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Out in the blue hills of the beautiful Ozark country, rich in romance, steeped in legends and brave deeds of its hardy pioneers—one of America's most delightful corners, with its swift rivers and vast caverns—the Union Electric Light and Power Company has just completed the building of the colossal Osage Hydro-Electric Development.

Nearly 400 years ago the French and Spanish were anxious to possess this Ozark Country. DeSoto and his courageous band came from Florida up the Mississippi and into the Ozark region. The dauntless Coronado in 1540 set out with his followers to conquer the seven cities of Cibola, dared the perils and blazed a trail across the plains from Old Mexico into the same region. Both were seeking gold, silver and precious stones, but found instead various tribes of Indians—some of them seven feet tall.

This Ozark country is reckoned as some of the oldest land on the American continent. Geological ages ago it was a high plateau, which accounts for the characteristic level horizon line of today, an unusual thing in a hill country. Then, sluggish rivers flowed over this elevated tableland, cutting through the softer areas and being deflected at other places by flinty masses which today are towering picturesque bluffs. These rivers, now entrenched, meander, tumble and roar through most fascinating scenery, winding in loops and oxbows until one may float

downstream for miles, suddenly to find one's self less than a mile across country from the starting place.

On the winding Osage river, which has its headwaters in the eastern part of Kansas and drains an area of 14,000 square miles, the Osage dam is located. Ordinarily the Osage is a sleepy and friendly stream, but capable of raging destructive fury when in flood. At a point approximately where the Osage Indian warpath trail intersected the trail of DuTisne—that intrepid French explorer, who in 1710 blazed a trail, through the interior of Missouri—the Osage Hydro-Electric Development has been built at a cost in excess of \$30,000,000. Here in a somewhat primitive and rugged setting, where even yet foxes bark on crisp nights, where, in the forests, wolves pull down deer and occasionally a panther will send blood-chilling screams across the ridges to his mate, the ingenuity and labor of man has converted the energy of nature into usable electricity to light homes and cities, to lessen the labor of humanity and to run the wheels of industry.

Construction of Osage Dam began August 6, 1929, and the first concrete was poured about eight months later. It was closed February 19, 1931. The dam is a monolithic of concrete and steel, flung with bewildering speed and skill across the Osage river. It is located about 46 miles south from Jefferson City, at approximately halfway between St. Louis and Kansas City, at about the geographic center of the State and about 75 miles from the confluence of the Osage and Missouri rivers.

The structure towers 148 feet above bed rock and would hide from view a row of 12-story office buildings seven city blocks long. It stands as a monument to the courage and vision of men, an awe-inspiring engineering triumph, impressive and majestic through its 2,543 feet of length. Some idea of the tremendous undertaking and accomplishment can be gained when one considers this:

A construction railroad four miles long was built from Bagnell to the dam. A sturdy railroad bridge large enough to hold trainloads of material was built over the Osage.

The maximum number of men employed at one time was 4,634, the average being 3,000. The total number of employees hired was approximately 20,500. Men from all the states in the Union and from nine foreign countries were employed.

Enough lumber was used in the concrete form work for the dam and in houses and camp buildings to build a board walk like that in use at Atlantic City—but long enough to reach half-way from Atlantic City to Philadelphia.

Sixty thousand carloads of construction materials were hauled to the dam site. These cars placed end to end would make two solid trains reaching from St. Louis to Chicago.

Concrete used in the dam would build an 18-foot roadway of Missouri Standard [probably 12" thick], reaching from St. Louis, Missouri, to Topeka, Kansas.

What is believed to be a world's record for concrete pouring was made at Osage when 5,082 cubic yards of concrete was poured in a single 21-hour day. 113,000 cubic yards were put into place in one month.

Above the dam and power house, a roadway 20 feet wide, with a three foot sidewalk, will carry United States Highway No. 54 over the Osage river.

A new highway bridge 1,630 feet long and 150 feet high which cost about \$400,000 was constructed over Grand Glaize Creek. Many miles of highway and one railroad were relocated and reconstructed in the reservoir area, whole school and road districts obliterated. One county seat, Linn Creek, in Camden County, was moved—court house, homes and business buildings, as the old site of the town will be under 40 feet of water.

