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Malmberg, Glenn T. and Downing, D.T., "Geology and Ground - Water Resources of Madison County" Report, 1957
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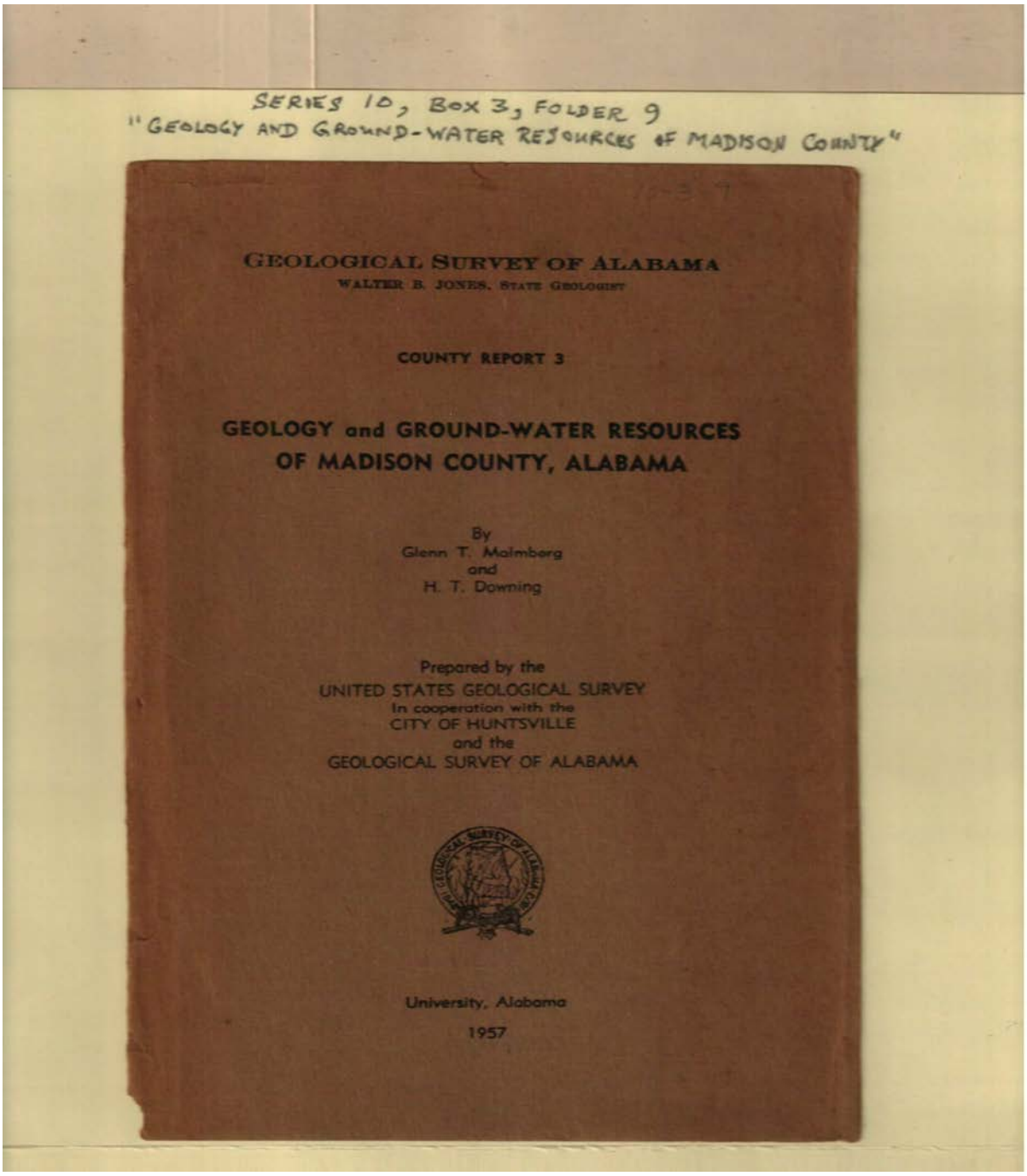

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Jones, Walter B.
Malmberg, Glenn T.
Geology & Ground-Water Resources

Places:

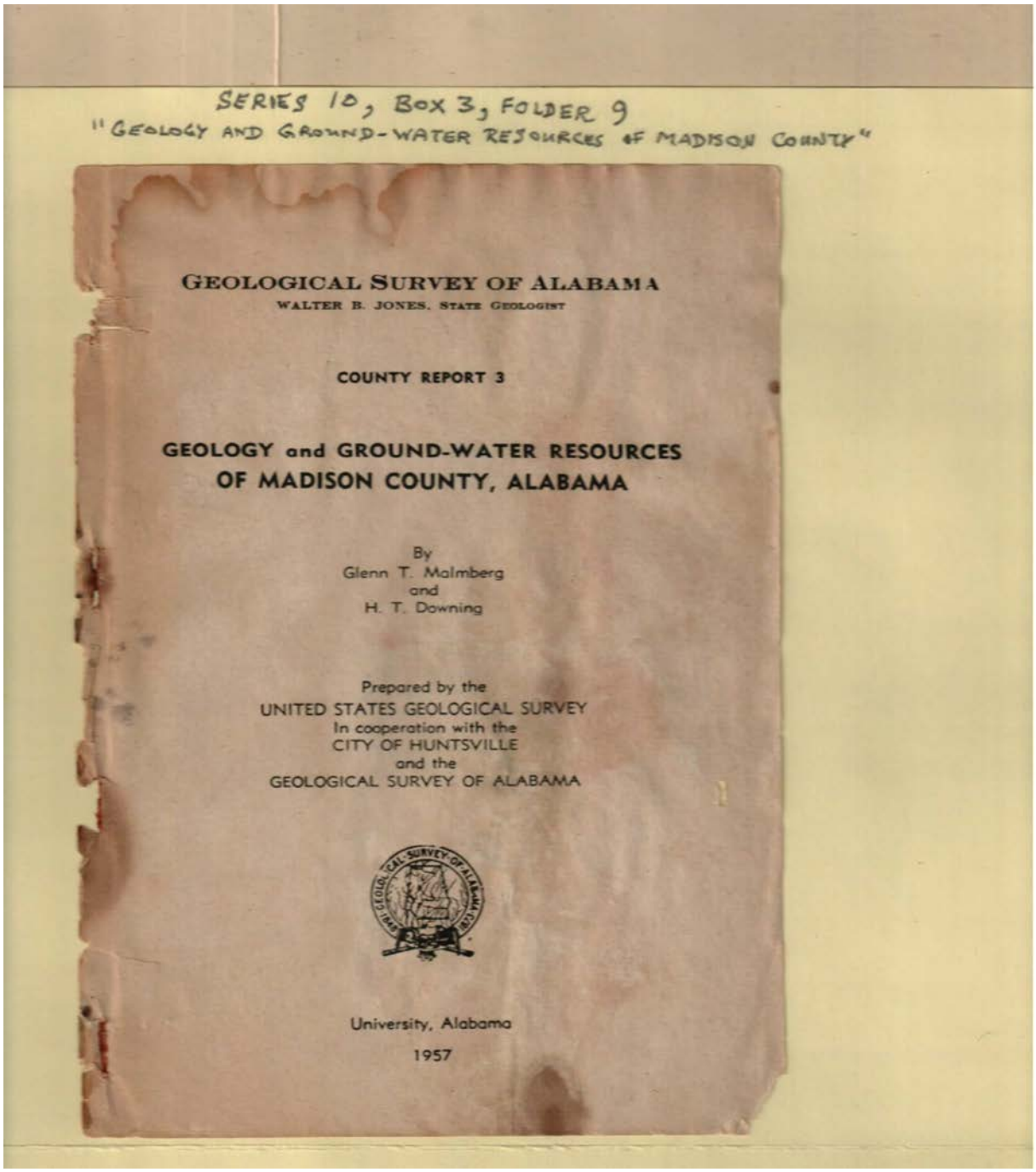
University, AL

Types:

booklet

Dates:

1957



Names:

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Jones, Walter B.
Malmberg, Glenn T.
Geology & Ground-Water Resources

Places:

University, AL

Types:

booklet

Dates:

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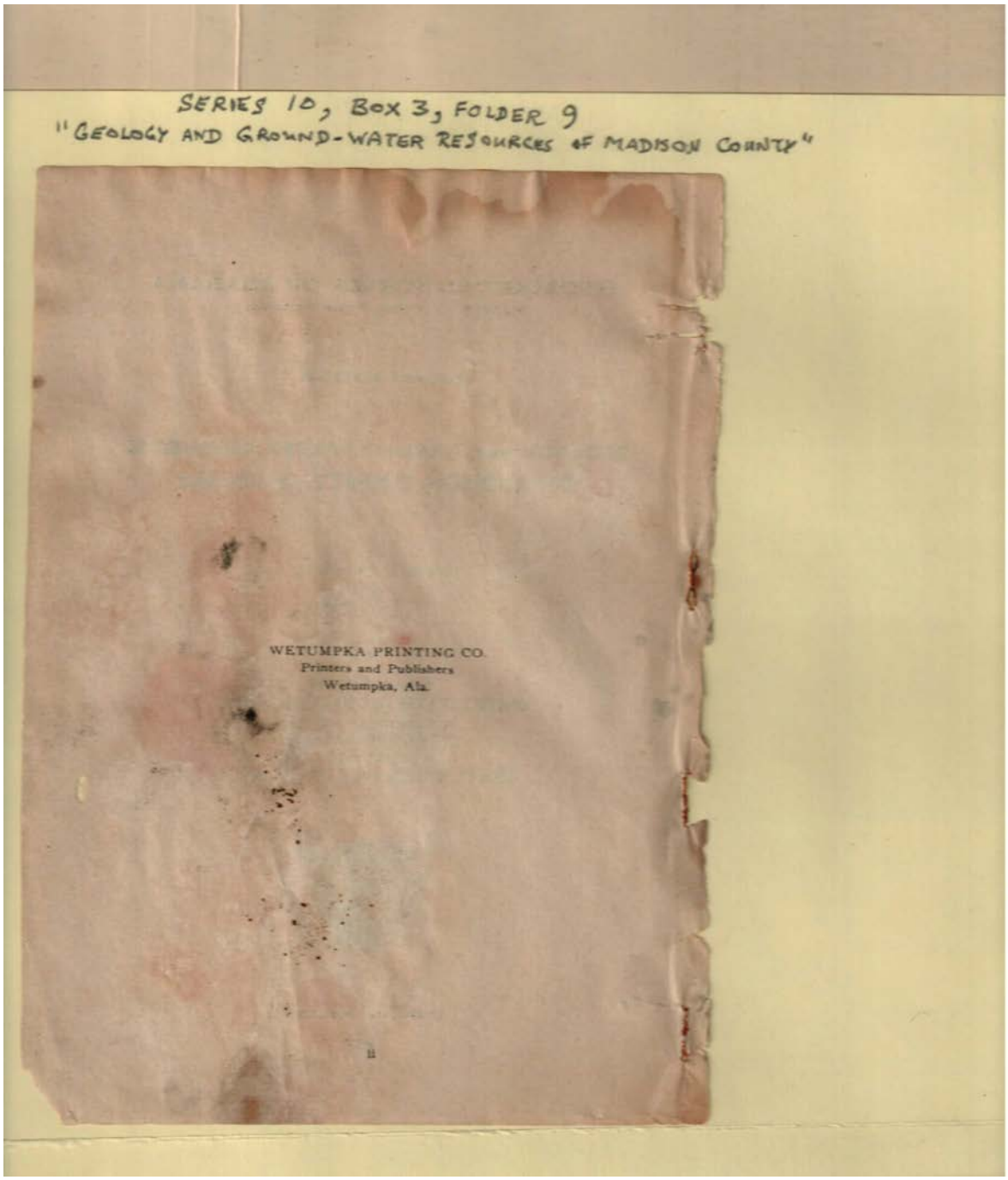

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Wetumpka Printing Co.

Places:
Wetumpka, AL

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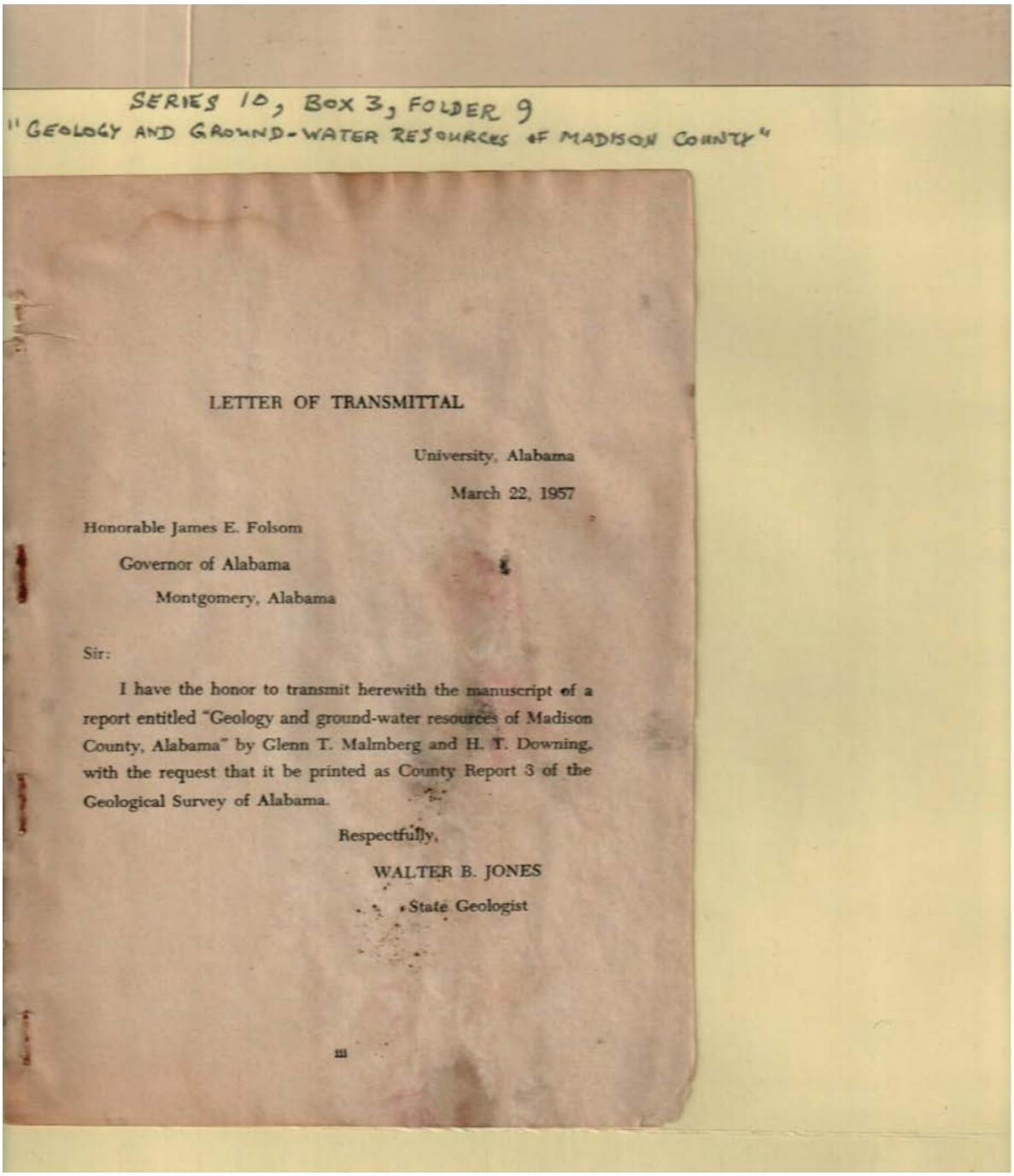
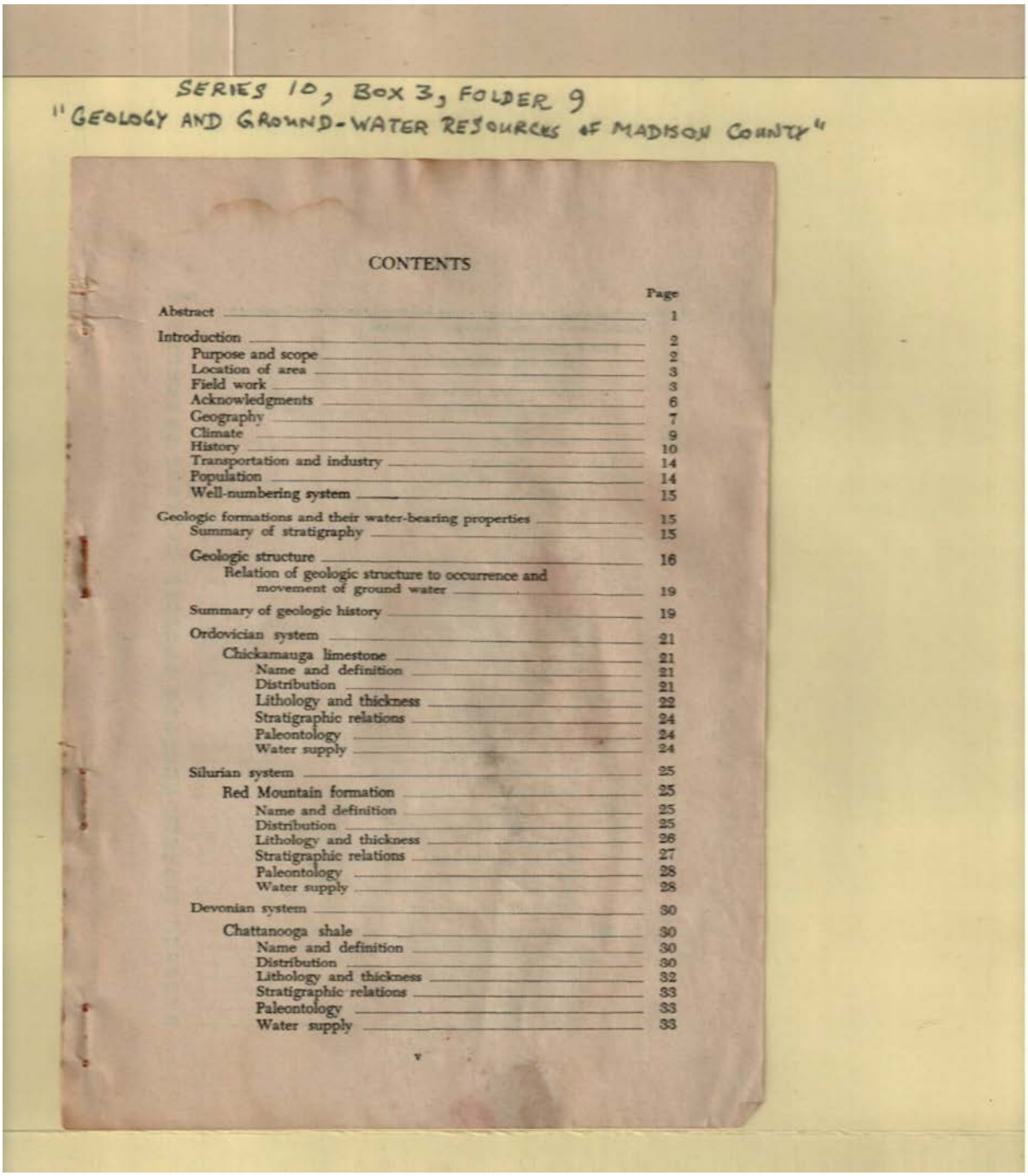


Names:
Downing, H. T.
Folsom, James E., Governor
Jones, Walter B.
Malmberg, Glenn T.

Places:
University, AL

Types:
correspondence

Dates:
Mar 22, 1957



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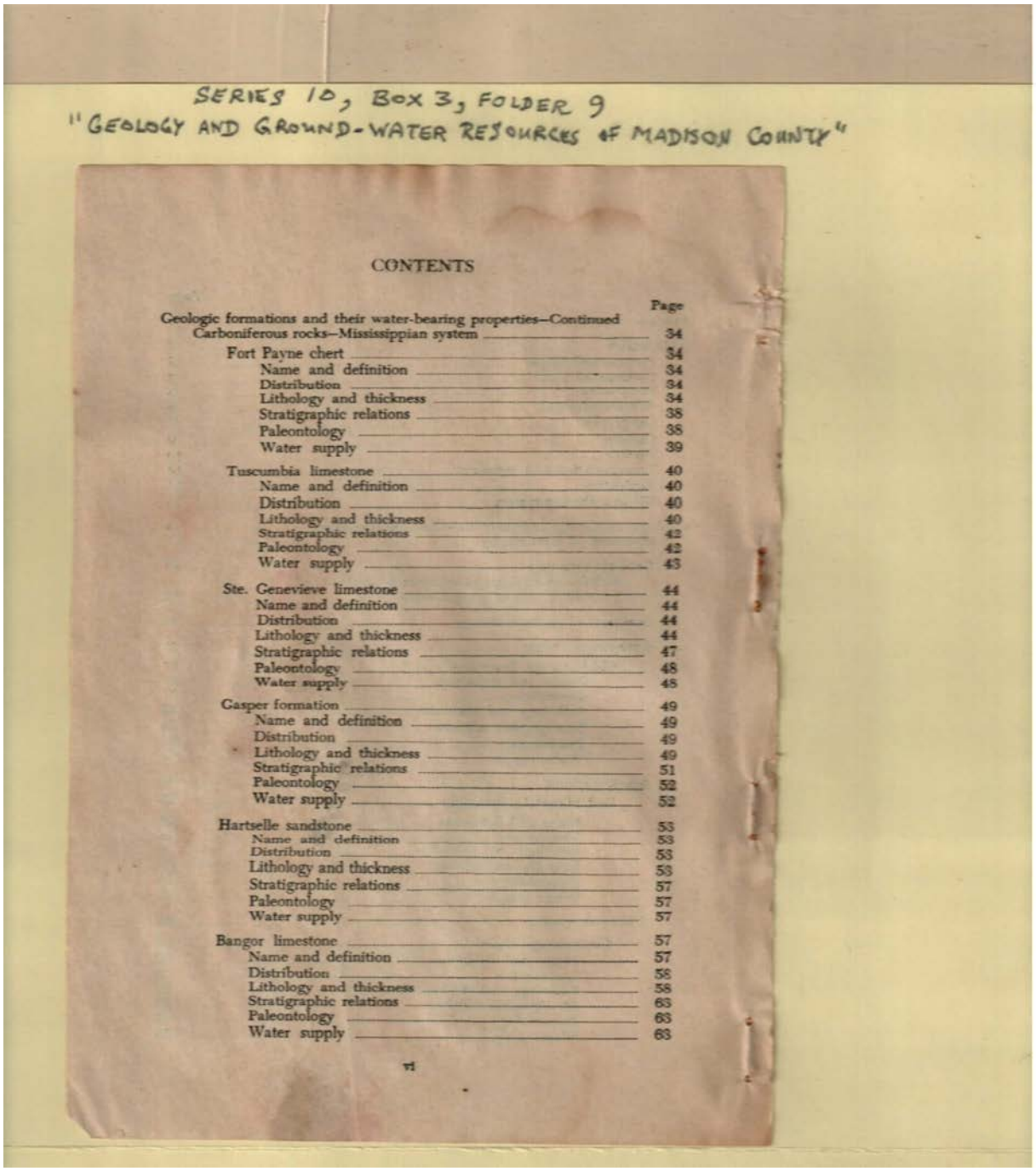

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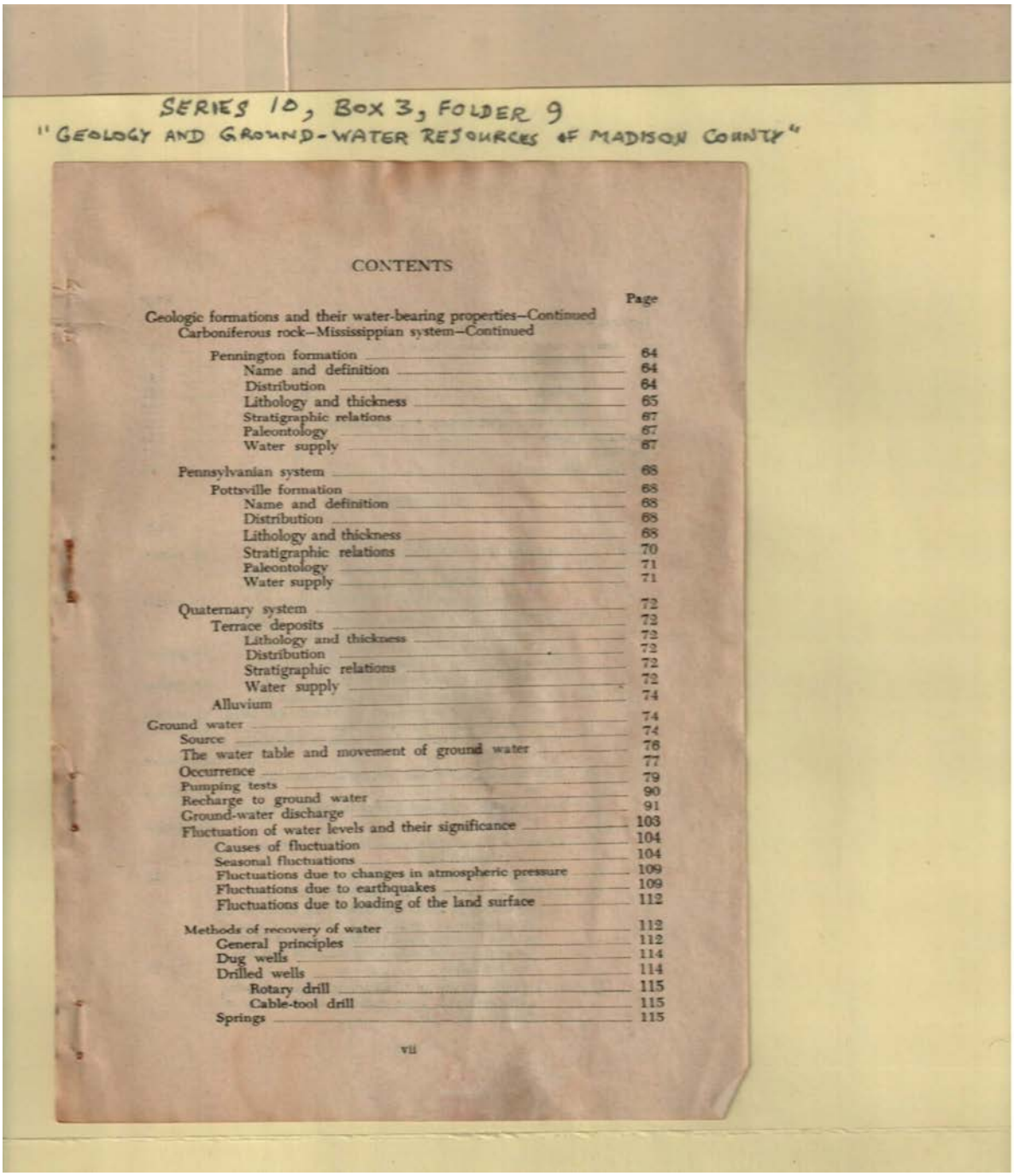

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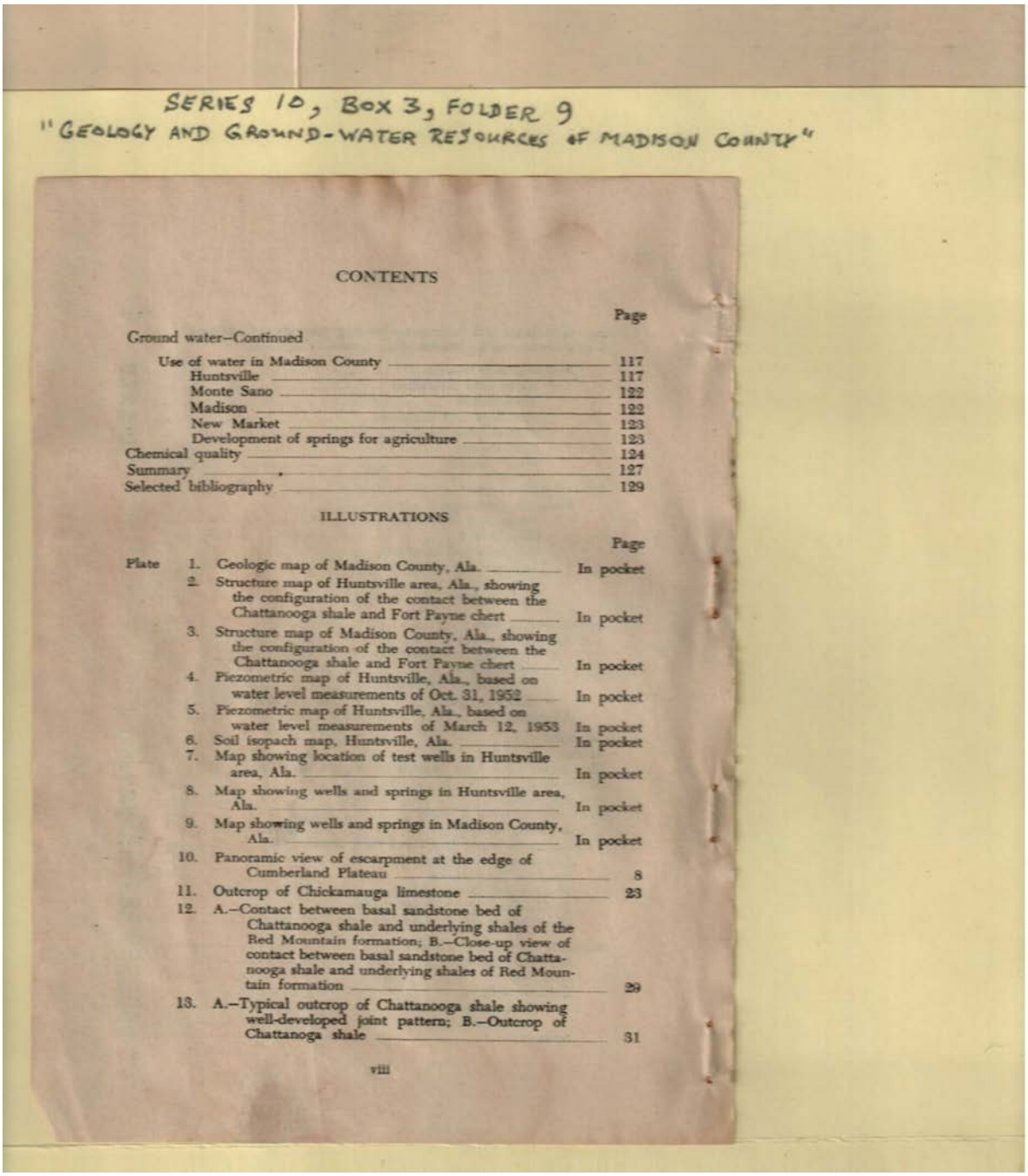

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

CONTENTS

ILLUSTRATIONS

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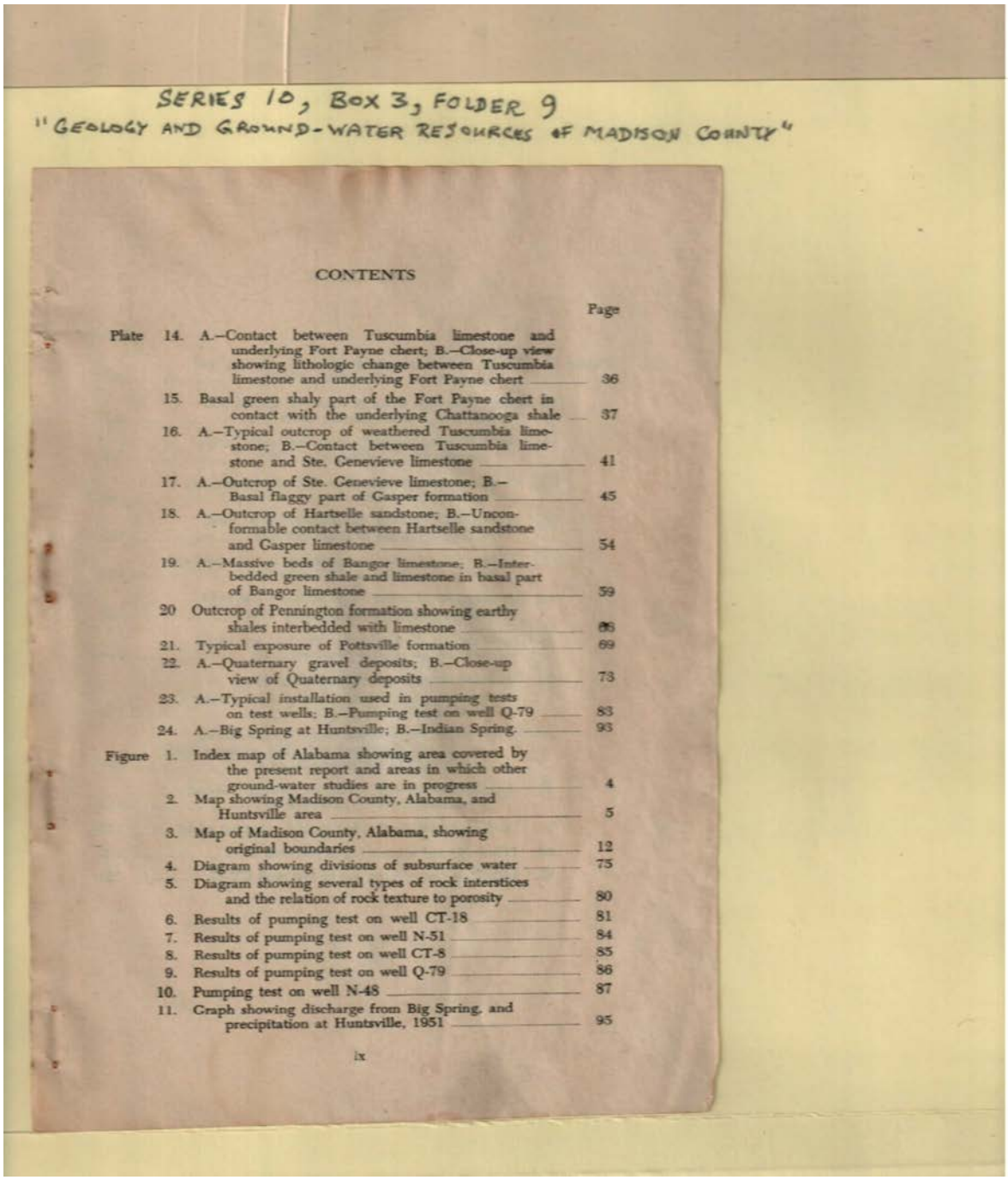

