

Super-Dam Will Harness the Mighty Colorado

World's Greatest Power and Irrigation Project Will Turn Millions of Barren Acres into Land of Wealth and Opportunity

By John Anson Ford

who was sent by POPULAR SCIENCE MONTHLY on a 400-mile motorcycle journey across deserts and mountains to get firsthand details about the government's vast power and irrigation project in the Colorado River basin

"SHE'S a wicked stream! And before we get her harnessed, we shall have to overcome some of the biggest obstacles this country's engineers have ever faced."

It was big Ray Gossett speaking, as he stood on the bank of the mighty, swirling Colorado River, and pointed to the black mouth of Boulder Canyon, three quarters of a mile away. He was explaining that this gorge with its sheer walls rising 1200 and 1400 feet above the river forms what engineers believe is a matchless site for a dam—a structure the like of which the world has never seen.

Here on the border line between Nevada and Arizona, the Federal government proposes to construct a dam that will rise 735 feet above bedrock, creating a reservoir with an area of 160,000 acres, and backing up the waters of the Colorado for 80 miles. The Virgin River, a tributary, will be backed up for 40 miles. This tremendous reservoir will have a storage capacity for 31,000,000 acre feet, far surpassing the largest reservoir in existence—the Asuan dam on the Nile, with a storage capacity of 3,500,000 acre feet.

400 Miles for News!

Gossett is the man on the ground directly in charge of the United States Reclamation Service camp engaged in preliminary investigations to determine by drilling the location of bedrock at this and a near-by site known as Black Canyon. What this giant of a man had to say about the project interested me intensely, for I had motored more than 400 miles across deserts and mountains to get firsthand information and to inspect the wild territory in which this work is being undertaken.

Tremendous benefits are promised from the great project, to which the Federal government has officially committed itself through Secretary A. B. Fall and Director A. P. Davis of the Reclamation Service. A vast barren waste is to be made marvelously fruitful; one of the continent's mightiest and most treacherous rivers is to be tamed; immense power now

wasted is to be developed and delivered to farmers and manufacturers scattered over ten states; untold wealth, now hidden, will be revealed in countless barren mountains; a region now almost unknown to the outside world will attract thousands of tourists by reason of its scenic beauties.

All these advantages can be claimed for the Boulder Canyon project alone, while the development of the entire Colorado River basin, of which this project is only the first big step, will result in far greater benefits—increasing tenfold the wealth, productivity, and population of a vast Western region. The complete harnessing of the Colorado will cost more than the Panama Canal, and will be by far the greatest public improvement ever undertaken by the government.

A Threefold Purpose

The incentive for harnessing the mighty Colorado is threefold:

First, flood control, which will save vast irrigated districts adjoining the lower Colorado from threats of perennial inundation.

Second, development through irrigation of 4,000,000 acres of land now arid, in addition to better irrigation of 2,000,000 acres under cultivation.

Third, the increase of hydroelectric power development from 100,000 horsepower (the present total for the entire basin), to 5,000,000 horsepower—or one half the total hydroelectric power now generated in the entire United States. This phase alone is sufficient to stagger the imagination. The total electrical energy of Niagara, developed to date is 760,000 horsepower—a figure that is nearing the maximum for that great power site.

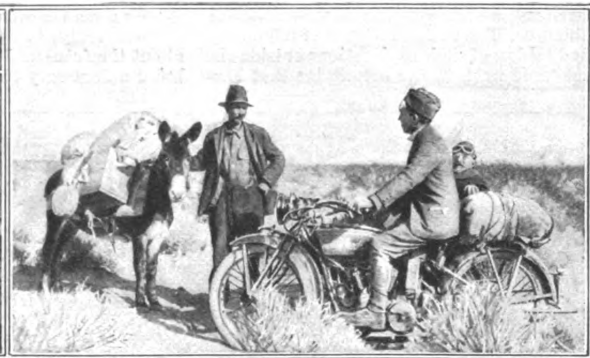
From a point on the northern border of Arizona, midway between New Mexico and Nevada, as a center, describe a circle with a radius of 500 miles. The territory within the circle represents approximately the vast ex-



Between the 1200-foot walls of Boulder Canyon, Nevada, Uncle Sam will build the greatest dam in history—735 feet high. In charge of preliminary work is Ray Gossett, in the foreground



The black mouth of Boulder Canyon (between the two cliffs at the right), with the government camp on the river bottom that will be flooded by a huge lake



The old West and the new—burro and motorcycle meet, 25 miles from habitation, in the typical Nevada desert country. The writer stops to chat with a prospector

panses that will directly benefit from the irrigation, power, and flood prevention project.

