

ARKANSAS GEOLOGICAL COMMISSION
3815 WEST ROOSEVELT ROAD
LITTLE ROCK, AR 72204

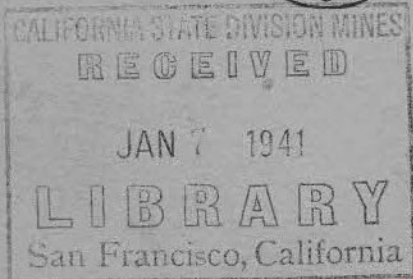
STATE OF ARKANSAS
ARKANSAS GEOLOGICAL SURVEY

ANNUAL ADMINISTRATIVE REPORT

of the

STATE GEOLOGIST

For the Period from December 1, 1939
to November 30, 1940



Little Rock

1940

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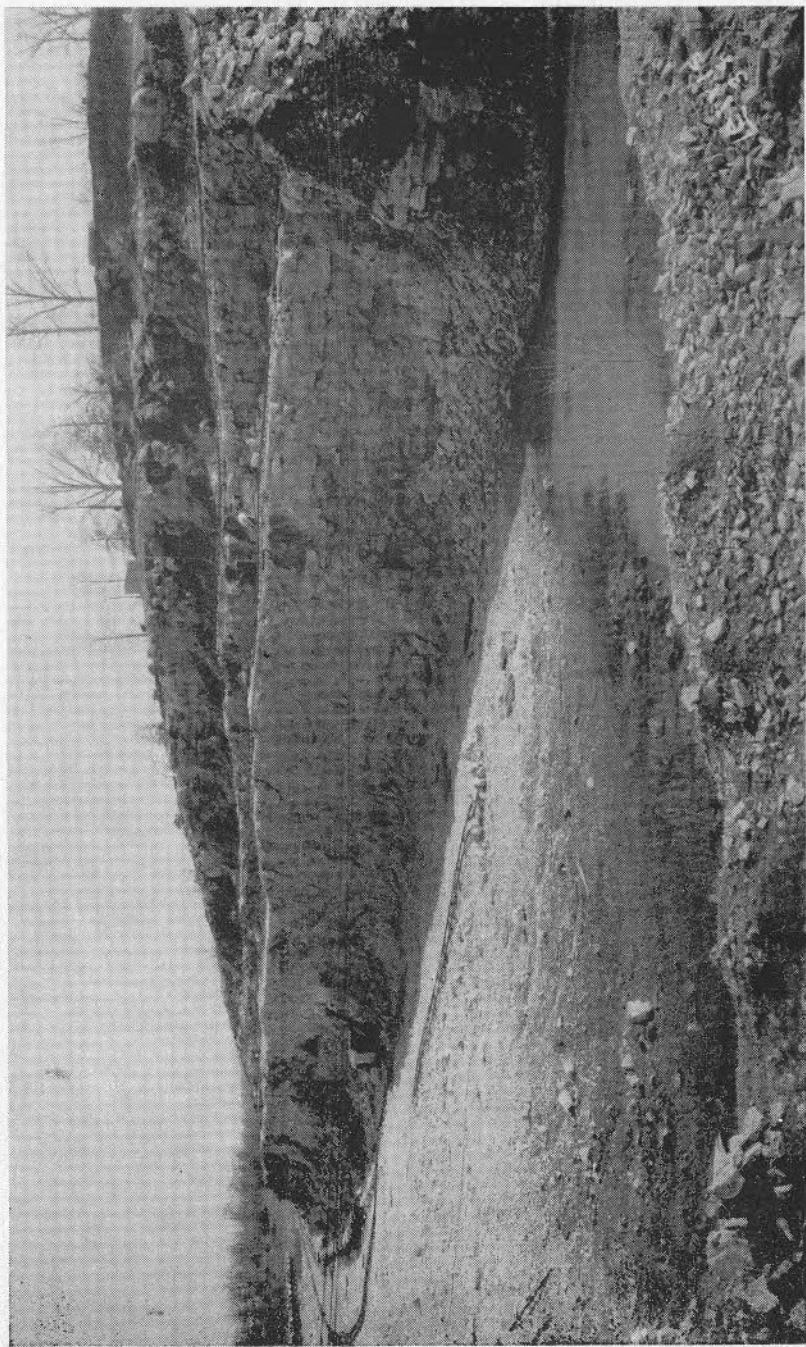
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Limestone quarry of the Batesville White Lime Company at Limestone Dale. •

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LETTER OF TRANSMITTAL

STATE OF ARKANSAS
ARKANSAS GEOLOGICAL SURVEY
Little Rock, Arkansas
DECEMBER 1, 1940

HONORABLE CARL E. BAILEY,
Governor of Arkansas,
Little Rock, Arkansas.

DEAR GOVERNOR BAILEY:

I hand you herewith my annual report for the twelve-month period December 1, 1939, to November 30, 1940, in accordance with the requirements of Section 2 of Act 573 of the General Assembly of 1923.

The work of the Arkansas Geological Survey has been greatly extended and facilitated during the period of the present report by assistance received from the Work Projects Administration. A minimum of 292 and a maximum of 708 persons have been at work on two projects sponsored by the Survey during the past twelve months, namely the State Mineral Survey and the Topographic Mapping Project.

The field work of the W. P. A. State Mineral Survey from January 7, 1938, to November 30, 1940, has resulted in the examination of a total area of 27,366 square miles in 48 counties. During the prosecution of this work 77,416 mineral samples were collected and examined. Laboratory analyses were made of 705 specimens. Approximately 282 clay specimens were collected and, of these, 251 were partially and 31 completely tested. In connection with the ground water survey, partial analyses were made of 16,940 specimens of well and spring water, and 83 complete analyses were made. New data collected on deposits of the following minerals is of special interest:

1. A deposit of molybdenite in Hot Spring County hitherto unreported in Arkansas.
2. A bed of gypsum in Pike and Howard Counties, which drilling results indicate contains in excess of 2,000,000 tons.

3. A bed of lignite in Dallas County, which drilling results indicate contains in excess of 7,000,000 tons.
4. A kaolin deposit in Howard County suitable for the manufacture of fire brick.
5. A deposit of tripoli in Benton County, which is of good quality and considerable extent.

During the year, considerable time has been devoted to the matter of defense industries for Arkansas, and a mass of data has been prepared for the State Planning Board and for the Agricultural and Industrial Commission offices of both Little Rock and Washington, D. C. Substantial price increases in many mineral products found in Arkansas, notably quicksilver, manganese, zinc and lead, have stimulated interest in the development of deposits of these minerals and much data has been distributed concerning them.

The attention of the Arkansas Utilities Commission was initially directed to the need for the establishment of an R. E. A. cooperative power line in the quicksilver mining area. Largely through the efforts of the Commission, the line was later constructed.

The W. P. A. Topographic Mapping Project has resulted in the completion of the mapping of 2 quadrangles having areas totaling 139 square miles, and the completion of 265 miles of leveling and 392 miles of traverse necessary for future topographic mapping. Two quadrangles previously surveyed by the W. P. A. mapping project, with areas of 258 square miles each, were lithographed during the year.

The active development of the barite mining industry in Hot Spring County during the past year has been a matter of interest, particularly as the development can, in part, be attributed to the issuance of a report by this Office in 1932 on the economic possibilities of the barite deposits. Plans for developing an agricultural lime industry in southwestern Pulaski County based on the results of drilling in that area by the State Mineral Survey are also well under way.

Office work has resulted in the publication of 11 printed reports, and the compilation of data which, it is anticipated, will result in the publication of 9 additional reports.

The activities of the Severance Tax Agent were continued as a part of the work of this office under the provisions of Act 286 of the General Assembly of 1935. The total amount of taxes collected by him on minerals and timber during the period

July 1, 1939, to June 30, 1940, was \$21,522.74. Claims are outstanding against producers for delinquent severance taxes in the amount of \$12,511.90.

It is of interest to note the increase in the value of mineral production and in the severance taxes collected, as set forth in the figures for the period 1936 to 1939 below:

Year	Value of Minerals Produced	Percentage of Increase over Previous Year	Severance Tax Collected on Minerals	Percentage of Increase over Previous Year
1936	\$19,438,448.42	27.8	\$274,300.85	13.0
1937	24,025,994.95	23.6	377,937.71	37.7
1938	26,576,532.80	10.4	493,795.86	30.7
1939	28,581,422.41	7.5	522,489.62	5.8

Respectfully submitted,

GEORGE C. BRANNER,
State Geologist.

ANNUAL ADMINISTRATIVE REPORT
of the
STATE GEOLOGIST
for the period
December 1, 1939, to November 30, 1940

The activities of the Office of State Geologist for the period December 1, 1939, to November 30, 1940, are discussed under the following heads:

- I. Accomplishments
- II. Future work
- III. Personnel
- IV. Finances

Appendix:

Summary of mineral production and value, severance tax collected on minerals, and a list of mineral producers in Arkansas in 1939.

I. ACCOMPLISHMENTS

The year's accomplishments are discussed under the following heads:

- A. Publications issued
 1. Pertaining to geology and mineral resources
 2. Pertaining to topography
- B. Projects
 1. Geologic
 2. Topographic
 3. Stream gaging
- C. Office administration
- D. Activities of Severance Tax Agent

A. PUBLICATIONS ISSUED

1. GEOLOGY AND MINERAL RESOURCES

1. **Information Circular 12:** *Lower Cretaceous and Jurassic Formations of Southern Arkansas and Their Oil and Gas Possibilities*, by Ralph W. Imlay. Describes character, structure, and distribution of oil and gas producing for-

- mations, for the most part deeply buried within an area of 9,000 square miles in the southwestern portion of Arkansas. Indicates areas favorable for prospecting. Contains 64 pages, 26 plates, and 17 tables. Lithoprinted, paper cover.
2. **County Report Series 1: *Mineral Resources of Polk County***, by Clayton Johnson; Harold Pickleseimer and R. H. Tucker, assistants. Contains information compiled from field data collected by W. P. A. State Mineral Survey and from state and federal reports. Contains a description of the geology and mineral resources, gives locations, descriptions of deposits, and analyses of minerals. Contains 41 pages, 9 plates, 5 figures, and 24 tables. Lithoprinted, paper cover.
 3. **County Report Series 2: *Mineral Resources of Benton, Carroll, Washington and Madison Counties***, by Clayton Johnson and A. D. Hoagland; Harold Pickleseimer, and R. H. Tucker, assistants. Contains information compiled from field data collected by W. P. A. State Mineral Survey, and from state and federal reports. Contains a description of the geology and mineral resources, gives locations and descriptions of deposits and analyses of minerals. Contains 60 pages, 10 plates, and 30 tables. Lithoprinted, paper cover.
 4. **Limestones of Northern Arkansas**, by George C. Branner. Describes the geology, reserves and uses of limestone and marble in north Arkansas, and gives production statistics from 1899 through 1939. Prepared as chapter of the report, "An Outline of the Non-Metallic Minerals of Arkansas." Contains 32 pages, 2 plates and 9 figures. Printed, paper cover.
 5. **Tertiary Limestones of Pulaski and Saline Counties, Arkansas**, by Milton W. Corbin. Sets forth results of an extensive limestone drilling campaign, completed in 1939 by W. P. A. field parties, to determine the quantity of limestone in Pulaski and Saline counties available for use as agricultural lime. Describes the occurrence of over 4,000,000 short tons of available limestone. Contains 35 pages, 5 plates. Lithoprinted, paper cover.
 6. **Minerals** chapter for a school textbook on the conservation of Arkansas' natural resources, under preparation by the State Board of Education, acting through the State Planning Board Source Book Committee. The chap-

- ter has been compiled under the direction of George C. Branner and is to be combined, for final publication, with chapters on soils, forests, wild life, water resources, parks, and flora. Contains 114 typewritten pages, 13 tables, 24 figures and 22 graphs.
7. **Manganese Minerals of Arkansas**, by George C. Branner. Prepared as chapter in the report, "An Outline of the Metallic Minerals of Arkansas." Contains 20 pages, 2 plates, 2 figures, 2 graphs and 7 tables. Printed, paper cover.
 8. **Catalog of Maps Contained in the State Map Library**. Compiled by George A. Rogers. Contains a list of maps, indexed and filed by W. P. A. Project 6008-3, State Map Library. Maps are listed by types. Contains 78 pages. Mimeographed, paper cover.
 9. **A Few Facts About the Natural Wealth of Arkansas**. Ten page folder summarizing statistical data on the economic products of Arkansas, together with a list of publications of the Arkansas Geological Survey. Contains 9 charts, 2 cross sections.
 10. **Survey of Crude Oils of the Producing Fields of Arkansas**, by O. C. Blade and George C. Branner. Sets forth the results of investigating the character of the crude oil in 25 Arkansas oil fields. Survey conducted under a cooperative agreement between the U. S. Bureau of Mines and Arkansas Geological Survey. Published as U. S. Bureau of Mines Report of Investigation 3486. Contains 40 pages. Mimeographed.
 11. **Annual Administrative Report of the State Geologist** for the period December 1, 1939, to November 30, 1940. Contains 74 pages, paper cover.

2. TOPOGRAPHY

1. **Lonoke topographic quadrangle**: Lithographed edition of sheet has been received from the U. S. Geological Survey. Includes an area of 258 square miles between north latitudes $34^{\circ} 45'$ and 35° and west longitude $91^{\circ} 45'$ and 92° . Scale 1: 62,500 or about 1 mile to the inch. Contour interval five feet. Field work was completed by the personnel of W. P. A. Projects 6682-9, Arkansas Geodetic Survey, sponsored by the office of State Geologist under the supervision of Sibley Ward; and in

cooperation with the U. S. Geological Survey. The location of the Lonoke quadrangle is shown in Figure 2.

2. **England topographic quadrangle:** Lithographed edition of sheet has been received from the U. S. Geological Survey. Includes an area of 258 square miles between north latitudes $34^{\circ} 30'$ and $34^{\circ} 45'$ and west longitudes $91^{\circ} 45'$ and 92° . Scale 1:48,000 or about $4/5$ mile to the inch. Contour interval five feet. The field work on the sheet was completed by the personnel of W. P. A. Projects 6682-9, Arkansas Geodetic Survey, sponsored by the Office of State Geologist under the supervision of Sibley Ward, in cooperation with the U. S. Geological Survey. The location of the England quadrangle is shown in Figure 2.

B. PROJECTS

1. Geologic

The geologic projects carried on have been designed primarily to supply detailed information concerning mineral resources which offer definite possibilities for commercial development. Geologic projects are discussed under three heads:

- a. Completed projects
- b. Incomplete projects continued from last twelve-month period
- c. New projects

a. Completed projects (geologic)

1. STATE MINERAL SURVEY SUB-PROJECTS

Special investigations completed by State Mineral Survey:

Lignite:

An investigation of lignite was completed in Secs. 25 and 26, T. 8 S., R. 17 W., Dallas County. Fifty-four shallow bore holes were put down, and a bed of lignite was mapped as to extent, thickness and overburden. The thickness was found to vary between two and eight feet. It is estimated that the deposit contains in excess of 7,000,000 tons. As a result of this investigation, the American Dyewood Company of New York leased a tract of land in Sec. 25, T. 8 S., R. 17 W., and is shipping lignite to its processing plant in Belleville, New Jersey.

Antimony:

Quartz veins (which are associated with antimony ore in Sevier and Polk counties) were mapped and trenched. Fifty-five cross-trenches were dug in order to expose these veins. The object of this work was to expose the vein system in order to assist prospectors in locating points for sinking prospect shafts within the antimony area.

Manganese:

Certain manganese deposits in Independence, Izard and Stone counties have been mapped, trenched and sampled.

Barite:

A deposit of barite (barium sulphate) in Polk County was investigated by trenching, and three veins were exposed. These are too small to justify development at present prices.

Zinc and Lead Reserve Estimate:

Howard Millar, Engineer of the State Mineral Survey, has completed an estimate of the metallic zinc and lead reserves of North Arkansas, based on a study of 119 mines and 117 prospects. The report contains 380 typewritten pages and will be published at an early date.

2. SAND AND GRAVEL DEPOSITS IN ARKANSAS

Data has been compiled from all available sources on sand and gravel pits and stone quarries in the state, together with physical tests of these materials. Data with respect to 779 sand and gravel pits and 252 stone quarries has been tabulated, together with basic data, and will be published at an early date. Contains 100 pages and 6 plates.

3. PITKIN LIMESTONE OF NORTHERN ARKANSAS

Under a cooperative arrangement made through the Department of Geology, University of Chicago, a study of the Pitkin limestone in Northern Arkansas was undertaken by William H. Easton. His report, which contains 228 typewritten pages, discusses the distribution, character, thickness and fauna of this important limestone formation.

4. ANTIMONY DEPOSITS IN ARKANSAS

Under a cooperative arrangement made through the Department of Geology, Northwestern University, a study of the antimony deposits of Southwestern Arkansas was under-

taken by Robert B. Hall. His report, which contains 227 typewritten pages, discusses the origin, distribution and economic importance of the antimony ores of Sevier and Howard Counties.

5. SPRINGS IN ARKANSAS

Basic data on 305 springs in Arkansas has been compiled and is ready for publication. Report will contain 100 pages and 20 plates.

6. LAKES IN ARKANSAS

Basic data on 487 lakes in Arkansas has been compiled and is ready for publication. Report will contain 150 pages and 12 plates.

7. CAVES AND CAVERNS IN ARKANSAS

The compiling of information on 230 caves and caverns in Arkansas has been completed by Mary L. Gibson. When published, will contain about 100 pages and 20 plates.

b. Incomplete projects (geologic)

1. STATE MINERAL SURVEY

A Work Projects Administration State Mineral Survey project, sponsored by the Office of State Geologist, was begun on January 7, 1938. The project was designed to take advantage of the unusual labor facilities made available by the W. P. A., in order to investigate the mineral values of those portions of the state which offer the most encouraging prospects for the development of mineral industries. As stated in the proposal, the project was "to determine the location and extent of construction material, mineral and other accessible natural resources, including the location of the state water tables, the available quantities of mineral deposits, their adaptability to commercial uses, and the preparation and publication of the compiled findings. This includes laboratory testing and analyses of the various materials."

In view of the relatively untrained type of field workers available, examinations could extend only to easily accessible and easily identifiable rocks and minerals and to surface and ground waters. By utilizing the assistance provided and establishing routine procedures, an immense body of valuable factual data has been accumulated as to the distribution, quality, and quantity of various minerals and waters present in the state.

The State Mineral Survey was originally established to undertake the examination of 23,086 square miles and was

later enlarged to include 30,536 square miles, or 57 per cent of the state's area. Up to November 30, 1940, a total of 27,366 square miles, or about 89 per cent of the area set up to be surveyed, had been surveyed for mineral resources and culture, a balance of 3,170 square miles of the selected area remaining to be examined on that date. That portion of the state not included in the revised plan, comprising a total of 21,989 square miles or about 43 per cent of the state area, will be surveyed in a modified form if W. P. A. approval for an extended project is obtained. In January, 1940, a ground water survey was established to supplement the mineral survey. This contemplates the ultimate water survey of every county in the state. Thirteen counties were completed on November 30, 1940.

A large number of mineral deposits have been surveyed; and, during the period January 7, 1938, to November 30, 1940, more than 77,416 mineral samples have been submitted to the Mineral Survey laboratory for identification or analysis. Samples of ground water collected by the field parties from wells and springs are being analyzed for chlorides, iron and hardness. A summary of the work completed in the various counties is given in table form on pages 24 and 25. (See also Figure 1.)

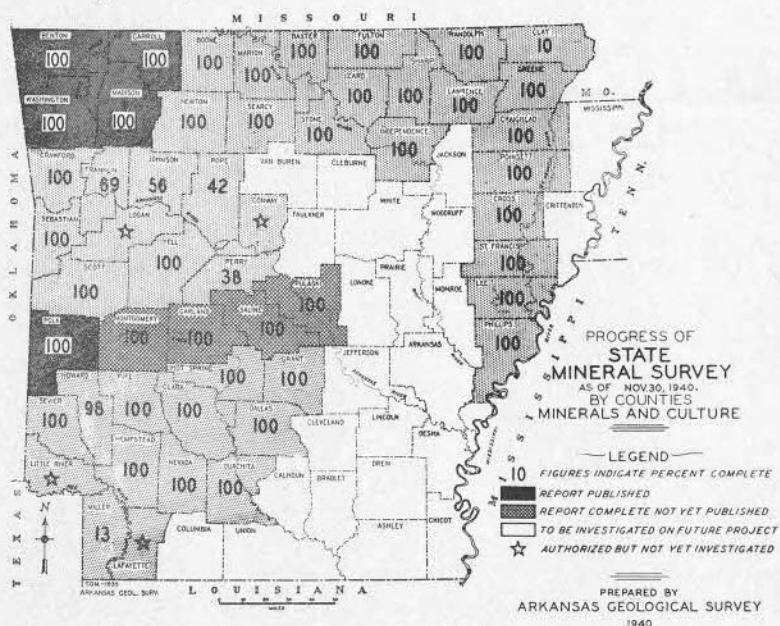


Figure 1. Map showing progress of the State Mineral Survey.

