of the century the recurring cycles of raging floods and desiccating droughts had so devastated the farms and communities of the Lower Colorado River Basin that the people had to turn to the United States Government for help.

In 1902, Congress passed the Reclamation Act, and within a matter of weeks the Reclamation Service, forerunner of today's Bureau of Reclamation, was organized. A small staff of engineers began preliminary surveys on how to apply the known principles and concepts of river control and utilization.

One of the first items to be authorized under the new Reclamation program was the Salt River Project, near Phoenix, Arizona, located on one of the major tributaries of the Colorado River. Problems of the farmers in the Salt River Valley were much like those of the farmers trying to wrest a living lower down in the Colorado River valleys of California.

Erratic flow of the river—sometimes nothing, sometimes everything—had harassed farmers in the valley since 1865.

The Salt River Project, authorized in 1903, covers an area of about 243,000 acres in the vicinity of Phoenix. It is irrigated by waters taken from the Salt and Verde Rivers, controlled by storage reservoirs, with water supplemented by 191 wells with electrically driven pumps.

The project now consists of seven storage reservoirs, three diversion dams, 201 pumping plants and more than 1,400 miles of canals, laterals and drains. The power system includes eight hydroelectric plants, a Diesel plant and a steam plant, together with more than 1,960 miles of power distribution facilities.

The operating agency is the Salt River Valley Water Users' Association. The first water was available from the project in May, 1907, with the original project being completed in 1917.

In the meantime, Reclamation engineers had started their long series of investigations on the control and utilization of the Colorado River itself.

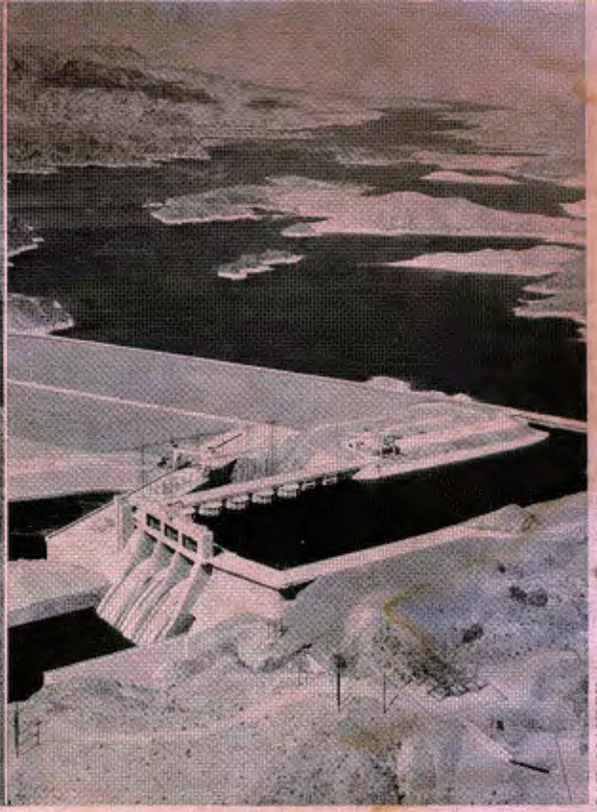
To these men the solution to the farmers' problem was clear—control the river to store water during the high run-off periods, for release to downstream users during the low run-off periods. In total, some 70 possible sites for a dam, or series of dams, were investigated in the entire Colorado River during the effort to harness the untamed river and control its flow so the low-lying valleys would be protected against flood and assured a stable, year-round water supply.

In 1918, Reclamation Commissioner and Chief Engineer Arthur P. Davis made a radical proposal to control the Colorado River by means of a dam of unprecedented height and design, located in Black Canyon a few miles from Las Vegas, Nevada.

By 1920 Davis' proposal had gained enough support throughout the Colorado River Basin states that a meeting of governors' representatives endorsed a proposal for an interstate water compact.

The following year, all seven of the basin states appointed compact commissioners, and by a special act of

Parker Dam was completed in September, 1938.



RAY MANLEY

Davis Dam finished in December, 1952.

Congress a federal representative was named – Herbert Hoover, then Secretary of Commerce. In January, 1922, the Colorado River Commission held its first meeting in Washington, D. C., and elected Mr. Hoover as its presiding officer.

The first objective of this commission was to formulate a plan for the division of water between the basin states. However, a common denominator could not be found because of the different methods used by the states in establishing water rights.

It was Delph E. Carpenter, Colorado's representative, who proposed a step that finally did clear the way for preliminary agreement between the states. He proposed that Colorado River water be divided between two groups, the Upper and the Lower Basin states – with the division of water among the individual states left to future agreement. The document was signed in November, 1922, in Santa Fe, New Mexico, and is often referred to as the Santa Fe, or 1922 compact.

The agreement placed the dividing line between the upper and lower portions of the drainage system at Lee's Ferry, near the confluence of the Paria and Colorado Rivers.

Specifically, the Santa Fe Compact apportioned from the Colorado River system 7,500,000 acre-feet of water annually to both the Upper and Lower Basins, with the Lower Basin given the right to increase its beneficial consumptive use of the water by 1,000,000 acre-feet annually. The document was not intended to allocate water to any individual state.

For six more years the erratic, raging Colorado River continued to alternately batter, then dry up the farmers in the Lower Basin, while the studies and investigations were completed.

In 1928, legislation introduced by Representative Swing and Senator Johnson passed both Senate and House, and the Boulder Canyon Project Act became law.

Among other things, the law (1) authorized the construction of a high dam in Black Canyon, (2) authorized the construction of the All-American Canal to connect the Imperial and Coachella Valleys with the Colorado River, and (3) authorized the expenditure of $165 million for the entire project.

In early March, 1931, the Bureau of Reclamation opened bids for the construction of Hoover Dam and later awarded contracts to Six Companies, Inc. The following April, the Bureau gave this firm its notice to proceed with the construction and the first step in the long-range development of the Colorado River became a reality.

Water storage was begun in February, 1935, the structure was dedicated by President Franklin D. Roosevelt in September, 1935, and the first generator began full operation in October, 1936.

Amid the fanfare and glamor of the construction of Hoover Dam, other Reclamation engineers quietly went to work on another, and equally important, river regulation structure some 155 miles downstream from the Hoover Dam site. This was the Parker Dam project, which would provide additional river regulation, power generation, and a desilting basin for the 243-mile Colorado River Aqueduct, which would deliver water to the Los Angeles and San Diego coastal areas.

The dam was completed in September, 1938, with the power plant construction underway in mid-1939. The powerplant's four 30,000 kilowatt generators began producing power for the growing World War II industrial giants by December, 1942.

Havasu Lake, behind Parker Dam, has a total storage capacity of 716,000 acre-feet of water and backs up behind the dam for 45 miles, covering more than 25,000 acres. Like the lake behind Hoover Dam, Havasu Lake is a leading recreational playground.

As early as 1938, other engineers interested in the development of the use of Colorado River water, felt that the public interest could be better served if still another river regulation structure were built. A site was surveyed in Pyramid Canyon and construction on Davis Dam was authorized in 1941.

Shortages of construction materials during World War II became critical, and about a year later the project was brought to a standstill.

In 1946, with the war over and the nation in the throes of conversion to peace-time economy, aided by public pressure for more reclamation development of land and a treaty with Mexico requiring additional river regulation at the border, construction on Davis Dam was resumed.

The dam was completed in December, 1952, at a cost of a little more than $67 million. The Davis Dam power plant contributes substantially to the Colorado River hydroelectric energy pool, which serves market areas in Southern California, Arizona and Southern Nevada.

For reasons of economy and efficiency of operation, the Secretary of the Interior in May, 1954, consolidated the Davis Dam project and the Parker Dam project into a single unit – the Parker-Davis project. Combined with the electric energy generating capacity of Hoover Dam, there exists a gargantuan electric power pool to provide power to the industry, homes and farms of the Southwest.

Thus, the story of the use of the Colorado River to serve the needs of man to this time has been one of progress, development, tempered by engineering talent and the desire to best serve the public interest.

However, the story does not stop here. It continues wherever there is a potential development for a multi-purpose project to provide water and power, which are the keys to growth.

Late in 1948 the Upper Colorado River Basin states of Utah, Wyoming, Colorado, New Mexico and Arizona, entered into the Upper Colorado River Basin Compact which apportioned the use of Upper Basin water among those states. This paved the way for comprehensive planning for the development of water resource potential within the Upper Basin.

Following the end of World War II the Bureau of Reclamation made a comprehensive study of the entire Colorado River drainage system, and the subsequent report showed 134 possible project development sites.

A further study of the most pressing needs for reclamation development indicated that a basin-wide program was feasible, and in 1956 Congress authorized the expenditure of $760 million for the program, which would ultimately cost $990 million.

The master plan included four water storage and power generating projects within the Upper Colorado River Basin: Glen Canyon, on the Colorado River in Northern Arizona; Flaming Gorge, on the Green River in Utah; Navajo, on the San Juan River in New Mexico; and the Curecanti Unit on the Gunnison River in Colorado.

Construction of Glen Canyon and Flaming Gorge Dams is in progress. Preliminary work on Navajo Dam and the Curecanti Unit has been started. Plans also include eleven participating projects – under which new lands will be reclaimed with irrigation and supplemental water provided for land already under irrigation – three in Wyoming, two in Utah, one in New Mexico and five in Colorado.

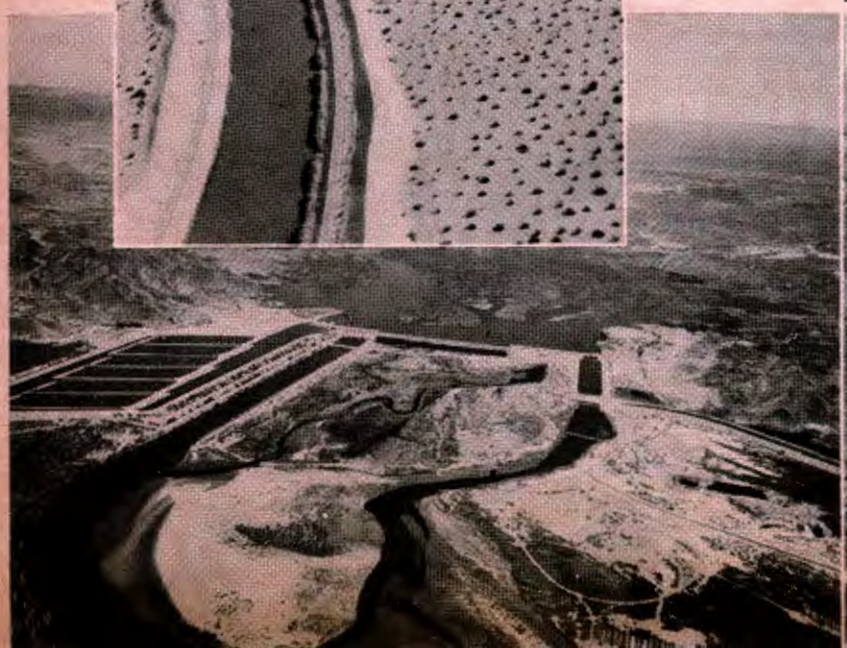
At the same time Congress was careful to spell out in the Upper Basin Legislation that Public Law 485 (the enabling act for Upper Basin Development) does not prevent future development for water resources.