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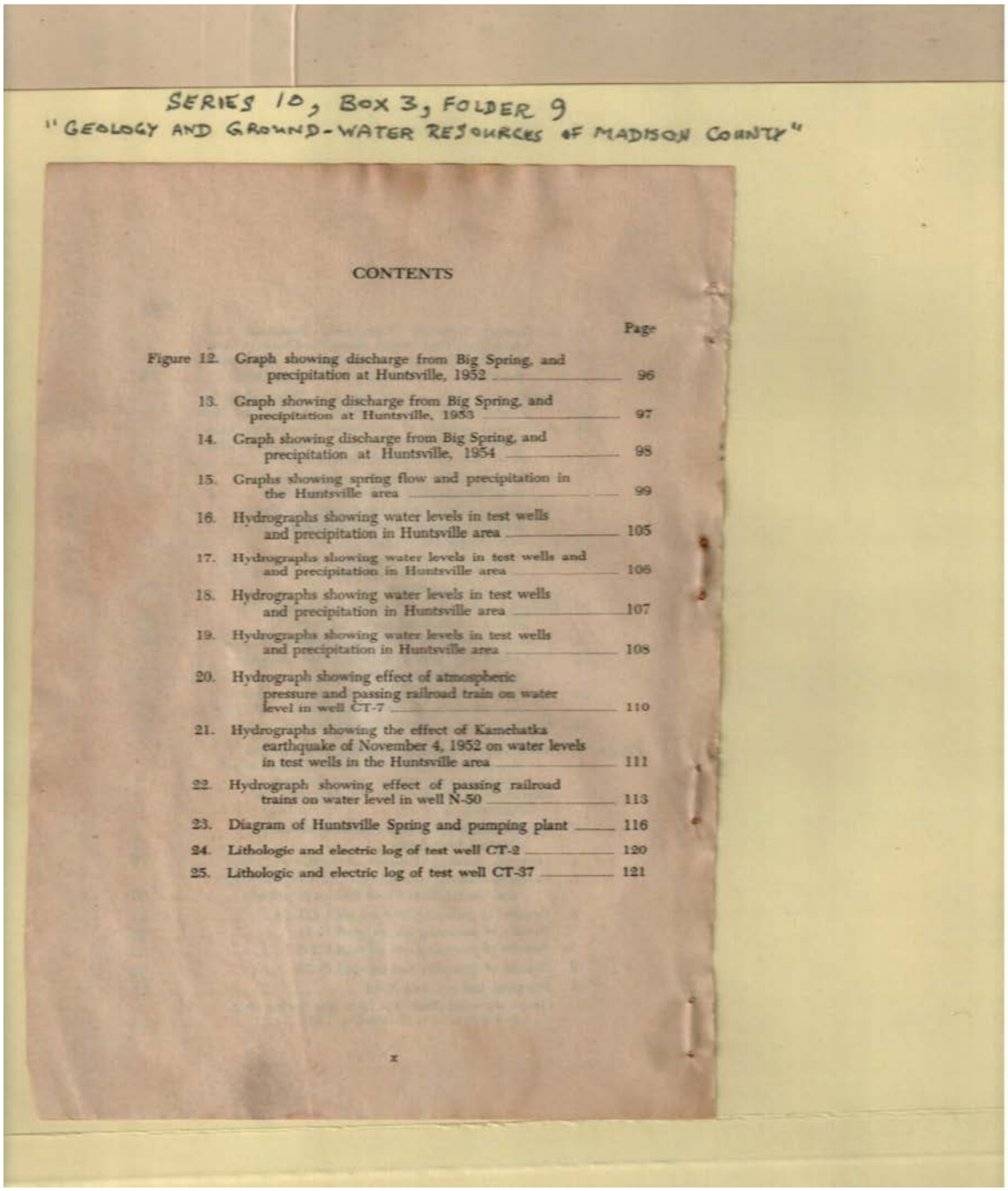

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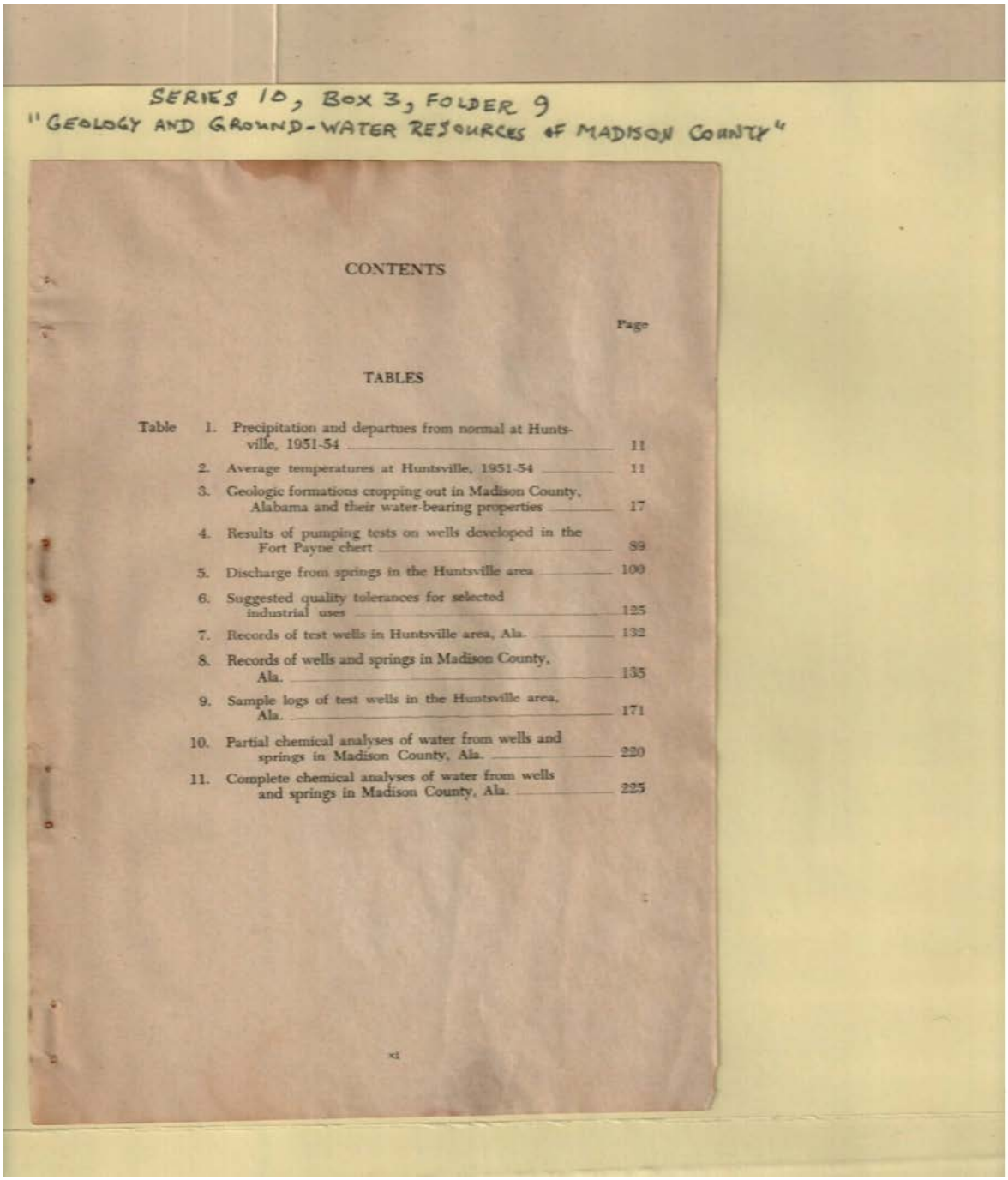

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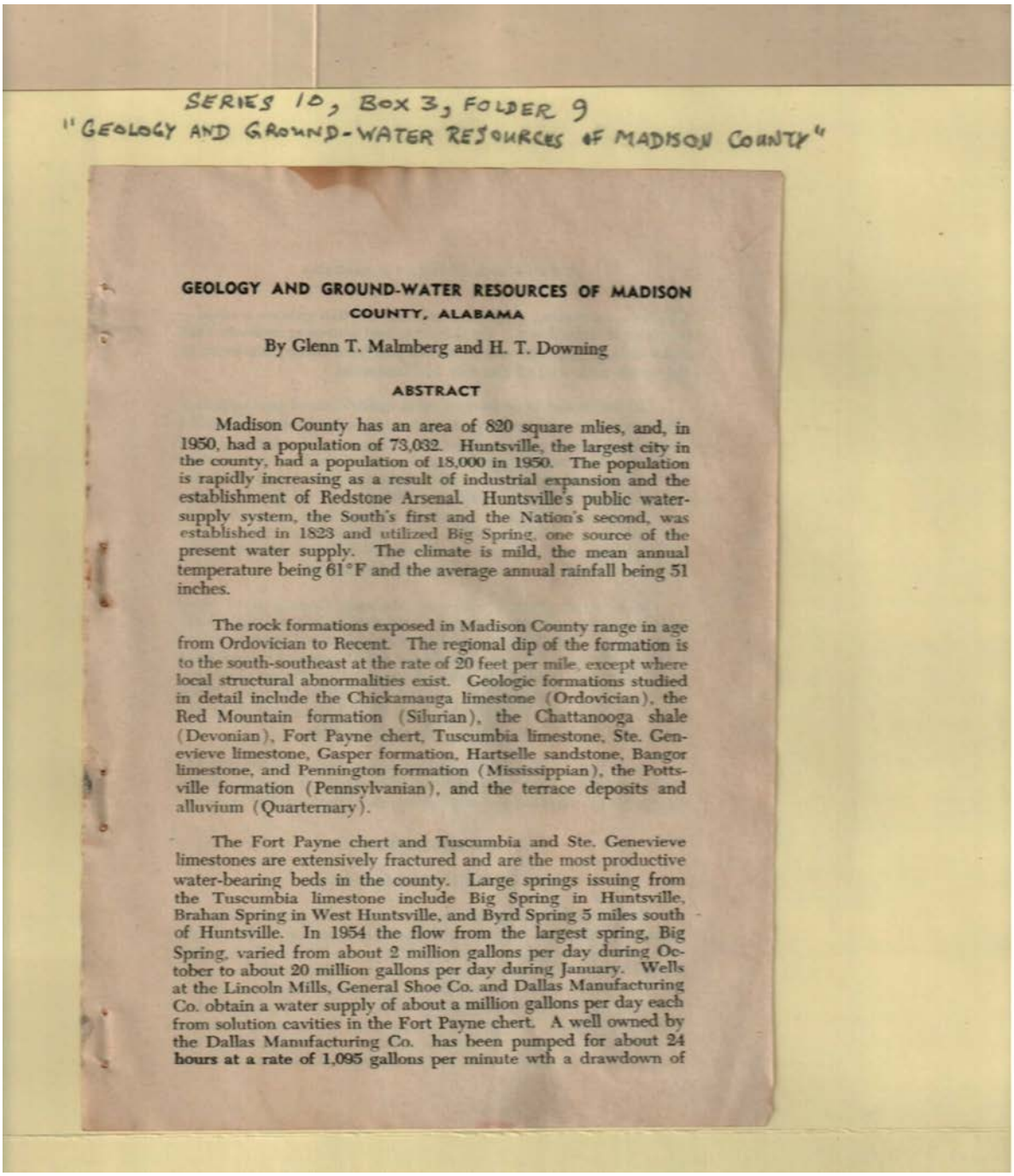

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY, ALABAMA

By Glenn T. Malmberg and H. T. Downing

ABSTRACT

Madison County has an area of 820 square mlies, and, in 1950, had a population of 73,032. Huntsville, the largest city in the county, had a population of 18,000 in 1950. The population is rapidly increasing as a result of industrial expansion and the establishment of Redstone Arsenal. Huntsville's public water-supply system, the South's first and the Nation's second, was established in 1823 and utilized Big Spring, one source of the present water supply. The climate is mild, the mean annual temperature being 61°F and the average annual rainfall being 51 inches.

The rock formations exposed in Madison County range in age from Ordovician to Recent. The regional dip of the formation is to the south-southeast at the rate of 20 feet per mile, except where local structural abnormalities exist. Geologic formations studied in detail include the Chickamauga limestone (Ordovician), the Red Mountain formation (Silurian), the Chattanooga shale (Devonian), Fort Payne chert, Tuscumbia limestone, Ste. Genevieve limestone, Gasper formation, Hartselle sandstone, Bangor limestone, and Pennington formation (Mississippian), the Pottsville formation (Pennsylvanian), and the terrace deposits and alluvium (Quarternary).

The Fort Payne chert and Tuscumbia and Ste. Genevieve limestones are extensively fractured and are the most productive water-bearing beds in the county. Large springs issuing from the Tuscumbia limestone include Big Spring in Huntsville, Brahan Spring in West Huntsville, and Byrd Spring 5 miles south of Huntsville. In 1954 the flow from the largest spring, Big Spring, varied from about 2 million gallons per day during October to about 20 million gallons per day during January. Wells at the Lincoln Mills, General Shoe Co. and Dallas Manufacturing Co. obtain a water supply of about a million gallons per day each from solution cavities in the Fort Payne chert. A well owned by the Dallas Manufacturing Co. has been pumped for about 24 hours at a rate of 1,095 gallons per minute wth a drawdown of

Names:

Downing, H. T.
Malmberg, Glenn T.

Places:

Madison County, AL

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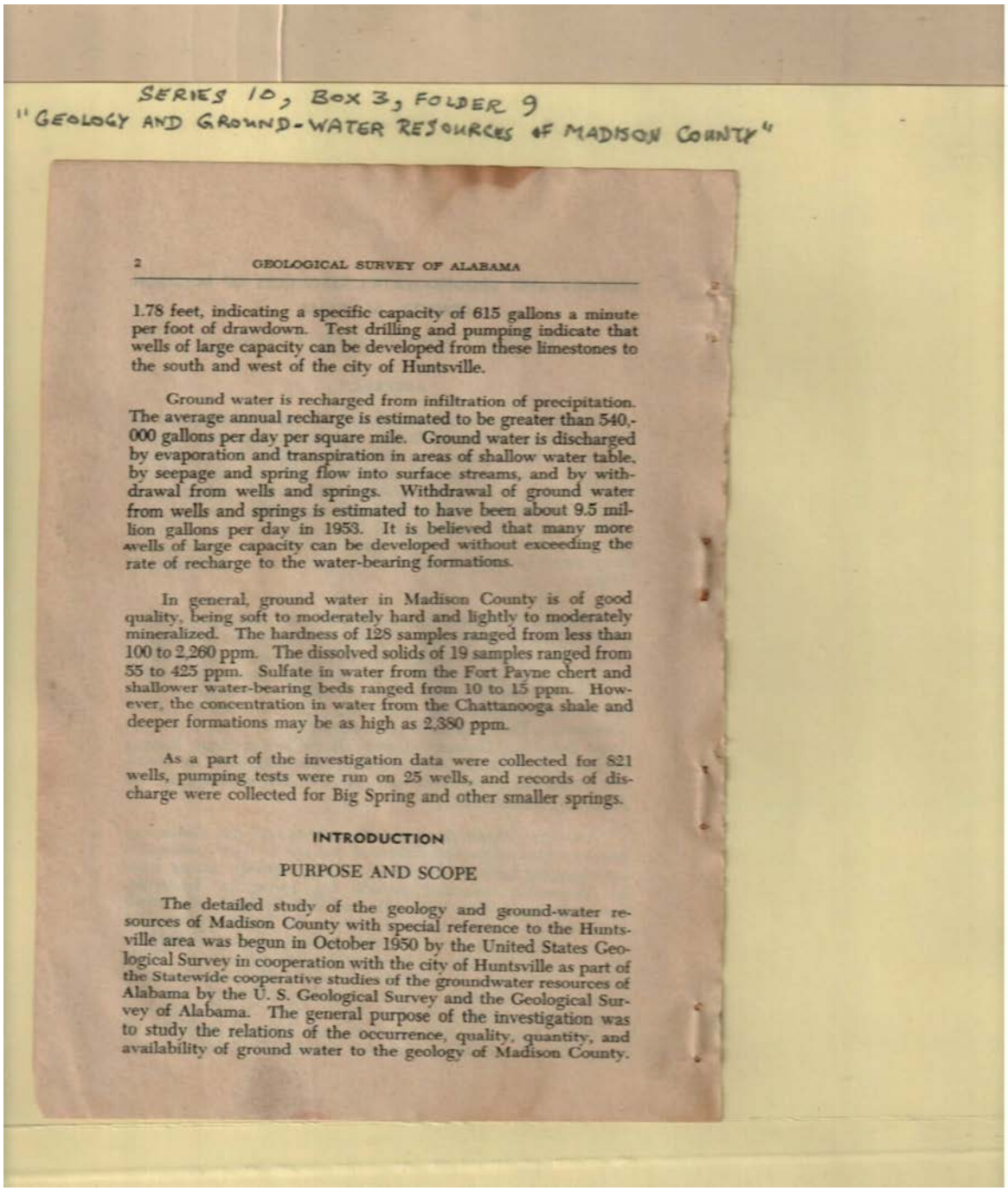
Geology & Ground-Water Resources



1.78 feet, indicating a specific capacity of 615 gallons a minute per foot of drawdown. Test drilling and pumping indicate that wells of large capacity can be developed from these limestones to the south and west of the city of Huntsville.

Ground water is recharged from infiltration of precipitation. The average annual recharge is estimated to be greater than 540,000 gallons per day per square mile. Ground water is discharged by evaporation and transpiration in areas of shallow water table, by seepage and spring flow into surface streams, and by withdrawal from wells and springs. Withdrawal of ground water from wells and springs is estimated to have been about 9.5 million gallons per day in 1953. It is believed that many more wells of large capacity can be developed without exceeding the rate of recharge to the water-bearing formations.

In general, ground water in Madison County is of good quality, being soft to moderately hard and lightly to moderately mineralized. The hardness of 128 samples ranged from less than 100 to 2,260 ppm. The dissolved solids of 19 samples ranged from 55 to 425 ppm. Sulfate in water from the Fort Payne chert and shallower water-bearing beds ranged from 10 to 15 ppm. However, the concentration in water from the Chattanooga shale and deeper formations may be as high as 2,380 ppm.

As a part of the investigation data were collected for 821 wells, pumping tests were run on 25 wells, and records of discharge were collected for Big Spring and other smaller springs.

INTRODUCTION

PURPOSE AND SCOPE

The detailed study of the geology and ground-water resources of Madison County with special reference to the Huntsville area was begun in October 1950 by the United States Geological Survey in cooperation with the city of Huntsville as part of the Statewide cooperative studies of the groundwater resources of Alabama by the U. S. Geological Survey and the Geological Survey of Alabama. The general purpose of the investigation was to study the relations of the occurrence, quality, quantity, and availability of ground water to the geology of Madison County.

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Madison County, AL

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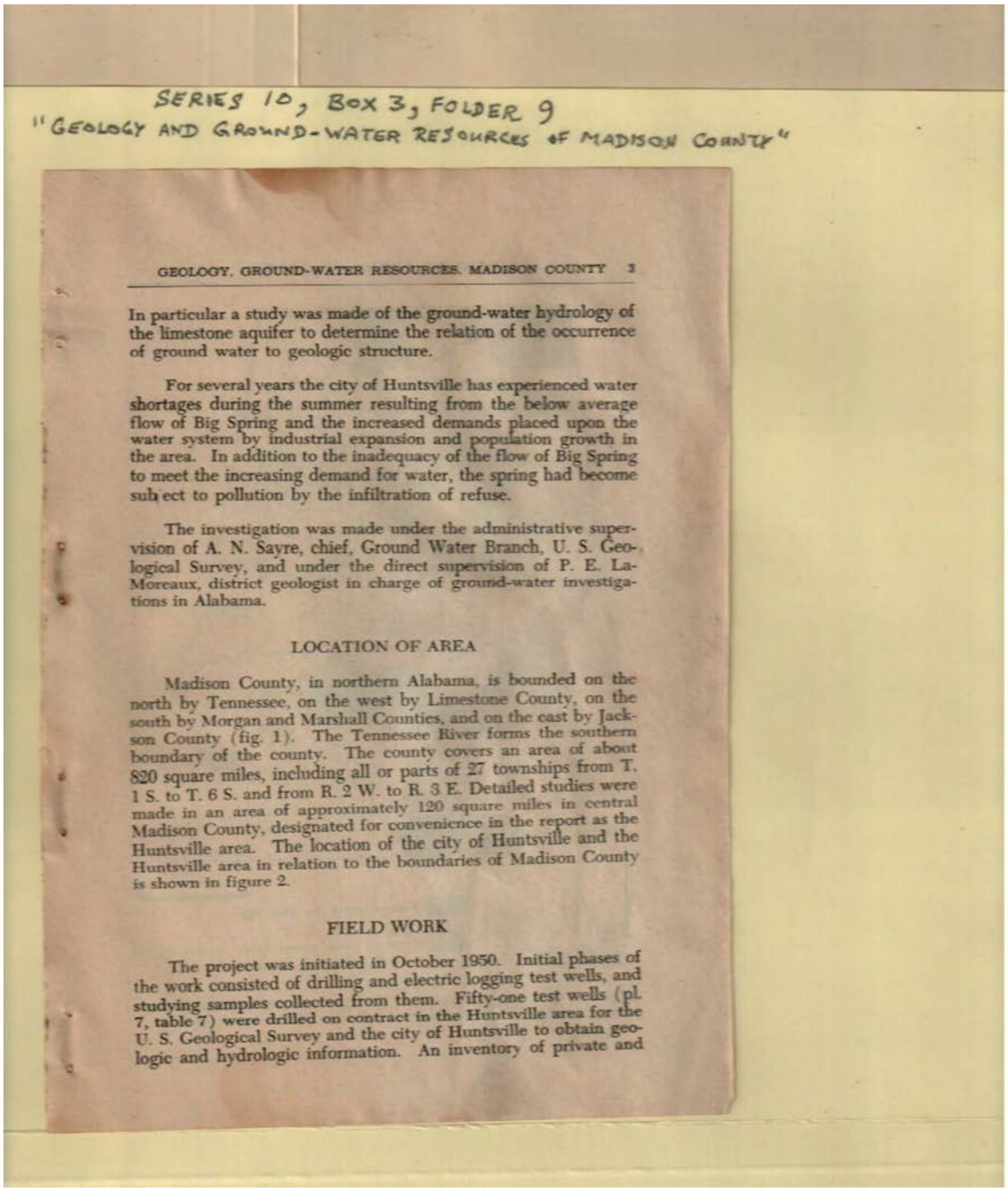

In particular a study was made of the ground-water hydrology of the limestone aquifer to determine the relation of the occurrence of ground water to geologic structure.

For several years the city of Huntsville has experienced water shortages during the summer resulting from the below average flow of Big Spring and the increased demands placed upon the water system by industrial expansion and population growth in the area. In addition to the inadequacy of the flow of Big Spring to meet the increasing demand for water, the spring had become subject to pollution by the infiltration of refuse.

The investigation was made under the administrative supervision of A. N. Sayre, chief, Ground Water Branch, U. S. Geological Survey, and under the direct supervision of P. E. LaMoreaux, district geologist in charge of ground-water investigations in Alabama.

LOCATION OF AREA

Madison County, in northern Alabama, is bounded on the north by Tennessee, on the west by Limestone County, on the south by Morgan and Marshall Counties, and on the east by Jackson County (fig. 1). The Tennessee River forms the southern boundary of the county. The county covers an area of about 820 square miles, including all or parts of 27 townships from T. 1 S. to T. 6 S. and from R. 2 W. to R. 3 E. Detailed studies were made in an area of approximately 120 square miles in central Madison County, designated for convenience in the report as the Huntsville area. The location of the city of Huntsville and the Huntsville area in relation to the boundaries of Madison County is shown in figure 2.

FIELD WORK

The project was initiated in October 1950. Initial phases of the work consisted of drilling and electric logging test wells, and studying samples collected from them. Fifty-one test wells (pl. 7, table 7) were drilled on contract in the Huntsville area for the U. S. Geological Survey and the city of Huntsville to obtain geologic and hydrologic information. An inventory of private and

Places:
Madison County, AL

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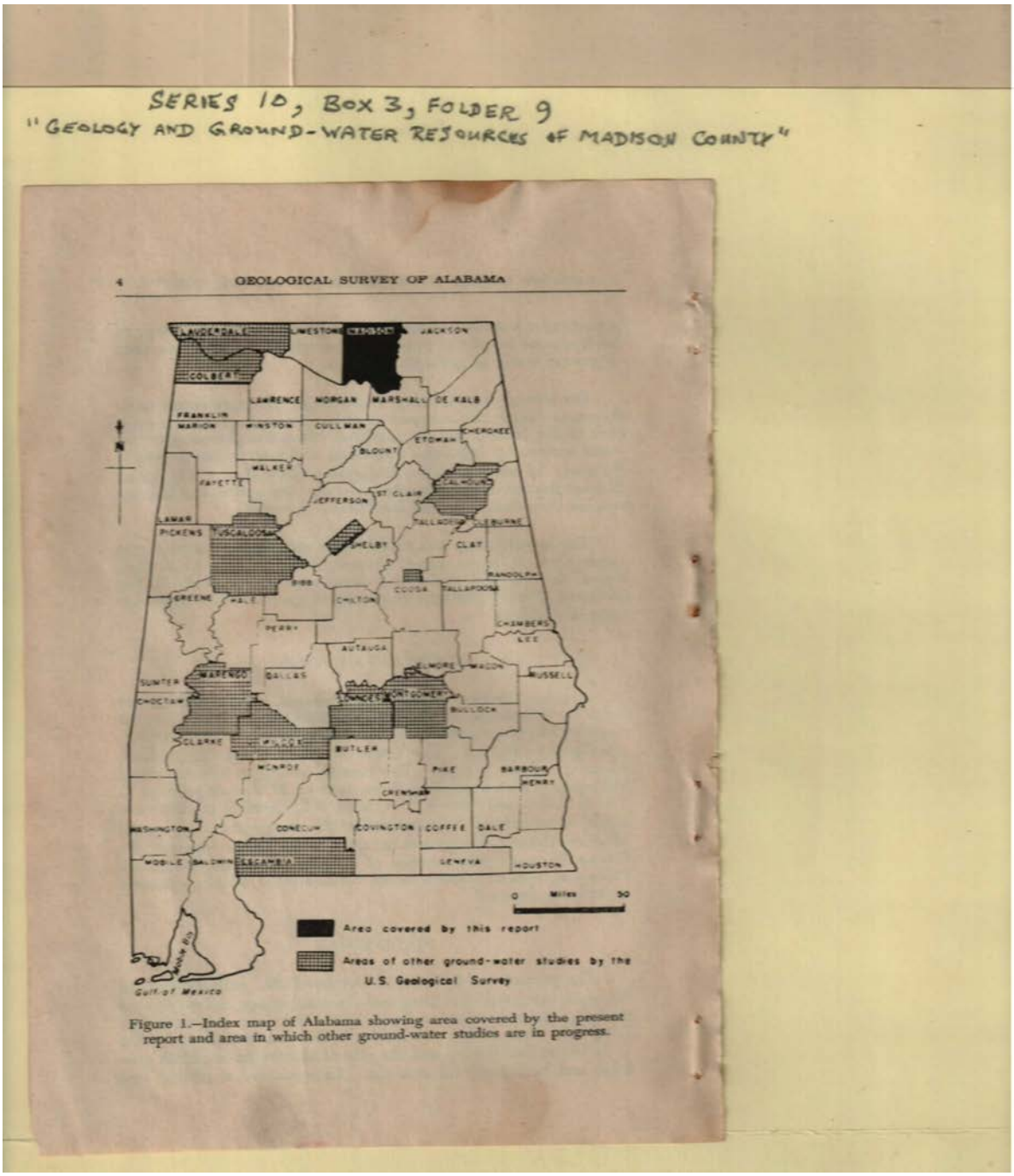

Names:

Ground Water Studies in Alabama

Types:

map

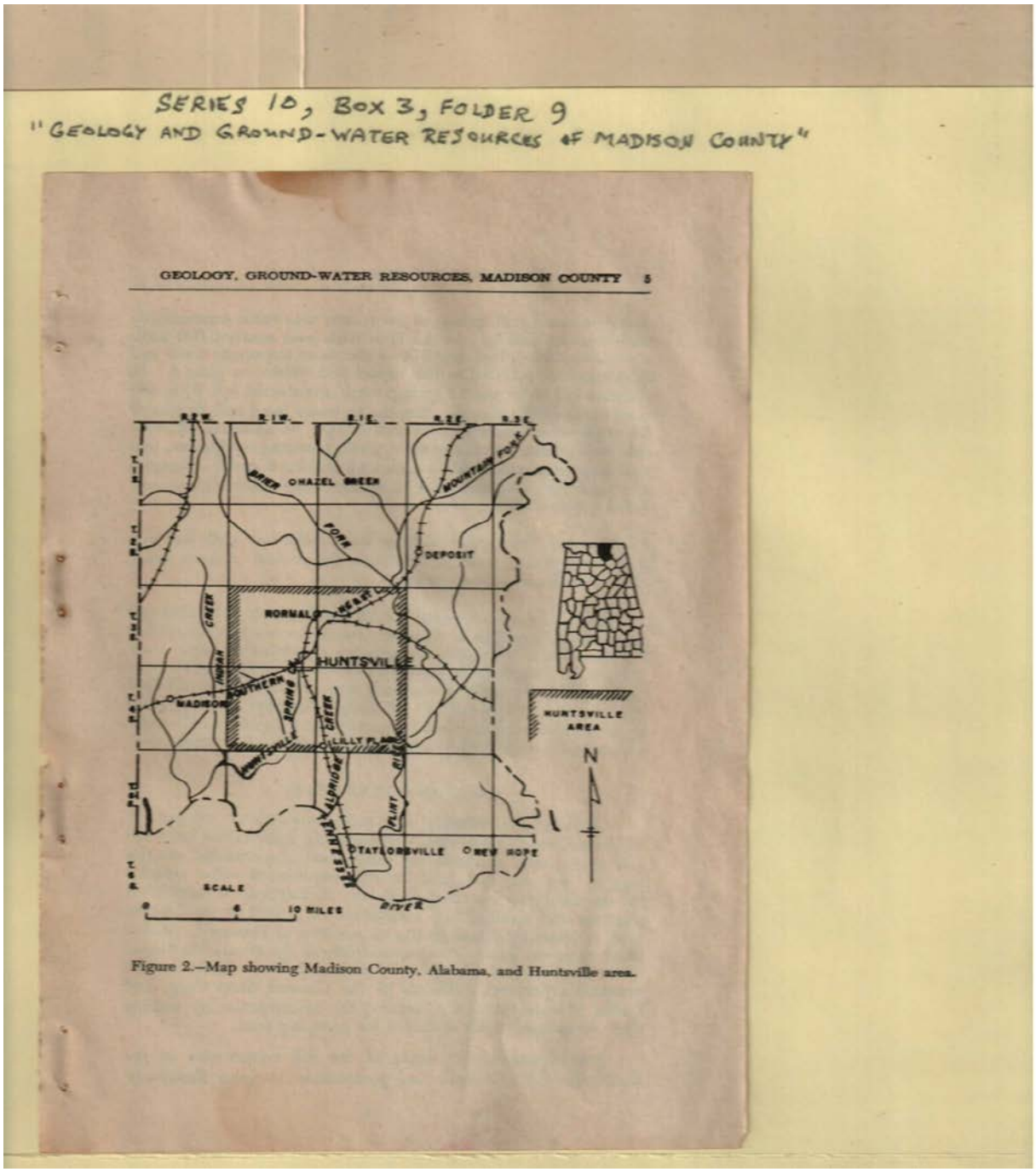

Figure 2.—Map showing Madison County, Alabama, and Huntsville area.