From January 7, 1938, to November 30, 1940, a total of 1,774,972 man hours had been consumed on the project and the total labor cost to the W. P. A. was \$817,706.12. On November 30, 1940, a total of 292 W. P. A. personnel was assigned to the project.

In July, 1940, the state field organization consisted of four districts composed of the counties indicated below, with district supervisors assigned to each.

DISTRICT SUPERVISORS AND COUNTIES

DISTRICT No. 1—

Lewis Crutchfield, Forrester Bldg., Waldron, Ark.
Benton, Carroll, Crawford, Franklin, Madison, Scott, Sebastian,
Washington, Yell.

DISTRICT No. 2—

Lewis Bohlinger, 148 College Ave., Batesville, Ark.
Baxter, Boone, Clay, Fulton, Greene, Independence, Izard, Marion,
Newton, Searcy, Sharp, Stone.

DISTRICT No. 3—

Rex E. Mhoon, Court House, 4th Floor, Hot Springs, Ark.
Clark, Garland, Hot Spring, Miller, Montgomery, Pike, Polk,
Sevier.

DISTRICT No. 4—

Percy C. Upton, 213½ W. 2d St., Little Rock, Ark.
Dallas, Grant, Hempstead, Nevada, Ouachita, Pulaski, Saline.

As an aid to the Mineral Survey, a laboratory has been constructed at the west end of the Old Penitentiary walls, at 3819 West Roosevelt Road in Little Rock, by W. P. A. labor. The laboratory consists of a clay-testing or ceramic laboratory and a chemical laboratory, and is equipped to make chemical analyses of mineral and water samples and to make physical tests of clays, including firing.

Work of Ceramic Laboratory

Although several brief reports on Arkansas clays have been published in the past and work has been done on some special clays such as the kaolins of Pike County, no comprehensive report, covering all the many types of useful ceramic clays available in the state, is now available. It is the purpose of this Survey to compile such a report and to make it available to all who may be interested in ceramic clays, either as producers of ceramic products who have need of clays, or as owners of the clay deposits who desire to sell or use the clays. The Survey is far from complete but a start has been

made and the results will be published as fast as it is practicable. It is evident from the work already done and the clays examined and tested that almost every type of clay known to the ceramic industries is present in the state. These include kaolin, ball clay, fire clay, surface clay, shale, bond fire clay, alluvial clay and terra cotta clay. Some of the articles that are made from these clays are: Porcelain, whiteware, pottery, common brick, face brick, sanitary ware, stoneware, enameled brick, tile, terra cotta, chemical ware, electrical insulators, refractories, paving brick, structural materials and many other articles. Some of the clays are not present in deposits large enough to warrant development, and it is one of the aims of the Survey to differentiate between deposits that contain usable clay in large quantities and those which contain limited quantities of usable clay.



Sample receiving building, State Mineral Survey Ceramic and Chemical Laboratory,
Little Rock.

Clay samples are obtained by augur borings. Samples are taken every $1\frac{1}{2}$ to 2 feet from each hole bored. Areas in which clay deposits of superior quality are found are bored sufficiently to determine the thickness and extent of each deposit.

Small clay samples from the field are examined by the ceramic engineer and, if judged to be of good quality, a 100-

pound sample is obtained from the deposit. Seventy-two large and thirty small test bars are then prepared for ten groups of tests to correspond with ten firing temperatures. A large kiln can be raised to 2500 degrees F. and a small fusing furnace to 3000 degrees F. Clays for special uses other than the manufacture of burnt clay products are sent to the U. S. Bureau of Mines clay laboratories either at Tuscaloosa, Alabama, or at Norris, Tennessee, both of which are cooperating. Following is a statement concerning clays tested from 11 counties.



Sample receiving room, State Mineral Survey Laboratory, Little Rock.

Saline County:

Thirty samples have been tested and ten of these were rejected as unfit for ceramic use. The results of the other twenty are complete. A special investigation on the kaolins formed from the weathering of syenite rock will be made before this county is completed.

Dallas County:

Work has been started on forty-six samples and these are in various stages of completion. One hundred and forty-two samples will be tested before this county is completed.

Grant County:

Fifty-six samples are being run. Seventy-six samples in all will be tested. The preliminary sampling is complete and the field crew is now engaged in obtaining samples from the deposits selected for testing.

Carroll County:

One sample has been tested. Requests for other samples will be made.

Garland County:

Three samples have been tested. The deposits to be tested have not yet been selected.

Hempstead County:

One sample has been started. Other deposits will be selected and tested.

Pike County:

Seven samples have been started. Only one of these is completed.

Sebastian County:

One sample is being tested. Other samples will be selected later.



Chemical Laboratory. State Mineral Survey Laboratory. Little Rock.

Sevier County:

Three samples have been received and are being tested. Other deposits will be tested.

Washington County:

Two samples have been partially completed. Further sampling and testing will be undertaken.

Ouachita County:

Small samples from thirteen deposits have been examined and passed upon as worthy of testing. None of the samples to be tested are in the laboratory as yet. Further sampling will be done before the county is completed.

Special Field Investigations

In addition to the routine field work of section by section survey, special investigations now being carried on by the State Mineral Survey are:

Gypsum:

Buried gypsum deposits in Howard and Pike counties are being drilled to determine their areal extent and thickness. With the aid of a man-powered drill, 30 test holes have



Preparing clay samples for firing tests, State Mineral Survey Ceramic Laboratory, Little Rock.

been put down and logged, 20 of which have penetrated gypsum beds varying in thickness from 8 to 16 feet. As a result of this drilling, the U. S. Gypsum Company of Buffalo, New York, has extended the prospecting with a power driven core drill.

Talc:

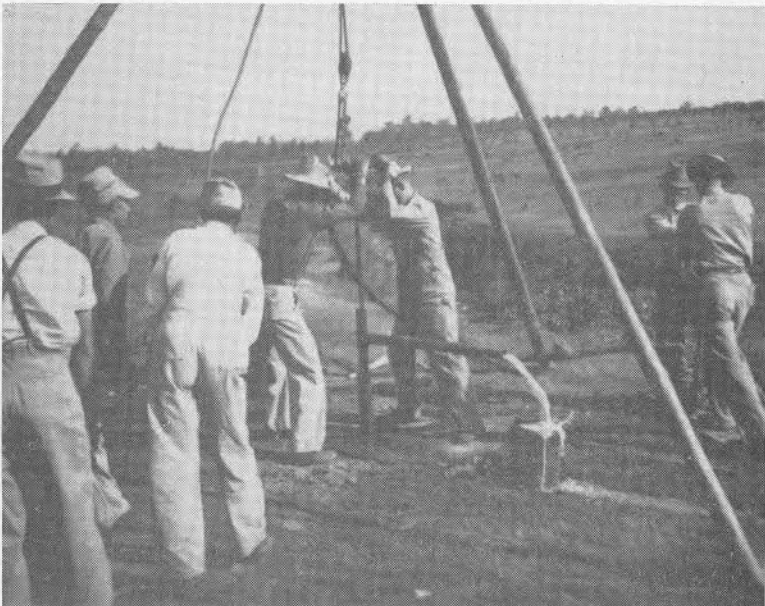
Talc, or soapstone, deposits near Congo in Saline County are being tested with a churn drill to determine their extent, thickness, overburden and tonnage. The quality of the material is being tested in the Survey ceramic laboratory.

Phosphate:

The rock phosphate deposits of Stone, Izard and Searcy counties are being mapped to determine their extent, thickness, overburden and quality. Other north Arkansas counties having phosphate deposits will be studied in like manner, as personnel becomes available.

Tripoli:

A deposit of tripoli, discovered in Benton County by the Mineral Survey, is being trenched, sampled and mapped



Drilling for gypsum in Pike County, State Mineral Survey project.

as to extent, thickness and overburden. Samples are being analyzed in the Survey laboratory.

Kaolin:

The Survey is attempting to locate a deposit of refractory clay which will make possible the exclusive use of Arkansas clays by Arkansas fire brick manufacturers. A deposit in Howard County is being investigated as to extent, thickness, overburden and burning range.

A list of the agencies and the individuals who have made possible the State Mineral Survey by providing necessary supplies, equipment, space or transportation is given below:

STATE DEPARTMENT CONTRIBUTORS

Arkansas State Highway Department
 Arkansas State Health Department
 Arkansas State Planning Board
 Arkansas Geological Survey

COUNTY CONTRIBUTORS

County	Contributor	Address
Benton	Benton County (Joe Beasley, County Judge)	Bentonville
Boone	Boone County (Jeffery Dixon, County Judge)	Harrison
Carroll	City of Eureka Springs (A. J. Russell, Mayor)	Eureka Springs
Clark	City of Amity (Homer Francis, Mayor)	Amity
Crawford	City of Alma (Mack C. Bolding, Mayor)	Alma
Dallas	Chamber of Commerce (Ed Schultz, Manager)	Fordyce
Fulton	Fulton County (Delbert Davis, County Judge)	Salem
Garland	Garland County (Elza T. Housley, County Judge)	Hot Springs
Grant	Grant County (John R. Matthews, County Judge)	Sheridan
Greene	Greene County (G. S. Self, County Judge)	Paragould
Hempstead	Hempstead County (Frank Rider, County Judge)	Washington
Hot Spring	Hot Spring County (Jack Kight, County Judge)	Malvern
Independence	Independence County (D. D. Adams, County Judge)	Batesville
Izard	Izard County (C. C. Aylor, County Judge)	Melbourne
Madison	Madison County (W. J. Drake, County Judge)	Huntsville
Marion	Chamber of Commerce (L. H. Caveness, Secretary)	Yellville

County	Contributor	Address
Montgomery	Montgomery County (J. H. Shaw, County Judge)	Mount Ida
Nevada	Nevada County (J. C. Woodul, County Judge)	Prescott
Newton	Newton County (C. B. Hudson, County Judge)	Jasper
Ouachita	Ouachita County (England Plunkett, County Judge)	Camden
Pike	Chamber of Commerce (John Porhamer, Secretary)	Glenwood
Pike	Pike County (Fred Nizzia, County Judge)	Murfreesboro
Polk	City Mena (J. A. Middleton, Mayor)	Mena
Pulaski	Arkansas Geological Survey (George C. Branner, State Geologist)	Little Rock
Pulaski	Arkansas Highway Department (W. W. Mitchell)	Little Rock
Saline	Saline County (Chas. O. Smithers, County Judge)	Benton
Scott	Scott County (Albert Oller, County Judge)	Waldron
Searcy	Searcy County (W. G. Fendley, County Judge)	Marshall
Sebastian	Sebastian County (R. P. Strozzi, County Judge)	Greenwood
Sevier	Sevier County (O. Kolb, County Judge)	DeQueen
Sharp	Sharp County (Lester Steward, County Judge)	Hardy
Stone	Young Business Men's Club (U. B. Dearien, President)	Mountain View
Washington	Washington County (I. R. Rothrock, County Judge)	Fayetteville
Yell	Yell County (Morris Moore, County Judge)	Danville

RESUME OF COUNTY WORK COMPLETED BY THE STATE MINERAL SURVEY

COUNTY	Area of County (sq. mi.)	Area to be Surveyed (sq. mi.)	Area Completed (sq. mi.)	Per Cent Complete	Number of Samples Collected	Principal Deposits Sampled	Total Number Wells Investigated Nov. 30, 1940	Total Number Wells Investigated Nov. 30, 1940	Partial Water Analyses of Wells and Springs Nov. 30, 1940	Complete Water Analyses of Wells and Springs Nov. 30, 1940
Baxter	586	586	586	100	1,298	Limestone, marble, dolomite, sandstone, chert, tripoli, shale, slate.	481	607	0	0
Benton	876	876	876	100	2,331	Limestone, marble, dolomite, sandstone, chert, tripoli, shale, slate.	1,890	1,277	1,022	0
Boone	608	608	608	100	2,787	Limestone, marble, dolomite, sandstone, shale, hematite, limonite, galena, clay.	333	291	570	8
Carroll	641	641	641	100	1,154	Limestone, marble, dolomite, sandstone, quartzite, chert, sand, galena.	747	308	372	0
Clark	882	882	864	98	352	Clay, marl, chalk, sandstone.	1,000	75	0	0
Clay	654	201	64	10	0	To be surveyed later.	0	0	0	0
Conway	563	563	0	0	0	To be surveyed later.	0	0	0	0
Craighead	687	179	179	100	103	Clay, marl, sandstone, gravel.	240	77	0	0
Crawford	593	593	593	100	1,471	Clay, sand, gravel, coal.	422	42	403	0
Cross	619	99	99	100	112	Clay, marl, sandstone, gravel.	130	10	0	0
Dallas	679	679	679	100	5,105	Clay, sand, sandstone, lignite.	769	45	0	0
Franklin	606	606	418	69	0	Sandstone, shale.	857	53	0	0
Fulton	625	625	625	100	775	Limestone, marble, dolomite, sandstone, chert, tripoli, kaolin, shale, slate.	583	241	824	4
Garland	738	738	738	100	1,945	Limestone, sandstone, novaculite, shale, slate.	551	133	0	0
Grant	637	637	637	100	3,954	Clay, sand, sandstone, lignite.	724	68	0	0
Greene	561	561	561	100	2,076	Clay, marl, sandstone, gravel.	1,214	17	1,231	4
Hempstead	727	727	727	100	2,574	Clay, marl, chalk, sandstone, greensand.	1,476	77	574	1
Hot Spring	613	613	613	100	2,777	Clay, bentonite, limestone, quartzite, slate.	927	193	0	0
Howard	602	602	590	98	777	Barite, limestone, marl, sand, sandstone, greensand, selenite, sphalerite, galena, cinnabar, stibnite.	706	102	0	0
Independence	762	762	762	100	2,514	Clay, limestone, marble, sand, sandstone, shale, slate, epsom salts, phosphate, iron ore, manganese.	819	196	0	0
Izard	583	583	583	100	2,809	Limestone, dolomite, marl, sandstone, chert, tripoli, shale, phosphate, sphalerite, hematite, slate.	445	533	939	5
Johnson	675	675	378	56	470	Sandstone and shale.	412	49	0	0
Lafayette	525	525	0	0	0	To be surveyed later.	0	0	0	0
Lawrence	592	246	246	100	338	Kaolin, limestone, dolomite, sandstone, tripoli, gravel, sphalerite, smithsonite, galena, iron oxide.	250	71	0	0
Lee	601	60	60	100	0	Clay, marl, sandstone, gravel.	40	5	0	0
Little River	546	546	0	0	0	To be surveyed later.	0	0	0	0

RESUME' OF COUNTY WORK COMPLETED BY THE STATE MINERAL SURVEY—Continued

COUNTY	Area of County (sq. mi.)	Area to be Surveyed (sq. mi.)	Area Completed (sq. mi.)	Nov. 30, 1940	Percent Complete	Number of Samples Collected	Jan. 1938	Nov. 30, 1940	Principal Deposits Sampled	Total Number Wells Investigated Nov. 30, 1940	Partial Water Analyses of Wells and Springs Nov. 30, 1940	Complete Water Analyses of Wells and Springs Nov. 30, 1940
Logan	726	726	0	0	0	0	0	0	To be surveyed later.	0	0	0
Madison	836	836	836	2,456	100	2,456	0	966	Limestone, quartzite, shale, oil shale, gravel.	245	1,041	0
Marion	646	646	646	3,327	100	3,327	0	369	Limestone, marble, dolomite, sandstone, chert and flint, iron oxide, zinc, lead.	911	771	0
Miller	623	623	95	13	2	0	0	0	To be surveyed later.	0	0	0
Montgomery	784	784	784	4,188	100	4,188	0	742	Limestone, sandstone, novaculite, shale, slate, zinc, lead.	257	0	0
Nevada	620	620	620	1,907	100	1,907	0	1,063	Clay, marl, chalk, sandstone.	148	768	0
Newton	846	846	846	1,851	100	1,851	0	471	Yellow ochre, limestone, marble, sandstone, chert, shale, zinc.	333	131	0
Ouachita	733	733	733	3,380	100	3,380	0	739	Clay, lignite, sand, gravel.	111	0	0
Perry	552	552	210	135	38	135	0	402	Clay, limestone, Black marble, sand, sandstone, soft coal.	8	0	0
Phillips	692	42	42	27	100	27	0	43	Clay, marl, sandstone, gravel.	5	0	0
Pike	601	601	601	1,253	100	1,253	0	994	Clay, limestone, gravel, gypsum, cinnabar, kaolin.	145	332	0
Poinsett	721	72	72	165	100	165	0	110	Clay, marl, sandstone, gravel.	67	0	0
Polk	846	846	846	3,244	100	3,244	0	1,413	Copper, iron, lead, manganese, zinc, barite, clay, novaculite, slate, building and road materials, tripoli, sandstone and shale.	391	1,387	28
Pope	828	348	348	802	100	802	0	627	Sandstone and shale.	19	0	0
Pulaski	779	779	779	1,084	100	1,084	0	1,695	Limestone, quartzite, gravel, slate, lead, clay.	122	1,130	0
Randolph	654	438	438	673	100	673	0	260	Clay, limestone, gravel, iron ore.	80	0	0
Saline	743	743	743	2,597	100	2,597	0	464	Clay, kaolin, bentonite, limestone, sand, talc.	33	26	0
Scott	970	970	970	1,145	100	1,145	0	1,002	Sandstone, novaculite, shale, calcite, sandstone, shale, sphalerite, iron ore, zinc, lead.	58	604	0
Searcy	673	673	673	862	100	862	0	289	Clay, limestone, marble, calcite, sandstone, shale, sphalerite, iron ore, zinc, lead.	501	666	4
Sebastian	531	531	531	1,247	100	1,247	0	1,899	Sandstone, shale, clay.	37	1,413	3
Sevier	572	572	572	2,950	100	2,950	0	738	Kaolin, clay, greensand, zinc, stibnite.	140	0	0
Sharp	609	609	609	3,209	100	3,209	0	522	Kaolin, limestone, dolomite, sandstone, tripoli, gravel, sphalerite, smithsonite, galena, iron oxide clay.	452	853	0
St. Francis	628	82	82	431	100	431	0	3	Clay, sand and gravel.	0	0	0
Stone	611	611	611	789	100	789	0	317	Limestone, marble, dolomite, sandstone, chert, tripoli, shale, slate.	239	583	18
Washington	955	955	955	3,548	100	3,548	0	1,753	Limestone, quartzite, shale, tripoli, clay.	433	1,300	8
Yell	955	955	955	1,424	100	1,424	0	1,345	Sand, sandstone and gravel.	19	0	0
TOTALS	35,515	30,536	27,366	85	77.416	85	77.416	33,242		9,224	16,940	83

c. New projects (geologic)

In addition to the projects completed and continued, the following new projects have been initiated:

1. OUTLINES OF ARKANSAS' MINERAL RESOURCES

This publication was originally issued in 1927 and has proved so popular that a second edition is now being prepared. Chapters on the minerals found in the state are being prepared separately. Two of these chapters, *Manganese Minerals of Arkansas* and *Limestones of Northern Arkansas*, have been published. When all chapters have been revised, the completed report will be published in three volumes: *Non-Metallic Minerals*, *Metallic Minerals*, and *Fuel Minerals*.

2. MINING LAWS OF ARKANSAS

A digest of all laws directly and indirectly affecting mining in Arkansas has been compiled by J. Fred Brown, Severance Tax Agent. The manuscript includes 213 typewritten pages.

3. HANDBOOK ON ECONOMIC RESOURCES OF ARKANSAS

A booklet compiled for use of Arkansas Agricultural and Industrial Commission, Washington office, by Elizabeth Poe. Contains data on geography, climate, topography, surface and ground water, population, occupations, agricultural products, forest products, mineral products, manufactured products, electric power, transportation and labor in Arkansas. Contains 100 pages, in looseleaf binder. It is planned to publish the material for distribution in cooperation with the State Planning Board and the Agricultural and Industrial Commission.

4. COOPERATION WITH THE U. S. GEOLOGICAL SURVEY IN CONNECTION WITH W. P. A. SURVEY OF GROUND WATERS OF ARKANSAS

During the fiscal year 1939-40, a cooperative agreement was entered into with the U. S. Geological Survey to provide technical advice in connection with the prosecution of the Ground Water Survey section of the W. P. A. State Mineral Survey.