The Hoover-Davis-Parker combination has not spelled the end of river development in the lower river basin. Reclamation engineers have surveyed two excellent dam sites in the upper reaches of the basin. Marble Canyon Dam site is located about 35 miles downstream from the Glen Canyon site. The Bridge Canyon Dam site is located some 100 air miles downstream from the Marble Canyon site.

Development of potential use of Colorado River water will cease only when none of the water goes needlessly to the sea, and sufficient storage is developed to guarantee an adequate discharge the year-round to meet the human and industrial needs of the people of the Southwest.

RAY MANLEY

WESTON AND JEANNE LEE



Canal carries water to coast cities.
Below, left, Imperial Dam and Morelos Dam project
RAY MANLEY

Flying the Colorado

Article and Photographs by
NAURICE R. KOONCE

Gorge of the Little Colorado

Near Crossing of the Fathers (Weston and Jeanne Lee Photo)

Many, many words have been written about the Colorado River, but I have yet to read an account that doesn't either state or prove that words can't do it justice. Pile on top of each other all the superlatives that can be applied to a turbulent flow of water—*wildest, fastest, most dangerous, most unpredictable*—and you're no closer to the truth of this river than a stack of Manhattan skyscrapers planted in its bed would be to the rim of one of its canyons.

Factual statistics don't help much, either, when you're trying to give an impression of its unique and awful grandeur. Tell a person that the Colorado River system drains some quarter-million square miles of territory, nearly one-twelfth of the United States; that it carries an average million tons of sediment—as much as twenty-seven million tons—past a given point in one day; that in its 1400-mile course the main stream drops from 14,000 feet above to sea level, traveling between canyon walls of its own making almost two-thirds of the way and at speeds of from two to twenty-five miles an hour; that it has gouged some 350 cubic miles of rock and earth out of the Grand Canyon alone while knifing through over a billion years of geologically recorded time.

Tell him all this and your hearer may be impressed, he may be flabbergasted. But he won't see the Colorado River as you want him to see it.

Perhaps because I am a photographer by profession, it has always seemed to me that the best, and perhaps only, way to tell the complete Colorado River story would be on color film. But there was always the little problem of getting the full subject in focus. There are very few accessible vantage points along the river, once it starts in earnest to carry its payload to the sea. And whenever I reached them, by car, in the saddle, or afoot, I found tripod holes, camera clichés, and mounting frustration. You know how it is: you want to get just a little farther out for the perfect shot—and there's nothing there to stand on. So you compromise with necessity and take the same picture that's been taken a thousand times before.

The Kolb Brothers, Ellsworth and Emery, found one solution to the problem when they rode the river in a wooden boat from Green River, Wyoming, to tidewater back in 1911-12. As much a part of the Grand Canyon in this century as the Bright Angel Trail and its most persistent photographers, they made the hair-raising trip, in two installments, expressly to film the river and its environs.

But even if I'd had the nerve to attempt such a feat, what I wanted wasn't the fish's view, but the eagle's. I wanted to record the labyrinthine course of the mighty river across the West's untenanted wastes, to look down into its titanic crevasses, to register the colors of its unscalable walls.

The obvious answer was a plane, and I knew just the fellow to help me.

Peylan Hudgin, one of four brothers who operate Hudgin Air Service in Tucson and the Grand Canyon Scenic Airline, was the pilot who located the wreckage of the TWA-United air crash in the Grand Canyon several years ago. The northern reaches of the Colorado would be new to him, but he knows the Grand Canyon terrain and its atmospheric whims as well as I know my dark room. He had flown me on enough air-photo assignments to be aware of a camera's requirements and limitations and—most reassuring of all—he could be depended upon to refuse to take me where a plane shouldn't go.

Peylan accepted the proposition, and together we worked out a flight plan that would give us the advantage of proper light and the scattered refueling stops along the way. We decided on a Piper Super Cub as the best plane for the job—light, maneuverable, with reserve power to take us in and out of steep, narrow canyons, and a low stalling speed (35-40 mph) for sunset shots and close-ups. I would have to sit behind him and shoot through the open door between the struts and propellor, so we developed a set of hand signals to use when the engine's roar kept him from hearing my shouted directions. But signals weren't often necessary. Peylan soon acquired the "seeing eye" for a good exposure and all I had to do was point the camera. He pointed the plane.

Grand Lake in Rocky Mountain National Park, five or six miles west of snow-capped Long's Peak, is now accepted as the head of the Colorado River and was the logical point for the start of our flight last October 4.

For the first fifty miles or so, the little stream below us seemed insignificant indeed. As it ambled by small villages and through patchwork farm lands, I was reminded of similar views over Germany and France.

But then, as towering mountain ranges loomed ahead and swiftly closed in around us, the lazy stream gathered in rivulets from either side and quickened its pace. The plane climbed into the clear and, the land spread out below like a relief map in geography class, we saw a river being born. Trickles of melting snow from the mantled ranges merged into rills that rolled down into brooks and creeks; these, in turn, tumbled down widening ravines or cascaded over naked rocks, pell-mell into the main trunk of the river bed. Now we saw the white water of our first rapids, and looked forward to the smothering crescendos to come.

For the next hundred miles the timbered mountains were quilted in fall colors. Peylan remarked that it looked as if the Great Painter had used this area to clean his brushes.

At Grand Junction, where the river picked up tempo with the added flood of the Gunnison, our course and the scenery changed abruptly. Now the colors came from rocks, not trees. Instead of craggy peaks, we were over the arid plateau country, where the water's abrasive action had channeled a maze through red and yellow layers, leaving flat-topped mesas, spires, and buttes of weird and grotesque shapes, hundreds and sometimes thousands of feet above the river bed. Every turn in this fantastic wilderness seemed to reveal the ultimate in beauty, and I took shots right and left like a greedy child at the dessert counter in a cafeteria.

The general course of the river now slanted across southeastern Utah like the diagonal of a right triangle, but the torrent itself wound more and more erratically through this wild museum of its own immense and endlessly varied sculptures.

We swung right at Arches National Monument to explore the colossal vaults and arcs, scoured and hollowed by water and wind-driven grit. As Peylan banked and slipped the plane to give me a choice of views, I knew for a certainty the advantages of the air-borne photog-

A tourist waving at Delicate Arch

rapher. I had visited this Monument before and hiked to some of the arches, but now we saw them all in a few minutes from angles that gave them entirely new meaning and dimensions.

As we approached the Delicate Arch, we saw two hikers not far off. We glided low and yelled down a request to stand by the arch. By the time we had circled for the picture, they were posing obligingly to give me a size comparison for the photograph. We had no opportunity to exchange cards, but if they read this they will know that I am grateful.

Back on course, we landed at Moab to refuel the plane and ourselves, and then continued to wind southwest with the river as it dredged deeper and deeper into the weird and wonderful wasteland of Dead Horse Mesa. And now, to our right, veering into our path from the north, we could see the serpentine channel of the Green River, which heads below the Grand Tetons in Wyoming.

Major John Wesley Powell, the intrepid one-armed Civil War veteran who planned and captained the first successful descent through the Grand Canyon in 1869, flatly stated that the Green was the upper continuation of the Colorado and called what we had been following from Long's Peak the Grand River. It was easy for us to see from the air that he was in error, that it was the Green River which was the tributary. It was easier still to acquit him of the error, remembering his indomitable valor and recalling his description of what we now beheld.

Here at the juncture of the two rivers, where we hovered so easily only hours after our start, Powell had beached his boats on the fifty-sixth day after pushing off on his hazardous venture from Green River City in Wyoming. He and a companion had spent the good part of the next day clambering up the 1300-foot canyon wall, through a boulder-strewn gulch, around a vast amphitheater of rock, along a narrow sloping shelf half a mile long, and finally through a chimney up which they inched their way by pressing hands and feet against its sides. And he, remember, with only one arm!

"And what a world of grandeur is spread before us!" he later wrote of his view from the summit.*

> "Below is the canyon, through which the Colorado runs. We can trace its course for miles, and at points catch glimpses of the river. From the northwest comes the Green, in a narrow, winding gorge. From the northeast comes the Grand, through a canyon that seems bottomless from where we stand. Away to the west are lines of cliffs and ledges of rock —not ledges as you may have seen where the quarryman splits his blocks, but ledges from which the gods might quarry mountains, that, rolled out on the plain below, would stand a lofty range; and not such cliffs as you may have seen where the swallow builds its nest, but cliffs where the soaring eagle is lost to view ere he reaches the summit . . . Wherever we look there is but a wilderness of rocks; deep gorges, where the rivers are lost below cliffs and towers and pinnacles; and ten thousand strangely carved forms in every direction; and beyond them, mountains blending with the clouds."

Rereading that passage, I am almost ready to withdraw my contention that words can't tell the Colorado

* First Through the Grand Canyon by Major John Wesley Powell, New York, Macmillan, 1925.

NOTES FOR PHOTOGRAPHERS

A Camera Tour By Air of the Mighty Colorado River

BY NAURICE KOONCE

(The camera used for taking the following portfolio of color photographs of the Colorado River from the air is the "Manley Aerial Color Camera" designed by Ted Schwartz of Tucson for the Ray Manley Commercial Studio of which Photographer Naurice Koonce is an associate. It is a box type camera, with a fixed focus on infinity, to which has been attached the back section of a 5x7 Linhof, interchangeable with a 4x5 Linhof back. Bellows section have been eliminated thereby preventing vibration when shooting from a plane. Hand grip designed for photographer's need. Release button was installed in the hand grip similar to a pistol trigger. The film used has a normal speed of ASA 32. For a fast exposure, necessary for aerial photography, the speed was increased to ASA 50 by special processing.)

OPPOSITE PAGE

"GRANBY RESERVOIR—NORTH CENTRAL COLORADO." 5x7 Anscochrome; f.5.6 at 1/475th sec.; 210mm Symmar lens; cloudy-hazy sun. "Man-made Granby Reservoir in Rocky Mountain National Park (Northcentral Colorado) is where our aerial photographic tour of the Colorado River began. Reflecting back to this beautiful resort area surrounded by snowcapped mountains, it seems only natural for the river to begin at such a place for, as I found, the Colorado is a river of moods from beginning to end."

"THE COLORADO RIVER, GRAND JUNCTION, COLORADO." "Here at Grand Junction, Colorado, we saw some of the use to which the Colorado waters have been put. Water has been diverted on either side to irrigate the many groves of fruit trees that thrive in this area. This photograph is looking west with the town of Grand Junction about five miles distance."

FOLLOWING PAGES

"GLENWOOD SPRINGS, COLORADO—AND THE COLORADO RIVER." 5x7 Anscochrome; f.6.3 at 1/475th sec.; Symmar 210mm lens with skylite haze filter; 4:30 P.M.; scattered clouds. "Still a shallow river the Colorado passes through Glenwood Springs, Colorado. This area and nearby Aspen is known for its winter sports and recreation facilities. A snow covered peak towers over the valley in the distance. This view is looking south and was taken from an altitude of approximately 5000 feet."

