

AN OUTLINE
OF THE
PHYSICAL FEATURES
OF
ARKANSAS

BY
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State Geologist



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By GEORGE C. BRANNER

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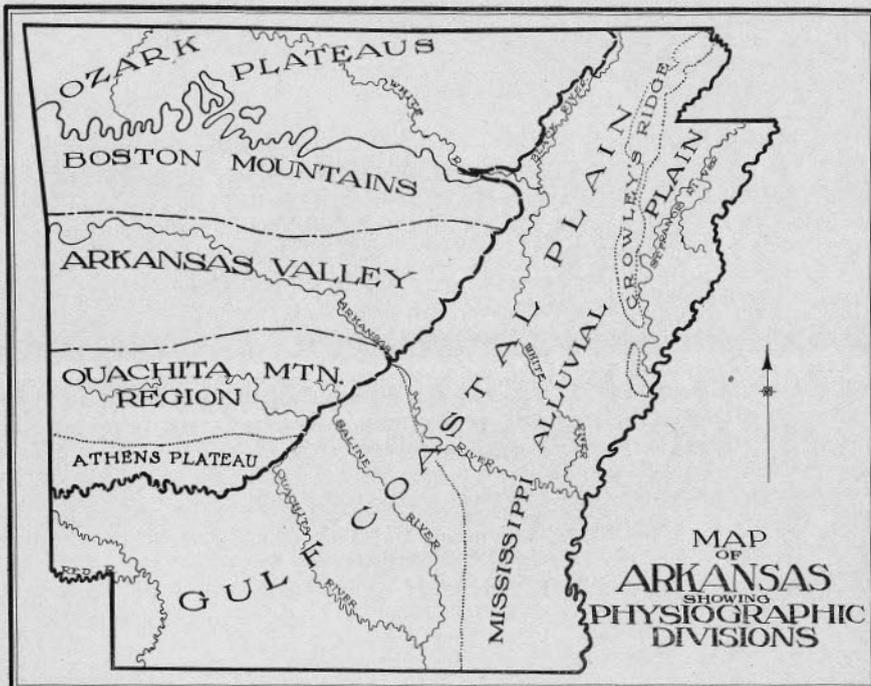
SERVICE TO THE PUBLIC

The offices of the Arkansas State Geological Survey, rooms 443-447 State Capitol, Little Rock, are open from 8:30 a. m. to 5 p. m., except on Saturdays, when the hours are from 8:30 a. m. to 1 p. m. The public is invited to visit these offices and make use of a service that is maintained for the purpose of giving information on geological matters and assisting those who are interested in the development of the natural resources of Arkansas.

General Physical Features of Arkansas

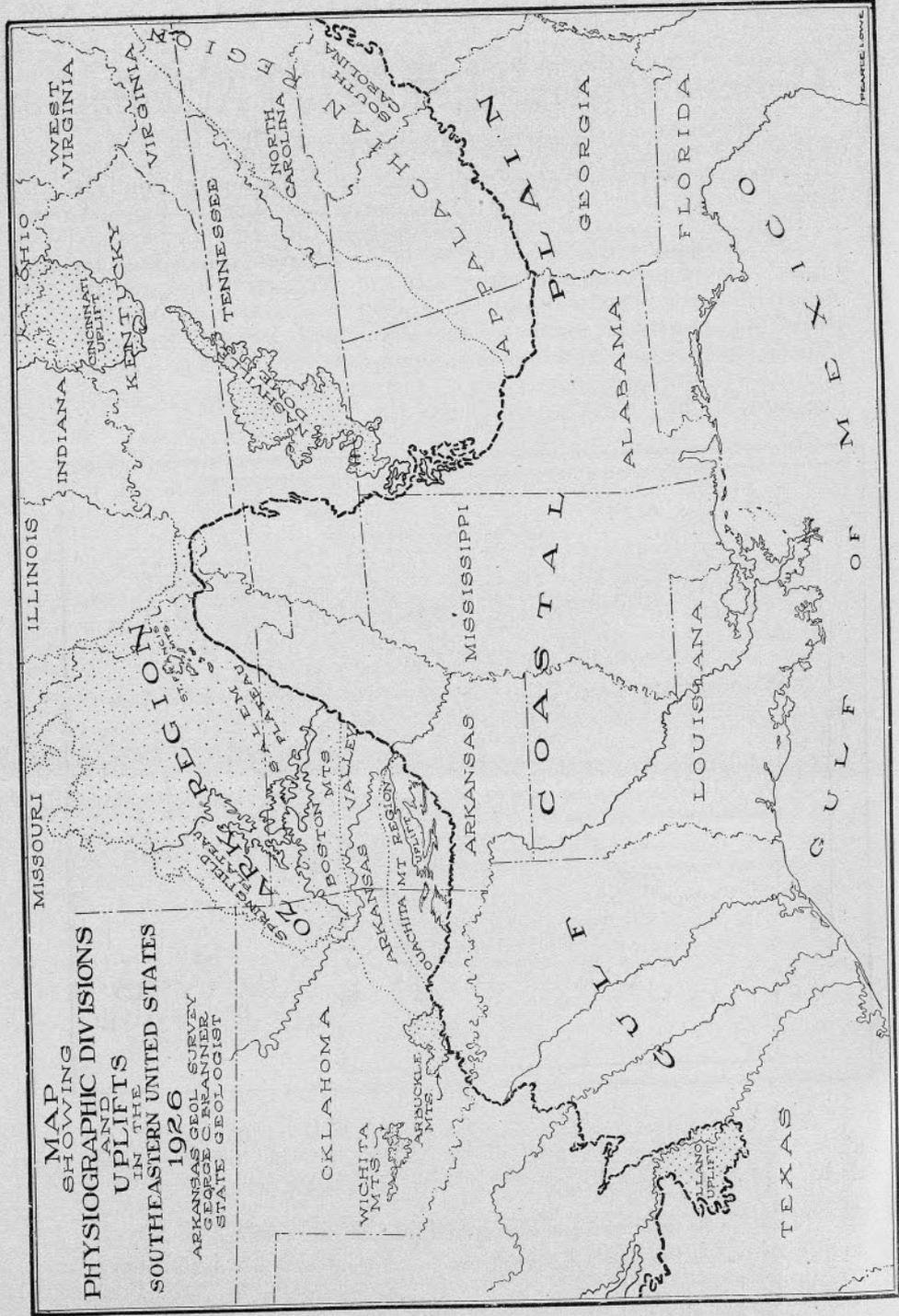
PHYSIOGRAPHY

Arkansas lies in two major physiographic divisions of southern United States. The southwestern and eastern portions of the State lie in the Gulf Coastal Plain or lowland area, and the northern and western portions lie in the interior highland area comprising the Ozark region, the Ouachita Mountains, the Arkansas Valley and the Athens Plateau. The dividing line between these two great divisions enters the northeast corner of the State near Pitman, Randolph County, and crosses Arkansas in a southwesterly direction, passing near Newport, Searcy, Little Rock, Arkadelphia, and thence nearly due west, slightly north of De Queen, into Oklahoma.



The Gulf Coastal Plain occupies about 27,370 square miles, or about 52 per cent of the area of the State, and the highland area 25,155 square miles or 48 per cent of the total State area.

The Ozark region is an uplift, having an area of about 50,000 square miles of somewhat irregular oval shape, which lies in northern Arkansas, southern Missouri and northeastern Oklahoma. The Boston Mountains occupy the southern and southwestern flank of the Ozark region in northern Arkansas and northeastern Oklahoma and,



passing northward, the Springfield and Salem Plateaus make up the remainder of the Ozark region of the State.

The Ouachita Mountain system covers a broad belt, for the most part of fairly regular east-west ridges and is some thirty to fifty miles in width. The region extends from between Little Rock and Malvern westward about 320 miles to the vicinity of Atoka, Oklahoma.