Names:

Madison County, Alabama

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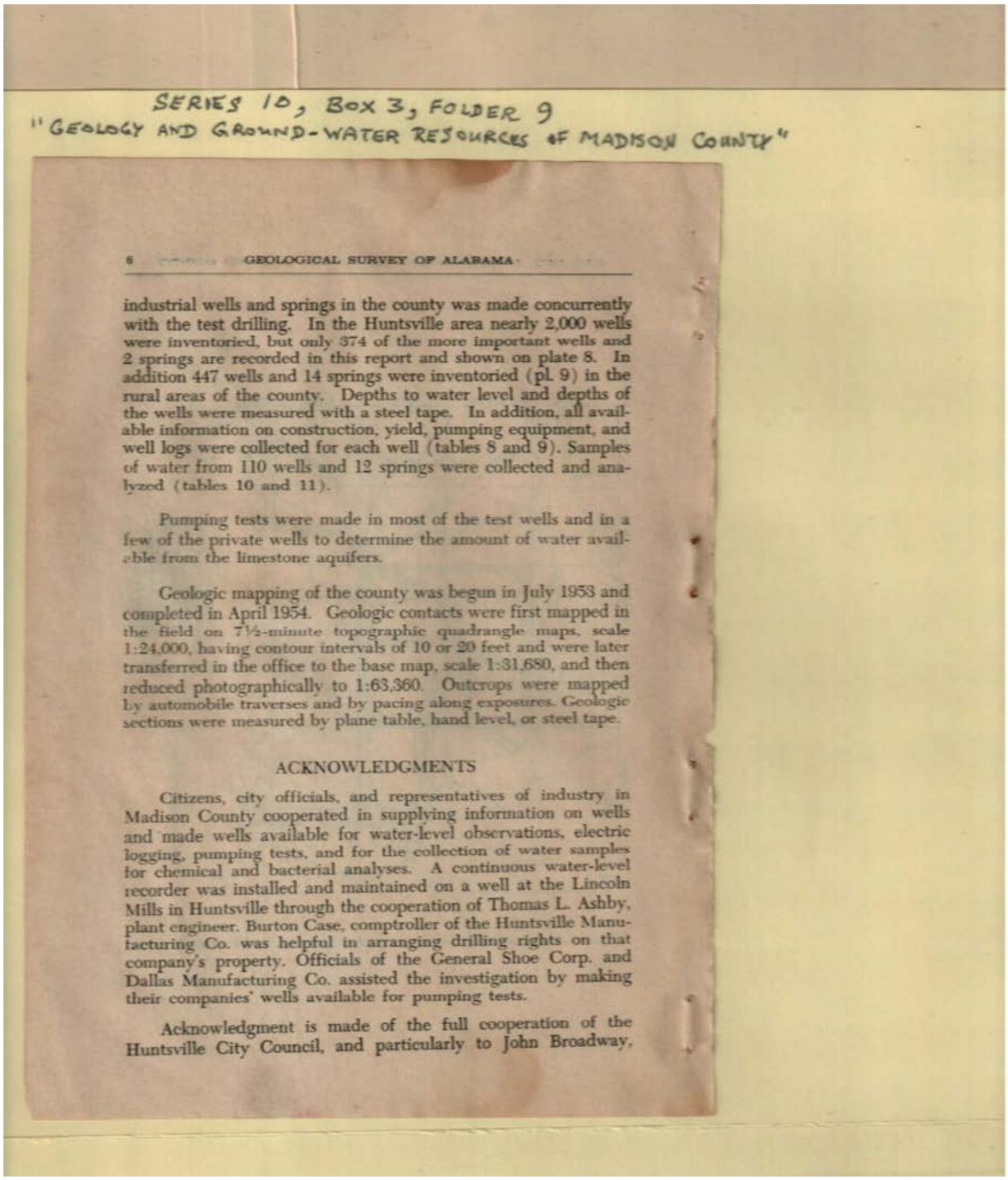
map



industrial wells and springs in the county was made concurrently with the test drilling. In the Huntsville area nearly 2,000 wells were inventoried, but only 374 of the more important wells and 2 springs are recorded in this report and shown on plate 8. In addition 447 wells and 14 springs were inventoried (pl. 9) in the rural areas of the county. Depths to water level and depths of the wells were measured with a steel tape. In addition, all available information on construction, yield, pumping equipment, and well logs were collected for each well (tables 8 and 9). Samples of water from 110 wells and 12 springs were collected and analyzed (tables 10 and 11).

Pumping tests were made in most of the test wells and in a few of the private wells to determine the amount of water available from the limestone aquifers.

Geologic mapping of the county was begun in July 1953 and completed in April 1954. Geologic contacts were first mapped in the field on 7½-minute topographic quadrangle maps, scale 1:24,000, having contour intervals of 10 or 20 feet and were later transferred in the office to the base map, scale 1:31,680, and then reduced photographically to 1:63,360. Outcrops were mapped by automobile traverses and by pacing along exposures. Geologic sections were measured by plane table, hand level, or steel tape.

ACKNOWLEDGMENTS

Citizens, city officials, and representatives of industry in Madison County cooperated in supplying information on wells and made wells available for water-level observations, electric logging, pumping tests, and for the collection of water samples for chemical and bacterial analyses. A continuous water-level recorder was installed and maintained on a well at the Lincoln Mills in Huntsville through the cooperation of Thomas L. Ashby, plant engineer. Burton Case, comptroller of the Huntsville Manufacturing Co. was helpful in arranging drilling rights on that company's property. Officials of the General Shoe Corp. and Dallas Manufacturing Co. assisted the investigation by making their companies' wells available for pumping tests.

Acknowledgment is made of the full cooperation of the Huntsville City Council, and particularly to John Broadway,

Names:
Ashby, Thomas L. Broadway, John Case, Burton

Types:
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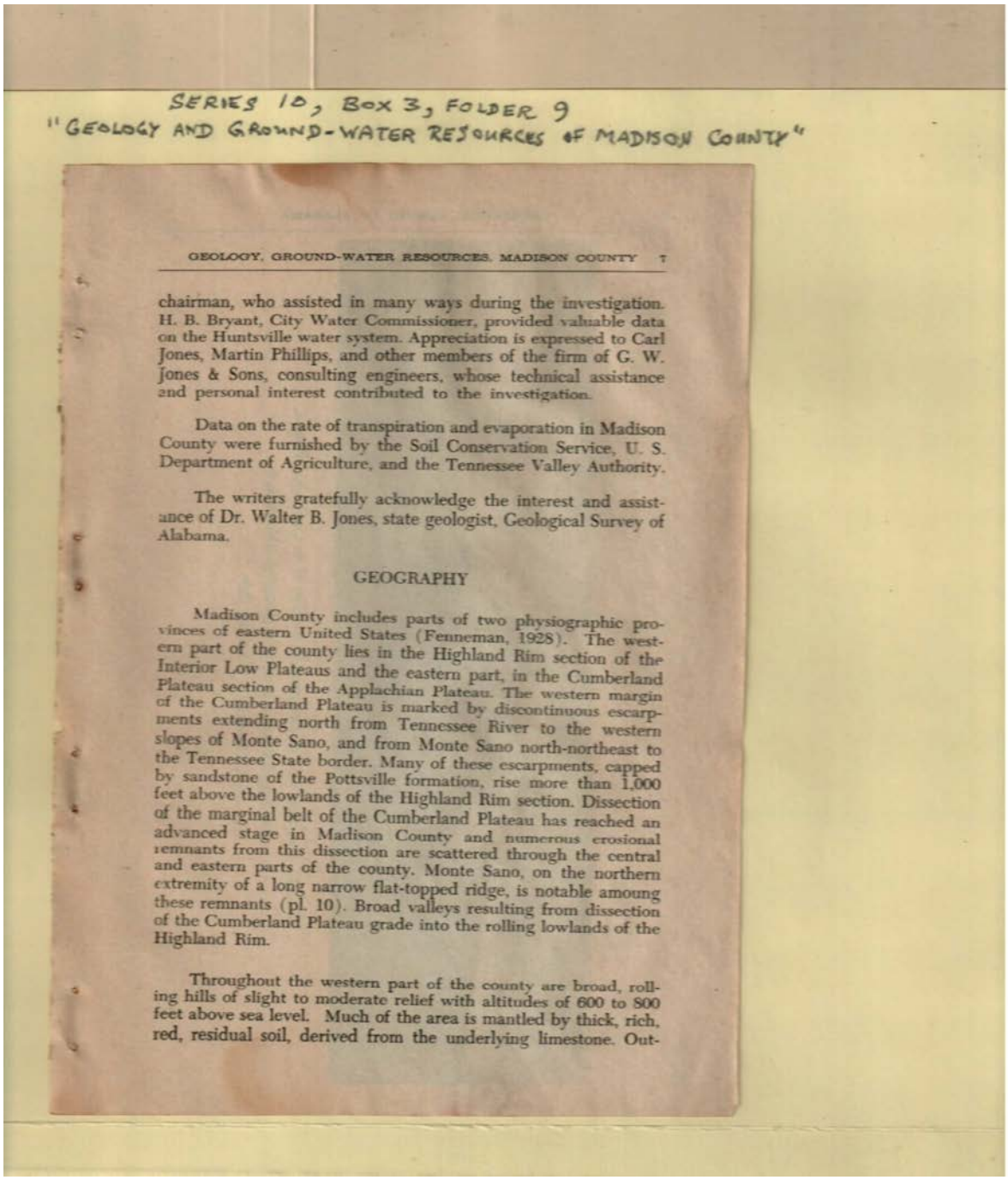

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"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

chairman, who assisted in many ways during the investigation. H. B. Bryant, City Water Commissioner, provided valuable data on the Huntsville water system. Appreciation is expressed to Carl Jones, Martin Phillips, and other members of the firm of G. W. Jones & Sons, consulting engineers, whose technical assistance and personal interest contributed to the investigation.

Data on the rate of transpiration and evaporation in Madison County were furnished by the Soil Conservation Service, U. S. Department of Agriculture, and the Tennessee Valley Authority.

The writers gratefully acknowledge the interest and assistance of Dr. Walter B. Jones, state geologist, Geological Survey of Alabama.

GEOGRAPHY

Madison County includes parts of two physiographic provinces of eastern United States (Fenneman, 1928). The western part of the county lies in the Highland Rim section of the Interior Low Plateaus and the eastern part, in the Cumberland Plateau section of the Applachian Plateau. The western margin of the Cumberland Plateau is marked by discontinuous escarpments extending north from Tennessee River to the western slopes of Monte Sano, and from Monte Sano north-northeast to the Tennessee State border. Many of these escarpments, capped by sandstone of the Pottsville formation, rise more than 1,000 feet above the lowlands of the Highland Rim section. Dissection of the marginal belt of the Cumberland Plateau has reached an advanced stage in Madison County and numerous erosional remnants from this dissection are scattered through the central and eastern parts of the county. Monte Sano, on the northern extremity of a long narrow flat-topped ridge, is notable amoung these remnants (pl. 10). Broad valleys resulting from dissection of the Cumberland Plateau grade into the rolling lowlands of the Highland Rim.

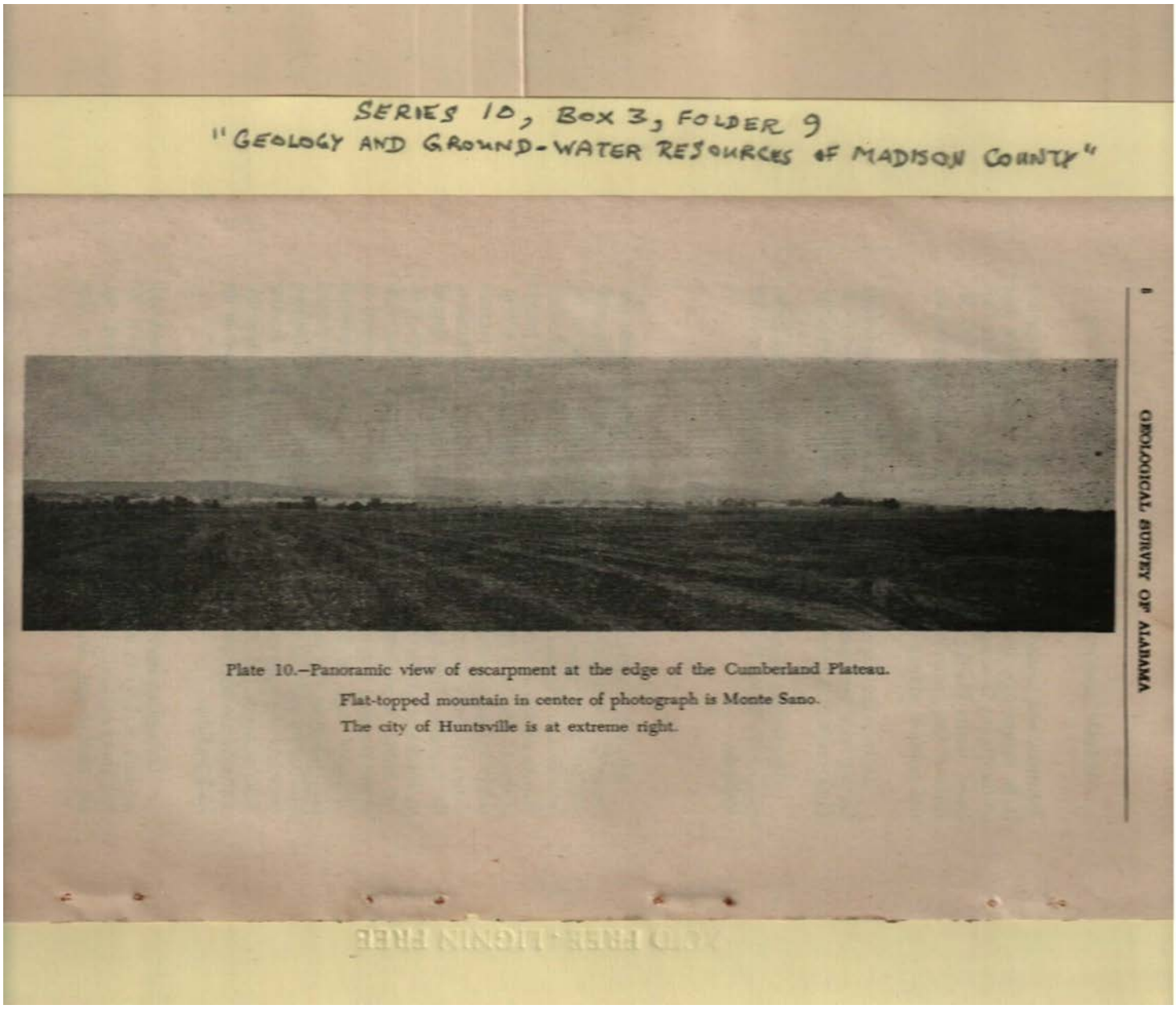
Throughout the western part of the county are broad, rolling hills of slight to moderate relief with altitudes of 600 to 800 feet above sea level. Much of the area is mantled by thick, rich, red, residual soil, derived from the underlying limestone. Out-

Names:

Bryant, H. B.
Fenneman,
G. W. Jones & Sons
Geography
Jones, Carl
Jones, Walter B., Dr.
Phillips, Martin

Types:

booklet

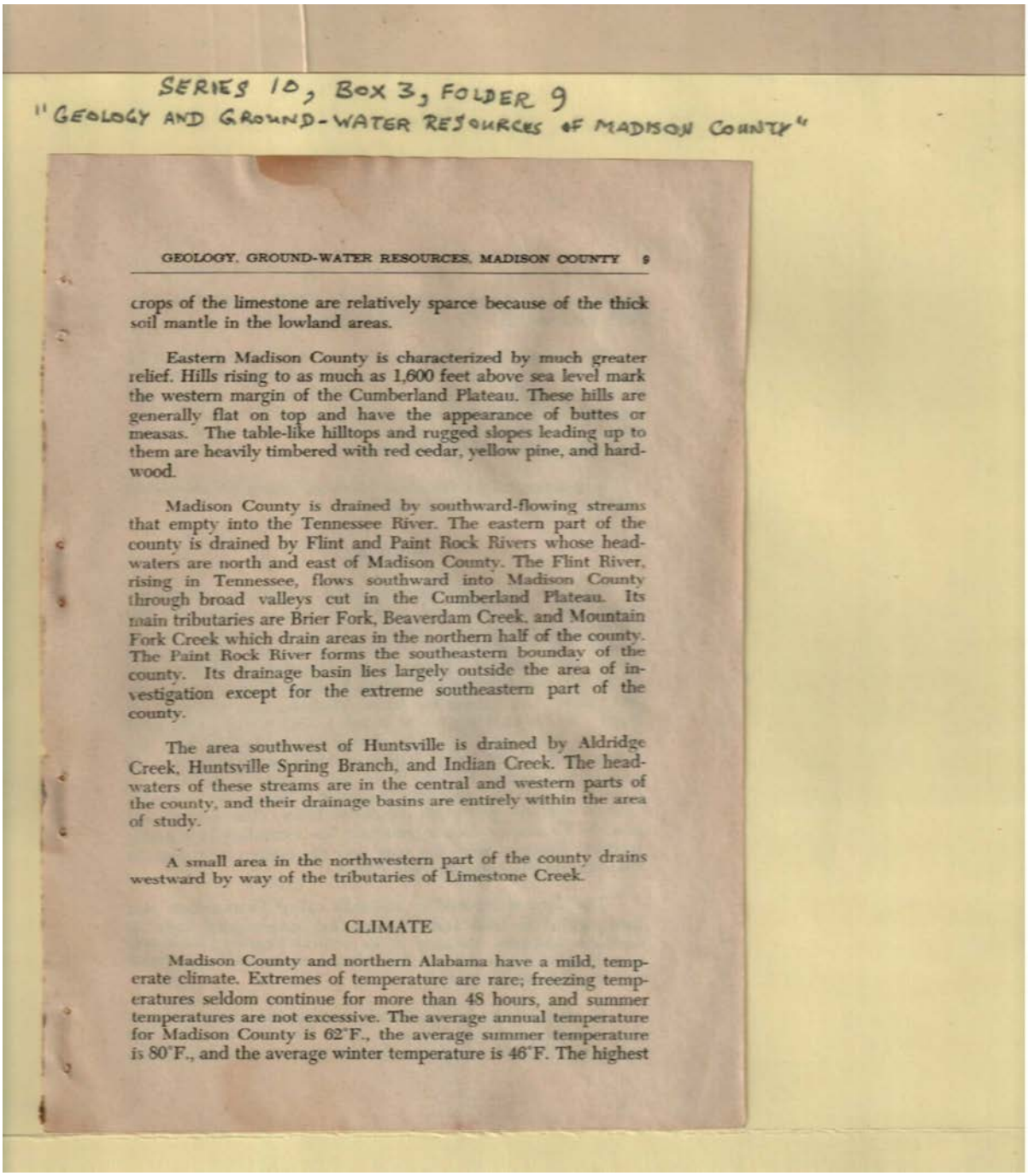


Names:

Monte Sano and Huntsville, Alabama

Types:

photograph



crops of the limestone are relatively sparce because of the thick soil mantle in the lowland areas.

Eastern Madison County is characterized by much greater relief. Hills rising to as much as 1,600 feet above sea level mark the western margin of the Cumberland Plateau. These hills are generally flat on top and have the appearance of buttes or measas. The table-like hilltops and rugged slopes leading up to them are heavily timbered with red cedar, yellow pine, and hardwood.

Madison County is drained by southward-flowing streams that empty into the Tennessee River. The eastern part of the county is drained by Flint and Paint Rock Rivers whose headwaters are north and east of Madison County. The Flint River, rising in Tennessee, flows southward into Madison County through broad valleys cut in the Cumberland Plateau. Its main tributaries are Brier Fork, Beaverdam Creek, and Mountain Fork Creek which drain areas in the northern half of the county. The Paint Rock River forms the southeastern bounday of the county. Its drainage basin lies largely outside the area of investigation except for the extreme southeastern part of the county.

The area southwest of Huntsville is drained by Aldridge Creek, Huntsville Spring Branch, and Indian Creek. The headwaters of these streams are in the central and western parts of the county, and their drainage basins are entirely within the area of study.

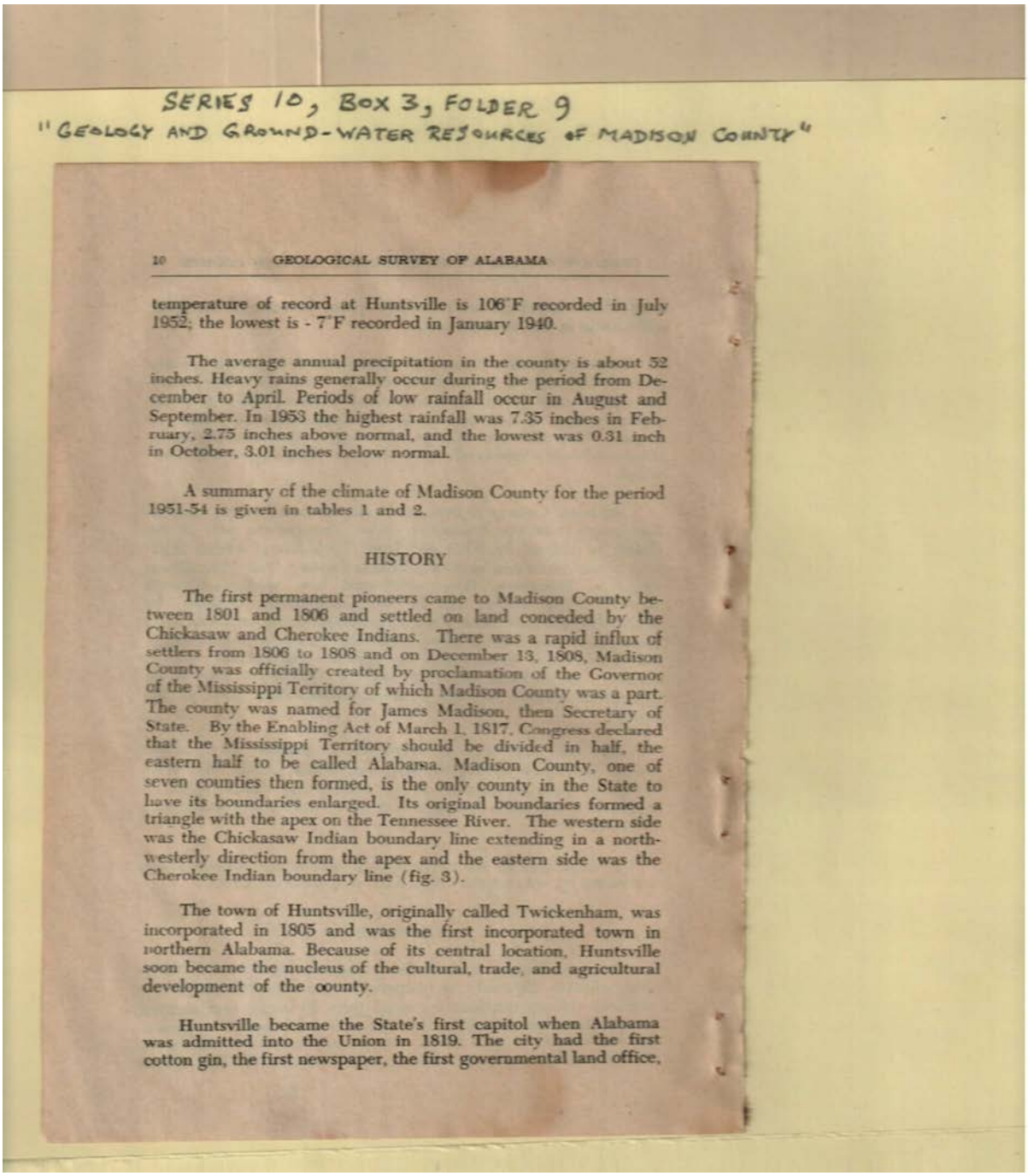
A small area in the northwestern part of the county drains westward by way of the tributaries of Limestone Creek.

CLIMATE

Madison County and northern Alabama have a mild, temperate climate. Extremes of temperature are rare; freezing temperatures seldom continue for more than 48 hours, and summer temperatures are not excessive. The average annual temperature for Madison County is 62°F., the average summer temperature is 80°F., and the average winter temperature is 46°F. The highest

Names:
Climate

Types:
booklet



temperature of record at Huntsville is 106°F recorded in July 1952; the lowest is - 7°F recorded in January 1940.

The average annual precipitation in the county is about 52 inches. Heavy rains generally occur during the period from December to April. Periods of low rainfall occur in August and September. In 1953 the highest rainfall was 7.35 inches in February, 2.75 inches above normal, and the lowest was 0.31 inch in October, 3.01 inches below normal.

A summary of the climate of Madison County for the period 1951-54 is given in tables 1 and 2.

HISTORY

The first permanent pioneers came to Madison County between 1801 and 1806 and settled on land conceded by the Chickasaw and Cherokee Indians. There was a rapid influx of settlers from 1806 to 1808 and on December 13, 1808, Madison County was officially created by proclamation of the Governor of the Mississippi Territory of which Madison County was a part. The county was named for James Madison, then Secretary of State. By the Enabling Act of March 1, 1817, Congress declared that the Mississippi Territory should be divided in half, the eastern half to be called Alabama. Madison County, one of seven counties then formed, is the only county in the State to have its boundaries enlarged. Its original boundaries formed a triangle with the apex on the Tennessee River. The western side was the Chickasaw Indian boundary line extending in a northwesterly direction from the apex and the eastern side was the Cherokee Indian boundary line (fig. 3).

The town of Huntsville, originally called Twickenham, was incorporated in 1805 and was the first incorporated town in northern Alabama. Because of its central location, Huntsville soon became the nucleus of the cultural, trade, and agricultural development of the county.

Huntsville became the State's first capitol when Alabama was admitted into the Union in 1819. The city had the first cotton gin, the first newspaper, the first governmental land office,

Names:
History
Madison, James, Secretary of State

Types:
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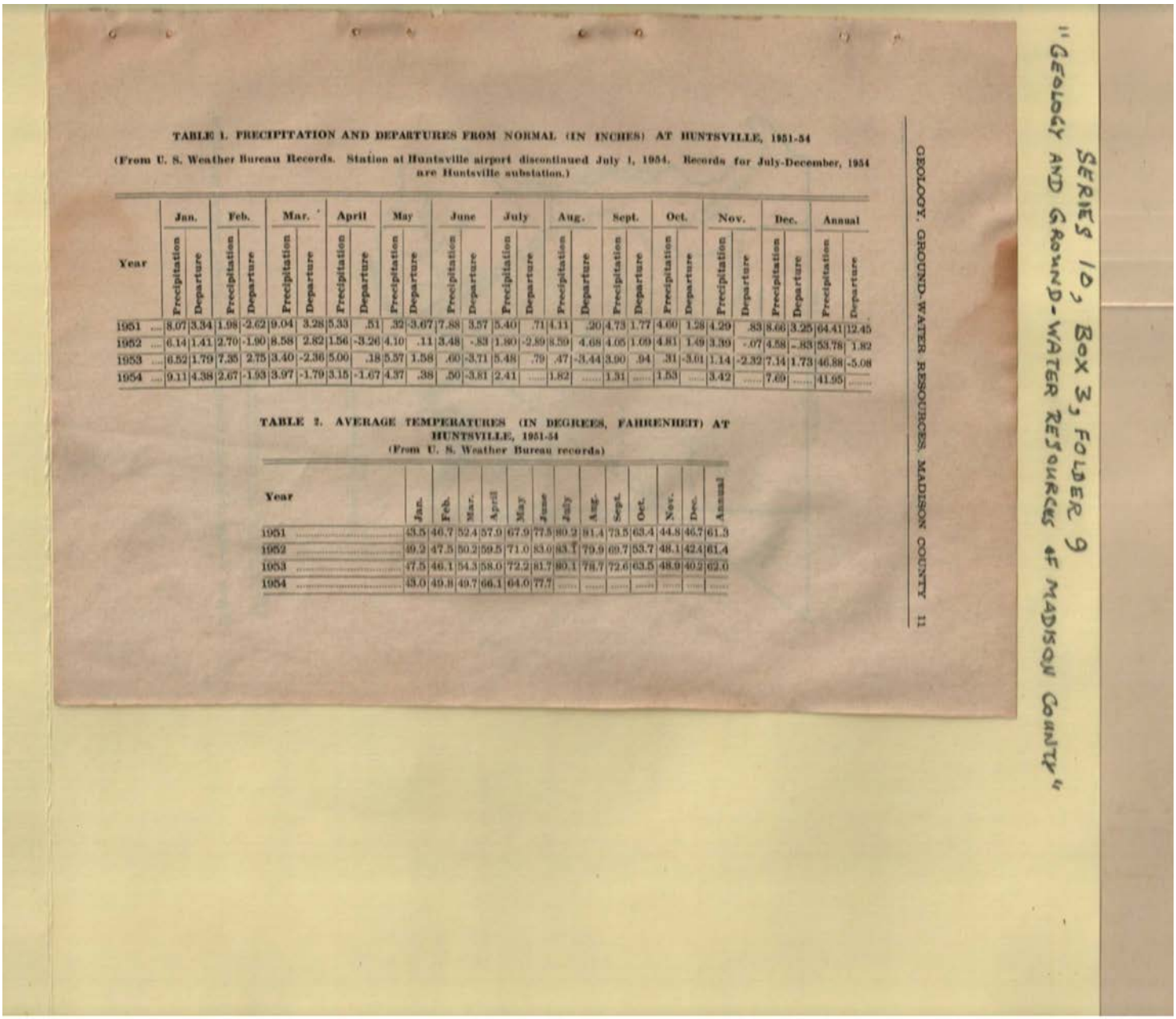

TABLE 1. PRECIPITATION AND DEPARTURES FROM NORMAL (IN INCHES) AT HUNTSVILLE, 1951-54

(From U. S. Weather Bureau Records. Station at Huntsville airport discontinued July 1, 1954. Records for July-December, 1954 are Huntsville substation.)

Year	Jan.		Feb.		Mar.		April		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Annual	
	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure	Precipitation	Departure
1951	8.07	3.34	1.98	-2.62	9.04	3.28	5.33	.51	.32	-3.67	7.88	3.57	5.40	.71	4.11	.20	4.73	1.77	4.60	1.28	4.29	.83	8.66	3.25	64.41	12.45
1952	6.14	1.41	2.70	-1.90	8.58	2.82	1.56	-3.26	4.10	.11	3.48	-.83	1.80	-2.89	8.59	4.68	4.05	1.09	4.81	1.49	3.39	-.07	4.58	-.83	53.78	1.82
1953	6.52	1.79	7.35	2.75	3.40	-2.36	5.00	.18	5.37	1.58	.60	-3.71	5.48	.79	.47	-3.44	3.90	.94	.31	-3.01	1.14	-2.32	7.34	1.73	46.88	-5.08
1954	9.11	4.38	2.67	-1.93	3.97	-1.79	3.15	-1.67	4.37	.38	.50	-3.81	2.41	.....	1.82	.....	1.31	.....	1.53	.....	3.42	.....	7.69	.....	41.95	.....

TABLE 2. AVERAGE TEMPERATURES (IN DEGREES, FAHRENHEIT) AT HUNTSVILLE, 1951-54

(From U. S. Weather Bureau records)

Year	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1951	43.5	46.7	52.4	57.9	67.9	77.5	80.2	81.4	73.5	63.4	44.8	46.7	61.3
1952	49.2	47.5	50.2	59.5	71.0	83.0	83.1	79.9	69.7	53.7	48.1	42.4	61.4
1953	47.5	46.1	54.3	58.0	72.2	81.7	80.1	78.7	72.6	63.5	48.9	40.2	62.0
1954	43.0	49.8	49.7	66.1	64.0	77.7	.....	.....	.....	.....	.....	.....	.....