"MOAB, UTAH, ON THE COLORADO." "Moab, Utah, a few years ago was a sleepy little town which travelers scarcely noticed. Recent uranium strikes have swelled its population and has changed Moab into a bustling, thriving city several times its former size. I took this photograph looking southeast at about 7500 feet altitude mainly to illustrate how the Colorado has knifed its way through the cliffs on both sides of Moab with seemingly little effort. Many times on our flight we saw instances such as this where the river seemed to choose the most difficult course as if to 'show off' its power."

"THROUGH THE BADLANDS OF UTAH." Bright sun but hazy due to altitude at which taken. "This type of formation located south of the juncture of the Green River and the Colorado is repeated many times from Moab, Utah to the Grand Canyon. Our altitude for this picture was 14,000 feet. We estimated that the bends taken by the river at this point added another five miles length to the Colorado. The area within a 25 mile radius of this location is one of undescribable beauty and the most inaccessible region I can think of."

"Granby Reservoir – Northcentral Colorado"

"The Colorado River, Grand Junction, Colorado"

"Glenwood Springs, Colo. — And the Colorado River"

"Moab, Utah, On The Colorado"

"Through The Badlands of Utah"

CENTER PANEL

AIR PANORAMA — *"Hoover Dam And Lake M*

"Parker Dam And Lake Havasu"

"Canal System Near Yuma"

"Yuma Crossing"

"Diversion Dam On Colorado Near Yuma"

Photographer Koonce (left) and Pilot Hudgin

CENTER PANEL

AIR PANORAMA—"HOOVER DAM AND LAKE MEAD." "Hazy sun, showers to left of picture. Lake Mead, the Colorado River's first big resting place in its long journey, was formed by the construction of Hoover Dam. A remarkable piece of engineering, Hoover Dam not only formed the body of water seen in this photograph, but caused a much larger lake to the east and north that was impossible to get in one picture. The altitude for this picture was 11,000 feet."

"PARKER DAM AND LAKE HAVASU." Bright clear day. "Parker Dam located about halfway between Needles and Blythe, California (17 miles north of Parker) is another great project designed to harness the power of the Colorado. It is here that the Colorado River Aqueduct begins furnishing water to Southern California cities. Lake Havasu is formed by this dam. In this photograph we are looking northwest from about 600 feet. California is to the left and Arizona to the right." The word "Havasu" is from the Havasupai meaning "blue." Lake Havasu is becoming an increasingly popular fishing and water sports area.

"CANAL SYSTEM NEAR YUMA." Bright sunny day. "The All American Canal, just west of Yuma, Arizona, is probably the largest tapping of the Colorado waters as evidenced in this photograph. This photograph was taken from the California side looking south toward the river bed and Arizona. It was interesting to us to note after traveling this great distance following this mighty river that below this irrigation project and one a little farther south constructed by the Mexican government it became very difficult to follow the river bed. Instead of a distinct channel as before it became marshy and slow moving. This was the case far into Mexico before it once again took the shape of a river."

"YUMA CROSSING." 5x7 Anscochrome; f.7 at 1/475th sec.; 210mm Symmar lens; bright, clear day. "View of Yuma, Arizona. U.S. 80 crosses the Colorado River at Yuma. In the foreground is the old highway and railroad bridges and farther up the newly constructed bridge may be seen. The only possible sea port for Arizona, Yuma at one time could be reached by ferries from the Gulf of California. View taken from plane traveling south. Yuma business district is on the left."

"DIVERSION DAM ON COLORADO NEAR YUMA." 5x7 Anscochrome; f.7 at 1/475th sec.; 210mm Symmar lens; backlight—bright sun. "This canal is formed a few miles north of Yuma, Arizona, and is diverting waters of the Colorado to the canal system supplying the Imperial Valley of California. California is to the right of this photograph and Arizona is to the left."

OPPOSITE PAGE

"THE COLORADO NEAR THE GULF OF CALIFORNIA." 5x7 Anscochrome; f.6.3 at 1/475th sec.; 210mm Symmar lens; hazy, smoke-filtered sunlight. "Approximately five miles from the Gulf, the Colorado winds back and forth like a snake over the flatlands of Mexico. The river is slow at this point and seems reluctant to end its journey. Our altitude for this photograph was 5000 feet."

River story. At least I can bear witness that Major Powell did not exaggerate.

Our flight continued over this rugged wilderness of naked rock, the winding river beneath us sometimes broad and placid, sometimes churning into foam where the towering walls closed in. It was hard to judge the depth of the channel while we flew above the general surface of the land, but when Peylan brought us down to within about a hundred feet of the river for a close look at a series of boiling rapids and had to bank steeply to avoid brushing a wing against the wall on a hairpin turn, I knew the meaning of Francis Thompson's phrase, "Titanic glooms of chasmed fear."

The next stream of any size to join the Colorado was the Fremont River, which the Powell party called "Dirty Devil" because of its muddy waters and bad smell. We didn't try to verify the odor, but can testify that the devil is still dirty.

Our river's curves were mostly wider now, and without fear of losing permanent contact with its course we climbed high enough to get a view of the formations on our left that give Natural Bridges National Monument its name. We swung back over the river just in time to identify the incoming Escalante, named for one of the doughty padres who forded the Colorado a little downstream in the fall of 1776 at what has been known since as "The Crossing of the Fathers."

Not long after, the San Juan spewed in from the east, the largest tributary of the Colorado as the Green is the longest.

We gained altitude again to view, to the east, the loops and coils of the San Juan's "goosenecks," more pronounced, even, than those we had been following. We needn't have bothered, for the Colorado, gathering in the San Juan's waters, also took on its giddy character. The plane fairly rocked as we swung left and right, in and out, to keep pace with the river's convolutions. And so we corkscrewed our way across the Arizona border and settled down on the airstrip at Marble Canyon, just beyond Lee's Ferry.

John Doyle Lee, whether of his own volition or at someone else's bidding, was the leader of the Mormon raiders that wiped out a wagon train in the infamous Mountain Meadow Massacre. To escape prosecution he fled from Utah into Arizona with several wives and settled in 1872 at the junction of the Colorado and Paria Creek. Eventually his house, really a stockade, became a kind of inn for infrequent wayfarers in the area and the ferry he built of pine hauled sixty miles by oxen served such trans-river traffic as there was until the Navajo Bridge was built.

We wanted to get into the Grand Canyon for the sunset and couldn't tarry long with history, but Peylan took time for a full swing around the bridge—467 feet above the river and the only highway span in the thousand-mile stretch between Moab and Hoover Dam—and then swooped downstream under its arch.

The character of the land had changed again. The surface now looked to us as smooth as a crock of butter and through it ran a deep gash, comparatively straight and so deep that for mile on mile no light glinted from the river at the bottom. This was the narrow abyss that Powell had mistakenly named Marble Canyon and we followed it across the high plateau until, quite suddenly, it opened into a terraced multi-hued vastness and we were

over the most tremendous of the world's canyons.

The river, when we could sight it, was growing more and more roily, a stream of café au lait with cream curds now and then, where whirlpools and rapids whipped up the foam. It was all the more dramatic, then, to view the sudden emergence of the Little Colorado, a turquoise ribbon threading the high plateau from the east through a gorge as deep as the Colorado's and to see it lose its color and identity in the muddy flood.

And now we turned west with the river and into the terraced multi-hued vastness that is the grandest of the world's canyons.

Colin Sprang, an Englishman teaching science at the Southern Arizona School for Boys, gave me the most satisfactory description of the impact of that spectacle I've had so far. Getting his first view from the South Rim at sunrise last New Year's Day, he said that it looked to him as if the gods had started building the world at opposite ends and had run out of material here in the middle.

The only descriptive word I have for the Grand Canyon was coined by a youngster for another purpose —*stupidifying*. When you've thought of a better one, let me know. Until then, I'll rely on color film.

I took my sunset exposures, as planned. Peylan almost stalled the plane giving me plenty of time to shoot them slow.

We were overnight guests of Grand Canyon Scenic Airlines, courtesy of the Hudgin family, and left the airfield early next morning on the second half of our journey.

Where the Colorado swings almost due north in a wide arc, we continued west in order to get a glimpse of Havasu Canyon, ancestral home of the Havasupai Indians. You might as well expect to see a vegetable patch on Wall Street as the little cultivated oasis in one of the canyon recesses of this breath-taking world of rock. But there it is, with Cataract Creek irrigating corn and squash as it did long before Padre Garces visited there in 1776.

We picked up the main flood again, still meandering through "caverns measureless to man" until, almost imperceptibly, its turgid muddy flow was lost in the clear waters of Lake Mead.

Here was the opportunity for another geography lesson, for it was plain to be seen from our height how the waters backing up from Hoover Dam had turned ravines and gorges into rock-buttressed bays and inlets and the lower valley of the Virgin River had become a gulf stretching north through the back-country badlands of volcanic mountain and treeless mesa. Somewhere under this reservoir, where pleasure craft skitter like water-bugs in the morning sun, there lies the little Mormon town of Callville where Major Powell and five of his original party of nine emerged from their arduous conquest of the Colorado back in 1869.

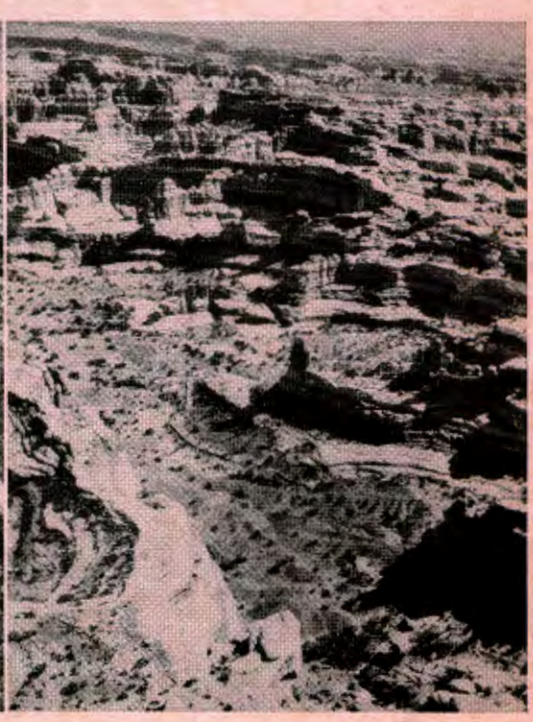
We stayed high to avoid the network of cables around Hoover Dam and, after a gas stop at Las Vegas, looped south with the final stage of the river's relentless march to the sea.

Now, to the right and left, are the baked barren mountains of the desert, cinder cones, volcanic peaks, dry lake beds, vast lava flows. Like an engorged artery between pressure points, the Colorado widens into lakes between Hoover, Davis, and Parker Dams. But generally, the waterway still looks like the Colorado—and retains its stubborn waywardness. It would have been so easy to swing out into the level desert to the right; instead, it bucks and gouges and tears through mountains as far as Blythe.