The water impounded in “The Lake of The Ozarks,” 650 billion gallons, is enough to supply the daily needs of St. Louis for over 12 years.

More than 200,000 people had visited Osage by May 1 of this year—7,831 people visited on a single Sunday.

Osage is the first large step in Missouri water power development. Its capacity is ten times that of the total water power in the state in 1929.

Before construction work began on the dam, it was necessary to do much preliminary work, such as building bridges, gravel plants, railways, houses, dormitories, dining halls and kitchens, a commissary store, fire department, school, jail, a hospital with ambulance facilities, a power plant—larger than the one now serving Jefferson City—water supply and sewer system. A model town of 5-6,000 population was established at the dam to provide facilities for workers on the project.

For more than two years a study of the maximum and minimum flows of the Osage river, utilizing available records, was made to determine the amount of power that could be economically generated and the size of spillways necessary to take care of the flood waters. The geologic formation was thoroughly observed. The entire basin was searched for subterranean tunnels or sink holes that might cause the water of the lake to run off and be wasted. It was found that the Osage is a free basin with little or no seepage.

From the standpoint of capacity, the Osage Development is by far the largest project of its kind in the middle west and ranks fifth among the developed water powers in the United States.

The power station section is 511 feet long and has eight large and two small head gates, made of structural steel, the larger ones weighing 70 tons each. Three lanes of auto traffic could easily pass through these large gate openings at one time. Through one of these gates at full

load, 29,400 gallons of water flows every second into a 33,500 horsepower water wheel which is in turn connected to a 21,500 kilowatt generator. The initial installed capacity of the power plant will be 301,000 horsepower. Provision has been made for increasing the capacity, when the growing load of the U.E. System makes it necessary, to 268,000 horsepower.

The generators deliver their power at 13,800 volts and this voltage is raised to 132,000 volts by means of transformers before being sent out on the transmission lines for delivery to St. Louis, 136 miles distant and Rivermines, Missouri, 120 miles away. At the delivery end a second set of transformers lower the voltage to suit the requirements for distribution of the power to consumers.

The power station is unique in that each generator is placed under a separate, removable roof, instead of being housed in a large building, each having an enclosed water-cooled air-circulating system. Any necessary repairs to the rotors that would normally be made in a power station can be made under the removable covers when raised by the power station crane.

The Lake of the Ozarks will store the water before it passes through the water wheels and develops electricity. Flood waters from rainy seasons will be disposed of through 12 immense taintor gates in the spillway section of the dam, which is 520 feet long. Each gate is nearly as wide as a city street and capable of discharging 101,000 gallons per second.

Massive concrete steps, at the base of the spillway over which the surplus water must flow, cause the force of this water to be expended in a boiling maelstrom within the water itself, and flow downstream without undue erosion of the river bed.

To bring the power developed at Osage to Rivermines and to the St. Louis District was a considerable task. To locate the most direct line over the Ozark mountains, though forests, over valleys and rivers the airplane rendered a new and helpful service. Photographic surveys for the transmission lines were made by aerial cameras from 5,000 feet in the air.

Delivery of power generated at the Osage plant to the system of Union Electric Light and Power Company is accomplished by means of a wood pole transmission line to the Page Avenue substation of St. Louis and a double circuit steel tower transmission line to the lead district at Rivermines.

Both of these points are connected to the network of transmission lines of the U.E. System. The wood pole line consists of three steel-reinforced aluminum cables, each approximately $\frac{3}{4}$ inch in diameter and capable of transmitting the output of two of the generators. The steel tower transmission line consists of two sets each of three copper cables, approximately $\frac{5}{8}$ inches in diameter, each set capable of transmitting the energy developed by two generators. Two million pounds of copper and over half a

million pounds of aluminum cables were used for the transmission lines.

Missouri is rich in iron ore deposits. One-third of the lead supply of the country is within its boundaries. The mineral resources of the Ozarks are only partially developed—there are valuable deposits of cobalt, copper and nickel to be developed. This increased supply of power may eventually mean much to the Ozark country which is destined to play an important part in the future development of the State.

In the average year the initial Osage plant will deliver over 400 million kilowatt hours of electric energy to St. Louis, Rivermines and points on the Union Electric interconnected system. This is more electricity than was used by the city of St. Louis for all purposes during the year 1924. An annual conservation of fuel equivalent to 270,000 tons of coal will be effected.