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 11

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"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:

Precipitaton in Huntsville, 1951-54
1954
Temperature Averages in Huntsville

Types:

chart

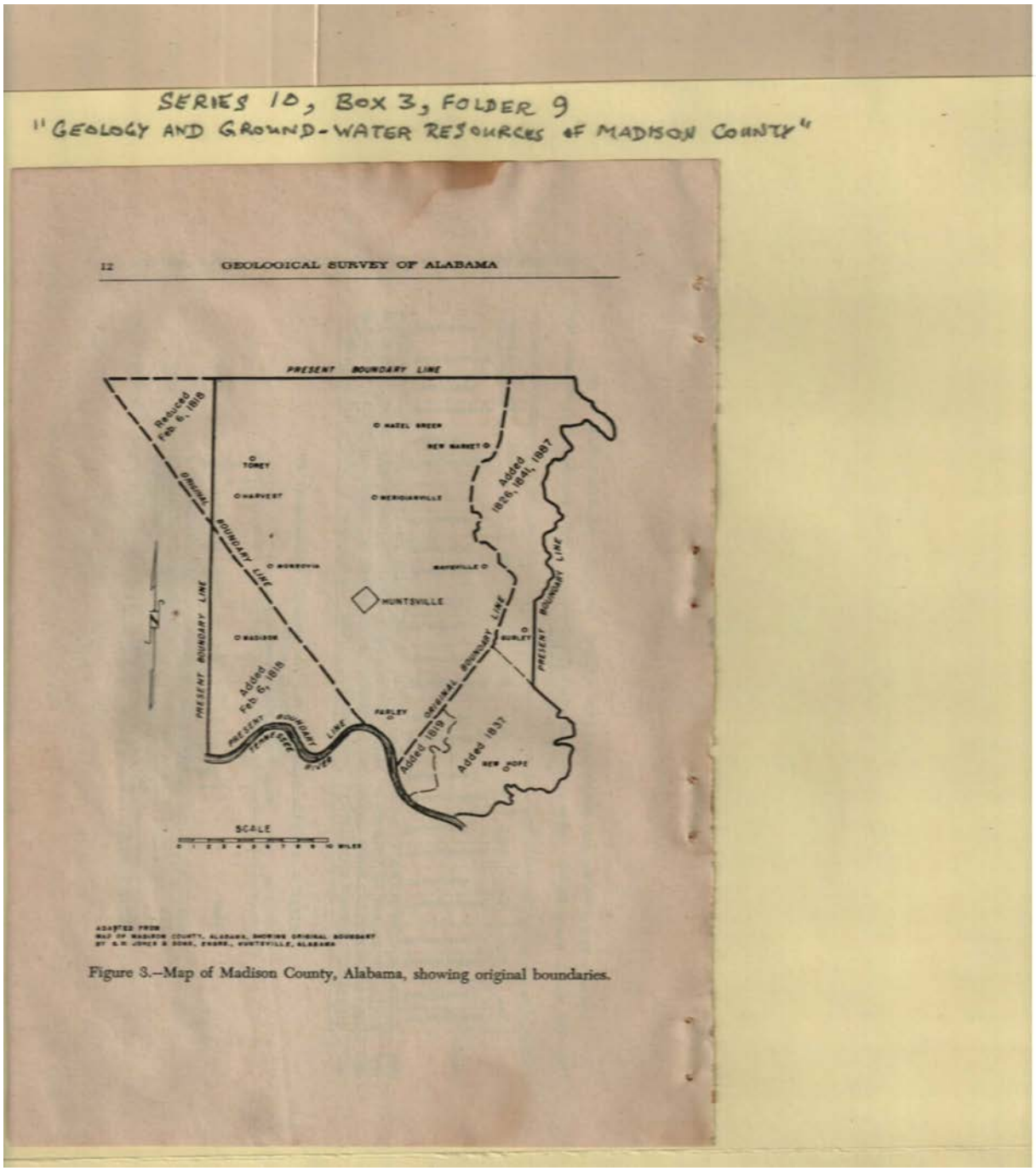


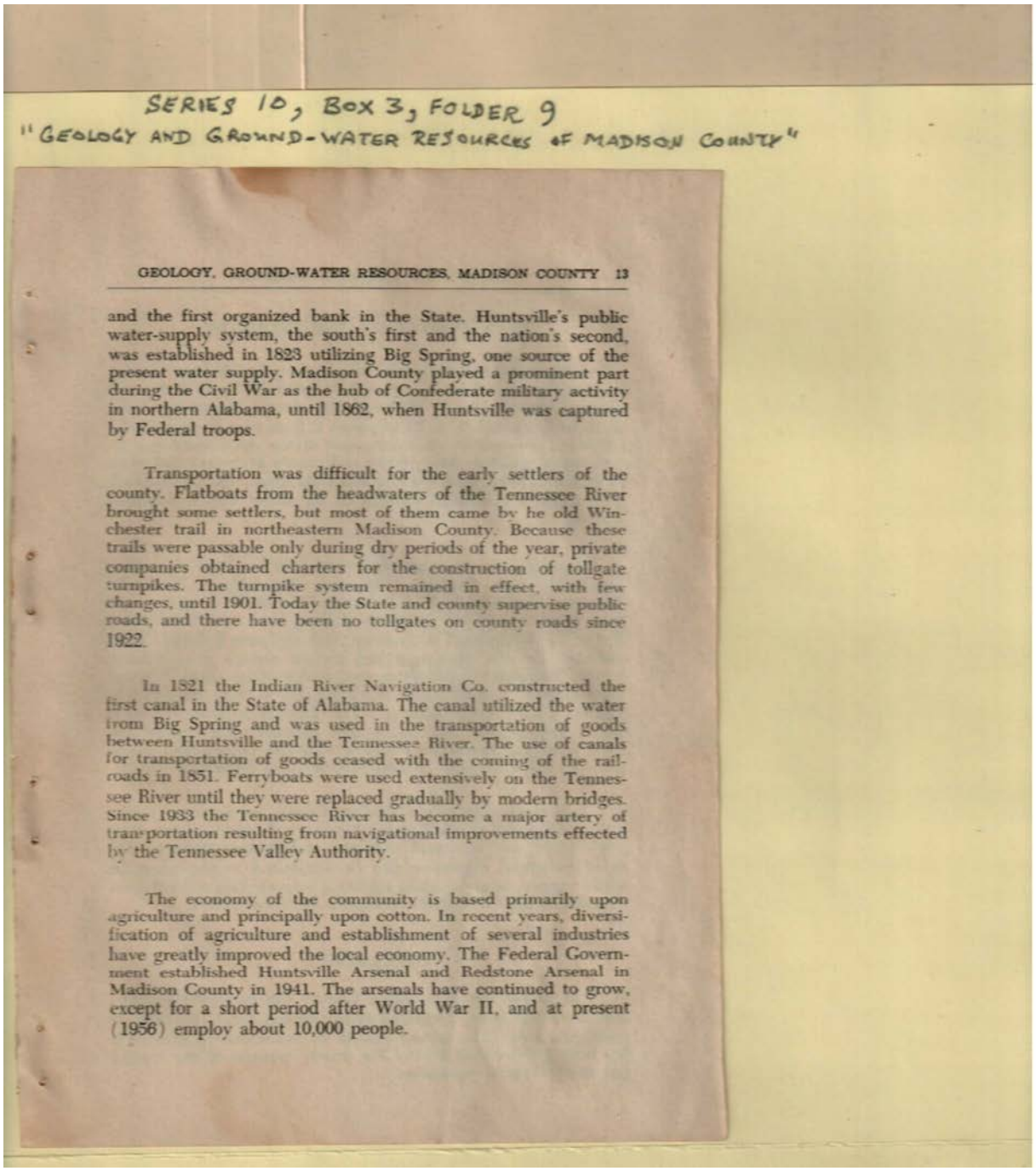
Figure 3.—Map of Madison County, Alabama, showing original boundaries.

Names:

Madison County, Alabama

Types:

map



and the first organized bank in the State. Huntsville's public water-supply system, the south's first and the nation's second, was established in 1823 utilizing Big Spring, one source of the present water supply. Madison County played a prominent part during the Civil War as the hub of Confederate military activity in northern Alabama, until 1862, when Huntsville was captured by Federal troops.

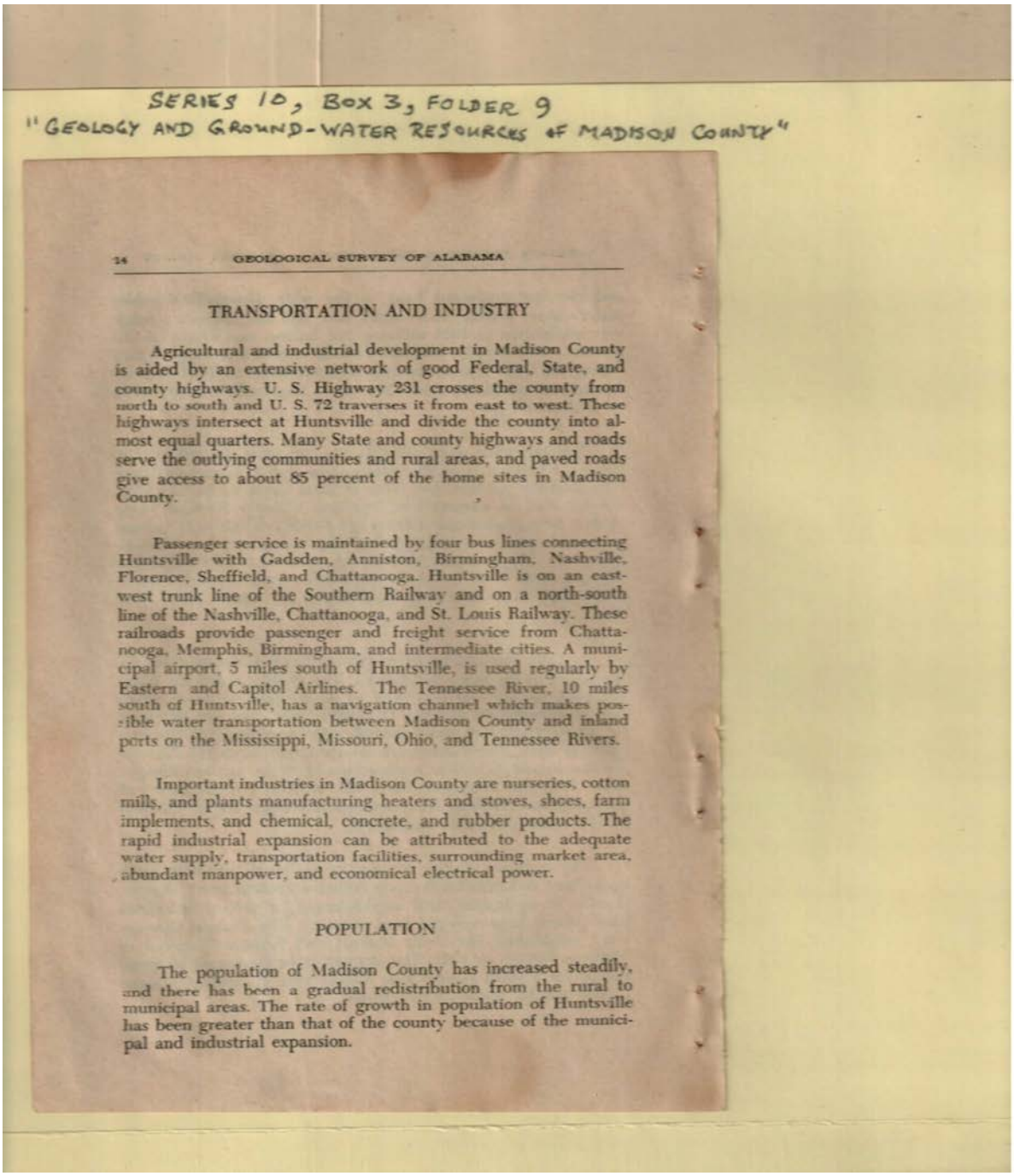
Transportation was difficult for the early settlers of the county. Flatboats from the headwaters of the Tennessee River brought some settlers, but most of them came by he old Winchester trail in northeastern Madison County. Because these trails were passable only during dry periods of the year, private companies obtained charters for the construction of tollgate turnpikes. The turnpike system remained in effect, with few changes, until 1901. Today the State and county supervise public roads, and there have been no tollgates on county roads since 1922.

In 1821 the Indian River Navigation Co. constructed the first canal in the State of Alabama. The canal utilized the water from Big Spring and was used in the transportation of goods between Huntsville and the Tennessee River. The use of canals for transportation of goods ceased with the coming of the railroads in 1851. Ferryboats were used extensively on the Tennessee River until they were replaced gradually by modern bridges. Since 1933 the Tennessee River has become a major artery of transportation resulting from navigational improvements effected by the Tennessee Valley Authority.

The economy of the community is based primarily upon agriculture and principally upon cotton. In recent years, diversification of agriculture and establishment of several industries have greatly improved the local economy. The Federal Government established Huntsville Arsenal and Redstone Arsenal in Madison County in 1941. The arsenals have continued to grow, except for a short period after World War II, and at present (1956) employ about 10,000 people.

Names:
Indian River
Navigation Co.

Types:
booklet



TRANSPORTATION AND INDUSTRY

Agricultural and industrial development in Madison County is aided by an extensive network of good Federal, State, and county highways. U. S. Highway 231 crosses the county from north to south and U. S. 72 traverses it from east to west. These highways intersect at Huntsville and divide the county into almost equal quarters. Many State and county highways and roads serve the outlying communities and rural areas, and paved roads give access to about 85 percent of the home sites in Madison County.

Passenger service is maintained by four bus lines connecting Huntsville with Gadsden, Anniston, Birmingham, Nashville, Florence, Sheffield, and Chattanooga. Huntsville is on an east-west trunk line of the Southern Railway and on a north-south line of the Nashville, Chattanooga, and St. Louis Railway. These railroads provide passenger and freight service from Chattanooga, Memphis, Birmingham, and intermediate cities. A municipal airport, 5 miles south of Huntsville, is used regularly by Eastern and Capitol Airlines. The Tennessee River, 10 miles south of Huntsville, has a navigation channel which makes possible water transportation between Madison County and inland ports on the Mississippi, Missouri, Ohio, and Tennessee Rivers.

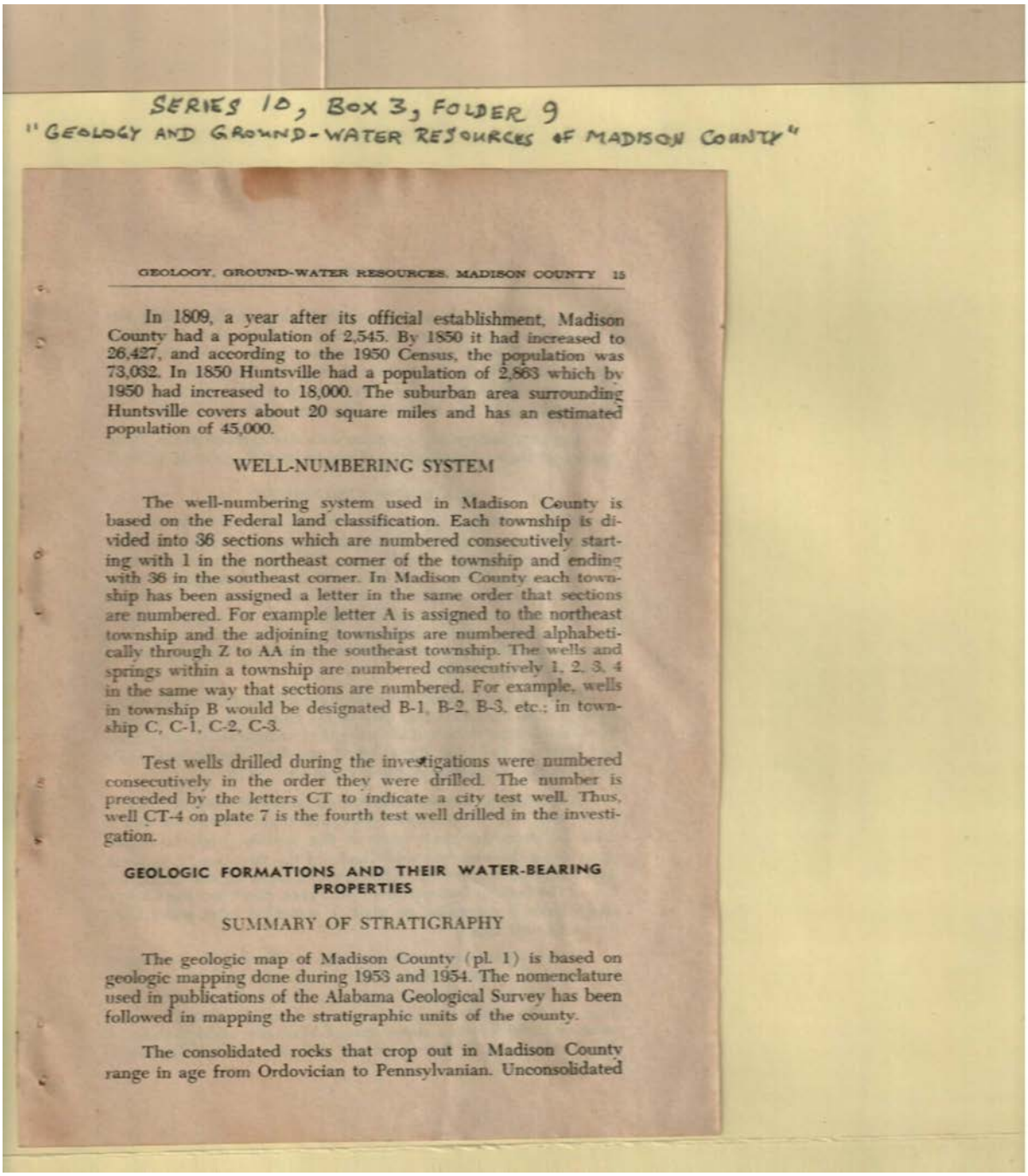
Important industries in Madison County are nurseries, cotton mills, and plants manufacturing heaters and stoves, shoes, farm implements, and chemical, concrete, and rubber products. The rapid industrial expansion can be attributed to the adequate water supply, transportation facilities, surrounding market area, abundant manpower, and economical electrical power.

POPULATION

The population of Madison County has increased steadily, and there has been a gradual redistribution from the rural to municipal areas. The rate of growth in population of Huntsville has been greater than that of the county because of the municipal and industrial expansion.

Names:
Population
Transportation & Industry

Types:
booklet



In 1809, a year after its official establishment, Madison County had a population of 2,545. By 1850 it had increased to 26,427, and according to the 1950 Census, the population was 73,032. In 1850 Huntsville had a population of 2,863 which by 1950 had increased to 18,000. The suburban area surrounding Huntsville covers about 20 square miles and has an estimated population of 45,000.

WELL-NUMBERING SYSTEM

The well-numbering system used in Madison County is based on the Federal land classification. Each township is divided into 36 sections which are numbered consecutively starting with 1 in the northeast corner of the township and ending with 36 in the southeast corner. In Madison County each township has been assigned a letter in the same order that sections are numbered. For example letter A is assigned to the northeast township and the adjoining townships are numbered alphabetically through Z to AA in the southeast township. The wells and springs within a township are numbered consecutively 1, 2, 3, 4 in the same way that sections are numbered. For example, wells in township B would be designated B-1, B-2, B-3, etc.; in township C, C-1, C-2, C-3.

Test wells drilled during the investigations were numbered consecutively in the order they were drilled. The number is preceded by the letters CT to indicate a city test well. Thus, well CT-4 on plate 7 is the fourth test well drilled in the investigation.

GEOLOGIC FORMATIONS AND THEIR WATER-BEARING PROPERTIES

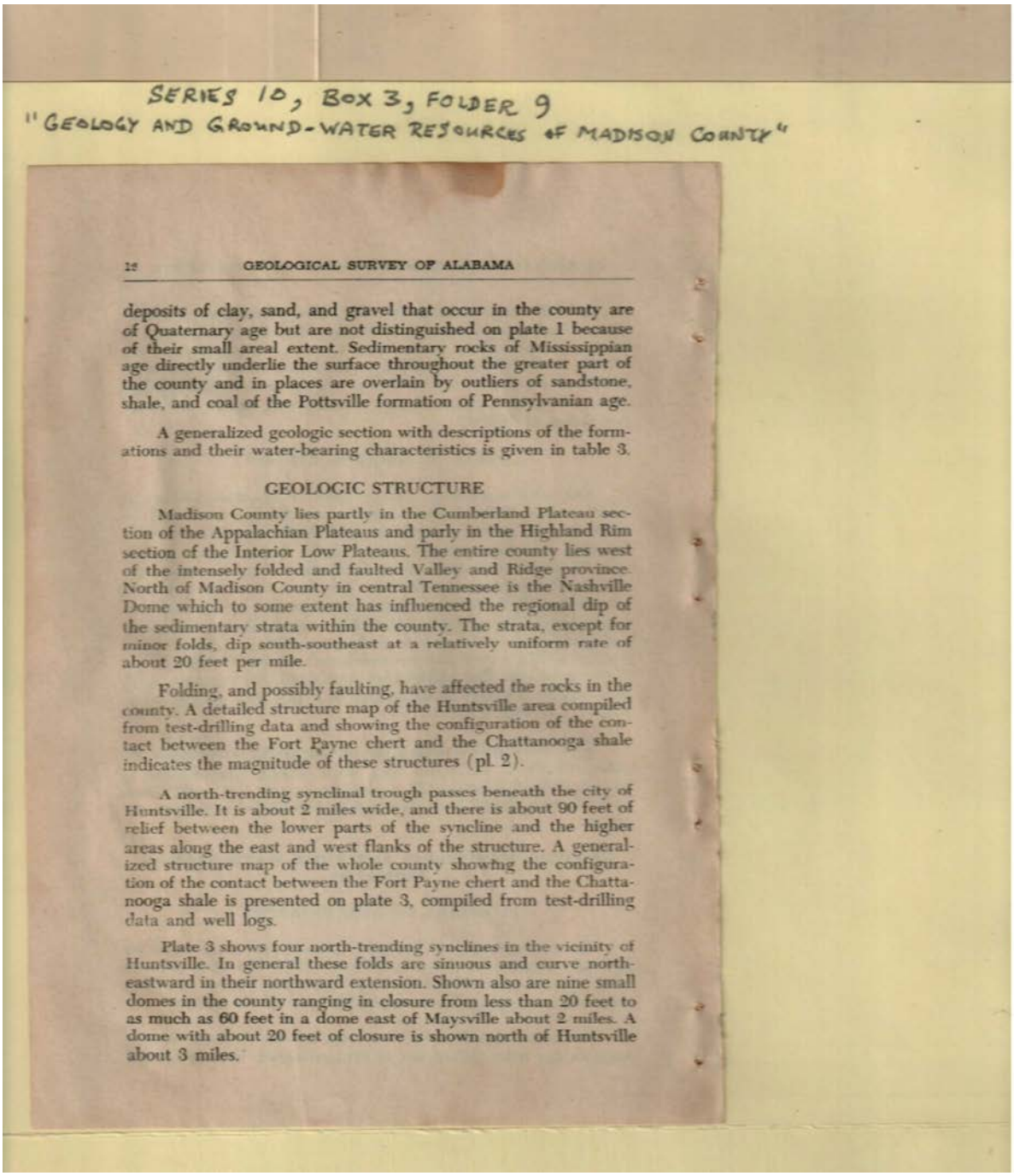
SUMMARY OF STRATIGRAPHY

The geologic map of Madison County (pl. 1) is based on geologic mapping done during 1953 and 1954. The nomenclature used in publications of the Alabama Geological Survey has been followed in mapping the stratigraphic units of the county.

The consolidated rocks that crop out in Madison County range in age from Ordovician to Pennsylvanian. Unconsolidated

Names:
Summary of Stratigraphy

Types:
booklet



deposits of clay, sand, and gravel that occur in the county are of Quaternary age but are not distinguished on plate 1 because of their small areal extent. Sedimentary rocks of Mississippian age directly underlie the surface throughout the greater part of the county and in places are overlain by outliers of sandstone, shale, and coal of the Pottsville formation of Pennsylvanian age.

A generalized geologic section with descriptions of the formations and their water-bearing characteristics is given in table 3.

GEOLOGIC STRUCTURE

Madison County lies partly in the Cumberland Plateau section of the Appalachian Plateaus and parly in the Highland Rim section of the Interior Low Plateaus. The entire county lies west of the intensely folded and faulted Valley and Ridge province. North of Madison County in central Tennessee is the Nashville Dome which to some extent has influenced the regional dip of the sedimentary strata within the county. The strata, except for minor folds, dip south-southeast at a relatively uniform rate of about 20 feet per mile.

Folding, and possibly faulting, have affected the rocks in the county. A detailed structure map of the Huntsville area compiled from test-drilling data and showing the configuration of the contact between the Fort Payne chert and the Chattanooga shale indicates the magnitude of these structures (pl. 2).

A north-trending synclinal trough passes beneath the city of Huntsville. It is about 2 miles wide, and there is about 90 feet of relief between the lower parts of the syncline and the higher areas along the east and west flanks of the structure. A generalized structure map of the whole county showing the configuration of the contact between the Fort Payne chert and the Chattanooga shale is presented on plate 3, compiled from test-drilling data and well logs.

Plate 3 shows four north-trending synclines in the vicinity of Huntsville. In general these folds are sinuous and curve northeastward in their northward extension. Shown also are nine small domes in the county ranging in closure from less than 20 feet to as much as 60 feet in a dome east of Maysville about 2 miles. A dome with about 20 feet of closure is shown north of Huntsville about 3 miles.

Names:
Geologic Structure

Types:
booklet

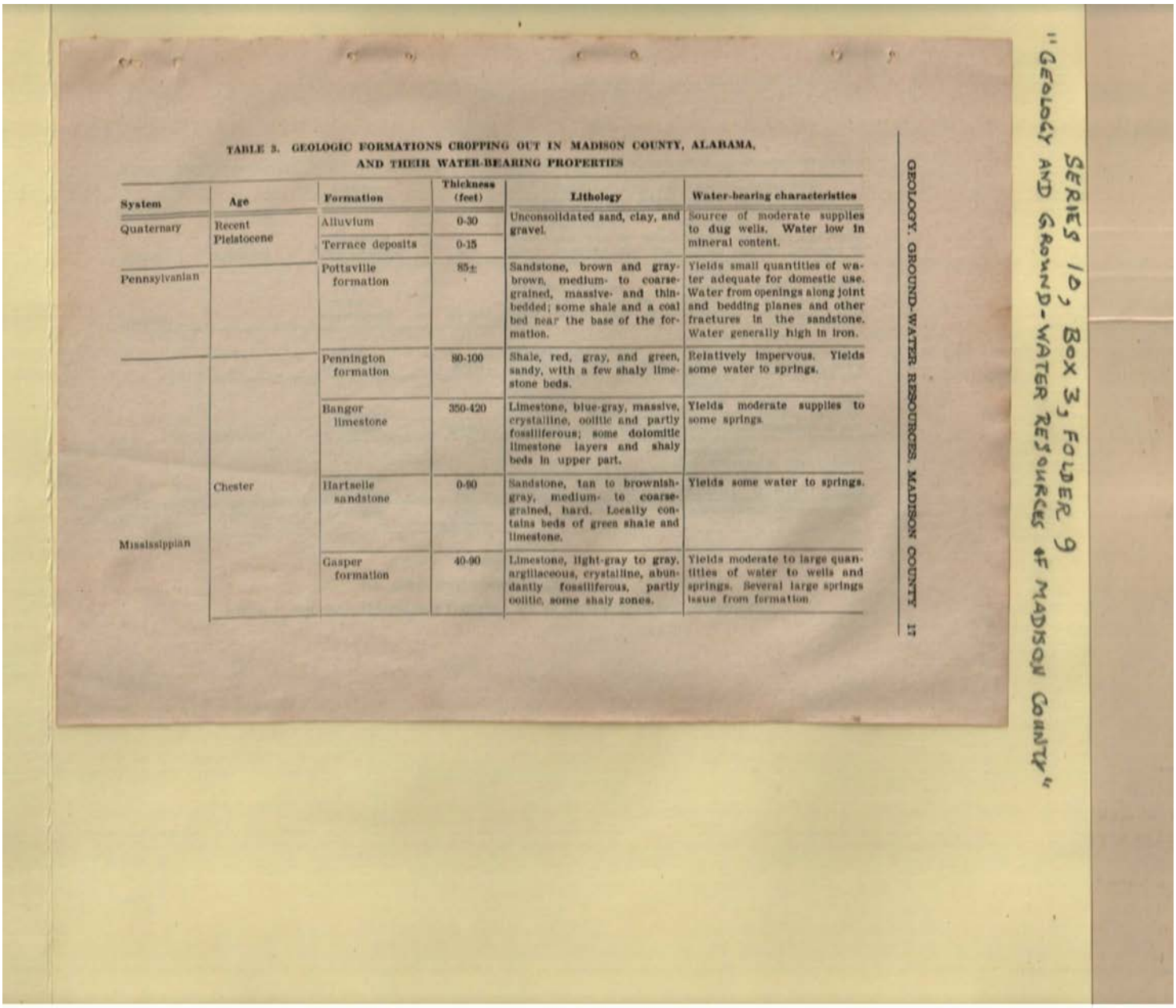


TABLE 3. GEOLOGIC FORMATIONS CROPPING OUT IN MADISON COUNTY, ALABAMA, AND THEIR WATER-BEARING PROPERTIES

System	Age	Formation	Thickness (feet)	Lithology	Water-bearing characteristics
Quaternary	Recent Pleistocene	Alluvium	0-30	Unconsolidated sand, clay, and gravel.	Source of moderate supplies to dug wells. Water low in mineral content.
		Terrace deposits	0-15		
Pennsylvanian		Pottsville formation	85±	Sandstone, brown and gray-brown, medium- to coarse-grained, massive- and thin-bedded; some shale and a coal bed near the base of the formation.	Yields small quantities of water adequate for domestic use. Water from openings along joint and bedding planes and other fractures in the sandstone. Water generally high in iron.
Mississippian	Chester	Pennington formation	80-100	Shale, red, gray, and green, sandy, with a few shaly limestone beds.	Relatively impervous. Yields some water to springs.
		Bangor limestone	350-420	Limestone, blue-gray, massive, crystalline, oolitic and partly fossiliferous; some dolomitic limestone layers and shaly beds in upper part.	Yields moderate supplies to some springs.
		Hartselle sandstone	0-90	Sandstone, tan to brownish-gray, medium- to coarse-grained, hard. Locally contains beds of green shale and limestone.	Yields some water to springs.
		Gasper formation	40-90	Limestone, light-gray to gray, argillaceous, crystalline, abundantly fossiliferous, partly oolitic, some shaly zones.	Yields moderate to large quantities of water to wells and springs. Several large springs issue from formation.