From here on, it takes the easy way, either grown sluggish with its load of silt or discouraged by the repeated dammings and syphonings. Verdure spreads across the desert sands; fields and groves take the place of dunes; aqueducts, canals, and irrigation ditches multiply, and the river grows smaller and smaller. There is one final swelling—Imperial Reservoir—and then, near Yuma, when the

Where Green and Colorado meet

Near Dead Horse Mesa



last two canals have been broader than the parent stream, it disappears entirely.

Eight miles south of Yuma and just one mile below the U.S.-Mexico border the much diminished Colorado waters are almost entirely diverted to the Alamo Canal by the Morelos Dam.

This diversion structure was erected in 1949 by the Government of Mexico in accordance with the provisions of the 1944 Water Treaty between the U.S. and Mexico. This project is the river's last salute to the thirsty desert it has so bravely bisected.

Although the water itself had evidently all been diverted west, we continued to follow the bed for some fifty miles or so into Mexico, and there was our river again; not deep, for there were sand bars, but as much as a hundred yards across.

And now we approached the Mexican delta, one of the greatest accumulations of silt, they say, in the world, and certainly, to our eyes, as much land as water. The great tidal plain, perhaps 2000 miles square, is a hodgepodge of alkalai flats, mud flats, and lakes—wet and dry, fresh and salt.

But even through this morass, the river has not lost its vigor, or its power to excavate. You have to get up in the air to see this, high enough to observe the change in shade from light to dark as the offshore waters deepen in the Gulf of California. And that's how we got our final view of the Colorado—as a deep dark submarine channel charging east by south through the shallower waters of the gulf—the river still dredging canyons, still fighting its battle against the land, even under the sea.

We had followed this unrelenting river almost two thousand miles in two days, from above snow line to sea level, winding much of the way through the most rugged, desolate, and magnificent country on the continent—country of its own making. We were tired, even if the river wasn't. Turning east, we headed home for Tucson.

Above Marble Canyon

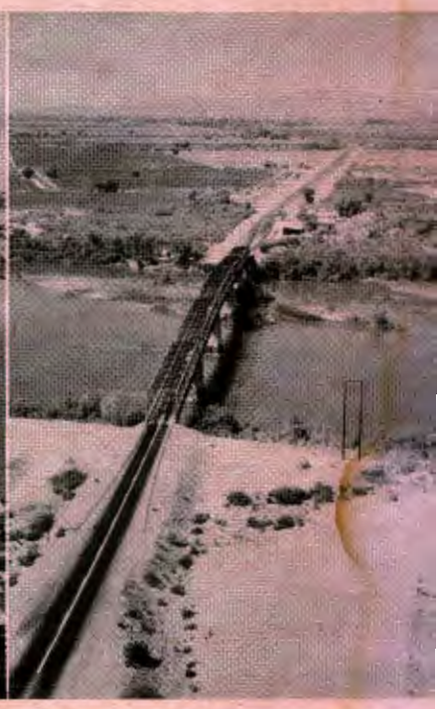
WESTON AND JEANNE LEE

Delta of the Colorado

Little Colorado confluence

Flood-stage in Mexico

Near Blythe, Calif.



Boatlanding at Martinez Lake

RIVER PLAYGROUND

BY CHARLES C. NIEHUIS

PHOTOGRAPHS BY THE AUTHOR UNLESS NOTED OTHERWISE

"Murl Emery has been on the river the longest," said Bud Fox as we approached the mouth of El Dorado Canyon, which empties into the Colorado River on the Nevada side. "You know he ferried the engineers *up* the river to make the first surveys for Hoover Dam."

"Do you know how he did it?" asked my boating companion.

I wouldn't guess. Hoover had been built years ago, before powerful outboards were possible to a man of modest means. We had just come down through Roaring Rapids, just above The Caves and several inches of water still sloshed around in the bottom of our boat. The rapids had been a keel twister! To think of trying to get a boat back up through there . . . well!

"He built a sort of a water sled and pushed it with an airplane motor and propellor. That's how he did it."

Bud shut off our outboard motor and we oared up to the floating houseboat Murl Emery used as a headquarters. "You know, Murl's the only man, living, who has a place on the National Parks named after him—it's Emery Falls on Lake Mead."

Just then a huge, broad-shouldered, red-headed man walked out of the houseboat. He appraised us silently, blue eyes glinting under shaggy brows. I wondered uneasily if we were intruding on his private domain.

Too, I began to wonder if Bud Fox had told me the truth, was this man a friend of his?

Then the man spoke, his impressive eyes narrowing, "What are you guys doing on my end of the river? Fishing out deadmen? Or, are you salvaging timber?" He scowled at Bud, "I thought we were partners, Fox?"

Bud laughed goodnaturedly.

That evening, over a roasted Canadian honker that

Murl had bagged the day before, I heard some of the answers to the questions which had risen in my mind.

Murl, who had lived at El Dorado Canyon for years, and Bud, who had homesteaded a plot just above old Fort Mohave after World War I, had both made themselves a few dollars from time to time, finding drowned men in the River, and salvaging timber which came floating down the Colorado. Mohave County paid $25 for the recovery of the dead men. And the timber could be sold on the market, or used for building boats and houses which did away with the necessity of buying it.

The building of Hoover Dam to form Lake Mead—in which Murl Emery played such an important part—was the beginning of an entirely new way of life for one of the mightiest rivers on this continent. Instead of a wild, turbulent, and sometimes sullen river of unpredictable moods and questionable gifts, the Colorado River has become a steady, obedient servant who now contributes many good things to our way of life.

I, for one, have had more than my share from her.

Hualapai Wash, on the Arizona side of Lake Mead, is a mecca to which many fishermen pilgrimage each spring to pay homage to the largemouth bass, so plentiful in this lake. From Hualapai, it is only thirteen miles by boat up through Iceberg Canyon to Driftwood Cove . . . a most mysterious and intriguing place, to me. For some reason or another, most of the trees and debris that come floating down the Colorado River from its vast drainage collect there.

At times, it is almost impossible to get a boat into the cove because of the flotsam. At other times, the floating logs gather into raft-like groups, leaving waterways through which you can snake your boat.

If you're a bass fisherman, and happen into Driftwood Cove in a late spring or early summer evening, you'll swear there's a lunker bass waiting under every log, just daring you to drop a lure alongside. And—you're practically right!

Sometimes they won't even wait for you to get the lure in the water!

Here's how it happened for me—Wally Blanchard and I were in the cove at just the right time, in the quiet of a summer evening. The westering sun was low, the water like a smoke glass mirror. This was a time when nothing else will serve a bass fisherman except a surface plug.

I overcast, laid my bass lure right next to a log, fouling the hooks in the watersoaked wood. I jerked the line, flipping the rod tip and rattling the plug on the log like some live thing hoping to free itself. This bass couldn't wait for me. He shot out from under, slid his length along the log, knocking the plug loose and hooking himself.

There are many other places on Lake Mead, as exciting as Driftwood Cove: God's Pocket, Grand Wash,

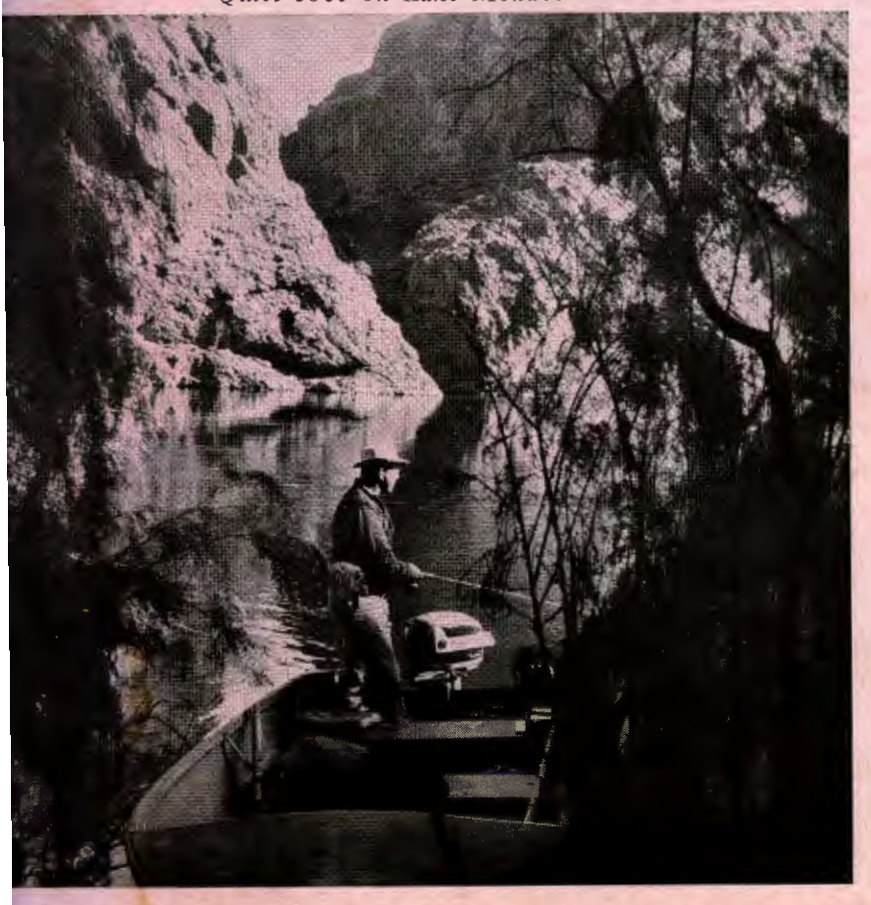
Speed boat at Lake Mead

JOSEF MUENCH

WESTON AND JEANNE LEE

Willow Beach near Hoover Dam

Quiet cove on Lake Mohave



Rattlesnake Cove, Gregg's Hideout, Little Jackass Cove, The Temple, Haystack, Sugar Loaf, Hobo Point, Monkey Cove, Napoleon's Tomb, *and* The Bass Factory (there's a name that has everything—if you're a bass fisherman.)

But fishing isn't all that's offered by Lake Mead!

One glorious summer's day, after we'd been fishing most of the morning, Ed Marshall, Dan Gish and I came upon a most wonderful sandy beach. Up to now, I've kept this a secret, but its really too good to stay bottled up in our memories any longer. The three of us—all grown men—two of us middle-aged gents—were of one mind when we saw the white sand, the cool, clear waters. We stripped off and went swimming, galavantin' around, hootin' and hollerin', running in the sand and diving in the water . . . I wager, you too, would have been glad to wash off the last thirty years of your life and would have joined us, if you'd been there.

Although I contend that any place is a good place to go swimming, you might want to do it "proper"; there are nice beaches all around the lakes on the Colorado River. All the boating marinas have beaches nearby.

From these spots too, you can go pleasure boating . . . and sailing!

Some of us who long ago discovered the Colorado River and its many pleasures, have gone campboating on the shores of its lakes. Surprisingly enough though, not too many people have participated in this recreation. There are perhaps a thousand miles of coves and points on Lake Mead and the others that furnish campsites.

Havasu Springs Resort near Parker Dam

At the Caves, Lake Mohave

Whether it is campboating, or just plain pleasure boating, no matter—you'll have a wide choice of activities!

Shortly after Hoover Dam was finished and the waters began to back up, a very peculiar change took place in the Colorado River. She became an entirely different body of water below the dam. For here, the water drawn from the lower levels of Lake Mead come forth very cool, a 50-55°.