The Arkansas River Valley region is between thirty to forty miles in width and lies between the Boston Mountains on the north and the Ouachita Mountain area on the south. It extends from the Coastal Plain border between Little Rock and Newport westward into Oklahoma, a total distance of about 300 miles.

The Athens Plateau is a belt sloping south, having a width of about fifteen miles, lying between the Ouachita Mountains and the Gulf Coastal Plain. It extends from a short distance west of Arkadelphia westward into Oklahoma.

TOPOGRAPHY

The topography of Arkansas naturally falls into two main divisions, the lowland area and the mountainous or highland area. The lowland area corresponds to the Gulf Coastal Plain region of western and southern Arkansas, described as one of the main physiographic divisions of the State. This is a relatively low, south sloping plain, the elevations of which vary from about 100 to 700 feet above sea level. The western portion of this plain is a rolling, hilly country intersected by south and southeastward flowing streams, elevated for the most part between 200 and 400 feet above sea level. The eastern and northeastern portion is a comparatively level plain with the exception of Crowley's Ridge, which is the one outstanding topographic feature of eastern Arkansas. The elevation of the plains area varies from 100 to 300 feet. Crowley's Ridge is an erosional ridge extending from west of Cairo, Illinois, to near Helena, Phillips County, a distance of about 200 miles. Its elevation above the adjacent lowlands in Arkansas averages about 200 feet. Its elevation above sea level varies from about 400 to 500 feet, the higher portions lying in the northern part of the Coastal Plain.

The northwestern half of the State, or highland area, topographically may be separated into (1) the Ozark region, which includes the Boston Mountains, the Springfield and Salem Plateaus; (2) the Arkansas Valley, which is a broad synclinal trough lying south of the Boston Mountains; (3) the Ouachita Mountain system of central and western Arkansas, and (4) the Athens Plateau, which lies between the Ouachita Mountains and the Coastal Plain.

The Ozark region of Arkansas is generally divided into three topographic divisions, (1) the Boston Mountains, (2) the Springfield Plateau, and (3) the Salem Plateau.

The Boston Mountain area occupies approximately the southern third of the Ozark region of Arkansas and extends westward from near Newport for about 200 miles into Oklahoma, terminating in the western portion of Sequoyah County, Oklahoma. The average width of this area is about thirty miles. The mountains of the region are much cut up and dissected by drainage and are rugged and irregular. They consist usually of northward and southward branching spurs from a main east-west mountainous backbone which constitutes the main watershed between the Arkansas and White River drainage basin. This applies particularly to the Boston Mountain region of western Arkansas. Summits of the mountains in this area usually vary in altitude from 1,850 to 2,250 feet above sea level. The elevations of two mountains in northwestern Newton County, according to the U. S. Geological Survey, are 2,400 feet. The elevation of the mountains above the adjacent lowlands varies from 500 to 1,300 feet. The Boston Mountain area grades gradually into the Arkansas Valley on the south, but on the north it forms what is often an abrupt escarpment overlooking the Springfield Plateau area. The Boston Mountains constitute the highest land area in the Ozark region, an aggregate of about 5,000 square miles, while the total in Oklahoma is about 2,000 square miles.

The Springfield Plateau is an intermediate topographic division lying between the northern border of the Boston Mountains and the Salem Plateau, which makes up the larger portion of the Ozark region. The Springfield Plateau in the eastern portion of the Ozark region of Arkansas is quite narrow and winding, varying between five miles and twenty-five miles in width, while in the northwestern corner of the State it broadens to a width of about forty miles and extends westward into Oklahoma and northward into Missouri, covering a total area of about 12,000 square miles. The higher portions of the Springfield Plateau are largely made up of siliceous beds of a resistant nature and at one time probably constituted a somewhat level plain. At present, however, the Arkansas portion of the Plateau has been eroded by the drainage of the region so that it is cut by numerous streams of the White River basin. The northeastern portion of the Plateau in Arkansas is a gently rolling country. The height above sea level of this Plateau usually varies between 1,250 and 1,700 feet.

The Salem Plateau makes up a third and the largest, as well as the lowest, division as a whole, of the Ozark region. It covers approximately 31,000 square miles in northeastern Arkansas and Missouri. The Salem Plateau region of Arkansas occupies a triangle which is bounded on the north by the Missouri-Arkansas line, on the east by the border of the Gulf Coastal Plain of Arkansas, and on the southwest by a line roughly approximating the course of the White River. The topography of this region is usually not so precipitous as that of the Springfield Plateau or Boston Mountain region. Small pocket-shaped areas of the Plateau extend into Arkansas in northern

Carroll and eastern Benton counties. The average height of the Salem Plateau in Arkansas is about 1,250 feet above sea level. It is usually made up of less precipitous and less rough topography than that of either the Springfield Plateau or Boston Mountains.

The Arkansas Valley lying south of the Boston Mountains and north of the Ouachita Mountain region is, as a whole, fairly level. It contains, however, some isolated ridges and a few mountains which arise abruptly from the valley floor, such, for example, as Mount Nebo, Petit Jean Mountain and Magazine Mountain. Magazine Mountain is the highest in Arkansas, rising to 2,823 feet in height. Rich Mountain, in LeFlore County, Oklahoma, is, according to the U. S. Geological Survey, slightly higher, having an elevation of between 2,850 and 2,900 feet above sea level. The average elevation of the floor of the Arkansas Valley above sea level is from 300 to 600 feet.

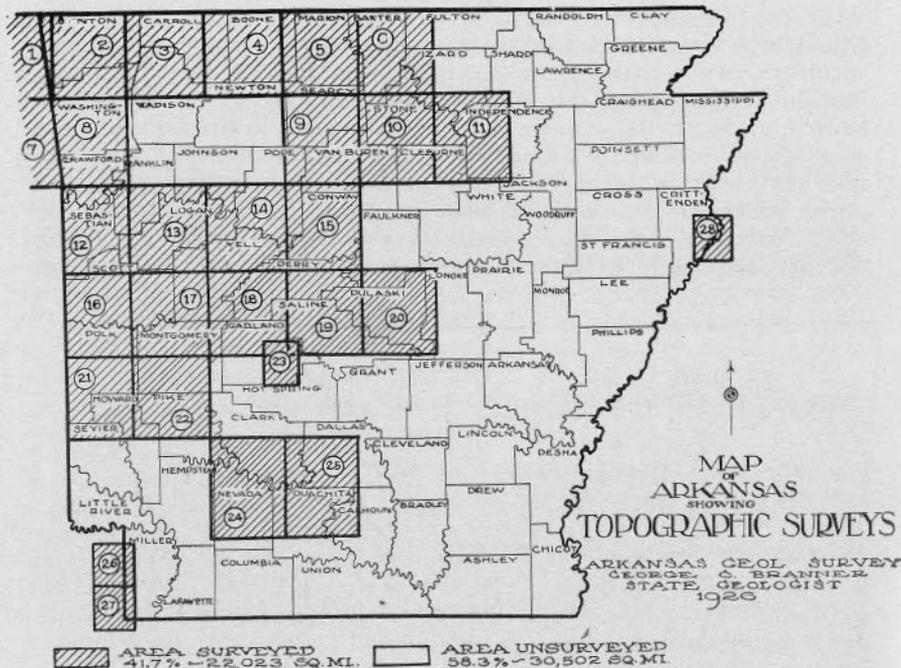
The Ouachita Mountain region consists of a series of ridges, mainly east-west, which diminish in height from west to east. In the vicinity of Athens, Arkansas, the elevation of the highest siliceous ridges composing central portions of this system is 2,340 feet, while at their eastern intersection with the Coastal Plain their elevation is about 1,000 feet above sea level. The average slope of this system to the east is about fifteen feet to the mile. In the northern and southwestern portions of the Ouachita Mountain system, the ridges usually have an east-west direction, while in the southeastern portion near Hot Springs they are very much buckled and distorted, many of the ridges having a northeast-southwest direction.

