FIGHT FOR POWER RIGHTS CONTINUED

Ozarks Company Asks Federal Permit to Harness White River.

1925

(From the Gazette's Correspondent.)

Washington, D. C., Oct. 6.—A fight for power rights on the White river which has been before the Federal Power Commission and Congress at intervals for more than four years was renewed here today when the Ozarks Hydro-Electric Power Company of Little Rock filed an application with the Federal Power Commission for a water power permit covering three proposed dam sites on the White river and its tributaries in Marion and Baxter counties.

This company claims to hold a contract for the purchase of the properties and rights of the Dixie Power Company, whose permit to develop the power sites on the White river expired yesterday. A rival concern, the White River Power Company, organized to become a part of the Hugh L. Cooper Company and the North American Company, also claims to have purchased the rights of the Dixie Power Company and is expected to apply for a federal permit covering the same sites as those specified in the Ozarks company's application.

The Cooper interests were barred from doing business in Arkansas after they are alleged to have allowed the original permit of the Dixie Power Company to expire and attempted to obtain a new permit. By a special act of Congress the Dixie Company's permit was extended for 18 months.

Local Men Interested.

The application of the Ozarks Company was filed by Elbert Smith of Little Rock. Associated with Mr. Smith in the enterprise are Charles S. McCain, president of the company and also president of the Bankers Trust Company of Little Rock; H. L. Remmel, vice president of the power company and chairman of the Board of Directors of the trust company, and several other Little Rock business men. The company is said to have the backing of John Nickerson & Co., New York bankers, and a part of the Dixie company stockholders.

J. B. Miller of St. Louis, president of the Dixie company, and a block of stockholders claiming to represent the majority holdings in the company, recently filed petition with the Arkansas Railroad Commission asking that body to withdraw an order barring the Cooper company from the state. This faction of the Dixie company contends that the old differences between that company and Cooper have been settled and asks that Cooper and the North American Company be invited into the state to develop the holdings of the Dixie company.

It is not considered likely that the Federal Power Commission will act upon the applications for permits until the validity of the disputed contracts has been established by Arkansas courts.

IS MUCH DRAINAGE WORK IN ARKANSAS

Eastern Section Especially Is Benefited by Vast Engineering Feats.

In eastern Arkansas today farmers may view spreading cotton fields where only frogs and snakes and other swamp creatures lived in the depths of tree shadowed black water, ooze and slime and tangled undergrowth.

The change has been brought about by no gradual shifting of Nature's ways, but through proper legislative provision, vast engineering feats and the investment of at least $20,000,000 in capital.

Not more than 20 years ago, one-sixth of Arkansas' entire land area of 33,616,000 acres was classed as "lowlands" and was unfit for cultivation without artificial drainage. Most of this land was in eastern Arkansas, bordering the Mississippi river.

4,000 Miles of Ditches.

Today about three-fourths of the lowland area has been drained or partly drained. There are about 4,000 miles of drainage ditches or canals in the state which partially drain approximately 4,000,000 acres. The work has been done through the organization of drainage districts, now numbering about 200 and including an average of 20,000 acres to the district. The cost has averaged between $6 and $10 per acre.

These figures were given out yesterday by O. G. Baxter of Little Rock, who for 13 years represented the United States Department of Agriculture as consulting drainage engineer in Arkansas. For the past six years, Mr. Baxter has directed his own company, the Baxter Engineering Company, specializing in drainage work.

Drainage Laws Praised.

Arkansas has one of the best drainage laws in this country, according to Mr. Baxter. The first general drainage law was enacted in 1891. This was superseded by a law in 1903, which in turn was superseded by the present law, enacted in 1909, under which 90 per cent of the drainage work in the state has been done.

This law authorizes county courts to establish drainage districts upon petition of three or more owners of real property within the proposed district, and gives Circuit Courts jurisdiction over districts which embrace land in more than one county.

After a plan of drainage is formulated and the district boundaries are defined by an engineer appointed by the court, a public hearing is held and the district is established if the court finds the project will be of benefit to the property owners. The district must be established if petition for it is made at the hearing by a majority of the landowners in number, acreage or value. The officers of the district are three commissioners appointed by the court, although the selection may be determined by petition from a majority in value of the landowners. The final plan of improvement work, estimate of cost and assessments of damages and benefits is made by the commissioners, subject to review by the court at public hearing. The cost of the enterprise is apportioned according to the benefits and collected like taxes. Bonds may be issued by the district, to mature within 30 years.

A few districts that are not organized under this general law have been formed by the enactment of special or local bills in the state legislature. Under this group are found 90 per cent of the districts which fail or which never finish the drainage work after it is started.

Cause of Failures.

When such districts fail it is usually because they were established without the knowledge or consent of the majority of the property owners within the district or because of legal defects in the bill, according to Mr. Baxter. He said also that it is undesirable to form districts by the special or local bill methods because taxes will be higher than if they are established under the general drainage district law. This is explained by the fact that bond buyers are not sure that the majority of property owners want the district or that they will be able to pay their taxes, and so will not bid as high for the bonds.

If the proposed constitutional amendment to prohibit local legislation in the General Assembly is adopted at the next general election, the evil of forming districts by the special bill method will be eliminated and the status of drainage work in the state will be advanced, in the opinion of engineers.

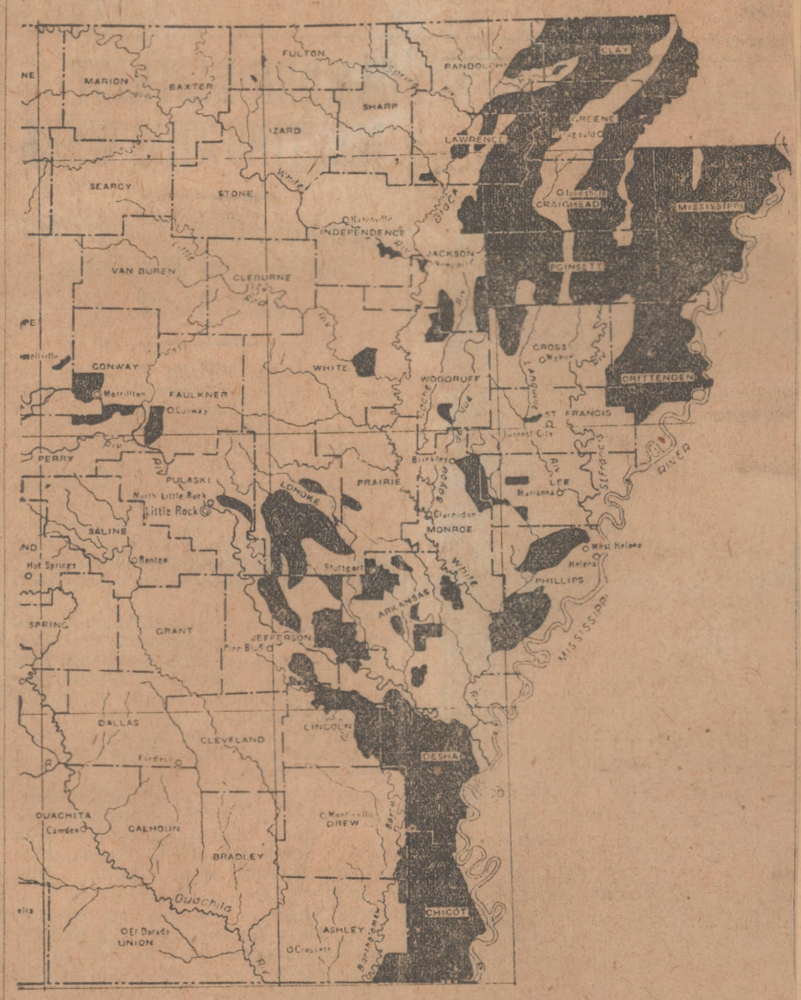
Should be Kept Cleared.

The most serious defect in the operation of districts after the drainage system has been completed is the failure to keep the ditches cleared of willows and brush, Mr. Baxter said. If the ditches are not properly maintained and cleaned, after a few years they will be so filled with the rapidly growing willow trees that they will be practically useless. However, if the canals are cleaned regularly for the first five years, the growth of trees and thorns will be stopped permanently and little more maintenance, thhrogh assessment of the property owners, is provided for in the general drainage district law.

The largest district in area in the state is the Cypress Creek Drainage District in Desha and Chicot counties, in which there will be 400 miles of ditches which drain 300,000 acres when the work is finished. The main ditches have been completed.

The largest drainage canal in Arkansas, and the largest in the South, is the main ditch in the Eudora Western Drainage District in Chicot county, which will be completed in about four months. The canal is 210 feet wide at the bottom, nearly the width of a city block at the top, and 20 feet deep. It drains 1,200 square miles of land, and empties into the Beouff river in Louisiana, about three miles below the Arkansas state line. The work for the district was designed by the Baxter Engineering Company and is being constructed under that company's supervision by the McWilliams Company, Inc., of Memphis, Tenn.

Drainage Enterprise in State Which Cost Nearly $20,000,000



The map above shows the east two-thirds of the state in which practically all of the drainage work has been done. A few drainage districts have been established in Little River, Miller, Hemstead and Clark counties in the southwest part of the state, not shown here. The sections in black indicate the lands that have been drained. They total approximately 4,000,000 acres, in which there are about 4,000 ditches. The capital invested in the drainage enterprises is estimated at $20,000,000.

WHITE RIVER BIG SOURCE OF POWER

One Dam Is in Operation and 11 Other Projects Planned.

Gazette 4/23/26

Special to the Gazette.

Cotter, April 22.—When all the power projects that now are contemplated in this sector are completed, they will develop approximately 300,000 horse power, and at the same time considerably reduce floods below the mouth of the Northfork river, in Baxter county.

One power dam is in operation on White river, in Taney county, Missouri, near Forsyth, and 11 more projected. The Doherty interests, which now operate this dam, have another project at Table Rock, above Hollister and Branson, Mo., on which construction work is almost ready to start. This dam will be 175 feet high, and will create a reservoir 75 miles long. The Arkansas Power and Light Company's project in Arkansas includes three dams on the White river above Cotter, two on Crooked creek, four on the Buffalo river, and one on the Northfork river. A license was granted by the Water Power Commission for this project last month.

The first project planned for the upper White river, at Wildcat Shoals, five miles above Cotter, called for a dam 250 feet high, which would have absorbed all of the natural fall in the river to Forsyth, Mo., a distance of approximately 120 miles. One dam of this magnitude would have flooded a vast amount of territory, and would have afforded no flood protection to the upper river. A three-dam project, as now planned over the same stretch of river, the dams spaced at equal distances apart, and built high enough to absorb all the natural fall of the river, will not flood half the land the large dam would flood, and flood control above the dams will be much more effective. When the first reservoir above dam No. 3 becomes full, the surplus water will start to flow into the reservoir behind dam No. 2, and when this reservoir becomes full, it will start to flow into the reservoir behind dam No. 1, thereby distributing the flood water over a larger area, and not backing it up behind the first dam to excessive flood stage.

A three-dam project would reduce the flood waters above the third dam 34 per cent; between the second and third dam, 30 per cent, and between the first and second dam, 42 per cent.

Higher stages of water are reached, and the peaks of the floods come quicker than they did 25 years ago. In December, the river reached a stage of 38 feet at Batesville in a 24-hour period, which was probably the quickest rise of that magnitude on record.

At Buffalo City, in Marion county, the river bank is 44 feet high. A flood early in the Sixties covered the bottom there to a depth of several inches. It was not overflowed again until August, 1915. A period of 50 years elapsed between these overflows. Another flood came in February, 1916, and still another in April, 1927. Or, three in 12 years against one in 50 years.

Buffalo river, Northfork river and Crooked creek are the three principal tributaries of the White river, above Batesville. Crooked creek is first in steepness of its watershed, Buffalo river, second; Northfork river, third, and White river, fourth. The frequency of higher floods and more rapid rises can be attributed only to one cause, and that is the cutting of the timber on the watersheds of these streams.

Before the White River Division of the Missouri Pacific and the M. and N. A. railroads were built early in 1900, there was little immigration. Land that was in cultivation had been cleared many years by the early settlers. The railroads brought new settlers and a market for timber products and the warfare on the forests began. Late years have seen hundreds of miles of fine highways built in the watershed. Wide-cleared rights-of-way properly drained. They used to be narrow, rough trails, overlapped by the tops of growing trees. All of this has had the effect of giving the watershed quicker drainage, which means more rapid rises and higher stages of water. Because more timber is being cut now annually than ever before, and this cut will probably increase, rather than decrease, as the territory develops agriculturally, flood conditions along the White river will grow worse instead of better, unless some other than a natural agency is used to prevent it.

(K. R. Daily News, Sept. 1924)

WTER POWER.

In the mountain sections of the state there are numerous power sites on every river where small powers—fifty to two hundred horsepower—can be obtained from low-head commercial hydro-electric development a series of these dams can be linked together electrically to produce a total of any desired number of hersepower.

Projects are under way for the development of water power on the Litle Red river, betwen Judsonia and Pangburn; on White river above Cotter, and on the Onuchita river in the vicinity of oHtSprings.

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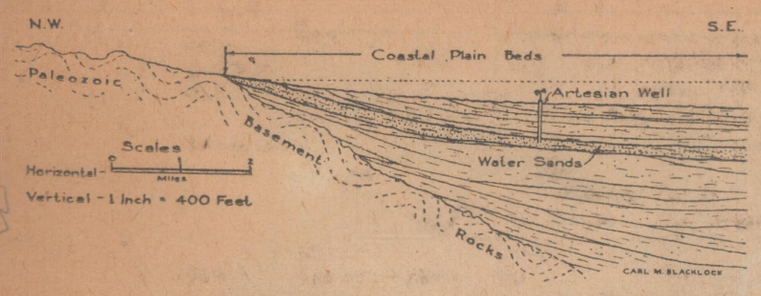
This Drawing Shows the Formation Favorable to Artesian Reservoirs



Section of underground strata showing formation favorable to artesian reservoirs. The waterbearing sands slope sharply underground after their exposure to rain water and streams at their outcrop (on the left). They are encased in impervious rock layers which help them hold the water. The well is drilled at a point lower topographically than the sand outcrop, and when the sand is reached, the resulting stream attempts to reach the level of its original source. The result is a flow above the top of the well.

Artesian Well Is Drilled To Restore Man's Health

Woodworker's Foreman Comes All the Way From Indiana to Arkansas, and Finds What He Wants in Pulaski County.

Gazette 7/1/28

Louie Fishback, erstwhile woodworkers' foreman for a railroad company, followed a trail of health from Indiana into Pulaski county years ago.

He was burdened with a variety of internal ills, and he was tired of wanderings that had carried him through many interesting sections of the United States. In addition he suffered apparently from what in this day would be diagnosed as an inferiority complex. They had put him in charge of the wooden work on a great railroad station at Chicago, and he decided the job was too big for him. He quit.

Mr. Fishback knew what he wanted. He wanted an artisan well in his own back yard, an artificial spring that would be good for what ailed him, near which he might build himself a home with his own hands and settle down. He came to Arkansas, possibly because of the far-flung reputation of the Hot Springs, possibly because it was an uncle of his who contributed a historic bit to the state's legal history—the famous "Fishback Amendment." But that is another story, often told.

Why he picked Pulaski county for his spring is not clear, because this county never has had many artesian wells. But Mr. Fishback knew what he wanted. He toured Pulaski county from one end to the other, rejecting location after location. Finally he picked a spot and said, "Dig." Just what technical knowledge Mr. Fishback had is unknown, but he was in an area which geological experts back in 1905 had predicted would supply artesian water. Perhaps he read their report.

Well Sunk 140 Feet.

The well was sunk about 130 feet, and tapped water. It was tiled to keep out sand, and the water ran over the tile in a steady flow, without pumps. But Mr. Fishback wanted better results than that. He had them drill farther down to 140 feet, and this time a pressure was found which forced the water above the well, three or four feet. Then he capped it.

It was a fountain of health for Louie Fishback. He stayed there and drank the waters and built a home, practically with his own hands, and with lathes of his own construction he turned fine pieces of wooden work. All his wood, stout oak, was cut from his own homestead, and sawed into boards with his own machinery. There was much built-in stuff, drawers, cabinets and even a stairway, all in oak.

That was in 1913. The property was bought several years ago by Ed Engstrom, deputy county clerk. Louie Fishback moved from the homestead he had carved out, two miles east and a mile north of Mabelvale, near the Geyer Springs school, to a modern house in the city. He died there a few months later. His search for health had terminated.

Where Water Comes From.

Where did the water come from that would still be pressing upward on the Fishback place, if sand had not choked its flow to a heavy trickle?

No one can say for certain, but State Geologist George C. Branner, who is versed in the underground contours of Arkansas, is of the opinion that streams in the hills of southwestern Pulaski county, across the Fourche from Mabelvale, are furnishing the bulk of it. They are the northern sentinels of the Ouachita Mountain range, and are sufficiently high to furnish the hydrostatic pressure which is the basis of all artesian flows.

Artesian wells present a curious study. They are artificial springs, and a "spring" does just what its name implies—gushes forth, under some kind of pressure. The pressure is stored up by the flow of water from a height to a point at which it is tapped, naturally or artificially, from the surface. It then will endeavor to seek is previous level, and only the friction of its upward flow will prevent it.

The "tube" through which the water is carried is a stratum of porous rock or sand. At its upper end, where it receives the water, it is an outcrop; that is, it spreads over the surface, forming a catchment area for moisure. The moisture, sinking, follows the slanting stratum underground.

To produce artesian flows, this stratum usually must be encased, both above and below, by layers or strata of hard, impervious rock or like material, which serve to hold the water in its chosen bed.

The driller of an aresian well will find this saturated bed buried far below the surface. It may be overlaid by the hardest of rocks and most impervious of clays. Nevertheless, when the drill has been inserted, the water will gush upward. The smaller the diameter of the well, the greater the pressure.

Sometimes this subterranean flow extends hundreds of miles. In South Dakota water absorbed in the Black Hills finds an outlet through artificial tubes sunk 350 miles to the east.

Such a condition hardly prevails in Pulaski county, for a very good reason. The county is on the dividing line between the Great Coastal Plain and the Ozark province of hard, paleozoic rocks, formed in the older division of geologic history. Few of these rocks are susceptible to absorption.

The greater part of the county lying west of the Missouri Pacific railway is included in the Ozark province, characterized by hills and ridges which trend in general east and west, with summits 500 to 1,000 feet or more above sea level. The remainder is part of the coastal plain, including an upland west of the Arkansas river bottom, a small area of Tertiary upland near Jacksonville and an advance lowland. Hills of the upland west of the Arkansas are 400 to 500 feet above sea level, but the upland has been strongly dissected by Fourche and Lorane creeks and their tributaries. That is where the Fishback well derived its source.

The rock outcrops in the Ozark province are Paleozoic, of the Orodovician and Carboniferous ages. They are separated from the deposits of the coastal plain by a steep, southeastward-dipping erosion declivity which extends from northeast to southwest a few miles west of the Missouri Pacific. Along the line of this declivity, or escarpment, the upper eroded surface of the Paleozoic rocks underlaps the coast plain deposits and extends beneath them toward the southeast.

Resting on these rocks and occupying a narrow outcrop along the margin of the Coastal Plain, southwestward from Little Rock, is the Midway formation, including strata of the Tertiary Age. It consists of 25 feet or more of limestones, calcareous sandstones, sands, clays and marls.

It is the sand of the Midway formation whic his believed to catch and hold the water seeping southeastward toward Mabelvale. The sands outcrop sufficiently on the surface to receive the rain and the waters of such streams as Broady creek, McHenry creek, Panther branch and Glover branch. Binding them in are the impervious limestones and marls. The Midway formation then buries itself under undifferentiated Eocene deposits, the first in time of the Tertiary formation divisions. They consist of unconsolidated sands and clays, covering the surface to the southeast of the Midway area, past Fourche mountain, and almost to the Arkansas river on the east. They also outcrop near Jacksonville in the northeast part of the county.

It is in such an outcrop that the Engstrom farm, purchased from Fishback is located; but the well penetrates to the Midway formation, and draws up water that has passed under Fourche creek from the western hills. There are several other wells in the vicinity.

Other Wells in County.

A flowing well was brought in at Sweet Home many years before these were dug, and another at Wrightsville, both at 140 feet, but it is believed that these penetrate only to the Eocene deposits, the sands which are also capable of absorbing and carrying water.

The materials underlying the Arkansas river bottom to an estimated depth of 100 to 200 feet consist of Quarternary alluvial loams, clays, sands and gravels which contain large quantities of water. These deposits rest on undifferentiated strata of the Cretaceous and Eocene age. The former, which at Little Rock has been recognized in well excavations and a few outcrops, includes beds of chalk, green sand, etc., deposited in the latter part of the Mesozoic age.

East of the Arkansas, wells 15 to 100 feet deep tap the sands and gravels of the Quarternary alluvium, which hold waters eight to 30 feet below the surface. Many of these waters are hard, but some are soft and some contain iron.

"The undifferentiated Eocene and Cretaceous deposits intervening between the alluvial deposits and the buried Paleozoic basement rocks, except in proximity to the margin of the Ozark province, doubtless contain water-bearing beds that are a probable source of artesian waters," United States geologists wrote in 1905. "These waters are under hydrostatic pressure probably sufficient to bring them within less than 50 feet of the surface, but it is doubtful if flowing wells can be obtained in the advance lowlands east of the Arkansas river. The static head of the flowing well at Sweet Home is believed to be due to local conditions."

When the Fishback well was dug, the drill passed through 38 feet of a grayish, solid rock before striking the water-bearing sand. This rock is believed to be a limestone of the Midway formation, such as outcrops west of the Fourche.

From the sand itself the drillers took shells and even a fish fossil. This is another characteristic of the Midway formation, deposited in the course of the making and unmaking of the gigantic inland sea which once washed the hills of Pulaski county and surged around the "island" of Fourche mountain. Even the limestone of this formation is studded with shells, from which it was in fact derived.