In March, 1940, W. O. George of the U. S. Geological Survey Ground Water Staff of Texas spent several days in Little Rock and assisted in the organization of field work and field procedures for the Ground Water Survey.

5. COOPERATION WITH THE U. S. BUREAU OF MINES IN A STUDY OF THE CLAYS OF ARKANSAS

During the fiscal years 1939-40 and 1940-41, a cooperative agreement was made with the U. S. Bureau of Mines for the purpose of coordinating the state and federal clay investigation program. The State Geological Survey, through the W. P. A. State Mineral Survey, is locating promising deposits of clays and, where necessary, drilling them to determine their extent, thickness and overburden. Samples of clays of especial interest and value are sent to the Experiment Stations of the U. S. Bureau of Mines at Tuscaloosa, Alabama, and Norris, Tennessee, for extended testing.

The Bureau of Mines also supplies the services of an engineer from time to time for such detailed field investigation as may be necessary.

6. STATE MAP LIBRARY

A State Map Library has been established. Four map cabinets have been constructed and now contain 1050 maps. All have been indexed and a considerable number have been mounted on linen. The collection is principally confined to Arkansas and includes topographic, geologic, soil, ownership, oil and gas, highway, county base, and historic maps. Also included are a considerable number of United States maps and those of foreign countries. With the permission of the Secretary of State, the map library has been set up in one corner of the hall adjoining the Geological Survey offices. Three map display frames have been placed on the walls.

2. Topographic Projects

(a) Completed topographic projects

The field work on the Scott 1 and 3, and the Cabot 4, all 7½ minute quadrangle sheets, covering areas of approximately 63 square miles each, or a total of 189 square miles, has been completed. The area mapped during the year on these three quadrangles totaled 119 square miles. Twenty square miles of Cabot 1 have been completed. The horizontal scale is 1:24,000, contour interval five feet. The locations of these sheets are shown in Figure 2.

The mapping was completed by the personnel of W. P. A. Projects 6682-9, Arkansas Geodetic Survey, sponsored by the Office of State Geologist, under the supervision of Sibley L. Ward, in cooperation with the United States Geological Survey.

Vertical and horizontal control, preliminary to contour mapping, has been completed on the 7½ minute Levy sheets 1, 2, and 3, on the Cabot 1 and 2 and on the 15 minute Sheridan, Conway, Enola and Beebe sheets. The locations of these sheets are shown in Figure 2.

QUADRANGLES PUBLISHED

As indicated under "Publications Issued," the Lonoke (15 minute) quadrangle and the England (15 minute) quadrangle have been published in lithographed form.

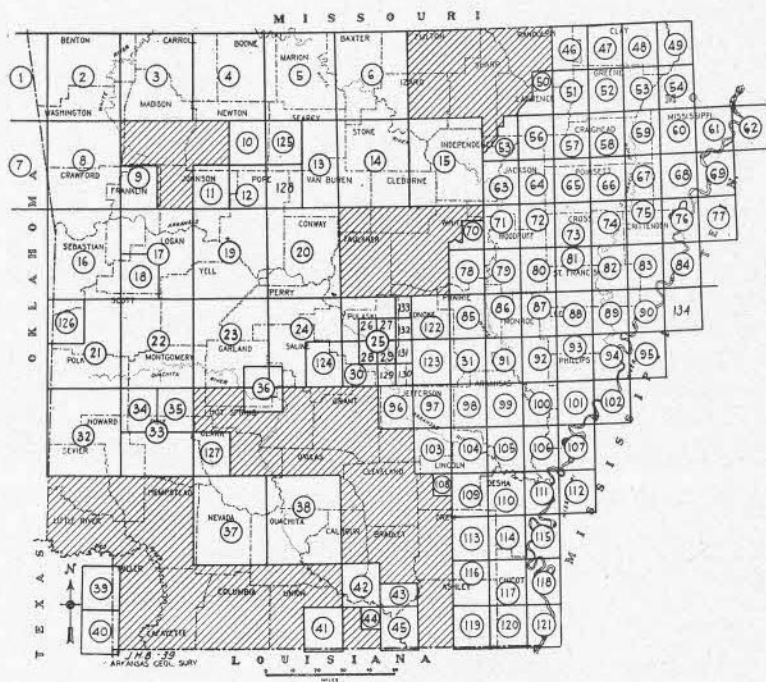


Figure 2. Index map of topographic quadrangles in Arkansas.

QUADRANGLE SHEETS OF THE UNITED STATES GEOLOGICAL SURVEY

Available at the U. S. Geological Survey, Washington, D. C., or the
Arkansas Geological Survey

1. Siloam Springs	21. Poteau Mountain	41. El Dorado
2. Fayetteville	22. Mount Ida	42. Moro Bay
3. Eureka Springs	23. Hot Springs	43. Ingalls
4. Harrison	24. Benton	44. Strong
5. Yellville	25. Little Rock, 30 minute	45. Felsenthal
6. Mountain Home	26. North Little Rock	122. Lonoke*
7. Tahlequah	27. McAlmont	123. England
8. Winslow	28. Little Rock, 7½ minute	124. Benton, 15 minute
9. Watalula	29. Sweet Home	125. Snowball**
10. Mount Judea	30. Alexander	126. Poteau Mountain 2 **
11. Ozone	31. Stuttgart	127. Antoine**
12. Treat	32. DeQueen	128. Smyra**
13. Marshall	33. Caddo Gap	129. Woodson*
14. Mountain View	34. Athens	130. Keo*
15. Batesville	35. Glenwood	131. Scott 1 *
16. Fort Smith	36. Hot Springs and vicinity	132. Jacksonville*
17. Magazine Mountain	37. Gurdon	133. Cabot*
18. Booneville	38. Camden	134. Horn Lake
19. Dardanelle	39. Texarkana	
20. Morrilton	40. Atlanta	

* Being prepared for publication.

** Being surveyed.

QUADRANGLE SHEETS OF THE WAR DEPARTMENT CORPS OF ENGINEERS

Available at Mississippi River Commission, Vicksburg, Miss., and at
the Arkansas Geological Survey

46. Reyno	72. Tilton	98. Goldman
47. Knobel	73. Vanndale	99. DeWitt
48. Rector	74. Prindedale	100. Indian Bay
49. Piggott	75. Deckerville	101. Modoc
50. Powhatan	76. Jericho	102. Farrell
51. Walnut Ridge	77. Millington	103. Nobel Lake
52. Gainesville	78. Kensett	104. Varner
53. Marmaduke	79. Gregory	105. Gillett
54. Kennett	80. Hunter	106. Henrico
55. Strawberry	81. Wynne	107. Mellwood
56. Alicia	82. Whitmore	108. Feenyville
57. Sedgwick	83. Edmonson	109. Rotan
58. Jonesboro	84. Memphis	110. Red Fork
59. Leachville	85. Hazen	111. Big Island
60. Manila	86. DeValls Bluff	112. Pace
61. Blytheville	87. Brinkley	113. Cominto
62. Hale's Point	88. Marianna	114. McGehee
63. Newport	89. Park Place	115. Lamont
64. Tuckerman	90. Horseshoe Lake	116. Mist
65. Weiner	91. Clarendon	117. Lake Village
66. Dee	92. Holly Grove	118. Refuge
67. Marked Tree	93. Marvell	119. Wilmot
68. Evadale	94. La Tour	120. Eudora
69. Osceola	95. Clayton	121. Readland
70. Bald Knob	96. Pastoria	
71. Augusta	97. Altheimer	

b. Incomplete topographic projects continued during the pe- riod December 1, 1939, to November 30, 1940.

1. COMPUTATION AND RUNNING OF LEVEL AND TRAVERSE LINES AND TOPOGRAPHIC MAPPING

The computation of plane coordinates and the running of level and traverse lines in unmapped areas in the central part of the state (See Fig. 2), which was begun by W. P. A.

Projects 3334-3 and 4702-3, Arkansas Geodetic Survey, sponsored by the Arkansas Geological Survey, has been continued by Projects 5575-9 and 6682-9. The work accomplished by these projects, in addition to the quadrangle mapping described under (a) above, is as follows:



Topographic mapping with plane table.

- (a) Office Computation: Computations of Lambert projection plane coordinates for every minute intersection of latitude and longitude within the state have been completed. This work involved 69,480 computations.

Tables known as "Delta Tables" are being made up, which will simplify the computations of surveys made in Arkansas, save two-thirds of the work, and eliminate most of the errors usually made in computing. This work was 70 per cent complete on November 30, 1940.

Field notes for second order precise levels have been corrected and reduced to sea level datum; third order transit traverse, covering an area of approximately 1,360 square miles, have been converted to geographic positions of latitude and longitude; polar observations have been computed and true North referred to permanent points near monuments. These positions, elevations and azimuths constitute the basic control for the topographic mapping of the following quadrangles: Cabot 1 and 2, Levy 1, 2, and 3; Conway, Enola, Beebe and Sheridan (see Fig. 2).

Descriptions of 1,075 bench marks of the U. S. Coast and Geodetic Survey and the Arkansas Geo-

detic Survey have been rewritten for publication by the U. S. Coast and Geodetic Survey and for the files of the Arkansas Geological Survey.

- (b) Field Work: A total of 265 linear miles of second order precise levels and 392 miles of transit traverses have been run; 61 polar observations have been taken, and 1,500 miles of reconnaissance, including setting 214 bench marks, have been completed. This work has been both in areas subject to flood and areas in the vicinity of Camp Robinson, and is therefore of value to the U. S. Engineers. The field topography of Cabot 4 and Scott 3, covering an area of approximately 139 square miles, has been completed and forwarded to the U. S. Geological Survey for publication. Topographic field work on Cabot 1 and 2 and Levy 1 and 2 quadrangles is being continued.
- (c) A card index of all elevations in Arkansas is kept up-to-date. This now includes 22,000 elevations. Elevations and descriptions of all bench marks which were established during the year by any agency have been added to the file. An index card file, which shows the geographic positions by latitude and longitude of monuments and readily identifiable landmarks, is being added.

3. Stream Gaging Project

In accordance with the provisions of Act 573 of the Acts of 1923, the Arkansas Geological Survey has provided dollar for dollar cooperative support, \$800 for the fiscal year ending June 30, 1940, and \$850 for the year ending June 30, 1941, in the state stream gaging program during the past year. The field work has been in charge of the Water Resources Branch of the U. S. Geological Survey, J. L. Saunders, Fort Smith, District Engineer. Other agencies, federal, state, and private, contribute to the program.

The following statement, dated October 31, 1940, was submitted by John L. Saunders, U. S. Geological Survey, Fort Smith, Arkansas, with reference to stream gaging in Arkansas:

"Beginning with the fiscal year ending June 30, 1938, a program of orderly and systematic collection of stream-flow records has been carried on in Arkansas, largely as a result of cooperative agreements between the Water Resources Branch of the U. S. Geological Survey, the Arkansas Highway

Commission, and the Arkansas Geological Survey. Prior to that time, this important and basic work was carried on only intermittently and on a small scale, due to the lack of sufficient State funds being advanced to support the work. The results of this program should prove of inestimable value in future years. Continuous records of stream flow, extending over a long period of years, are an essential prerequisite to the intelligent planning of all projects and developments that are dependent on, or related to, the flow of water in streams—such as public water supplies, sewage disposal and pollution control, hydroelectric power plants, steam power plants, navigation, flood control reservoirs, levees, irrigation, and many others. Thus, the collection of these data should prove an important factor in the development of the abundant natural resources with which the State is favored and, of which, water is one of the most important.

"As of December 1, 1939, there were 45 stream flow measurement stations being operated by the U. S. Geological Survey in cooperation with the Arkansas Highway Commission, Arkansas Geological Survey and other interested agencies. Under this cooperative program, two new stations were established during the year—one station being equipped with recording gage and the other, of the non-recording type. No stations were discontinued during the year. Thus, a total of 47 stream gaging stations were being operated at the end of the year ending December 31, 1940, 39 of which were equipped with automatic water-stage recorders. During the year about 900 current-meter discharge measurements were made by engineers of the U. S. Geological Survey, and some additional measurements were made by the Corps of Engineers, U. S. Army. This is a much larger number of measurements than it had been possible to obtain in any preceding year.

"Contributions to the stream-flow gaging program in Arkansas for the fiscal years 1939-41 are as follows:

Agency	Fiscal year 1939-1940	Fiscal Year 1940-1941
Arkansas Highway Commission	\$ 7,500	\$ 7,500
Arkansas Geological Survey	800	850
U. S. Geological Survey	11,450	10,850
Corps of Engineers, U. S. Army	4,075	4,250
Federal Power Licensees	1,600	1,500
Municipalities	250
	\$25,675	\$24,950

"Records of daily, monthly and yearly discharge, together with brief station descriptions and such other information regarding the stations and the conditions under which the records were collected as seems necessary for the convenience and proper use of the records, are published without cost to the State by the U. S. Geological Survey in the annual series of Water-Supply Papers.

"On November 30, 1940, the following cooperative stream-gaging stations were in operation:

"Stream gaging stations now in operation. The numbers refer to the numbers shown on the map (Figure 3).

1. St. Francis River at Marked Tree
2. St. Francis Floodway near Marked Tree
3. White River near Flippin
4. White River near Batesville
5. White River at DeValls Bluff
6. West Fork of White River near Fayetteville
7. Buffalo River near Rush
8. North Fork White River near Fayetteville
9. Black River near Pochontas
10. Spring River at Imboden
11. Eleven Point River near Eleven Point
12. Strawberry River near Poughkeepsie
13. Little Red River near Heber Springs
14. Red River at Index
15. Lagrue Bayou near Stuttgart
16. Arkansas River at Van Buren
17. Arkansas River at Dardanelle
18. Arkansas River at Little Rock
19. Frog Bayou near Mountainburg
20. Petit Jean Creek near Booneville
21. Petit Jean Creek at Danville
22. Fourche La Fave near Nimrod
23. Petit Jean Creek near Blue Mountain
24. Bayou Meto near Stuttgart
25. Red River at Garland
26. Little River near Horatio
27. Cassatot River near De Queen
28. Ouachita River near Mountain Pine
29. Ouachita River near Malvern
30. Mulberry River near Mulberry
31. Little Missouri River near Murfreesboro
32. Saline River near Rye
33. Black River near Corning
34. Buffalo River near St. Joe
35. Crooked Creek near Humphrey
36. Fourche La Fave near Gravelly
37. Middle Fork Little Red River near Shirley
38. Piney Fork of Strawberry River at Evening Shade
39. Poteau River at Cauthron
40. Saline River near Dierks
41. South fork of Little Red River near Clinton
42. Strawberry River near Evening Shade
43. White River at Calico Rock
44. White River at Newport
45. Black River at Black Rock

- 46. Crooked Creek at Yellville
- 47. Kings River near Berryville

"The additional 5 stations needed are as follows:

- 48. St. Francis River near Parkin
- 49. White River near Georgetown
- 50. Saline River near Benton
- 51. Illinois River near Siloam Springs
- 52. Ouachita River near Mt. Ida"

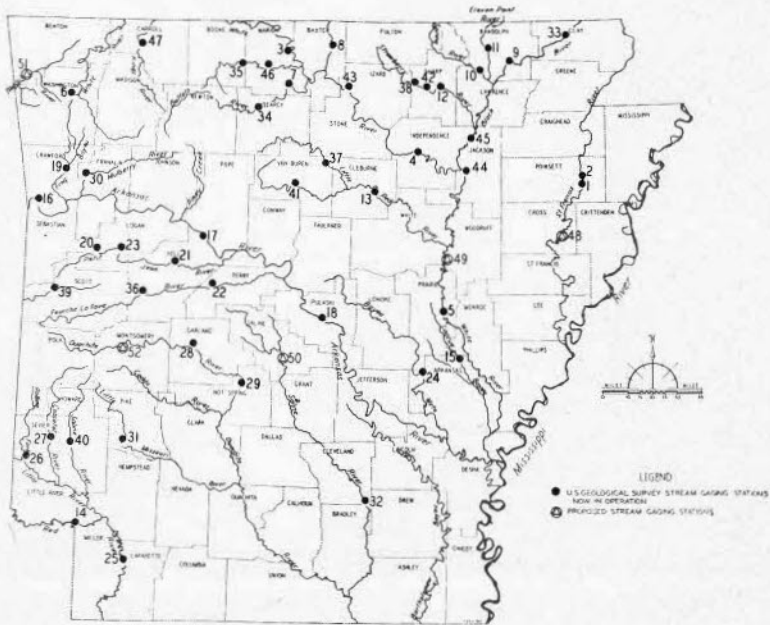


Figure 3. Map of Arkansas showing location of stream gaging stations now in operation and stations recommended for installation.

C. OFFICE ADMINISTRATION

The office administration is discussed under three divisions:

1. Work of the State Geologist
2. Services maintained
3. Work Projects Administration projects

1. WORK OF THE STATE GEOLOGIST

In addition to handling the routine correspondence and examining and reporting on samples of minerals submitted by individuals throughout the state, the State Geologist has spent time in the field collecting data for reports and examining mineral properties which appear worthy of attention.

Field trips have also been made in connection with the field work being done by the W. P. A. State Mineral Survey project under the sponsorship of the Arkansas Geological Survey.

Considerable time has been spent in Washington, D. C., (as assistant to the Office of the State Agricultural and Industrial Commission) on matters pertaining to the location of defense industries in Arkansas.

In addition to the reports listed under "Publications," the following papers and articles have been prepared by the State Geologist for publication in journals or for delivery before scientific meetings:

1. *Mineral Production of the South*, prepared for *Manufacturers Record*, November, 1939.
2. *Report on Economic Resources of St. Francis River Basin*, prepared for St. Francis Subcommittee, Lower Mississippi "A" Basin Committee, of the National Resources Planning Board, August 23, 1939.
3. *Mineral Production in the Little Missouri River Basin*, prepared for the Arkansas Flood Control Commission, October 9, 1939.
4. *Mineral Development in Arkansas—Past and Future*, prepared for the *Memphis Commercial Appeal*, October 11, 1939.
5. *Mineral Production of the South*, prepared for *Manufacturers Record*, November, 1939.
6. *War Demand for Southern Minerals with Especial Reference to Arkansas*, prepared for the *Manufacturers Record*, February, 1940.
7. *Effect of the European War on Arkansas' Metallic Mineral Production*, prepared for the United Press, February 27, 1940.
8. *Utilization of Electric Power in Connection with the Development of Mineral Resources of the Ozark Region*, prepared for Governor Baily, September 6, 1940.
9. *War Demand for Southern Minerals*, prepared for the *Arkansas Gazette*, October 2, 1940.
10. *State Mineral Survey in Arkansas*, prepared for *Society of Economic Geologists*, September, 1940.

Out of state meetings attended by the State Geologist during the year included the following:

1939

December 3 To Washington, D. C., to confer with officials of U. S. Geological Survey and other federal bureaus in connection with cooperative agreements with states with respect to investigations of strategic minerals.

December 26 To Minneapolis, Minn., to attend annual meetings of Geological Society of America and Society of Economic Geologists. Paper delivered "State Mineral Survey In Arkansas."

1940

February 13 To Washington, D. C., to attend meeting of Association of American State Geologists and for conference with officials of the United States Geological Survey.

March 19	To Memphis, Tenn., to attend meeting of Lower Mississippi "A" Basin Committee, National Resources Planning Board.
April 15	To Chicago, Ill., to attend annual meeting of American Association of Petroleum Geologists.
August 8	To Dallas, Tex., to attend meeting of Southwest Mississippi "B" Basin Committee of the National Resources Planning Board.
September 5	To Washington, D. C., to assist Arkansas defense industries work of the Agricultural and Industrial Commission.
September 21	To Washington, D. C., to assist work of Agricultural and Industrial Commission in connection with the establishment of an aluminum plant in Arkansas.
September 23	To Dallas, Tex., to attend meeting of Regional Planning Advisory Committee of National Resources Planning Board.
November 10	To Washington, D. C., to assist Arkansas defense industries work of the Agricultural and Industrial Commission.

The State Geologist has served on the State Planning Board, both as a member and as vice-chairman and disbursing officer; on the Executive Committee as chairman; on the Water Resources Committee as chairman, and on the Governor's Council of National Defense organized by the Planning Board.