The Athens Plateau lies between the Ouachita Mountains and the Coastal Plain and is a considerably dissected country which has been eroded by streams most of which flow south. The higher portions of this plateau have an elevation of from 400 to 1,100 feet above sea level.

TOPOGRAPHICAL MAPPING

The progress of the topographic survey in Arkansas by the U. S. Geological Survey is shown on the accompanying index map. Each of the rectangles outlined and numbered shows the area covered by a quadrangle which has been surveyed. The name of the resulting topographic map is indicated by the numbered list of sheets appearing below.

Each of the maps represented by the smaller quadrangles covers an area measuring 15 minutes of latitude and longitude (1/16 of a square degree), or from 246 to 250 square miles in area according to latitude. The scale on the smaller quadrangles is 1:62,500, or about one mile to one inch and the contour interval is 20 feet, with the exception of the Memphis sheet, which has a contour interval of five feet in Arkansas and ten feet in Tennessee. Each of the maps represented by the larger rectangles shows a quadrangle measuring



30 minutes of latitude and longitude ($1/4$ of a square degree), or from 963 to 992 square miles in area. The scale is 1:125,000, or about two miles to one inch, and the contour interval is 50 feet. There are twenty-eight published topographic maps covering quadrangles in Arkansas. The area covered by these surveys is 22,023 square miles, or 41.7 per cent of the area of the State.

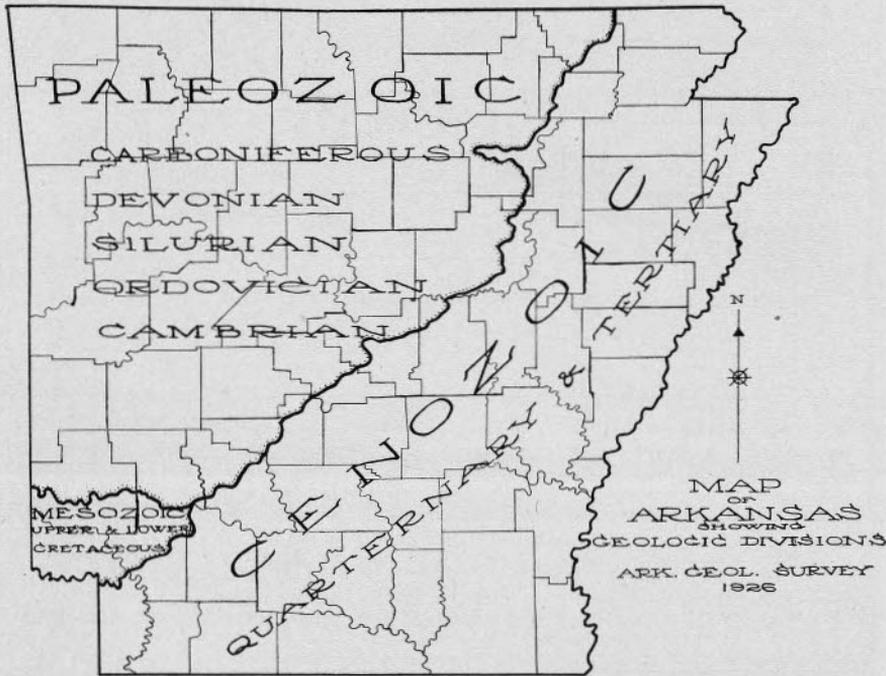
These maps are obtainable from The Director, U. S. Geological Survey, Washington, D. C., for 10 cents each in orders amounting to less than \$3.00. For orders of \$3.00 or above the price is 6 cents.

LIST OF TOPOGRAPHIC MAPS

- | | |
|-----------------------|------------------------------|
| 1. Siloam Springs | 15. Morrilton |
| 2. Fayetteville | 16. Poteau Mountain |
| 3. Eureka Springs | 17. Mount Ida |
| 4. Harrison | 18. Hot Springs |
| 5. Yellville | 19. Benton |
| 6. Mountain Home | 20. Little Rock |
| 7. Tahlequah | 21. De Queen |
| 8. Winslow | 22. Caddo Gap |
| 9. Marshall | 23. Hot Springs and vicinity |
| 10. Mountain View | 24. Gurdon |
| 11. Batesville | 25. Camden |
| 12. Fort Smith | 26. Texarkana |
| 13. Magazine Mountain | 27. Atlanta |
| 14. Dardanelle | 28. Memphis, Lithograph only |

GEOLOGY

The surface of Arkansas is almost entirely made up of sedimentary rocks; that is, rocks which were formed from sediments laid down ages ago in salt or fresh water seas and lakes. These sediments are found today more or less consolidated in the form of sandstones, shales, clays, chinks, limestones and dolomites. There are also in the State about fourteen square miles of intrusive volcanic rocks which are scattered in relatively small patches. The blue or gray "granites" of Pulaski, Garland, and Saline Counties make up the principal body of these volcanic rocks. Other rocks of a vol-

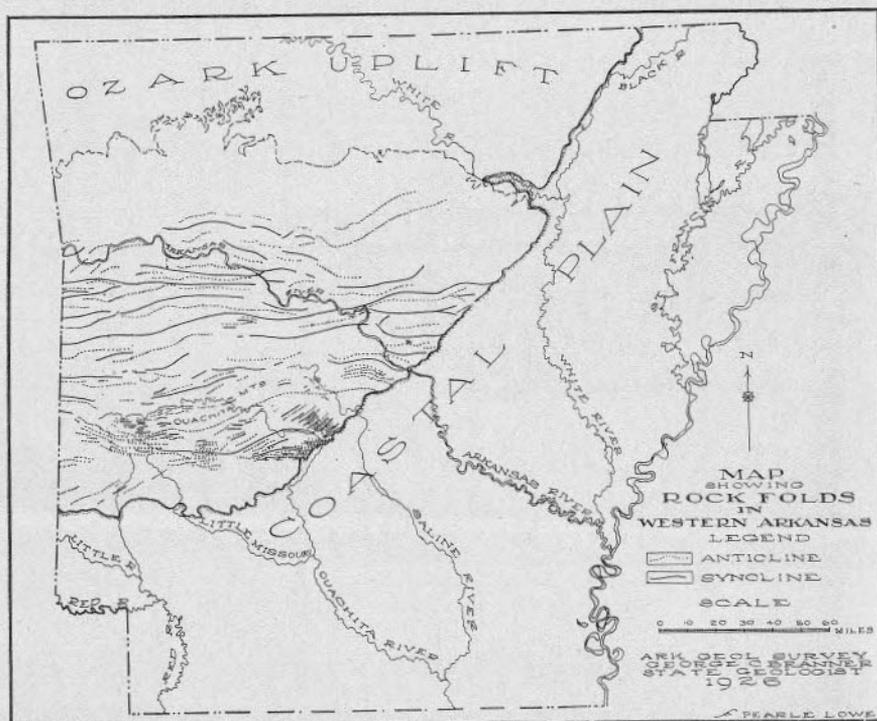


canic nature are found at Magnet Cove near Hot Springs, and in small patches in southern Pike, northeastern Scott, southern Logan and southern Conway Counties.

The sedimentary rocks of the Ozark, Ouachita, Arkansas Valley and Athens Plateau region were laid down during the Paleozoic era as the fossil remains in the rocks of this area were occupied by living organisms during the Paleozoic era, or what is known as the era of ancient life. The formations in the Coastal Plain area of the State were laid down during the Mesozoic and Cenozoic eras or the eras of middle and recent life. The above map shows the distribution of the Paleozoic, Mesozoic, and Cenozoic rocks.

The different rock formations of Arkansas, together with their vertical position and thickness in the Ozark region, the Arkansas Valley, the Ouachita Mountains and the Coastal Plain of Arkansas are shown on the accompanying chart.