U. S. Geological Service Interested in Rice Field

Gazette 12-11-27

Noticeable Lowering of Water Level in Wells Used in Irrigating Area in Arkansas Leads to Survey to Determine Life of Supply.

A noticeable lowering of the water level in wells in the rice fields of Arkansas during the past few years led the United States Geological Survey to make a preliminary survey of the area the past summer with a view of determining the probable life of the present water supply.

The survey was made by O. E. Meinzer, government geologist in charge of the division of ground water. He has submitted a preliminary report to G. C. Branner, state geologist, with a recommendation that the state provide funds through appropriation or contributions from interested parties to assist the U. S. Geological Survey in making a complete survey of the region, covering about two years.

Mr. Meinzer estimated that $5,000 a year would be required in addition to the amount furnished by the government. The state Geological Survey probably will attempt to interest private parties in making contributions to carry on the survey as suggested by Mr. Meinzer.

The preliminary report contains much interesting information for rice growers and the public in general.

Summary of Report.

The report in part follows:

"Rice has been grown commercially in Arkansas since about 1904. According to statistics at hand, there were in the entire state 460 acres in rice in 1905, about 60,000 acres in 1910, about 93,000 acres in 1914, and about 200,000 acres in 1926. Of the total crop in 1926, about 160,000 acres were located in the area between the Arkansas and White rivers, which is generally called the Grand Prairie. The value of the rice crops in Arkansas in 1926 was about $10,000,000. Hence, the value of the crop in the Grand Prairie probably was about $8,000,000. The Grand Prairie rice growing district roughly is 60 miles long and 20 miles wide, and occupies much of the prairie area between these two rivers. The commercial center of the district is Stuttgart.

"The rice fields in the Grand Prairie area are irrigated chiefly with water pumped from wells. These wells average perhaps 150 feet in depth, and apparently end in the sand strata at the base of the Pleistocene deposits. Yields of as much as 1,000 gallons a minute are reported from many of the wells.

Cause of Lower Level.

"The heavy pumping in this district has resulted in a persistent lowering of the water level in the wells. Although there is no danger of any sudden exhaustion of the ground water supply, there is a serious question of ultimate depletion and it is undoubtedly very desirable that a thorough investigation be made of the ground water supply of this area. The purpose of such an investigation will be to determine as accurately as possible the existing conditions and the quantity of water that will be annually available, and furthermore, to ascertain what steps could be taken, if any, to increase the recharge by artificial means.

"The question of quantity of water that will be available annually is essentially a question as to whether the water pumped in the past has been supplied year by year through percolation from surface sources.

"If 150,000 acres were irrigated in the Grand Prairie in 1926 with water from wells and two-acre feet of water were placed on each acre, the total pumpage amounted to 300,000 acre-feet in that year. On this basis it would appear that roughly 4,000,000 acre-feet may have been pumped in this district since the beginning of rice irrigation. The total area of the Coastal Plain between the Arkansas and White rivers is more than 10 times the area that was planted to rice in this part of the Coastal Plain in 1926. A draft of 4,000,000 acre-feet would represent a layer of water two and a half feet deep over an area of 1,600,000 acres. It is, therefore, possible that a large part of the pumped water has been obtained from storage. The objective of the investigation would be largely to determine what portion came from storage, and what portion from recharge."

Method of Investigating.

The geologist outlined a method to be used in investigating the quantity of the water supply of the Grand Prairie area.

Following is a summary of his recommendations:

"Establish bench marks at a considerable number of irrigation wells distributed throughout the area. Measure the depth of the water level in these wells. Connect the wells by level lines, and construct a contour map of the piezometric surface—that is, the imaginary surface which passes through the water levels in the wells.

"A good time to make the first series of measurements would be immediately before pumping began in the spring. The contour map would show the direction of the hydraulic gradient in all parts of the area, and hence the direction from which the ground water is coming. The series of measurements should be made before pumping begins in the spring, immediately after pumping stops in the fall, and at intervals of perhaps a month during the period of rise in the fall and winter. Automatic water stage recorders, such as are used in steam gauging, should be installed over a few wells in order to obtain continuous records of the fluctuation of the water level.

"Make pumping tests and obtain other data necessary to determine approximately the quantity of water used per acre and the total pumpage in the years covered by the investigation. Also collect records of part drilling and production, and with these data, make approximate computations of the pumpage each year since irrigation began and of the total pumpage to date.

"Collect records of water levels in irrigation wells in past years. Much valuable information along this line can doubtless be obtained from drilling companies, which preserved records to show the depth to water when the well was completed. These records will have to be interpreted with reference to the time of year in which thy were made. Estimate from these data the position of the piezometric surface in past years, and the amount and rate of lowering of the water level. Compare the lowering with the pumpage and apply the hydrologic laws for drawdown; thus, if the water level declines when the rate of pumping is not increased, depletion of the water supply is indicated, but lowering with increase in rate of pumpage does not in itself indicate depletion.

Logs of Wells Necessary.

"Obtain logs of wells, also samples of drillings and undisturbed samples where possible to determine the specific yield—that is, the quantity of water that will drain out of the material. Measure the depth to water in shallow non-irrigation wells. Tie these into level lines and compare with water levels in irrigation wells. Get available information as to lowering of the water level in these shallow wells. From the data as to the logs and water levels determine whether the irrigation wells are artesian or whether they have a water table. This will affect the interpretations that are made of the fluctuations in the piezometric surface. Compute the approximate amount of unwatering—that is, the quantity of water that has been removed locally from underground storage.

"Determine the permeability of the water bearing sand by means of the pumping method, and then compute the rate of flow of the ground water toward the rice growing area. The conditions seem exceptionally favorable for making tests of this kind. They probably can be made most conveniently on wells with electric motors just after the irrigation season and before the transformers have been removed. A test of this kind consists of pumping from one well at a known rate and measuring the depth to the water level in other wells in the neighborhood. All the wells have to be connected with level lines so that the water levels can be expressed in elvation above the sea, or other base level. If a large number of such tests are made the average results should give a fairly approximate value for the permeability of the water bearing bed, and hence, of the quantity of ground water that percolates into the rice growing area each year.

"By the study of well logs throughout the entire area in which recharge might occur, search should be made for localities in which the material that overlies the water bearing beds is sufficiently permeaeble to permit recharge of the ground water supply from the surface. Install water stage recorders on water table wells in such localities and obtain records of the fluctuations of the water table and their relation to rainfall and stream flow. If good results are obtained, tests of specific yield can be made and the quantity of recharge can then be computed. In any event, the relation of the principal streams to the water table should be studied.

"Throughtout the investigation attention eshould be given to the problem of the practicability of artificial recharge with a view to making recommendations for experiments along this line."

TO SURVEY WATER SUPPLY FOR RICE

Gazette 1-22-28

Senator Caraway Advised Federal Funds May Be Available.

(From the Gazette's Correspondent.)

Washington, D. C., Jan. 21.—Prospects for an intensive survey of unerground water in the Grand prair.e section loomed brighter today when Senator Caraway of Arkansas was advised by the United States Geological Survey that funds available for this work might be larger than at first anticipated. A preliminary survey was made this summer at Senator Caraway's request. At that time several similar projects and a shortage of funds indicated that it would be imposible to make a proper sort of investigation soon. Rice growers in this section, who have been using water from deep wells for irregation, have become alarmed at the gradually decreasing water level which, in addition to increasing pumping costs, has caused fear that the water will disappear.

With aid from state funds it is expected that the work can be started by the Geological Survey this year. It is anticipated that at least two years will be required before a final report can be rendered.

PRELIMINARY REPORT ON WATER SURVEY

Grand Prairie Leader - Stuttgart 3-22-28

Arkansas Geological Survey Gives Out First Report on Water Survey of Grand Prairie

October 13, 1927

The Director,
Geological Survey.

Memorandum in regard to preliminary investigation of water supply for rice irrigation in Arkansas, by O. E. Meinzer, September 20-24, 1927.

According to my original program I should have reached Arkansas about September 1, but on account of the serious illness of my father, and other delays, I did not reach the State until September 20. As a result of this delay, Mr. George C. Branner, the State Geologist, was out of the State at the time of my arrival at his office in Little Rock. He had, however, made arrangements with Mr. Elbert L. Smith, of the Arkansas Light and Power Co., to take me through the principal rice-growing district of the State. Mr. Smith furnished the automobile and helped me in every way possible to obtain the pertinent information. Thus I accomplished much more than would otherwise have been possible during the five days, September 20-24, which I spent in the rice-growing district. In addition to making a general survey of the situation, I measured the depth to water in 16 wells that are used for rice irrigation.

Rice has been grown commercially in Arkansas since about 1904. According to the statistics at hand, there were in the entire State 460 acres in rice in 1905, about 60,000 acres in 1910, about 93,000 acres in 1914, and about 200,000 acres in 1926. Of the total 200,000 acres in 1926, about 160,000 acres are located in the area between the Arkansas and White rivers, which is generally called the Grand Prairie. The value of the rice crop in Arkansas in 1926 was about $10,000,000. Hence, the value of the crop in the Grand Prairie was probably about $8,000,000. The Grand Prairie rice-growing district is roughly 60 miles long and 20 miles wide, and occupies much of the prairie area between these two rivers. The commercial center of the district is Stuttgart.

The rice fields in the Grand Prairie area are irrigated chiefly with water pumped from wells. These wells average perhaps 150 in depth, and apparently end in the sand strata at the base of the Pleistocene deposits. Yields of as much as 1,000 gallons a minute are reported from many of the wells.

The heavy pumping in this district has resulted in a persistent lowering of the water level in the wells. Although there is no danger of any sudden exhaustion of the ground-water supply, there is a serious question of ultimate depletion and it is undoubtedly very desirable that a thorough investigation be made of the ground-water supply of this area. The purpose of such an investigation will be to determine as accurately as possible the existing conditions and the quantity of water that will be annually available, and furthermore, to ascertain what steps could be taken, if any, to increase the recharge by artificial means.

The question of quantity of water that will be annually available is essentially a question as to whether the water pumped in the past has been taken from storage out of the underground reservoir, or whether it has been supplied year by year through percolation from surface sources. If 150,000 acres were irrigated in the Grand Prairie in 1926 with water from wells and 2 acre-feet of water were placed on each acre, the total pumpage amounted to 300,000 acre-feet in that year. On this same basis it would appear that, roughly, 4,000,000 acre-feet may have been pumped in this district since the beginning of rice irrigation. The total area of the Coastal Plain between the Arkansas and White rivers is more than 10 times the area that was planted to rice in this part of the Coastal Plain in 1926. A draft of 4,000,000 acre-feet would represent a layer of water 2½ feet deep over an area of 1,600,000 acres. It is, therefore, possible that a large part of the pumped water has been obtained from storage. The objective of the investigation would be largely to determine what portion came from storage, and what portion from recharge.

I estimate that an investigation of the water supply of the Grand Prairie and a report thereon could be made in two years, but it is possible that this investigation will open up the subject in such a way that further study and experiment will be desirable. The Geological Survey should contribute as much as possible toward the financing of this investigation, but the very small funds that are available from the Federal appropriation are, of course, not adequate to carry out an investigation of this scope. I believe, however, that if $5,000 a year were contributed for two years by co-operating parties in addition to what the Survey can contribute, the investigation could be carried out successfully.

Following is an outline of the methods which, in my judgment, should be used in a quantitative investigation of the water supply of the Grand Prairie:

1. Establish bench marks at a considerable number of irrigation wells distributed throughout the area. Measure the depth to the water level in these walls. Connect the wells by level lines, and construct a contour map of the piezometric surface—that is, the imaginary surface which passes through the water levels in the wells. A good time to make the first series of measurements would be immediately before pumping began in the spring. The contour map would show the direction of the hydraulic gradient in all parts of the area, and hence the direction from which the ground water is coming.

2. Make the above-mentioned series of measurements: a, before pumping begins in the spring; b, immediately after pumping stops in the fall; and c, at intervals of perhaps one month during the period of rise in the fall and winter. Automatic water stage recorders, such as are used in stream gaging, should be installed over a few wells in order to obtain continuous records of the fluctuation of the water level.

3. Make pumping tests and obtain other data necessary to determine approximately the quantity of water used per acre and the total pumpage in the years covered by the investigation. Also collect records of past drilling and production, and with these data, make approximate computations of the pumpage each year since irrigation began and of the total pumpage to date.

4. Collect records of water levels in irrigation wells in past years. Much valuable information along this line can doubtless be obtained from the records of the Layne-Arkansas Co., which show the depth to water in wells drilled by that company at the time the wells were completed. These records will have to be interpreted with reference to the time of year in which they were made. Estimate from these data the position of the piezometric surface in past years, and the amount and rate of lowering of the water level. Compare the lowering with the pumpage and apply the hydrologic laws for drawdowns thus, if the water level declines when the rate of pumping is not increased, depletion of the water supply is indicated, but lowering with increase in rate of pumpage does not in itself indicate depletion.

5. Obtain logs of wells, also samples of drillings and undisturbed samples where possible in order to determine the specific yield—that is, the quantity of water that will drain out of the material. Measure the depth to water in shallow non-irrigation wells. Tie these into level lines and compare with water levels in irrigation wells. Get available information as to lowering of the water level in these shallow wells. From the data as to the logs and water determine whether the irrigation wells are artecian or whether they have a water table. This will affect the interruptions that are made of the fluctuations in the piezometric surface. Compute the approximate amount of unwatering—that is, the quantity of water that has been removed locally from underground storage.

Determine the permeability of the water-bearing sand by means of the pumping method, and then compute the rate of flow of ground water toward the rice-growing area. The conditions seem exceptionally favorable for making tests of this kind. They can probably be made most conveniently on wells with electric motors just after the irrigation season and before the transformers have been removed. A test of this kind consists of pumping from one well at a known rate and measuring the depth to the water level in other wells in the neighborhood. All the wells have to be connected with level lines so that the water levels can be expressed in elevation above the sea, or other base level. If a large number of such tests are made the average results should give a fairly approximate value of the permeability of the water-bearing bed, and hence, of the quantity of ground water that percolates into the rice-growing area each year.

7. By the study of well logs throughout the entire area in which recharge might occur, search should be made for localities in which the material that overlies the water-bearing beds is sufficiently permeable to permit recharge of the ground-water supply from the surface. Install water recorders on water table wells in such localities and obtain

records of the fluctuations of the water table and their relation to rainfall and stream flow. If good results are obtained, tests of specific yield can be made and the quantity of recharge can then be computed. In any event, the relation of the principal streams to the water table should be studied.

8. Throughout the investigation attention should be given to the problem of the practicability of artificial recharge with a view to making recommendations to experiments along this line.

O. E. Meinzer (signed)
Geologist in Charge,
Division of Ground Water.

EXPERTS TO STUDY IRRIGATION OF RICE

Gazette 4/15/28

Watering and Pumping Phases of Industry to Be Investigated.

Fayetteville, April 14.—(AP)—A two-year investigation of rice irrigation in Arkansas will be conducted by the Bureau of Public Roads, Department of Agriculture, with the Arkansas experiment station co-operating, at the rice branch experiment station at Stuttgart, Dan T. Gray, dean of the University of Arkansas College of Agriculture, announced today.

The purpose of this project is to investigate methods and costs of pumping, to study factors affecting efficiency of the pumping plants, and to study the rate, time, amount, and method of application of water, and the effect on the crop. This project will be the first comprehensive study of engineering factors in Arkansas.

B. S. Clayton of the Division of Agricultural Engineering, Bureau of Public Roads, will be the engineer in charge. The work will begin this month, and will be under the supervision of S. H. McCrory, chief of the Division of Agricultural Engineering, and Dean G. Carter, head of the Department of Agricultural Engineering College of Agriculture.

Virtually no specific information is available to rice growers in Arkansas and surrounding states on the irrigation and pumping phases of rice culture. The project is opportune for the reason that there is definite demand from the growers for such information, Dean Gray said.

In May, 1927, Mr. Carter made a preliminary study involving 647 pumping plants. In discussing the project, he said:

"For the last two years the rice market has not been favorable to growers. They naturally have given much of their attention to production costs. The information resulting from this co-operative agricultural engineering project will enable the growers to affect the desired saving in rice production."

GROUND AND WATER SURVEY TO START

Conditions in Rice District of Arkansas Being Investigated.

8-5-28 Aug 5- 1928 Gazette

An investigation of ground and water conditions in the rice irrigation district of Arkansas which will extend over a period of two years, has been started under the direction of state and federal geological surveys, it was announced by George C. Branner, state geologist, yesterday.

The study of these natural conditions in the rice district was started as result of a request made by Senators T. H. Caraway to the Federal Geological survey more than a year ago for an investigation of ground water supplies in the district to determine the effect of pumping large quantities of water to discover possible sources for future development. Cost of the two-year investigation will be about $14,000.

In addition to Arkansas county, the center of the rice growing belt where most of the work will be done, the survey also will include Lonoke, Prairie and Monroe counties, Mr. Branner said.

David G. Thompson, a geologist of the federal survey, is in charge of the work and is maintaining headquarters at Stuttgart. Information will be gathered on the character, thickness and exit of water-bearing strata, the yield of the wells, and the total quantity of water used in the rice section.

determine the elevation of the wells, David G. Thompson, geologist for the U. S. Geological Survey, is in charge of the investigation to determine the sources and probable life of the ground water supply in the rice belt. He has headquarters at Suttgart and has done considerable work on the survey which will cover a period of a year or two.

OUR BIG SPRING

Mammoth Spr. Demo. 6-24-27

The state geologis should be a man of authority, and thoroughly reliable, especially as touching his printed work; but if G. C. Branner, state geologist of Arkansas, gave out the "interview" on "Spriugs of Ozark Region Discussed by Geologist" as printed in the Arkansas Gazette of last Sunday, June 19, our opinion is he is neither authentic nor reliable.

The article is so far from the truth and so rank with marks of prejudicial guessing that we conclude G. C. Branner did not give a line of it from personal knowledge.

Mammoth Spring flows 580,000 gallons of water per minute, has a temperature of 58 degrees, and has never been known to vary in either.

We wonder if the location of this giant spring in Arkansas did not prompt the report Oscar Edward Meinzer of the U. S. Geological Survey made to the Department of the Interior upon which Mr. Branner seems to rely?

Mr. Meinzer, Mr. Branner and the whole works have depended too much on "is thought to be."

Guess: "The spring is 64 feet deep," says the report.

Fact: It is 96 feet deep.

Guess: "Issues from a large cavern and other large crevises."

Fact: It boils up in one place only.

Guess: "The discharge is estimated at 333 second-feet but in 1904 it was as low as 150."

Fact: The flow has never diminished.

Guess: "It develops 1,1000 horse power."

Fact: It develops 1,5000 horse power.

Mammoth Spring is one spring and all flow comes out at one place, making a lake covering 18½ acres.

All the springs mentioned in the report are truly springs, not spring. Silver spring in Marion county, Florida, is in reality 20 or more springs, so with Greer in Oregon and Big Spring in Carter county, Mo., though not so many.

If Mr. Branner will investigate our great spring we believe he will join us in declaring that Arkansas has in it the largest single spring in the world.

Water Survey for Rice Belt Is Begun by Engineers.

Gazette 10-23-28

D. W. Weber, engineer for the topographic branch of the United States Geological Survey, and two assistants began work yesterday toward running a new line of levels from Varner in Lincoln county through Gillette, DeWitt and Suttgart to Hazen, connecting with lines already run, G. C. Branner, state geologist, announced.

The line will be used in connection with the water survey being made in the rice belt by the state and federal geological surveys. Permanent bench marks will be established every few miles and from these lines will be run to approximately 100 rice wells throughout the rice producing area to

NEW WATER POWER PROJECT PLANNED

Two Companies Surveying Creeks in Northwest Faulkner County.

Special to the Gazette. 11-28-28

Conway, Nov. 27.—A water power project of important proportions will be developed in northwestern Faulkner county, if the hopes of Dr. James S. Martin of Little Rock, nephew of the late Capt. W. W. Martin and member of a pioneer Faulkner county family, are realized.

Dr. Martin, who was in Conway today, said that he had succeeded in interesting two large concerns, one a power development orgnaization and the other a financing corporation, in the project and that their engineer, after a preliminary survey, had reported favorably.

The two companies, he said, had advised him that if he would secure options on the land to be flooded, at a reasonable price, they would proceed with a detailed survey to ascertain if the project were feasible.

Dr. Martin now is securing these options and said today he had acquired them from a majority of the land owners affected. He expects to complete them within a short time.

In general the plan contemplates the use of water power from four mountain streams flowing through Walker township, in the northwest corner of Faulkner county, North Cadron, Cove, Batesville and Cedar creeks. There is a possibility that in order to combine the waters of Cadron and Batesville creeks, the waters of the former will be drawn into the latter through a tunnel or siphon a distance of about a half mile at a point where the elevation of Batesville creek is 10 feet lower than the Cadron.

The site suggested for the main dam would be on Cove creek at a point a short distance north of Fish Trap bridge on the Damascus highway about 15 miles north of Conway. Other auxiliary dams could be contsructed, the preliminary survey indicated.

REPORT IS MADE ON WATER SURVEY

Two Years Required to Analyze Rice Growers' Supply Problem.

1/3/28

(From the Gazette's Correspondent.)

Washington, D. C., Jan. 2.—It will require about two years to complete an investigation of the cause of the lowering of the underground water supply of Arkansas, Lonoke and Prairie counties, an important factor in the production of rice in those counties, it was said in a memorandum received today by Senator Caraway from the United States Geological survey.

Copies of the memorandum were sent to George C. Branner, state geologist of Arkansas, with whom the Federal Bureau has been co-operating in conducting preliminary surveys.

Several months ago Senator Caraway, at the request of rice producers, brought the question of the lowering water level to the attention of the Geologic Survey. Since that time a preliminary survey has been made at the joint expense of the state of Arkansas and the federal government.

The water level has been dropping each year, falling from 40 or 50 feet below the surface to 70 or 80 feet. The resulting increased cost of pumping, together with fear that the water might disappear and end rice production, Arkansas' secon largest farm crop, caused an appea. to be sent out by the rice farmers.