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 17

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Geologic Out-Croppings

Types:
chart

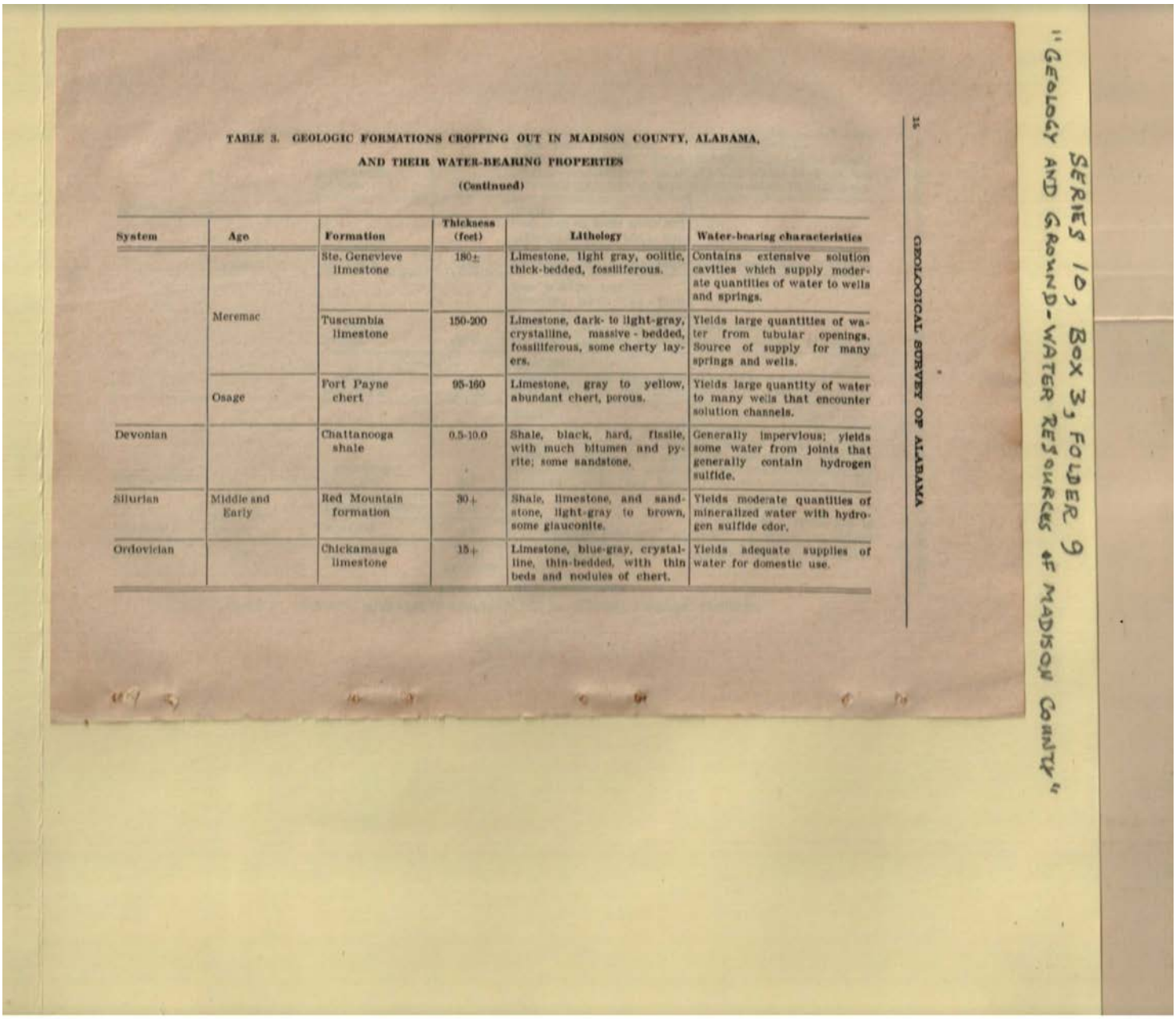


TABLE 3. GEOLOGIC FORMATIONS CROPPING OUT IN MADISON COUNTY, ALABAMA, AND THEIR WATER-BEARING PROPERTIES

(Continued)

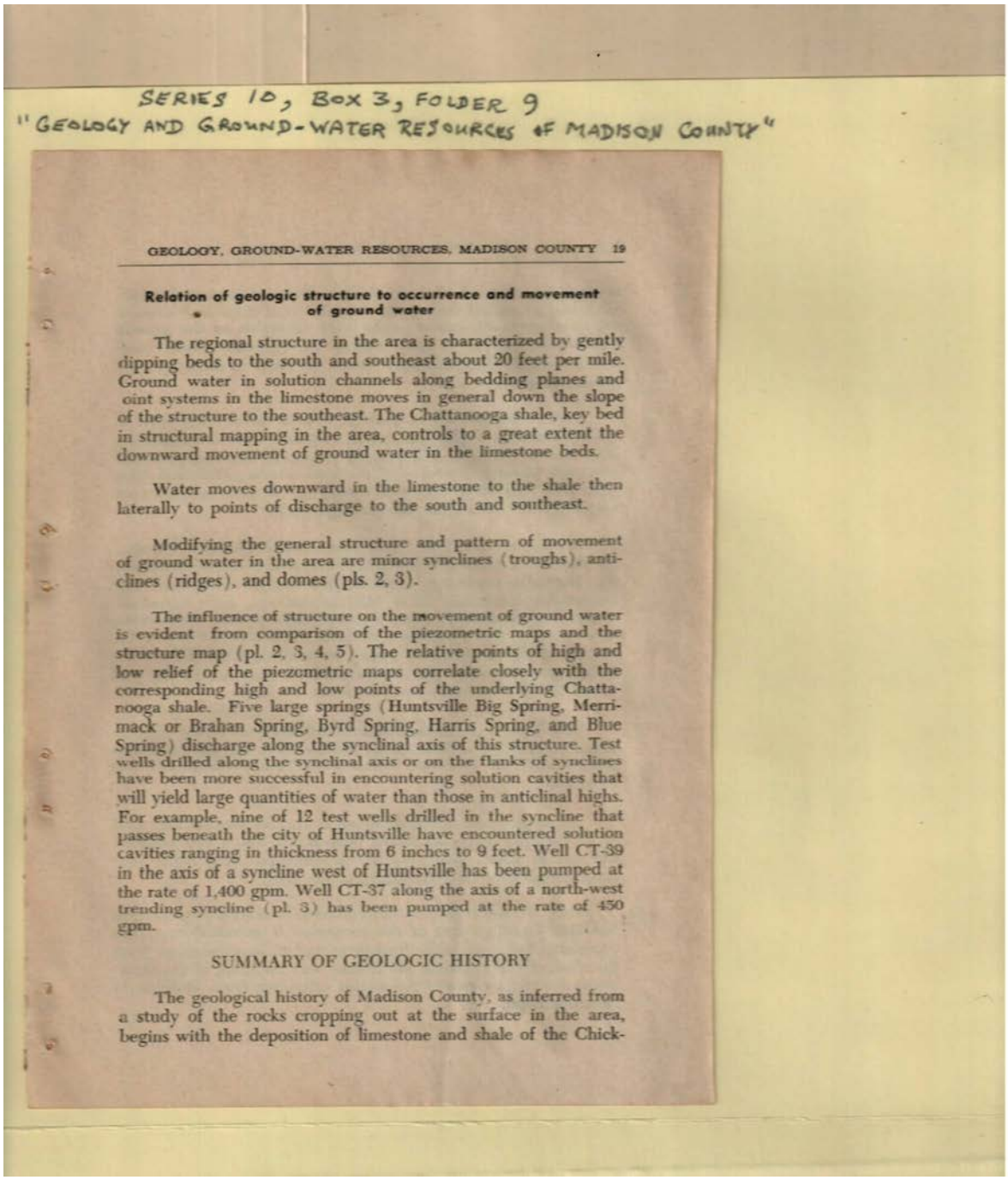
System	Age	Formation	Thickness (feet)	Lithology	Water-bearing characteristics
	Meremac	Ste. Genevieve limestone	180±	Limestone, light gray, oolitic, thick-bedded, fossiliferous.	Contains extensive solution cavities which supply moderate quantities of water to wells and springs.
		Tuscumbia limestone	150-200	Limestone, dark- to light-gray, crystalline, massive-bedded, fossiliferous, some cherty layers.	Yields large quantities of water from tubular openings. Source of supply for many springs and wells.
	Osage	Fort Payne chert	95-160	Limestone, gray to yellow, abundant chert, perous.	Yields large quantity of water to many wells that encounter solution channels.
Devonian		Chattanooga shale	0.5-10.0	Shale, black, hard, fissile, with much bitumen and pyrite; some sandstone.	Generally impervious; yields some water from joints that generally contain hydrogen sulfide.
Silurian	Middle and Early	Red Mountain formation	30+	Shale, limestone, and sandstone, light-gray to brown, some glauconite.	Yields moderate quantities of mineralized water with hydrogen sulfide odor.
Ordovician		Chickamauga limestone	15+	Limestone, blue-gray, crystalline, thin-bedded, with thin beds and nodules of chert.	Yields adequate supplies of water for domestic use.

35 GEOLOGICAL SURVEY OF ALABAMA

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Geologic Out-Croppings

Types:
chart



Relation of geologic structure to occurrence and movement of ground water

The regional structure in the area is characterized by gently dipping beds to the south and southeast about 20 feet per mile. Ground water in solution channels along bedding planes and joint systems in the limestone moves in general down the slope of the structure to the southeast. The Chattanooga shale, key bed in structural mapping in the area, controls to a great extent the downward movement of ground water in the limestone beds.

Water moves downward in the limestone to the shale then laterally to points of discharge to the south and southeast.

Modifying the general structure and pattern of movement of ground water in the area are minor synclines (troughs), anticlines (ridges), and domes (pls. 2, 3).

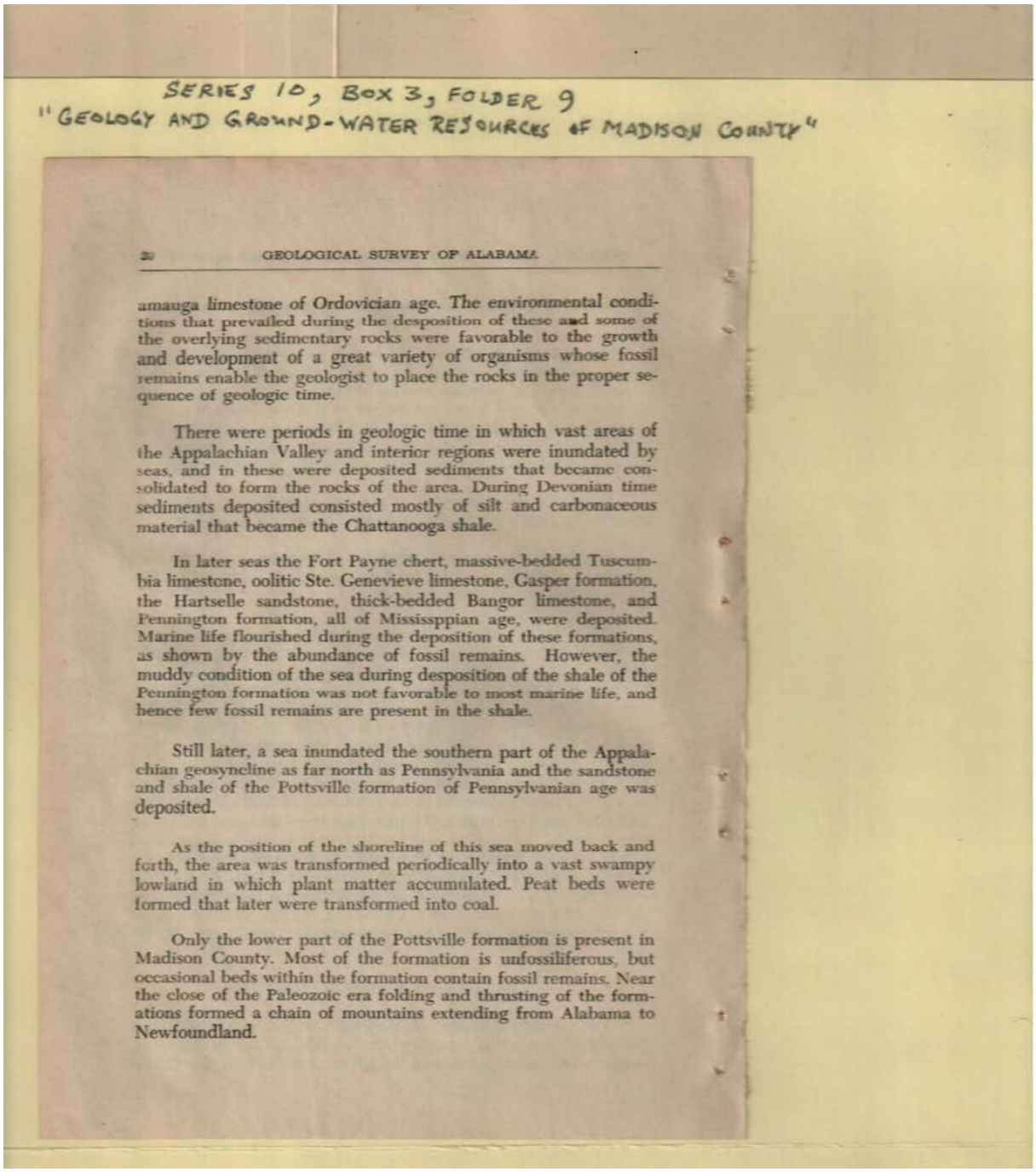
The influence of structure on the movement of ground water is evident from comparison of the piezometric maps and the structure map (pl. 2, 3, 4, 5). The relative points of high and low relief of the piezometric maps correlate closely with the corresponding high and low points of the underlying Chattanooga shale. Five large springs (Huntsville Big Spring, Merrimack or Brahan Spring, Byrd Spring, Harris Spring, and Blue Spring) discharge along the synclinal axis of this structure. Test wells drilled along the synclinal axis or on the flanks of synclines have been more successful in encountering solution cavities that will yield large quantities of water than those in anticlinal highs. For example, nine of 12 test wells drilled in the syncline that passes beneath the city of Huntsville have encountered solution cavities ranging in thickness from 6 inches to 9 feet. Well CT-39 in the axis of a syncline west of Huntsville has been pumped at the rate of 1,400 gpm. Well CT-37 along the axis of a north-west trending syncline (pl. 3) has been pumped at the rate of 450 gpm.

SUMMARY OF GEOLOGIC HISTORY

The geological history of Madison County, as inferred from a study of the rocks cropping out at the surface in the area, begins with the deposition of limestone and shale of the Chick-

Names:
Geologic History

Types:
booklet



amauga limestone of Ordovician age. The environmental conditions that prevailed during the desposition of these and some of the overlying sedimentary rocks were favorable to the growth and development of a great variety of organisms whose fossil remains enable the geologist to place the rocks in the proper sequence of geologic time.

There were periods in geologic time in which vast areas of the Appalachian Valley and interior regions were inundated by seas, and in these were deposited sediments that became consolidated to form the rocks of the area. During Devonian time sediments deposited consisted mostly of silt and carbonaceous material that became the Chattanooga shale.

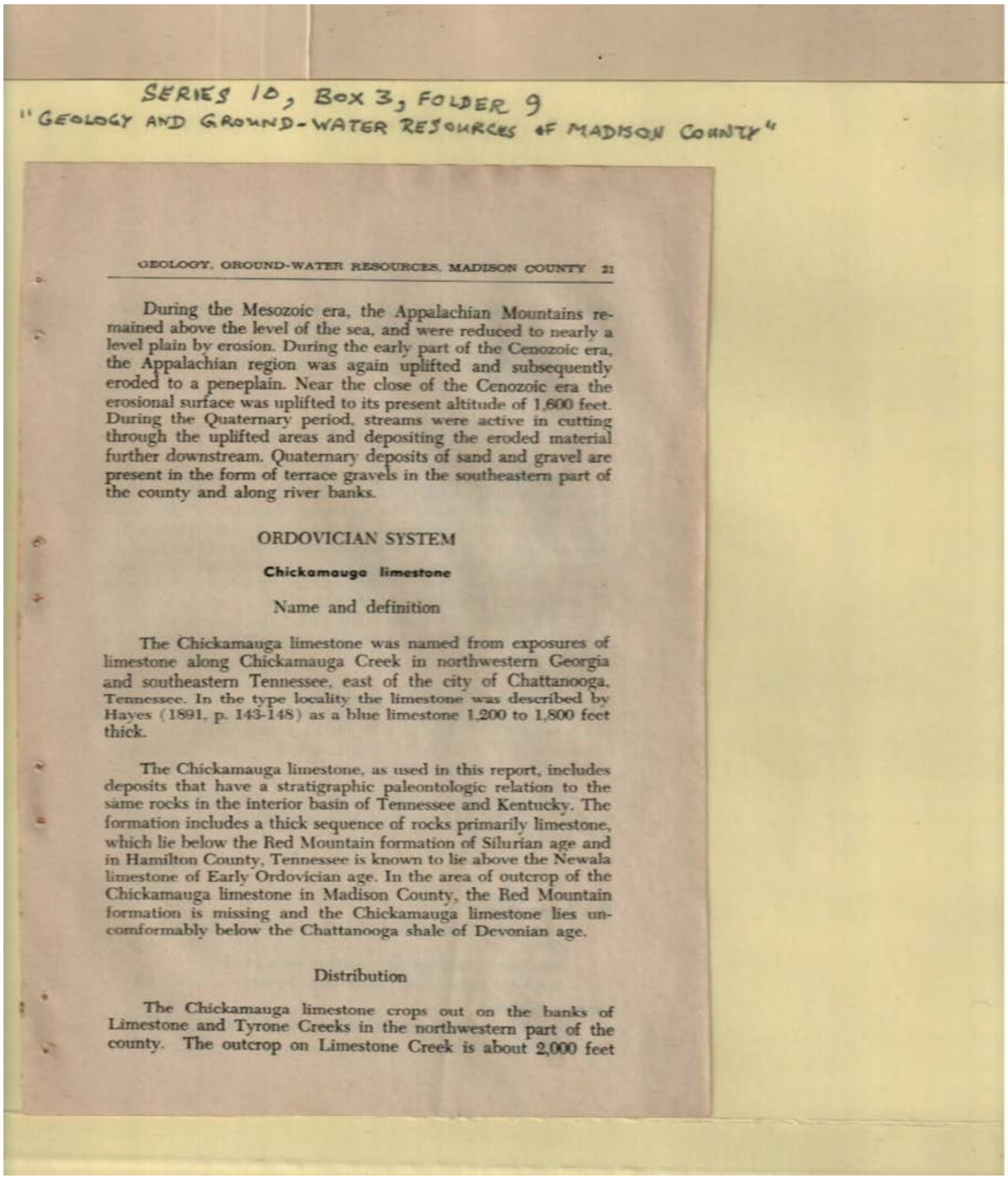
In later seas the Fort Payne chert, massive-bedded Tuscumbia limestone, oolitic Ste. Genevieve limestone, Gasper formation, the Hartselle sandstone, thick-bedded Bangor limestone, and Pennington formation, all of Mississppian age, were deposited. Marine life flourished during the deposition of these formations, as shown by the abundance of fossil remains. However, the muddy condition of the sea during desposition of the shale of the Pennington formation was not favorable to most marine life, and hence few fossil remains are present in the shale.

Still later, a sea inundated the southern part of the Appalachian geosyncline as far north as Pennsylvania and the sandstone and shale of the Pottsville formation of Pennsylvanian age was deposited.

As the position of the shoreline of this sea moved back and forth, the area was transformed periodically into a vast swampy lowland in which plant matter accumulated. Peat beds were formed that later were transformed into coal.

Only the lower part of the Pottsville formation is present in Madison County. Most of the formation is unfossiliferous, but occasional beds within the formation contain fossil remains. Near the close of the Paleozoic era folding and thrusting of the formations formed a chain of mountains extending from Alabama to Newfoundland.

Types:
booklet



During the Mesozoic era, the Appalachian Mountains remained above the level of the sea, and were reduced to nearly a level plain by erosion. During the early part of the Cenozoic era, the Appalachian region was again uplifted and subsequently eroded to a peneplain. Near the close of the Cenozoic era the erosional surface was uplifted to its present altitude of 1,600 feet. During the Quaternary period, streams were active in cutting through the uplifted areas and depositing the eroded material further downstream. Quaternary deposits of sand and gravel are present in the form of terrace gravels in the southeastern part of the county and along river banks.

ORDOVICIAN SYSTEM

Chickamauga limestone

Name and definition

The Chickamauga limestone was named from exposures of limestone along Chickamauga Creek in northwestern Georgia and southeastern Tennessee, east of the city of Chattanooga, Tennessee. In the type locality the limestone was described by Hayes (1891, p. 143-148) as a blue limestone 1,200 to 1,800 feet thick.

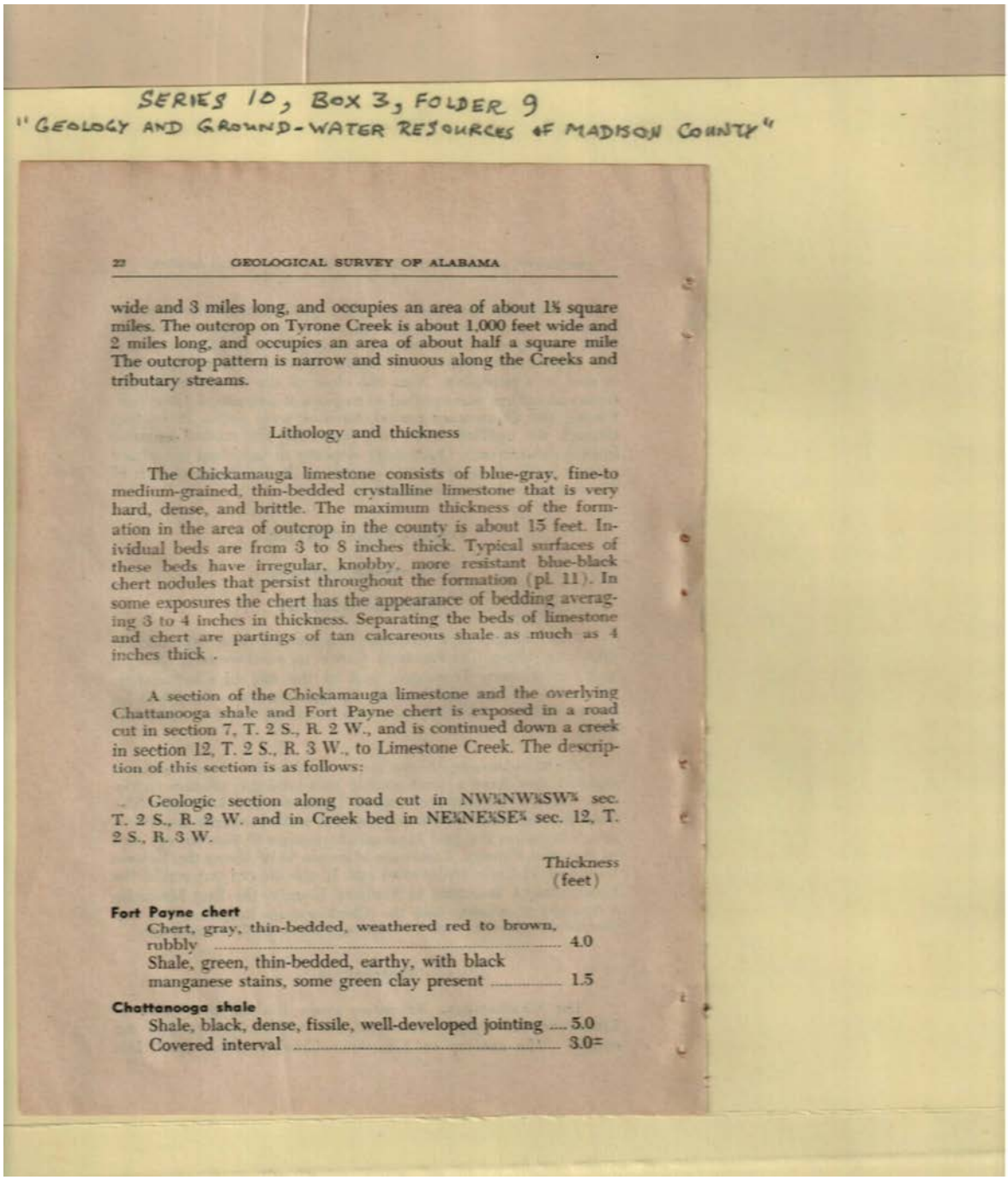
The Chickamauga limestone, as used in this report, includes deposits that have a stratigraphic paleontologic relation to the same rocks in the interior basin of Tennessee and Kentucky. The formation includes a thick sequence of rocks primarily limestone, which lie below the Red Mountain formation of Silurian age and in Hamilton County, Tennessee is known to lie above the Newala limestone of Early Ordovician age. In the area of outcrop of the Chickamauga limestone in Madison County, the Red Mountain formation is missing and the Chickamauga limestone lies unconformably below the Chattanooga shale of Devonian age.

Distribution

The Chickamauga limestone crops out on the banks of Limestone and Tyrone Creeks in the northwestern part of the county. The outcrop on Limestone Creek is about 2,000 feet

Names:
Ordovican System

Types:
booklet



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

wide and 3 miles long, and occupies an area of about 1¾ square miles. The outcrop on Tyrone Creek is about 1,000 feet wide and 2 miles long, and occupies an area of about half a square mile The outcrop pattern is narrow and sinuous along the Creeks and tributary streams.

Lithology and thickness

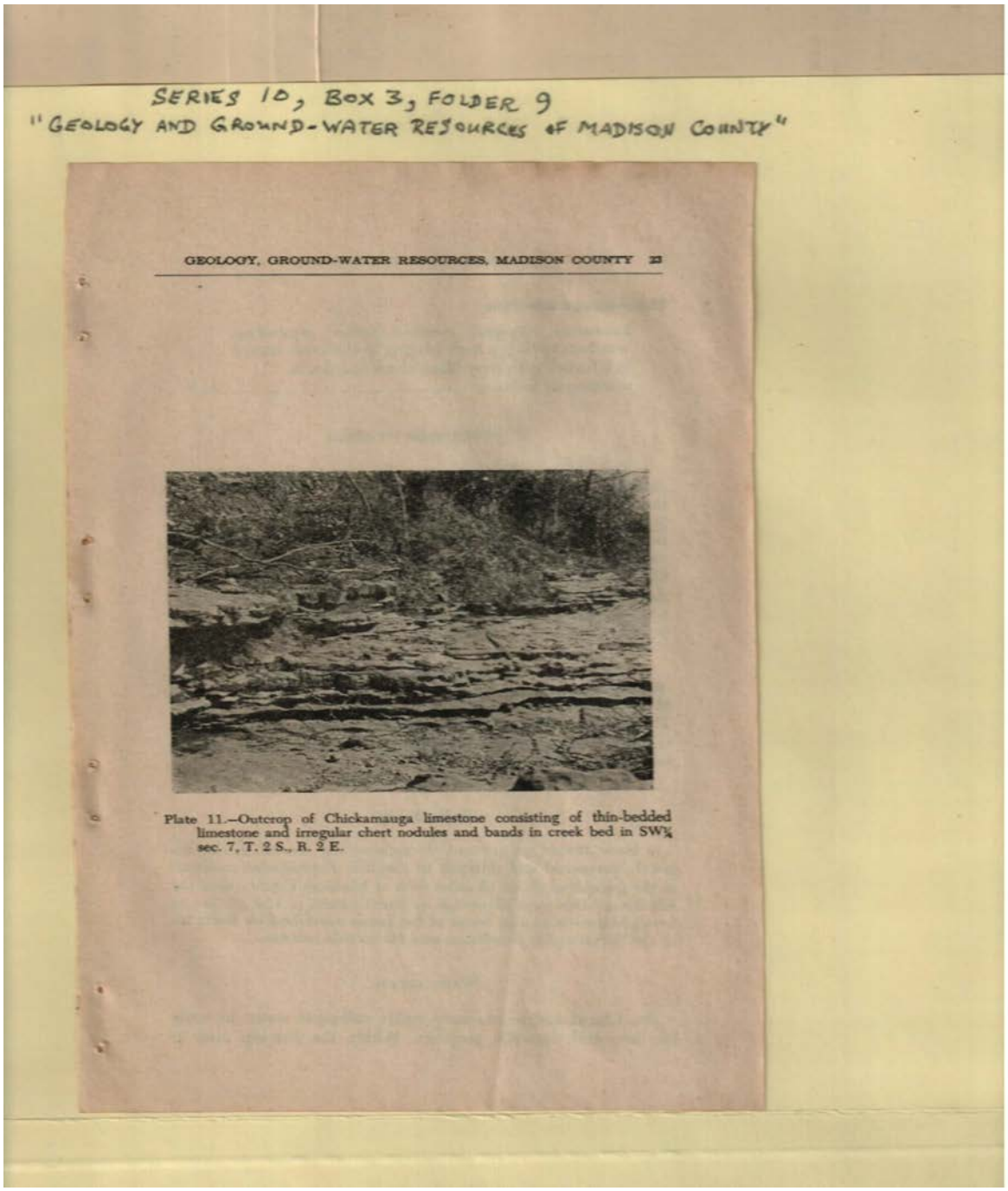
The Chickamauga limestone consists of blue-gray, fine-to medium-grained, thin-bedded crystalline limestone that is very hard, dense, and brittle. The maximum thickness of the formation in the area of outcrop in the county is about 15 feet. Individual beds are from 3 to 8 inches thick. Typical surfaces of these beds have irregular, knobby, more resistant blue-black chert nodules that persist throughout the formation (pl. 11). In some exposures the chert has the appearance of bedding averaging 3 to 4 inches in thickness. Separating the beds of limestone and chert are partings of tan calcareous shale as much as 4 inches thick .

A section of the Chickamauga limestone and the overlying Chattanooga shale and Fort Payne chert is exposed in a road cut in section 7, T. 2 S., R. 2 W., and is continued down a creek in section 12, T. 2 S., R. 3 W., to Limestone Creek. The description of this section is as follows:

Geologic section along road cut in NW¼NW¼SW¼ sec. T. 2 S., R. 2 W. and in Creek bed in NE¼NE¼SE¼ sec. 12, T. 2 S., R. 3 W.

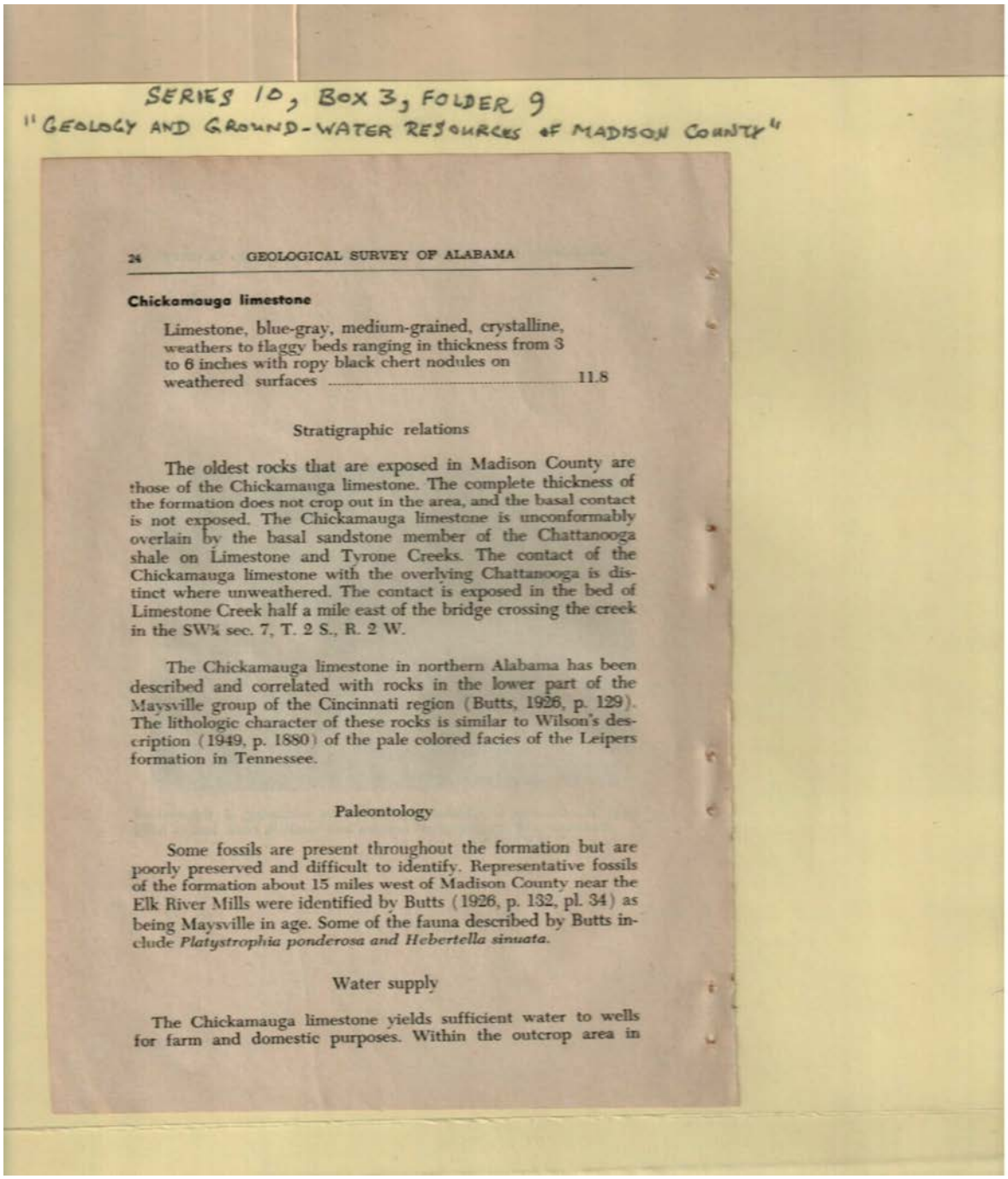
	Thickness (feet)
Fort Payne chert	
Chert, gray, thin-bedded, weathered red to brown, rubbly	4.0
Shale, green, thin-bedded, earthy, with black manganese stains, some green clay present	1.5
Chattanooga shale	
Shale, black, dense, fissile, well-developed jointing	5.0
Covered interval	3.0=

Types:
booklet



Names:
Limestone Outcrop

Types:
photograph



Chickamauga limestone

Limestone, blue-gray, medium-grained, crystalline, weathers to flaggy beds ranging in thickness from 3 to 6 inches with ropy black chert nodules on weathered surfaces 11.8

Stratigraphic relations

The oldest rocks that are exposed in Madison County are those of the Chickamauga limestone. The complete thickness of the formation does not crop out in the area, and the basal contact is not exposed. The Chickamauga limestone is unconformably overlain by the basal sandstone member of the Chattanooga shale on Limestone and Tyrone Creeks. The contact of the Chickamauga limestone with the overlying Chattanooga is distinct where unweathered. The contact is exposed in the bed of Limestone Creek half a mile east of the bridge crossing the creek in the SW¼ sec. 7, T. 2 S., R. 2 W.

The Chickamauga limestone in northern Alabama has been described and correlated with rocks in the lower part of the Maysville group of the Cincinnati region (Butts, 1926, p. 129). The lithologic character of these rocks is similar to Wilson's description (1949, p. 1880) of the pale colored facies of the Leipers formation in Tennessee.