He has also served as a committee member of the following groups:

- American Engineering Council, Surveys and Maps Committee.
- National Resources Planning Board, Lower Arkansas "A" Basin Committee.
- National Resources Planning Board, Regional Planning Advisory Committee.
- Association of American State Geologists, Federal Reorganization Committee.
- State Department of Education, Editorial Sub-Committee.
- State Farm Tenancy Commission.
- Centennial Commission, World's Fair Planning Committee.
- Am. Inst. of Min. & Met. Engineers, Industrial Preparedness Committee.

In the capacity of Lieutenant Colonel in the Officers Reserve Corps of the United States Army, the State Geologist is assigned to the Commodities Division of the Office of the Assistant Secretary of War for study of strategic and critical mineral resources. At the request of that Office, a study was

prepared during the year on manganese supply and demand in the United States, which has been submitted to the Army and Navy Munitions Board. A second study on "Reserves and Production of Minerals in the Southern States and Their Relation to the Public, 117, Sec. 7," dealing with investigations of strategic and critical minerals in the Southern States, was also submitted.

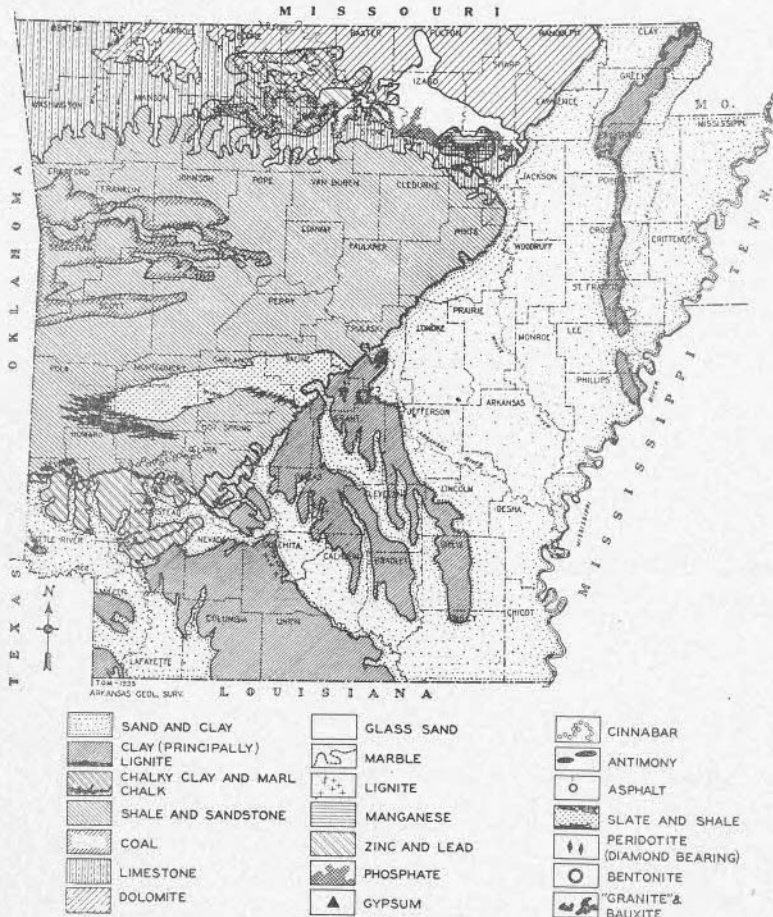


Figure 4. Map of Arkansas showing mineral resources.

2. Services Maintained

Requests for information: During the past year, the office has replied to approximately 5,000 requests for geological, mineralogical and industrial information, and has sold or otherwise distributed approximately 1600 publications.

Examination and analyses of minerals: Examination and partial analyses of approximately 300 mineral specimens submitted were made during the year.

Mineral property and market index: Names of owners of mineral properties and of those who report the existence of mineral deposits are kept on file in order to meet frequent requests for such information. Names of mining companies, manufacturers, and buyers who inquire concerning the existence of mineral deposits are also indexed for reference. The office thus acts as a clearing house for information affecting the development of mineral industries.

Exhibits: A permanent exhibit of the economic minerals and mineral products of Arkansas is maintained on the ground floor of the State Capitol. A second exhibit is maintained on the fourth floor of the Capitol.

An exhibit of maps and charts was also placed in the Arlington Hotel, Hot Springs, for the meeting of the National Oil Scouts Association, May 30 to June 2, 1940.

Compilation of mineral production figures: Monthly severance tax statistics on state mineral production are compiled and kept up-to-date. Production figures from sales reports on sand and gravel removed from state-owned stream beds are also compiled monthly. Other statistics relative to state mineral production are compiled from records of the U. S. Bureau of Mines, U. S. Geological Survey, and the American Petroleum Institute.

Well log file: Available logs of oil, gas and water wells drilled in Arkansas are on file for use by the public. Approximately 2500 oil or gas well logs and 500 water well logs are on file.

Library: A department library is maintained for office reference and for public use. This contains approximately 7000 books and pamphlets relating to the natural resources of Arkansas and other states. Current periodicals relating to the development and utilization of oil, gas and other minerals are kept on file for consultation.

Mineral collection: A collection of over 400 specimens of minerals of the state is arranged for inspection.

Core collections: A collection of cuttings and 800 feet of cores from wells drilled in Arkansas are kept for reference.

Distribution of publications: The publications listed below are on hand in the Office of State Geologist for distribution:

	Copies on Hand
1. Annual Report, 1890, Vol. IV, Marbles and other Limestones, by T. C. Hopkins	156
2. Annual Report, 1891, Vol. II, Miscellaneous Reports	271
3. Annual Report, 1892.....	307
4. Publication of 1909, Slates of Arkansas, by A. H. Purdue, with a bibliography of the geology of Arkansas by J. C. Branner ...	425
5. Publication of 1927, An Outline of the Physical Features of Arkansas, by George C. Branner.....	17
6. Advance reprint from Bulletin 2, Upper Cretaceous Ostracoda of Arkansas, by M. C. Israelsky.....	1,156
7. Bulletin 1, 1929, Upper Cretaceous Formations of Southwestern Arkansas, by Carle H. Dane	1,426
8. Bulletin 3, 1930, The Geology of the Arkansas Paleozoic Area, by Carey Croneis	2,260
9. Bulletin 4, 1930, St. Peter and Older Ordovician Sandstones of Northern Arkansas, by A. W. Giles.....	500
10. Bulletin 5, 1930, a Geomagnetic Survey of the Bauxite Region in Central Arkansas, by N. H. Stern.....	1,090
11. Stream Gaging Report 1, 1930, Stream Gaging in Arkansas from 1859 to 1928, by W. S. Frame.....	1,674
12. Geologic Map of Arkansas, 1930, scale 1:500,000.....	1,250
13. Geologic Map of Arkansas, 1930, scale 1:500,000, mounted	5
14. Topographic Map of Arkansas, 1930, scale 1:500,000, contour interval 250 feet.....	2,700
15. Topographic Map of Coastal Plain of Arkansas, 1930, scale 1:500,000, contour interval 100 ft.....	1,600
16. Topographic Map of Arkansas, 1930, scale of 1:500,000, showing national forests	254
17. Topographic Map of Arkansas, 1930, scale of 1:500,000, showing national forests and roads	215
18. Topographic Map of Arkansas, 1930, scale 1:500,000, showing national forests and power transmission lines	190
19. Topographic Map of Arkansas, 1930, scale 1:500,000, showing national forests, oil and gas fields, oil and gas pipe lines	1,853
20. Geological Subsurface of Central Arkansas, Bauxite Region, Bramlette	650
21. Topographic Map of Arkansas, showing transmission lines, some mines and quarries	1,853
22. Topographic Map of Arkansas, showing Gulf Coastal Plain boundary, oil and gas pipe lines, some mines and quarries ..	1,853
23. Information Circular 3, 1932, Black Marbles of Northern Arkansas, by Bryan Parks and J. M. Hansell	407
24. Information Circular 4, 1933, Eearthquake Risks in Arkansas, by George C. Branner and J. M. Hansell	76
25. Information Circular 6, 1936, Elevations in Arkansas,	
Volume I	32
Volume II	33
Volume III	89
Volume IV	98
Volume V	59

Volume VI.....	103
Volume VII.....	87
Volume VIII.....	70
Volume IX.....	90
26. Information Circular 7, Directory of Arkansas Mineral Producers for 1935, compiled by Mary L. Gibson.....	220
27. Information Circular 8, Geology of the Arkansas Bauxite Region, by M. N. Barmlette.....	1,070
28. Information Circular 9, Mineral Production Statistics of Arkansas for the Period 1880-1935, compiled by Mary L. Gibson.....	324
29. Information Circular 10, List of Arkansas Oil and Gas Wells, compiled under the direction of George C. Branner.....	750
30. Information Circular 11, List of Arkansas Water Wells, compiled under the direction of George C. Branner.....	323
31. Information Circular 8, Plate IX.....	650
32. Information Circular No. 12, Lower Cretaceous and Jurassic Formations of Southern Arkansas, by Ralph W. Imlay.....	960
33. Pope County Report No. 1.....	360
34. State Map Library.....	225
35. Manganese Minerals in Arkansas, by George C. Branner.....	1,400

3. Work Projects Administration Projects

During the year December 1, 1939, through November 30, 1940, two W. P. A. projects were carried on under the sponsorship of the Arkansas Geological Survey:

Name:	State Mineral Survey Project
No.:	6041-9
Purpose:	Statewide survey to determine the location and extent of construction materials, mineral and other accessible natural resources, including location of the state water tables; available quantities of mineral deposits; their adaptability to commercial uses and the preparation and publication of the compiled findings. This includes laboratory testing and analyses.
Personnel:	(October 31, 1940)
	1 State supervisor
	11 assistant state supervisors
	4 district supervisors
	7 assistant district supervisors
	9 timekeepers
	1 physical scientist
	1 chief of party
	28 foremen, grade "B"
	7 draftsmen
	6 laboratory assistants
	1 accountant
	2 clerks, supervising
	6 secretaries
	2 carpenters
	1 plumber
	1 library clerk, supervising
	70 junior engineering recorders
	13 research checkers
	11 stenographers
	2 senior clerks
	1 stock clerk

	4 drivers	
	3 junior typists	
	13 junior clerks	
	118 laborers	
	1 janitor	TOTAL324
Date:	Set up January 7, 1938.	
Supervisors:	E. E. Castleberry, Assistant State Supervisors: William Spence, R. C. Tucker, Jr., H. Pickleseimer, F. D. Roach, J. S. Lewis, Jr., R. N. Denning, H. A. Millar (project engineer), A. Wagoner, H. E. Carroll, P. C. Upton. District Supervisors: L. C. Crutchfield, Rex Mhoon, L. Bohlinger. Assistant District Supervisors: Mrs. Mary Dickson, Rex F. Redwine, S. E. Henry, S. Kimzey, L. Hall, R. D. Sharrock, W. G. Rinehart.	
Work accomplished:	Referred to in this report under "Accomplishments."	
Name:	Arkansas Geodetic Survey.	
Nos.:	5775-9 (12/1/39 to 4/15/40) 6682-9 (4/15/40 to 11/30/40)	
Purpose:	To establish permanent magnetic stations in each county seat, compute the magnetic declination of various cities and towns and prepare maps and tables wherein the declination of any point may be easily determined; compute plane coordinate positions for each minute of latitude and longitude of the State of Arkansas, projected on a map in conjunction with the magnetic stations, so that positions, as well as declination, may be determined for any points in the State; establish triangulation, traverse, and level nets for permanent base control lines that will constitute accurate control for topographical surveys of the unmapped areas of the State; compute plane coordinate positions, using both Lambert and Mercator projections, and level lines of the U. S. Coast and Geodetic Survey, and the correction of certain U. S. Coast and Geodetic Survey and U. S. Geological Survey level lines and topographical work; and to conduct a topographical survey of area covered by two or more fifteen minute quadrangle sheets.	
Personnel:	(Office)	(Field)
	2 supervisors	4 supervisors
	1 secretary	1 timekeeper
	1 timekeeper	3 foremen, Grade B
	3 clerks (supervising)	1 engineering recorder
	13 senior clerks	21 Rodman-chainmen
	3 draftsmen	
	13 engineering recorders	
	1 stenographer	
	2 senior typists	
	1 junior clerk	
		TOTAL70
Dates:	Set up October 12, 1938 (Project No. 5775-9) April 15, 1940 (Project No. 6682-9)	
Supervisors:	Sibley L. Ward, Superintendent; Marvin J. Ray, Assistant Superintendent; 4 project engineers and 1 topographer.	
Work accomplished:	This project is for the continuation and expansion of work begun under Project No. 4702-3 and is discussed in this report under "Accomplishments."	

D. ACTIVITIES OF THE SEVERANCE TAX AGENT

The following letter, dated October 31, 1940, from J. Fred Brown, Severance Tax Agent, to the State Geologist, describes his activities for the period July 1, 1938, to November 30, 1940:

"It appears the last published report from this Department provided a section on my activities as Severance Tax Agent to June 30, 1938. I therefore transmit herewith a summary of my activities in this capacity from July 1, 1938, to November 30, 1940.

"Attached hereto and made a part hereof, as Exhibit 'A,' is a schedule showing a detail of all audits made, broken down into taxes assessed and collected, and further divided by resources applicable thereto. This report indicates total assessments for the period \$34,034.64, from which collections have been reported as follows:

"Oil and gas	\$14,964.46
Timber	4,537.77
Bauxite	122.16
Cinnabar	917.76
Stone	11.55
Coal	775.71
Limestone and gypsum	193.33
	Total
	\$21,522.74

"By way of explanation of the uncollected items:

"**First.** Assessments have been made against timber producers for severance tax accruing on timber cut from government owned tracts. The tax is assessed upon the theory that the assessments are primarily against the producer, the tax being a privilege tax against those actually engaged in severing. The assessments are defended on the theory that for the severance tax act to be valid, it must be based upon the State's right of police power. In that the State is not vested with authority to police federally owned timber lands, it therefore follows that we have no taxing power pertaining thereto. This matter should be formally adjudicated and has been submitted to the State Revenue Department's counsel for that purpose.

"Second. Assessments are made against those engaged in purchasing cedar posts in Northwest Arkansas. In view of the cedar posts being acquired in both Arkansas and Missouri without distinction as to place of purchase, it has become a difficult matter to single out the Arkansas production for the application of taxes. I expect to close these cases in the near future purely by compromise and common reasoning.

"Third. Assessments representing the bulk of uncollected items apply to hewn cross-ties against purchasers, which are defended on the theory of such production being exempted specifically by Act 116 of 1923, the same being an Act purporting to amend Act 118 of 1923 by exempting hewn cross-ties from the customary severance tax. I have previously reported and again repeat, in my opinion Act 116 of 1933 is invalid for the failure of the title to the Act. Said title does not summarize in detail the Act which it purports to amend, but depends on its validity by using only the Act number and year, which is inaccurately stated. Our Supreme Court has held that in such case, if the Act number referred to for amendment is inaccurately stated without an expression as to the subject matter sought to be amended, the entire Act will within itself fail. Severance taxes pertinent to hewn cross-ties at the present time are being most inequitably administered. Perhaps 30% of the severance taxes accruing thereon are being reported and paid; but nothing is being done to test the validity of the act on which the remaining 70% is being withheld. This matter should also be adjudicated, and has been placed in the hands of the Revenue Department's attorneys for this purpose.

"At the Extraordinary Session of the General Assembly of 1919, a bill was passed to exempt royalties on sand and gravel taken from navigable streams or lakes within the state of Arkansas when such deposits are to be used for road building. I have previously expressed this Act to be invalid for the reason of its not falling within the purview of the Governor's proclamation for the Extraordinary Session. This Department is being deprived of considerable revenues by virtue of said Act; and, in my opinion, a suit should be filed to test the validity of the Act, or a new bill presented to the 1941 legislature to repeal the Act. Even if valid, the same was passed to assist the counties and improvement districts in rebuilding their roads during an emergency and a depression; and in view of such conditions being now non-existent, it naturally follows that the law should be removed.

"Due to our severance tax laws having been amended by almost every session of the legislature to the point where it has become almost practically impossible to understand all phases pertaining thereto, I would suggest that the entire laws be redrafted into one complete bill for presentation before the 1941 legislature. This has been suggested by the Comptroller's office, and I am assured their cooperation.

"During the past six months, data and information have been assembled for the purpose of supporting a publication on 'The Mining Laws of Arkansas.' A rough draft is now on your desk and I shall be pleased to complete same after your review."

EXHIBIT "A"
STATEMENT OF SEVERANCE TAX AUDITS AND COLLECTIONS
FROM 7-1-38 TO 11-30-40

	Severance Tax Assessed	Oil & Gas	Timber	SEVERANCE TAX COLLECTED				Lime- stone & Gypsum
				Barite	Cinnabar	Stone	Coal	
American Cyanamid & Chemical Company, New York, N. Y.								
The Milwittie Company, Magnet Cove, Ark.	\$ 122.16							
Southwestern Quicksilver Company, St. Louis, Mo.	917.76							
The Titanium Corporation, Tulsa, Okla.	Incomplete							
Tobin Quarries, Incorporated, Kansas City, Mo.	11.55				\$11.55			
Mid-Continent Quicksilver Company, Wichita, Kan.	718.35							
Quality Coal Company, Ozark, Ark.	628.89						\$628.89	
Atlas Pipe Line Company, Shreveport, La.								
Benedum-Trees, Pittsburg, Pa.								
F. W. Burford, Dallas, Texas								
I. E. Crosbie, Incorporated, Tulsa, Okla.	3,738.54	\$ 3,738.54						
Henry H. Cross Company, Chicago, Ill.	1,459.08	1,459.08						
East Texas Refining Company, Dallas, Texas								
F. C. & E. P. Henderson, San Antonio, Texas	32.31	32.31						
Louisiana Iron & Supply Company, Shreveport, La.								
Lion Oil Refining Company, El Dorado, Ark.	4,461.24	4,461.24						
McMillian Petroleum Company, Barlettsville, Okla.								
Phillips Petroleum Company, El Dorado, Ark.								
Republic Oil Company, Pittsburg, Pa.								
The Bruce-White Manufacturing Company, Eudora, Ark.	225.00							
Wilson Lumber Company, Hot Springs, Ark.	1.57							
H. L. Wilson Lumber Company, Hot Springs, Ark.	68.80		\$	1.57				
Wright & Braughton, Hot Springs, Ark.	308.40		68.80					
Gunter Lumber Company, Hope, Ark.	169.39		308.40					
J. W. Anthony & Sons, Nashville, Ark.	250.00		169.39					
Budd Post Company, Fayetteville, Ark.			250.00					
Anthony-Jones Lumber Company, Pine Bluff, Ark.	45.53							
W. V. Harris Lumber Company, Clarksville, Ark.	17.45							
L. H. King Lumber Company, Clarksville, Ark.	487.82							
Anthony-Bass Lumber Company, Ashdown, Ark.								
F. T. Dooley Lumber Company, Brinkley, Ark.	473.94							
F. E. Monzuigo Lumber Company, Rosston, Ark.								
L. A. Foster, Stephens, Ark.								
White City Lumber Company, Camden, Ark.	294.96							
Murfreesboro Lumber Company, Murfreesboro, Ark.	384.35							
Waldron Lumber Company, Waldron, Ark.	148.09							

II. FUTURE WORK

The program for future work of the Office is discussed under the following headings:

- A. Geologic
- B. Topographic
- C. Stream gaging

A. GEOLOGIC

Plans for geologic work for the year beginning December 1, 1940, involve the publication of manuscripts now on hand, or which may be completed during the year, and the carrying on of field work so far as funds permit.

1. Funds permitting, it is planned to publish the following reports during the next twelve months:

County Report Series 3. Mineral Resources of Pulaski, Saline, Garland and Montgomery Counties.

County Report Series 4. Mineral Resources of Boone, Marion, Newton and Searcy Counties.

County Report Series 5. Mineral Resources of Pike, Howard and Sevier Counties.

County Report Series 6. Mineral Resources of Clark, Hot Spring, Dallas and Grant Counties.

Estimate of Zinc and Lead Reserves of North Arkansas.

Fuel Minerals of Arkansas.

Metallic Minerals of Arkansas.

Non-Metallic Minerals of Arkansas.

Mining Laws of Arkansas.

Sand, Gravel and Stone Deposits of Arkansas.

Handbook of Economic Resources of Arkansas (Cooperative).

Antimony Deposits of Southwestern Arkansas.

Pitkin Limestone of Northern Arkansas.

Lakes of Arkansas.

Caves and Caverns of Arkansas.

Springs of Arkansas.