The preliminary investigation disclosed that because of the clay soil underlying the rice fields, little surface water is permitted to percolate through to the water-bearing beds. It will be necessary, therefore, the Geologic Survey reported to Senator Caraway, to ascertain from what point the water-bearing sands are replenished in order to determine whether the level can be raised. It will require something about two years to complete such an investigation, the survey officials said.

ANOTHER DAM ON OUACHITA PLANNED

Hot Springs Sewage System, However, May Interfere With Project.

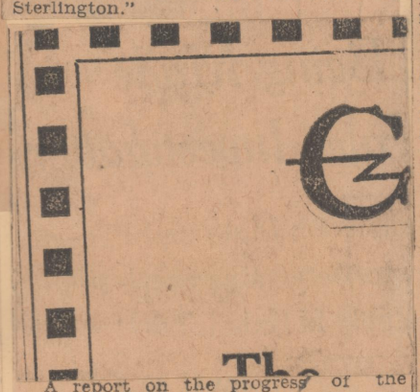
Gazette 1/4/29

C. Hamilton Moses, attorney for the Arkansas Power and Light Company, last night confirmed reports from Hot Springs that the power company is faced with the necessity of enlarging its plant at Serlington, La., unless steps are taken soon to take care of sewage disposal in a way that will not interfere with the impounding of water near Hot Springs through construction of a second hyro-electric plant on the Ouachita river.

The company now has a hydro-electric plant at Remmel Dam, 12 miles southeast of Hot Springs. This dam was built as the first of a series of three contemplated on the Ouachita river The second dam would be located about four and a half miles south of Hot Springs, it was said, but at present sewage from Hot Springs is emptied into Hot Springs creek at a point where backwater from the Ouachita would reach it if the dam were built.

Mr. Moses said that at a conference attended by him, H. C. Couch, president of the Arkansas Power and Light Company, and members of the Hot Springs City Council Wednesday night there was little promise of early solution of the sewage problem.

"The Arkansas Power and Light Company," Mr. Moses said, "must increase its source of power. If this cannot be done through the building of another dam on the Ouachita, it will be necessary to enlarge the plant at Sterlington."



The

A report on the progress of the ground-water investigation being made in the Arkansas rice belt by the Water Resources branch of the Department of the Interior through a co-operative arrangement with the Arkansas Geological Survey, has been received by G. C. Branner, state geologist.

The report was written by D. G. Thompson, geologist in charge of the work, which is being supervised by O. E. Meinzer, chief geologist of the Water Resources branch of the United States Geological Survey.

The investigation was undertaken to determine if the water supply in the rice belt is liable to become depleted, and if so, what steps could be taken to replenish the supply or to conserve the present supply.

Text of Report.

The report in full follows:

An investigation of the ground-water supply vaailable for irrigation in the Grand Prairie rice district of Arkansas is being made by the United States Geological Survey under a co-operative agreement with the state geologist.

Rice is one of the most valuable crops produced in Arkansas, being second only to cotton as a cash crop. In 1927, when the market price was low, the value of the crop was about $6,700,000. In 1925 and 1926, the years of maximum production, the value exceeded $10,500,000.

In 1927 rice was raised in 16 counties in the state. Three counties, however—Arkansas, Lonoke and Prairie—produced most of the crop. Rice was planted on nearly 143,000 acres in these counties which was nearly 80 per cent of the acreage devoted to this crop in the entire state. More than 98,000 acres, or about 54 per cent of the total, was planted in Arkansas county alone. In 1926 nearly 160,000 acres in these three counties was planted in rice, of which about 109,000 acres was in Arkansas county.

The rice-growing territory in these counties is confined to an area that lies between the White river on the east and Bayou Meto on the west and extends from the Chicago, Rock Island and Pacific Railway between Lonoke and DeValls Bluff southward for about 60 miles to the Arkansas river. The concentration of the production of rice in these three counties is largely the result of favorable soil. Throughout practically the entire area the soil is composed of "tight" clay, into which water percolates very slowly. For this reason the soil is adapted to growing rice, because it holds the water with which the plants must be surrounded during the growing season. Many thousands of acres elsewhere in the state could be used for rice culture except for the fact that the soil is too permeable and requires too much water for irrigation. Prior to the development of the rice-growing industry in Arkansas, which began only in 1904, the land now planted to rice was considered to have little agricultural value, presumably because the soil is so tight that the usual farm crops will not grow on it. The land was mostly covered with wild hay and was treeless, except along the small streams. The land as a whole is level and presents the features of typical prairie land. In consequence, the main rice territory, which stretches almost without break from Carlisle to Gillette, is known as the Grand Prairie. Smaller areas that are cut off from the main prairie by areas of timber along the streams are known by such names as Little Prairie and Prairie Longue.

Much Water Required.

The culture of rice requires a considerable quantity of water. For at least three months of the growing season the ground is constantly covered with several inches of water. On hot days the water evaporates about as fast as it is pumped onto the fields. The quantity pumped during the average growing season would cover the area irrigated to a depth between one and two feet. For the acreage covered in 1927 the minimum amount would be 143,000 acre-feet. This quantity would fill a reservoir one mile square to a depth of about 225 feet or a reservoir 10 miles square to a depth of 2 1-4 feet. If this water were to be supplied to the land by a single canal, the canal would have to be nearly 50 feet wide and 10 feet deep with the water moving at a velocity of 100 feet a minute. Enough water is pumped during the irrigation season in these three counties to supply the yearly needs of a city of a million people, with a per capita consumption of 125 gallons a day.

At least 90 per cent of the water used for rice irrigation in Arkansas is obtained by pumping from wells. In this respect conditions are different from those in the other rice-growing states, where a large part of the water is obtained from surface streams. The cost of water is a considerable item in the cost of producing rice. The Arkansas farmers have been able to use water from wells and still compete with other regions largely because the clay formation in the area is underlain by beds of sand and gravel that yield large quantities of water. The smallest wells used for irrigation yield 400 gallons a minute, and the average yield is probably about 1,000 gallons a minute. One well is reported to yield 4,500 gallons a minute—enough to irrigate 800 acres. Several wells yield 2,500 to 3,000 gallons a minute.

More than 1,000 irrigation wells have been drilled in Arkansas, Lonoke and Prairie counties, and about three-fourths of them are in Arkansas county. It is estimated that the wells alone, without pumps or engines, have cost more than $2,000,000 and that the total cost, including the pumping equipment, has been several times that amount.

Average Depth 150 Feet.

Most of the wells range in depth from about 100 to 225 feet and average about 150 feet. The water is obtained from beds of sand and gravel that are encountered at depths of 25 to 80 feet and extend to the bottom of the wells. The depth to the water level in wells in different parts of the territory in summer ranges from about 20 feet to more than 100 feet. About 10 wells have been drilled to depths of 500 to 900 feet. The water level in the deep wells generally stands higher than in the shallow wells, so that the cost of pumping is less. Also, the water is from 5 to 10 degrees warmer than that from the shallow wells. This is a favorable condition, for the water from the shallower wells is so cold that it may retard the growth of the rice plants. However, the cost of drilling the deep wells is so much greater than that of the shallow wells that up to the present time few of them have been drilled.

In the 25 years since pumping for irrigation began in this region the water level in most wells in the rice belt has gone down. In many places in the region the depth to the water level in the wells was originally from 35 to 50 feet, whereas it is now from 60 to 90 feet. In certain parts of the region, notably around the borders of the irrigated area, as near Lonoke and Gillette, the lowering of the water level has been much less. In general, however, the drop in the water level has been rather widespread. One result has been that the water must be lifted from a greater depth, and the cost of pumping is thereby increased. A problem even more serious relates to the adequacy of the ground-water supply. Will the water level continue to decline in the future until the supply is seriously depleted, and is this a condition that can be remedied in any way? Obviously these are questions of grave concern not only to the rice farmer but to the industries related to rice growing and to those who furnish funds to maintain the industry.

Looking toward the future, interested persons have realized the desirability of studies to determine the quantity of ground water that can be pumped for irrigation without creating serious depletion of the supply. The problem was brought to the attention of the United States Department of the Interior with the request that an investigation of the ground-water supply of the Grand Prairie region be made. A short preliminary study of conditions was made in September, 1927, by O. E. Meinzer, a geologist of the United States Geological Survey. Subsequently, an agreement was entered into between the director of the Federal Survey and the state geologist for a two-year study of the ground-water supply of the region. Under the terms of the agreement

$14,000 is to be expended in the investigation. In each year the Federal Survey is to contribute $2,000 and the state survey a like amount. In addition $3,000 is to be contributed annually by local interests. As a matter of fact, in the first year of the study the Federal Survey is spending an additional $1,900, mostly in determining the altitude above sea level of the surface at observation wells.

The investigation is being made by the United States Geological Survey, thus profiting from the experience of men who have specialized in studies of ground-water supplies in all parts of the United States. David G. Thompson, a geologist of the Federal Survey, has recently returned to Washington, D. C., after four months spent in investigation and in collecting data in the rice fields. It is planned that he will spend several months in the coming spring and summer in the field before preparing a report. At present a party of three men is engaged in running lines of levels to many wells in the region, the altitudes of which are necessary in computing some of the observations. The results of this level work will be of use not merely for the present investigation but also for work in the future when the United States Geological Survey makes a topographic map of the country. Permanent bench marks, composed of metal tablets set in concrete, on which is marked the height above sea level, are being set at about 75 selected points.

Valuable Information Obtained.

Much information of value has been obtained by well drillers and others in the development of the many irrigation wells in the rice fields, and these persons have freely furnished data for the present study. It is well known for example, that conditions are more favorable in certain parts of the territory than in other parts. A driller familiar with the territory can tell in advance about how deep he will have to dill and how much water can be obtained from a well in a given locality. It is also a common observation of the owners that the wells yield more at some times than others. However the present study requires much information for which no observations have been made in the past, and in order to collect such information, showing the effects of pumping, the investigation must be continued through at least two years. In fact, it is not probable that the final answer to the problem can be found until records are available for an even longer period.

Exact information is needed in regard to fluctuations of the water levels in wells in order to see whether they are affected by rainfall or river floods. These observations may give some clue to the source of the water and also as to whether the water supply is being overdrawn. To obtain such data automatic recording instruments, which give a continuous record of the movement of the water in wells, have been installed on four wells, one near Carlisle, one near Stuttgart, and two near Gillett. In addition, the depth to water is being measured in 100 wells throughout the territory at intervals of about a month.

One of the important problems to be solved relates to the source of the water. The soil and underlying strata in the rice territory to a depth of 10 to 80 feet consist mostly of clay, through which practically no water percolates to recharge the water-bearing beds. If the water that is pumped out enters from the surface it must do so outside of the rice territory. The quantity that can be pumped each season depends largely on the quantity that enters the water-bearing formation, and it is therefore necessary to know the area in which surface water is seeping into the water-bearing beds. Another problem relates to the rate at which water is percolating toward the rice territory. To determine this rate it is necessary to know the direction and amount of slope of the groundwater surface. This information is being obtained by the measurements of the depth to water level in the observation wells and the altitudes of the top of the wells. It is also necessary to know the permeability of carrying capacity of the water-bearing materials in different parts of the area. To determine this capacity a number of pumping tests have been made on individual wells with observations to discover the effect on nearby wells. To obtain proper conditions for these tests they must be made at least several weeks after all pumping has stopped in the fall or before it begins in the spring, in order that other pumping wells may produce no interference with the wells under observation. In seeking data as to the source of the water and the rate of flow of the water into the rice territory, it has been necessary to study conditions far beyond the borders of the territory During the last summer observations have been made at many scattered points from Pine Bluff and Little Rock eastward to Marvel, Marianna, and Forrest City and northward to Newport, Hoxie and Jonesboro.

POWER COMPANY TO BUILD ANOTHER DAM

Couch Interests to Expend $6,175,000 on Plant Near Hot Springs.

WILL START WORK TODAY

New Barrier to Be Named in Honor of Capt. Flave J. Carpenter of Arkadelphia.

Construction of a second dam and hydroelectric plant on the Ouachita river near Hot Springs, to cost $6,175,000, was authorized by the Board of Directors of the Arkansas Power and Light Company, meeting here yesterday, and work on the new project was ordered started today.

The new barrier will be known as Carpenter Dam, in honor of Capt. Flave J. Carpenter of Arkadelphia. It will be between four and five miles south of Hot Springs, and the waters of the lake created by the dam at one point will reach almost to the city limits of Hot Springs, it is said.

The new dam and plant, with transformer stations, additional lines to Little Rock and to tie in with the system at Remmel Dam, about 12 miles southeast of Hot Springs, will mean an additional investment in power facilities of the Arkansas Power and Light Company for Arkansas of approximately $7,000,000, H. C. Couch, president of the company, said here yesterday. Approximately half of this will be represented by wages paid workmen, it was said.

To Be Completed by 1931.

The Carpenter plant will be constructed by the power company with C. S. Lynch, chief engineer, in direct charge. Work on construction of camp facilities, the clearing of trees from the land to be inluded in the reservoir and other preliminaries will begin at once. Approximately 1,000 men will be employed on the project, and it is planned to complete it within two years.

The dam will store water from a drainage area of 1,498 square miles and will create a lake 24 miles long and 10,000 acres in extent. This will be more than five times as large as Lake Catherine, the body of water created by Remmel Dam, 10 miles down the river. The power plant will have installed capacity of 40,000 kilowatts, or 53,333 horsepower, and be provided with two turbines of 20,000 kilowatts each.

Lauds Industrial Tour.

Mr. Couch said that the additional power to be provided by the Carpenter plant is not needed immediately, but that the company seeks to keep two or three years ahead of the demand at all times. In this connection Mr. Couch commended the honorary Arkansas Industrial Commission, of which Judge Richard M. Mann is chairman, for sponsoring the trip through the industrial Southeast which is scheduled to end today.

"We feel that the members of the legislature and the business men who made the trip will learn first hand of conditions that stimulate industrial and agricultural expansion," Mr. Couch said, "and believe that the knowledge of methods employed in other Southern states, of the legislation affecting industries and the results obtained in the efforts to foster new industrial projects in the sections visited, will go far toward bringing about similar conditions in Arkansas.

"We have faith in the industrial future of Arkansas, and our decision to build the second of the three projected dams on the Ouachita river is a reaffirmation of this faith."

Officers of the Arkansas Power and Light Company yesterday said that belief in the future rapid expansion of Arkansas industrially was the paramount factor in the decision to construct Carpenter Dam. Immediate future demands, they said, could have been met by enlargement of the present gas-steam plant at Sterlington, La., or by additions to some of the other steam plants in Arkansas, and such additions would have cost only about half as much as the new hyroelectric plant

Another factor which entered into consideration of the question of building the dam, rather than enlarging the Sterlington plant, was the co-operation and encouragement given the company by the 150 Arkansas towns served by the Arkansas Power and Light Company in Arkansas, and particularly of Hot Springs, Camden and El Dorado, Mr. Couch said. In the case of Hot Springs this co-operation has included a promise to construct a plant for disposal of sewage which now empties into Hot Springs creek at a point which will be in the bed of the lake created by the impounding of water by Carpenter dam.

Tribute to Capt. Carpenter.

In naming the dam for Captain Carpenter a tribute is being paid by Mr. Couch to the man whom he regards as largely responsible for the entire Ouachita hydroelectric project. Many years ago, Mr. Couch said, Captain Carpenter envisioned the stream harnessed by dams that would provide power, prevent floods and aid navigation.

In 1913 and 1914 when Mr. Couch, J. L. Longino and associates began their studies of the stream, Captain Carpenter encouraged them, took them for a trip up the river and provided them with data he had assembled from government reports and other sources.

Captain Carpenter is a former steamboat captain, planter, and sand and gravel dealer. In recent years he has devoted most of his time to his farming interests.

The lake created by the barrier is expected to provide the Hot Springs district with additional resort features, including sites for summer homes, boating, swimming and fishing, and to bring nearer realization the expressed hope of Mr. Couch that Hot Springs may become one of the greatest year-around resorts in the United States.

To Use Electric Machinery.

In building the dam all machinery used will be electrically driven, it was said yesterday. This will necessitate the early building of a power line from Remmel Dam to the new site, a few miels east of the Hot Springs-Arkadelphia highway. Four miles of railroad to connect with the main line of the Missouri Pacific will be constructed for use in getting machinery, equipment and supplies to the Carpenter site. Mr. Lynch said it is likely the company will install its own rock crushing plant and use granite from near-by hillsides in constructing the dam. Arkansas men and materials will be given preference in filling positions and placing orders, it was said.

Additional transmission lines, with necessary transformer stations, to be constructed will include a line of 110,000 volts from Carpenter to Little Rock; one 33,000-volt and one 110,000-volt line from Remmel to Carpenter; the changing of an existing 33,000-volt line from Remmel to Bauxite and Little Rock into a line of 110,000 volts capacity, and the changing of a 33,000-volt line between Pine Bluff and Little Rock into one of 66,000-volts capacity. This will tie the new hydroelectric plant into the company's interconnected system with three lines.

With the completion of the Carpenter plant, Arkansas will have four hydroelectric plants, three of them operated by the Arkansas Power and Light Company—Remmel, Russellville and Carpenter. Connected with them will be the 120,000 horsepower station at Sterlington, steam-electric plants at Little Rock, Pine Bluff and El Dorado, other steam plants of the Louisiana Power and Light Company and the Mississippi Power and Light Company, and for the purpose of exchange of power, the system is tied in with the big Memphis plant of the Memphis Power and Light Company.

The Arkansas Power and Light Company has rights for another dam on the Ouachita and for dams on several other Arkansas streams.

CEMENT IS ORDERED FOR CARPENTER DAM

Largest Part of $300,000 Contract Given New Arkansas Company.

4-5-29

Special to the Gazette.

Pine Bluff, April 4.—Contracts for 150,000 barrels of cement to cost about $300,000, and which will be used in construction of Carpenter dam on the Ouachita river near Hot Springs, were awarded today by Q. C. Shores, purchasing agent, to four manufacturing concerns this morning.

The Arkansas Portland Cement Company, which is building a plant at Akay and which will use some of the power to be generated by the new hydroelectric dam was awarded the contract for the largest quantity. Other companies to furnish it are the Trinity Portland Cement Company, Fort Worth, Tex., Atlas Portland Cement Company, Waco, Tex., and National Cement Company, Birmingham, Ala.

The dam will be 100 feet high and 1,000 feet long with a width of 85 feet at the base.

Officials of the Arkansas Power & Light Company said that the McGeorge Construction Company of Pine Bluff has completed grading for the five mile railroad track from the dam site to Hot Springs and that this will be laid immediately.

Construction camp work also is well under way they reported. L. G. Warren has been named construction superintendent and his administration office building and two camp administration offices are also occupied .

Construction of Carpenter Dam to Start Monday.

4-5-29

Special to the Gazette.

Hot Springs, April 4.—Arrival this afternoon of a great steam shovel and its transportation to the site of the Carpenter dam, the second of three hydro-electric projects to be built by the Arkansas Light and Power Company, was followed by an announcement that construction work would be started Monday.

At present, there are 450 men employed at the site in preliminary work, and it was not indicated that any additional workmen would be engaged for the present.

Work on the Coffer dams will begin the first of the week. A narrow gauge road has been built from the site to the gravel pit, where a large concrete mixed also has been installed, and the four and one half miles of track, extending from the Missouri Pacific line, here, to the site, also have been completed and the first train is expected to be run over it not later than May 1.

The road was built to haul the heavier material and machinery to the dam. Transformers also have been installed and a telephone line run to the site, and the company, together with County Judge Davis, is building a two-way road extending from the main highway to the river.

WORK PROGRESSING AT CARPENTER DAM

However, Contractor in Need of 100 to 200 Additional Laborers.

6-20-29 Gazette

Employment of between 100 and 200 additional laborers in building the huge Carpenter dam on the Ouachita river near Hot Springs is necessary, it was announced yesterday by L. G Warren, superintendent for the Pheonix Construction Company, which is erecting the dam for the Arkansas Power and Light Company. Preference will be shown Arkansans in the employment of additional men, it was said.

The construction company now has more than 750 employes at the dam and has erected a small, but modernly equipped city on the river bank to house its force. The "city" has lighting facilities and sewerage. In addition to the commissary, a church, motion picture show, barber shop and billiard hall are available for the employes who receive from 15 cents per hour, up for a 10-hour day. Two shifts are employed. There are more than 100 employes homes on the construction site.

The first cofferdam, which will house the power plant and the first spillway of the Carpenter project, has been completed and concrete work will be started within the next 20 days. The dam will be completed probably in 1931, and will be the second of a series of such projects along the Ouachita river, the first of which is the Remmel dam now in operation. The Carpenter dam, will be about twice as large as the Remmel project, being 115 feet high and 1,100 feet long, and will furnish power for many Arkansas cities as well as aid navigation along the Ouachita river.

EXCAVATIONS FOR DAMSITE STARTED

Workmen Toil Below Ouachita River on Hydro-Electric Project.

Special to the Gazette.

Hot Springs, July 13.—Far below the surface of the Ouachita river but safe and dry within the huge walls of a gigantic cofferdam, hundreds of workmen this week began excavating the riverbed, preparatory to pouring the concrete foundation for the north half of the $6,175,000 hydro-electric dam being constructed south of here by the Arkansas Power and Light Company.

In less than 24 hours after the walls of the coffer had been completed, pumps had remoed all water from the interior and workmen were clearing out debris in order that the huge steam shovels could begin digging. As soon as the foundation and north half of the dam is completed, the cofferdam will be placed on the south side of the river and the other half of the dam completed.

The coffer dam is a box-like structure built out from the bank of the river. Its walls are higher than the river and water tight. It diverts the river and after it is pumped dry enables workmen to work right on the bed of the stream.

Work has been completed on the large construction camp required for the dam. Eighteen four and five room cottages have been built, a modern commissary, a moving picture show, church, barber shop, well equipped hospital, mess hall for 200, several bunk houses, engineers' bunk house, foreman's bunk house, two offices, 70 one-room negro shacks, a negro dance hall, barber shop and bath house are in use.