Where they first came from, no one seems to be sure, but who really cares, as long as the trout are there?

During the early '40's the Nevada and Arizona Game and Fish Commission established a special limit on the trout from the Colorado River—ten fish, regardless of weight. It had to be that, because a fisherman might easily, and frequently did, catch two or three running from five pounds up.

During those years, what impressed me most was the brilliant coloring of these trout, inside as well as out. The meat was a brilliant orange, like that of a salmon. Outside, they defied description—rainbows, in truth. All due, I was told by a learned biologist, to the plentiful supply of fresh water shrimp and snails.

Then they finished Davis Dam, to form Lake Mohave.

It was our prediction, mine and that of others, that Mohave would be, one time, the greatest of all trout fishing waters in the West.

Then, a very peculiar thing took place, something none of us foresaw. The lower end of Lake Mohave be-

Murl Emery's boathouse—Lake Mohave

Marina at Katherine Wash

A good day's catch at Lake Mead

came warm, its water temperatures suitable for largemouth bass, and in a few short years lower Lake Mohave was replete with the chunkiest, fightingest bass you could wish to hang on a lure.

And the trout began to disappear, to retreat to the upper end of Lake Mohave, also the quality of the trout fishing began to decline.

There was a reason for this, we soon discovered. The fresh water shrimp and the snails, which had figured so prominently in the development of the Colorado River as a trout fishery, had disappeared as the flowing river changed to the quiet waters of a lake.

The fisheries biologists of Arizona and Nevada rushed in to make a study of Lake Mohave and discovered a phenomeneon. The quiet waters above Davis Dam had risen in temperature and had backed up to El Dorado Canyon. There the cold waters coming into the lake met the warm water front.

The cold water, being heavier, went under the warm water, creating a rolling action. This line was easy to find, even for the layman, for the rolling water brought up vegetation from the bottom. Carp, a warm-water-loving scavanger, were lined up like pigs at a trough, on the warm water side, to feed on the vegetation brought up by the turbulence.

Except for a few strays, the trout, a cold water fish, in Lake Mohave were found above the line and largemouth bass and crappies, warm water game fish, were found below!

The fisheries biologists working in our behalf found something else too: that there was a "missing link" in the food chain (the procedure where the big ones eat the little ones) necessary for the growth and maturing of both the bass and the trout. As a result, the treadfin shad was imported and introduced into the Colorado River to supply the necessary forage fish for the game fish.

What has this done for the fishing, on the Colorado River?

One day, about a year ago, I dropped in for a chat with Bill Minette, editor of Wildlife-Sportsman, a regional magazine devoted to the interests of Southwest outdoorsmen. Bill, without comment, tossed a report of the U. S. Park Service in front of me. It was a recent compilation of the monthly and yearly visitations made by people to the various boat landings on Lake Mohave. Then Bill tossed another such report, but made the previous year, on top of the first, with the terse suggestion I compare the figures.

The visitations at Willow Beach had jumped from a hundred a month to better than a thousand every thirty days. The same had happened to El Dorado Landing, Cottonwood and Katherine Wash, and is happening all up and down the Colorado.

Why this increase? An interesting question that Bill Minette and I set out to pursue immediately.

It was *fish*—just trout and bass and crappies—that was the reason behind the upturn in visitations!

We saw husky trout, weighing better than six pounds, twenty-five inches long, and highly colored. There were largemouth bass running up to nine pounds, and crappies looking like swimming meat platters. All because of the millions of threadfin shad, which are to carnivorous, healthy game fish what milk is to a human.

But, the Colorado River and its lakes have more than

fish—the entire area is rich with historical spots, lost mines, unusual rock formations, semi-precious stones, all of which are accessible and subject to exploration and investigation by means of a boat and outboard motor.

Below Davis Dam, the Colorado, again a river, offers trout fishing for a number of miles, sandy beaches, quiet lagoons and the Topock Slough. There are acres of marsh lands around the head of Lake Havasu, acres of tules and water grasses.

In the fall and winter it is a duck and goose hunting area. At any time, it is a place for a bird watcher! All kinds of waterbirds are to be seen, as well as desert and mountain mammals.

I remember once when Bud Fox and I were just lying in our drifting boat, relaxed, stretched out in the sun, watching the sky, the clouds and the changing scenery.

We were floating a few yards off a solid bank of green tules. We came upon an opening, a pathway through the verdant growth, where animals had made their way to drink from the Colorado. Directly at the blue water's edge, sitting on its haunches in the sun under an archway of green tules, was the yellowest wildcat I've ever seen. Neither of us moved, nor did the cat. He regarded up with topaz eyes, tufted ears alert to catch any hostile sound from our craft. The way he sat, his creamy white undercoat was visible—a most memorable picture, one not many men are privilege to see in a lifetime.

Lake Havasu, below Topock Slough, and the Colorado River below Parker Dam, which forms the lake, probably draws more people than any other section.

Tommy Kinder of Parker pioneered the way of life now so eagerly sought by hundreds of thousands of us. When Tom was a young man it was his job to run the Parker Ferry for Nellie and Joe Bush. In those days, between ferrying jobs, he used to fish for the Colorado River salmon, a fish that migrated up the Colorado and its many tributaries. On hot summer days, Tommy used to swim alongside the ferry as it slowly made its way back and forth across the river. On his time off he rowed small boats and explored.

And when the Colorado was first put in harness, first by Hoover Dam and then Parker Dam, a grown-up Tommy Kinder chopped out the first clearing on the banks of the river for a trailer court, a boating resort and began teaching people the way to live on the river.

From Tommy's and Murl Emery's, and old Jim Alexander's down on the lower Colorado beginnings sprang many developments, until now the River, Lake Havasu and the rest draw people from all over the continent, for here they find a fulfillment in an easy way of life that cannot be excelled anywhere else.

This stretch of river, above Parker to the dam which impounds Lake Havasu, is also now classed as the finest freshwater skiing area in the West. There, water skiiers will find a stretch of smooth water where the wind seldom blows, where the sun shines almost every day, where there are accommodations to meet every purse, where outboard-powered boats can run at top speed back and forth without danger of running over submerged bars. Hosts of people are coming to the area for greater enjoyment of this type of water sports.

The water skiiers have gone skittering their way downriver, too, to Cibola Slough and the upper reaches of Martinez Lake, and down into the main body of that water. They've gone upriver, on Lake Havasu's Bill Williams, Whipple Bay, California, Thompson and Blankenship Bend. Katherine Wash on Lake Mohave, and Overton Wash on Lake Mead are skiing waters.

But, to get on down the River—there is Lost Lake! That's below Parker, Arizona and Earp, California. This backwater, really an old channel that the then untamed, wild and woolly Colorado carved out for itself years ago, is a wonderful place to fish.

Not far below Lost Lake, is the Palo Verde Weir—and from here you can make a very unusual float trip onto Martinez Lake.

Enroute there are innumerable backwaters and lagoons to explore, or in which to laze away a day, fishing, picture-taking, or just getting away from the jingle-jangle of city life.

Cibola Slough, on the Arizona side of the Colorado, midway between the diversion dam and Martinez Lake, is unique. This area has the feel of wilderness sanctity, where you can expect to see all types of wildlife—and usually do.

Cibola Slough and Martinez Lake are utilized the year around by migratory waterfowl and resident birdlife. Ducks and geese pass through this area on the way north in the spring and south in the winter. The miles and miles of lagoons, eddies, backwaters and hidden lakes are a-swarm with wildfowl of all kinds, including sea birds that come up from the Gulf of California or wing their way over from the West Coast.

Some extremely rare birds have been observed on Martinez Lake and the lower reaches of the Colorado. A rare Roseate spoonbill was seen there a number of years ago, by a reliable observer. This beautiful pink-feathered bird, in the adult stage, was considered on the verge of extinction in the Gulf States, its natural habitat. How and why a single specimen got over on the lower Colorado is anybody's guess.

Perhaps, as an outdoorsman, I have an especial affinity for Martinez Lake, its backwaters and sloughs, as I do for Topock Slough across the river from Needles, California. Mysterious, uncharted, primitive—being there, on the Colorado, fortifies a need most of us have to get away from it all, to be quiet, to just let Nature go about her business, while we watch. Maybe that's why I used the area as a background for my first book. For if you go quietly in your boat, and look sharp, you will see a wildlife panorama here: beaver, muskrats, mountain sheep, Colorado burro deer, and birds. If you fish, you're bound to come off the Colorado with something in your hand. But, no matter why you go, you come away with something for your mind—a new serenity and a feeling of well-being for the neglected "inner man."

KOLB BROTHERS PHOTOGRAPH

Ellsworth Kolb on rocks in Black Canyon Rapids, 1921

THEY BRAVED THE WILD, WILD RIVER

BY JONREED LAURITZEN

Why have men risked—and lost—their lives in the attempt to run the Colorado? Not simply because it is "there." Not only because it is one of the world's great challenges. The urge is hard to define.

The River is not like the Mountain, a passive "force" waiting to be taken. It is a live thing, cruel and violent, seeming to lust for a man's blood. It can be a brutal, snarling, roaring, slavering creature, merciless as an aroused cougar one moment and the next moment a quiet, sinuous beauty carrying the reflections of walls and towers and clouds on its glistening skin.

The early Spaniards caught this fascination. They called the Colorado "*El Rio del Tizón*"—Firebrand River. Later Spaniards called it the River of Mysteries. What some mountain men called it, and others who suddenly came upon its canyons and had to traipse through five states to go around it, is unprintable. Roving Indians stayed away from the Grand Canyon. This was the path of the Thunder Thrower, forbidden to mortal man, and from the time Cardenas, one of Coronado's men, had the first paleface's view of this mile-deep chasm, to the time of James White, men who would poke into every other nook and cranny in North America agreed with them. They stayed away from it.

The mention of James White will speckle the eyes of men who think they know the River. "That old Kybosh again! Stanton dowsed the Jim White legend fifty years ago." A lot of other people have tried to put the Jim White legend to rest. They have sneered at him for whole chapters in books, scorned him in scholarly treatises. But I want to go on record as saying that, without the slightest shadow of a doubt, James White was the first man to go through the Grand Canyon. Some day he will

have a monument, if I have to build it myself with the swollen skulles of some who tried to discredit him.

Most of the evidence, for one who reads it right, is in White's letter to his brother back east, written from Callville while he was recuperating.

White, with a Captain Baker and George (Henry) Strole, had been prospecting through Colorado. They came down out of the San Juan Mountains, crossed the San Juan River, were attacked by Utes. Baker was killed. White and Strole walked down a side canyon to the River, carrying lariats and supplies. They cut dry cottonwood logs and built a raft that night. "We had good sailing for three days and the forth day George Strole was washed off the raft and down and that left me alone . . ." White took off his boots and pants, tied an end of one of the long ropes around his waist and drifted on. "I went over falls from 10 to 15 feet hie, my raft would tip over three and four times a day . . ." On the third day the flour had been lost and for seven days White lived on nothing but a rawhide scabbard. He was too weak to climb out of the Canyon. (Try it yourself sometime, on an empty stomach.) This gaunt, indestructible man lay scalding in the sun, trying to keep on the upside of his raft whenever it turned over, hurling down rapids and resting on smooth water. On the ninth day he came to the lower reaches of the Canyon where kindly Hualapai Indians fished him out of the River and gave him some mesquite bean bread. On the thirteenth day he found Paiutes who would give him nothing, but they traded the hind parts of a dog for his pistols. He ate one leg for supper and the other for breakfast. On the fourteenth day he was pulled half dead out of the River at Callville, "burned so I could hardly walk,"—the first man to go through the Grand Canyon and come out alive.