The rocks of the Ozark region of Arkansas lie on the southern flank of the Ozark Uplift as it passes into the Arkansas Valley. The rocks have a gentle southward dip and, as a rule, the local folding and faulting is not great. The surface rocks of the Ozark region consist of dolomites, limestones, sandstones, and shales with the



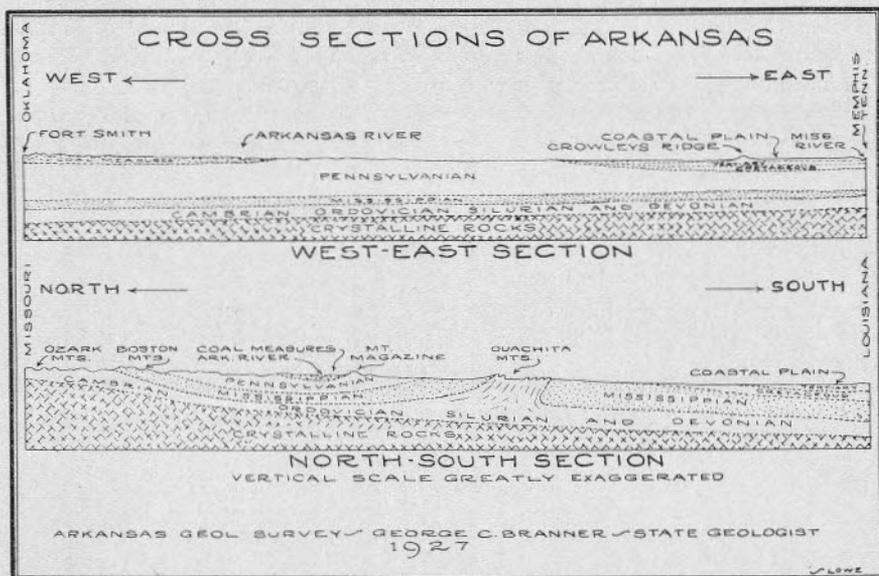
dolomites and limestones predominating. The youngest rocks of this series are the Carboniferous shales and sandstones which cap the Boston Mountains. These grade into older rocks of Devonian, Silurian, and Ordovician age over the Springfield and Salem Plateaus. These formations have an aggregate maximum thickness estimated at 3,200 feet.

Practically all of the Salem Plateau area lying north of the White River in Arkansas is made up of dolomite of Ordovician age and has an estimated thickness along the northern border of Arkansas of between 2,300 and 2,600 feet.

The Arkansas Valley lies between the Ozark Uplift on the north and the Ouachita Uplift on the south, and as such constitutes a

synclinal trough, the sedimentary beds of which are thickest in the center and grow thinner toward the north and south. There are a great many local east-west rock folds in this area which were formed by the uplift of the Ouachita region during the late Pennsylvania period. See map. The Arkansas Valley region is made up largely of shales and sandstones of Pennsylvania age, which, in the eastern portion, have been estimated to have a thickness in excess of 25,000 feet. In the western portion these shales and sandstones contain the commercial coal beds of the State. Passing southward from the lower portion of the Arkansas Valley, these Pennsylvanian rocks grade into Mississippian shales and sandstones lying on the north flank of the Ouachita Uplift.

The Ouachita Mountain region consists of a well defined uplift of great size with a more or less central east-west axis. The whole



region has been subjected to intense lateral folding. The rocks of the Ouachita Mountain region consist principally of shales, slates, sandstones, and cherts, with a relatively small amount of limestone and novaculite. The oldest rocks exposed in the Ouachita Mountain Uplift lie along the central portion of the great Ouachita fold and, in general, decrease in age both north and south of the central axis of this fold. The oldest beds in part of the central portion of this region are of Cambrian age and, passing either north or south of the central axis of the fold, include the rocks of middle and upper Ordovician, Silurian, and Carboniferous age. See map.

The Athens Plateau makes up the south flank of the Ouachita Uplift. There are some local folds and faults in this area, but they are not as great in number as in the region immediately north of

the Ouachita Uplift. The rocks of the plateau are Pennsylvanian and Mississippian in age and have a small regional dip to the south.

The northern and eastern portion of the Coastal Plain of Arkansas makes up the western half of a great embayment or synclinal trough extending northward into central United States. See map. The beds in this portion of the Coastal Plain dip gently to the southeast toward the axis of the embayment, which approximates the position of the Mississippi River. The southern portion of the Coastal Plain of Arkansas is not so much influenced by the presence of this synclinal trough and the beds dip more to the south than to the southeast.

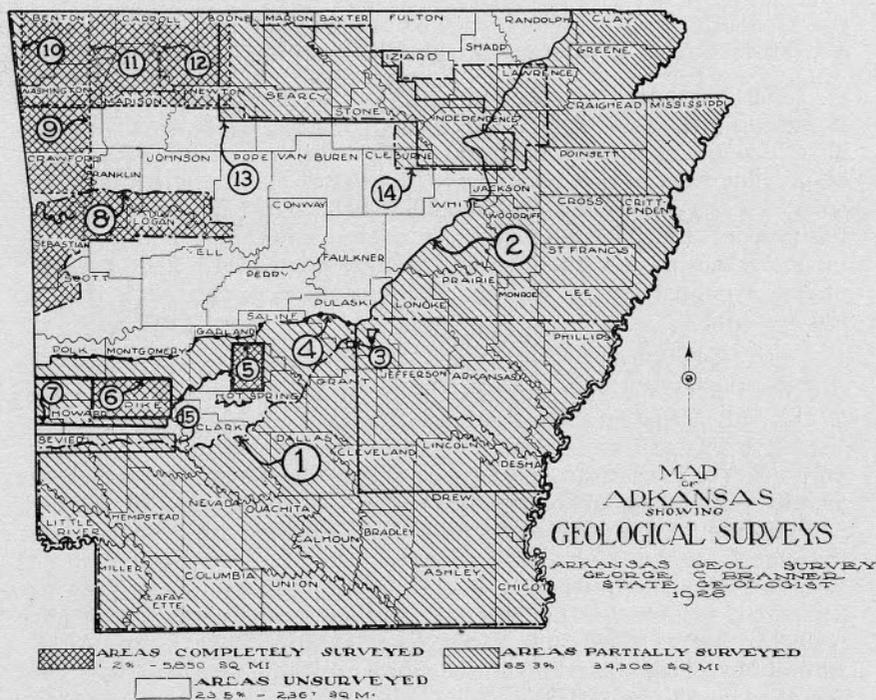
The rocks of the Coastal Plain series in northeastern Arkansas are deposited over the eastward extension of dolomites and limestones of the Salem Plateau. In eastern Arkansas, south of approximately the north line of Cross County they are deposited over what is probably a fairly level plain made up of shales and sandstones which are an eastward extension of the Arkansas Valley region. In the central and eastern portions of the Coastal Plain they are deposited over the steeply inclined Ouachita Mountain series of rocks, and in the southern and southeastern portions of the Coastal Plain they are deposited, so far as is known, over Carboniferous rocks which have probably been eroded to a fairly level plain. These Coastal Plain formations feather out along the border of the Coastal Plain beds and thicken to over 4,100 feet along the southern border of the State, and probably to over 5,000 feet along the southeastern border, and are about 2,200 feet thick along the northeastern border of Mississippi County.

GEOLOGICAL MAPPING

The portions of Arkansas which have been geologically surveyed are shown on the accompanying index map.

To show the portions of the State which have been mapped, the area of the State has been divided into three parts: (1) The portion which has been completely surveyed is shown by the cross hatching and constitutes 11.2 per cent of the area of the State, or 5,850 square miles. In this area practically all of the geologic formations have been mapped and classified. (2) The portion which has been partially surveyed is shown by the single hatching and constitutes 65.3 per cent of the area of the State, or 34,308 square miles. This area is only partially surveyed because some of the formation groups have not been broken up or classified and the structural features of the area have not been fully worked out.