With work progressing rapidly on the dam, C. S. Lynch, chief engineer for the Arkansas Power and Light Company, disclosed today that the original plan for the power plant at the dam, calling for 25,000 kilowatts, has been changed and that the plant will be capable of producing 56,000 kilowatts, or approximately 80,000 horsepower. The total height of Carpenter dam from the foundation to the top will be somewhat in excess of 110 feet, depending on the rock encountered at the bottom of the river, Mr. Lynch said. The dam will be of solid concrete.

At the construction camp a small sawmill has been sut up for cutting material for use in scaffolding and other work. The timber used is cut from the area which will be flooded from backwater, forming Lake Hamilton. A concrete mixing plant, gravel and sand mixing plant and other features have been installed.

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General view
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STORY OF CANADIAN PROTEST IS DENIED

Neither Dominion Nor Britain Has Objected to Tariff Bill, Says Stimson.

HEARINGS ARE CONTINUED

Four Senate Subcommittees Virtually Complete Consideration of the Free List.

Washington, July 13.—(AP)—A denial by Secretary Stimson of published reports that Canada had protested against provisions of the House tariff bill caused Chairman Borah of the Senate Foreign Relations Committee, to declare today he had "thought all along that these supposed protests from Canada originated in the United States."

Stimson's statement referred to reports that Canadian Minister Massey had made oral representations to the secretary regarding the proposed duties on shingles, lumber and feeder cattle, and rumors that Great Britain had threatened to impose a tariff on American wheat.

The reports picture the administration as being much concerned over the protests and threats.

"I wish to deny unequivocally" said Mr. Stimson, "that any such statement was made by the Canadian minister or any representative of the Can-

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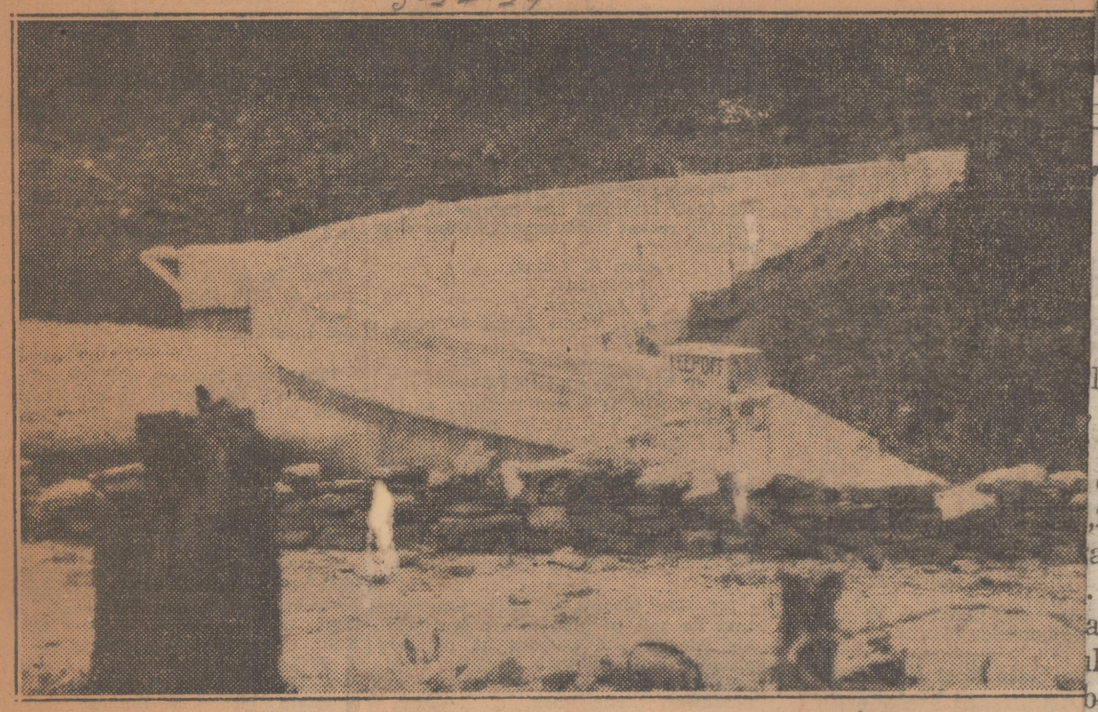
Water Survey

Concrete Dam for Booneville's Waterworks System, Which Has Been Constructed for Power Firm by Tulsa Compa

5-24-29



Nichols-State Sanatorium

Booneville.—The water works dam, a mile north of Booneville which will furnish water for Booneville ply. The water system has been completed and several business and residences have been connected. Th tration plant is completed except for the roof on the pump station. The water now being used from the tests 90 per cent pure. The water system was construct ed for the Arkansas Public Service Company by the Construction Company of Tulsa, Okla.

Water Survey of Rice District Is to Be Resumed.

Gazette 9/6/29

G. C. Branner, state geologist, was notified yesterday by the United States Geological Survey that David G. Thompson of the Water Resources Branch of the Geological Survey is en route from Washington to resume his work in connection with a water survey being conducted in the rice producing area of Arkansas. Work on the project was started a year ago under a co-operative agreement between the federal survey and the State Geological Department. Part of the funds to carry on the work was to be contributed by business interests in the rice belt. At a meeting at Stuttgart recently plans were made to raise funds necessary to complete the survey.

Deficiency Proclamation Issued.

Governor Parnell yesterday issued a deficiency proclamation authorizing the State Geological Survey to incur an indebtedness of $3,000 to complete payment of the cost of a water supply survey in the rice growing region of Arkansas. The project was started more than a year ago, the federal government, state government and private interests sharing in the cost. Some private pledges never were paid. The state and federal governments have contributed more than the original plan called for and the value of the entire project was threatened by lack of funds to complete it, it was said. The deficiency was authorized to meet this emergency. 12/30/28 Gazette

Deficiency Proclamation for Water Survey Issued.

1-5-29

Special to the Gazette.

Stuttgart, Jan. 4.—Governor Parnell has issued a deficiency proclamation authorizing Dr. George C. Branner, state geologist, to incur an indebtedness of $3,000 in his office, to help continue a water survey in the rice growing sections of Arkansas. The federal government has spent several thousand dollars in the work, and it was necessary for the state to take over the obligations of private agencies that declined to make further contributions.

The Stuttgart Chamber of Commerce has been working for some time in an effort to secure funds to complete the work, and was successful in securing aid from rice farmers. This, together with financial assistance from the Arkansas Power & Light Company, will be pooled with the money secured from the state.

An abundance of water for irrigation is essential to the rice growers of this section, and the survey work was started after it was noticed that the underground water level was being lowered. It was feared that a water shortage would cause the rice acreage around Stuttgart and DeWitt to be curtailed.

Parnell Provides Fund for Survey

Democrat 12-29-28

In order to continue a water supply survey in the rice growing area of Arkansas and other eastern Arkansas counties which was begun two years ago by the U. S. Geological Survey in co-operation with the Arkansas geological department, Governor Parnell issued a deficiency proclamation yesterday authorizing Dr. George C. Branner, state geologist, to incur an indebtedness of $3,000 in his office for the work.

The deficiency appropriation became necessary, it was said, to meet the state's share of expense in conducting the water supply survey in which the federal government has expended several thousand dollars. Additional revenues from the state for the work became necessary to take care of obligations of private agencies who have declined to make further contributions, the proclamation said.

It was declared by the governor that the amount may prevent irreparable damage to rice growers in Arkansas.

A survey of water conditions in the rice belt was started after evidences were detected that the water yield for irrigation of rice fields had shown a considerable diminution, which it was feared, would force growers to abandon considerable rice acreage, especially in the vicinities of Stuttgart and DeWitt.

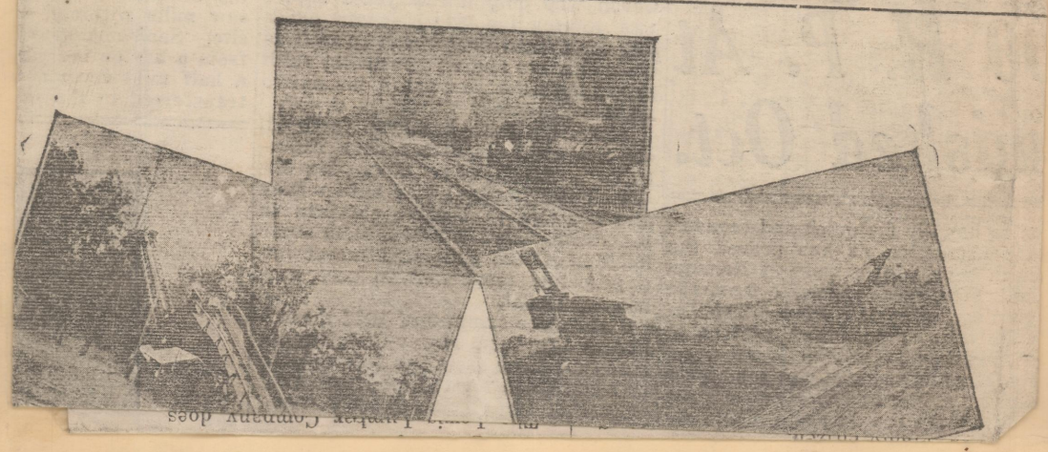
THE LITTLE ROCK DAILY NEWS, SEPTEMBER, 1924

ltural Wealth i

TATISTICS PROVE OPPORTUNITY AWAITS THE INVESTOR IN SALINE

pulation, 16,781; urban, 2,933; rural, 13,848. Number of farms, 1,918; 1,895; colored, 23. Total land area, 475,520 acres; in farms, 161,645 improved acres, 67,946. Value of manufactured products, $1,928,741. of farm property ,total, $5,473,118! land in farms, $2,839,612; buildings, ,285; implements and machinery, $330,187; live stock, $1,153,034; amount of age debt on farms, $144,375; average value of farm land alone, per acre, . Number of domestic animals on farms—horses, 1,548; mules, 2,561; attle, 2,287; dairy cattle, 8,480; sheep, 409; goats, 2,741; hogs, 16,050. Value ltry, $77,424; value of poultry produced, chickens and eggs, $163,039. Val- bees, $3,570; value of honey and wax produced, $2,122. Production of pal crops—corn, 321,619 bushels; oats, 33,864 bushels; wheat, 18,411 bush- e, 242 bushels; dry peas, 1,140 bushels; peanuts, 5,951 bushels; hay and 9,961 tons; Irish potatoes, 36,885 bushels; sweet potatoes, 123,565 s; other vegetables, 588 acres; cotton, 2,309 bales; syrup, 19,852 gallons; 747 pounds. Small fruits and orchard crops—strawberries, 12,801 quarts; erries, 2,955 quarts; apples, 19,786 bushels; peaches, 28,965 bushels; pears, ushels; plums, 2627 bushels; cherries, 47 bushels; grapes, 43,142 pounds; 767 pounds. Average elevation, 350 feet. Topography, gently rolling to anious in north. Saline river. Soils, sandy loam, clay, alluvial in valleys. r, pine and hardwood. Minerals, bauxite, pottery clay, road gravel, gravel, g stone, fuller's earth, glass sand, soapstone. Industries, saw mills, pot- ants, screen door and crate factories mining. Good markets for dairy, y and garden products in nearby cities of Little Rock and Hot Springs. pal towns, Benton, Bauxite, Bryant, Haskell, Slocomb, Traskwood, Congo llegeville. Acres of homestead land, 800.

ONE OF BENTON'S THRIVING INDUSTRIES.



Arkansas Light and Power Has Made Possible Great I In Industrial Life of V

(More about Remmel Dam

It will not be long until Arkansas through the Arkansas Light and Power Company, will have enough hydro-electric energy to supply all the light and power required in this state, and then have plenty to spare.

This condition will have been brought about by H. C. Couch, president of the Arkansas Light and Power Company who has built up a public service company with 700 miles of transmission lines, eight central steam power plants and one hydro-electric station serving 56 cities and hundreds of farms, in the short space of ten years.

The record is all the more remarkable when it is noted that Mr. Couch had nothing when he began except an unusual ambition to capitalize the resources and opportunities which his vision and faith in his native state, wove into a dream of industrial greatness.

Had Strong Associates.

Everything he dreamed when he and James L. Longino tramped through the pine woods on the Ouachita river a few years ago has come true, because he was not content with hoping to realize his ambitions. That was not Mr. Couch's way. He was a worker from the start. He realized he could hardly hope to reach his objective—a super-power system for the state by his own efforts, and he early set about enlisting the financial and moral support of men with capital as well as faith in the future of the state. He was fortunate in his associates for he was joined in his enterprises by such men as H. L. Remmel, Charles S. McCain, A. B. Banks, G. W. Donaghey, Gordon H. Campbell, Julian Blass, W. C. Ribenack, H. M. Armistead, and C. H. Moses of Little Rock; A Bertig of Paragould; J. L. Longino of Pine Bluff; John R. Fordyce of Hot Springs; W. Noel Adams, F. J. Carpenter and C. P. Couch of Arkadelphia; Joe Mahoney of El Dorado, J. H. Meek of Camden, A. B. Cook of Malvern, and about 1,200 other citizens of this state, who expressed their confidence in the executive ability of Mr. Couch [illegible] ing money in his enter[illegible]ir confidence has been [illegible]stified for the company's [illegible] as grown constantly since [illegible]s incorporation in 1914 and they receive 7 per cent a year, dividends being paid January 1st, April 1st, July 1st and October 1st.

The Arkansas Light and Power Company preferred may now be obtained on a basis to yield more than 7 1-2 per cent a year. An additional advantage of this form of investment is that it keeps capital within the state of Arkansas where it is used to develope the resources of the state. The investment is preferred both as to assets and dividends. Dividends are exempt from the normal federal income tax and the general property tax in Arkansas.

Prosperous as the affairs of the company have been, and great as has been its growth, only the surface of the field it has been organized to serve, has been touched. There are millions of acres of fertile land uncultivated in Arkansas, capable of sustaining a large additional population in comfort and independence. Electricity is a necessity in domestic, commercial and industrial life, yet only ten per cent of Arkansas' homes are wired for electrical service. The field is enormous. The demand will continue to grow.

A Native Son.

The Arkansas Light and Power Company is a native son incorporated under the laws of this state and controlled and operated by Arkansas folks for the benefit of Arkansas.

When Mr. Couch dreamed his dreams and laid his plans, he showed keen judgment in their gradual development, for about one-third of the population of the state is in the 18 counties served by the transmission systems of the Arkansas Light and Power Company. This company was the first in the state to develop hydro electric energy completing and putting into operation one 1,100 h. p. hydro electric power station on the Ouachita River, which will be completed in October.

What the development of this water power means to Arkansas may be realized by consideration of the fact that approximately one-fourth of the population of Arkansas is engaged in industrial, agricultural, mercantile and commercial pursuits in the cities and towns and rural sections of the 18 counties of Arkansas now served or traveled by the more than 700 miles of transmission systems of the Arkansas Light & Power Company.

Overcoming Obstacles.

Many obstacles had to be overcome before the company could undertake this development of the water power found in the Ouachita River. It may not be generally known but as far back in the '90s government engineers surveyed the Ouachita for dams and locks. The report was that the project would prove too costly for the government to undertake, and it was the recommendation that the government endeavor to induce some power company to undertake conversion of the water power into electric energy, the government to share in the cost. Other interests considered the development of the Ouachita, but despite the invitation to a possible government bonus or subsidy, no effort to develop the water power of the Ouchita was made until Mr. Couch and his associates started the preliminary work which has culminated in the 10-year program and the beginning of actual construction on the first of the dams.

Available Power.

Throughout the development of the Ouachita River hydro-electric projects, it is proposed to operate the existing steam plants in conjunction with the hydro-electric power stations in order that the water power may be untilized to produce maximum hydro-electric output, with the stream plants to supply any sudden abnormal, demand. The three steam plants now connected with the Pine Bluff-Picron-Stuttgart-Malvern-Arkadelphia transmission system will connect with additional steam plants of the company at El Dor[illegible]den and Russellville so tha[illegible] available supplementary st[illegible] capacity will reach 32,500 [illegible]er. The combined power [illegible] immediately upon the com[illegible] the Remmel dam and stati[illegible] 52,000 horsepower. Some[illegible] power will be available in L[illegible] if the need arises, throug[illegible] change arrangement existin[illegible] the Arkansas Light and Po[illegible]pany which is developing [illegible] power and has the transmi[illegible]tem in readiness for its di[illegible] and the local company.

The increased use of ele[illegible] Arkansas in the past few ye[illegible] the service the Arkansas [illegible] Power Company is perform[illegible] development of the stat[illegible] power resources to meet th[illegible] more economical and effici[illegible] While the average increase

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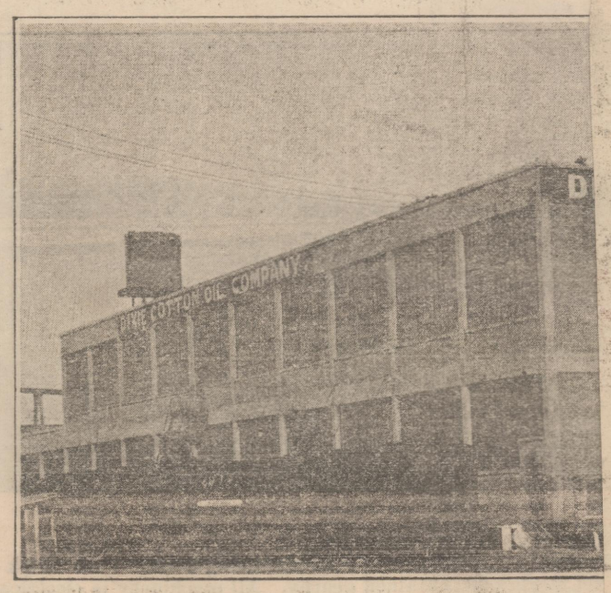
of electricity throughout [illegible] States as a whole was 8 [illegible] increase in Arkansas w[illegible] per cent, and the increas[illegible] ritory served by the Ark[illegible] and Power Company was [illegible]

With hydro-electric po[illegible] stimulus to the develop[illegible] kansas' wonderfully vari[illegible] it may be expected that [illegible] increase will be greater [illegible] few years. Thus, the [illegible] Ford, Bacon & Davis i[illegible]

"The hydro-electric de[illegible] the Ouachita River and



One of the big industries operated by electricity from the S[illegible] also are served by the same system.

the ill fated "Slow Train" of fiction wended an uncertain and hesitating way, has gone. In its place has been developed a fertile, progressive state, with abundant hydro-electric and steam-electric power stations interconnected with cotton, timber, rice, oil, gas, clay, and other products in close proximity to markets, well served by trunk railways and populated by people practically 100 per cent American.

The farmer and the manufacturer in Arkansas can find scope for their energy and enterprise. Nature has provided the rich soil and the equitable climate where every kind of agricultural endeavor can be carried on. Dairying, poultry growing, fruit and truck farming, general farming all yield handsome returns to the modern farmer. From 1880 to 1920 the population of Arkansas doubled. The increase since 1920 was stimulated by the discovery of oil.

While the people of Arkansas give thanks for the bounties of Nature, they also show their gratitude to those men of vision, courage, faith and executive ability, who decided that the rich natural resources of the state, as exemplified in the farm lands, the mineral deposits, and the wealth in the woods, must be developed, if the state was to reach the full glory of its destiny.

H C. Couch Pioneer in Industry

And so it came about that 11 years ago H. C. Couch began in a small way his work of development which was to culminate in the Arkansas Light and Power Company, by far the most important factor in the development of Southern Arkansas. Today with nine central power stations, 700 miles of transmission lines serving 56 cities and towns and hundreds of farms, the Arkansas Light and Power Company can justly claim and is admitted to be entitled to full credit as the pioneer in the development of a super-power system for the Wonder State, which has helped greatly to make the magnificent agricultural and industrial development of the last few years possible.

More dollars worth of farm produce, excluding nursery and greenhouse products, are produced in Arkansas per acre of improved farming land than in any other state in the Union. Nature is due much of the credit for this enviable record, but the men who pioneered on the farms and the men who pioneered in industry to provide power and markets are due their full share. Again the Arkansas Light and Power Company comes to the fore for hundreds of farms in the 18 counties through which the transmission lines of the company radiate owe much of their success to the service in power and light provided by the Arkansas Light and Power Company. The value of all farm property in Arkansas has increased from $400,000,000 in 1910 to $924,000,000 in 1920, while the acreage of improved farms increased during the same period by 14 per cent, compared with a decrease in such famous agricultural states as Indiana, Ohio, and Iowa. It was more than a coincidence that during the period of greatest agricultural development, the Arkansas Light and Power Company was expanding its transmission lines, and building new steam electric plants here and there throughout south eastern Arkansas, helping, the cities, towns and farmers to capitalize on the opportunities for successful growth.

A Hardwood State.

Arkansas is a leading producer of hardwood lumber, and has enormous resources of standing timber. Sixty different kinds of trees are cut and marketed of which the most important are short leaf pine, gum, long leaf pine, white and red oak, hickory, ash and cypress. Arkansas contains more merchantable oak timber than any state in the Union. These valuable timbers have given rise to a large industry in the manufacture of wood products. Planning mills, box cooperage factories, makers of furniture veneer, vehicle stock, mill work etc., are distributed throughout the state, the majority in southeast Arkansas being served by the Arkansas Light and Power Company, whose electrical energy has made possible the important development

Among men who are helping to build the New South, is one whose achievements will be recorded in additional industrial development for Arkansas and Mississippi and more prosperity and contentment for thousands who benefit through increased production. This is H. C. Couch. Here in Arkansas where he has been at work for some time, they will tell you "Couch is doing more for Arkansas than any man in the state."

From mail clerk to head of two electrical power companies—the Arkansas Light & Power Company and the Mississippi Power &Light Company—in less than a score of years. And all through his own efforts, encouraged and supported by loyal friends. This is Couch's record.

Born in Magnolia, Arkansas, of Georgia parentage. Couch is every inch a southerner, embued with the ambition to do something for his country, as well as provide for his wife and children. He is the father of five—all girls but four.