Ten states are included, wholly or partly, in this territory—the southern half of California, all of Arizona and Utah, most of Nevada, Colorado and New Mexico, the southern parts of Idaho and Wyoming, parts of Texas and Oregon—and in addition, larger areas in the northern part of Mexico.

Other Power Sites

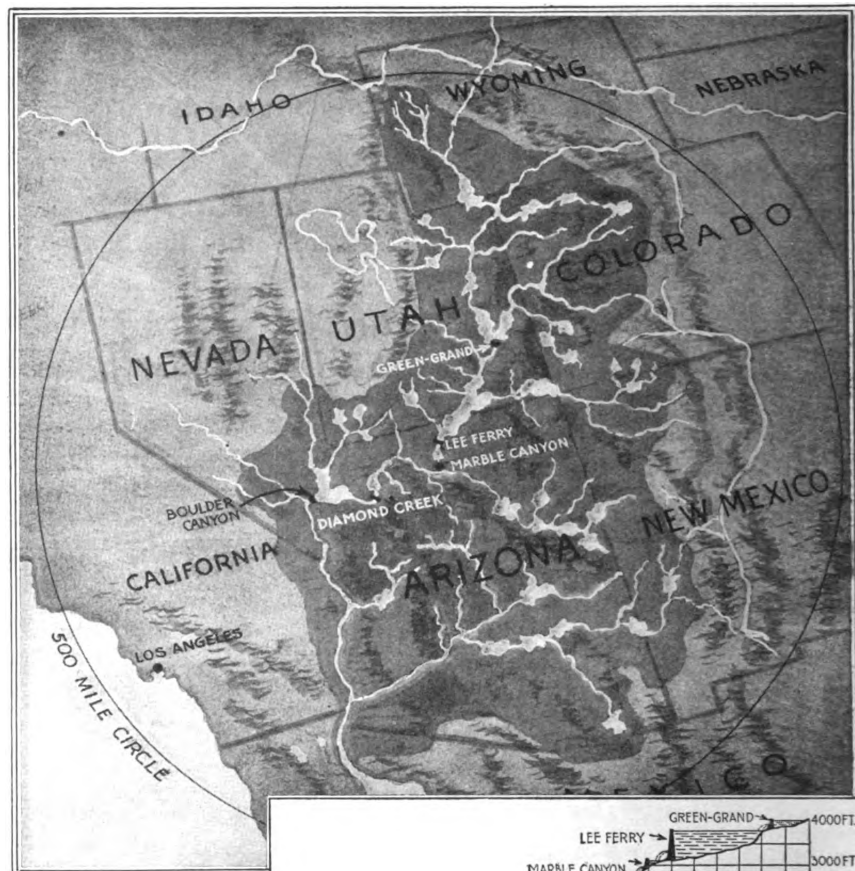
Ultimate development includes, in addition to the development of Boulder Canyon, the construction of power plants at Lee's Ferry, Marble Canyon above the Grand Canyon, and Diamond Creek, 50 miles below the Grand Canyon.

Maps of the Boulder Canyon region show a land where real roads are unknown. In their stead are a few trails, boulder-strewn, that wind over cliffs, across steep-sided washes, and lead through baffling sand. Accordingly I decided to undertake the expedition from Los Angeles in a motorcycle with a side car attached. On my arrival at the Boulder Canyon camp I was surprised to learn from Gossett that I was the first man who had ever traversed the trails to the dam site on a motorcycle.

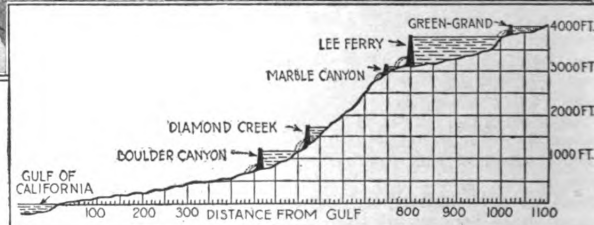
"If the government follows the official recommendations of Director Davis and erects a dam at Boulder Canyon 735 feet high (600 feet above the bed of the river), it will submerge the quaint Mormon village of St. Thomas, Nevada," said Gossett.

St. Thomas was the village at which my side-car passenger, A. G. Goldsmith, and I had stopped the night before reaching the dam site. The fact that this town lies more than 40 miles away, in the peaceful Valley of the Virgin, serves to emphasize the magnitude of the Boulder Canyon project. It had taken almost a whole day to toil across the region to be submerged by the vast artificial lake. It is a wonderful region, yet today it is barren indeed. Here and there along bleak stretches we came upon bleaching bones that told of the death of animals who had wandered too far from the waters of the Colorado or the Virgin.