It took White some time to realize that he had performed an extraordinary feat and stood on the glimmering brink of immortality. He had a simple story to tell and he told it to anyone who asked to hear it. He made no capital of it and he never changed the substance of it. The scholarly hatchet men tired to break the story down and distort it, but the truth comes clearer now than ever before, to anyone who knows the *land* as well as the River. James White *was* the first man to go through the Grand Canyon and live.

The first man to take a party down Green River was General William Henry Ashley, trapper impresario. He loaded a number of trappers into bull boats and started downstream in search of beaver. That was in the summer of 1825. They drifted down from Greenriver, Wyoming, and into what Powell later named Flaming Gorge. Here the current quickened and they had their first taste of the River's rage. Through the Gate of Ladore the canyon narrowed and the walls grew higher. "I was forcibly struck with the gloom which spread over the countenances of my men," Ashley wrote later. The Canyon of Ladore—named after Southey's poem—has some stiff rapids, and the bull boats were hard to handle. The party portaged through Whirlpool Canyon and Split Mountain Canyon, where there were about "twenty miles of bad rapids." Below Split Mountain Canyon they passed the point where Fray Escalante and his party crossed the river in 1776. When the Ashley party arrived at the location of the present town of Greenriver, Utah, they shook the flood spume off their moccasins and headed for the hills.

The next adventurers to drift into the story of the River are the members of the William Manly party of "fortyniners." These men were headed for California and they had to make a choice between wintering in Salt Lake City with dreaded Mormons, or finding a quick route to the Coast. The military party with which they had travelled West had told them that the river ended in the Pacific and held "no obstacles to navigation except cataracts." Cataracts, hah! What were a few little old cataracts to men who had fought Indians, roamed as mountain men, worked as bullwhackers! With a whoop they piled their "possibles" on an old wagon ferry and shoved off for the Pacific. Wrote Many years later: "It looked as if we were taking the most sensible way to get to the Pacific, and wondered why everybody was so blind as not to see it . . . " And what a fine, hilarious journey it turned out to be—while it lasted. Not until Clyde Eddy took his collegiate crew down the River shouting "Hey, Ruth" for the echoes nearly a century later, was the River

Emery Kolb running a typical rapids on the Colorado

KOLB BROTHERS PHOTOGRAPH

Powell and Paiute Chief, 1873

to be assaulted with such glee.

They drifted happily for a time, secure from "Mormons and Indians." The few rocks that showed up in the current they pushed away with their poles. "Captain" Manly got his pole stuck between two boulders and was thrown into the river, but came up grinning at his hilarious crew, "Well, we're on our way to California by *water*, ain't we?"

After five days of peaceful drifting, with some of the men taking turns at the poles and oars while others slept, Manly was suddenly wakened. The men were troubled. A range of mountains appeared to lie athwart the river ahead and the journey seemed to end. The question was, what now became of the River? Manly remembered hearing something about Brown's Hole. "I told the boys I guessed we were elected to go on foot to California after all, for I did not propose to follow the river down any sort of hole through any mountain." But at the last moment the accomodating mountain opened up like the Red Sea and permitted them to float on.

In Red Canyon they lined the old scow through with remarkable success, but Ashley Falls got the boat. The rapid was blocked by a rock as big as a cabin. One man stayed on the bank with the rope to ease the boat down, the others got up on the rock with their poles to shove the boat away from it. The current hurled the boat against the rock in spite of them, pinned its bottom against the flat stone so tight they could not budge it.

"Beyond a few rapid thoughts . . . as to whether we would not be safer among the Mormons than out in this wild country afoot and alone" they lost no time repining. They took what of their plunder they could rescue, walked down to a grove of pines, ax-hewed four rough dugouts which they lashed together in pairs. With Manly's Commodore's flag—a pair of wet drawers—flying from the first craft, they went on down through Red Canyon and camped in Brown's Hole, where they feasted on elk, geese, ducks, otter, deer—and "mud-stupified fish a foot long."

They went on through the Gate of Ladore and into rapids which they lined-down. They came upon a deserted camp where a previous party had left the River in disgust leaving a notice posted on an alder tree saying the River was too full of rocks to be navigated and they were starting overland for Salt Lake. "This notice rather disconcerted us, but we thought we had better keep on and see for ourselves . . ." These were mountain men, and some of them evidently from Missouri.

Hell's Half Mile tried to stop them. Tall, brutal waves got hold of their dugouts, turned them over, and over, tossed the men into the stream. They managed to recover the boats and go on, through Whirlpoor and Split Mountain Canyons. Finally, near the mouth of the Uintah, they heard a shot which led them to a camp of Utes. The chief, "Walker," took Manly to a spot of beach sand and built him a relief map with his hands, showing what the canyons were like further down the River. "I understood perfectly plain from this that below . . . was a terrible canyon . . . and the rapids were not navigable with safety."

It took more persuading from Indians further down the River, but this wonderful band of bull-whackers were finally induced to head for California by land. After a scorching trek through Death Valley "I came . . . to this land so pleasant and so fair, wherein, after over forty years of earnest toil, I rest in the midst of family and friends, and can truly say I am content." Where have better words been better said?

Ashley and Manly had beat at the tail of the River, James White had been tossed on its horns, but until 1869 nobody, to our knowledge, had ever taken the beast's entire measure. That job was keeping for a man of size. It needed one with courage and stature and a mind for scientific care as well as an imagination to be tempted by the supreme challenge that lay in the River of Mysteries. Major John Wesley Powell, soldier, scientist, dreamer, was the man.

After many months of exploration in the Rocky Mountains and reconnaisance on the upper reaches of the River, he had boats built to his own specifications and hauled on flat cars to Greenriver, Wyoming. He assembled a carefully selected crew, stocked the watertight compartments of the boats with supplies for ten months and with barometers and other instruments. On May 24, 1869 they put the four boats, Emma Dean, Kitty Clyde's Sister, Maid of the Canyon, and No-Name on Green River and began an adventure that was to become one of the classic feats of courage and endurance of all time. The names of the men of that immortal crew in addition to Powell, were his younger brother, Walter H. Powell, John C. Sumner, William H. Dunn, G. W. Bradley, O. G. Howland, Seneca Howland, Frank Goodman—who quit the River not far from the start—William R. Hawkins, and Andrew Hall.

In the Canyon of Ladore the No-Name is caught in rapids, shattered on the rocks, and its crew, the Howland brothers and Frank Goodman, are thrown into the water. The men are saved but precious provisions and instruments are lost. Goodman's dowsing is too much for him. He leaves the party at the Uintah. Major Powell broods over the loss of the boat, but there is no thought of turning back.

Through Desolation Canyon they fight winds and rocks and rapids, with the valiant Major himself thrown into the water, more instruments and supplies lost or damaged in boat upsets. On into Gray Canyon and then into the painted corridors of Labarynth and Stillwater Canyons where in relatively quiet drifting the man may take their eyes from the water and admire the walls, buttes, and towers that move majestically into their range of vision and then away in an endless parade: "Cathedral-shaped buttes, towering hundreds of feet, walls that shrink the river to insignificance, with vast, hollow domes and tall pinnacles . . . all highly colored . . . bare, polished." Then the orange colored cliffs and the junction of the Grande (now Colorado) and Green. They have found themselves a river and a major conflict is shaping up for them in the unknown canyons below.

The walls rise higher, the water becomes swifter. There is an acceleration of growing excitement and apprehension as they go deep into the unknown. Hard portages are made, boats are overturned, oars lost, men when not struggling in the water are bathed with spray. Now the walls are nearly two thousand feet high and the River rolls between in "solemn majesty."

The men speculate on what may wait ahead. Falls that they cannot by-pass? Cataracts they cannot avoid, so swift as to mean sure destruction? Sumner jokes, "My idea is, we had better go slow and learn to peddle."

Now the channel is filled with great angular blocks that have broken from the ledges and rolled into the River. Among the rocks the water goes in chutes, whirlpools, great waves. The air is heavy with the constant deep-toned roar. Portages, more portages, rapids and still more rapids. They kill mountain sheep and have a feast, and they laugh and joke, but their eyes are cold. They have met the Adversary, finally, and they know better than they have known before that the satanic old River is out to kill them.

Next day they make two portages around rapids, run a chute through marble. At the foot of the chute the torrent turns abruptly, the water rolls against a ledge almost athwart its course. The boats are carried headlong toward the ledge and for a moment it looks like certain destruction. The River has them and with a screaming roar it hurls them at the ledge. But the rebound catches them, covers them with spray and thrusts them out into smooth water. Drenched and tense with anxiety, they move on into a narrow channel between walls that rise perpendicularly out of the water. If the River has more ordeals for them they must be braced to take it, for there is no way around or out. But for the time being the River is content to let them drift. And presently they have left Cataract Canyon behind. They have won a major victory over the old Firebrand. But there is no exultation. There is still much river ahead.

They relax and dream through Glen Canyon, an avenue filled with smooth water, shimmering with color. This is a long cavalcade of beauty, of orange and vermillion walls, of towering shapes, of pyramids and huge colonades set back from the channel, of immense buttresses, nobbed and steepled. Everywhere one looks on that winding journey there is a new vista of oriental splendor and color and dramatic form.

On by Lee's Ferry, a place not inhabited at that time. Then they go on over rough water in Marble Canyon. At the end of this they can look into the dark, gloomy chasm of the Little Colorado. Here they make camp for three days.