Paleontology

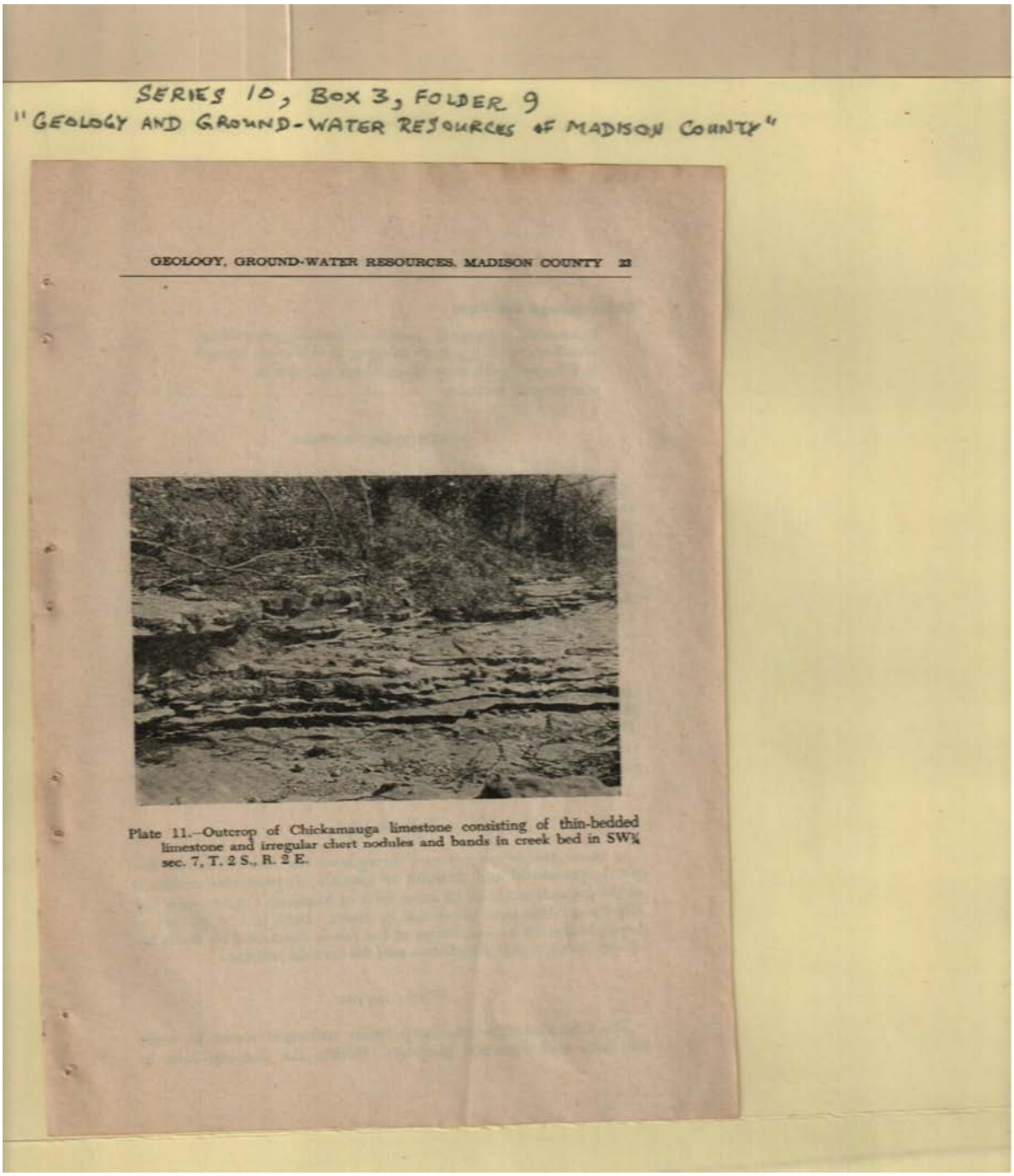
Some fossils are present throughout the formation but are poorly preserved and difficult to identify. Representative fossils of the formation about 15 miles west of Madison County near the Elk River Mills were identified by Butts (1926, p. 132, pl. 34) as being Maysville in age. Some of the fauna described by Butts include *Platystrophia ponderosa and Hebertella sinuata.*

Water supply

The Chickamauga limestone yields sufficient water to wells for farm and domestic purposes. Within the outcrop area in

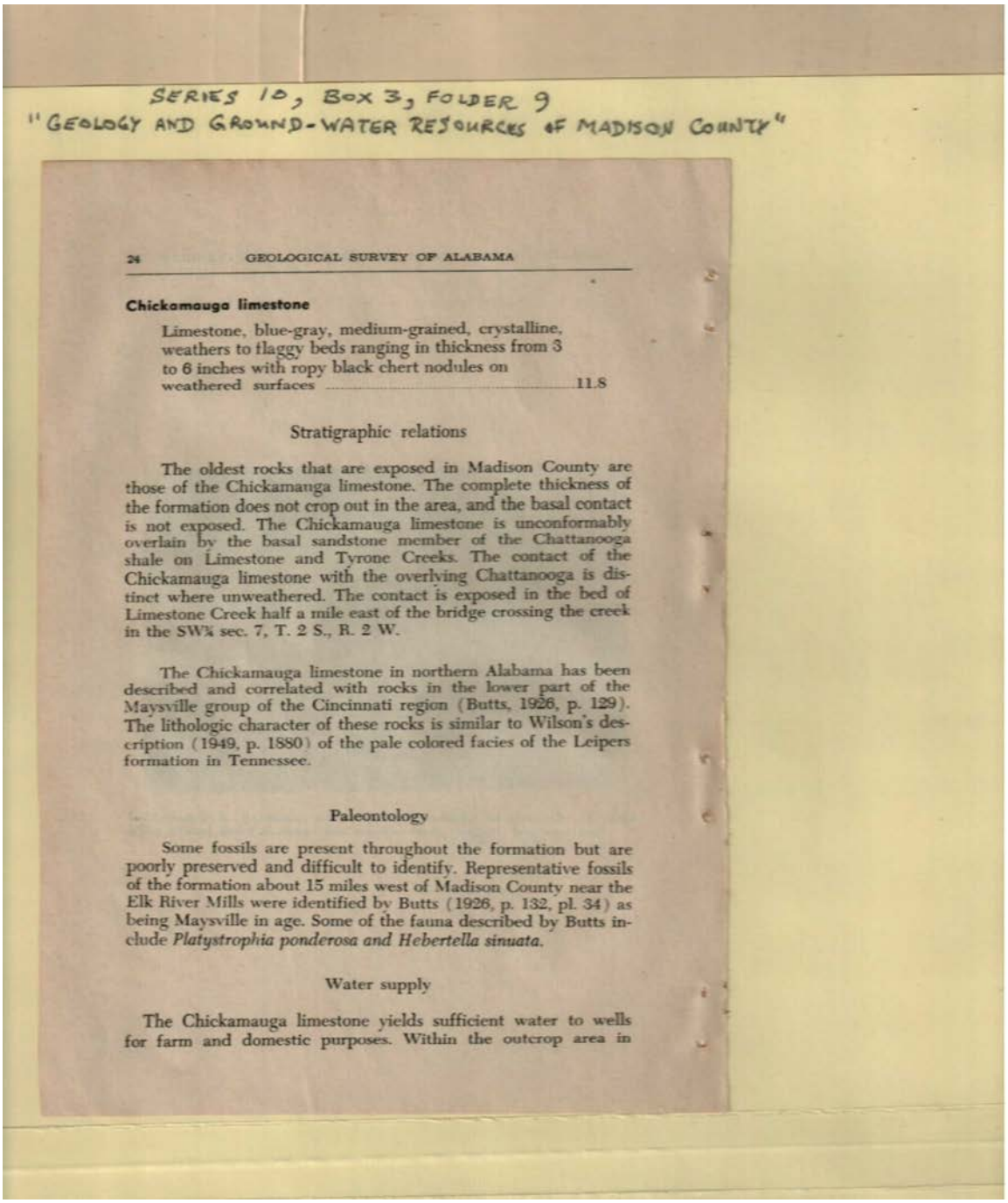
Names:
Butts, Wilson,

Types:
booklet



Names:
Limestone Outcrop

Types:
photograph



24 GEOLOGICAL SURVEY OF ALABAMA

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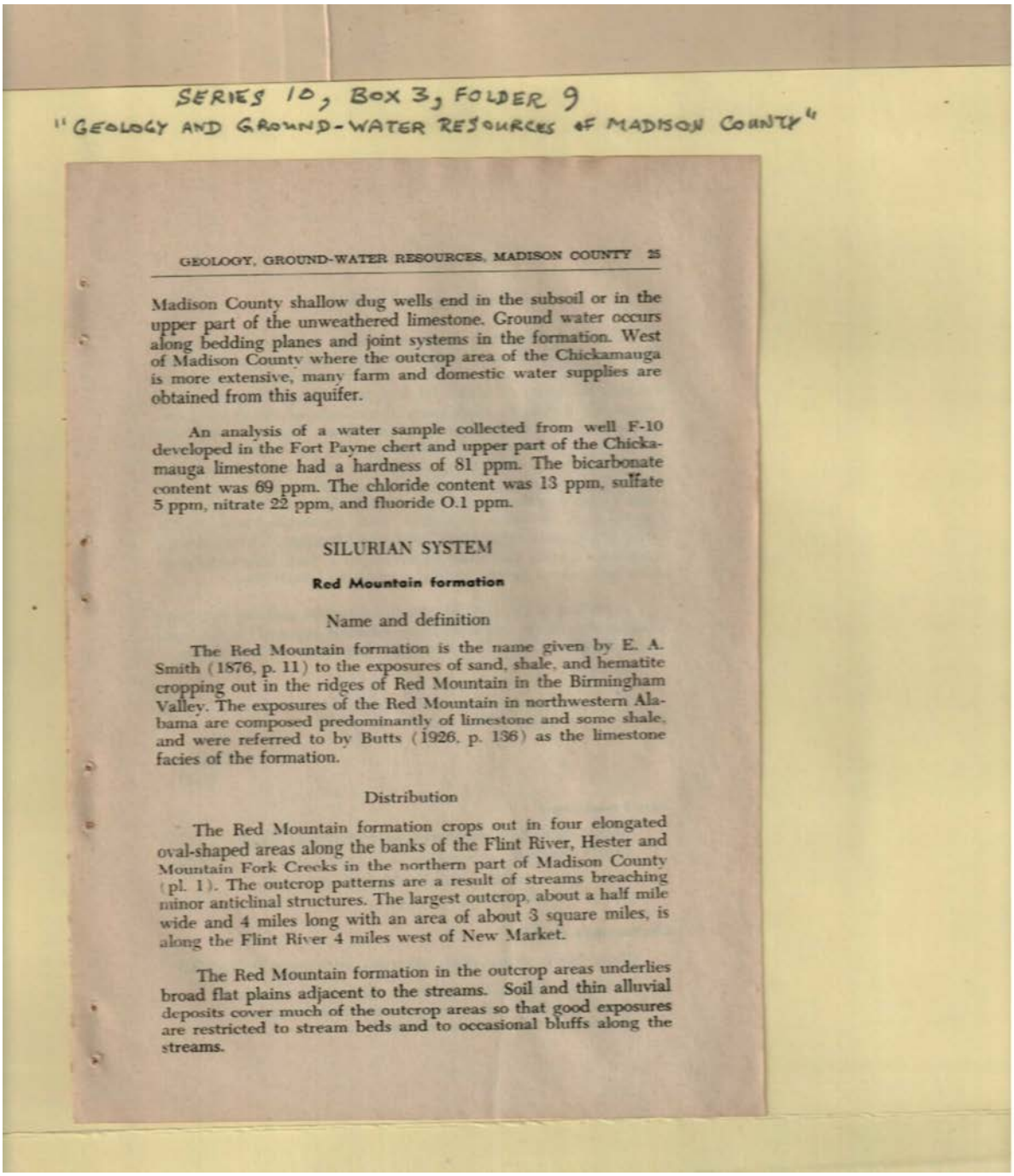
Types:
booklet



Madison County shallow dug wells end in the subsoil or in the upper part of the unweathered limestone. Ground water occurs along bedding planes and joint systems in the formation. West of Madison County where the outcrop area of the Chickamauga is more extensive, many farm and domestic water supplies are obtained from this aquifer.

An analysis of a water sample collected from well F-10 developed in the Fort Payne chert and upper part of the Chickamauga limestone had a hardness of 81 ppm. The bicarbonate content was 69 ppm. The chloride content was 13 ppm, sulfate 5 ppm, nitrate 22 ppm, and fluoride 0.1 ppm.

SILURIAN SYSTEM

Red Mountain formation

Name and definition

The Red Mountain formation is the name given by E. A. Smith (1876, p. 11) to the exposures of sand, shale, and hematite cropping out in the ridges of Red Mountain in the Birmingham Valley. The exposures of the Red Mountain in northwestern Alabama are composed predominantly of limestone and some shale, and were referred to by Butts (1926, p. 136) as the limestone facies of the formation.

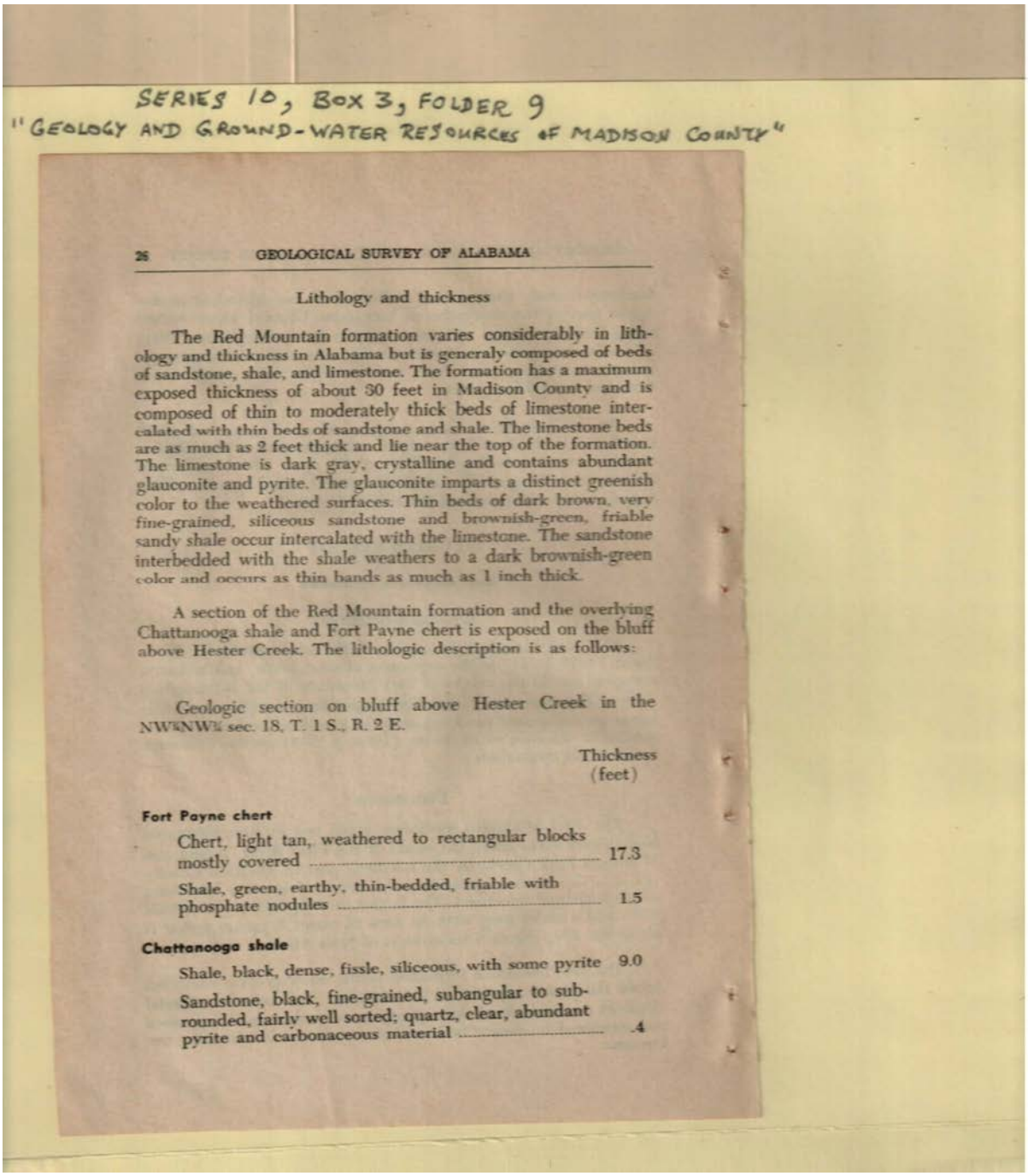
Distribution

The Red Mountain formation crops out in four elongated oval-shaped areas along the banks of the Flint River, Hester and Mountain Fork Creeks in the northern part of Madison County (pl. 1). The outcrop patterns are a result of streams breaching minor anticlinal structures. The largest outcrop, about a half mile wide and 4 miles long with an area of about 3 square miles, is along the Flint River 4 miles west of New Market.

The Red Mountain formation in the outcrop areas underlies broad flat plains adjacent to the streams. Soil and thin alluvial deposits cover much of the outcrop areas so that good exposures are restricted to stream beds and to occasional bluffs along the streams.

Names:
Butts, Silurian System Smith, E. A.

Types:
booklet



Lithology and thickness

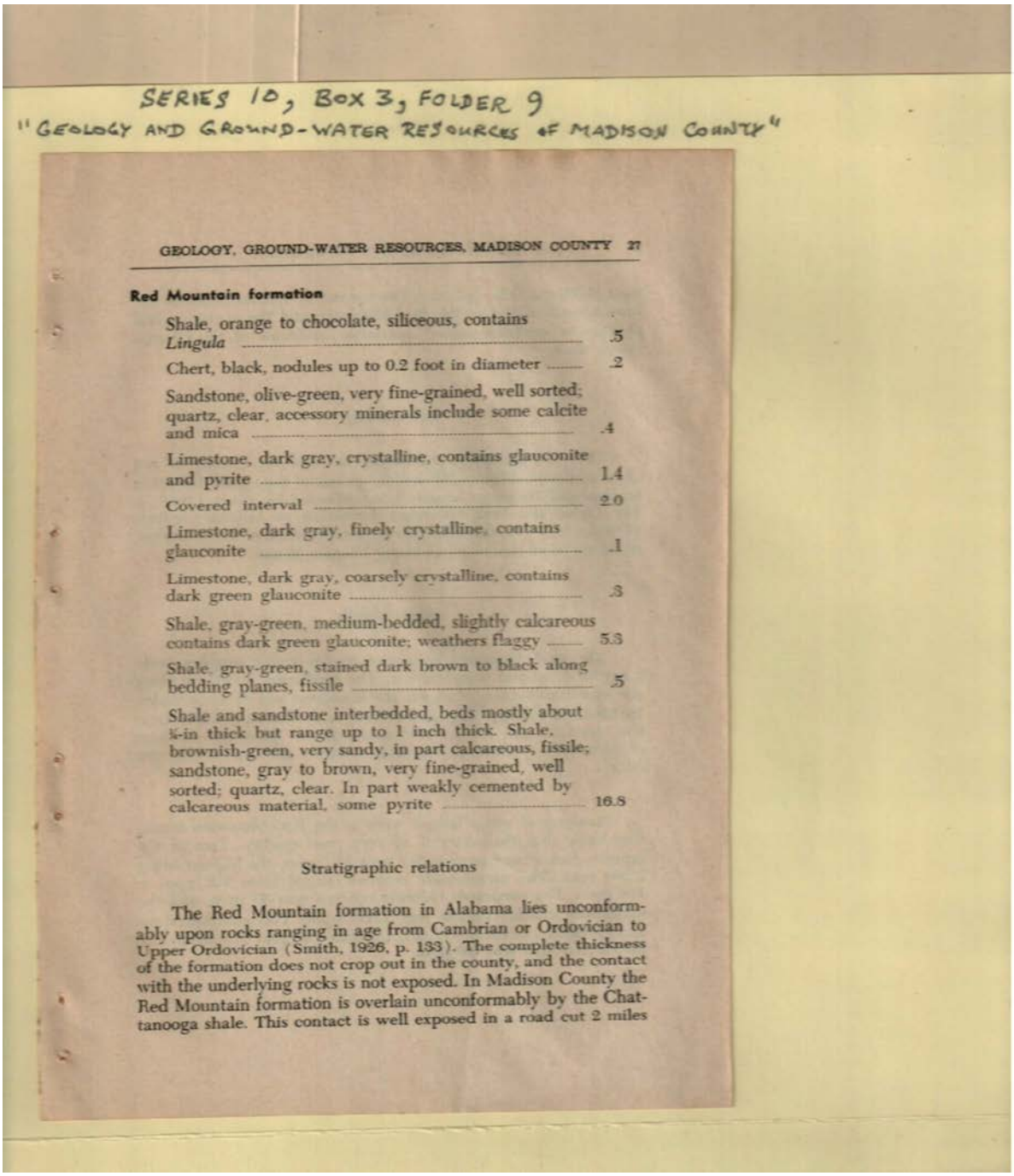
The Red Mountain formation varies considerably in lithology and thickness in Alabama but is generaly composed of beds of sandstone, shale, and limestone. The formation has a maximum exposed thickness of about 30 feet in Madison County and is composed of thin to moderately thick beds of limestone intercalated with thin beds of sandstone and shale. The limestone beds are as much as 2 feet thick and lie near the top of the formation. The limestone is dark gray, crystalline and contains abundant glauconite and pyrite. The glauconite imparts a distinct greenish color to the weathered surfaces. Thin beds of dark brown, very fine-grained, siliceous sandstone and brownish-green, friable sandy shale occur intercalated with the limestone. The sandstone interbedded with the shale weathers to a dark brownish-green color and occurs as thin bands as much as 1 inch thick.

A section of the Red Mountain formation and the overlying Chattanooga shale and Fort Payne chert is exposed on the bluff above Hester Creek. The lithologic description is as follows:

Geologic section on bluff above Hester Creek in the NW¼NW¼ sec. 18, T. 1 S., R. 2 E.

	Thickness (feet)
Fort Payne chert	
Chert, light tan, weathered to rectangular blocks mostly covered	17.3
Shale, green, earthy, thin-bedded, friable with phosphate nodules	1.5
Chattanooga shale	
Shale, black, dense, fissle, siliceous, with some pyrite	9.0
Sandstone, black, fine-grained, subangular to subrounded, fairly well sorted; quartz, clear, abundant pyrite and carbonaceous material	.4

Types:
booklet



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"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

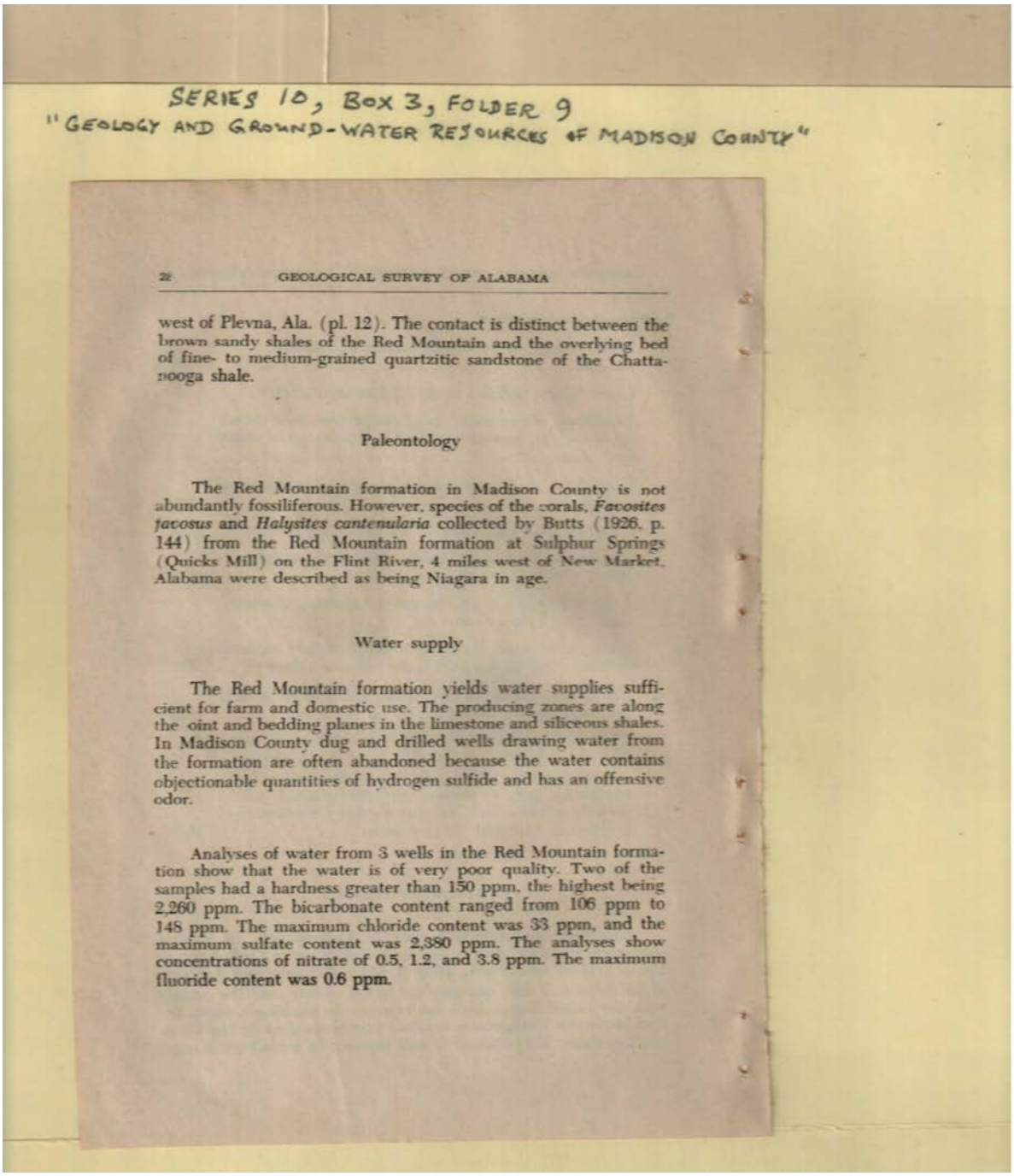
Red Mountain formation

Shale, orange to chocolate, siliceous, contains *Lingula*	.5
Chert, black, nodules up to 0.2 foot in diameter	.2
Sandstone, olive-green, very fine-grained, well sorted; quartz, clear, accessory minerals include some calcite and mica	.4
Limestone, dark gray, crystalline, contains glauconite and pyrite	1.4
Covered interval	2.0
Limestone, dark gray, finely crystalline, contains glauconite	.1
Limestone, dark gray, coarsely crystalline, contains dark green glauconite	.3
Shale, gray-green, medium-bedded, slightly calcareous contains dark green glauconite; weathers flaggy	5.3
Shale, gray-green, stained dark brown to black along bedding planes, fissile	.5
Shale and sandstone interbedded, beds mostly about ¼-in thick but range up to 1 inch thick. Shale, brownish-green, very sandy, in part calcareous, fissile; sandstone, gray to brown, very fine-grained, well sorted; quartz, clear. In part weakly cemented by calcareous material, some pyrite	16.8

Stratigraphic relations

The Red Mountain formation in Alabama lies unconformably upon rocks ranging in age from Cambrian or Ordovician to Upper Ordovician (Smith, 1926, p. 133). The complete thickness of the formation does not crop out in the county, and the contact with the underlying rocks is not exposed. In Madison County the Red Mountain formation is overlain unconformably by the Chattanooga shale. This contact is well exposed in a road cut 2 miles

Types:
booklet



west of Plevna, Ala. (pl. 12). The contact is distinct between the brown sandy shales of the Red Mountain and the overlying bed of fine- to medium-grained quartzitic sandstone of the Chattanooga shale.

Paleontology

The Red Mountain formation in Madison County is not abundantly fossiliferous. However, species of the corals, *Favosites favosus* and *Halysites cantenularia* collected by Butts (1926, p. 144) from the Red Mountain formation at Sulphur Springs (Quicks Mill) on the Flint River, 4 miles west of New Market, Alabama were described as being Niagara in age.

Water supply

The Red Mountain formation yields water supplies sufficient for farm and domestic use. The producing zones are along the joint and bedding planes in the limestone and siliceous shales. In Madison County dug and drilled wells drawing water from the formation are often abandoned because the water contains objectionable quantities of hydrogen sulfide and has an offensive odor.

Analyses of water from 3 wells in the Red Mountain formation show that the water is of very poor quality. Two of the samples had a hardness greater than 150 ppm, the highest being 2,260 ppm. The bicarbonate content ranged from 106 ppm to 148 ppm. The maximum chloride content was 33 ppm, and the maximum sulfate content was 2,380 ppm. The analyses show concentrations of nitrate of 0.5, 1.2, and 3.8 ppm. The maximum fluoride content was 0.6 ppm.

Names:
Butts,

Types:
booklet

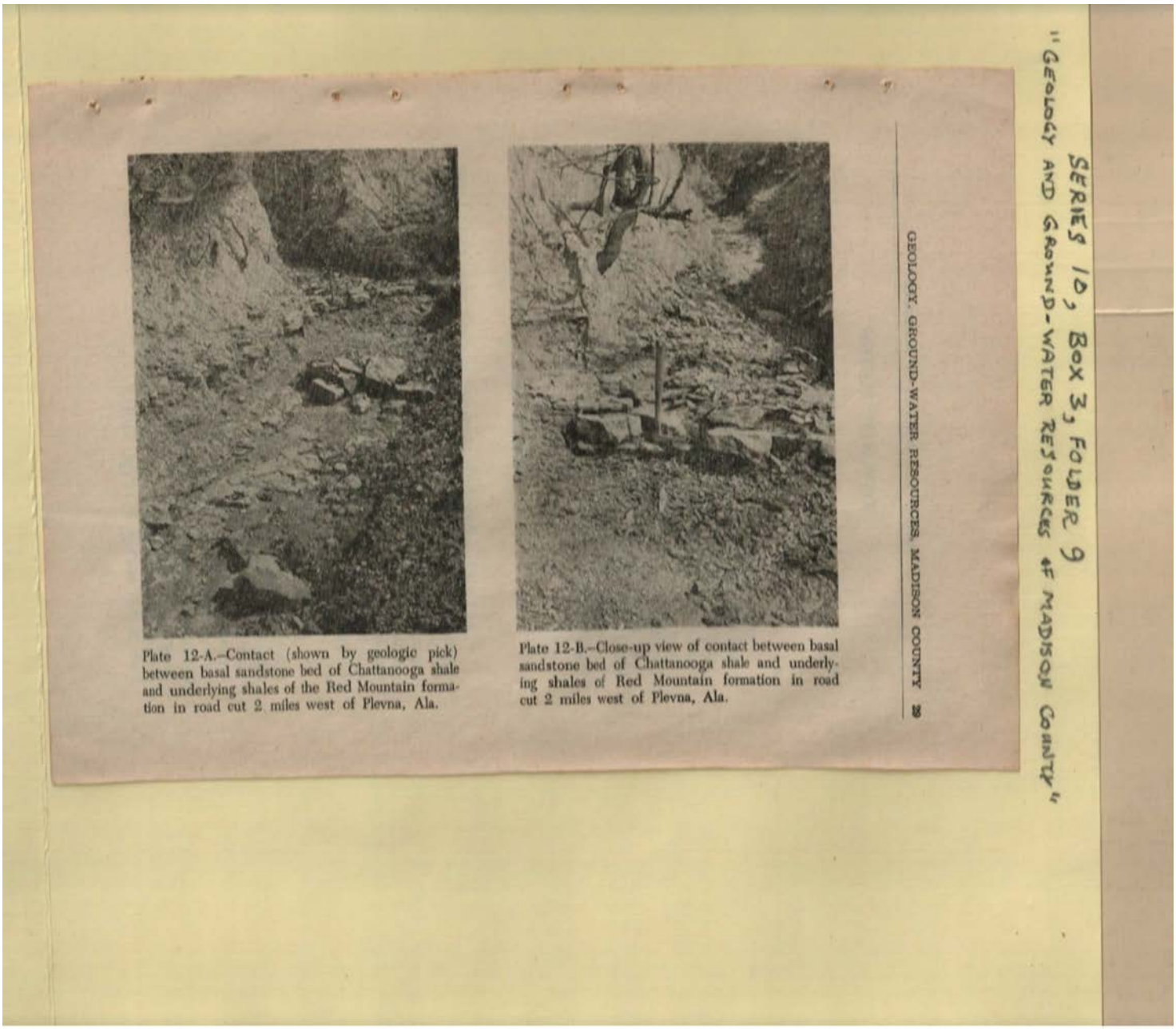
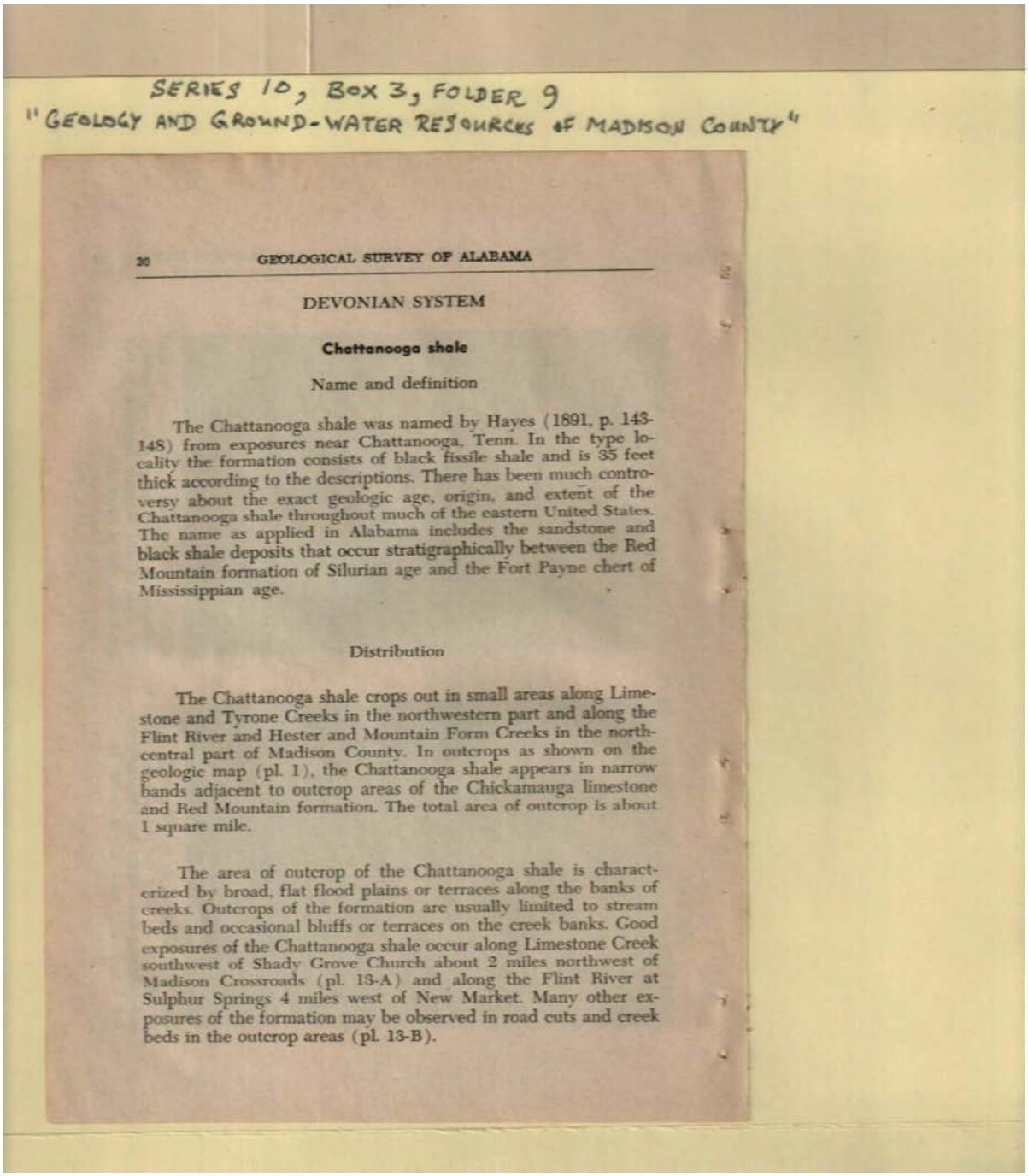


Plate 12-A.–Contact (shown by geologic pick) between basal sandstone bed of Chattanooga shale and underlying shales of the Red Mountain formation in road cut 2 miles west of Plevna, Ala.