2. W. P. A. field project sponsored by the Survey to be continued—

State Mineral Survey. It is anticipated that the mineral and culture investigations in the following counties will be completed during the twelve-month period:

Baxter, Benton, Boone, Carroll, Clark, Clay, Conway, Craighead, Crawford, Dallas, Franklin, Garland, Grant, Hempstead, Hot Spring, Howard, Independence, Izard, Johnson, Lafayette, Little River, Logan, Madison, Marion, Miller, Montgomery, Nevada, Newton, Ouachita, Pike, Randolph, Saline, Scott, Searcy, Sevier, Washington and Yell. It is planned to carry on the following W. P. A. special

investigations by State Mineral Survey personnel at such time as funds will permit.

Molybdenite:

A deposit of molybdenite, or molybdenum sulphide, which has not been previously reported as occurring in Arkansas, has been found. A detailed study of a deposit of this mineral, which occurs in the eastern part of Magnet Cove, Hot Spring County, will be made by the State Mineral Survey.

Marble:

Samples of the different types of marble found in Baxter, Boone, Carroll, Independence, Izard, Marion, Newton, Searcy and Stone Counties will be collected. Three sets of these samples will be cut and polished for display.

Zinc:

A drilling program for deposits of zinc minerals will be carried out along the St. Joe and Mill Creek faults in Newton and Searcy Counties.

Lignite:

Continuation of the lignite prospecting program is planned for Dallas, Grant, Hot Spring, Nevada, Ouachita, Pulaski and Saline Counties.

Phosphate:

A study of phosphate rock deposits in Izard County will be continued. It is planned to extend this work to the deposits in Independence County.

Greensand:

A drilling program for greensands (glauconitic or potash sands) is planned for Clark, Hempstead, Howard, Little River and Nevada Counties.

Clays:

It is planned to continue laboratory study of the clays of the Coastal Plain counties in the State Ceramic Laboratory.

3. As funds become available, it is planned to begin field studies of the following mineral resources in Arkansas:

Phosphates. In addition to the W. P. A. Mineral Survey field work now proceeding in the phosphate area, it is planned to make detailed geologic studies of the occurrences of phosphate in the entire Ozark area, the Ouachita area, and the Cretaceous area, in order to understand their distribution and economic value more completely.

Quartz crystals. A systematic study of the quartz crystal deposits of Arkansas has never been made, and, as quartz is classed as a strategic mineral by the Army and Navy Munitions Board, the distribution of the deposits is of importance.

Limestones. A study of the Ordovician limestone beds of Pulaski, Saline, Garland, and Montgomery counties has never been completely made, and it is planned to complete such study. Limestones are particularly valuable in central Arkansas as their occurrence is limited, and as limestones used in central Arkansas, for the most part, have to be transported from northern Arkansas.

Oil shales. A study of the oil shales of northern Arkansas. No systematic study of these has ever been made. The oil

content of these shales may at some time be commercially important.

Limestone suitable for rock wool. A study of the limestones of Arkansas suitable for the manufacture of rock wool insulating material, has never been made and such a study is contemplated.

Geologic mapping. Several geologic mapping studies should be made when and if sufficient funds are available. These include:

- Mapping and differentiation of the Ordovician rocks of the central Ouachita Province.
- Detailed mapping of the Tertiary formations of southwestern Arkansas.
- Mapping of the Fayetteville shale in northern Arkansas.
- Study of the structures of the Ouachita Province.

B. TOPOGRAPHIC

So far as funds permit, it is planned to continue the W. P. A. topographic mapping and extend the work during the year beginning December 1, 1940, to include the following quadrangles:

- Cabot Nos. 1 and 2—7½ minute quadrangle
- Levy Nos. 1 and 2—7½ minute quadrangle
- Conway—15 minute quadrangle
- Enola—15 minute quadrangle
- Sheridan—15 minute quadrangle

Horizontal control (leveling and traverse), which is preliminary to topographic mapping, will be extended as personnel and funds permit. The following figures show the present status of the mapping within the state:

	Square miles	Per cent
Area adequately mapped	19,988	37.5
Area inadequately mapped	19,505	36.6
Total area mapped	39,493	74.1
Area not mapped	13,842	25.9
Total area of state	53,335	

In view of the fact that 25.9 per cent of the state is not mapped (see Fig. 5), it seems highly advisable that a systematic program for the mapping of the unmapped areas, cooperatively with the U. S. Geological Survey on a 50-50 basis, be followed. An appropriation of \$15,000 per year would permit the expenditure of \$30,000 per year for cooper-

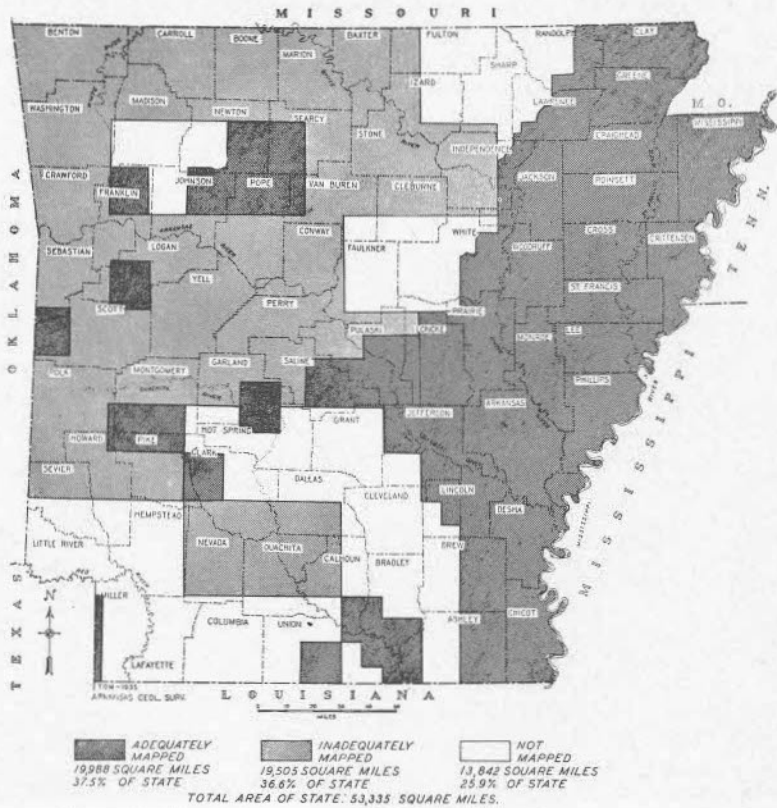


Figure 5. Map of Arkansas showing areas adequately and inadequately mapped, and unmapped areas.

ative mapping of all unmapped areas, and would permit the completion of such maps in about 17 years. An item was included in Act 387 of 1937 for this amount to be spent on topographic mapping during the fiscal years 1939-40 and 1940-41, but no expenditures have been made for this purpose under this Act because of its questioned legality.

C. STREAM GAGING

For the fiscal year 1940-41, the stream gaging program, in cooperation with the U. S. Geological Survey, will be continued on a 50-50 basis, the Arkansas Geological Survey contributing \$850.00.

III. PERSONNEL

The personnel of the Office of State Geologist during the period December 1, 1939, to November 30, 1940, has been as follows:

George C. Branner, State Geologist
Sue Peay Martin, Secretary
Mary L. Gibson, Senior Clerk-Stenographer
Elizabeth Poe, Senior Statistical Clerk
Rose Marie Gougeon, Stenographer
Jeanice Hundley, File Clerk
Sarah Large, Librarian (part time)
George H. Pace, Clerk (part time)

Milton W. Corbin, Co-ordinator, State Mineral Survey
Project

A. D. Hoagland, Writer, State Mineral Survey Project
Albert Hess, Draftsman
J. Fred Brown, Severance Tax Agent

Paul Goss, Editor-Writer (resigned)
Raymond J. Wismer, Co-ordinator (resigned)
John B. Hanley, Assistant Geologist (resigned)
Harry Wallace (deceased)
Lucy C. Marion, Secretary (resigned)

During the year, W. P. A. personnel in numbers varying from 319 to 708 have been assigned to the two projects under the sponsorship of the Survey. On November 30, 1940, the total number assigned was 319.

IV.—FINANCES

The finances of the Department during the year ending November 30, 1940, are discussed under the following headings:

- A. Appropriations
- B. Receipts
- C. Expenditures
- D. Sinking fund
- E. Cooperative funds

A. APPROPRIATIONS

For the fiscal years July 1, 1938, to June 30, 1940, the items of the appropriations for the support of the Office of State Geologist are summarized as follows:

	Fiscal year 1939-1940	Fiscal year 1940-1941
Salaries, miscellaneous wages	\$20,500.00	\$20,500.00
Topographic mapping	2,000.00	2,000.00
Stream gaging	1,000.00	1,000.00
Geological field and office work, including contribu- tions to State Mineral Survey	5,000.00	5,000.00
Travel, State Geologist and Severance Tax Agent....	2,700.00	2,700.00
Publications, miscellaneous maintenance, printing, freight, express, analyses, stationery	7,230.00	7,230.00
	\$38,430.00	\$38,430.00

B. RECEIPTS

For the fiscal years July 1, 1939, to June 30, 1941, the receipts for the support of the Office of State Geologist are summarized as follows:

	Fiscal year 1939-1940	Fiscal year 1940-1941 (Estimated)
Severance tax	\$19,924.08	\$22,780.44
Sand and gravel tax	30,958.62	29,340.64
Sale of publications	554.80	1,530.12
Others	25.15
Transfer	3,900.00	3,900.00
	\$55,362.65	\$57,551.20
Less receipts from severance tax, sand and gravel sales and other sources for deposit in sinking fund (1%)	660.23	575.51
Amount received for current expenses	\$54,702.42	\$56,975.69
Amount carried over from preceding year	21,206.63	25,479.15
	\$75,909.05	\$82,454.84
Total amount available for current expenses		
Appropriations for current expenses:		
Arkansas Geological Survey .. \$38,429.97*		
Flood Control Commission	11,999.93*	50,430.00
	50,429.90	50,430.00
Balance to be carried over	\$25,479.15	\$32,024.84

* Actual expenditures

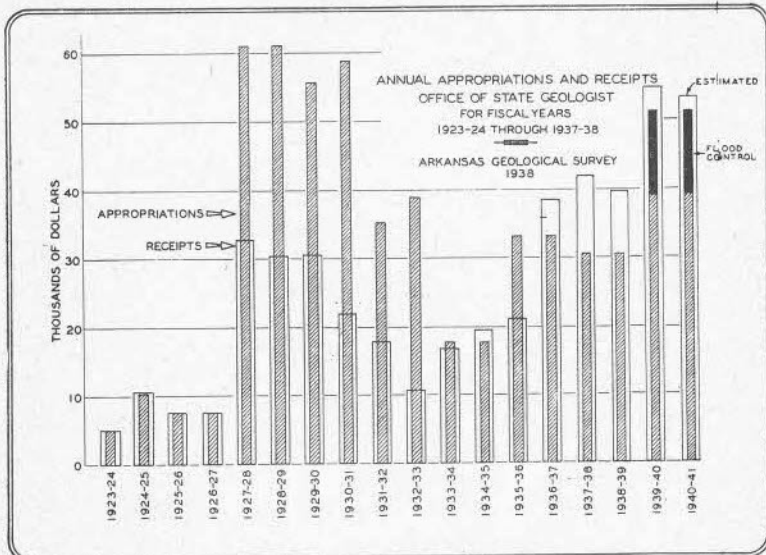


Figure 6. Graph showing annual appropriations and receipts of Office of State Geologist for fiscal years 1923-23 through 1940-41.

C.—EXPENDITURES

The expenditures of the Office of State Geologist for the years 1939-1940 and 1940-1941 are summarized as follows:

	Fiscal year 1939-1940	Fiscal year 1940-1941
Salaries of office employees, severance tax agent, extra help	\$16,453.42	\$17,000.00
State geological studies, including salaries and travel (Imlay and Easton).....	1,064.19	1,000.00
Contribution to State Mineral Survey WPA project including equipment, supplies and travel	8,299.15	8,300.00
Topographic mapping:		
Contribution to WPA mapping project	\$ 860.36	
Cooperation with USGS.....	1,463.16	3,000.00
Water Resource studies:		
Stream gaging (cooperation with USGS)	\$ 800.00	
Underground water studies (cooperation with USGS)	60.00	860.00
Travel:		
State Geologist	\$ 427.26	
Severance tax agent.....	1,174.60	
Others	37.36	1,500.00
Publication of reports	2,298.38	3,000.00
Office supplies, equipment, books, postage, express, and other miscellaneous maintenance.....	5,492.12	3,780.00
	<u>\$38,430.00</u>	<u>\$38,430.00</u>

D. SINKING FUND

For the fiscal years July 1, 1939, to June 30, 1940, the receipts and disbursements from the State Geologist Sinking Fund are summarized as follows:

	Fiscal year 1939-1940	Fiscal year 1940-1941 (Estimated)
Balance on hand, July 1, 1939	\$ 1,503.54	\$ 1,663.77
Receipts	660.23	575.51
	<hr/>	<hr/>
Total available	2,163.77	2,239.28
Expenditures	500.00	500.00
	<hr/>	<hr/>
Balance	\$ 1,663.77	\$ 1,739.28

E. COOPERATIVE FUNDS

I.

The following amounts were expended by various agencies on projects carried on in cooperation with the Arkansas Geological Survey during the fiscal year 1939-1940:

AGENCIES	Stream gaging	Topographic mapping	W.P.A. Triang. & Leveling Sur. Project Nos. 5775-9 6682-9	State-wide mineral survey W.P.A. Project 6041-9	Totals
Works Projects Administration					
Salaries			\$53,788.78	\$221,018.62	\$274,807.40
Travel			2,050.00	20,668.91	22,718.91
Equipment and supplies			584.89	1,086.89	1,671.78
Laboratory				5,946.54	5,946.54
U. S. Coast and Geodetic Survey			3,250.00		3,250.00
Equipment and supplies					
U. S. Geological Survey	\$ 800.00	\$1,500.00			2,300.00
Cooperation				60.00	60.00
Ground water studies					
Others (Includes co-sponsors with the Arkansas Geological Survey)					
Rent				13,440.58	13,440.58
Equipment and supplies				10,002.95	10,002.95
Utilities				2,054.31	2,054.31
Transportation				22,777.50	22,777.50
Miscellaneous				8,443.94	8,443.94
OH site				12,446.12	12,446.12
Totals for cooperating agencies	\$ 800.00	\$1,500.00	\$59,673.67	\$317,946.36	\$379,920.03
Arkansas Geological Survey					
Salaries			57.47	1,520.50	1,520.50
Equipment and supplies			802.89	6,550.43	6,607.90
Travel				228.22	1,031.11
Laboratory		1,463.16		4,855.05	4,855.05
Cooperation	800.00				2,263.16
Ground water studies				60.00	60.00
Totals for Arkansas Geological Survey	\$ 800.00	\$1,463.16	\$ 860.36	\$ 13,214.20	\$ 16,337.72
Totals for Arkansas Geological Survey and cooperating agencies	\$1,600.00	\$2,963.16	\$60,534.03	\$331,160.56	\$396,257.75

II.

It is estimated the following amounts will be spent by various agencies on projects carried on in cooperation with the Arkansas Geological Survey during the fiscal year 1940-1941. (The amounts shown as contribution by the Works Projects Administration are estimated on the basis of project requests.):

AGENCIES	Stream gaging	Topographic mapping	W.P.A. Triang. & Leveling Sur. Project No. 6082-9	State-wide mineral survey W.P.A. Project 6041-9	-Totals
Works Projects Administration					
Salaries			\$55,000.00	\$225,000.00	\$280,000.00
Travel			2,400.00	21,500.00	23,900.00
Equipment and supplies			750.00	1,200.00	1,950.00
Laboratory				5,000.00	5,000.00
U. S. Coast and Geodetic Survey					
Equipment and supplies			3,000.00		3,000.00
U. S. Geological Survey					
Cooperation	\$ 850.00	\$1,500.00			2,350.00
Others (Includes co-sponsors with the Arkansas Geological Survey)					
Rent					
Equipment and supplies				12,350.00	12,350.00
Utilities				9,750.00	9,750.00
Transportation				1,950.00	1,950.00
Miscellaneous				21,450.00	21,450.00
Off site				7,800.00	7,800.00
				11,700.00	11,700.00
Totals for cooperating agencies	\$850.00	\$1,500.00	\$61,150.00	\$317,700.00	\$381,200.00
Arkansas Geological Survey					
Salaries				3,600.00	3,600.00
Equipment and supplies			1,500.00	5,305.00	6,805.00
Travel				200.00	200.00
Cooperation	850.00	1,500.00		200.00	2,550.00
Totals for Arkansas Geological Survey	\$ 850.00	\$1,500.00	\$ 1,500.00	\$ 9,305.00	\$ 13,155.00
Totals for Arkansas Geological Survey and cooperating agencies	\$1,700.00	\$3,000.00	\$62,650.00	\$327,005.00	\$394,355.00

APPENDIX—MINERAL PRODUCTION
AND PRODUCERS IN ARKANSAS

1939

**QUANTITY AND VALUE OF AND SEVERANCE TAX COLLECTED
ON MINERALS PRODUCED IN ARKANSAS, 1939**

Mineral Produced	County	No. of Prod. Companies ¹		Quantity Produced	Value	Severance Tax Paid ²
Barite	Hot Spring	1	1	2,545.51 Sh. T.	\$ 16,469.45	\$ 122.16
Bauxite	Pulaski	4		69,917.95 Lg. T.	400,629.85	4,087.56
"	Saline	4	6	330,335.99 Lg. T.	1,892,825.22	19,324.89
				400,253.94 Lg. T.	2,293,455.07	23,412.45
Cement	Howard	1	1	564,500.00 Bbls.	818,525.00	459.45
Clay Products (Brick)	Craighead	1		13,284 Thousand	99,630.00	14.21
"	Hempstead	1		18,073 Thousand	135,547.50	.25
"	Hot Spring	2		63,843 Thousand	478,822.50	198.15
"	Sebastian	1	4	12,137 Thousand	91,027.50	55.21
				107,337 Thousand	805,027.50	267.82
Clay (Raw)	Hot Spring	1		3,789.10 Sh. T.	26,523.70	6.90
"	Miller	1		40,109.58 Sh. T.	88,642.17	88.65
"	Sevier	1		11,889.99 Sh. T.	26,276.88	26.25
"	Saline	1	3	949.52 Sh. T.	1,880.05	1.84
				56,738.19 Sh. T.	143,322.80	123.64
Coal	Franklin	16		121,324.25 Sh. T.	428,274.61	1,213.26
"	Johnson	28		182,576.85 Sh. T.	644,496.27	1,825.77
"	Logan	28		379,073.59 Sh. T.	1,338,129.78	3,792.41
"	Pope	1		38,495.23 Sh. T.	135,888.16	384.96
"	Scott	1		17,141.00 Sh. T.	60,507.73	171.41
"	Sebastian	36	106	423,717.70 Sh. T.	1,495,723.48	4,408.24
				1,162,328.62 Sh. T.	4,103,020.03	11,796.05

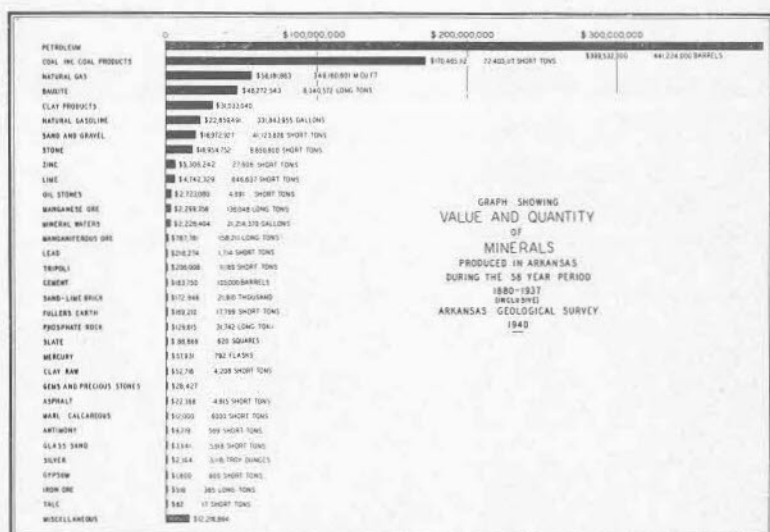


Figure 7. Graph showing value and quantity of minerals produced in Arkansas during the 58 year period 1880-1937, inclusive.