Once a Mail Clerk.

Couch was a mail clerk running between Memphis and Texarkana, when he determined that he would endeavor to make the life and work of farmers—Couch had lived on a farm and knew the isolation—easier and better by building more telephone lines. He paid another clerk $100.00 to swap runs, and he took the run from McNeill, Arkansas to Bienville, Louisiana. His ambition was laudable and his determination high, but he was without funds. Couch enlisted the interest of the postmaster at Bienville, and secured him as a partner. The postmaster had no more money than Couch. This didn't feaze them though. They sold coupons for telephone service to farmers and with this money and their reputation obtained credit for wire, insulators, etc., and built a telephone line, using small trees for poles.

Couch kept extending. His postmaster partner became apprehensive, he told his young partner, "You are going to bust us." "Will you buy or

in wood working in the state in recent years.

Business always goes where it is well treated, where there is a fertile field, where prospects for expansion are inviting. Read the record, South Arkansas farms can grow three crops a year on the same land. South Arkansas cuts from three to seven crops annually of alfalfa averaging about one ton to the acre at each cutting. South Arkansas showed an increase of 100 per cent in livestock, dairy products, poultry and eggs in the past ten years. South Arkansas has the only diamond mine in the North American continent. It produces the finest quality of whetstone, of which there are large deposits at Remmel Dam. Clays of all kinds abound, and the famous Niloak pottery known in the art shops throughout the world is turned on the potters wheels at Benton, driven by electrical power.

Arkansas offers opportunities for the successful manufacturing of cotton textiles, matresses, clay products, paper pulp and paper, wood working plants, clothing, flour and kindred industries, because the Arkansas Light and Power Company has economical and plentiful power, while the manufacturers have the additional advantages of close proximity to raw products, a plentiful and contented labor supply, and a mild climate.

Textile Industry.

Arkansas is particularly interested in attracting the attention of those having experience in the manufacture of cotton textiles, South Arkansas is in much the same position today as the Carolinas were 18 years ago. South Arkansas has the cotton and the labor—99 per cent white Americans. South Arkansas has the power as witness the Arkansas Light and Power Company with its ample resources and its great transmission system.

South Arkansas has the capital and also the market, and South Arkansas

have a prime capacity of 600,000,000 k. w. h., a seasonal capacity of 39,000,000 k. w. h., and an off peak capacity of 92,000,000 k. w. h. It will be a multiple concrete arch structure and will cost approximately $30,000,000.

not include transmission lines, substations and distribution lines to be built from these hydroelectric plants and to deliver their power to industries and other customers. These lines and substations will require the investment of additional millions.

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Realization of Years.

The White River Power Company is the successor of the old Dixie Power Company, organized by the late Walker Powell, who devoted the best years of his life in the effort to bring about development of the White river, and of the Ozark Hydroelectric Company, organized some years ago by Harvey C. Couch, Charles S. McCain, Frank Pace, C. H. Moses and others.

After the death of Mr. Powell, control of the Dixie company was acquired by the North American Company, and for a time it appeared that controversy would delay indefinitely the undertaking. Negotiations undertaken by Mr. Couch and others led to the North American Company acquiescing in the proposal that the development be undertaken by the White River Power Company, of which Mr. Couch is president; C. S. Lynch, chief engineer for the Arkansas Power and Light Company, vice president, with Charles S. McCain, formerly president of the Bankers Trust Company and now president of the Chase National bank, New York; C. Hamilton Moses, Elbert L. Smith, O. H. Simonds, New York, and H. A. Priest, Englewood, N. J., comprising the Board of Directors.

Building of Units Necessary.

Economy is the big reason for undertaking the construction of the White river dam and station in units. The 265,000 horsepower capacity to be ultimately installed is more than would be required before the first unit could be constructed. By beginning operations with a 125-foot dam and plant of 66,000 horsepower capacity, the company will save the fixed charges on the greater investment entailed by the 225-foot dam with 265,000 capacity, and at the same time will be enabled to have the plant earning on the 66,000 horsepower capacity, while other work is going on.

"We must look five to 10 years ahead and begin to build three to five years ahead to maintain the growth of Arkansas," said Mr. Couch. "If we did not have the capacity, some great industrial plants desirous of locating here might go elsewhere. When they want power we are prepared to provide it. We purpose to continue to be prepared.

"The growth that has followed the development of the power facilities we have at present has resulted in large increase in the use of electric power. Our business is growing at the rate of 25,000 to 30,000 horsepower a year. Large factories require immense quantity of power, and manufacturers prefer to purchase as they can use the money they would put into an individual power plant more profitably in productive machinery.

Increased Power Expected

"Carpenter hydroelectric plant, now under construction on the Ouachita river, will be completed by fall. The growth and increased demand for power indicates that the output of Carpenter, will be required by that time, and that by 1933 or 1934 additional capacity will be required. That's why we are anxious to begin construction of additional generating stations, and have applied for final license to go ahead with the work on the White river.

"Arkansas is attracting wide attention by reason of its resources, the rapid development under way the past few years, and the change in attitude of the people toward manufacturers and investors. Let me say that in bringing about investment of outside money in industrial development in the state, the public attitude is the most important factor.

"Manufacturers and other investors are not going where they are likely to be harassed and mulcted. Such a situation in Arkansas might make it impossible for us to obtain the necessary money, and thereby lose for Arkansas this development and the benefits that come from such development. We are very grateful for the co-operation and the support accorded us in our efforts to bring about the manufacture at home of more of our products. With a continuation of this attitude and co-operation with manufacturers and other investors, we look forward to growth greater in the next 10 or 15 years than we have enjoyed in the past half century."

Mr. Couch said that while construction work could not be undertaken until permission is granted by the Federal Power Commission he believed the commission is disposed to expedite matters that unnecessary delay be avoided.

He said that many problems are involved in an undertaking of this kind, and that engineers have been at work for many months making studies of the streams, crews drilling to determine conditions for foundations at different points, and industrial engineers have completed thorough surveys of Arkansas' resources and possibilities for future expansion.

"The results of these studies of possibilities," Mr. Couch said, "give us sufficient faith and hope in the future of Arkansas to feel that we are justified in undertaking this development."

White River Dams to Change Topography

June 15-1930

By TOM SHIRAS.

The topography of the upper White river country in north Arkansas and south Missouri, will be radically changed by the construction of the water power projects now contemplated by the White River Power Company and the Empire Electric Company in the White river.

Instead of a twisting, tumbling river broken only by the placid waters of Lake Taneycomo, which was created by 1910 by the construction of a power dam near Forsyth, in Taney county, Missouri, there will be a chain of three big lakes. This chain of lakes will extend from Wild Cat shoals, a few miles above Cotter, the site of the big power dam which will be constructed by the White River Power Company, to well up toward the head of the river. These lakes will cover a large area of territory now in the woods or in farm lands. In places where creeks empty into the river from both sides, they will be several miles across, with bays and inlets reaching well back into the surrounding mountains.

The lake which will be created by the construction of the dam at Wild Cat shoals by the White River Power Company will be approximately 110 miles long, the headwaters reaching nearly to the foot of the dam already installed and owned by the Empire Electric Company, near Forsyth, Mo. Lake Taneycomb, which was created by the construction of this dam, is 27 miles long, its headwaters reaching to Table Rock, a bold, rocky promontory overhanging the White river, the site of another Empire Electric project, on which work will start in the near future. This dam will be about 190 feet high, and will create a lake about 100 miles long, its headwaters reaching well up toward the source of White river. Table Rock is about five miles above Hollister and Branson, in Taney county.

If Lake Taneycomo can be taken as a precedent, the creation of these new lakes will only amplify the beauty of the mountain scenery, and will make the upper White river country one of the largest summer resort centers in the United States. Already the territory is visited by half a million people every summer, and with two additional lakes, which will be the largest artificial lakes in the United States, the crowd of visitors should be swelled enormously.

The White River Power Company recently asked the Water Power Commission for a license to build three dams. One on the White river at Wild Cat shoals, one on the Northfork river near the mouth, and one on the Buffalo river near the mouth. The value of the lakes that will be created by these dams will be enormous.

The lake that will be created by the construction of the dam at Wild Cat shoals, five miles above Cotter, and near Flippin, will open up a new north Arkansas empire. The territory which will border the lake is thinly settled, but with unlimited resources. It consists of several hundred square miles well timbered with hardwood and a scattering of pine, hundreds of lead and zinc prospects, and deposits of marble and onyx. The lake will be deep enough for large boats, which will give transporation to valuable resources which have lain dormant for centuries.

It will also open up a new agricultural section. About the only land that has been cultivated in that section to date is the bottom land lying along the White river. Thousands of acres of rich upland will be made accessible. This land is productive, producing corn, cotton, small grains, domestic grasses and all other crops native to the temperate zone. Lead Hill, in north Boone county, will be the center of the uplake activities. It is located on Sugar Loaf creek, five miles from White river. When the dam at Wild Cat shoals is completed and the lake formed it will be on an embayment of the lake, with water transporation at its door.

This lake tonnage has already been given consideration. A railroad leading from the Missouri Pacific tracks at Flippin to the dam site, has already been surveyed. It will be used to handle material while the dam is building. After it is finished it will remain to handle freight from the lake.

One of the leading factors that makes water power development on White river so attractive to capital is the fact that damage to inundated lands is nominal. It is estimated that 50,000 acres above the Wild Cat shoals dam will be covered with water. Five thousand acres of this is bottom land, and in cultivation, the rest being wild forest land. No highways, railroads or bridges will be affected, and only one village. This is the village of Oakland, in Marion county, containing about 100 inhabitants. Oakland will probably have to move.

Some historic old ferries will either be put out of commission by the creation of the lake, or have to change their motive power. The ferries that will be afected are Naves, Bradley, Pace, Mooney, Holt and Music ferries. All of these ferry boats are strung to a wire cable with a pulley and are operated by the force of the current. With the lake a mile wide they will have to change to power boats or discontinue. Mooney's ferry across White river, connecting Marion and Baxter counties is a historic ferry and one of the oldest on the upper river. It was used by both the Federals and Confederates during the Civil war. It was also the crossing point on White river for the old Military Trail.

Three old steamboat landings will also be obliterated. These are the Naves, Bradley and Music creek landings. Protem, Mo., and the south part of Taney county, were served from the Naves landing. Peel, and the extreme north part of Marion county from the Music creek landing, and Lead Hill and north Boone county from the Bradley landing.

The dam on the Northfork river will be located about a mile and a half from the mouth of the river. This river has a greater fall and the dam will not be so high as the Wild Cat shoals dam, so the lake will be much smaller. It will probably be about 15 miles long, and will not have the industrial value that the lake above the Wild Cat shoals dam will have. Timber and timber products will be about all that will be moved over it. Because it is on two state highways and accessible by the Missouri Pacific railroad it will probably develop into an important resort section. The back water from this lake will be forced up Fall creek to within about three miles of Mountain Home, giving that town easy access to the lake. Mountain Home will also be about six miles from an embayment on the lake created by the Wild Cat shoals dam.

The dam on Buffalo river will create a lake which will have an enormous industrial value, as an avenue of transportation. Buffalo river flows through a mountainous section heavily timbered with pine and hardwood timber. There is also probably more zinc ore adjacent to this stream than in any other section of the United States. Millions of pounds of this ore was shipped during the war while prices were high, but many of the mines are so inaccessible that they cannot be operated at a profit during low price periods. One of the greatest items of expense is hauling, and with water transporation this will be overcome. The lake will also give transporation to an immense amount of timber and timber product that cannot be handled at a profit now because of their inaccessibility.

Landing Field Constructed at Wildcat Dam-site.

Special to the Gazette. 9-21-30

Flippin, July 19.—The big bottom field at the Wild Cat dam-site on the White river near this place is being transformed into a landing field and officials of the White River Power Company, who have headquarters at Pine Bluff, will fly here when they have business. It reduces the time of the trip down from a half-day to about one hour.

Permit to Build Power Dam on Buffalo River Asked.

Gazette 8-1-30

The Ozark Reduction Company, an Arkansas corporation organized several months ago to mine and market manganese and other Arkansas ores and to operate hydro-electric power plants, filed an application with the Arkansas Railroad Commission yesterday for a permit to build a power dam on the Buffalo river near Carver in Newton county. Preliminary plans call for a dam 105 feet high capable of developing 550,000 horsepower. It would create an artificial lake covering about 10 square miles and would cost about $1,200,000.

Contracts for Illinois River Dam Project Awarded.

8-21-30

Special to the Gazette.

Siloam Springs, Aug. 20.—Contracts were awarded Monday by the Illinois Water Development Company of Tulsa for construction of a dam at Forest Park, four miles east of Siloam Springs on the Illinois river in Adair county Oklahoma, east of where the Oklahoma state Highway No. 17 crosses the river. The main dam which will be of concrete will be built by the Southwest L. R. Meyers Company of Dallas, Tex., for $68,300, work is to be completed within 90 working days. Earthwork dikes, rip-rap and auxiliary spillway contract was awarded to Winstead & Gunter, local contractors for $33,625, and the work is to be completed within 90 working days.

J. W. Sloan, president of the Illinois Water Development Company and owner of Forest Park, was in Tulsa Monday to open the bids.

The dam will impound water to furnish the hydro-electric power in this city and provide a lake. Approximately 600 acres will be inundated. Operation of the hydro-electric part will be turned over to the city with the exclusive right to use all electric current generated, except a sufficient amount to light the dam.

PLANS FOR THREE POWER DAMS FILED

Development Along White River to Cost $47,340,000.

9-1-30

Special to the Gazette.

Mountain Home, Aug. 31.—In connection with their application for a state permit to build three dams on the White river and its tributaries the Northfork and Buffalo rivers, the White River Power Company yesterday filed plans and estimates with the county clerk of Baxter county.

The petition consists of an engineers estimate on the cost of the three projects, including not only the dams but mechanical equipment, spillways and power lines as well. It was illustrated with maps and drawings covering all phases of the proposed developments.

According to the estimates filed, the White River dam, at Wild Cat shoals will cost $27,930,000. The Northfork dam, which is to be constructed in the Northfork river, four miles above the town of Norfork, $13,150,000. The Buffalo river dam, which will be constructed a mile above the mouth of Rush Creek, $6,260,000.

It is estimated that it will take three years to build the White river dam, three years to build the Northfork river dam, and two years to build the Buffalo river dam. The White river dam will be built in three steps. The first step will go to a height of 125 feet. Two more steps will be added up to 225 feet as the demand for power increases. Construction of the last unit on the three projects is estimated to start sometime in 1936 or 1937, which in the allotted time for the completion of all of them, would indicate that work would start on the first unit sometime within the next few months.

Ground Water Supply Survey of Arkansas Completed.

Gazette 9-13-30

David G. Thompson, representative of the Geological Survey, who has been conducting a two-week survey of ground water supply in Arkansas, assisted by George Branner, state geologist, has returned to Washington. A report is being prepared and will be completed within two weeks.

The survey is part of a move inaugurated by Senator T. H. Caraway to conserve the water supply for irrigating rice fields on the prairie.

Mr. Thompson and Mr. Branner inspected the irrigation section Tuesday in a plane piloted by Capt. Marvin Cronk, pilot of the Arkansas Power and Light Company.

Work on Hydro-Electric Dam Near Siloam Springs Begins.

10-22-30

Special to the Gazette.

Siloam Springs, Oct. 21.—Concrete work on the large hydro-electric dam across the Illinois river, at Forest Park, will be started this week by the L. E. Meyers Construction Company.

A clamshell dragline has been set in the river just below the dam site. The company expects to take all of the gravel for the dam from the river.

A large transformer has been installed and the electric system has been connected to a line of the Southwestern Gas and Electric Company, which will provide power for two large pumps, a large saw, and the lighting system. Two crews will work in 10-hour shifts. The concrete mixer and the pile drivers will be operated by power from the highline.

Work on an extension of 2,480 feet on the levy was started today. The contractors will begin work this side of Watts, Okla., at the railroad crossing and follow the Kansas City Southern railway right-of-way to a point near the coke kilns near Watts. This will protect the railroad bed and will keep the water line away from the tracks.

Dam Builders Drill To Find Foundation

11-23-30 Gazette

By TOM SHIRAS.

For the last three years the White River Power Company has been making foundation tests on three hydro-electric projects on the White river, Northfork and Buffalo rivers in north Arkansas, and are still employed in this important prelude to dam construction.

Preliminary work on earlier constructed dams in the United States was not so thorough, and in several instances during the last 50 years, loss of life has been heavy as a result of dams going out in times of flood. The more modern structures are so firmly attached to the rock foundations on the sides and the bottom that they are as solid as these formations.

The casual observer looking over a power site on the upper White river, and seeing the rock bottom of the river and the rocky bluffs on either side would figure immediately that the small strip of bottom over which the dam would have to be built to tie onto the side of the mountain would not present any difficulties, that the bed rock would be encountered at a very shallow depth. This is not always the case. Engineers in charge of the construction of an immense dam must have absolute facts and when they get through with their foundation tests, they have a picture of what is underneath as plain as one taken with a camera of the surface.

This underground picture, however, is much more expensive and takes much more time to get than the former. It is presented by a series of holes, which are charted with each formation passed through. Core drills with diamond bits are used, for the reason that every few feet a core of the formation passed through can be cut off and brought to the surface. This holds good for the harder rock formations. Cores cannot be taken of clay, shale, or other soft material, because it crumbles.

At the Wildcat shoals site on the White river above Cotter, probably as many as 150 holes have already been drilled and the drills are still rotating. A deep shaft is also being sunk to give them more information. In foundation tests for big dams the holes must be sunk into solid rock for 15 to 20 feet. Far enough to determine without the shadow of a doubt that the rock encountered is bed rock. Holes in foundation tests on the upper White river have varied in depth from 30 to 150 feet, which show the different depths to solid rock, say on a straight line half a mile long.

The original spacing of the drill holes for a foundation test is from 30 to 50 feet. If all of the holes encountered bed rock at the same depth the work would be easy, but they don't. When they drill a hole in which soft material is found, and bed rock is encountered much deeper than in the hole drilled previously, they have to offset this hole by others to see just what the deviation is. Some times as many as 10 holes will be drilled in a space 50 feet square to get a true picture of the underground condition in that small area.

Our larger rivers are constantly changing their courses, shifting this way and that. The mountains or bluffs bordering the White river above Batesville are about one-half mile apart on an average. As far as can be determined White river has been confined between these rock-ribbed mountains for ages. The river itself is about 400 feet wide, or, say, one-fifth as wide as the narrow valley. It seems that every few thousand years the old river got tired of the bed it was lying in and turned over. The terrian adjoining the White river is peculiar to all the rivers in the Ozarks. Invariably there is a bluff on one side against which the river runs, and a bottom, about 1,600 feet wide, on the other. The widest part of the bottom is generally on a bend of the river, and indications now seem to show that where the bottoms are was once a part of the old river channel, the bed of which is very rough and irregular like the present one.

Nature plays many peculiar tricks underground. At one very deep drill hole, which should have reached bed rock at a shallow depth, the drill went down to approximately 150 feet before encountering it. A shaft was sunk on this hole and a large quantity of pyrites of iron was taken out. Pyrites of iron is made up largely of sulphur. The opinion of one geologist was that in times of very low water, when the underground flow was stopped, large amounts of sulphuric acide was formed which ate out the surrounding limestone formations. The mass kept burrowing down to greater depths.

It is very important that the engineers of a big dam project know all these things and blend them into one composite picture. It is also very necessary for the contractor who is going to build the dam to know it, for if he didn't, he would not know what kind of material he would have to move. It is also very well for the people living adjacent to the dam to know that the engineers and the contractor know it, for with this knowledge they can rest with an easy mind in times of flood.

The safety of a big dam depends largely upon its foundation and the manner in which it is tied to the foundation. In the construction of modern dams an excavation the entire length of the dam is made to bed rock. A notch some 15 feet deep is cut into the bed rock, and tapered out upstream to the thickness of the base of the dam. The base of the dam rests in this notch which makes the structure as solid as the foundation it is tied to.

The hydro-electric dam on the White river in Taney county, Mo., proved the value of modern thoroughness and construction in the flood of April, 1927. For nearly a week this dam and powerhouse were entirely covered with water, and took all the buffeting the swift waters of the White had to give. They were ready to function when the water went down.

HOT SPRINGS HAS JOYOUS HOLIDAY

Celebrates Dedication of Carpenter Dam and Illumination of White Way.

LARGE CROWD ATTENDS

Speakers Stress Importance of New Power Project to Future Development of Arkansas.

Gazette 12-18-30

By FLETCHER CHENAULT.
(Staff Correspondent of the Gazette.)

Hot Springs, Dec. 17.—Carpenter dam was dedicated here today and the lights of the new white way flashed tonight on schedule. All of which was achieved with an elaborate and entertaining program.

It was the greatest celebration Hot Springs ever staged.

The significance of the event as it relates to the future progress of the state was impressed on the vast audience, and the elements co-operated to make the celebration into a merry and auspicious occasion and one which must be reckoned as a milestone in the advancement of Arkansas industrialism.

At Carpenter's dam, a vast concourse stood on the hillside and saw the first water impound in Lake Hamilton. They saw the Ouachita river amassing force to serve the needs of man by electrifying his cities and towns, his factories and farms. The huge audience was swept on a high tide of enthusiasm, to greet with shouts and cheers the unleashed power giant, imprisoned for centuries in these hills.

Governor Lights White Way.

The white way was inaugurated with a program tonight at the Auditorium theater, where hundreds were turned away from the doors. At the conclusion of the program, Governor Parnell touched the button which brought illumination to miles of streets.

Along the broad esplanade the asphalt reflected a wave of white light and the facades of public buildings stood out in bold relief against the gloom of mountain ranges. Never since De Soto came this way with firearms and horses and coats of mail to amaze the Indians, has there been such a transformation, and Hot Springs streets now rival the Broadway of New York with their handsome illumination.

Carpenter dam is Harvey C. Couch's fine Christmas gift to Arkansas. The facts revealed in this case are astounding. The outlay for the dam was $7,700,000 and it will stand until the end of time.

Parade Held.