Plate 12-B.–Close-up view of contact between basal sandstone bed of Chattanooga shale and underlying shales of Red Mountain formation in road cut 2 miles west of Plevna, Ala.

Names:
Chattanooga Shale

Types:
photograph



DEVONIAN SYSTEM

Chattanooga shale

Name and definition

The Chattanooga shale was named by Hayes (1891, p. 143-148) from exposures near Chattanooga, Tenn. In the type locality the formation consists of black fissile shale and is 35 feet thick according to the descriptions. There has been much controversy about the exact geologic age, origin, and extent of the Chattanooga shale throughout much of the eastern United States. The name as applied in Alabama includes the sandstone and black shale deposits that occur stratigraphically between the Red Mountain formation of Silurian age and the Fort Payne chert of Mississippian age.

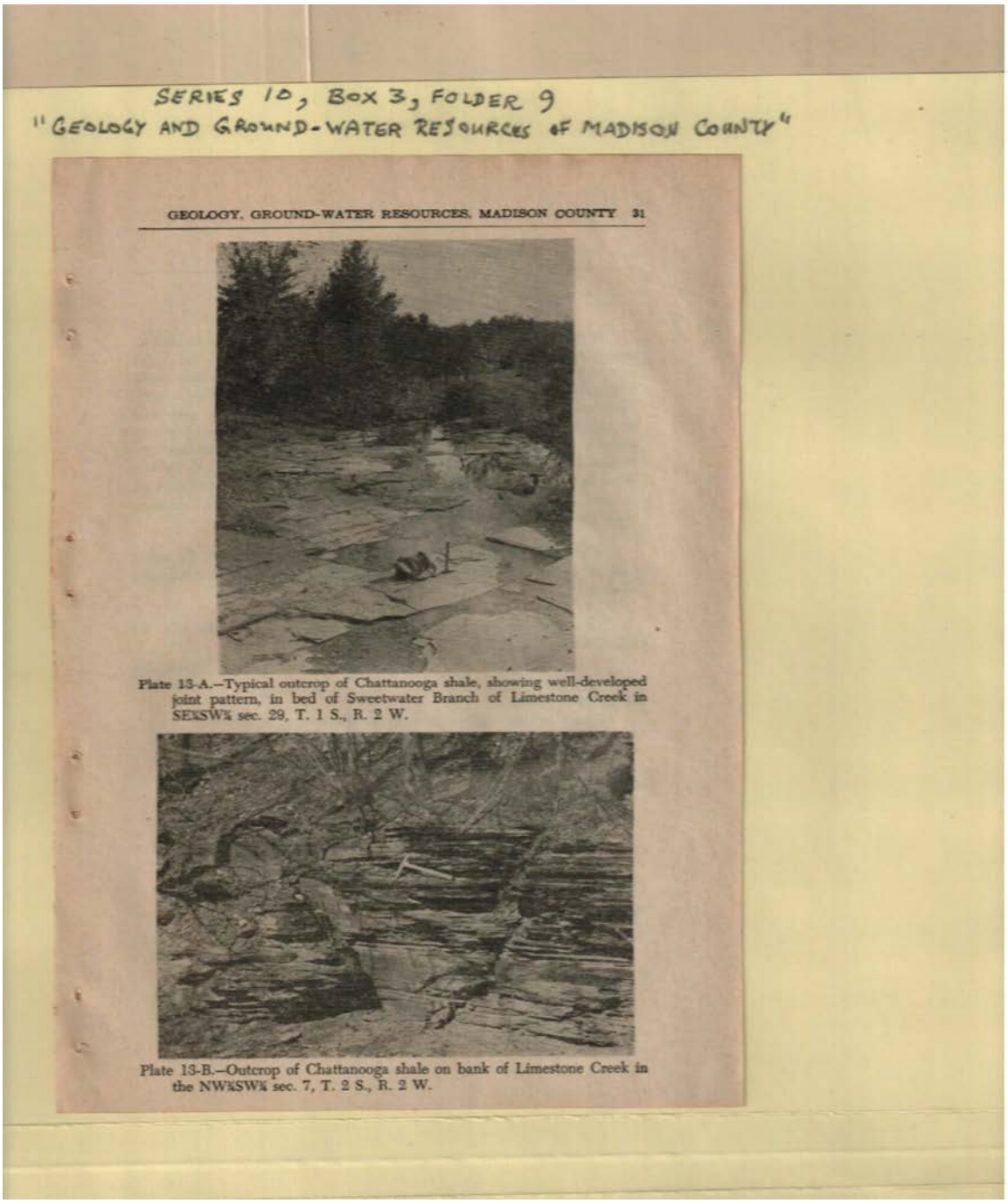
Distribution

The Chattanooga shale crops out in small areas along Limestone and Tyrone Creeks in the northwestern part and along the Flint River and Hester and Mountain Form Creeks in the north-central part of Madison County. In outcrops as shown on the geologic map (pl. 1), the Chattanooga shale appears in narrow bands adjacent to outcrop areas of the Chickamauga limestone and Red Mountain formation. The total area of outcrop is about 1 square mile.

The area of outcrop of the Chattanooga shale is charactcrized by broad, flat flood plains or terraces along the banks of creeks. Outcrops of the formation are usually limited to stream beds and occasional bluffs or terraces on the creek banks. Good exposures of the Chattanooga shale occur along Limestone Creek southwest of Shady Grove Church about 2 miles northwest of Madison Crossroads (pl. 13-A) and along the Flint River at Sulphur Springs 4 miles west of New Market. Many other exposures of the formation may be observed in road cuts and creek beds in the outcrop areas (pl. 13-B).

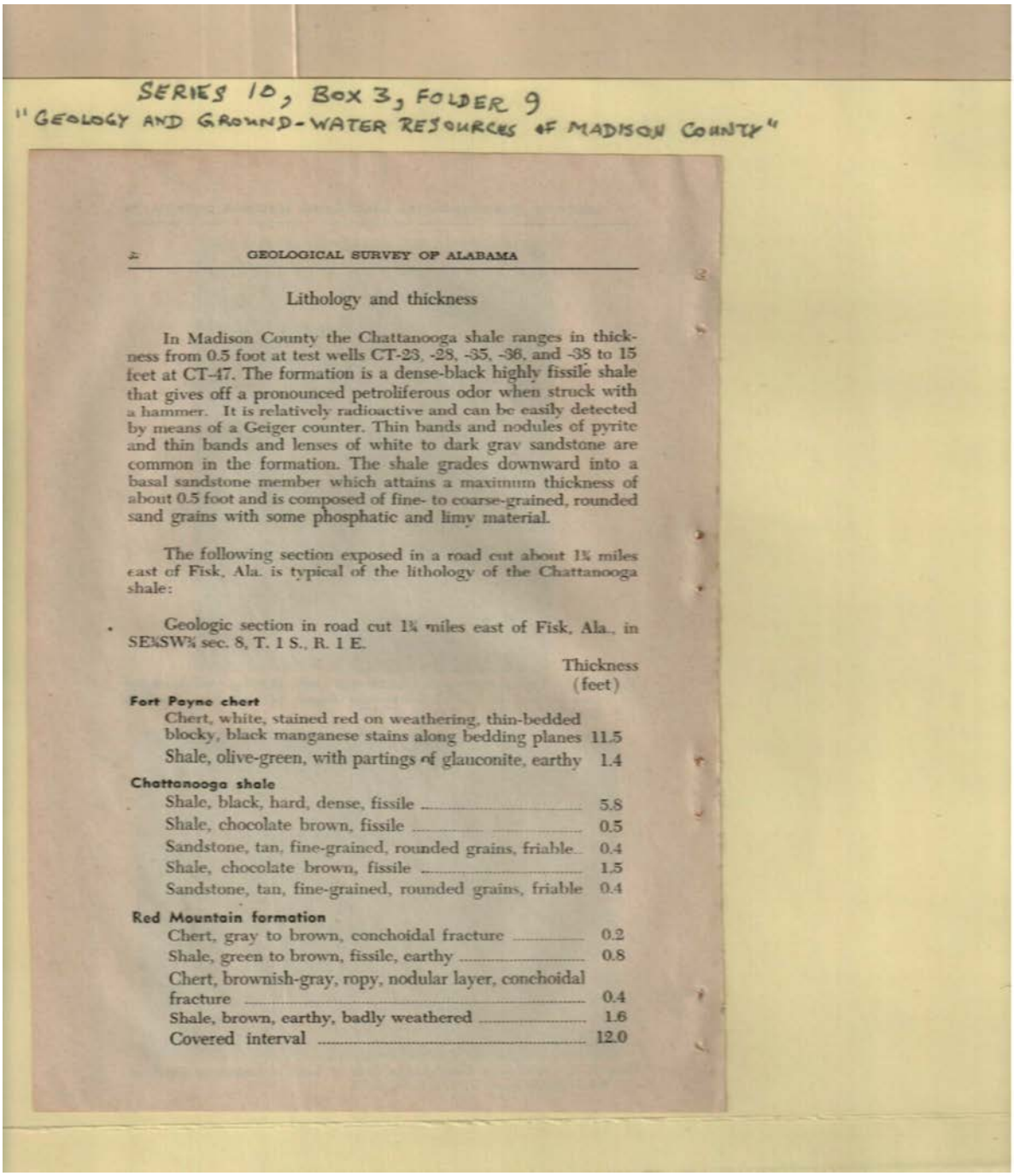
Names:
Devonian System Hayes,

Types:
booklet



Names:
Chattanooga Shale

Types:
photograph



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Lithology and thickness

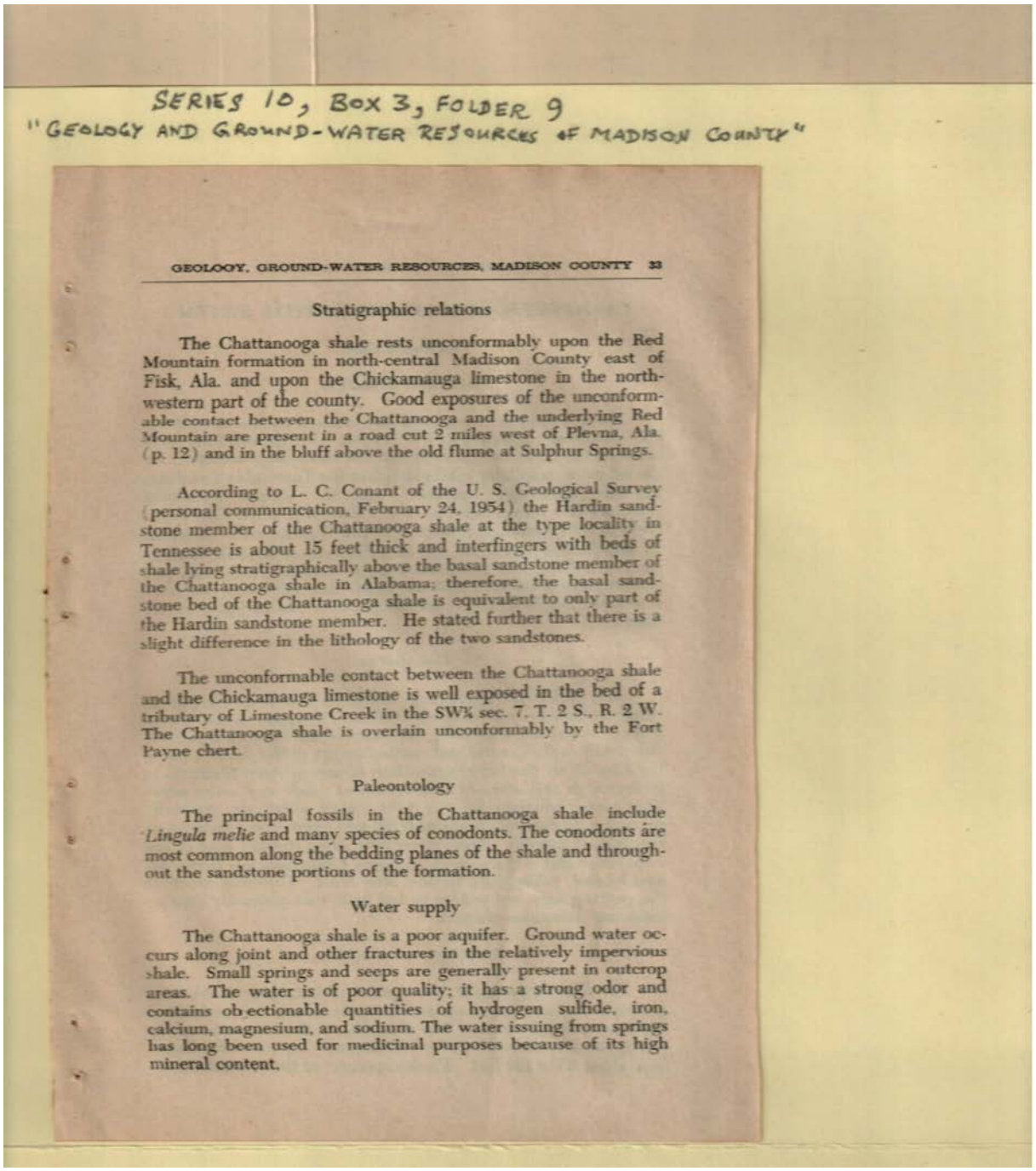
In Madison County the Chattanooga shale ranges in thickness from 0.5 foot at test wells CT-23, -28, -35, -36, and -38 to 15 feet at CT-47. The formation is a dense-black highly fissile shale that gives off a pronounced petroliferous odor when struck with a hammer. It is relatively radioactive and can be easily detected by means of a Geiger counter. Thin bands and nodules of pyrite and thin bands and lenses of white to dark gray sandstone are common in the formation. The shale grades downward into a basal sandstone member which attains a maximum thickness of about 0.5 foot and is composed of fine- to coarse-grained, rounded sand grains with some phosphatic and limy material.

The following section exposed in a road cut about 1¾ miles east of Fisk, Ala. is typical of the lithology of the Chattanooga shale:

Geologic section in road cut 1¾ miles east of Fisk, Ala., in SE¼SW¼ sec. 8, T. 1 S., R. 1 E.

	Thickness (feet)
Fort Payne chert	
Chert, white, stained red on weathering, thin-bedded blocky, black manganese stains along bedding planes	11.5
Shale, olive-green, with partings of glauconite, earthy	1.4
Chattanooga shale	
Shale, black, hard, dense, fissile	5.8
Shale, chocolate brown, fissile	0.5
Sandstone, tan, fine-grained, rounded grains, friable	0.4
Shale, chocolate brown, fissile	1.5
Sandstone, tan, fine-grained, rounded grains, friable	0.4
Red Mountain formation	
Chert, gray to brown, conchoidal fracture	0.2
Shale, green to brown, fissile, earthy	0.8
Chert, brownish-gray, ropy, nodular layer, conchoidal fracture	0.4
Shale, brown, earthy, badly weathered	1.6
Covered interval	12.0

Types:
booklet



Stratigraphic relations

The Chattanooga shale rests unconformably upon the Red Mountain formation in north-central Madison County east of Fisk, Ala. and upon the Chickamauga limestone in the northwestern part of the county. Good exposures of the unconformable contact between the Chattanooga and the underlying Red Mountain are present in a road cut 2 miles west of Plevna, Ala. (p. 12) and in the bluff above the old flume at Sulphur Springs.

According to L. C. Conant of the U. S. Geological Survey (personal communication, February 24, 1954) the Hardin sandstone member of the Chattanooga shale at the type locality in Tennessee is about 15 feet thick and interfingers with beds of shale lying stratigraphically above the basal sandstone member of the Chattanooga shale in Alabama; therefore, the basal sandstone bed of the Chattanooga shale is equivalent to only part of the Hardin sandstone member. He stated further that there is a slight difference in the lithology of the two sandstones.

The unconformable contact between the Chattanooga shale and the Chickamauga limestone is well exposed in the bed of a tributary of Limestone Creek in the SW¼ sec. 7, T. 2 S., R. 2 W. The Chattanooga shale is overlain unconformably by the Fort Payne chert.

Paleontology

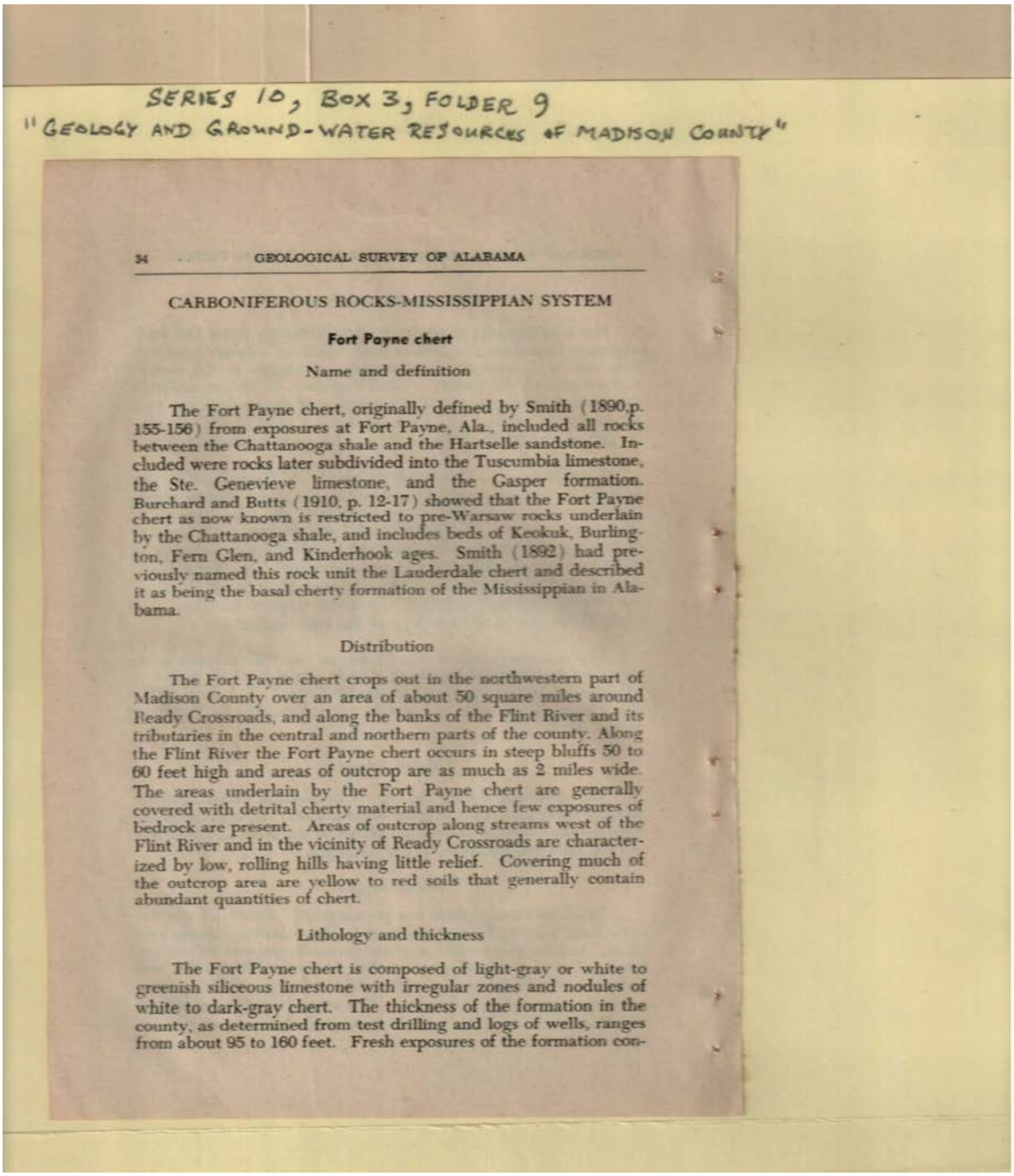
The principal fossils in the Chattanooga shale include *Lingula melie* and many species of conodonts. The conodonts are most common along the bedding planes of the shale and throughout the sandstone portions of the formation.

Water supply

The Chattanooga shale is a poor aquifer. Ground water occurs along joint and other fractures in the relatively impervious shale. Small springs and seeps are generally present in outcrop areas. The water is of poor quality; it has a strong odor and contains objectionable quantities of hydrogen sulfide, iron, calcium, magnesium, and sodium. The water issuing from springs has long been used for medicinal purposes because of its high mineral content.

Names:
Conant, L. C.

Types:
booklet



CARBONIFEROUS ROCKS-MISSISSIPPIAN SYSTEM

Fort Payne chert

Name and definition

The Fort Payne chert, originally defined by Smith (1890,p. 155-156) from exposures at Fort Payne, Ala., included all rocks between the Chattanooga shale and the Hartselle sandstone. Included were rocks later subdivided into the Tuscumbia limestone, the Ste. Genevieve limestone, and the Gasper formation. Burchard and Butts (1910, p. 12-17) showed that the Fort Payne chert as now known is restricted to pre-Warsaw rocks underlain by the Chattanooga shale, and includes beds of Keokuk, Burlington, Fern Glen, and Kinderhook ages. Smith (1892) had previously named this rock unit the Lauderdale chert and described it as being the basal cherty formation of the Mississippian in Alabama.

Distribution

The Fort Payne chert crops out in the northwestern part of Madison County over an area of about 50 square miles around Ready Crossroads, and along the banks of the Flint River and its tributaries in the central and northern parts of the county. Along the Flint River the Fort Payne chert occurs in steep bluffs 50 to 60 feet high and areas of outcrop are as much as 2 miles wide. The areas underlain by the Fort Payne chert are generally covered with detrital cherty material and hence few exposures of bedrock are present. Areas of outcrop along streams west of the Flint River and in the vicinity of Ready Crossroads are characterized by low, rolling hills having little relief. Covering much of the outcrop area are yellow to red soils that generally contain abundant quantities of chert.

Lithology and thickness

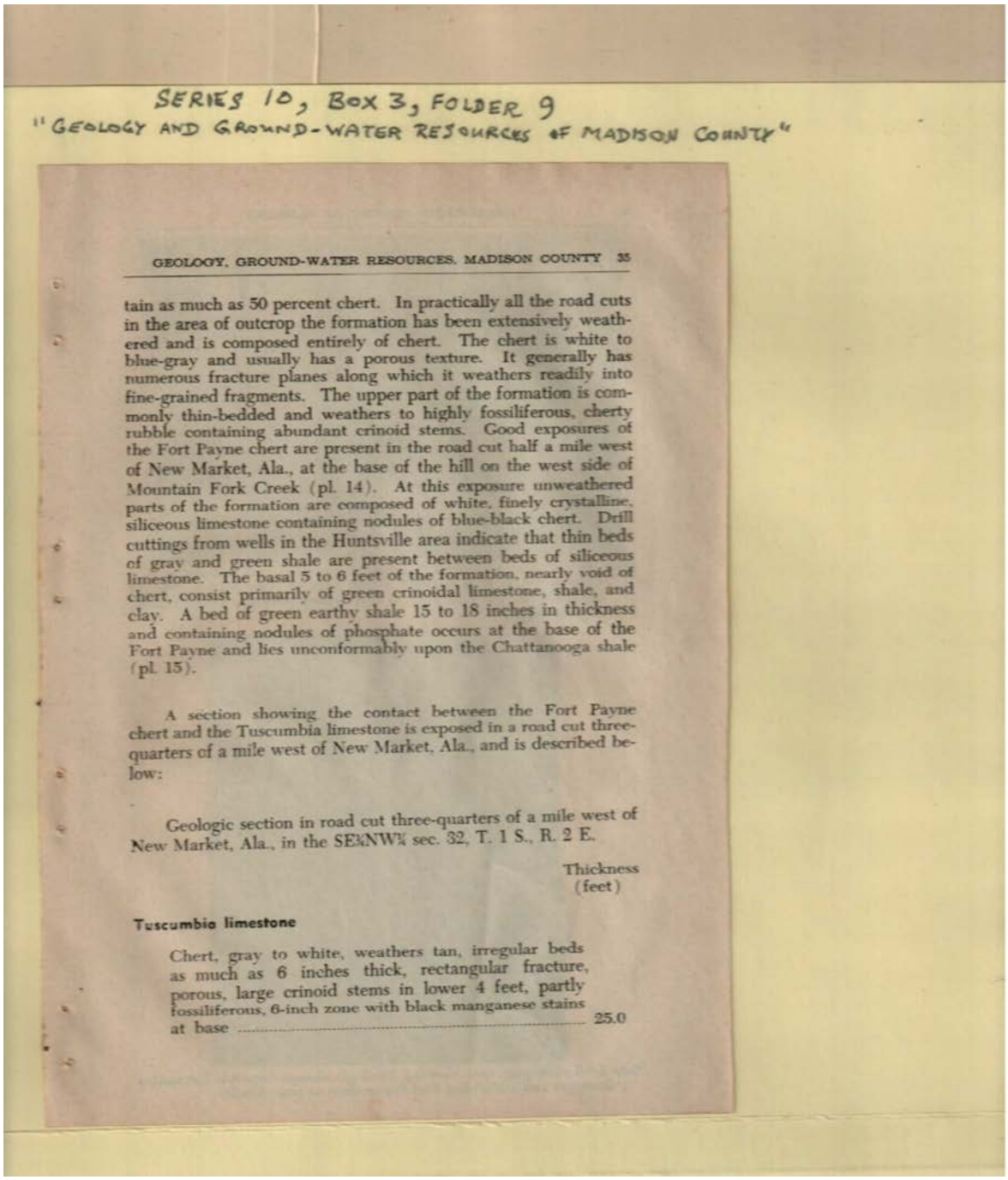
The Fort Payne chert is composed of light-gray or white to greenish siliceous limestone with irregular zones and nodules of white to dark-gray chert. The thickness of the formation in the county, as determined from test drilling and logs of wells, ranges from about 95 to 160 feet. Fresh exposures of the formation con-

Names:

Burchard, Butts, Carboniferous-Mississippian System Smith,

Types:

booklet



tain as much as 50 percent chert. In practically all the road cuts in the area of outcrop the formation has been extensively weathered and is composed entirely of chert. The chert is white to blue-gray and usually has a porous texture. It generally has numerous fracture planes along which it weathers readily into fine-grained fragments. The upper part of the formation is commonly thin-bedded and weathers to highly fossiliferous, cherty rubble containing abundant crinoid stems. Good exposures of the Fort Payne chert are present in the road cut half a mile west of New Market, Ala., at the base of the hill on the west side of Mountain Fork Creek (pl. 14). At this exposure unweathered parts of the formation are composed of white, finely crystalline, siliceous limestone containing nodules of blue-black chert. Drill cuttings from wells in the Huntsville area indicate that thin beds of gray and green shale are present between beds of siliceous limestone. The basal 5 to 6 feet of the formation, nearly void of chert, consist primarily of green crinoidal limestone, shale, and clay. A bed of green earthy shale 15 to 18 inches in thickness and containing nodules of phosphate occurs at the base of the Fort Payne and lies unconformably upon the Chattanooga shale (pl. 15).

A section showing the contact between the Fort Payne chert and the Tuscumbia limestone is exposed in a road cut three-quarters of a mile west of New Market, Ala., and is described below:

Geologic section in road cut three-quarters of a mile west of New Market, Ala., in the SE¼NW¼ sec. 32, T. 1 S., R. 2 E.

	Thickness (feet)
Tuscumbia limestone	
Chert, gray to white, weathers tan, irregular beds as much as 6 inches thick, rectangular fracture, porous, large crinoid stems in lower 4 feet, partly fossiliferous, 6-inch zone with black manganese stains at base	25.0

Types:
booklet

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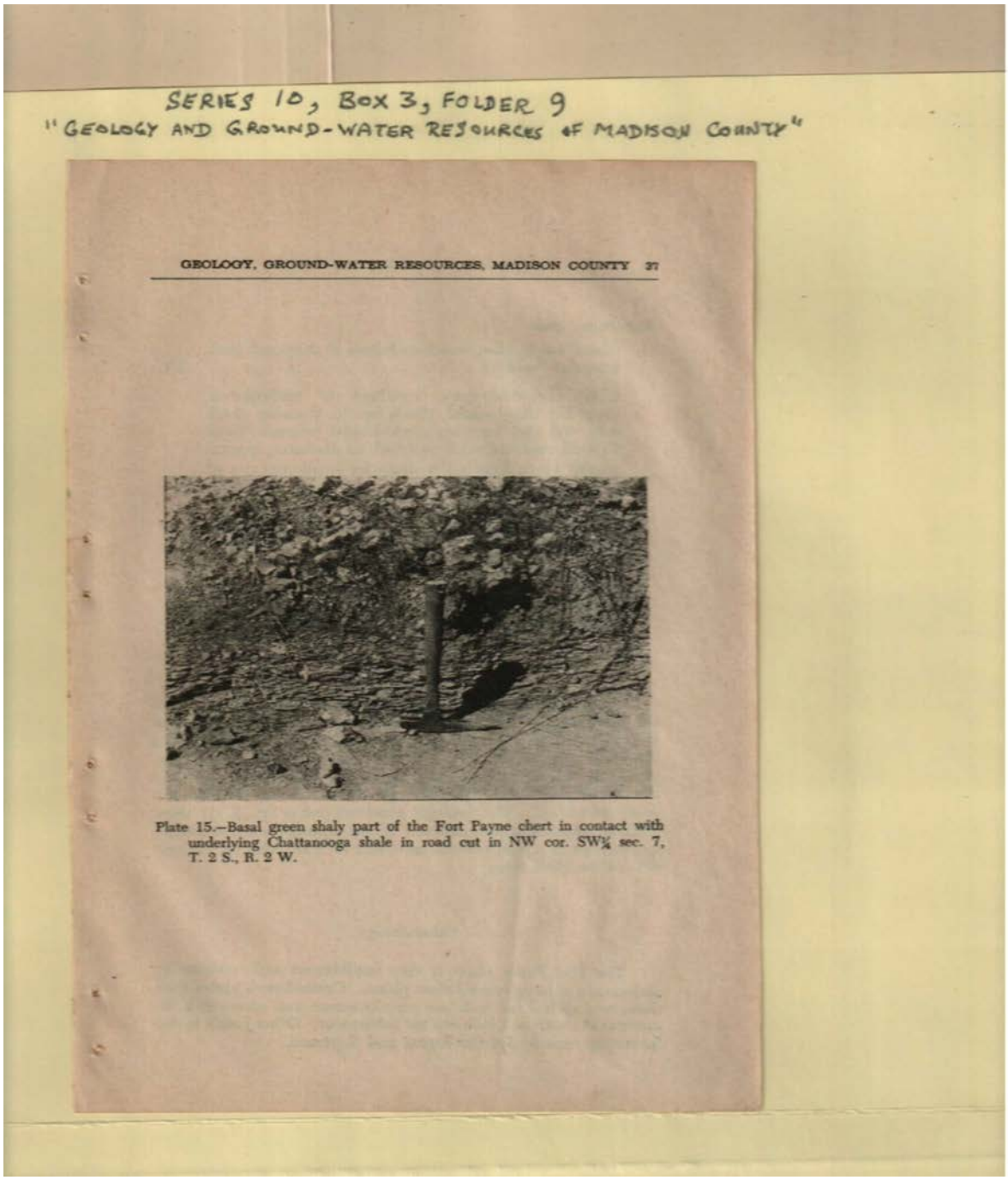
Plate 14-A.—Contact between Tuscumbia limestone and underlying Fort Payne chert in road cut half a mile west of New Market, Ala., in SE¼NW¼ sec. 32, T. 1 S., R. 2 E. (Contact marked by color change in photograph)

Plate 14-B.—Close-up view showing lithologic change between Tuscumbia limestone and underlying Fort Payne chert at same locality.