**QUANTITY AND VALUE OF AND SEVERANCE TAX COLLECTED
ON MINERALS PRODUCED IN ARKANSAS, 1939—Continued**

Mineral Produced	County	No. of Prod. Companies ¹	Quantity Produced	Value	Severance Tax Paid ²
Glass Sand	Boone	1	5,104.90 Sh. T.	8,729.38	6.88
	Izard	1	65,310.32 Sh. T.	111,680.65	87.73
			70,415.22 Sh. T.	120,410.03	94.61
Gravel ³	Bradley	1	83,236.00 Cu. Yds.	66,172.62	64.92
"	Baxter	1	64,608.00 Cu. Yds.	51,363.36	3,230.40
"	Chicot	2	50,328.93 Cu. Yds.	40,011.50	1,838.51
"	Clark	2	30,809.40 Cu. Yds.	24,493.47	54.51
"	Clay	2	5,115.00 Cu. Yds.	4,066.42	6.64
"	Cleveland	1	11,612.46 Cu. Yds.	9,231.90	15.09
"	Columbia	4	15,254.80 Cu. Yds.	12,127.56	36.66
"	Conway	1	3,684.80 Cu. Yds.	2,929.42	4.80
"	Craighead	2	21,344.00 Cu. Yds.	16,968.48	24.80
"	Cross	1	18,680.21 Cu. Yds.	14,850.77	24.28
"	Dallas	1	11,582.00 Cu. Yds.	9,207.69	30.10
"	Drew	4	12,211.40 Cu. Yds.	9,708.06	15.88
"	Franklin	2	17.00 Cu. Yds.	13.52	.85
"	Grant	1	1,344.50 Cu. Yds.	1,068.88	1.75
"	Greene	3	685.00 Cu. Yds.	544.57	.89
"	Hot Spring	1	39,571.05 Cu. Yds.	31,458.98	30.83
"	Independence	3	3,427.00 Cu. Yds.	2,724.47	106.83
"	Jackson	2	38,754.86 Cu. Yds.	30,810.11	1,937.35
"	Jefferson	2	13,480.87 Cu. Yds.	10,717.29	378.27
"	Johnson	1	260.00 Cu. Yds.	206.70	13.00
"	Lafayette	1	55,826.08 Cu. Yds.	44,381.73	145.14
"	Lawrence	1	26,154.14 Cu. Yds.	20,792.54	90.73
"	Lincoln	1	13,432.40 Cu. Yds.	10,678.76	16.98
"	Little River	1	13,031.77 Cu. Yds.	10,360.26	16.93
"	Logan	3	313.00 Cu. Yds.	248.84	15.65
"	Miller	1	900.00 Cu. Yds.	715.50	1.17
"	Montgomery	1	976.70 Cu. Yds.	776.48	.08
"	Ouachita	1	254,859.00 Cu. Yds.	202,612.99	12,742.95

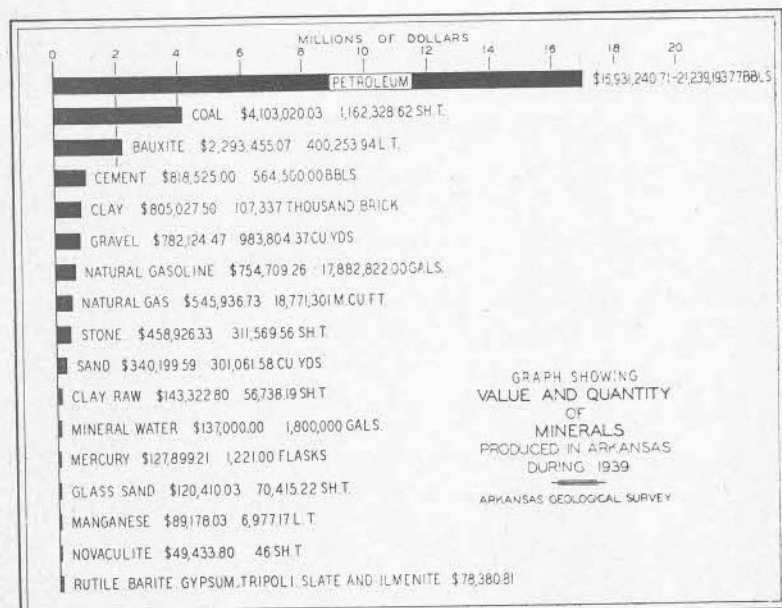


Figure 8. Graph showing quantity and value of minerals produced in Arkansas in 1939.

QUANTITY AND VALUE OF AND SEVERANCE TAX COLLECTED
ON MINERALS PRODUCED IN ARKANSAS, 1939—Continued

Mineral Produced	County	No. of Prod. Companies ¹	Quantity Produced	Value	Severance Tax Paid ²	
Gravel ³ (Cont.)	Nevada	1	411.00 Cu. Yds.	326.74	.54	
	Perry	1	39,813.00 Cu. Yds.	31,651.34	51.75	
	Pike	1	5,430.80 Cu. Yds.	4,317.49	7.06	
	Polk	8	52,961.20 Cu. Yds.	42,104.15	63.58	
	Pulaski	1	1,132.00 Cu. Yds.	899.94	1.47	
	Randolph	5	21,745.00 Cu. Yds.	17,287.28	33.04	
	St. Francis	1	20,148.50 Cu. Yds.	\$ 16,018.06	\$ 26.19	
	Saline	1	15,952.80 Cu. Yds.	12,682.48	20.75	
	Sebastian	4	26,143.06 Cu. Yds.	20,783.73	1,307.17	
	Sevier	1	238.00 Cu. Yds.	189.21	.31	
	Yell	1	69	11,640.64 Cu. Yds.	9,254.31	581.96
			987,116.37 Cu. Yds.	784,757.51	22,939.81	
Gypsum	Pike	1	1	9,382.10 Sh. T.	14,917.54	28.05
Ilmenite	Yell	1	1	4.00 Sh. T.	20.00	2.50
Manganese	Independence	2	2	6,977.17 Lg. T.	89,178.03	704.65
Mercury	Pike	5	5	1,221.00 ⁴ Flasks (76 lb.)	127,899.21 ⁴	229.44
	Carroll	1				
Mineral Waters	Garland	6	11	1,800,000.00 ⁴ Gals	137,000.00 ⁴	
	Pulaski	4				
Natural Gas	Columbia	4 ⁵	762,616 M. Cu. Ft.	29,869.79	776.68	
	Crawford	2	876,608 M. Cu. Ft.	43,089.11	1,120.53	
	Franklin	2	1,061,468 M. Cu. Ft.	52,268.10	1,358.99	
	Johnson	2	1,194,321 M. Cu. Ft.	65,548.90	1,704.16	
	Lafayette	2	47,140 M. Cu. Ft.	2,142.91	55.73	
	Miller	1	8,992,100 M. Cu. Ft.	61,169.53	1,590.42	
	Nevada	1	12,912 M. Cu. Ft.	516.48	13.43	
	Ouachita	7	616,709 M. Cu. Ft.	32,055.90	806.64	
	Pope	1	486,558 M. Cu. Ft.	26,760.79	695.79	
	Sebastian	3	442,585 M. Cu. Ft.	21,849.35	568.08	
	Union	11	23	4,278,284 M. Cu. Ft.	210,715.87	5,477.19
			18,771,301 M. Cu. Ft.	545,936.73	14,154.24	
Natural Gasoline	Miller	1	6	17,882,822.00 Gals.	754,709.26	
	Ouachita	1				
	Union	4				
Novaculite	Garland	3	3	46.00 Sh. T.	49,433.80	
Petroleum	Columbia	12 ⁵	4,648,120.58 Bbls.	4,021,877.02	104,462.18	
	Lafayette	2	367,137.57 Bbls.	299,977.68	7,799.42	
	Miller	6	1,421,105.64 Bbls.	1,469,243.77	38,154.34	
	Nevada	4	630,857.43 Bbls.	314,013.99	8,164.39	
	Ouachita	14	3,607,459.77 Bbls.	2,881,260.35	75,177.43	
	Union	15	31	10,564,512.78 Bbls.	7,944,867.90	206,876.17
				21,239,193.77 Bbls.	16,931,240.71	440,633.93
Rutile	Hot Spring	1	1	456.15 Sh. T.	18,246.00	69.85
Sand ³	Baxter	1	18,783.00 Cu. Yds.	21,224.79	30.88	
	Chicot	2	35,795.06 Cu. Yds.	40,448.41	741.55	
	Clark	1	3,788.00 Cu. Yds.	4,280.44	6.88	
	Franklin	3	455.50 Cu. Yds.	514.72	11.37	
	Independence	1	2,290.00 Cu. Yds.	2,587.70	57.29	
	Jackson	2	22,306.81 Cu. Yds.	25,206.69	557.70	
	Jefferson	2	28,417.40 Cu. Yds.	32,111.66	710.44	
	Johnson	1	275.00 Cu. Yds.	310.75	6.88	
	Lawrence	1	14,376.20 Cu. Yds.	16,245.11	70.18	
	Little River	1	8,234.42 Cu. Yds.	9,304.90	10.71	
	Logan	2	1,314.50 Cu. Yds.	1,485.38	32.87	
	Mississippi	1	90.00 Cu. Yds.	101.70	2.25	
	Montgomery	1	75.00 Cu. Yds.	84.75	.01	
	Pulaski	3	46,813.84 Cu. Yds.	52,899.64	1,083.70	
	Sebastian	5	104,323.63 Cu. Yds.	117,885.71	2,608.17	
Yell	1	26	13,733.22 Cu. Yds.	15,507.24	343.01	
			301,061.58 Cu. Yds.	340,199.59	6,273.79	

QUANTITY AND VALUE OF AND SEVERANCE TAX COLLECTED ON MINERALS PRODUCED IN ARKANSAS, 1939—Continued

Mineral Produced	County	No. of Prod. Companies ¹	Quantity Produced	Value	Severance Tax Paid ²
Slate.....	Montgomery.....	1	743.58 Sh. T.	6,372.48	35.75
"	Polk.....	1 2	927.00 Sh. T.	7,944.39	2.41
			1,670.58 Sh. T.	14,316.87	38.16
Stone.....	Baxter.....	1	176.04 Sh. T.	\$ 2,839.53	\$ 39.01
"	Benton.....	1	22,532.61 Sh. T.	30,419.02	175.74
"	Clark.....	1	738.40 Sh. T.	671.94	.96
"	Conway.....	1	1,292.40 Sh. T.	1,176.09	1.68
"	Independence.....	7	56,767.11 Sh. T.	96,237.95	271.11
"	Pulaski.....	3	199,381.00 Sh. T.	293,217.96	439.90
"	Washington.....	1 13	30,682.00 Sh. T.	34,363.84	209.38
			311,569.56 Sh. T.	\$458,926.33	\$ 1,137.78
Tripoli.....	Benton.....	1 1	955.00 Sh. T.	14,410.95	1.24
TOTALS.....	50 Counties.....	273		\$28,581,422.41	\$522,489.62

Producing Companies

- ¹ When the same company produces in more than one county the total includes only actual producing companies.
- ² Includes sales of sand and gravel taken from state owned streams.
- ³ Includes production and selling value of sand and gravel taken from state owned streams.
- ⁴ Estimated.
- ⁵ Producers and purchasers paying severance tax.

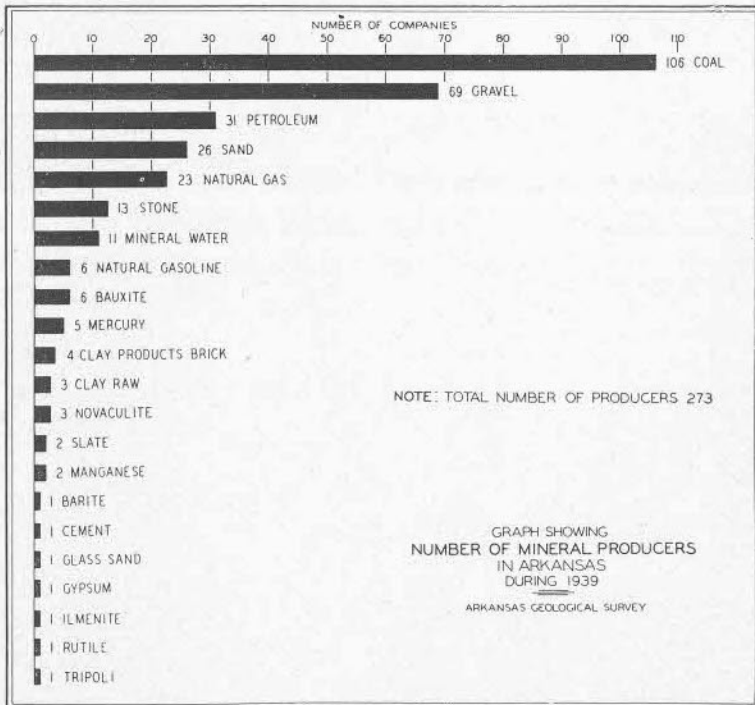
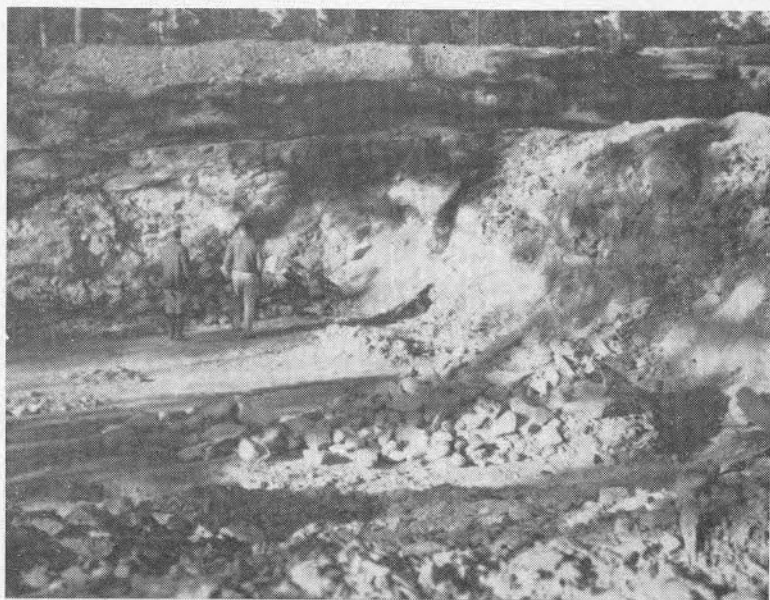


Figure 9. Graph showing number of mineral producers in Arkansas during 1939.

LIST OF MINERAL PRODUCERS IN 1939 GROUPED BY MINERALS

Mineral	Company	Address	Location of Mine or Plant
Barite	Milwhite Co., Inc., The	Houston, Tex.	Magnet Cove, Hot Spring County.
Bauxite	American Cyanamid & Chemical Corp.	Route 4, Box 41, Bauxite, Ark.	Rauch lease mine in Pulaski County and Mount Olive mine in Saline County.
	Arkansas Bauxite Corp.	West Bauxite, Ark.	Swampoodle, Saline County.
	Consolidated Chemical Industries	Houston, Tex.	Saline County.
	Crouch Mining Co.	R. F. D., Box 342, Little Rock, Ark.	Berger, Pulaski County.
Cement	Dixie Bauxite Co.	Sweet Home, Ark.	2½ miles from Sweet Home, Pulaski County.
	Republic Mining & Mfg. Co.	Bauxite, Ark.	Ratcliff lease, one-half mile southeast of city limits of Little Rock, Pulaski County; Bauxite mine at Bauxite, Saline County.
Cement	Arkansas Portland Cement Co.	Okay, Ark.	Okay, Howard County.
Clay	Acme Brick Co.	Fort Worth, Tex.	Malvern, Hot Spring County; Perla, Hot Spring County; and Greenwood Road, Sebastian County.
	Dickey, W. S. Clay Mfg. Co.	Texarkana, Tex.	Clay pit at Texarkana, Miller County, Ark. (Plant in Texas) and a pit in Sevier County, Ark.
	Hope Brick Works	Hope, Ark.	Hope, Hempstead County.
	Jonesboro Brick Co.	Jonesboro, Ark.	Jonesboro, Craighead County.
	Malvern Brick & Tile Co.	Malvern, Ark.	Malvern, Hot Spring County.
Niloak Pottery & Tile Co.	Benton, Ark.	Benton, Saline County.	



Barite quarry of The Milwhite Company, Hot Spring County.

Coal	Acme Coal Co.	Coal Hill, Ark.	Johnson County.
	A & M Coal Co	Paris, Ark.	Logan County.
	Anling & Hanshew	Hartman, Ark.	Johnson County.
	Arnold Coal Co.	Charleston, Ark.	Franklin County.
	Atchison, J. O.	Paris, Ark.	Logan County.
	Bates Coal & Mining Co.	Fort Smith, Ark.	Scott County.
	Bates, J. M., Coal Co.	Hartford, Ark.	Sebastian County.
	Bennite Coal Co.	Fort Smith, Ark.	Sebastian County.
	Bernice Anthracite Coal Co.	McAlester, Okla.	Two miles south of Russellville, Pope County.
	Big Four Coal Co.	Clarksville, Ark.	Johnson County.
	Blackard Coal Co.	Hartman, Ark.	Johnson County.
	Blue Blaze Coal Co.	Clarksville, Ark.	Johnson County.
	Blue Star Coal Co.	Alix, Ark.	Franklin County.
	Boyd Excelsior Operating Co.	Box 372, Fort Smith, Ark.	Sebastian County.
	Boyd Sicard Coal Co.	Greenwood, Ark.	Sebastian County.
	Bull Moose Coal Co.	Midland, Ark.	Sebastian County.
	Carbon Coal Co.	Paris, Ark.	Mines Nos. 1 and 2, Logan County.
	Chastain, Roy	Branch, Ark.	Franklin County.
	Clay Coal Co.	Jenny Lind, Ark.	Sebastian County.
	C. L. S. Coal Co.	Midland, Ark.	Sebastian County.
	Collier-Dunlap Coal Co.	Clarksville, Ark.	1½ miles east of Hartman, Johnson County.
	Dixie Fuel Co.	Paris, Ark.	3½ miles northwest of Paris, Logan County.
	Eastern Excelsior Coal Co.	Greenwood, Ark.	Sebastian County.
	Economy Coal Co.	Paris, Ark.	Logan County.
	Eureka Coal Co.	Paris, Ark.	2½ miles west of Paris, Logan County.
	Excelsior Coal & Mining Co.	Greenwood, Ark.	Sebastian County.
	Excelsior Smokeless Coal Co.	Hackett, Ark.	Hackett, Ark.
	Excelsior Thin Vein Coal Co.	Hackett, Ark.	One-fourth mile east of Hackett, Sebastian County.
	Excelsior Valley Coal Co.	Greenwood, Ark.	Sebastian County.
	Felkins, Will	Clarksville, Ark.	Johnson County.
	Fernwood Mining Co.	McAlester, Okla.	Johnson County.
	Fort Smith Bonanza Coal Co.	Fort Smith, Ark.	Sebastian County.
	Goodin, A. L.	Paris, Ark.	Logan County.
	Great Western Coal Co.	Bonanza, Ark.	Sebastian County.
	Green Coal Co.	Ozark, Ark.	Johnson County.
	Griggs & Blaylock	Ozark, Ark.	Johnson County.
	Hall, J. O.	Charleston, Ark.	Franklin County.
	Harding Coal Co.	Spadra, Ark.	Johnson County.
	Hartford Mining Co.	Hartford, Ark.	Sebastian County.
	Hays & Son	Clarksville, Ark.	Johnson County.
	Hobbs, A. M., Coal Co.	Hartford, Ark.	Sebastian County.
	Ideal Coal Co.	Paris, Ark.	Logan County.
	Jewel Mining Co.	Paris, Ark.	Logan County.
	Johnson, A. H., Co.	Huntington, Ark.	Sebastian County.
	Jones, Alden & F. E.	Coal Hill, Ark.	Johnson County.
	Jones Bros. Coal Co.	Hartman, Ark.	Johnson County.
	King and Hays	Clarksville, Ark.	Johnson County.
	King, Perry	Charleston, Ark.	Franklin County.
	Koch, Coal Co.	Paris, Ark.	Logan County.
	K. & S. Coal Co.	Prairie View, Ark.	Logan County.
	Kuykendall, J. S.	Paris, Ark.	Logan County.
	Liberty Coal Co.	Altus, Ark.	Franklin County.
	Liberty Coal Co.	Spadra, Ark.	Johnson County.
	Little Ben Coal Corp.	Midland, Ark.	Sebastian County.
	Little, John	Hartman, Ark.	Johnson County.
	Looper Coal Co.	Huntington, Ark.	Sebastian County.