Yet as we worked our way along through the Valley of the Virgin and adjoining territory, we knew there was untold wealth about us. The village fathers in St. Thomas had told us of their explorations outside the sheltered nook in the mountains that har-



Within this circle of 500-mile radius, touching ten great states, is the vast territory that will be made fertile or receive power from the Colorado River development. The shaded portion of the map indicates the river basin, while the white lakes are proposed storage sites for flood control and power development.



This profile of the proposed development shows the comparative volumes of water to be impounded by the five largest storage sites.

bors their settlement of 1000 villagers and farmers.

"Borax, gypsum, salt, gold, silver, and many other precious metals are to be found in this region," they said. "The building of the dam will bring us real roads, and this wealth for which many an illy equipped prospector has vainly searched, will be revealed and made accessible."

"But what will become of this quaint village?" I asked.

"We are a God-fearing, trusting people," was the reply, "and we are not worrying about the future. I think myself they will build a dam only 450 feet high. That will

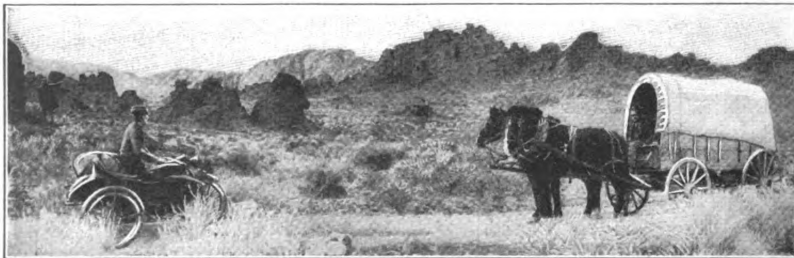
bring the artificial lake to within a mile or two of the edge of town and will not inundate any of our farms. Then our little settlement here will become the mecca for miners, engineers, railroad men, power men, and thousands of tourists."

Arriving at Boulder Canyon, we talked late into the evening with Gossett and his men, of the dam project and what it will mean to the country.

\$100,000,000 To Be Safeguarded

Two of the subjects on which the men in the Reclamation Service camp dwelt were flood control and irrigation. The estimated value of the irrigation development and allied industries below Boulder Canyon is \$100,000,000. They pointed out that the Colorado at present is a recurring menace to this vast investment. Only last summer, when the melting snows of the mountains augmented the river, the Imperial Valley narrowly escaped inundation. Feverish work night and day was all that kept the levees from giving way and prevented a repetition of the disaster of 1905 when the river cut a new channel to the Salton Sea and damaged hundreds of square miles of fertile fields.

The construction of a 735-foot dam in



Across the vast desert land that waits the magic touch of water and electric power, the prairie schooner still toils—meeting, by chance, the writer on his motorcycle

Boulder Canyon will permit impounding no less than 31,000,000 acre feet of water—an amount about twice that which flows down this channel into the Gulf of Mexico in the course of a year. Not only will it be possible effectively to check floods when the water is high and so safeguard the 750,000 acres under irrigation below the dam site, but it will so conserve the water that an additional million acres can be brought under irrigation.

By desert highway it is 450 or 400 miles from Los Angeles—the greatest of the prospective users of Colorado River power—to Boulder Canyon—according to whether one travels the “old road” via St. Thomas, Nev., or goes down the new road that descends by a more direct route to the river from Los Vegas, Nev. To one who travels that long trail, as we did, visualizing all that the Colorado River project will bring about, the journey is filled with the most intense interest. All through the southwest there are villagers and ranchers dreaming of the days when the Colorado will be harnessed.

“Shall We Get Water?”

In the desert town of Victorville, California, a woman of moderate means asked me, “Do you think we shall get any benefit from the Boulder Canyon project? We have a little ranch out on the desert on the east side of Mt. San Antonio. I wonder if it will help us get water onto our land?”

It is hard to give a definite answer to such questions. Probably the ranch of my inquirer is at far too high an elevation to be reached by any of the water if gravity is depended on to distribute it. But without doubt electric power will be available at greatly reduced rates and that will mean that these desert ranches can afford many times the volume of pumped water that they now pay for.

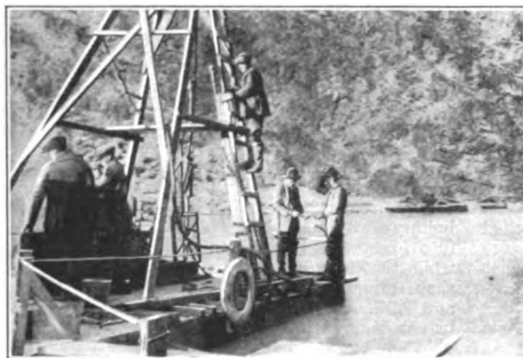
Fifteen years ago the town of Searchlight, Nev., was a booming, “wide open” mining town of 4000 people. Today it is but a skeleton of its former self—a few unpainted frame stores, and hastily constructed houses set in the midst of a boundless desert. But if you talk with the remaining inhabitants, of whom there are only a few score, you will find that they, too, are hoping for another golden age for Searchlight.