The celebration tonight was featured by a parade in which bands played, banners dipped up and down Central avenue, and the populace with tin horns and masks made merry on the streets.

At the theater Walter M. Ebel was master of ceremonies and ushered the dignitaries to a front row. They sat down and with their shoulders screened the queen and her maids on the second row, causing a sigh of dissatisfaction.

The speakers were Garnett Eisele, president of the Chamber of Commerce; Hamp Williams, chairman of the National Park Planning Commission; S. E. Dillon, manager; Federal Judge J. E. Martineau; Mayor Leo P. McLaughlin and Governor Parnell. Mayor Pat Robinson extended felicitations of Little Rock, and Fred N. Rix, bank president, introduced the queen and her maids, who are:

Miss Betty Dodson, Hot Springs; Miss Clarice Mercer, Little Rock; Miss Polly Ann Veasey, Gurdon; Miss Virginia Parker, Arkadelphia; Miss Anna Felice McCrary, Malvern; Miss Irene Martin, Mena, Miss Lotta Reed, Benton; Miss Maurine Rembert, Camden; Miss Retha Jones, Sheridan; Miss Vivian Perkins, Morrilton; Miss Maxine Denslow, Stuttgart; Miss Mary Hall, Fordyce; Miss Margaret Watkins, Mt. Ida; Miss Iva Hipp, Hope; Miss Maxwell Lynch, Pine Bluff, and Miss Marjorie Edwards, Booneville.

Hot Springs Hospitable.

The royal seneschals and majordomos of Hot Springs demonstrated tact and judgment, and familiarity with the rules of hospitality, in making a rare event of their holiday. A spirit of co-operation was manifest through the activities of the Chamber of Commerce, led by Mr. Eisele and Mr. Hamilton, the mayor, and their committees.

The actors in this drama stood in a booth draped with American flags, facing microphones and loud speawers. The audience was gathered on the hillside that soon will be at the bottom of Lake Hamilton, and a string of workmen perched like blackbirds high up on the rim of the dam.

"The Stars and Stripes Forever," crashed from the military band and the kings of the celebration took charge. Wandering aimlessly through the crowd, shaking hands and seeking obscurity, was a man in a dark overcoat with a gray soft hat who could not escape from the spotlight's glare. He was Harvey C. Couch.

Senators Send Greetings.

Garnett M. Eisele, president of the Chamber of Commerce, introduced Mayor Leo P. McLaughlin, who read messages from Senators Robinson and Caraway, Congressman D. D. Glover, President J. H. Gorman of the Rock Island and President L. W. Baldwin of the Missouri Pacific, and extended a welcome on behalf of the city.

Governor Parnell followed with an address, during which he urged a continued development of Arkansas and courage in the face of an economic depression which is, he said, largely a product of imagination.

L. G. Warren, superintendent of the Phoenix Utilities Company, subsidiary of the Arkansas Power and Light Company, builders of the dam, was on the program and Dr. C. H. Brough, former governor, introduced C. Hamilton Moses of Little Rock, for whom Lake Hamilton is named. Mr. Moses told of Couch's efforts to raise money to build the dams and his faith in the future of Arkansas.

"We did not need this dam," he said. "We will have no use for it unless there are more wheels to turn in Arkansas. Mr. Couch and his associates, which include 6,000 Arkansas stockholders, are building on the future. We have faith in Arkansas progress."

Captain Carpenter Honored.

He paid a tribute to Capt. Flave Carpenter, retired steamboat captain of Arkadelphia, who first outlined for Mr. Couch a vision of hydro-electric dams on the Ouachita, and who, because of infirmities, could not attend the celebration. But Mrs. Carpenter was introduced.

T. K. Martin responded, outlining advantages of the power development to Hot Springs.

Scott Hamilton introduced Queen Betty Dodson and her maids, and Miss Catherine Couch, for whom Lake Catherine was named. He also called on C. S. Lynch, chief engineer for the power company, whose speech was cheered heartily. He said: "Ladies and gentlemen, I have nothing to say."

Mr. Couch Speaks.

Mr. Eisele considered it rather an anomaly to introduce Mr. Couch to an Arkansas crowd, but did so anyway, just to keep the record straight, and the "power king" received an ovation.

Mr. Couch expressed hope that eventually every home in Arkansas will be equipped with all modern innovations. He recalled the day 15 or 20 years ago when, accompanied by J. L. Longino, he walked over these hills and visualized the system of power dams. He praised his assistants, the managers and engineers, the financiers and stockholders, but—

"We owe a debt of gratitude to the workers, those men you see lined up on the dam," he said, and all eyes were turned aloft. "I want now to express our appreciation to those loyal workmen up there."

The Boys Glee Club of the Hot Springs High School sang, and the photographers who had been sniping from distant hilltops and from points of vantage across the river and on the dam, closed in on Queen Betty and prevailed on her to pose in the attitude of turning the switch.

Charming little twins, Nancy and C. Hamilton MHoses Jr., aged three, dressed in blue ensembles, tugged at the ribbons which released two bottles of water, one from the Atlantic and the other from the Pacific, and in childish glee watched them spatter against the concrete barrier.

Queen Betty then turned the switch and the gates fell.

No one knows how long it will be before the lake fills. It might require three days, or it might take six months, depending on the flow. An estimate is 25 days. Momentous figures are involved in this enterprise; a concise statement would read as follows: Length of dam at top, 1,165 feet; heighth, 115 feet; cost $7,700,000; thickness at base, 74 feet; begun February, 1929; to be completed July 1, 1931; horsepower, 80,000; total cement, 187,000 barrels; sand and gravel, 204,000 cubic yards; area of reservoir, 7,150 acres; length of lake, 24 miles.

POWER FIRM SEEKS TWO DAM PERMITS

Arkansas-Missouri Company Would Build Projects on Spring River.

Gazette 1-10-31

Washington, Jan. 9.—(AP)—Relief for some of the hungry and unemployed men in Arkansas was promised today by the Arkansas-Missouri Power Company in a letter to the Power Commission advising of its intention to build two dams on Spring river in Fulton county.

The declaration of intention was submitted so the commission may determine whether it or the state has authority to issue a permit.

H. L. Ponder, attorney for the company, told the commission: "We are very anxious to go to work on this immediately, as conditions are bad in this country."

The project calls for one dam and power plant to replace structures destroyed by a flood, and would generate 650 horsepower. The second dam and power plant would generate 2,550 horsepower and be the completing link in a spstem of four dams.

Basing their estimates on the average cost of $100 per horsepower, the commission's engineers estimated the total cost of the two dams at $320,000.

Chairman Smith of the Power Commission said action upon the letter would be expedited.

WATER DECLINES IN STATE'S RICE BELT

Demand Exceeds the Supply for Irrigation, According to Report.

1-26-31

(From the Gazette's Correspondent.)

Washington, D. C., Jan. 25.—The demands made on water-bearing beds in the Grand Prairie district of Arkansas for rice irrigation exceeds the supply, according to a report of the United States Geological Survey, which made an exhaustive study in co-operation with the Arkansas Geological Survey and the Arkansas Agricultural Experiment Station, and unless conservation steps are taken by the rice growers further drop in the head of the water beds is to be expected.

The report shows more than 1,000 rice wells with a capital outlay of $5,000,000 now in use, and in 1929 the estimates show the water output in excess of 200,000-acre feet, enough to cover an area more than 300 square miles to a depth of one foot. The annual total cost of irrigation was estimated at $1,250,000.

The average demands on the water-bearing beds, the report shows, has caused a gradual lowering of the head, in some sections only a few feet, but an average of 20 feet.

The report says in part:

"The conclusion as to the safe yield of the Pleistocene beds is that 175,000-acre feet per year is the maximum that should be taken from them. This has been exceeded every year since 1916, with the exception of 1921 and 1923. The safe yield may be as low as 150,000 acre-feet. This would water from 100,000 to 117,000.

"If the overdraft continues the head probably will continue to decline. A natural result will be an increase in the cost of pumping water and a decrease in the yield of the wells. In several wells the water level during pumping is so near the bottom of the wells that a further loss of head of only a few feet would necessitate a decrease in the rate of pumping.

"The problem arising from overdraft does not concern the whole of the Grand Prairie region, for the loss of head around the outer parts has not been great. It is doubtful whether in these parts of the region the lowering of head ever will become serious."

Power Dam at Siloam Springs Nearing Completion.

Special to the Gazette. 3-23-31

Siloam Springs, March 22.—Weather permitting, the concrete part of the large hydro-electric power dam, which is being built by the Illinois Water Development Company, across the Illinois river at Forest Park, a summer resort near Siloam Springs, will be completed by Thursday.

Work on the last section of the main dam was started Saturday. Within the next few days this section will be below the present water level, which will permit the removal of the steel pilings. When this work is completed, the gate will be closed and the water let in.

A large lake formed by the dam has been named "Francis Sloan Lake," in honor of the second daughter of J W. Sloan, president of the Illinois Water Development Company of Forest Park. The lake will be used for all kinds of aquatic amusements. The first boat races, sponsored by the boating club of Tulsa, Okla., will be held Saturday and Sunday, May 30 and 31. Four states, Oklahoma, Arkansas, Kansas and Missouri will participate. The lake is one mile wide and three miles long and covers more than 800 acres.

Tests Pave Way for Vast Hydro-Electric Project

By RALPH HULL.

Flippin, April 11.—To the average person the selection of a site for a hydro-electric dam—decision having been reached to build one—would appear to be a comparatively easy job.

All an engineer need do, it might be reasoned, is to choose a river on which to construct the dam, find a place where the banks are bluffs or steep hills, determine that bed rock is not too deep under the top soil, ascertain if land to be flooded by the impounded waters may be bought at a reasonable price, and then go ahead.

Perhaps this isn't giving Mr. Average Person credit for enough knowledge or intelligence. Nevertheless it is a safe venture that he will be surprised to know that the Arkansas Power and Light Company has spent 18 months and hundreds of thousands of dollars making tests for a dam along a strip of White river less than a mile long.

Furthermore the tests are not finished and will not be for three or four months, and they are supplemental to exhaustive studies made by two other groups of engineers, at the same place, in former years.

It also likely will be news to many residents of Arkansas that during the period when much has been said and published about the big hydro-electric development at Carpenter Dam, and its older but smaller sister projects at Remmel Dam, the Arkansas Power and Light Company has been working steadily on this White river development—a project which will dwarf in size and significance the two Ouachita projects combined. In fact, the White river project and its three sister developments on North Fork and Buffalo rivers will produce a total of electric power only slightly less than the much-discussed Muscle Shoals plant.

Plan to Spend $52,000,000.

Briefly, the northwest Arkansas project under present plans will provide for four dams to cost a total of approximately $52,000,000. The White river dam and power plant will represent some $30,000,000. A dam across North Fork (of White river) will cost approximately $12,000,000. Two dams across Buffalo river will mean expenditure of about $6,000,000 and $4,000,000 respectively.

An idea of the magnitude of the White river project may be gained when it is known that Carpenter Dam and its hydro-electric plant, now the largest in the state, cost $7,500,000 The cost of Remmel Dam and plant was less than half this amount.

Carpenter Dam is 75 feet high and Remmel Dam is 50 feet high. The White river dam will be 225 feet high—as tall as a 15-story building. The new dam will be nearly half a mile long at the top.

The White river dam alone will flood 38,980 acres, or almost 61 square miles. It will back water up White river 100.25 miles to within 1,500 feet of the tailrace of the dam at Forsythe, Mo. This dam, incidentally, is 85 feet high.

Site Believed Determined.

Engineers are a conservative lot when it comes to making predictions, but the group now in charge of preliminary work on White river opines, rather cautiously, that the point at which they now are working very likely will be the site finally selected for the dam.

This location is at what is known as Wild Cat Shoals. It is approximately three miles northeast of Flippin and about five and a half miles up the river from Cotter. On the south bank of the river rises a bluff 375 feet high at its highest point, and on the other side a hill which slopes less abruptly to a height above the river more than sufficient for the purposes of the project.

The site is one which has been considered for many years as a logical one for a dam—during years when the project was merely the dream of a few men in this section of northwest Arkansas, and of one man in particular. This man is Capt. Charles LeVasseur of Yellville, geologist and now consulting engineer in charge of preliminary work at the prospective dam site.

Classmate of Foch.

Captin LeVasseur is a native of France, former commissioned officer in the French army, and a classmate in military school of the late Marshal Ferdinand Foch, commander of the allied forces in France during the World war. After finishing his education Captain LeVasseur elected geology and engineering for a career, instead of the army, and later came to the United States where he entered government service as a geologist.

He was assigned for a time to the Mississippi river valley as geologist and during his government service did some geological work in Marion and Baxter counties. He resigned his government position to become consulting geologist for a company which had large mineral land holdings in northwest Arkansas and in this position, 28 years ago, established his residence in Yellville.

In his wanderings over the hills and mountains he became impressed with the water power possibilities of the section, and in 1912, with a few associates, organized the Dixie Power Company This company made various explorations and surveys, obtained a permit for a dam on White river from the Federal Power Commission, and in 1924 entered into an agreement with the American Power Company to complete exploration and build the dam.

Obtain Water Power Rights.

This company did considerable test work, but did not complete it, and a new company called the Ozark Power Company was formed by Elbert Smith, attorney for the Arkansas Power and Light Company; Charles McCain, New York banker, formerly of Little Rock, and Captain LeVasseur. The Ozark Company entered into litigation with the American Company for the water power rights desired and was successful in its suit.

Then, some two years ago, the Ozark Power Company was merged with the White River Power Company, under the latter name. This company, a subsidiary of the Arkansas Power and Light Company, now is doing the preliminary work for the dam, and it is expected will construct the dams on White, North Fork and Buffalo rivers for the parent company.

The preliminary work involves a huge amount of study and labor. Not only was it necessary to determine what lands would be flooded, what the lands would cost and how much timber must be cut in the basins of the lakes formed by the impounded water, but, in the case of the Buffalo and North Fork dams particularly, how the high dams may be built without flooding valuable mineral lands. For it is the mineral resources of the section that make the big power projects worth consideration.

A study of the map of northwest Arkansas, along with a few statistics, quickly will reveal that the present population and present industrial development would in no sense justify the production of power on the scale contemplated. The northwest Arkansas project therefore is predicated on the belief—perhaps faith is a better word—that provision of plentiful electric power will result in the development of north Arkansas minerals on a scale and in a way never dreamed of a quarter of a century ago.

See Mineral Development.

Officials of the Arkansas Power and Light Company, and the financial interests in New York which make the Arkansas Company's developments possible, one is told, have visions of northwest Arkansas as a section where the waters of "made" lakes lave the mineral lands; where smelters using the new electric process of refining ore are located along the lake shores, probably at the dam sites, and where barges are transporting ore, or perhaps the finished product, to smelter or rail shipping point as the case may be.

Under present conditions little of the zinc, lead and manganese of the Arkansas Ozarks can be mined profitably because of transportation costs, or, as often is the case, because of the impossibility of transporting ore. There are few railroads tapping the mineral lands and little prospect that new ones will be built through the section. But railroad spurs will be built to the dam sites, or part of them at least.

Then, with dams at strategic points, the impounded waters back of one reaching to the dam above if available, and locks built into the dams when needed to permit passage of barges from lake to lake, conditions will change and mineral lands now inaccessible may be worked profitably. The building of smelters, using the comparatively new electric process, will mean industrial activity on a scale not even though of until recently and will bring to the region money which otherwise would go out of the state to smelters in other sections.

Test Underground Conditions.

But to get back to Wild Cat Shoals. When the White River Power Company, or the Arkansas Power and Light Company, as you prefer, began making tests for a dam site some 18 months ago, drilling to determine what foundation was best was started at a point about half a mile above the shoals. Every resident of this section knows that bed rock is just a few feet below the surface of the soil in the White river country, and often there is no top soil. But everyone does not know that limestone formations of the kind which constitute the earth's crust hereabouts are treacherous as foundations for a dam.

For instance a drill may go through 50 or 75 feet of solid rock and then break into a cavity large enough to accommodate a house. Sometimes a so-called cavity is not actually an open pocket, but is filled with porous, rotten stone. Sometimes one is found filled with clay or other material not impervious to water.

One Site Abandoned.

It was to determine this underlying condition that the tests were started. H. S. Stickle, engineer formerly employed at Carpenter Dam and previously an engineer for the Alabama Power Company, said that the tests at the upper dam site indicated good foundation until after the work had progressed for nearly a year, and was believed almost finished. Then conditions were encountered which made abandonment of the site advisable. Mr Stickle, by the way, is Captain LeVasseur's superintendent in charge of tests.

Last November the tests were moved down the river to Wild Cat Shoals, the number of drills was increased from four to seven and almost as much has been done in the last five months as was done at the upper site in 12.

A few weeks ago the largest cavity yet found in the tests was encountered by drillers at a depth of 75 feet below the surface and after the drill had cut through 40 feet of solid rock. A shaft was sunk into this cavity and it was cleared of the clay and rotten limestone with which it was filled. If something unforseen does not develop, the walls, floor and ceiling of this cavity will be sealed with concrete to prevent seepage into or from it, and the project will go on as if it did not exist. For the 40 feet of rock above it is sufficient to support either the dam, or the weight of water in the lake, as the case may be.

Drill in Checkerboard.

Drill tests have been made along three lines extending from different points on the bluff south side of the river to the top of the hill across the stream. Some cavities have been encountered on each of the lines, and now the spaces between the lines have been checker-boarded and drills are being sunk in each of the squares.

The engineers explain that it would be possible to build a dam on any of the lines, but that by determining the line with the smallest number of cavities, or where the underground water flow is least the cost of constructing a dam will be lowest. By spending a few hundred thousands of dollars in tests, it is asserted, it may be possible to save millions when work is started.

All holes are drilled at least 100 feet deep, and some of them, according to conditions encountered, are sunk as much as 200 feet. Cores are kept and carefully filed in the offices built at the dam site where they not only are available to company geologists and engineers, but to United States geologists or other scientists. The cores from the Wild Cat Shoals test to date, would reach more than three miles if stretched out.

Whenever cavities are found tests are made with dyes to ascertain if they are connected, by underground water flow, with any other cavities. Thus far only one such connection has been found—that is between two holes on the mountain on the north side of the river. All drill holes are subjected to water pressure tests with pressure far greater than the formations will be subjected to when the dam is built.

Site on Horseshoe Bend.

The Wild Cat Shoals site is near the lower end of a sort of irregularly-shaped horseshoe bend in the river. Mike Walton, engineer working with Mr. Stickle stood at the site the other day and pointed across the hill where, he said, the river was just half a mile away. Following the shore line to the same point the distance is more than three miles. This point is known as Low Gap and it has important bearing on the Shoals project.

The elevation at Low Gap, Mr. Walton said, is lower than the top of the dam will be. If left alone water would flow through this gap, across the neck of the horseshoe into Tuell creek and thence into White river below the dam. To get away from this and also to utilize the natural contours of the land, a dam approximately 150 feet high and 1,000 feet long, will be built across the gap. The dam will be provided with gates and Tuel creek then will constitute a spillway by means of which the level of the lake may be regulated. Water never will run over the dam, but only through the power plant turbines.

The type of dam to be built has not been determined, but consideration now is being given the multiple arch type of concrete structure. Other types of arch dams also are being studied, and it also has been suggested that an earth dam be built.

Some work has been done along North Fork and Buffalo rivers in the way of surveys and other preliminary studies, but actual tests at dam sites will not be started, it was said, until the Wild Cat Shoals tests are completed.

Engineers Writes History Of Water Pow

(Continued from Page 9.)

Missouri. This stream had long attracted the attention of engineers as a promising source of waterpower and Dean W. N. Gladson of the College of Engineering at the University of Arkansas made several preliminary surveys of the White river and its numerous tributaries, the King's river, Buffalo and North Fork. Perhaps no stream in the Mississippi valley has the potential power possibilities of the White, not even excepting the Tennessee.

In the late Nineties the district engineer's office at Vicksburg, charged with river and harbor improvements on streams in north Louisiana and southern Arkansas, made a survey of the Ouachita river about Arkadelphia which brought the attention of the War Department to storage and power possibilities of this stream and section. In 1909 a more extended survey was undertaken to determine the probable cost and benefits in flood control, improvement of navigation and development of waterpower by large storage reservoirs on the Ouachita near Hot Springs. This report published as a Congressional document in 1912 outlined a plan of development by construction of one high head dam at Blanco Springs, west of Hot Springs, and while the estimated cost was deemed excessive for purposes of navigation and flood control it was recommended that efforts be made to interest power companies to join in the project with the government and bear a share of the cost for the power that could be produced.

About this time H. C. Couch, a newcomer in the electric power development field, was beginning the development of transmission line electric service and serving a number of small communities by a single large generating system, but his progress was beset with many difficulties and a very strong prejudice. His first venture was to tie the towns of Arkadelphia and Malvern together with a 22,000-volt line some 20 miles long. Town councils had no faith in such arrangements and people were loathe to live near what they considered a "dangerous agency" and were leary about granting right-of-ways for a "high powered line" over their property and near their premises, but the gradual development of transmission line service where the current is stepped up to high voltages to overcome line losses in transit and then reduced by transformer stations to usable voltage again, marked the real beginning of water power development.

Congress passed a special act in 1912 authorizing the Dixie Power Company to develop water power by the construction of a dam on White river near Cotter, but the same Congress enacted the Connecticut River Act authorizing the secretary of war to award a contract to the highest bidder for the right to develop power on that stream in western Massachusetts.