(3) The area which is unsurveyed and is left blank on the map constitutes 23.5 per cent of the total area of the State, or 12,367 square miles. This area has not been geologically surveyed as no detailed reports have been made of this region and the geologic formations and structural features are known only in a general way.



The accompanying list shows the principal reports which contain geological maps of the State. Their numbers correspond with those shown on the index map.

INDEX TO GEOLOGICAL MAPS

1. U. S. Geological Survey Professional Paper, No. 46, "Geology and Underground Water Resources of Northern Louisiana and Southern Arkansas," by A. C. Veatch. (Out of print.)*
2. U. S. Geological Survey Water Supply Paper No. 399, "Geology and Ground Waters of Northeastern Arkansas," by L. W. Stephenson and A. F. Crider. (Out of print.)*
3. Arkansas Geological Survey Annual Report for 1890, Vol. II, "Igneous Rocks," by J. Francis Williams. (Out of print.)
4. Arkansas Geological Survey Annual Report for 1890, Vol. III, "Novaculites," by L. S. Griswald. (Out of print.)*
5. U. S. Geological Survey Folio, No. 215, "Hot Springs Geologic Folio." (Obtainable from U. S. Geologic Survey, Washington, D. C., for 25c.)
6. Arkansas Geological Survey Report for 1909, "The Slates of Arkansas," by A. H. Purdue. (Obtainable from Arkansas Geological Survey, 446 State Capitol Building, Little Rock, Ark. For postage charges see table on page 271.)

7. U. S. Geological Survey Bulletin, No. 660, "Manganese Deposits of the Caddo Gap-De Queen Quadrangles of Arkansas," by H. D. Miser. (Out of print.)*
8. U. S. Geological Survey Bulletin, No. 326, "The Arkansas Coal Fields," by A. J. Collier. (Out of print.)*
9. U. S. Geological Survey Folio, No. 154, "Winslow Geologic Folio." (Out of print.)*
10. U. S. Geologic Survey Folio, No. 119, "Fayetteville Geologic Folio." (Out of print.)*
11. U. S. Geological Survey Folio, No. 202, "Eureka Springs-Harrison Geologic Folio." (Obtainable from U. S. Geological Survey, Washington, D. C., for 25c.)
12. U. S. Geological Survey Folio, No. 202, "Eureka Springs-Harrison Geologic Folio." (Obtainable from U. S. Geological Survey, Washington, D. C., for 25c.)
13. Arkansas Geological Survey Annual Report for 1890, Vol. IV, "Marbles and Other Limestones," by T. C. Hopkins. (Obtainable from Arkansas Geological Survey, 446 State Capitol Building, Little Rock, Ark. For postage charges see table on another page.)
14. Arkansas Geological Survey Annual Report for 1892, Vol. V, "The Zinc and Lead Region of North Arkansas," by J. C. Branner. (Obtainable from Arkansas Geological Survey, 446 State Capitol Building, Little Rock, Ark. For postage charges see table on another page.)
15. U. S. Geological Survey Bulletin, No. 690, "Gravel Deposits of Caddo Gap-De Queen Quadrangles," by H. G. Miser and A. H. Purdue. (Out of print.)*

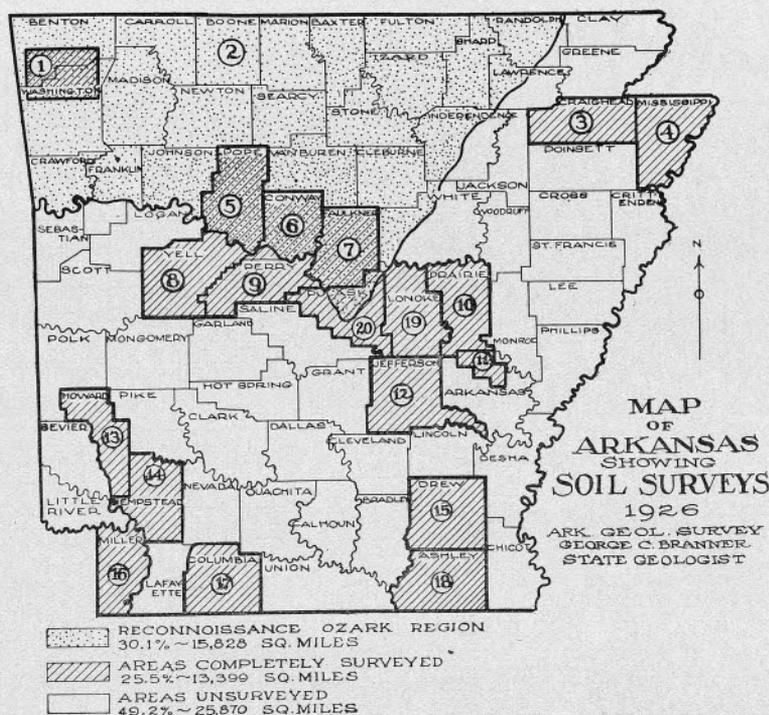
SOIL SURVEYS

The accompanying soil survey index map shows the counties and portions of Arkansas where soil surveys have been completed by the Bureau of Soils of the U. S. Department of Agriculture.

Detailed soil surveys have been made of sixteen counties in the State and of the Fayetteville and Stuttgart areas. A general soil reconnaissance has been made of the Ozark region and that part of the State north of the Arkansas River and west of the Coastal Plain shore line.

A bulletin containing a description of all the soils of the State together with a State soil map has been issued by the Agricultural Experiment Station of the University of Arkansas and deals with the different classes of soils found in the State, their crop possibilities and fertilizer treatment. This is Bulletin No. 187, "The Soils of Arkansas," by M. Nelson, W. H. Sachs and R. H. Austin, and may be obtained on request from the Agricultural Experiment Station, Fayetteville, Ark.

*May be consulted in Library of Arkansas Geological Survey, or in public libraries.



Soil Survey Bulletins

1. Soil Survey of the Fayetteville Area.
2. Reconnaissance Survey of the Ozark Region.
3. Soil Survey of Craighead County, by E. B. Deeter.
4. Soil Survey of Mississippi County, by E. C. Hall, T. M. Bushnell, L. V. Davis, W. T. Carter, Jr., and A. L. Patrick.
5. Soil Survey of Pope County, by Clarence Lounsbury and E. B. Deeter.
6. Soil Survey, Conway County, by James L. Burgess and C. W. Ely.
7. Soil Survey of Faulkner County, by E. B. Deeter.
8. Soil Survey of Yell County, by E. B. Deeter.
9. Soil Survey of Perry County, by E. B. Deeter.
10. Soil Survey of Prairie County, by W. T. Carter, Jr., F. N. Meeker, H. C. Smith and E. L. Worthen.
11. Soil Survey of the Stuttgart Area, by J. E. Lapham.
12. Soil Survey of Jefferson County, by B. W. Tillman.
13. Soil Survey of Howard County, by M. W. Beck.
14. Soil Survey of Hempstead County, by A. E. Taylor.
15. Soil Survey of Drew County, by B. W. Tillman.
16. Soil Survey of Miller County, by J. O. Martin.
17. Soil Survey of Columbia County, by Clarence Lounsbury.
18. Soil Survey of Ashley County, by E. S. Vanatta, B. D. Gilbert, E. B. Watson and A. H. Meyer.

19. Soil Survey of Lonoke County, by E. W. Knobe, C. Lounsbury, L. V. Davis, E. D. Fowler and A. W. Goke.
20. Soil Survey of Pulaski County, by E. B. Deeter, A. H. Meyer and T. H. Benton.