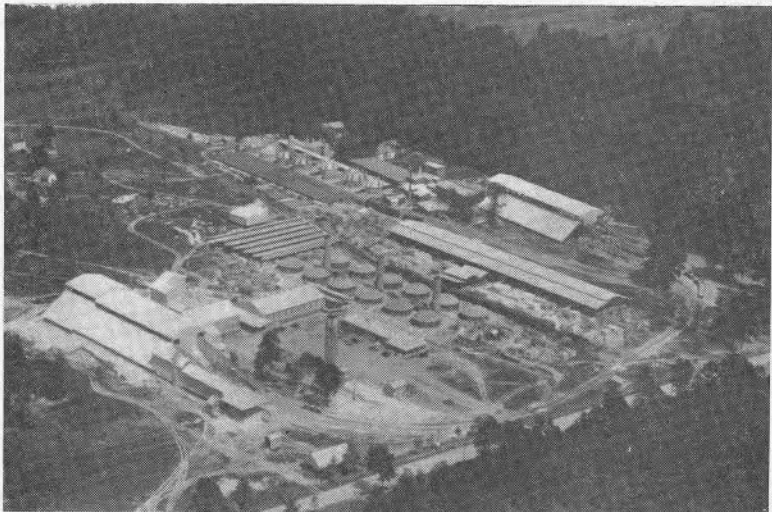
Mineral	Company	Address	Location of Mine or Plant
Coal (Cont.)	McKinney, D. A., Coal Co.	Clarksville, Ark.	Four miles west of Clarksville, Johnson County.
	Mack Coal Co.	Paris, Ark.	Logan County.
	Mumey Coal Co.	Jenny Lind, Ark.	Sebastian County.
	New Shockley Coal Co.	Paris, Ark.	Four miles west of Paris, Logan County.
	New Superfuel Coal Co.	Paris, Ark.	Four miles west of Paris, Logan County.
	New Union Coal Co.	Paris, Ark.	Logan County.
	Nichols, Roy	Ozark, Ark.	Franklin County.
	Noel, E. H., Coal Co.	Fort Smith, Ark.	Sebastian County.
	Odom, Cecil E.	Paris, Ark.	Logan County.
	Oliver Mining Co.	Greenwood, Ark.	Sebastian County.
	Oliver-McGuire Coal Co.	Greenwood, Ark.	Sebastian County.
	Paris Development Co.	Paris, Ark.	Logan County.
	Paris Purity Coal Co.	Paris, Ark.	About 4½ miles northwest of Paris, Logan County.
	Peerless Coal Co.	Greenwood, Ark.	Sebastian County.
	Petty, Fred	Jenny Lind, Ark.	Sebastian County.
	Plymouth Coal Co.	Paris, Ark.	Logan County.
	Porter Excelsior Coal Co.	Hackett, Ark.	Sebastian County.
	Pyburn, Allen W.	Charleston, Ark.	Franklin County.
	Quality Coal Co.	Ozark, Ark.	Near Altus, Franklin County.
	Quality Excelsior Coal Co.	Greenwood, Ark.	Sebastian County.
	Rainbow Coal Co.	Clarksville, Ark.	Johnson County.
	Rains Coal Corp.	Midland, Ark.	Sebastian County.
	Rohrer Fuel Co.	Huntington, Ark.	Sebastian County.
	Ross, H. T.	Hartman, Ark.	Johnson County.
	Simmons, J. C.	Charleston, Ark.	Franklin County.
	Sims, Willie	Paris, Ark.	Logan County.
	Smith, James H.	Charleston, Ark.	Franklin County.



Furnace house and condensing system, Mercury Mines, Inc., Amity.

Mineral	Company	Address	Location of Mine or Plant	
Coal (Cont.)	Smith, R. H., Coal Co.	Ozark, Ark.	Franklin County.	
	Smith & Sargent Smokeless Coal Co.	Charleston, Ark. Midland, Ark.	Franklin County. Sebastian County.	
	Smokeless Coal Co. Smokeless Coal Co. No. 1	Clarksville, Ark. Clarksville, Ark.	Johnson County. Johnson County.	
	Smokeless Coal Co. No. 2	Clarksville, Ark.	Johnson County.	
	Smerkar, Frank Stanfill, E. O.	Huntington, Ark. Fort Smith, Ark.	Sebastian County. Sebastian County.	
	Stewart Coal Co. Stewart Smokeless Coal Co.	Denning, Ark. Denning, Ark.	Franklin County. Franklin County.	
	Sublett Coal Co. Sunshine Anthracite Coal Co.	Greenwood, Ark. Clarksville, Ark.	Sebastian County. Johnson County.	
	Sun Smokeless Coal Co.	Fort Smith, Ark.	Sebastian County.	
	Thompson, Robert, Coal Co.	Hartman, Ark.	Johnson County.	
	Thornton, Floyd Tucker, S. A.	Harmony, Ark. Paris, Ark.	Johnson County. Logan County.	
	Turner, R. B., Coal Co.	Paris, Ark.	Logan County.	
	Vandermeulen, Jules	Greenwood, Ark.	Sebastian County.	
	Victor Coal Co. Watson Coal Co.	Paris, Ark. Paris, Ark.	Logan County. Logan County.	
	Weaver, W. L. West Spadra Coal Co.	Paris, Ark. Clarksville, Ark.	Logan County. Johnson County.	
	Young, R. A. & Son, Coal Co.	Fort Smith, Ark.	Sebastian County.	
	Glass Sand	Everton Silica Sand Co., Inc.	Guion, Ark.	Everton, Boone County, and Guion, Izard County.
	Gravel	Arkadelphia Sand & Gravel Co.	P. O. Box 517, Arkadelphia, Ark.	One-half mile east of Arkadel- phia, Clark County.
		Arkholia Sand & Gravel Co.	S. 7th & B Sts., Fort Smith, Ark.	Sebastian County.
		Barnes, W. P. Barnett, C. A.	Sheridan, Ark. Batesville, Ark.	Grant County. Independence County.
		Bell, Mrs. Etta Benton Gravel Co.	Bloomerg, Texas Pine Bluff, Ark.	Miller County. Edge of town of Benton, Saline County.
		Bench, W. C. Blissenback, Peter	Paris, Ark. Pocahontas, Ark.	Logan County. Randolph County.
		Bridges, Mrs. W. S.	Waldo, Ark.	Columbia County.
		Byrum, R. E. L. Cloud, Mrs. T. R. Clyne, Dr. A. G.	Van Buren, Ark. Monticello, Ark. Paragould, Ark.	Sebastian County. Drew County. N $\frac{1}{2}$ Sec. 22, T. 16 N., R. 5 E., 5 miles from Paragould, Greene County.
		Cotton, Garland Cross County Gravel Co.	Paris, Ark. Pine Bluff, Ark.	Logan County. (1) 1 mile from Cherry Valley, Cross County (2) 3 miles east of Wynne on Coppers Creek, Cross County.
		Crow Creek Gravel & Sand Co.	Box 4, Forrest City, Ark.	One mile west of Madison, St. Francis County.
		Curlie, Florence Dismang, W. E.	DeQueen, Ark. Pocahontas, Ark.	Sevier County. Randolph County.
		Eaton, Mrs. Katie Estep, S. R.	Pine Bluff, Ark. Van Buren, Ark.	Jefferson County. Sebastian County.
		Gantt Gravel & Sand Co.	Magnolia, Ark.	Seven miles west of Magnolia, Columbia County.
		Glover, A. B. Greenville Sand & Gravel Co.	Star City, Ark. Memphis, Tenn.	Lincoln County. Chicot County.
		Henderson, J. H. Hermitage Gravel Co.	Ozark, Ark. P. O. Box 1149, Little Rock, Ark.	Franklin County. Bradley County.
		Holmes, Mrs. S. R. Hope Brick Works Howard, J. W.	Mena, Ark. Hope, Ark. Hatfield, Ark.	Polk County. Montgomery County. Polk County.
		Huddleston, Mrs. M. A.	Mena, Ark.	Polk County.
		Jansen, Will	Pocahontas, Ark.	Randolph County.

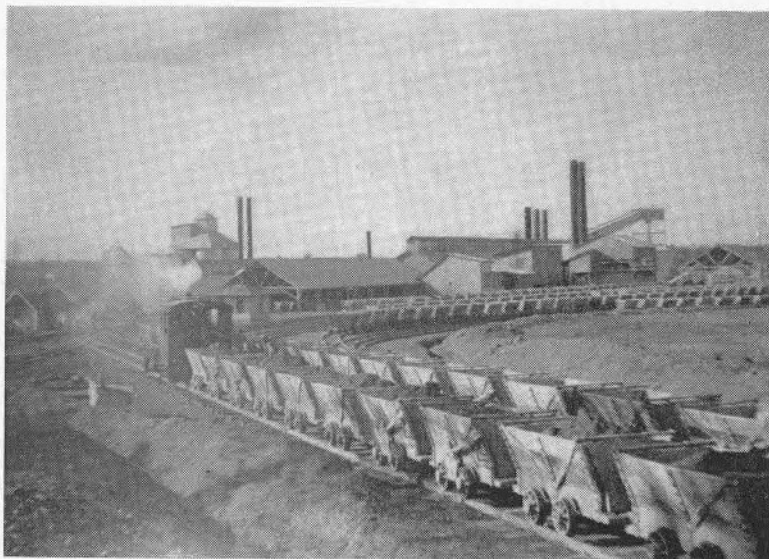
Mineral	Company	Address	Location of Mine or Plant
Gravel (Cont.)	Jeffrey, Roy N., Lumber Co.	Batesville, Ark.	Independence County.
	King, Jessie	Walnut Grove, Ark.	Independence County.
	Lake Village Sand & Gravel Co.	Lake Village, Ark.	Chicot County.
	Lein, F. J.	Vandervoort, Ark.	Polk County.
	Lutesville Sand & Gravel Co.	Black Rock, Ark.	In town of Black Rock, Law- rence County.
	McBee, J. M.	Big Fork, Ark.	Polk County.
	McCauley, H. E.	Wickes, Ark.	Polk County.
	McDonald, Mrs. Maggie	Pocahontas, Ark.	Randolph County.
	Malvern Sand & Gravel Co.	Malvern, Ark.	Secs. 16, 17, 20, T. 4 S., R. 17 W., two miles from Mal- vern, Hot Spring County.
	McNulty Construc- tion Co.	Pine Bluff, Ark.	Perry County.
	Marlar, J. A.	Buckner, Ark.	Columbia County.
	Meriwether Sand & Gravel Co.	Box 1365, Shreveport, La.	Two miles northeast of Lewis- ville, Lafayette County.
	Miller, F. J.	Bono, Ark.	S $\frac{1}{2}$ SE Sec. 20 and SW SW Sec. 21, T. 15 N., R. 3 E. one mile east of Bono, Craig- head County.
	Mitchell, D. F.	Monticello, Ark.	Drew County.
	Mitchell, Davis & French	Greenway, Ark.	Clay County.
	Mobley Construc- tion Co.	Morrilton, Ark.	(1) North of Dardanelle, Yell County (2) Newport, Jackson County.
	Newark Sand & Gravel Co., Inc.	Box 735, Pine Bluff, Ark.	Drew County.
	Neyer Construction Co.	Billings, Mo.	Baxter County.
	Owen, Ben	Magnolia, Ark.	Columbia County.
	Pearl City Packet Co.	Newport, Ark.	On White River, near city lim- its of Newport, Jackson County.
Pike County Bank	Murfreesboro, Ark.	Pike County.	
Pine Bluff Sand & Gravel Co.	Pine Bluff, Ark.	(1) Near Rison, Cleveland Coun- ty (2) Arkansas River, Jeffer- son County.	
Pollard, Rex	Piggott, Ark.	Clay County.	



Clay plant of the Acme Brick Company, Perla.

Mineral	Company	Address	Location of Mine or Plant	
Gravel (Cont.)	Porter, E. C. Producers Gravel & Sand Co., Inc.	Clarksville, Ark. P. O. Box 1615, Shreveport, La.	Johnson County, Wilton, Little River County.	
	Pruitt, Ike Rowe, Ober St. Louis South- western Ry. Co. Salyers, Whit Smith, G. W.	Ozark, Ark. Hatfield, Ark. St. Louis, Mo. Mena, Ark. Fort Smith, Ark.	Franklin County, Polk County, Arkansas River, Ouachita County, Polk County, Sec. 25, T. 9 N., R. 32 W., Sebastian County, Dallas County, Craighead County, Randolph County, Pulaski County.	
	Smith & Hornaday Snow, W. W. Sorg, Joe Southern Kraft Corp.	Fordyce, Ark. Jonesboro, Ark. Pocahontas, Ark. Mobile, Ala.	Greene County, Clark County.	
	Weaver, J. P. White, Fred	Paragould, Ark. Route 1, Okolona, Ark. Prescott, Ark. Route 3, Paragould, Ark.	Nevada County, SE Sec. 10, T. 16 N., R. 5 E., 4 miles from Paragould, Greene County, Drew County.	
	White, Mrs. Fred Williams, C. F., & Sons	Monticello, Ark.	Conway County, Pike County.	
	Wilson, Wood- row K. Young Lumber Co. Arkansas Gypsum Co.	Morrilton, Ark. Murfreesboro, Ark.	Yell County.	
	Gypsum	Southern Mineral & Development Co. Arkansas Mangan- ese Co.	Batesville, Ark.	Independence County.
		Denison, Walter H., Manganese & Contracting Co., Inc.	Cushman, Ark.	(1) Near Cushman, Indepen- dence County (2) Near Penters Bluff, Izard County (3) Near Pfeiffer, Independence County.
	Manganese	Hintze, Walter F. McElwaine, R. B. & Yount, Leo Mid-Continent Mer- cury Producers, Inc. Southwestern Quicksilver Co. U. S. Mercury Co. Cascade Springs	Murfreesboro, Ark. Murfreesboro, Ark. Little Rock, Ark. Murfreesboro, Ark.	Pike County, Pike County, Pike County, Pike County.
		DeLeon Spring Water Co.	Murfreesboro, Ark. 3018 High St., Little Rock, Ark. 707 Center St., Little Rock, Ark.	Pike County, 3018 High St., Little Rock, Pu- laski County, Fourteen miles from Little Rock, Pulaski County, on upper Hot Springs Highway.
Eureka Spring Water Co. Happy Hollow Springs Co. Lithox Mineral Water Co. McClendon Health Spring McFadden Three Sisters Springs Mountain Valley Water Co. Nolting Crystal Springs Radio Magnesia Spring Raleigh Artesian Springs Arkansas Fuel Oil Co. East Texas Refin- ing Co. Gulf Refining Co.		Eureka Springs, Ark. Hot Springs, Ark. 179 Cedar St., Hot Springs, Ark. 230 Ouachita Ave., Hot Springs, Ark. Hot Springs, Ark. Hot Springs, Ark. 2606 High St., Little Rock, Ark. 206 Central Ave., Hot Springs, Ark. 2301 Pulaski St., Little Rock, Ark. El Dorado, Ark. Dallas, Tex. El Dorado, Ark.	Two miles NE of Eureka Springs, Carroll County, End of Fountain Ave., Hot Springs, Garland County, 179 Cedar St., Hot Springs, Garland County, 230 Ouachita Ave., Hot Springs, Garland County, Hot Springs, Garland County. NE $\frac{1}{4}$, Sec. 19, T. 1 S., R. 19 W., Garland County, 2606 High St., Little Rock, Pu- laski County, 206 Central Ave., Hot Springs, Garland County, 2301 Pulaski St., Little Rock, Pulaski County, Sec. 31, T. 17 S., R. 15 W., Union County, Capps City, Miller County, South El Dorado Field, Union County.	
Mercury	U. S. Mercury Co. Cascade Springs	Murfreesboro, Ark. 3018 High St., Little Rock, Ark. 707 Center St., Little Rock, Ark.	Pike County, 3018 High St., Little Rock, Pu- laski County, Fourteen miles from Little Rock, Pulaski County, on upper Hot Springs Highway.	
	DeLeon Spring Water Co.	Murfreesboro, Ark. 3018 High St., Little Rock, Ark. 707 Center St., Little Rock, Ark.	Pike County, 3018 High St., Little Rock, Pu- laski County, Fourteen miles from Little Rock, Pulaski County, on upper Hot Springs Highway.	
	Eureka Spring Water Co. Happy Hollow Springs Co. Lithox Mineral Water Co. McClendon Health Spring McFadden Three Sisters Springs Mountain Valley Water Co. Nolting Crystal Springs Radio Magnesia Spring Raleigh Artesian Springs Arkansas Fuel Oil Co. East Texas Refin- ing Co. Gulf Refining Co.	Eureka Springs, Ark. Hot Springs, Ark. 179 Cedar St., Hot Springs, Ark. 230 Ouachita Ave., Hot Springs, Ark. Hot Springs, Ark. Hot Springs, Ark. 2606 High St., Little Rock, Ark. 206 Central Ave., Hot Springs, Ark. 2301 Pulaski St., Little Rock, Ark. El Dorado, Ark. Dallas, Tex. El Dorado, Ark.	Two miles NE of Eureka Springs, Carroll County, End of Fountain Ave., Hot Springs, Garland County, 179 Cedar St., Hot Springs, Garland County, 230 Ouachita Ave., Hot Springs, Garland County, Hot Springs, Garland County. NE $\frac{1}{4}$, Sec. 19, T. 1 S., R. 19 W., Garland County, 2606 High St., Little Rock, Pu- laski County, 206 Central Ave., Hot Springs, Garland County, 2301 Pulaski St., Little Rock, Pulaski County, Sec. 31, T. 17 S., R. 15 W., Union County, Capps City, Miller County, South El Dorado Field, Union County.	
	Louisiana Iron & Supply Co. Magnolia Petro- leum Co. Standard Oil Co. of La.	Shreveport, La. Kenova, Ark. Shreveport, La.	(1) Louann, Ouachita County, (2) $1\frac{1}{2}$ miles south of El Do- rado, Union County, Sec. 8, T. 15 S., R. 16 W., Union County, South El Dorado Field, Union County.	
Natural Gasoline	Louisiana Iron & Supply Co.	Shreveport, La.	(1) Louann, Ouachita County, (2) $1\frac{1}{2}$ miles south of El Do- rado, Union County.	
	Magnolia Petro- leum Co. Standard Oil Co. of La.	Kenova, Ark. Shreveport, La.	Sec. 8, T. 15 S., R. 16 W., Union County, South El Dorado Field, Union County.	

Mineral	Company	Address	Location of Oil or Gas Wells
Novaculite	Lewis Whetstone Co.	Hot Springs, Ark.	Garland County.
	Norton Pike Co. Wootten, Gil H.	Littleton, N. H. Hot Springs, Ark.	Garland County. Garland County.
Petroleum & Natural Gas	Alford, E. H.	Box 265, Stephens, Ark.	Columbia County.
	Alice Sidney Oil Co.	212 Armstrong Bldg., El Dorado, Ark.	Columbia, Ouachita and Union Counties.
	J. S. Rushing, Tr. American Liberty Oil Co.	El Dorado, Ark. Dallas, Tex.	Miller County.
	Anding & Byrd	Kilgore, Tex.	Miller County.
	Anding & Kraker	Kilgore, Tex.	Miller County.
	Arkansas Fuel Oil Co.	Slattery Bldg., Shreveport, La.	Columbia, Ouachita and Union Counties.
	Arkansas Louisiana Gas Co.	Box 1734, Shreveport, La.	Pope and Johnson Counties.
	Arkansas Oklahoma Gas Co.	23 North 8th St., Fort Smith, Ark.	Crawford, Franklin and Sebastian Counties.
	Arkansas Pipe & Scrap Metal Co., Inc.	El Dorado, Ark.	Ouachita and Union Counties.
	Arkansas Southern Oil Co.	El Dorado, Ark.	Union County.
	Atlantic Refining Co.	Magnolia Bldg., Dallas, Tex.	Columbia, Lafayette and Union Counties.
	Bailey & Trimble	Trimble Bldg., El Dorado, Ark.	Union County.
	Beebe, J. S., & Cherry, C. C.	El Dorado, Ark.	Union County.
	Benedum Trees Oil Co.	Benedum Trees Bldg., Pittsburgh, Pa.	Nevada County.
	Berg, Laney & Brown	Camden, Ark.	Ouachita and Union Counties.
	Berkshire Oil Co.	608 Nat'l Standard Bldg., Houston, Tex.	Columbia and Miller Counties.
Berry Asphalt Co.	1472 West 76th St., Chicago, Ill.	Nevada County.	
Biddy, C. W.	Smackover, Ark.	Ouachita County.	



Bauxite drying and calcining plant of The Republic Mining and Manufacturing Company, Bauxite.