A Desert Will Blossom

As for benefits to specific communities, there can be no question of the value to the vast territory as a whole. The desert will blossom as the rose. Manufacturing will receive a tremendous impetus, particularly in and near seacoast towns. The many valleys forming the lower lands of the Colorado River basin will be made green with flourishing crops. Flood control will not only free the Imperial Valley from a present serious danger, but will make possible a far greater development both north and south of the international border in the vicinity of the Colorado.

Then, too, desert folks are particularly interested in the cultivation of compara-

tively narrow strips of land in many places, forming the very banks of the Colorado. These low level tracts are said to possess some of the richest soil in the world—the accumulation of hundreds of years of periodic overflow of the river. At present cultivation of these potential Edens is difficult and uncertain because each spring or summer sees all the work of the year threatened by rising flood waters. In the future this menace will be removed, and what is now an uninhabited region will be dotted with prosperous settlements. Near



On a scow in midstream, drillers toil day and night with diamond drills to determine the condition of bedrock at the dam site

the desert town of Needles, Calif., there is a tract of 30,000 acres of this rich river bottomland, awaiting flood control.

Tremendous engineering and political obstacles must be overcome before the Boulder Canyon project can be carried to completion.

First of all, there is the task of constructing a dam between two canyon walls such as are found at Boulder Canyon. What is to be done with the water while such a barrier is being laid, with foundations perhaps 135 feet below the river? The only way, says Gossett, is to construct four other

crests of onrushing water and fine sand that appear unexpectedly, due to swift current and a constantly shifting riverbed. This pair of outermost dams will be built of trainloads of rock dumped into the river in sufficient quantity to hold it in check.

But when these barriers have been completed, what will become of the water, some of which must be kept moving to the lands below? If the dam could be built in a few weeks, the answer would be simple, but the engineers' plans must provide for several years' work. The annual flow is approximately 16,000,000 acre feet and to carry the needed portion past the dam site it will be necessary to blast tunnels through the walls of the canyon.

Why Boulder Was Chosen

While it is almost universally conceded that Boulder Canyon will be the site for the first dam, some authorities believe that other sites farther up the river, notably Lee Ferry, should be the scene of the first activity. There a still greater lake could be created; but that site is farther from the regions that would be most benefitted by flood control, irrigation, and power development. It was this factor of distance that largely influenced Director Davis of the United States Reclamation Service when he officially reported to Secretary Fall in favor of the Boulder Canyon project.

The Panama Canal cost something like \$300,000,000. The new task to which the United States has set its hand will eventually represent a far greater expenditure. Fortunately a body has been formed competent to solve the engineering problems that have arisen—the Federal Colorado River Commission, at the head of which President Harding has appointed Secretary Herbert Hoover. Associated with Mr.

Hoover are representatives of the seven states having territory lying within the Colorado River basin. Each of these has passed the legislation necessary to the appointment of a representative on this commission.

States' Rights a Difficulty

One of the difficult tasks of the commission will be to arrive at equitable division of the benefits of the project. Each of the states, as well as Mexico, is prepared to push its claims concerning water and power rights, and it will prove no easy undertaking to arrive at a just decision among the conflicting claims. A further question to be decided will be the relation of private power and light interests toward

the public improvement.

“We are not worrying about the Federal Commission's problems,” said Gossett, good naturedly, as I bade him good bye. “We have a big job right here and now in gathering our data in the face of all the opposition offered by this wicked stream and a barren country that becomes terribly hot in summer.”

“Some day the ground on which we stand will be the bottom of a lake whose beauties will attract thousands and which will be easily accessible by rail and highway. Our task is here.”



“Street scene” in St. Thomas, Nevada, which probably will be submerged by the government's vast irrigation project. This view shows the present water supply in roadside ditches

dams to protect the one permanent dam while it is being constructed. To explain: One coffer dam must be built immediately above, and another just below, the site of the permanent dam, so that excavations can be made down to the surface of bedrock, which is covered by many feet of accumulated sand, silt, and boulders. But to make possible the building of these coffer dams two other temporary barriers are counted necessary by engineers, since special precautions must be taken against rapid changes in water levels and such dreaded phenomena as “sand waves”—