As a usual thing, reports of not more than three separate areas and not exceeding one copy of each report are sent free to one individual. If more than three reports of separate areas are wanted, they should be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the following figures:

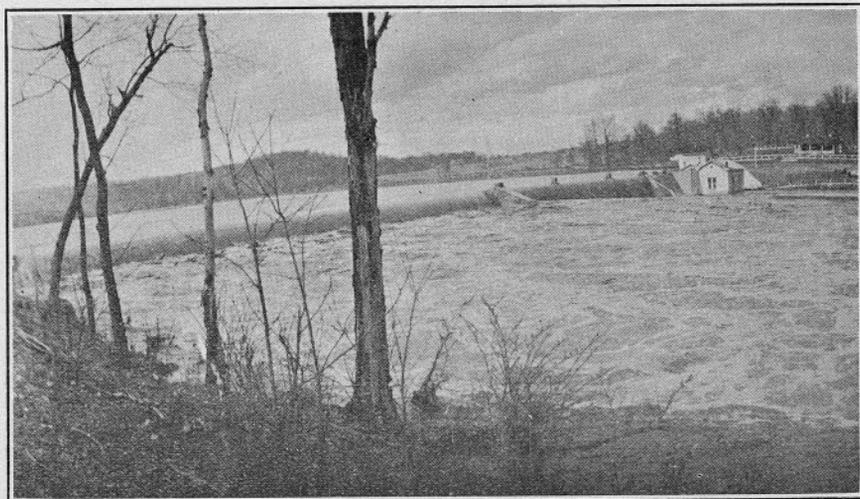
- 1902. Arkansas County (see Stuttgart area).
- 1913. Ashley County, 15 cents.
- 1914. Columbia County, 15 cents.
- 1907. Conway County, 15 cents.
- 1916. Craighead County, 15 cents.
- 1917. Drew County, 15 cents.
- 1917. Faulkner County, 15 cents.
- 1916. Hempstead County, 15 cents.
- 1917. Howard County, 15 cents.
- 1915. Jefferson County, 15 cents.
- 1921. Lonoke County, 25 cents.
- 1903. Miller County.
- 1914. Mississippi County, 15 cents.
- 1920. Perry County, 15 cents.
- 1913. Pope County, 15 cents.
- 1926. Pulaski County, 15 cents.
- 1902. Stuttgart Area (part of Arkansas County), 15 cents.
- 1915. Yell County, 15 cents.

The editions of the following Soil Survey Reports are exhausted for free distribution. They are included in the "Field Operations of the Bureau of Soils" for the years indicated, which may be consulted at the libraries as shown on the attached sheet or at a number of other principal public libraries throughout the United States. These reports also may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the prices indicated, with the exception that where no price is shown they are impossible of purchase except in the bound volumes of the Field Operations of the Bureau of Soils:

- 1906. Benton County (see Fayetteville Area).
- 1906. Fayetteville Area (parts of Benton and Washington Counties).
- 1906. Prairie County, 15 cents.
- 1906. Washington County (see Fayetteville Area).
- 1911. As shown on the Soil Survey map.

The following Soil Surveys are in progress in the field, or in course of preparation by the printer and lithographer, and will be available for distribution later:

- 1923. Baxter County.
- 1925. Bradley County.
- 1923. Clay County.
- 1925. Nevada County.



Power Dam Below Mammoth Spring, Ark.

WATER POWER

The streams of Arkansas, as estimated by the Interior Department, may be used to generate 125,000 horse power available 90 per cent of the time, and 178,000 horse power available 50 per cent of the time.

Mr. William Crooks of the Crooks Engineering Corporation, estimates the available primary and secondary horse power of the streams which may be used to generate major power in northwest Arkansas as follows:

	Primary Power Available 100% of the Time	Secondary Power Available Less Than 100% of the Time
Ouachita River	60,000 h. p.	75,000 h. p.
White River and tributaries	120,000 h. p.	±40,000 h. p.
Caddo River	20,000 h. p.
Little Red River	20,000 h. p.
Cossatot River	1,200 h. p.	3,000 h. p.
Total	181,200 h. p.	158,000 h. p.

At the present time four hydro-electric plants are operating in the State, as follows:

River	Name of Project	Located Near	Operated by	Primary Power	Secondary Power
Ill. Bayou	Russellville Dam	Russellville.....	Ark. L. & P. Co.....		800 h. p.
Spring.....	Dam No. 1.....	Mammoth Spring	Mam. Spring Mill'g Co.....	400 h. p.	100 h. p.
Spring.....	Dam No. 3.....	Manimoth Spring	Mam. Spring E. L. & P. Co	500 h. p.	220 h. p.
Ouachita..	Rommel.....	Hot Springs.....	Ark. L. & P. Co.....		5200 h. p.
			Total.....	900 h. p.	6320 h. p.

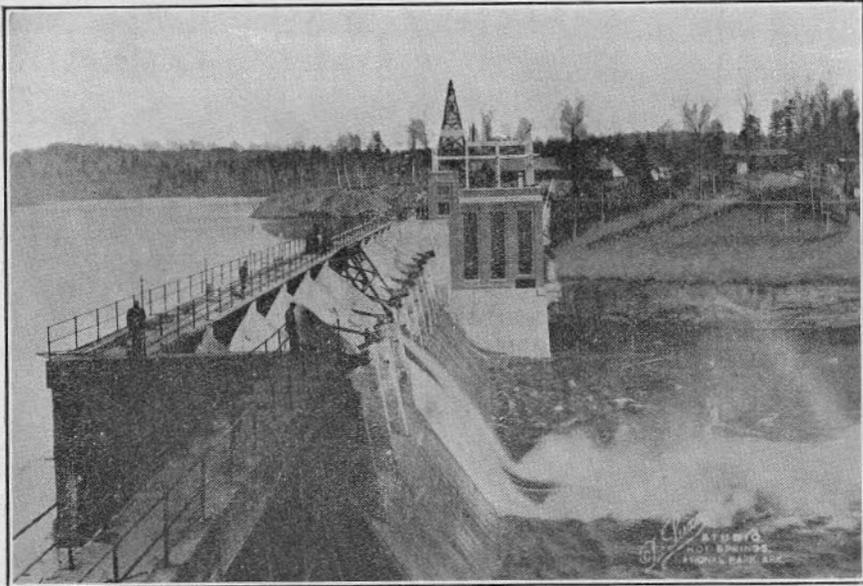
The Rempel dam is used to supplement the load requirements of the Arkansas Power & Light Company. Three 3500 KW generators are installed. This company plans to erect two more dams on the Ouachita River to operate in connection with the Rempel dam. The three dams are expected to give practically complete control of the Ouachita River and generate 62,000 primary and 100,000 secondary KW when all three are operating.

DAM	PRIMARY	SECONDARY 7,000KW
Rempel and.....	12,000KW	
Second dam.....	12,000KW	15,000KW
Rempel and.....	16,000KW	
Second dam and.....	22,000KW	100,000KW
Third dam.....	24,000KW	(Total three)
Total for all three.....	86,000KW	100,000KW

The estimated power generated per year in Arkansas follows:

K. W. H. Per Year	Dam
17,000,000	Rempel
1,500,000	Russellville
2,500,000	Two dams at Mammoth Springs
Total 21,000,000 per year for four dams	

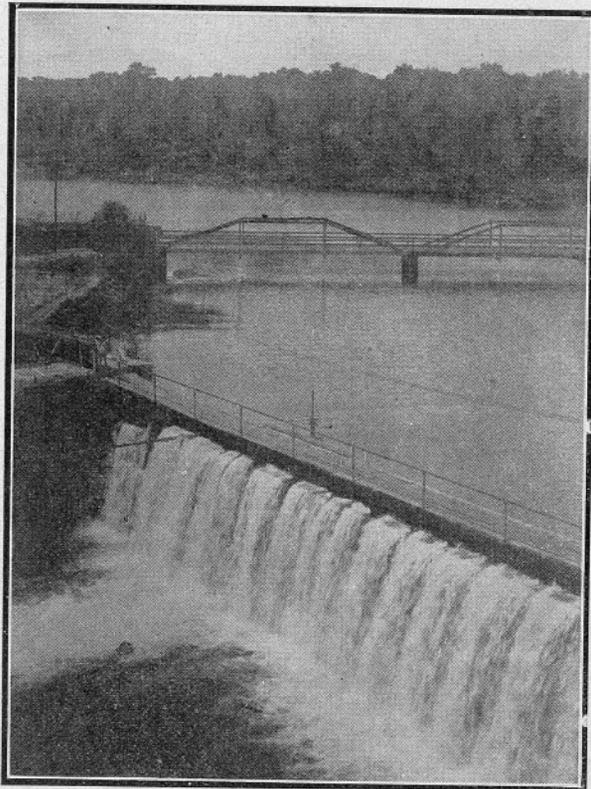
Assuming that these four dams generate 21,000,000 KWH per year, and that the value at the switchboard is 1c per KWH, the value of the electrical power generated in Arkansas during 1926 was approximately \$210,000.00.