Mineral	Company	Address	Location of Oil or Gas Wells
Petroleum & Natural Gas (Cont.)	Biddy, Ida L.	Box 293, Smackover, Ark.	Ouachita and Union Counties.
	Biddy, L. M.	Smackover, Ark.	Union County.
	Boswell, A. W., et al.	Magnolia, Ark.	Lafayette County.
	Bradham, E. G.	Magnolia Hgwy., El Dorado, Ark.	Union County.
	Brazil, W. H.	Smackover, Ark.	Ouachita and Union Counties.
	Brinson, V. V.	Citizens Bank & Trust Co., Camden, Ark.	Ouachita and Union Counties.
	Brown Oil Corp., c/o Virgil Brown	El Dorado, Ark.	Union County.
	Buffalo Oil Co.	Stephens, Ark.	Columbia County.
	Burford, F. W.	Box 2519, Dallas, Tex.	Miller County.
	Callaway, N. K.	Nat'l Bank of Commerce, El Dorado, Ark.	Union County.
	Cararas, J. A.	Ardis Bldg., Shreveport, La.	Miller County.
	c/o Idadore Roosth	Lamar, Ark.	Crawford County.
	Cazort, G. T.	Atlanta, Tex.	Miller County.
	Chamblee & Pitts	El Dorado, Ark.	Ouachita County.
	Cherry & Daily c/o C. C. Cherry	Pine Bluff, Ark.	Ouachita and Union Counties.
	Clark, Dr. O. W., Tr.	Route 4, El Dorado, Ark.	Ouachita and Union Counties.
	Coffman, H. G.	Smackover, Ark.	Ouachita and Union Counties.
	Collum, W. H., Tr.	Smackover, Ark.	Union County.
	Conklin, G. V.	Smackover, Ark.	Ouachita and Union Counties.
	Cook, Jim	Smackover, Ark.	Ouachita and Union Counties.
	Cook & Lambert c/o Jim Cook	Box 73, Louann, Ark.	Ouachita and Union Counties.
	Corley, W. E.	812 Ouachita Nat'l Bank Bldg., Monroe, La.	Union County.
	Crescent Drilling Co.	604 East 6th St., El Dorado, Ark.	Ouachita and Union Counties.
	Crestock Oil Co.	c/o Zach Brooks, El Dorado, Ark.	Ouachita and Union Counties.
	Crosbie, J. E., Inc.	122 Michigan Ave., Chicago, Ill.	Union County.
	Cross, Henry H., Co.	El Dorado, Ark.	Ouachita and Union Counties.
	Crotty, C. M.	1524 Hanna Bldg., Cleveland, Ohio	Ouachita and Union Counties.
	Cumberland Petro- leum Co.	Box 2012, Tyler, Tex.	Union County.
	Delta Drilling Co.	401 N. 57th Ave., Duluth, Minn.	Miller County.
	Duluth-Arkansas Oil Co.	Tower Petroleum Bldg., Box 2519, Dallas, Tex.	Lafayette and Miller Counties.
	East Texas Refg. Co.	Smackover, Ark.	Ouachita and Union Counties.
	Evans, H. W.	Monroe, La.	Miller County.
	Feazel, W. C.	322-4 Ricou-Brew- ster Bldg., Shreveport, La.	Miller County.
F. & H. Oil Co.	923 Esperson Bldg., Houston, Tex.	Ouachita and Union Counties.	
Fohs Oil Co.	40 Wall St., New York, or City Bank Bldg., Shreveport, La.	Columbia and Union Counties.	
Gerhig Co., The	Oil & Gas Bldg., Houston, Tex.	Miller County.	
Goldston, W. L.	Louann, Ark.	Columbia County.	
G. R. C. Oil Co., Inc.	Box 74, Stephens, Ark.	Ouachita and Union Counties.	
Green, Mrs. Claudia	Gladewater, Tex.	Columbia County.	
Grasty, G. C.	Prescott, Ark.	Miller County.	
Greeson, M. W.	El Dorado, Ark.	Franklin County.	
Griffin, B. W.	First Nat'l Bank Bldg., El Dorado, Ark.	Ouachita and Union Counties.	
Grimes Bros.	El Dorado, Ark.	Union County.	

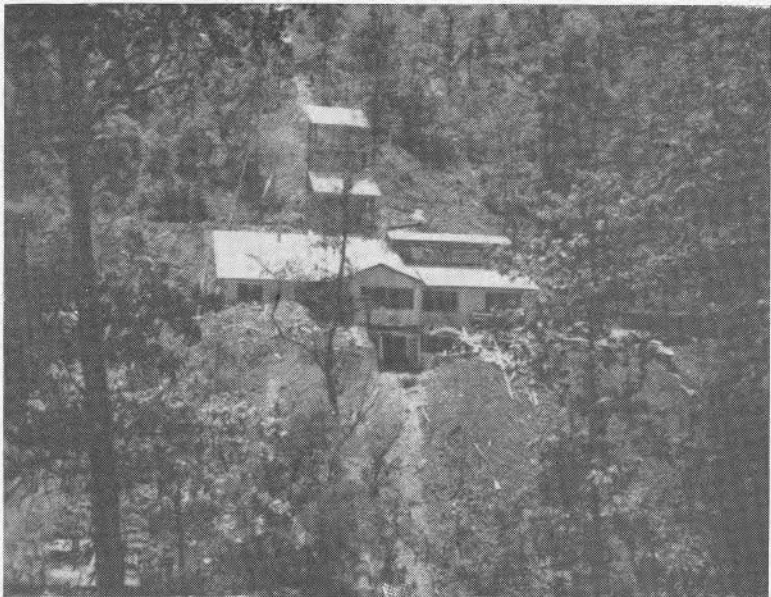
Mineral	Company	Address	Location of Oil or Gas Wells
Petroleum & Natural Gas (Cont.)	Gulf Refining Co.	Houston, Tex.	Ouachita and Union Counties.
	Hammonds, G. Scott	Hotel Marshall, Marshall, Tex. El Dorado, Ark. Box 294.	Columbia County. Union County. Ouachita and Union Counties.
	Harr, M. H. Harris, L. W., et al.	Smackover Ark. Smackover Ark.	Ouachita and Union Counties. Ouachita and Union Counties.
	Henderson & Primm	El Dorado, Ark.	Ouachita and Union Counties.
	Hollyfield & McFarlane		
	Hood, F. M., et al.	Box 988, Shreveport, La.	Columbia County.
	Huffman, M. J.	308 N. Smith St., El Dorado, Ark.	Ouachita and Union Counties.
	Hunt, Bruce, Est.	El Dorado, Ark.	Union County.
	Hunt, H. L., Inc.	Smackover, Ark.	Union County.
	Hunt, Hassie	Box 839, Dallas, Tex.	Columbia County.
	Industrial Oil & Gas Co.	Fort Smith, Ark.	Crawford County.
	James, G. W.	El Dorado, Ark.	Union County.
	James, O. L.	Norphlet, Ark.	Ouachita and Union Counties.
	Johnston, W. P., et al.	El Dorado, Ark.	Ouachita and Union Counties.
	Jones, Edwin M.	El Dorado, Ark.	Union County.
	Keever, W. R.	Box 986, El Dorado, Ark.	Ouachita and Union Counties.
	Killingsworth, S. H., & Killingsworth & Bander	Longview, Tex.	Miller County.
	Koury, George	Camden, Ark.	Ouachita and Union Counties.
	Lambert, J. L.	Smackover, Ark.	Ouachita and Union Counties.
	Larson & Spiers	Norphlet, Ark.	Ouachita and Union Counties.
	LaRobadiere, J. A.	El Dorado, Ark.	Union County.
	Liberty Oil Co.	Smackover, Ark.	Ouachita County.
	Lion Oil Refining Co.	El Dorado, Ark.	Columbia, Ouachita and Union Counties.
	Long, R. H., or Chireno Production Co.	Rodessa, La.	Miller County.



Gypsum quarry of Arkansas Gypsum Company, Murfreesboro.

Mineral	Company	Address	Location of Oil or Gas Wells
Petroleum & Natural Gas (Cont.)	Louark Producing Co. (Formerly the Standard Oil Co.)	Box 1739, Shreveport, La.	Columbia, Lafayette, Miller, Nevada, Ouachita and Union Counties.
	Louisiana Iron & Supply Co. Lyons & Merritt	El Dorado, Ark., and Shreveport, La. Giddens-Lane Bldg., Shreveport, La.	Union County. Miller County.
	M. H. S. Oil Corp.	c/o H. E. Hill, Oil City, La.	Miller County.
	M. S. & M. Oil Co.	El Dorado, Ark.	Ouachita County.
	Magnolia Petroleum Co.	El Dorado, Ark., and Dallas, Tex.	Miller, Ouachita and Union Counties.
	Mahony, Joe K., et al.	El Dorado, Ark.	Columbia and Union Counties.
	Malloy & Co.	412 Exchange Bldg., El Dorado, Ark.	Union County.
	Mansfield Gas Co.	Fort Smith, Ark.	Sebastian County.
	Marine Oil Co.	El Dorado, Ark.	Columbia, Ouachita and Union Counties.
	Maritsky, M.	Box 486, Homer, La.	Union County.
	Maritsky & Biddy	Homer, La.	Columbia County.
	Mason, Don	Norphlet, Ark.	Ouachita and Union Counties.
	Matheny, M. P.	Exchange Bldg., El Dorado, Ark.	Union County.
	Maxwell, R. M.	Louann, Ark.	Ouachita and Union Counties.
	McAlester Fuel Co.	Box 769, McAlester, Okla.	Columbia County.
	McClanahan, W. L.	Ardis Bldg., Shreveport, La.	Miller County.
	McCreslenn Oil Co.	1506 Dallas Bank & Trust Bldg., Dallas, Tex., and El Dorado, Ark.	Ouachita and Union Counties.
	McDermott, A. P.	Des Moines, Iowa	Union County.
	McDonald, I. L.	Smackover, Ark.	Ouachita and Union Counties.
	McFann, H. H.	El Dorado, Ark.	Union County.
	McLeon, R. A.	Box 212, Louann, Ark.	Union County.
	Mid-Continent Petroleum Corp.	Box 2040, Tulsa, Okla.	Columbia County.
	Miller Bros.	3824 Shenandoah Ave., Dallas, Tex.	Union County.
	Murphy, Bertie W.	El Dorado, Ark.	Union County.
	Murphy, O. G.	El Dorado, Ark.	Miller, Ouachita and Union Counties.
	Murry, Ethel Mae	Texarkana, Ark.	Miller County.
	Mitchell, A. J.	Smackover, Ark.	Ouachita and Union Counties.
	Nadel, I.	Box 996, Tulsa, Okla.	Ouachita and Union Counties.
	Normandie Oil Corp.	1907 Commerce Bldg., Houston, Tex.	Columbia County.
	North Central Texas Oil Co.	44 Beaver St., New York, N. Y.	Columbia County.
	Ohio Oil Co.	Findlay, Ohio, and Shreveport, La.	Columbia, Ouachita and Union Counties.
	Oliphant Oil Corp.	1905 Nat'l Bank of Tulsa Bldg., Tulsa, Okla.	Columbia County.
	Oswalt, J. A.	Smackover, Ark.	Ouachita and Union Counties.
	Ozark Natural Gas Co.	Fort Smith, Ark.	Crawford, Sebastian and Franklin Counties.
	Patterson & Smith	c/o Earl Patterson, El Dorado, Ark.	Union County.
	Patton, W. F.	El Dorado, Ark.	Union County.
	Pesnell, A. H.	Louann, Ark.	Ouachita and Union Counties.
	Pesses, I. L. (La. Iron & Supply)	El Dorado, Ark.	Union County.
	Petroleum Finance Corp.	Continental Bldg., Dallas, Tex.	Columbia County.
	Phillips Petroleum Co.	Bartlesville, Okla., & El Dorado, Ark.	Ouachita and Union Counties.
Phillips, A. C.	Route 6, Box 11, El Dorado, Ark.	Union County.	

Mineral	Company	Address	Location of Oil or Gas Wells
Petroleum & Natural Gas (Cont.)	Phillips, Mrs.	Route 6, El Dorado, Ark.	Columbia and Union Counties.
	Hattie Placid Oil Co.	Box 839, Dallas, Tex.	Columbia, Ouachita and Union Counties.
	Ramage, S. Y.	408 Frisco Bldg., Joplin, Mo.	Ouachita and Union Counties.
	Reynolds, J. D.	Camden, Ark.	Columbia, Ouachita and Union Counties.
	Richardson, Sam M.	El Dorado, Ark.	Ouachita and Union Counties.
	Richardson & Murphy	First Nat'l Bank Bldg., El Dorado, Ark.	Union County.
	River Valley Gas Co.	Paris, Ark.	Johnson County.
	Roberts & Murphy	c/o C. H. Murphy, Jr., El Dorado, Ark.	Union County.
	Rogers, J. G.	Route 6, El Dorado, Ark.	Union County.
	Root Petroleum Co.	Shreveport, La., & El Dorado, Ark.	Union County.
	Rushing, J. S., Tr.	El Dorado, Ark.	Miller County.
	S. H. A. Oil Corp.	El Dorado, Ark.	Union County.
	Shell Oil Co., Inc.	Box 2099, Houston, Tex.	Columbia County.
	Skelly Oil Co.	Box 1650, Tulsa, Okla.	Miller, Ouachita and Union Counties.
	Sklar Oil Corp.	Shreveport, La.	Miller, Ouachita and Union Counties.
	Sloan, W. S.	El Dorado, Ark.	Union County.
	Smart, C. C.	Stephens, Ark.	Columbia County.
Southern Gas Produ- cing Co.	Fort Smith, Ark.	Sebastian County.	
Southern Produc- tion Co.	c/o Geo. B. Graves, 1905 Rand Tower, Minneapolis, Minn.	Ouachita and Union Counties.	
Southern Union Production Co.	1104 Burt Bldg., Dallas, Tex.	Franklin County.	
Southwood Oil Co., Inc.	410 Continental Bldg., Dallas, Tex.	Columbia County.	



Big Six Quicksilver Mine near Murphreesboro, Ark.

Mineral	Company	Address	Location of Oil or Gas Wells	
Petroleum & Natural Gas (Cont.)	Spears Oil Co.	Smackover, Ark.	Ouachita County.	
	Spence, Mrs. H. M.	El Dorado, Ark.	Ouachita County.	
	Spiers, H. H.	Smackover, Ark.	Union County.	
	Steel, Will, Tr.	Texarkana, Ark.	Miller County.	
	Steffen, Harry	Smackover, Ark.	Union County.	
	Sugar, L. L.	325 Lister St., El Dorado, Ark.	Ouachita and Union Counties.	
	Superior Oil Co.	Oil & Gas Bldg., Houston, Tex.	Columbia County.	
	Texarkana Drilling Co.	Ardis Bldg., Shreveport, La.	Miller County.	
	Texas Company, The	Houston, Tex.	Ouachita and Union Counties.	
	Texas Canadian Oil Corp.	Drawer "B," Arap, Tex.	Miller and Union Counties.	
	Thompson, S. O.	Grim Hotel, Texarkana, Ark.	Miller County.	
	Tidewater Assoc. Oil Co.	Box 1404, Houston, Tex.	Columbia County.	
	Tillery, R. A.	Smackover, Ark., & El Dorado, Ark.	Ouachita and Union Counties.	
	Tirk, H. L.	Smackover, Ark.	Ouachita County.	
	Turnage, W. H.	Smackover, Ark.	Ouachita and Union Counties.	
	Vaughn, G. H.	601 Dallas Nat'l Bank Bldg., Dallas, Tex.	Columbia County.	
	Vickers & Spears	Smackover, Ark.	Ouachita and Union Counties.	
	Victor, J. J.	225 E. 3rd St., Willard Hotel, Tulsa, Okla.	Ouachita and Union Counties.	
	Vacarro & Waterman	c/o F. J. Roussel, Caddo Hotel, Shreveport, La.	Miller County.	
	Washington Bros.	Norphlet, Ark.	Ouachita and Union Counties.	
	Wesson & Bonner	Stephens, Ark.	Columbia County.	
	Western Oil Co.	Smackover, Ark.	Ouachita and Union Counties.	
	Whitaker, O. F., Tr. (Opr. Stephens for Ark. Fuel Oil)	Stephens, Ark.	Columbia, Ouachita and Union Counties.	
	White, T. D.	Norphlet, Ark. Box 136.	Ouachita and Union Counties.	
	Wilson, J. M.	Norphlet, Ark.	Ouachita and Union Counties.	
	Wisinger, A. L.	El Dorado, Ark.	Union County.	
	Woodley Petroleum Co.	Box 1403, Houston, Tex.	Union County.	
	Woodward, W. A. G.	Magnolia, Ark.	Columbia County.	
	Rutile	The Titanium Corp.	Box 1565, Tulsa, Okla.	At Magnet Cove, 9 miles west of Malvern, Hot Spring County.
	Sand	Arkadelphia Sand & Gravel Co.	P. O. Box 517, Arkadelphia, Ark.	One-half mile east of Arkadelphia, Clark County.
		Arkholia Sand & Gravel Co.	So. 7th & B. Sts., Fort Smith, Ark.	Sebastian County.
		Bench, W. C.	Paris, Ark.	Logan County.
		Big Rock Stone & Material Co.	Little Rock, Ark.	Foot of Ashley St., Little Rock. Pulaski County.
Byrum, R. E. L.		Van Buren, Ark.	Sebastian County.	
Cotton, Garland		Paris, Ark.	Logan County.	
Estep, J. R.		Van Buren, Ark.	Sebastian County.	
Greenville Sand & Gravel Co.		Memphis, Tenn.	Chicot County.	
Henderson, J. H.		Ozark, Ark.	Franklin County.	
Hope Brick Works		Hope, Ark.	Montgomery County.	
Jeffrey, Roy N., Lumber Co.		Batesville, Ark.	Independence County.	
Lake Village Sand & Gravel Co.		Lake Village, Ark.	Chicot County.	
Lutesville Sand & Gravel Co.		Black Rock, Ark.	In town of Black Rock, Lawrence County.	
Mobley Construction Co.		Morrilton, Ark.	(1) North of Dardanelle, Yell County. (2) Newport, Jackson County.	
Neyer Construction Co.		Billings, Mo.	Baxter County.	
Pearl City Packet Co.		Newport, Ark.	On White River, near city limits of Newport, Jackson County.	

Mineral	Company	Address	Location of Mine or Plant	
Sand (Cont.)	Pine Bluff Sand & Gravel Co.	Pine Bluff, Ark.	Upper plant, 1 mile east of Pine Bluff, lower plant, 1½ miles east of Pine Bluff, Jefferson County.	
	Porter, E. C. Producers Gravel & Sand Co. Pruitt, Ike Sheldon, C. W. Smith, G. S.	Clarksville, Ark. P. O. Box 1615. Shreveport, La. Ozark, Ark. Ozark, Ark. Van Buren, Ark.	Johnson County, Wilton, Little River County, Franklin County, Franklin County, Sec. 25, T. 9 N., R. 32 W., Sebastian County, Pulaski County, Ouachita County.	
Slate	Sprick, J. B. St. Louis Southwestern Ry. Co. Superior Coal & Mining Co. Twin City Lumber & Supply Co. Arkansas Slate Co.	Little Rock, Ark. St. Louis, Mo. Blytheville, Ark. 723 S. 9th St., Fort Smith, Ark. P. O. Box 340, Greenwood, Ark. Kansas City, Mo.	Mississippi County, Sebastian County, Montgomery County, Polk County.	
	Stone	Lerack, Otto J., Products, The Arkansas Black Marble Co. Batesville Stone & Marble Co. Batesville White Lime Co. Big Rock Stone & Material Co. Independent Gravel Co. Independence County Marble Co. Jeffrey-Keys Sand & Gravel Co. Little Rock Granite Co. Mallory, J. N. Ozark White Lime Co. Tobin Quarries, Inc. White River Marble Co. Womble, W. E., & Sons Corona Products, Inc.	South Main St., Batesville, Ark. Batesville, Ark. Batesville, Ark. Little Rock, Ark. Joplin, Mo. Batesville, Ark. Batesville, Ark. Little Rock, Ark. Jackson, Tenn. Fayetteville, Ark. Kansas City, Mo. Cartney, Ark. Fort Smith, Ark. Rogers, Ark.	Two miles south of Locust Grove, Independence County. Independence County, Quarry and six kilns at Limedale, Independence County, At foot of Big Rock, Pulaski County, Benton County, Near Limedale, Independence County, Independence County, Pulaski County, Independence County, Washington County, Pulaski County, Cartney, Baxter County, Conway and Clark Counties, Rogers, Benton County.
		Tripoli		



Shaft of Arkansas Quicksilver Mines, Inc., near Murfreesboro.