These two bills represented the two extreme views in Washington on the subject of governmental policy toward power development. The liberals' ideals were embraced in the terms of the Dixie Power Act which gave the consent and approval of the federal government to those who would undertake to finance and develop a market for power on the unnavigable portions of navigable streams under the jurisdiction of Congress. The Connecticut River Act represented the viewpoint of the conservatives, or, as they styled themselves, the "Conservationists," who believed that the waterpower should be treated as a natural resource and rented out to private parties on the best possible terms

many years. This mill was one of the largest enterprises of its kind in the state at the time of the outbreak of the Civil war and manufactured a gray jeans used in Confederate uniforms, supplementing the home-woven product. They also wove blankets which were purchased in quantities by Confederate

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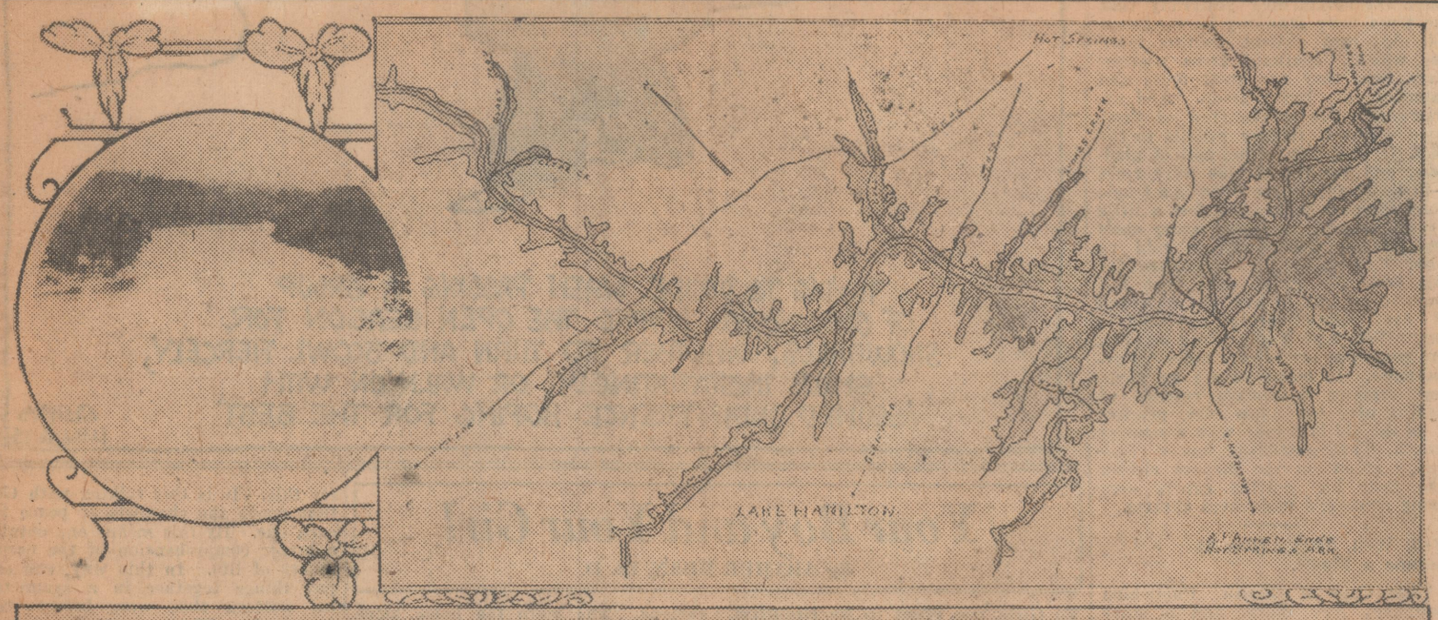
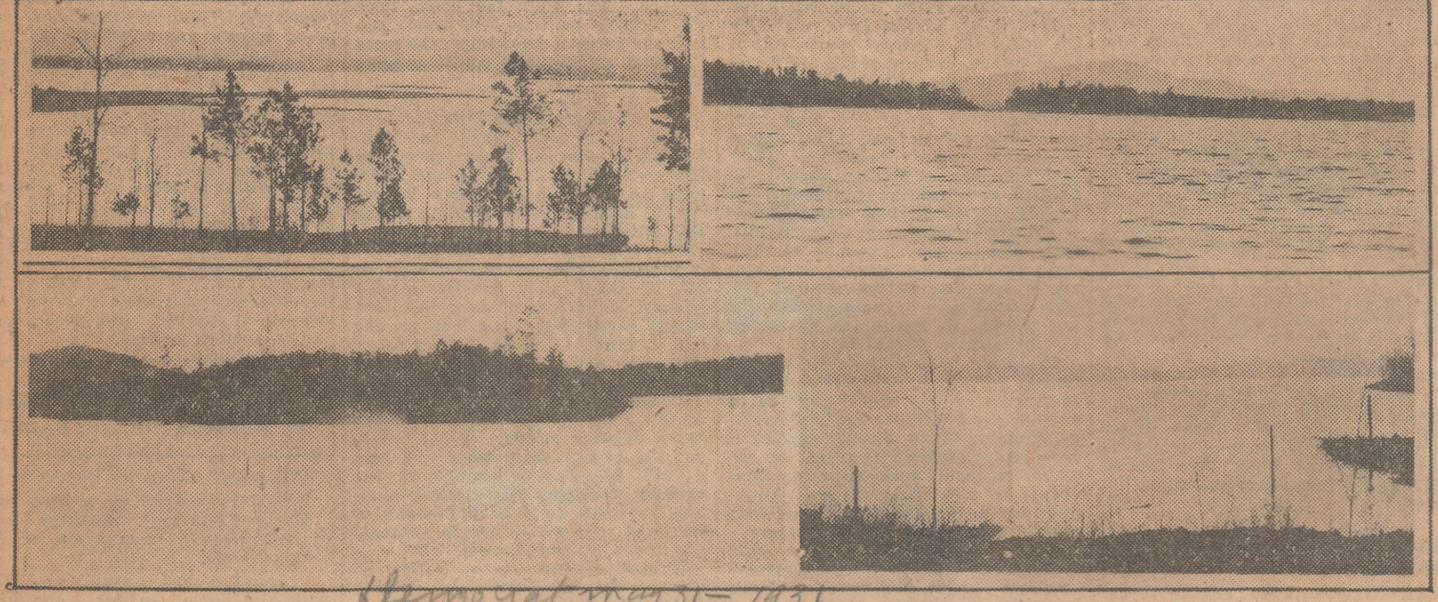
Lake Hamilton, Near Hot Springs, Next Largest In the State, Expected to Be One of Arkansas' Most Popular Play Places





Above—Map of Lake Hamilton, near Hot Springs, largest artificial lake in Arkansas and one of chain which make up waterpower project. The original channel of Ouachita river and all tributaries, also are shown. Line at left is Highway No. 6 leading to Mt. Ida. Line in center is Highway No. 70, leading to Glenwood, while line at right is Highway No. 7 leading to Arkadelphia. Scenes are of Lake Hamilton which, it is expected, will become one of the most popular pleasure resorts in the state. Every convenience for visitors, from motorboats to bungalows, will be found along its banks. The map was drawn by A. F. Annen, Hot Springs engineer.

Hot Springs, May 30.—(Special.)—If the Ouachita Indians could return to their former haunts along the meandering Ouachita river near Hot Springs, the "fountain of youth," they would find that the once narrow and insignificant stream has been transformed into a "shining big sea water" by the white man's magic.

Like shining pearls in the lap of Mother Nature, two artificial lakes, the by-products of the white man's magic in producing power more potent than Hiawatha's epic talents, lie in the valley at the back door of Hot Springs, and a third is to be added to the chain.

This inland water paradise is the gift of the Arkansas Power and Light Company to the people of Arkansas and the world.

Of the three lakes, Lake Hamilton, named for Hamilton Moses, Little Rock, general counsel for the Arkansas Power and Light Company, will be the gem of them all, insofar as recreational advantages are concerned. It will be the nearest to Hot Springs, being within a mile and a half at one point.

Lake Hamilton is created by Carpenter dam, a hydro-electric plant, which cost $7,700,000. Work was started in February, 1929, and the dam will be complete, and ready to generate 80,000 horsepower to be added to the inter-connected system July 1. This plant was named after Captain Flave Carpenter, veteran river man, of Arkadelphia.

Lake Hamilton is 24 miles long, with an area of approximately 14 1-16 square miles, with a shore line of some 200 miles. This reservoir contains approximately 43,671,000,000 gallons of water. The lake lacks only about 10 feet of being full. It is 90 feet deep at the 115-foot dam now, an dwill be 100 feet deep at the dam. Five feet to the mile is the average fall. The dam is 1,164.5 feet long, and 73 feet, 10 inches thick, at the base.

The variation of the water from now on will hardly be enough to be noticed by the casual observer. In other words, the lake, about as it will be, to all practical intents and purposes, is there now, full and ready to use.

At the widest point, it is about five miles across the lake. There is a large reservoir just above the dam, with about this width, which would be an ideal place for motor boat races. There is another large reservoir in the general vicinity of the Arkadelphia road bridge. Between the bridges on highways 7 and 70 there is a large reservoir.

Lake Catherine.

Lake Catherine, formed by Remmel dam, 10 miles south of Carpenter, is only one-fourth as large as Lake Hamilton, btu is a popular site for resort homes. Remmel dam was completed in 1924. Couchwood is one of the Lake Catherine homes and as the name indicates is owned by H. C. Couch, president of the Arkansas Power and Light Company. There many notables, including President Hoover, before he became president, Secretary of War Hurley and Senators Joe T. Robinson and T. H. Caraway have been entertained.

Twenty-four miles above Carpenter dam is to be the third dam, which will be approximately 180 feet high and create a lake 36 miles long, with art area of approximately 75 square miles, the surface of which will be 560 feet above sea level. Its cost will be approximately $15,000,000. It will likely be known as the Couch dam But this third lake, the greatest of all, will be used more as a storage reservoir, so that its shore line will fluctuate greatly, making it not so adaptable to recreational activities.

The three dams will create a series of three lakes, practically one, extending for 10 miles into the hills from Remmel dam.

The final lake will be one of the biggest artificial reservoirs in the world, the only one larger being the Saginaw lake in Missouri.

When these lakes are spoken of there comes to the mind's eye a vision of what they will mean in the future recreational development of Hot Springs. One pictures the exquisite sweep and roll of an inland lake, lapping at the Ouachita hills, with the mist being rent by the sunrise flaming crimson behind the somber pines; the bending fisherman's rod, drawn taut by the mettled fresh-water trout; the flash of bodies, diving gracefully as swans into the sun-drenched lake, for an afternoon swim. One hears the drone of high-powered speed boats, the chug of more leisurely craft, gayly awninged. There are the sail boats, too, like white clouds drifting idly across the summer sky. There are the house boats, with gay laughter ringing out across the waves, mingling with snatches of music from a guitar or ukulele; and at night the varicolored lights blinking across the water and on the shore-line, where the home-light beams out from neatly-curtained lodges.

To Stock Lake With Fish.

There are those who would prefer to dream of some morning when the smoke from a campfire would curl slowly upward; when there is a bracing tang in the air; when swift wings cleave the air; and the quack of ducks and the boom of shotguns mingle across the lake.

Nor is this vision wholly a dream to come true in some distant future. Most of it already is drawn from reality.

The Arkansas Game and Fish commission, the Izaak Walton league, the federal bureau of fisheries and the power and light company stocked Lake Catherine with fish, and will also stock Lake Hamilton. Preparations have already been made by the state commission in preparing for stocking with trout, by placing 40,000 brim, food for bass, in the lake. It has been estimated that 14,000,000 fish would find plenty of room and food in Lake Hamilton.

Three main highways touch Lake Hamilton. They are State Highway No. 7, south, to Arkadelphia; State Highway No. 70, west, to Glenwood; and State Highway No. 6, west, to Mt. Ida. Both No. 7 and No. 70 are paved. In addition, numerous community roads touch the lake, including one just below the dam.

The distance to Carpenter dam from Hot Springs is seven miles. The distance to both the Arkadelphia and Glenwood road bridges is about five miles, and it is about six miles to the Bull Bayou or Mt. Ida road bridge.

The lake development has necessitated new bridges on all these routes. There are magnificent concrete bridges on Highways 7, 70 and one under construction on No. 6.

An old iron bridgel on No. 7 was installed by the power company over the river on the community road.

Because the lake necessitated the building of the bridges much higher than formerly, the power company paid a large share of the cost of all these bridges.

At present power is available for use at the Arkadelphia road bridge; at the Glenwood road bridge; and around the dam site, consequently building activities are concentrating there. A power line is also near the Highway 6 bridge and power will be available there as soon as a transformer is installed.

Highway 7 and 70 both pass directly over the main body of the lake, or the former channel of the Ouachita. Highway 6 passes over an arm of the lake, where it backs up into Bull Bayou. A railroad touches the lake at that point and at the dam.

Homes Rising.

Subdivisions are plentiful at the points where power is available. Homes are already being constructed. Beautiful and exclusive residential sections have been laid out by some of the most experienced realtors of Hot Springs. It is at such points where "divorce colonies" will form, according to predictions, if Arkansas' 90-day divorce law stands.

Lots are now being offered for sale, and real estate development is going on.

There is one colony on upper Lake Catherine composed entirely of Little Rock residents, and more than likely there will be many Little Rock homes on this new lake.

Three power lines leave Remmel now—to Arkadelphia, Glenwood and Malvern, the latter touching Lake Catherine and not Lake Hamilton. There will be another line to Remmel, which may assist in serving both lakes. There will be a line to the third dam site, in fact it is practically already there, as the power company runs a line to Mountain Pine, Dierks town, near the site of the last dam.

There will also be two lines to Little Rock and two lines to Pine Bluff.

Naturally, as secondary lines increase with building, these lines which touch the lakes, will provide power to almost all parts of all lakes.

The power company owns considerable land on Lake Hamilton, but will not develop it further than laying it out in subdivisions and selling the lots alone.

There are numerous private plans, however, for development of boat landings, swimming beaches, club houses, and so on.

One of the most unique private developments so far on Lake Hamilton is a house boat, built by Wilbur Foote of this city, which is, according to the owner, for rent for houseboat parties. Built on empty oil barrels, this boat is a complete little modern home on the water. It has hardwood floors, lights, gas and water, shower bath, toilet, refrigeration, furniture, in fact everything that a modern city home might have, all complete within itself.

One of the model homes on Lake Hamilton is owned and occupied by Olin Longino, right-of-way man for the power company.

Five Tributaries.

The tributaries of the lake are Big Mazarn, Little Mazarn, Bull Bayou, Fourche a Loupe and Hot Springs creek.

The Ouachita river is noted for its rather steep banks. Some claim that the Indian word Ouachita means "deep water." Therefore most of the shore line is steeply sloping. There are some sheer bluffs. Practically the entire shore line is wooded. There are a few gentle slopes.

During a trip of about five hours which a correspondent for the Arkansas Democrat took with an official of the power company over the lake, the party came upon at least three bunches of ducks, feeding quietly in the lake. They seemed loath to fly away as the motorboat approached.

It is not exceedingly far-fetched to say that these lakes may have some effect on the climate of Hot Springs, making it cooler in the summer. The prevailing breeze is south from the Gulf, and this lake is south and west of Hot Springs. The effect is very noticeable on the surrounding territory.

Motorboats can already travel over the entire lake without danger. The government laws required cutting down and tying down or burning all trees.

Lake Chicot.

Lake Village, May 30.—(Special.)—The largest natural lake in Arkansas is to be found in Lake Chicot, which is situated in the southeast corner of Chicot county, beside Lake Village, the county seat. Lake Chicot, widely known as "The Home of the Big Black Bass," is curved in the form of a horseshoe, or, as some descriptions have it, "in C-shape."

Tradition relates that DeSoto, the great Spanish explorer and discoverer of the Mississippi river, was buried in Lake Chicot. It has been said of Lake Chicot, as has been stated of all the lakes bordering on the Mississippi river, that it was once a curve of the great Mississippi, centuries ago, but throught the gradual passing of years, the Father of Waters changed his course to a straighter one, leaving behind this loop(which became a lake. Much earlier, in the year 1541, or thereabouts, before this occurrence took place, and consequently while Lake Chicot was still a part of the river, DeSoto, it is said, in his journey from Hot Springs back to the Gulf, and from thence to Spain, desired to reach again the Mississippi river. Beginning at the present site of the town of Camden, he followed the Ouachita. Steadily traveling southeastward, he finally came to the Mississippi river, as it lay in its great curve, in what is now Lake Chicot.

Here, on the ground where Lake Village now is situated, a tribe of savages lived, the Chicot Indians, who gave the country and lake its name. Chief Chicot, who ruled the tribe, was friendly to the explorer and his men, giving them food and skins for clothing. Here DeSoto abided a little while, and during this time the Spaniard and his men built flat boats for the remainder of their journey to the Gulf. Ere the boats were all completed, DeSoto was attacked by swamp fever, dying shortly. Chief Chicot would have had two of his finest braves executed, to accompany DeSoto into the spirit world, but the Spaniards forbade it. Rowing out into the middle of the Mississippi river, the faithful followers of DeSoto lowered his body into the river's depths. This is believed to have been in the river's wide curve at that juncture, which is now Lake Chicot.

22 Miles Long.

This lake is 22 miles long, in its exact center. Its width at its widest point is one mile and a quarter. Its average width is three-quarters of a mile. It is about 12,247 acres in area, and its greatest depth is approximately 70 feet. Its average depth is reckoned as 37 1-2 feet. These measurements are all based on the lake's average level. Lake Chicot varies two or three feet normally. The spring rains each year cause it to rise, but it falls somewhat every autumn.

During the 1927 flood, Lake Chicot was almost divided into two lakes by a swift rush of sand out of Connerly Bayou. This bayou, becoming overflowed, surged into the lake, carrying water from the Arkansas river's break. When the bayou finally lowered to normal, a great stretch of sand, extending from Connerly bayou's mouth out into Lake Chicot, and reaching almost to the opposite side, was left as residue. When Lake Chicot is low this sandy beach all but divides it into two bodies of water. Normally, the lake's water covers the middle of this sandy stretch, however. The beach, now known as Chicot beach, is equipped with outdoor ovens for fish fries, with a diving and swimming pier which floats, and with a pavilion for dancing. It is now a widely known place of amusement.

Varieties of game fish to be found in Lake Chicot are the black bass, striped bass or bar fish, white perch or crappie, and channel cat. Emerson Hough, the noted writer, spent several weeks in a camp on Lake Chicot a few years before his death, and while there wrote a number of articles on fishing.

Lake Chicot's outlet, Ditch Bayou, is said to have originated from a long entrenchment built by Confederate soldiers during the Civil war. Lake Chicot had its share in helping to entertain the members of the Arkansas Press Association on their 51st annual convention in Lake Village June 7-8, 1923. Fish fries, boating, swimming, and fishing on Lake Chicot were enjoyed by the visitors, who declared the lake to be one of the South's greatest resorts.

Seven Lakes in New Matthews Land Development Plan Will Be Future Mecca of "Waltons"

Waters in Lakewood Area Are Being Stocked With Fish.

Project Outlined

Modern Fish-Hatching Methods Are Planned by Developers.

The graceful chain of lakes under construction near Park Hill by Justin Matthews Company will not only provide a setting for one of the most beautiful subdivisions in this part of the country, but when completed will also be an extensive and modern fish-raising and fish-hatching project, according to plans announced yesterday.

Seven beautiful lakes, the largest with a shore line of five miles, containing 60 acres and 65 feet deep, are well under way in the process of construction and are accessible over good roads both from Skyline Drive, Park Hill, and from the Sylvan Hills road. The development, known as "Lakewood," which surrounds the group of lakes, lies northeast of and adjacent to Park Hill.

The lakes are now being stocked with fish, and by next fall there will be good fishing, and within three years hundreds of thousands of pounds of bass and bream may be caught annually, it was announced by Justin Matthews, head of the firm of developers.

"... the lakes we are building, by next fall there will be good bass and bream fishing, and within three years hundreds of thousands of pounds of bream and bass can be caught annually; but if these lakes were not drained within 10 years, the fishing would be very poor due to the fact that the lake would be filled with destructive fish, etc.

"These destructive fish would be brought to the lake in the form of eggs on the legs of cranes, water turkeys, snipe and other water fowls, which when wading in shallow water of various lakes and streams will step in the spawn (eggs) of different types of fish. The spawn is more or less gluey and will adhere to the rough scaly legs of the water fowl. Then these water fowls fly to other bodies of water and in wading around, some of the eggs drop off and hatch out and soon the lake is infested with all types of fish.

"Turtles come overland and it is surprising how soon they find a body of water. Turtles are very destructive to fish, for no matter what the size of the parent fish they cannot guard the nest against a turtle that can wade from one nest to another devouring 100,000 fish eggs a day.

Many Fish Destructive.

"There are many small varieties of fish that are very destructive, because they feed on fish eggs. This is true of some of the small varieties of the sun fish family.

"In being able to drain a lake or body of water ... will, you can save all bass three pounds and under, save all bream and destroy all other fish and other water creatures.

"It is important to free the lake from large bass, for when a body of water is several years old many bass will be found weighing from four and one-half to eight pounds that have been hooked several times but escaped, and they are hook-wise and rarely are tempted to strike a hook, yet are preying on other fish constantly.

"To drain a lake there must not only be a bottom valve for draining the lake, properly screened so as to lose no fish when drained, but there must be another body of water to which the fish that are to be saved can be transferred quickly in wagons or tank trucks. ... spring ... dling of fish in this ... always be done in ... we are

"As we have it, we can have ... lakes will be d... lakes full of water December ... quickly ...ocked with fish and when ...main lake is drained, the fish be saved (bass of three pounds and ...ess, all bream except dwarfs), will be transferred to the smaller lakes, then the drain valve from the main lake will be closed and the drain valves from all six of the smaller lakes opened so as to drain into the larger lake. In that way fishing in the main lake will not be interferred

... duced annually in the lakes we were building if we confined the types of fish to three varieties; namely, big mouth black bass, bream (brim) and one type of minnow to furnish food for the bass. These fish are natives of the waters of this section.

"The bass attains a size in this climate of six to eight pounds and is one of the gamest fish known. While as a rule it doesn't spawn until it is two years old and only spawns once a year, bass lays a very large number of eggs. A female bass lays eggs equivalent to one-fourth of her weight, ranging from 2,000 to 20,000 eggs at a spawn, depending on age and weight of the fish. In this climate the bass spawn as a rule in April. The bass consume other fish, but they feed more on water insects than on fish.