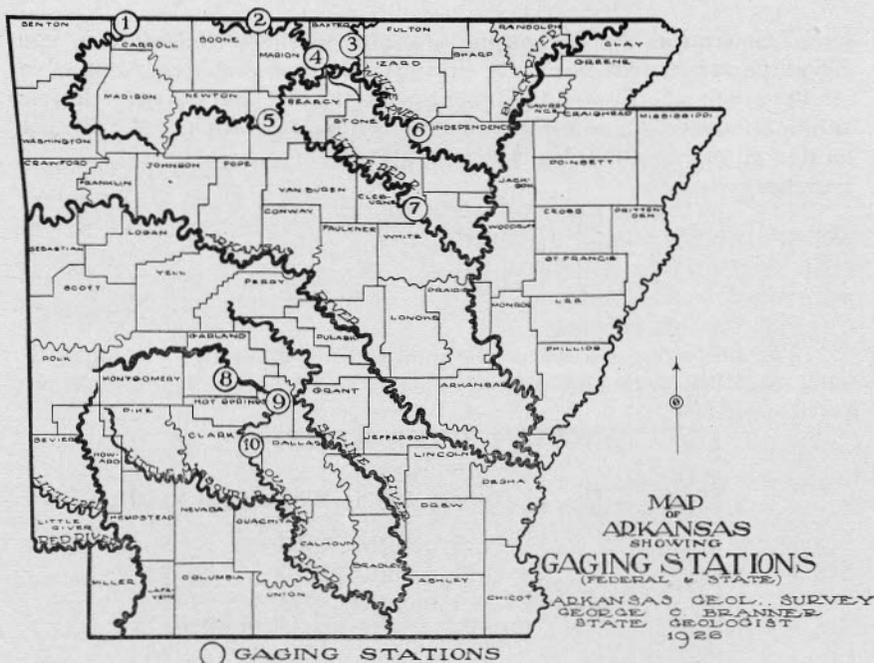
Rempel Dam Hydro-Electric Plant, Hot Spring County

The total of the developed primary power in the State is 900 horse power, which is .5 per cent of the total estimated available primary power. The total of the developed secondary hydro-electric power in the State at the present time is 6,320, which is 4 per cent of the estimated available secondary power.

Plans for the development of the water power of White River and its tributaries have been considered for many years, but as yet only preliminary developments have taken place. Four of these projects have an estimated total horse power of 147,000.



Power Dam on Spring River at Mammoth Spring



INDEX TO GAGING STATIONS

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| 1. Beaver | 6. Walls Ferry |
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| 3. Henderson | 8. Hot Springs |
| 4. Cotter | 9. Malvern |
| 5. Gilbert | 10. Arkadelphia |

STREAM GAGING STATIONS

The above map shows the locations of the stream gaging stations in Arkansas, most of which have been maintained over considerable periods of time. These stations have been established on the rivers for the purpose of determining the average quantity of water flowing throughout the year. From this information the available water power over a period of time may be calculated.

The U. S. Geological Survey has maintained seven stations on the White River basin in Arkansas and nine on the same basin in Missouri. It has also maintained three on the Ouachita River (Red River basin) in Arkansas. On the White River in Arkansas these stations are known by the following names: Beaver, Lead Hill, Henderson, Cotter, Gilbert, Walls Ferry and Pangburn. On the White River basin in Missouri they are known as Branson, Galena, Tecumseh, Leeper, Eminence (Current River), Van Buren, Doniphan, Eminence (Jacks Fork), Chicopee, Bardley and Greer. The

U. S. Geological Survey gaging stations on the Ouachita River in Arkansas are located near Hot Springs, Malvern and Arkadelphia.

The University of Arkansas maintained seven stations in the White River basin from July, 1909, to September, 1910. These were located at Beaver, Branson, Lead Hill, Cotter, Gilbert, Henderson and Pangburn.

The water flow data now available on Arkansas streams is not sufficient for a definite knowledge of the power possibilities of the main streams of northern Arkansas. No gaging stations are now maintained by the Arkansas Geological Survey, on account of lack of funds for this purpose.

The following is a list of the publications containing stream flow data, together with the periods during which gage readings were taken:

WHITE RIVER BASIN

White River

Periods During Which Gage Readings Were Taken

Beaver, Ark.	5 months, 1909, W. S. P. No. 267*
Beaver, Ark.	12 months, 1910, W. S. P. No. 567
Beaver, Ark.	4 months, 1923, W. S. P. No. 567
Beaver, Ark.	14½ months, 1909-10, W. P. of A. †
Branson, Mo.	5 months, 1909, W. S. P. No. 267
Branson, Mo.	12 months, 1910, W. S. P. No. 287
Branson, Mo.	14½ months, 1909-10, W. P. of A.
Lead Hill, Ark.	3 months, 1909, W. S. P. No. 267
Lead Hill, Ark.	12 months, 1910, W. S. P. No. 287
Lead Hill, Ark.	12 months, 1909-10, W. P. of A.
Cotter, Ark.	5 months, 1909, W. S. P. No. 267
Cotter, Ark.	12 months, 1910, W. S. P. No. 287
Cotter, Ark.	14⅓ months, 1909-12, W. P. of A.
Gilbert, Ark.	5 months, 1909, W. S. P. No. 267
Gilbert, Ark.	12 months, 1910, W. S. P. No. 287
Gilbert, Ark.	14½ months, 1909-10, W. P. of A.
Henderson, Ark.	5 months, 1909, W. S. P. No. 267
Henderson, Ark.	12 months, 1910, W. S. P. No. 287
Henderson, Ark.	14⅓ months, 1909-10, W. P. of A.
Walls Ferry, Ark.	

First measurement made in November, 1909, W. S. P. No. 287

James River

Galena, Mo.	11 4/31 months, 1921-22, W. S. P. No. 547
Galena, Mo.	12 months, 1922-23, W. S. P. No. 567

North Fork, White River

Tecumseh, Mo.	11½ months, 1921-22, W. S. P. No. 547
Tecumseh, Mo.	12 months, 1922-23, W. S. P. No. 567

Black River

Leeper, Mo.	12 months, 1921-22, W. S. P. No. 547
Leeper, Mo.	12 months, 1922-23, W. S. P. No. 567

Current River

Eminence, Mo.	12 months, 1921-22, W. S. P. No. 547
Eminence, Mo.	12 months, 1922-23, W. S. P. No. 567
Van Buren, Mo.	12 months, 1921-22, W. S. P. No. 547
Van Buren, Mo.	12 months, 1922-23, W. S. P. No. 567
Doniphan, Mo.	12 months, 1921-22, W. S. P. No. 547
Doniphan, Mo.	12 months, 1922-23, W. S. P. No. 567

Jacks Fork

Eminence, Mo.	11½ months, 1921-22, W. S. P. No. 547
Eminence, Mo.	12 months, 1922-23, W. S. P. No. 567