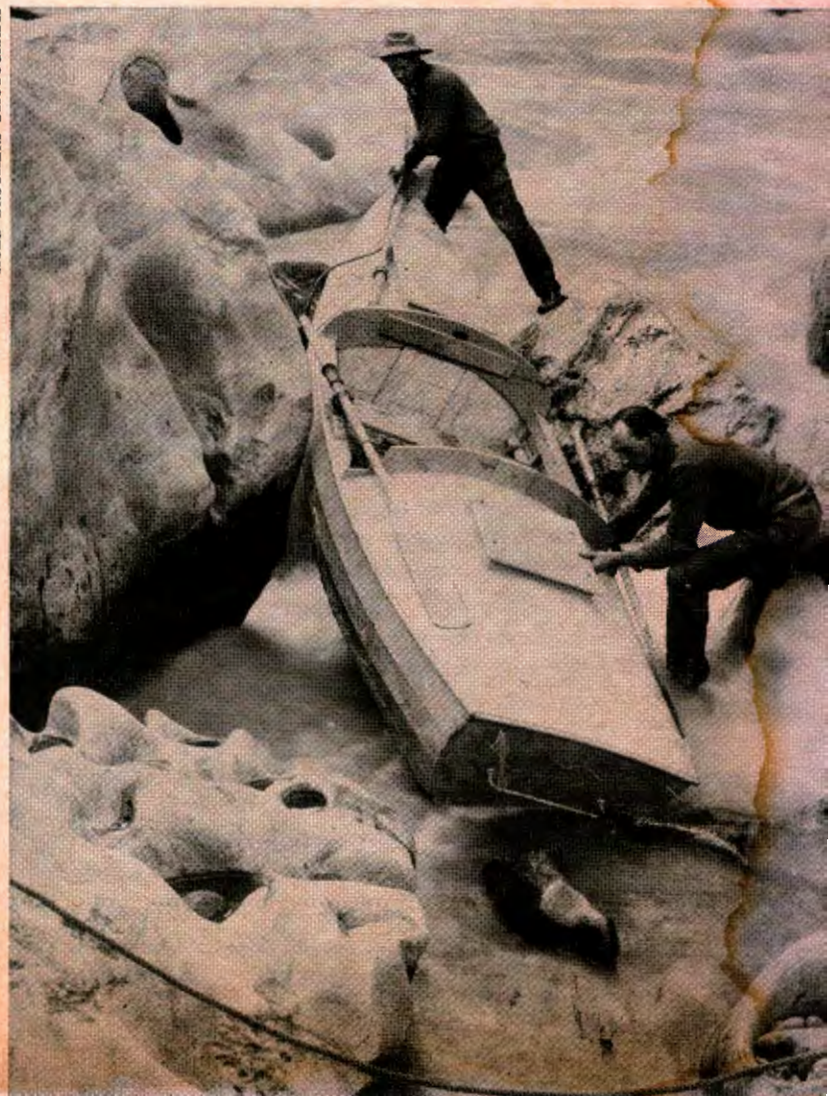
The scant supplies, the dangers of the mighty canyon before them cause Powell to muse in his journal, "We have an unknown distance yet to run; an unknown river yet to explore. What falls there are we know not; what rocks beset the channel we know not; what walls rise over the river we know not; Ah, well! 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 sombre and the jests are ghastly." The mood was justified. Seldom in history has man faced such fierce incalculables and in the midst of brooding grandeur that can crush or exalt the spirit.

Their first bout with the River after leaving Little Colorado was one of the worst of the whole journey—the Sockdologer Rapids. There was no way to portage around or to line down. The rapids, with waves thirty feet high, had to be run. The Major pushed off in the Emma Dean to show the way.

". . . Away we go, first on smooth but swift water, then we strike a glassy wave and ride to its top, down

Portage, rough going at times

KOLB BROTHERS PHOTOGRAPH



again into the trough, up again on a higher wave, and down and up on waves higher and still higher, until we strike one just as it curls back, and a breaker rolls over our little boat . . ."

The boats were nearly swamped in the back-curl of the soaring breakers but they made it through.

A few miles downriver they found a rapid which appeared more difficult than the Sockdologer. They portaged and lined around but before they had finished night caught them and they stayed huddled in the rain on a shelf until daybreak. Next morning a wild rapid had to be run which took two of their oars and spoiled more of the precious food.

Powell's gloom and foreboding deepened. "It is especially cold in the rain tonight. The little canvas we have is rotten and useless; the rubber ponchos . . . lost; more than half the party is without hats, and not one of us has an entire suite of clothes, and we have not a blanket apiece. So we gather driftwood and build a fire; but after supper the rain coming down in torrents extinguishes it, and we sit up all night on the rocks shivering . . . " As if the ultimate danger they faced were not enough!

They came to what is now known as Separation Rapids. Their mood of partial despair must have magnified its terrors, but Powell decided that they should run it next morning. After supper the elder Howland called Powell aside and told him he had decided to leave the party. The next morning the two Howlands and Dunn climbed out of the canyon without food, and with only a rifle with which they hoped to get game. They were killed by Shivwits after they reached the summit.

Powell and his diminished crew ran the rapids without mishap, and after a couple of hours waiting in the hope that the deserters would come back, they went on. A succession of rapids and they were out of the granite. By noon the next day they were on smooth water and the River had found a master . . .

One of the most creditable performances on the River was given by the doughty Kolb brothers, Emery and Ellsworth. There is showmanship, a lightness, an air of derring-do, a prankishness about their feat that takes them out of the heroic category and puts them in a class of their own. Not that the Kolbs took the River lightly. Nobody ever takes the old Firebrand lightly if he wants to live. But their approach seems to have been one of boyish innocence, blitheness, and spunk, as against the gravity of men like Powell, Stanton, Stone.

Kolbs had read everything they could find about the River and listened to anyone who might have something to tell. They made careful preparations. With the help of Nathan Galloway—probably the greatest of them all—they designed and fitted their own boats.

They kept motion picture records of the journey. They explored thoroughly as they went along. They were among the first to use the method, suggested by Galloway, of going down rapids with the boat stern first, pulling back on the oars to slow the boat's speed rather than accelerating it as happens when the boat is rowed down normally. This method was later used by Buzz Holmstrom and probably meant the difference between success and failure, life and death, for him.

But the thing that amazes about the Kolbs is not their courage and skill, which are genuine, but their superb indifference to danger. Like the tightrope walker who balances high above a city street, or the riveter who climbs nonchalantly around the skeletal maze of a birthing skyscraper, they seemed to defy the laws of chance. If anyone could spit in the face of the old Firebrand and live to talk about it, the Kolbs could—and did.

Haldane (Buzz) Holmstrom was working in Idaho when he began reading about the Colorado River expeditions. They became his single interest and he made up his mind that he would run the River. Like the Kolbs he studied everything he could find about river running and about the Colorado runs. He built boats and tried them down the local rivers, wherever there was swift water. When he felt that he was ready to take on the fiercest of all rivers, he went out and found a fallen, cured log of Port Orford cedar, a wood light and strong which grows only in Southwest Oregon and in the Holy Land. He sawed out a cant and towed it home and out of it he made a boat fifteen feet long, with a five foot beam, ten inches of rake fore and aft. He decked it over, except for a small cockpit, which was to hold nothing but himself and a life-preserver. "The cockpit could be brimming and she would support tons. She could turn end for end, roll completely over and as long as I stayed with her I would have a chance." In her watertight compartments he stored the few carefully selected supplies to see him through. "Nothing fancy. No balloon silk tents, no elaborate equipment or camp kits. Just food, clothing, stuff to keep me alive for the time it would take me to get through." No expensive scientific devices either. He was not going to measure anything except his own strength and stamina against that of the River. He was not trying to prove anything, except that he could run the river alone. No cameras, no sound recorders, no notebooks, no typewriters. Only Holmstrom, a boat and the River—simple ingredients of an epic.

He started out from Greenriver, Wyoming, October 4, 1937. Only a few curious people were there to see him off, people with whom he had talked during the few days when he had been packing supplies and readying the boat.

Down through Red Canyon to the Gates of Ladore and on into Desolation and Gray Canyons. He was shaken in a few rapids, testing the temper of the River, taking swift water stern first as the Kolb brothers had done. He had been jolted a few times now, sobered, like a young fighter taking his first blows on the chin, learning that this is no boy's game, that he had picked a grim adversary. He reminded himself that it gets worse, much worse, below. But there was satisfaction, too, and pride in his boat. In one rapid she hit a submerged boulder that might have shattered an ordinary boat, but she slid up on it, spun and slid off. That was because of the rake he had given her bow.

There was fear, all right, but with a hard core of confidence now. He assured himself that he was fit, prepared to meet one of the greatest challenges ever faced by man. Holmstrom, the boat against the River. Like an ancient Viking his trust was in himself and there was great pride that he could face the supreme danger in quiet strength—alone and without doubt or whimpering.

At the beginning of the rapids of Cataract Canyon there was calm water and low canyon sides, a chance to quit the game while he was ahead. Many before him had pulled out here, and there was no shame attached to their names for it. Others had gone down and had vanished without even leaving a name in a book or anything

but a fragment of boat wedged between boulders, or their own bones half-buried in the shore-sand.

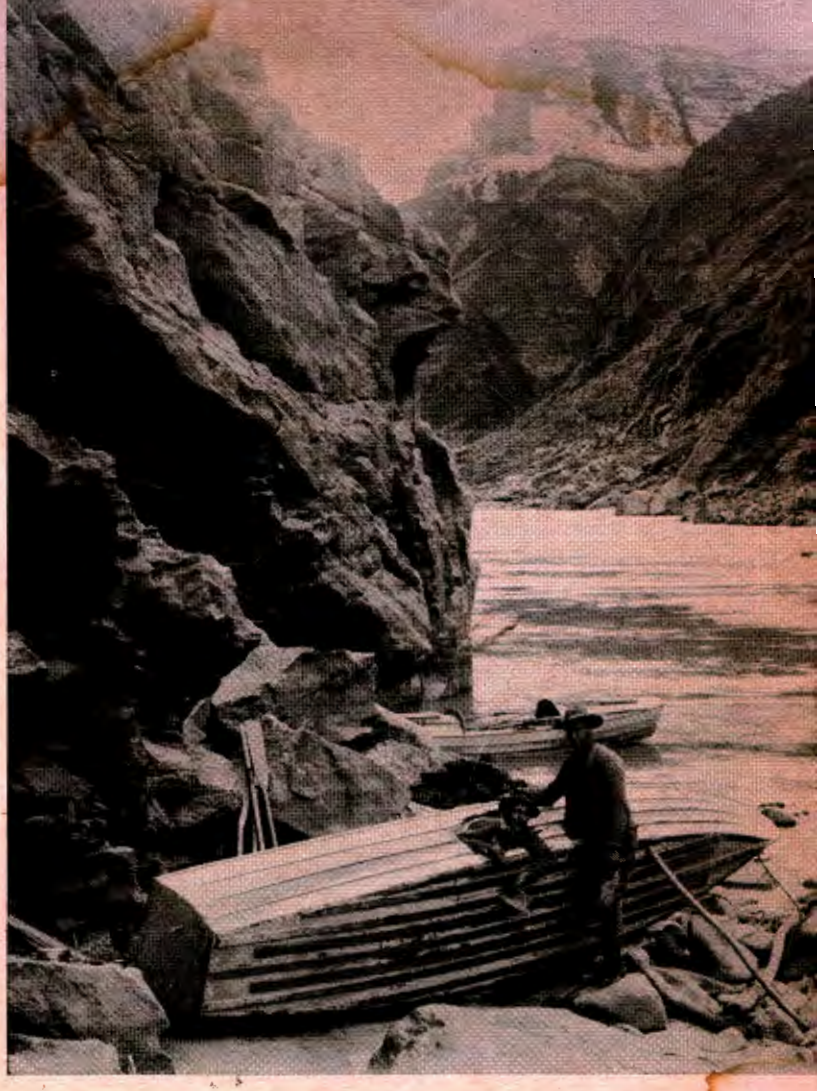
He did not think about it much. He got in the boat, took hold of the oars and pushed her out into the current . . . . He fought it through Cataract Canyon, came out miraculously alive, and rested through the smooth 165 miles of Glen Canyon. He bested Sockdologer. Deubendorf, Separation and all between in that "most beautiful, most pitiless canyon." He drifted out on the waters of Lake Meade 52 days after the start of his run. There was no exultance, only an "all gone" feeling.