Economical use of the Osage water power will be made by combining it with the steam generated power of the U.E. System. When the water supply is abundant, steam plants are shut down and coal is saved. During periods deficient in water flow, the steam plants carry the heavy burden, and water power is used only during a few hours each day. In fact, until such time reserve is developed as that which the U.E. has today, no economical development of the Osage River could be made.

Ordinarily the St. Louis District doubles its use of electricity every five years. U.E. has anticipated and adequately prepared for the future industrial progress of the district it serves in order that it may have available an abundance of electrical energy, at low cost, when it will be required. [U.E. has therefore] planned ahead to meet the demands of industry for years to come.

Out in the open country amid primitive, rugged surroundings—luxurious woodlands on every side. One hundred and twenty-nine miles of lake unfolding before you. And irregular shore line—1300 miles of it—with picturesque coves and inlets for you to explore. Glorious adventure. Scenic beauty. That is “The Lake of the Ozarks.”

This beautiful body of clear water is the largest wholly artificial lake in the United States. The backwaters will extend up the Niangua, Grand Glaize, Grand and Pomme de Terre rivers. The lake will be full during practically the entire vacation season from June until late October.

The Lake of the Ozarks is a distinct addition to the playgrounds of Missouri and of the United States. It will afford the pleasures of scenic grandeur and aquatic sports for which Missourians now travel hundreds of miles to enjoy. For its basin about 150,000 acres of land were purchased—60,000 acres were flooded, while the remaining acres will be available for improvements.

Over 17% of the county—Camden including the town of Linn Creek—also parts of Miller, Morgan, Benton, Henry and St. Clair counties will become part of the lake, thus opening to greater development vast areas that heretofore were known chiefly to hunters and fishermen.

[The lake is in] a part of the vast territory which the U.S. Government in 1808 purchased from the Big Osage and Little Osage Indians for \$1,200. This country has ever been known for its abundance of game and fish. For years after going to Kansas and Indian Territory, the Osages, Shawnees and Kickapoos returned to the Osage Valleys to fish, to shoot buffalo and deer. Today there is a real thrill for sportsmen who come to cast for the sporting bass and jack salmon or set a trot line for the juicy channel cat. In season every known variety of duck is to be found, and wild turkey is still obtainable by the tireless hunter.

Thousands of tourists from North, South, East and West will come to be charmed by glimpses of the Ozark's ever-changing beauty. Other thousands who seek rest and health will find new vigor and peace of mind in its health-giving climate. When its convenient central location to all Missouri, with improved highways leading to it from all directions, The Lake of the Ozarks lends itself splendidly as an ideal location for cabins, lodges, summer homes and resorts and is destined in a very short time to be the mecca for thousands who seek the communion of Nature and enjoyment of the great outdoors.

The material benefits to Missouri by the building of the Osage Hydro-Electric Development are manifold. A vast portion of the state sparsely settled and heretofore practically unknown, except to a limited few, will be opened to more intense settlement and profitable development. It is axiomatic that prosperity follows power. Here is available an abundance of power that foreshadows the development of natural resources which abound in this region. Thousands will be attracted to the state and region, many of whom will establish homes and businesses, others to visit and to later return. Property values will enhance, population increase and employment ensue, all combining for the general prosperity of the state.

The creation of The Lake of the Ozarks will aid greatly in flood control on the lower Osage, where high water has in the past been a serious menace.

It is estimated the evaporation that will take place will amount to three and one-half feet over the entire lake area and that this evaporation will actually change the climatic conditions of the district.

Osage will bring notable and lasting benefits to Missouri. Power attracts industry—Osage brings more power to the state. Progress and expansion of a state or community are largely dependent upon ample supply of dependable power at low rates. It is recognized that large productivity, higher wages, shorter hours, better working conditions, position in world's markets and maintenance of

general prosperity depend in a great measure on the application of electricity to industry.

A lazy river has been put to work for the benefit of mankind; Missouri's natural resources are ready for more extensive development; greater progress and prosperity lie ahead for our great commonwealth. And with progress and prosperity comes those physical advantages that make for a cultural and social growth.