Big Spring

Chicopee, Mo.	5½ months, 1921-22, W. S. P. No. 547
Chicopee, Mo.	6 months, 1922-23, W. S. P. No. 567

Eleven Point River

Bardley, Mo.	11½ months, 1921-22, W. S. P. No. 547
Bardley, Mo.	12 months, 1922-23, W. S. P. No. 567

Greer Spring

Greer, Mo.	10½ months, 1921-22, W. S. P. No. 547
Greer, Mo.	12 months, 1922-23, W. S. P. No. 567

Little Red River

Pangburn, Ark.	5½ months, 1909, W. S. P. No. 267
Pangburn, Ark.	6 months, 1909, W. P. of A.
Pangburn, Ark.	14½ months, 1909-10, W. P. of A.
Pangburn, Ark.	9 months, 1910, W. P. of A.
Pangburn, Ark.	12 months, 1910, W. S. P. No. 287

RED RIVER BASIN**Ouachita River**

Periods During Which Gage Readings Were Taken

Hot Springs, Ark.	3 months, 1922, W. S. P. No. 547
Hot Springs, Ark.	12 months, 1922-23, W. S. P. No. 567
Malvern, Ark.	12 months, 1903, W. S. P. No. 99
Malvern, Ark.	11 months, 1904, W. S. P. No. 131
Malvern, Ark.	4 months, 1905, W. S. P. No. 173
Malvern, Ark.	3 months, 1922, W. S. P. No. 547
Malvern, Ark.	12 months, 1922-23, W. S. P. No. 567
Arkadelphia, Ark.	9 months, 1905, W. S. P. No. 173
Arkadelphia, Ark.	5 months, 1905, W. S. P. No. 209
Arkadelphia, Ark.	12 months, 1906, W. S. P. No. 209

*W. S. P. refers to U. S. Geological Survey Water Supply Papers.

W. S. P. No. 267, obtainable from U. S. Geological Survey, Washington, D. C., for 25c.

W. S. P. No. 287, obtainable from U. S. Geological Survey, Washington, D. C., for 10c.

W. S. P. No. 567, obtainable from U. S. Geological Survey, Washington, D. C., on request.

W. S. P. No. 547, obtainable from U. S. Geological Survey, Washington, D. C., on request.

W. S. P. No. 99, obtainable from U. S. Geological Survey, Washington, D. C., for 25c.

W. S. P. No. 131, obtainable from U. S. Geological Survey, Washington, D. C., for 15c.

W. S. P. No. 173, out of print.

W. S. P. No. 209, obtainable from U. S. Geological Survey, Washington, D. C., for 15c.

†W. P. of A. refers to "Water Power of Arkansas," by A. H. Purdue, obtainable from Arkansas Geological Survey, 447 State Capitol Building, Little Rock, Ark., free of charge.

AVAILABLE REPORTS OF ARKANSAS GEOLOGICAL SURVEYS

The following reports of the Arkansas Geological Survey are available for distribution and may be obtained upon receipt of indicated postage (See table on following page). Orders may be addressed to Arkansas Geological Survey, 447 State Capitol Building, Little Rock, Arkansas.

Annual Report for 1890

Vol. IV—"Marbles," by T. C. Hopkins, pp. xxiv, 443; illustrated; atlas of six maps.

Annual Report for 1891

Vol. I—"Mineral Waters," by J. C. Branner, pp. viii, 144; one map.

Vol. II—Miscellaneous Reports: "Benton County," by F. W. Simonds and T. C. Hopkins; "Elevations," by J. C. Branner; "River Observations," by J. C. Branner; "Magnetic Observations," by J. C. Branner; "Mollusca," by F. A. Sampson; "Myriapoda," by Chas. H. Bollman; "Fishes," by Seth E. Meek; "Dallas County," by C. E. Siebenthal; "Bibliography of the Geology of Arkansas," by J. C. Branner, pp. xii, 349; illustrated; two maps.

Annual Report for 1892

Vol. II—"Tertiary" by Gilbert D. Harris, pp. xiv, 207; illustrated; one map.

Report of 1909

"The Slates of Arkansas," by A. H. Purdue, with a bibliography of the Geology of Arkansas by John C. Branner, pp. xii, 164; illustrated; two maps.

Report of 1910

"Coal Mining in Arkansas," by A. A. Steele. Parts I and II in one volume; illustrated; two maps. Part I, pp. xxviii, 383 with "Glossary of Coal Mining Terms"; Part II, pp. 389-632.

Publication of 1927

"Outlines of Arkansas' Mineral Resources," By George C. Branner.

REPORTS OF THE BUREAU OF MINES, MANUFACTURES AND AGRICULTURE

The following reports issued by the Bureau of Mines, Manufactures and Agriculture contain reference to the mineral resources and industries in the State, and requests for copies should be addressed to Commissioner W. N. Wilkes, State Capitol Building, Little Rock, Ark.:

"Mineral Fertilizers," by Dr. N. F. Drake, 1924.

"Industrial Arkansas," by J. G. Ferguson, 1924.

"Minerals of Arkansas," by W. N. Wilkes, 1925.

"Outlines of Arkansas' Mineral Resources," by George C. Branner, 1927.

POSTAGE RATES ON PUBLICATIONS OF ARKANSAS GEOLOGICAL SURVEY

Any of the following reports will be mailed to persons interested, so long as copies are available, on receipt of postage, which may be computed by the following table:

PUBLICATION	ZONES FROM LITTLE ROCK								
	Local	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth
Report for 1890: Vol. IV—Marbles and Atlas	.08	.09	.09	.12	.17	.22	.27	.33	.38
Report for 1891: Vol. I—Mineral Waters	.07	.07	.07	.08	.09	.10	.11	.13	.14
Report for 1891: Vol. II—Miscellaneous	.08	.08	.08	.10	.13	.16	.19	.23	.27
Report for 1892: Vol. II—Tertiary	.08	.08	.08	.10	.13	.16	.19	.23	.27
Report of 1909: Slates of Arkansas	.08	.08	.08	.10	.13	.16	.19	.23	.27
Report of 1910: Coal Mining in Arkansas	.08	.09	.09	.12	.17	.22	.27	.33	.38
"Outline of Arkansas' Mineral Resources"	Sent postage free								

AVAILABLE BASE MAPS OF ARKANSAS

1. U. S. Geological Survey Base Map, size 35x40 inches; scale 1:500,000, or 8 miles to the inch. Obtainable from U. S. Geological Survey, Washington, D. C. Done in black and white only. Price, 20c each, or in orders of over \$3.00, price 12c each.
2. U. S. Geological Survey Base Map; size 16x18½ inches; scale 1:1,000,000, of 16 miles to the inch. Obtainable from U. S. Geological Survey, Washington, D. C. Done in black and white. Price, 5c each; or in orders over \$3.00 price 3c each.
3. Rand-McNally Vest Pocket Edition Map, size 28x21 inches; scale 13 miles to the inch. Price, 35c. Obtainable from Rand-McNally & Company, 536 South Clark Street, Chicago, Ill.
4. Rand-McNally Wall Map, size 40x28 inches. Price \$3.50. Obtainable from Rand-McNally & Company, 536 South Clark Street, Chicago, Ill.
5. Arkansas State Base Map, in colors, by W. N. Wilkes, Commissioner of Mines, Manufactures and Agriculture; scale 10¼ miles to the inch; size 28¾x26 inches. Obtainable from Bureau of Mines, Manufactures and Agriculture, State Capitol Building, Little Rock, Ark., upon request.
6. Geologic Map of Arkansas, by J. C. Branner. Size 10¾x12 inches; scale 24 miles to the inch; in colors. Obtainable from the Arkansas State Geological Survey, State Capitol Building, Little Rock, Ark., upon request.
7. Base map of Arkansas showing counties, railroads, etc., 40½x48 inches, published by the National Map Company, Indianapolis, Ind.