There is simple Homeric grandeur in the River adventures of men like Powell, Holmstrom, Nathan Galloway, and Jim White—even though the wild journey of White was an unpremeditated thing—and their names will be remembered as long as individual courage is admired.

This does not mean that the making of River legends is ended. Glen Canyon Dam and perhaps future dams will take up some of the River's slack and throw her back on her heels in stretches, making quiet lakes that all may enjoy where now is a wilderness of silent and beautiful solitudes. But it will be a long time before we immerse the Grand Canyon with its Sockdologer, Deubendorf, and Separation, and all the rest. There is still time for generations of young explorers to dream of riding the hackles of the old dragon, to hear her snarl and feel the spume of her anger on their faces.

Chronological List of the Important River Runs

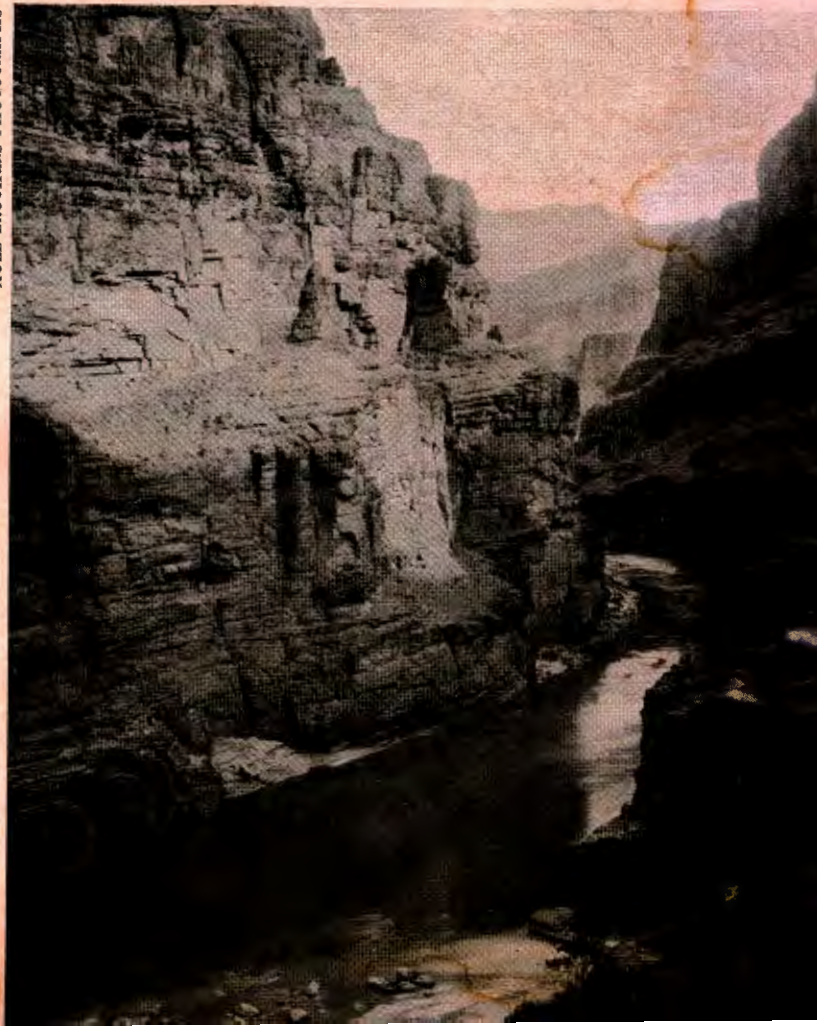
1825 Summer	General William Henry Ashley and party to Cataract Canyon.
1849	William Manly
1858	Lt. Jos. C. Ives and party—lower Colorado
1867 Aug. Sept.	James White—Navajo Canyon (?) to Callville
1869 May	Maj. John W. Powell—Greenriver, Wyoming to Virgin River
1871 May	Maj. John W. Powell—Greenriver, Wyoming to Kanab Canyon
1889 May	Frank M. Brown, Robert B. Stanton —Greenriver, Utah to lower Marble Canyon
1895 Autumn	Nathan Galloway—Greenriver, Wyoming to Lee's Ferry
1897 Feb.	Nathan Galloway, Wm. Richmond—Henry's Fork, Wyoming to Needles, California
1896 Aug.	George F. Flavell—Greenriver, Wyo. to Yuma, Arizona
1907 Sept.	Charles S. Russel, E. R. Monette, Bert Loper, Greenriver, Utah to Needles
1909 Sept.	J. F. Stone, Nathan Galloway, Charles Sharp, S. S. Deubendorff, R. A. Cogswell — Greenriver, Wyoming to Needles, California
1911 Sept.	Elsworth and Emory Kolb—Greenriver, Wyoming to the Gulf
1937 Oct.	Haldane (Buzz) Holmstrom—Greenriver, Wyoming to Boulder Dam. First alone.



The river plays rough.

Boats near Havasupai Canyon

KOLB BROTHERS PHOTOGRAPHS



★ Yours sincerely

COCHISE COUNTY:

. . . I have been cheated!

We have recently returned from a trip to your state and we traveled the entire distance around the edge of Cochise County (80 and 86) without once going into the interior of that area you so glowingly describe in your April issue. I certainly wish we could have read this issue before the trip so that we would have been made aware of the more interesting places in the interior of Cochise County. I will say, however, that we did enjoy visiting in Douglas, Bisbee, Tombstone and the St. David area. Incidentally, Douglas has the finest water we found anywhere on our entire 4,300-mile trip.

Your April issue is, in my estimation, the finest issue you have had for many moons. I am hoping this will in a small way inspire you to more issues similar in nature.

Dr. R. L. Cole
Liberty, Missouri

• *Cochise County has much to offer the discriminating traveler. Our April issue merely pointed the way to the scenic enchantment found there. Other counties in Arizona will be presented in these pages from time to time.*

EL PAISANO:

. . . Mr. Dobie's article on the road runner in your last issue is one of the most interesting you have published in a long time. In the back country of New Mexico, where I was born, we always considered the appearance of the road runner as a sign of good luck.

Arnold Westland
Syracuse, New York

• *We are glad Mr. Westland and other readers enjoyed J. Frank Dobie's tribute to the road runner. One can never be considered a true Westerner until he has become acquainted with this strange and fascinating bird.*

RECEPTION IN DENMARK:

. . . I have just had the pleasure to see your monthly issue of ARIZONA HIGHWAYS, and, as I can't find any kiosk here, where it is possible to buy the two copies, which I saw in the hands of some policeman, who had borrowed them from somebody else, who had been presented with them from I believe far off relatives, I am writing you about it.

I have had no success in tracing through the already mentioned policeman where I can get those special copies—December '54 and January '55. The policeman seemed to know no English, but as he has gardening as a hobby, he was just enjoying the wonderful illustrations. Now I am keen on getting hold of these copies—please help me, if you can.

Ruth Sandager
Copenhagen, Denmark

• *How delightful to find ourselves in a policeman's hand in Copenhagen! Must be a wonderful town.*

VACATION IN WHITE MOUNTAINS:

. . . Your May issue arrived at a particularly appropriate time. Your story on the White Mountains, illustrated so beautifully, has decided for us where we will spend a month this summer. After a tour of Northern Arizona, we'll pitch our tent under one of those tall pines beside one of those sparkling streams right in the middle of the Whites.

Mr. and Mrs. Tal Tomlinson
Topeka, Kansas

• *Welcome, our way, dear friends in Topeka! We promise you a pleasant vacation.*

. . . We enjoyed so much Joyce Muench's "The Delectable Mountain" in your May issue. Having spent a month in the White Mountains last summer, we know she did not exaggerate. We were especially lucky last year because the wild flowers were exceptionally beautiful.

H. T. Thompson
Los Angeles, California

• *Because of a rainy spring, the wild flowers in the White Mountains were unusually profuse. There is every reason to believe this summer's crop will be far better than average.*

OPPOSITE PAGE

AIR VIEW—"DAVIS DAM" BY NAURICE KOONCE. 5x7 Anscochrome; f.7 at 1/475th sec.; 210mm Symmar lens; bright sun (midday). Davis Dam located on the Colorado River about 30 miles west of Kingman, Arizona, has formed the beautiful Lake Mohave seen in the background. Lake Mohave, like all the man-made lakes at the Colorado, is a long, narrow lake dotted with many small islands. The silt and mud that is characteristic of the Colorado River have settled at these points; hence, the clear blue waters of Lake Mohave.

BACK COVER

"GOOSENECKS OF THE SAN JUAN" BY NAURICE KOONCE. 5x7 Anscochrome; f.7 at 1/475th sec.; 210mm Symmar lens; 10:00 A.M.; bright sunlight. A truly magnificent sight from the ground, the Goosenecks of the San Juan River are even more unbelievable from the air. The road to the regular lookout point can be seen in the left center of the photograph. Although a mammoth river in its own right, the San Juan makes no noticeable change in the Colorado River as they join a few miles west of this location. This photograph was taken from 10,000 feet looking in an easterly direction.

ON THE MAP OF TIME

The day sang past me; morning, afternoon,
I heard the rise and fall of hours in tune,
And my response found pattern in a rhyme
That marked off places on the map of time;
Thus I recall how certain moments came,
Single and wondrous, each with its own name.

ELINOR LENNE

★

THE FREAK SUMMER STORM

The sky grew dark and the golden day
Shivered in the sudden chill.
An uneasy wind crept slowly away
And left the hour as silent and still
As black water dammed behind a mill.

My father gazed at his wheat in the field,
Noted with pride each plump, heavy head
And computed what the South Forty would yield.
With grateful heart, like a prayer he said,
"This harvest will see us out of the red!"

Then lightning snarled and slashed the sky!
Like tortured beasts the clouds roared with pain;
But only the wind heard my father's sigh
As hailstones flailed the helpless grain
And beat it back in the earth again.

EMILY CAREY ALLEMA

★

CRICKETS

Everywhere the crickets go,
They think the world is but a show.
They clap with such resounding smack,
They must be Mother Nature's claque.

THELMA IRELAN

★

ROAD LEADING BACK

The way is but a double rut that ambles
By ancient oaks that stoop to touch the sage,
Bordered with San Juan shrub and last year's brambles,
Dun as the dust. Yet . . . in some other age
Less desperate and harassed than this one,
I walked this way; for now at every curve
Something within me leaps and tries to run
Ahead, as if I knew each halt and swerve.
Why, when I know the shape of hills I meet,
Am I thus soul-blind to envision you?
I come—not as a stranger—to repeat
A half-recalled beloved rendezvous.
There is a ruin at the canyon's end;
I know . . . who have not ever passed this ben

DOROTHY MARIE DAV

★

NOCTURNE

From where kind Night has placed it
On the West's high window-sill
The Evening Star's old silver lamp
Shines down on field and hill,
Lighting the evening going-out
Of many a meadow-mouse
And rabbit glad to leave a while
His dark and narrow house.

ELIZABETH-ELLEN LON