"The bream is a very game fish for its weight and they are splendid to have in connection with bass, for the bream commences to spawn when it is a year old and spawns every month in the year from May to October and sometimes as late as November, thereby furnishing far more food for the bass than the bass can ordinarily consume.

It has been found from experience that fish do not do so well when all types of fish are in a lake, but that they should be limited to two or three species that do best in the climate and the particular waters where they are to be raised.

"It is generally thought that crappie is a splendid fish. It is a splendid eating fish, but it is not as game as the bream and the disadvantage of the crappie is that they only spawn one time during a season, laying a limited number of eggs at a spawn, and live principally off of other fish. Any fisherman knows when he fishes for crappie, he must have a bucket of minnows, which is not the best fish bait for bass and very poor fish bait for bream.

Fish Hatching

"Ordinarily it is be... for fish supply by ... plat it state or gov... will have a main ... We have ... smaller lakes above ... States ... the main lake. Lake No. 2, did ... will cover about ... instance, ... and the water will ... acres be 33 feet deep at the dam. We can fence off the larger upper prong of Lake No. 2, about one acre, with one-inch poultry netting, seine 30 large bass from the main lake, put them above the poultry netting in Lake No. 2 in March.

"According to the law of average, with 30 bass we should have 15 females but we will certainly have 10 females. These bass will spawn an average of 10,000 eggs each, consequently with 10 females, we would hatch out 100,000 bass. By the middle of June all of the hatched out bass would have ...

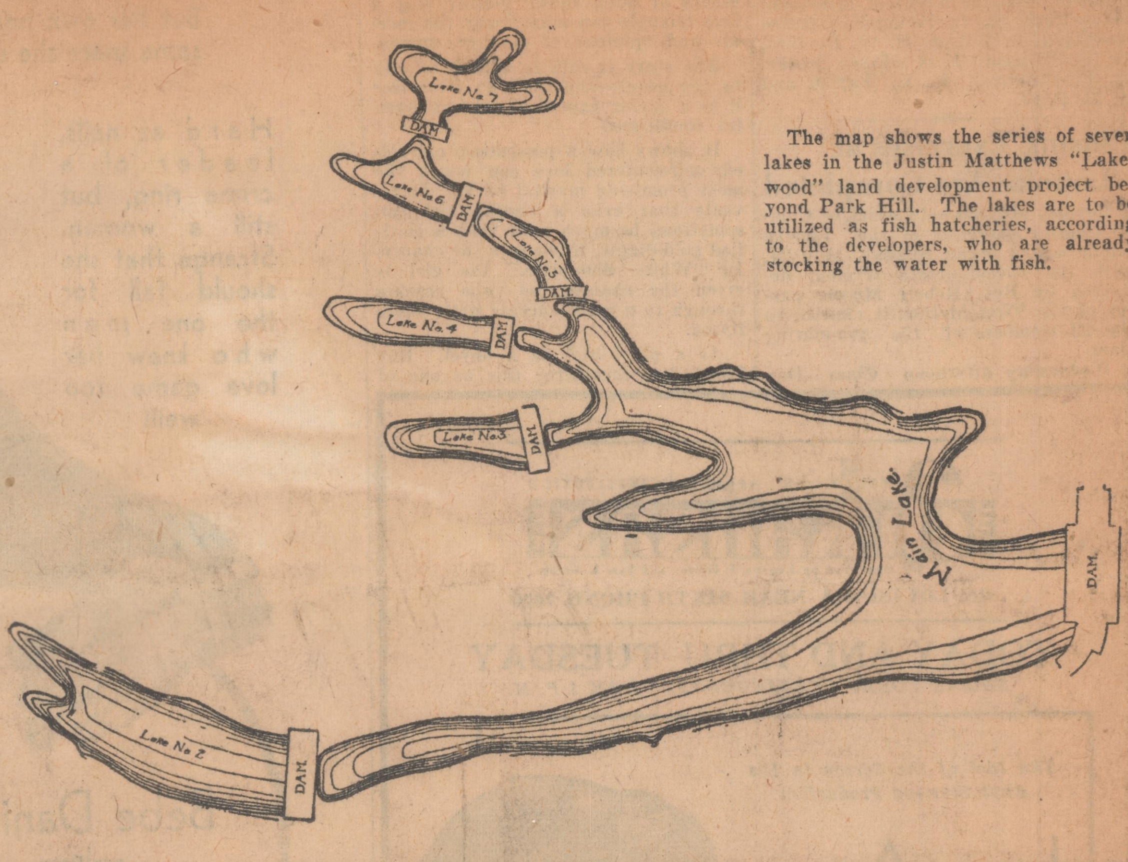
... in it, namely, bass and bream, will grow rapidly.

"Then in the small lakes the fish will grow still faster because the grown fish will be fenced off from the main portion of the small lakes and the small fish will all be of the same size and under such circumstances, fish will grow more than twice as fast as they will in bodies of water where there are many species of larger fish.

Fish Industry Could Be Made Profitable.

"We are building these lakes primarily as an asset to a new section that we are developing, known as 'Lakewood.' The fishing will be restricted to those we have sold property to. But there is much waste land in Arkansas, some in the mountain sections and some in swamp sections, where similar systems of lakes could be built and an enormous amount of fish produced, and land could be utilized for this purpose that otherwise could not be utilized."

Lakes Built in Real Estate Project



The map shows the series of seven lakes in the Justin Matthews "Lakewood" land development project beyond Park Hill. The lakes are to be utilized as fish hatcheries, according to the developers, who are already stocking the water with fish.

See other side of article

School News, Real Estate and Classified

(Continued on Page 10.)

...armer Is ...rchaeologist

...g the drill around and around. This was a laborious process but the male Indian had much time, for the women did the drudgery and labor of the camp and home. This division of labor may have been well enough with the early Americans but it is not shared in by Mrs. Grandstaff.

One of the prettiest of his pipes is one made of a red stone. As the supply of the red "pipestone" is found in Minnesota it is a conjecture that they came from there in barter or exchange, indicating the Indians had a well established system of trade and commerce. The flints of the ordinary ...

...Arkadelphia's pioneer families, has one of these rare old sideboards in her home today.

Other boats leading in early commerce from Blakelytown were the "Humphries" operated by Joseph Costart, the "Joe Jakes" with L. R. Tennyson master. The "Joe Jakes" was ... neer," "The Sylph," and later the "Will S. Hays." This boat, which was brought up the river only twice by F. J. Carpenter, was the largest steamer ever brought up as far as Arkadelphia. This steamer had a shipping capacity of two thousands bales of cotton.

The "Susie B." owned by the Times Democrat of New Orleans, has the most interesting history of all the boats. She ...

BELIEVE IT OR

... from Camden on to New Orleans was $15.

The Ouachita has always known ... is paid the ever faithful waters of the Ouachita. The river has been followed down through the ages always opening

Ozark Summer School Will Open Wednesday

Harrison, May 30.—(Special).—C. C. Denney, director of the summer school of the State Teachers College of the Ozarks, in a meeting with the board of trustees, completed plans for the opening of the session Wednesday, June 3.

The faculty is as follows: C. C. Denney, director; J. R. Bullington, education; Doris Brown, librarian; ...

... Scotland, ... land, Norway, Palestine, Sweden, Syria, Switzerland, South Africa, Turkey, Uruguay, United States, West Africa, Santo Domingo and Nine Islands.

MORE—

... This was all the rage at one time and many became real adept at designing snappy and original fobs. A fellow without a shoe string watch fob was a rarity in those days.

I also notice we don't see those large cumbersome portraits in black and white crayons, with those heavy gilt frames any more. It was a real event when a picture agent came into the neighborhood, and he usually was an artist at describing how beautifully the finished work would compare with the original photograph.

O, how well I remember how we young fellows felt when our girl friends would beg us for the hat bands from our hats and cut off a piece of the neck tie we wore, and when they secured enough of these ...

... Walsh that ... rains" have fallen in Valley county in two years, and that the crops will be a total loss if no relief comes by July 1.

Seek Additional Loans.

Several other requests have been made for further time in which to apply for drouth loans or to include new areas in the original drouth list for which Congress appropriated emergency funds for seed loans and farm rehabilitation.

At the department it was pointed out that Valley county was not included in the original list. It also was said the time for crop planting has passed, and there appeared to be no means by which the department could reopen the loans closed since April 30.

Senator Thomas, Republican, Idaho, was informed yesterday that loans could not be made in two counties of his state because they were not drouth counties.

Senator Walsh, nevertheless, was invited to submit the appeal of the Glasgow Chamber of Commerce to the department for study.

The chamber added in its telegram that "The Red Cross has done excellent work but cannot continue indefinitely."

The Northwest has experienced a deficiency of rainfall for more than a year while the remainder of the country, hard hit by the 1930 drouth, received generous rains.

The spring wheat belt has been particularly dry, and the condition of that crop was reported on June 1 to be the poorest on record. The Weather Bureau said heavy rains are needed to avert complete failure.

While the Agriculture Department has rejected practically all requests for time extensions in original drouth states, an extension from April 30 to May 15 was granted to Montana, Oregon, Washington and Pennsylvania counties because of local conditions.

Tests Pave Way for Vast Hydro-Electric Project

April 12, 1931
Gazette

By RALPH HULL.

Flippin, April 11.—To the average person the selection of a site for a hydro-electric dam—decision having been reached to build one—would appear to be a comparatively easy job.

All an engineer need do, it might be reasoned, is to choose a river on which to construct the dam, find a place where the banks are bluffs or steep hills, determine that bed rock is not too deep under the top soil, ascertain if land to be flooded by the impounded waters may be bought at a reasonable price, and then go ahead.

Perhaps this isn't giving Mr. Average Person credit for enough knowledge or intelligence. Nevertheless it is a safe venture that he will be surprised to know that the Arkansas Power and Light Company has spent 18 months and hundreds of thousands of dollars making tests for a dam along a strip of White river less than a mile long.

Furthermore the tests are not finished and will not be for three or four months, and they are supplemental to exhaustive studies made by two other groups of engineers, at the same place, in former years.

It also likely will be news to many residents of Arkansas that during the period when much has been said and published about the big hydro-electric development at Carpenter Dam, and its older but smaller sister projects at Remmel Dam, the Arkansas Power and Light Company has been working steadily on this White river development—a project which will dwarf in size and significance the two Ouachita projects combined. In fact, the White river project and its three sister developments on North Fork and Buffalo rivers will produce a total of electric power only slightly less than the much-discussed Muscle Shoals plant.

Plan to Spend $52,000,000.

Briefly, the northwest Arkansas project under present plans will provide for four dams to cost a total of approximately $52,000,000. The White river dam and power plant will represent some $30,000,000. A dam across North Fork (of White river) will cost approximately $12,000,000. Two dams across Buffalo river will mean expenditure of about $6,000,000 and $4,000,000 respectively.

An idea of the magnitude of the White river project may be gained when it is known that Carpenter Dam and its hydro-electric plant, now the largest in the state, cost $7,500,000 The cost of Remmel Dam and plant was less than half this amount.

Carpenter Dam is 75 feet high and Remmel Dam is 50 feet high. The White river dam will be 225 feet high—as tall as a 15-story building. The new dam will be nearly half a mile long at the top.

The White river dam alone will flood 38,980 acres, or almost 61 square miles. It will back water up White river 100.25 miles to within 1,500 feet of the tail-race of the dam at Forsythe, Mo. This dam, incidentally, is 85 feet high.

Site Believed Determined.

Engineers are a conservative lot when it comes to making predictions, but at its highest point, and on the other side a hill which slopes less abruptly to a height above the river more than sufficient for the purposes of the project.

The site is one which has been considered for many years as a logical one for a dam—during years when the project was merely the dream of a few men in this section of northwest Arkansas, and of one man in particular. This man is Capt. Charles LeVasseur of Yellville, geologist and now consulting engineer in charge of preliminary work at the prospective dam site.

Classmate of Foch.

Captin LeVasseur is a native of France, former commissioned officer in the French army, and a classmate in military school of the late Marshal Ferdinand Foch, commander of the allied forces in France during the World war. After finishing his education Captain LeVasseur elected geology and engineering for a career, instead of the army, and later came to the United States where he entered government service as a geologist.

He was assigned for a time to the Mississippi river valley as geologist and during his government service did some geological work in Marion and Baxter counties. He resigned his government position to become consulting geologist for a company which had large mineral land holdings in northwest Arkansas and in this position, 28 years ago, established his residence in Yellville.

In his wanderings over the hills and mountains he became impressed with the water power possibilities of the section, and in 1912, with a few associates, organized the Dixie Power Company This company made various explorations and surveys, obtained a permit for a dam on White river from the Federal Power Commission, and in 1924 entered into an agreement with the American Power Company to complete exploration and build the dam.

Obtain Water Power Rights.

This company did considerable test work, but did not complete it, and a new company called the Ozark Power Company was formed by Elbert Smith, attorney for the Arkansas Power and Light Company; Charles McCain, New York banker, formerly of Little Rock, and Captain LeVasseur. The Ozark Company entered into litigation with the American Company for the water power rights desired and was successful in its suit.

Then, some two years ago, the Ozark Power Company was merged with the White River Power Company, under the latter name. This company, a subsidiary of the Arkansas Power and Light Company, now is doing the preliminary work for the dam, and it is expected will construct the dams on White, North Fork and Buffalo rivers for the parent company.

The preliminary work involves a huge amount of study and labor. Not only was it necessary to determine what lands would be flooded, what the lands would cost and how much timber must be cut in the basins of the lakes formed by the impounded water, but, in the case of the Buffalo and North Fork dams particularly, how the high dams may be built without flooding valuable mineral lands. For it is the mineral resources of the section that make the big power projects worth consideration.

A study of the map of northwest Arkansas, along with a few statistics, quickly will reveal that the present population and present industrial development would in no sense justify the production of power on the scale contemplated. The northwest Arkansas project therefore is predicated on the belief—perhaps faith is a better word—that provision of plentiful electric power will result in the development of north Arkansas minerals on a scale and in a way never dreamed of a quarter of a century ago.

See Mineral Development.

Officials of the Arkansas Power and Light Company, and the financial interests in New York which make the Arkansas Company's developments possible, one is told, have visions of northwest Arkansas as a section where the waters of "made" lakes lave the mineral lands; where smelters using the new electric process of refining ore are located along the lake shores, probably at the dam sites, and where barges are transporting ore, or perhaps the finished product, to smelter or rail shipping point as the case may be.

Under present conditions little of the zinc, lead and manganese of the Arkansas Ozarks can be mined profitably because of transportation costs, or, as often is the case, because of the imposibility of transporting ore. There are few railroads tapping the mineral lands and little prospect that new ones will be built through the section. But railroad spurs will be built to the dam sites, or part of them at least.

Then, with dams at strategic points, the impounded waters back of one reaching to the dam above if available, and locks built into the dams when needed to permit passage of barges from lake to lake, conditions will change and mineral lands now inaccessible may be worked profitably. The building of smelters, using the comparatively new electric process, will mean industrial activity on a scale not even though of until recently and will bring to the region money which otherwise would go out of the state to smelters in other sections.

Test Underground Conditions.

But to get back to Wild Cat Shoals. When the White River Power Company, or the Arkansas Power and Light Company, as you prefer, began making tests for a dam site some 18 months ago, drilling to determine what foundation was best was started at a point about half a mile above the shoals. Every resident of this section knows that bed rock is just a few feet below the surface of the soil in the White river country, and often there is no top soil. But everyone does not know that limestone formations of the kind which constitute the earth's crust hereabouts are treacherous as foundations for a dam.

For instance a drill may go through 50 or 75 feet of solid rock and then break into a cavity large enough to accommodate a house. Sometimes a so-called cavity is not actually an open pocket, but is filled with porous, rotten stone. Sometimes one is found filled with clay or other material not impervious to water.

One Site Abandoned.

It was to determine this underlying condition that the tests were started. H. S. Stickle, engineer formerly employed at Carpenter Dam and previously an engineer for the Alabama Power Company, said that the tests at the upper dam site indicated good foundation until after the work had progressed for nearly a year, and was believed almost finished. Then conditions were encountered which made abandonment of the site advisable. Mr Stickle, by the way, is Captain LeVasseur's superintendent in charge of tests.

Last November the tests were moved down the river to Wild Cat Shoals, the number of drills was increased from four to seven and almost as much has been done in the last five months as was done at the upper site in 12.

A few weeks ago the largest cavity yet found in the tests was encountered by drillers at a depth of 75 feet below the surface and after the drill had cut through 40 feet of solid rock. A shaft was sunk into this cavity and it was cleared of the clay and rotten limestone with which it was filled. If something unforseen does not develop, the walls, floor and ceiling of this cavity will be sealed with concrete to prevent seepage into or from it, and the project will go on as if it did not exist. For the 40 feet of rock above it is sufficient to support either the dam, or the weight of water in the lake, as the case may be.

Drill in Checkerboard.

Drill tests have been made along three lines extending from different points on the bluff south side of the river to the top of the hill across the stream. Some cavities have been encountered on each of the lines, and now the spaces between the lines have been checker-boarded and drills are being sunk in each of the squares.

The engineers explain that it would be possible to build a dam on any of the lines, but that by determining the line with the smallest number of cavities, or where the underground water flow is least the cost of constructing a dam will be lowest. By spending a few hundred thousands of dollars in tests, it is asserted, it may be possible to save millions when work is started.

All holes are drilled at least 100 feet deep, and some of them, according to conditions encountered, are sunk as much as 200 feet. Cores are kept and carefully filed in the offices built at the dam site where they not only are available to company geologists and engineers, but to United States geologists or other scientists. The cores from the Wild Cat Shoals test to date, would reach more than three miles if stretched out.

Whenever cavities are found tests are made with dyes to ascertain if they are connected, by underground water flow, with any other cavities. Thus far only one such connection has been found—that is between two holes on the mountain on the north side of the river. All drill holes are subjected to water pressure tests with pressure far greater than the formations will be subjected to when the dam is built.

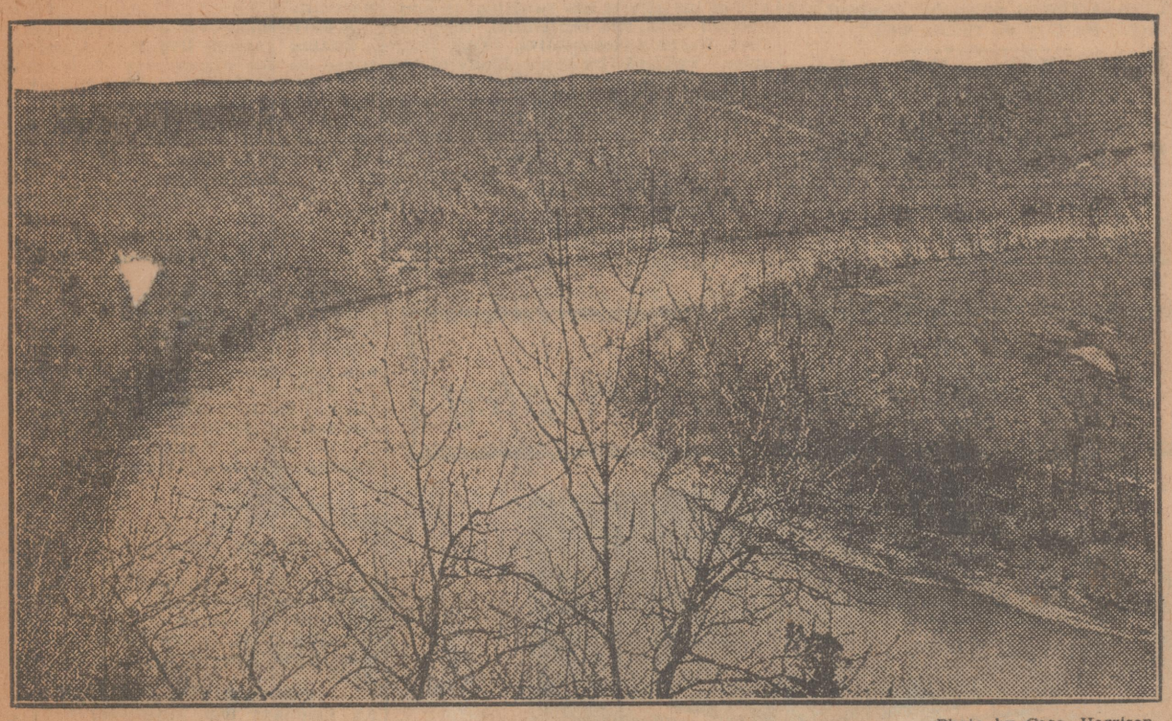
Site on Horseshoe Bend.

The Wild Cat Shoals site is near the lower end of a sort of irregularly-shaped horseshoe bend in the river. Mike Walton, engineer working with Mr. Stickle stood at the site the other day and pointed across the hill where, he said, the river was just half a mile away. Following the shore line to the same point the distance is more than three miles. This point is known as Low Gap and it has important bearing on the Shoals project.

The elevation at Low Gap, Mr. Walton said, is lower than the top of the dam will be. If left alone water would flow through this gap, across the neck of the horseshoe into Tuell creek and thence into White river below the dam. To get away from this and also to utilize the natural contours of the land, a dam approximately 150 feet high and 1,000 feet long, will be built across the gap. The dam will be provided with gates and Tuel creek then will constitute a spillway by means of which the level of the lake may be regulated. Water never will run over the dam, but only through the power plant turbines.

The type of dam to be built has not been determined, but consideration now is being given the multiple arch type of concrete structure. Other types of arch dams also are being studied, and it also has been suggested that an earth dam be built.

Some work has been done along North Fork and Buffalo rivers in the way of surveys and other preliminary studies, but actual tests at dam sites will not be started, it was said, until the Wild Cat Shoals tests are completed.



—Photo by Case, Harrison.

The scene above is looking up the river from the top of the bluff at Wild Cat Shoals, site of the projected $30,000,000 dam of the White River Power Company, a subsidiary of the Arkansas Power and Light Co. Impounded water in the lake will cover the slopes almost to the top of the hills alongside the river, and will back upstream more than 100 miles.