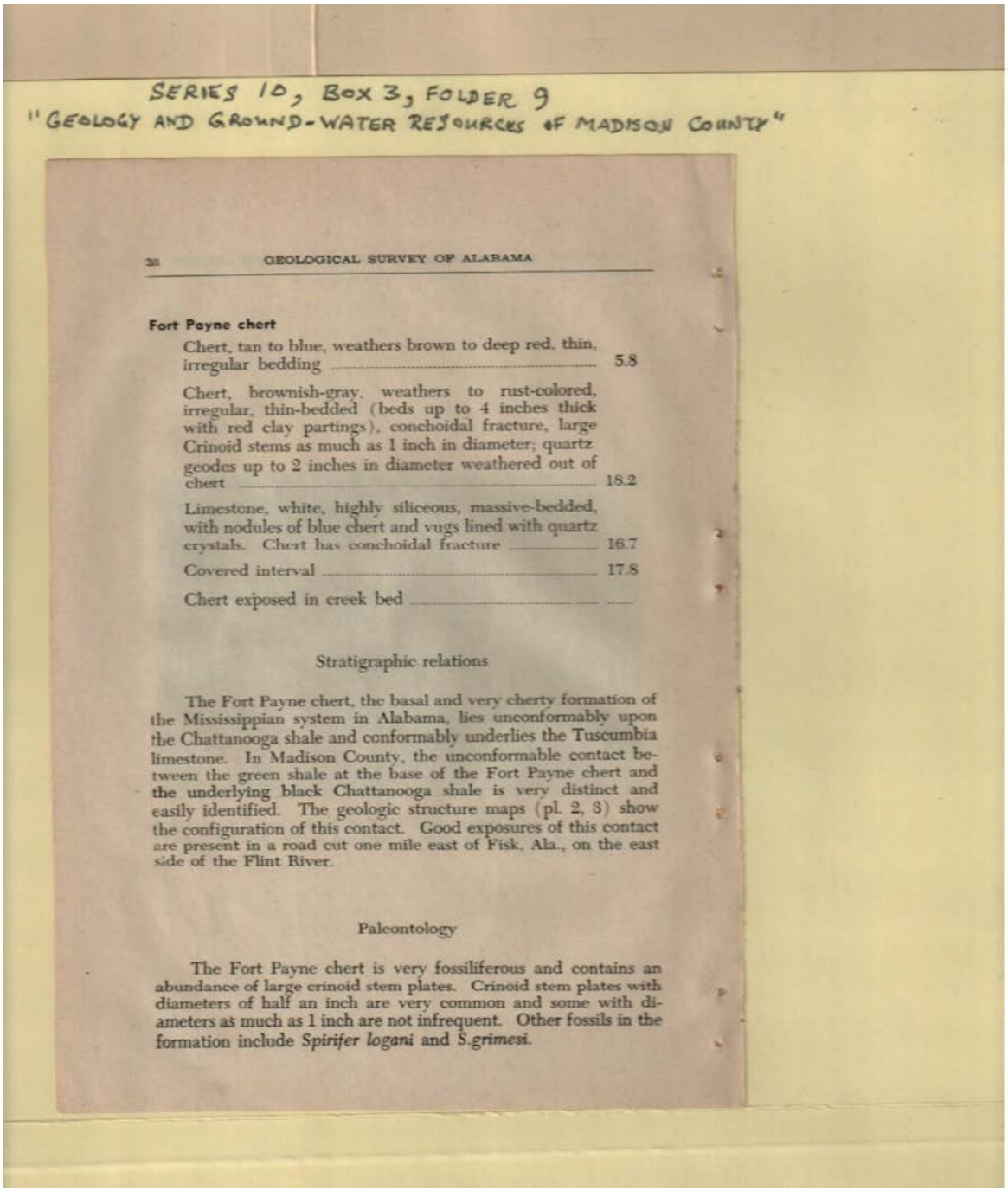
Names:
Fort Payne Chert

Types:
photograph



Names:
Fort Payne Chert

Types:
photograph



Fort Payne chert

Chert, tan to blue, weathers brown to deep red, thin, irregular bedding	5.8
Chert, brownish-gray, weathers to rust-colored, irregular, thin-bedded (beds up to 4 inches thick with red clay partings), conchoidal fracture, large Crinoid stems as much as 1 inch in diameter; quartz geodes up to 2 inches in diameter weathered out of chert	18.2
Limestone, white, highly siliceous, massive-bedded, with nodules of blue chert and vugs lined with quartz crystals. Chert has conchoidal fracture	16.7
Covered interval	17.8
Chert exposed in creek bed	----

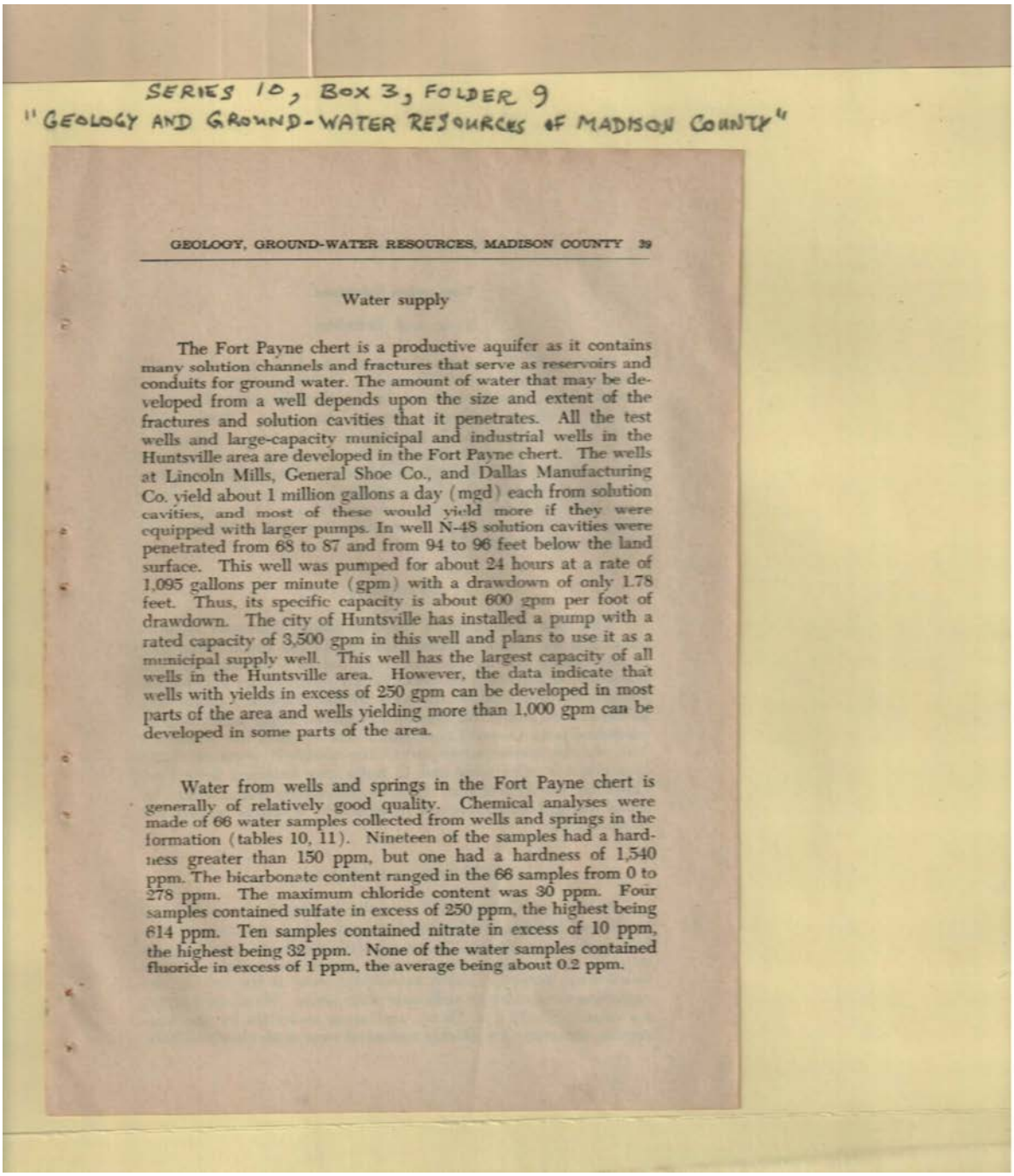
Stratigraphic relations

The Fort Payne chert, the basal and very cherty formation of the Mississippian system in Alabama, lies unconformably upon the Chattanooga shale and conformably underlies the Tuscumbia limestone. In Madison County, the unconformable contact between the green shale at the base of the Fort Payne chert and the underlying black Chattanooga shale is very distinct and easily identified. The geologic structure maps (pl. 2, 3) show the configuration of this contact. Good exposures of this contact are present in a road cut one mile east of Fisk, Ala., on the east side of the Flint River.

Paleontology

The Fort Payne chert is very fossiliferous and contains an abundance of large crinoid stem plates. Crinoid stem plates with diameters of half an inch are very common and some with diameters as much as 1 inch are not infrequent. Other fossils in the formation include *Spirifer logani* and *S.grimesi*.

Types:
booklet

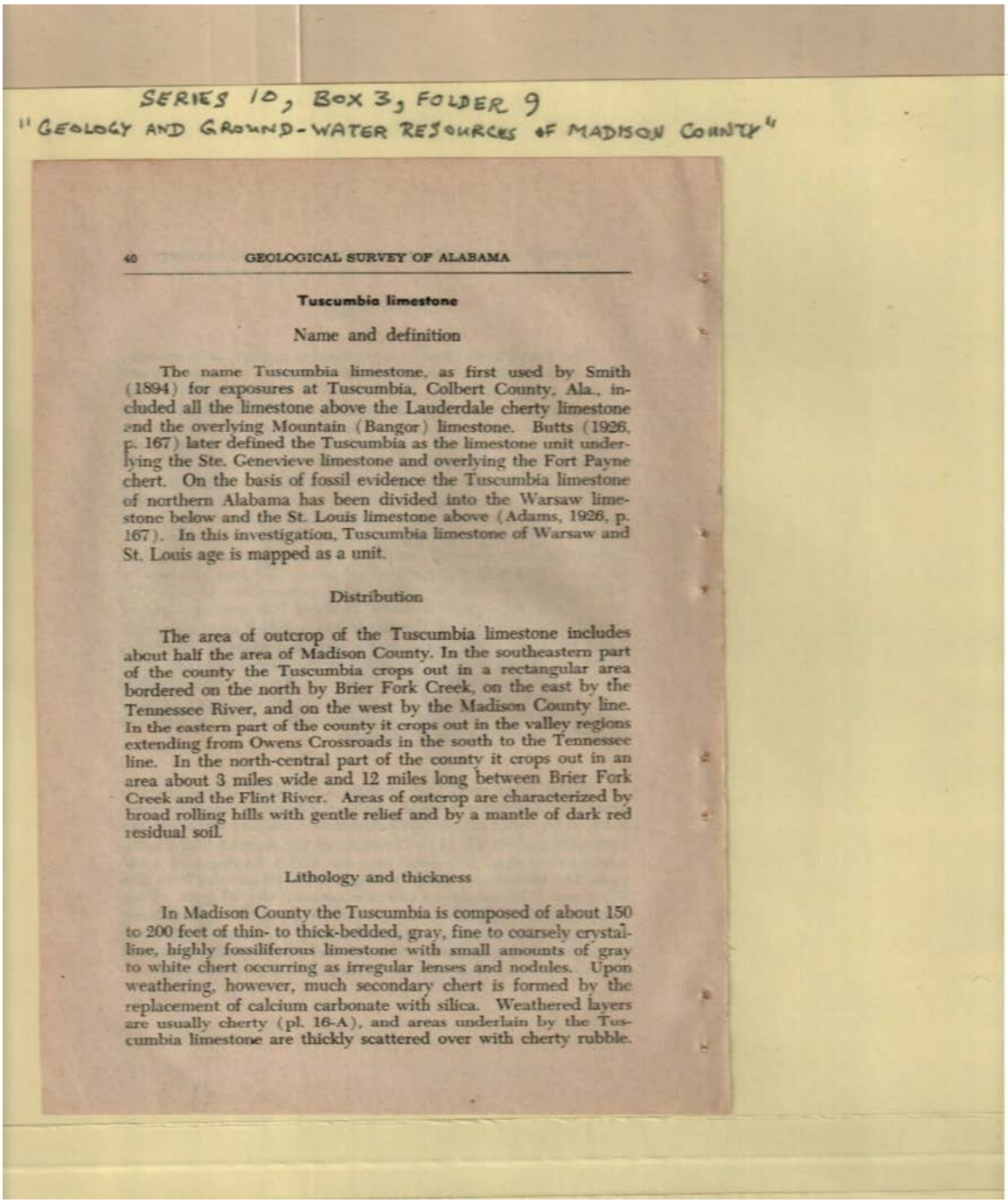


Water supply

The Fort Payne chert is a productive aquifer as it contains many solution channels and fractures that serve as reservoirs and conduits for ground water. The amount of water that may be developed from a well depends upon the size and extent of the fractures and solution cavities that it penetrates. All the test wells and large-capacity municipal and industrial wells in the Huntsville area are developed in the Fort Payne chert. The wells at Lincoln Mills, General Shoe Co., and Dallas Manufacturing Co. yield about 1 million gallons a day (mgd) each from solution cavities, and most of these would yield more if they were equipped with larger pumps. In well N-48 solution cavities were penetrated from 68 to 87 and from 94 to 96 feet below the land surface. This well was pumped for about 24 hours at a rate of 1,095 gallons per minute (gpm) with a drawdown of only 1.78 feet. Thus, its specific capacity is about 600 gpm per foot of drawdown. The city of Huntsville has installed a pump with a rated capacity of 3,500 gpm in this well and plans to use it as a municipal supply well. This well has the largest capacity of all wells in the Huntsville area. However, the data indicate that wells with yields in excess of 250 gpm can be developed in most parts of the area and wells yielding more than 1,000 gpm can be developed in some parts of the area.

Water from wells and springs in the Fort Payne chert is generally of relatively good quality. Chemical analyses were made of 66 water samples collected from wells and springs in the formation (tables 10, 11). Nineteen of the samples had a hardness greater than 150 ppm, but one had a hardness of 1,540 ppm. The bicarbonate content ranged in the 66 samples from 0 to 278 ppm. The maximum chloride content was 30 ppm. Four samples contained sulfate in excess of 250 ppm, the highest being 614 ppm. Ten samples contained nitrate in excess of 10 ppm, the highest being 32 ppm. None of the water samples contained fluoride in excess of 1 ppm, the average being about 0.2 ppm.

Types:
booklet



Tuscumbia limestone

Name and definition

The name Tuscumbia limestone, as first used by Smith (1894) for exposures at Tuscumbia, Colbert County, Ala., included all the limestone above the Lauderdale cherty limestone and the overlying Mountain (Bangor) limestone. Butts (1926, p. 167) later defined the Tuscumbia as the limestone unit underlying the Ste. Genevieve limestone and overlying the Fort Payne chert. On the basis of fossil evidence the Tuscumbia limestone of northern Alabama has been divided into the Warsaw limestone below and the St. Louis limestone above (Adams, 1926, p. 167). In this investigation, Tuscumbia limestone of Warsaw and St. Louis age is mapped as a unit.

Distribution

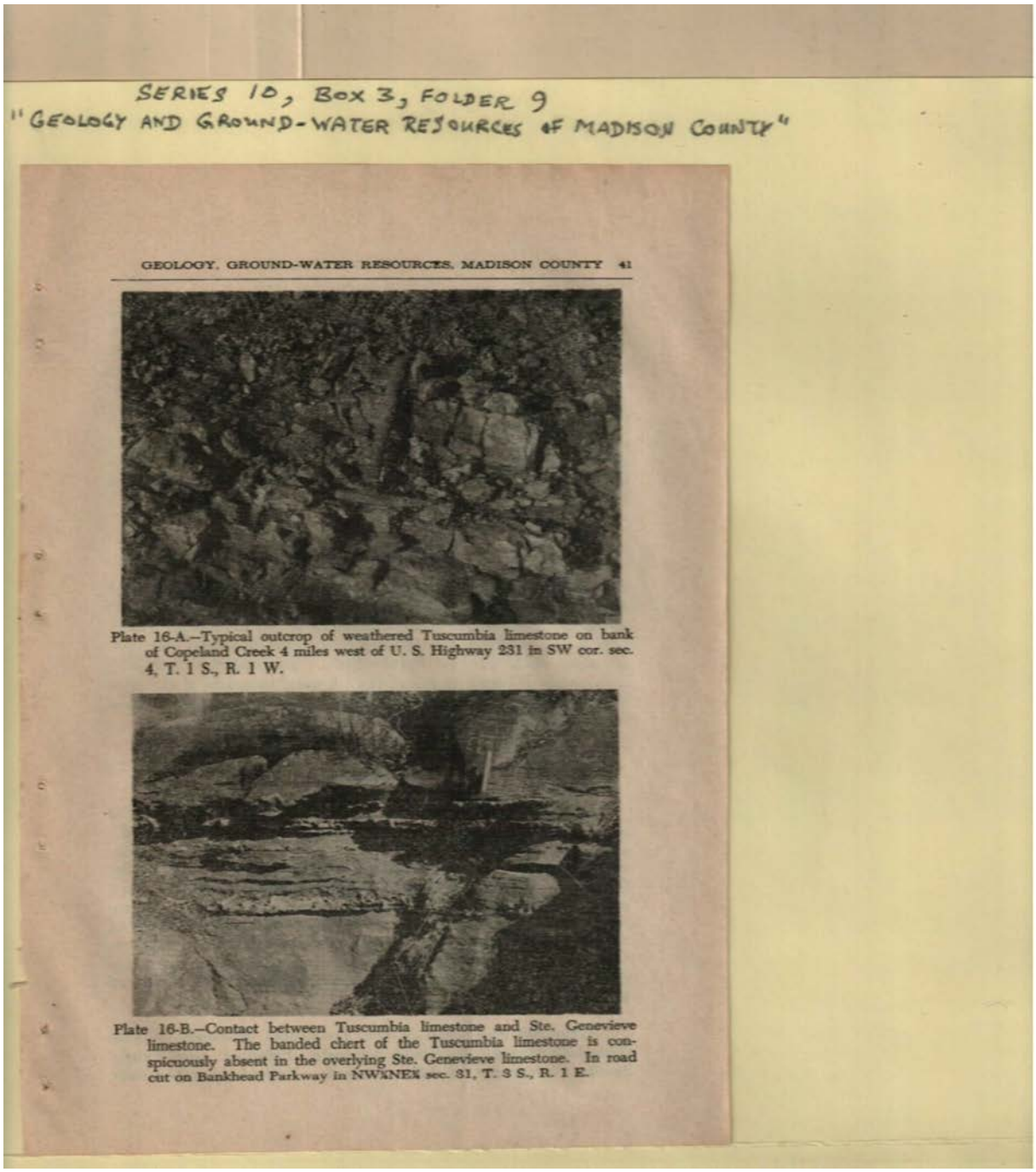
The area of outcrop of the Tuscumbia limestone includes about half the area of Madison County. In the southeastern part of the county the Tuscumbia crops out in a rectangular area bordered on the north by Brier Fork Creek, on the east by the Tennessee River, and on the west by the Madison County line. In the eastern part of the county it crops out in the valley regions extending from Owens Crossroads in the south to the Tennessee line. In the north-central part of the county it crops out in an area about 3 miles wide and 12 miles long between Brier Fork Creek and the Flint River. Areas of outcrop are characterized by broad rolling hills with gentle relief and by a mantle of dark red residual soil.

Lithology and thickness

In Madison County the Tuscumbia is composed of about 150 to 200 feet of thin- to thick-bedded, gray, fine to coarsely crystalline, highly fossiliferous limestone with small amounts of gray to white chert occurring as irregular lenses and nodules. Upon weathering, however, much secondary chert is formed by the replacement of calcium carbonate with silica. Weathered layers are usually cherty (pl. 16-A), and areas underlain by the Tuscumbia limestone are thickly scattered over with cherty rubble.

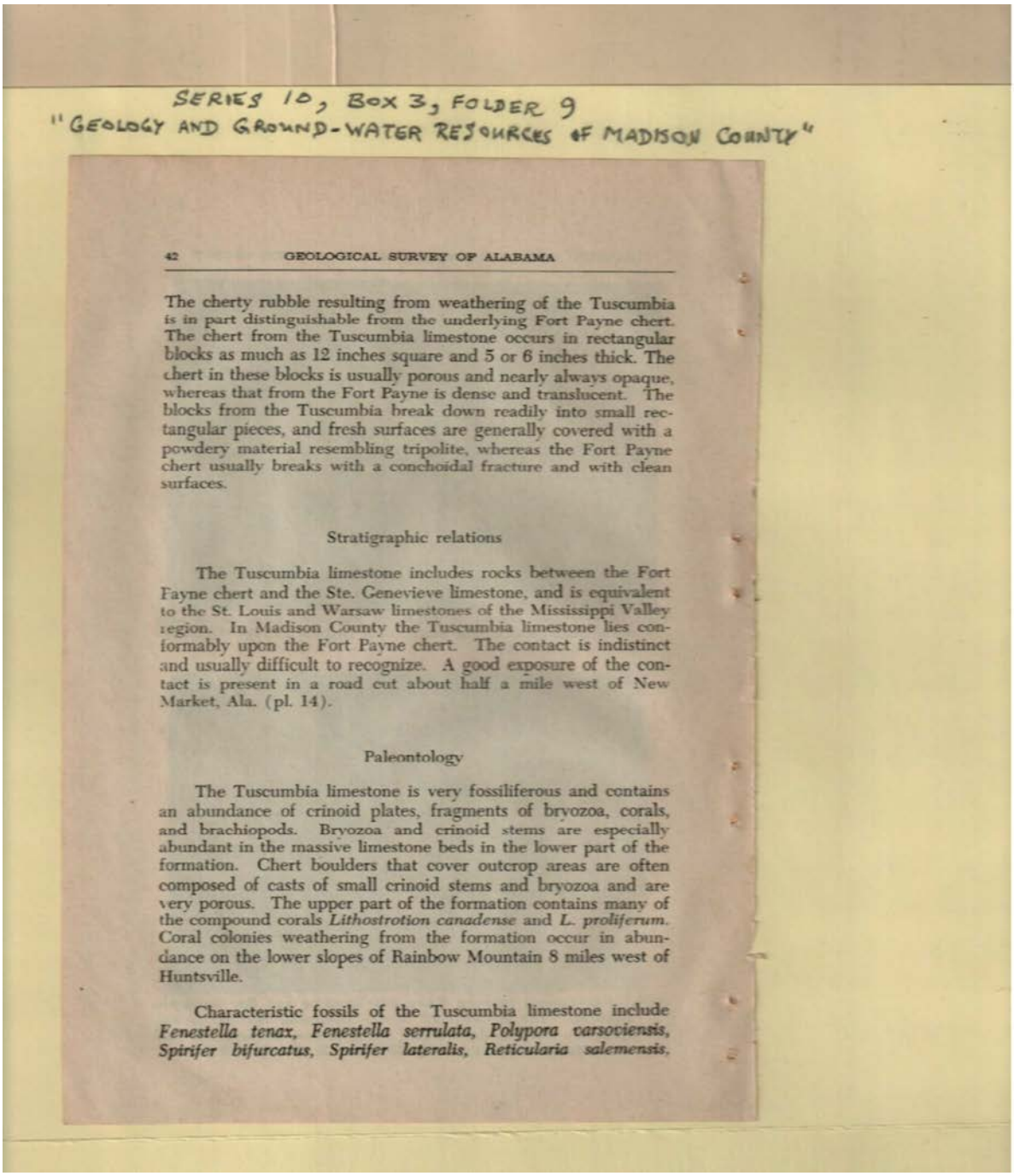
Names:
Adams, Butts, Smith,

Types:
booklet



Names:
Tuscumbia Limestone

Types:
photograph



The cherty rubble resulting from weathering of the Tuscumbia is in part distinguishable from the underlying Fort Payne chert. The chert from the Tuscumbia limestone occurs in rectangular blocks as much as 12 inches square and 5 or 6 inches thick. The chert in these blocks is usually porous and nearly always opaque, whereas that from the Fort Payne is dense and translucent. The blocks from the Tuscumbia break down readily into small rectangular pieces, and fresh surfaces are generally covered with a powdery material resembling tripolite, whereas the Fort Payne chert usually breaks with a conchoidal fracture and with clean surfaces.

Stratigraphic relations

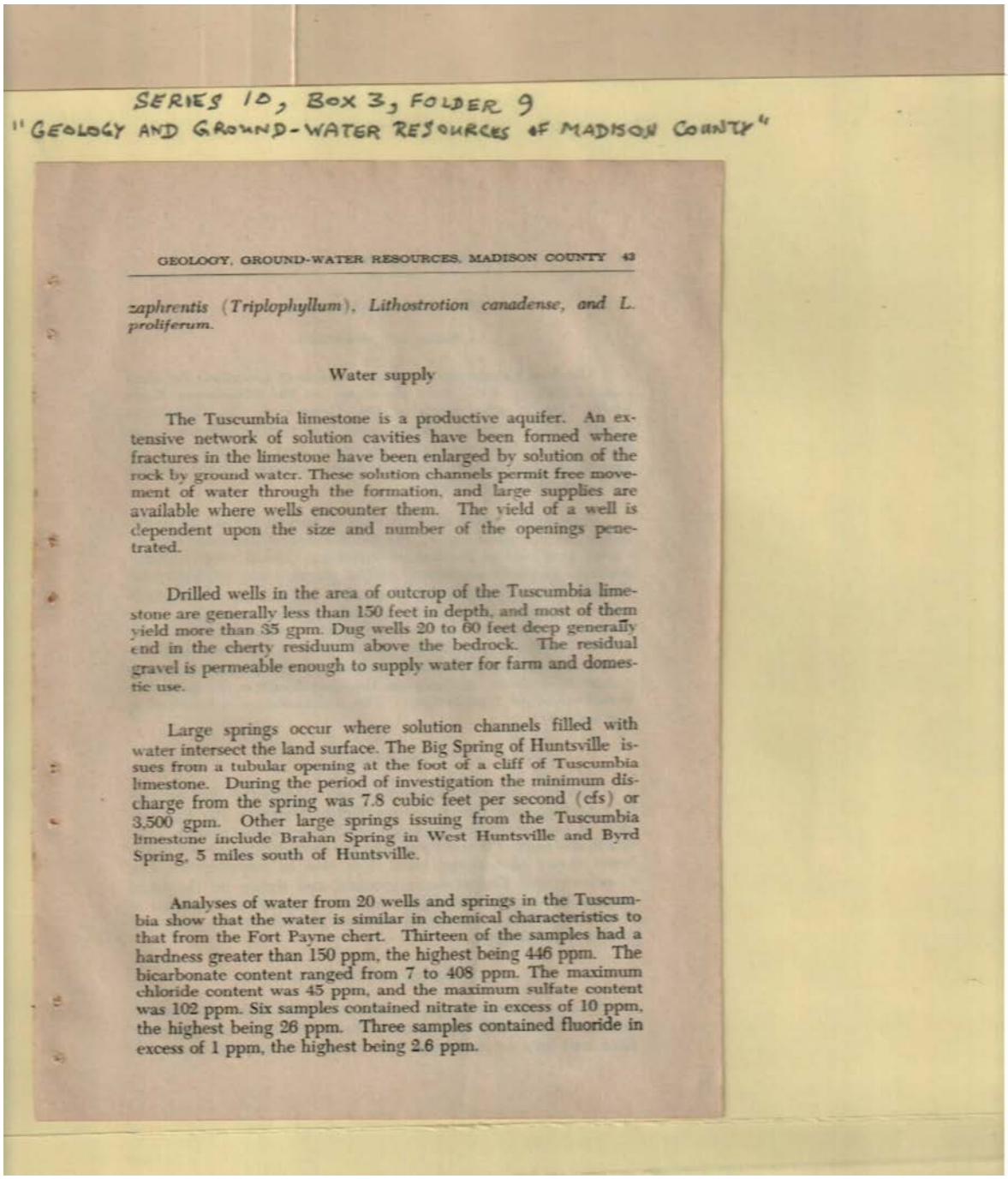
The Tuscumbia limestone includes rocks between the Fort Payne chert and the Ste. Genevieve limestone, and is equivalent to the St. Louis and Warsaw limestones of the Mississippi Valley region. In Madison County the Tuscumbia limestone lies conformably upon the Fort Payne chert. The contact is indistinct and usually difficult to recognize. A good exposure of the contact is present in a road cut about half a mile west of New Market, Ala. (pl. 14).

Paleontology

The Tuscumbia limestone is very fossiliferous and contains an abundance of crinoid plates, fragments of bryozoa, corals, and brachiopods. Bryozoa and crinoid stems are especially abundant in the massive limestone beds in the lower part of the formation. Chert boulders that cover outcrop areas are often composed of casts of small crinoid stems and bryozoa and are very porous. The upper part of the formation contains many of the compound corals *Lithostrotion canadense* and *L. proliferum*. Coral colonies weathering from the formation occur in abundance on the lower slopes of Rainbow Mountain 8 miles west of Huntsville.

Characteristic fossils of the Tuscumbia limestone include *Fenestella tenax, Fenestella serrulata, Polypora varsoviensis, Spirifer bifurcatus, Spirifer lateralis, Reticularia salemensis,*

Types:
booklet



zaphrentis (Triplophyllum), Lithostrotion canadense, and L. proliferum.

Water supply

The Tuscumbia limestone is a productive aquifer. An extensive network of solution cavities have been formed where fractures in the limestone have been enlarged by solution of the rock by ground water. These solution channels permit free movement of water through the formation, and large supplies are available where wells encounter them. The yield of a well is dependent upon the size and number of the openings penetrated.

Drilled wells in the area of outcrop of the Tuscumbia limestone are generally less than 150 feet in depth, and most of them yield more than 35 gpm. Dug wells 20 to 60 feet deep generally end in the cherty residuum above the bedrock. The residual gravel is permeable enough to supply water for farm and domestic use.

Large springs occur where solution channels filled with water intersect the land surface. The Big Spring of Huntsville issues from a tubular opening at the foot of a cliff of Tuscumbia limestone. During the period of investigation the minimum discharge from the spring was 7.8 cubic feet per second (cfs) or 3,500 gpm. Other large springs issuing from the Tuscumbia limestone include Brahan Spring in West Huntsville and Byrd Spring, 5 miles south of Huntsville.

Analyses of water from 20 wells and springs in the Tuscumbia show that the water is similar in chemical characteristics to that from the Fort Payne chert. Thirteen of the samples had a hardness greater than 150 ppm, the highest being 446 ppm. The bicarbonate content ranged from 7 to 408 ppm. The maximum chloride content was 45 ppm, and the maximum sulfate content was 102 ppm. Six samples contained nitrate in excess of 10 ppm, the highest being 26 ppm. Three samples contained fluoride in excess of 1 ppm, the highest being 2.6 ppm.

Types:
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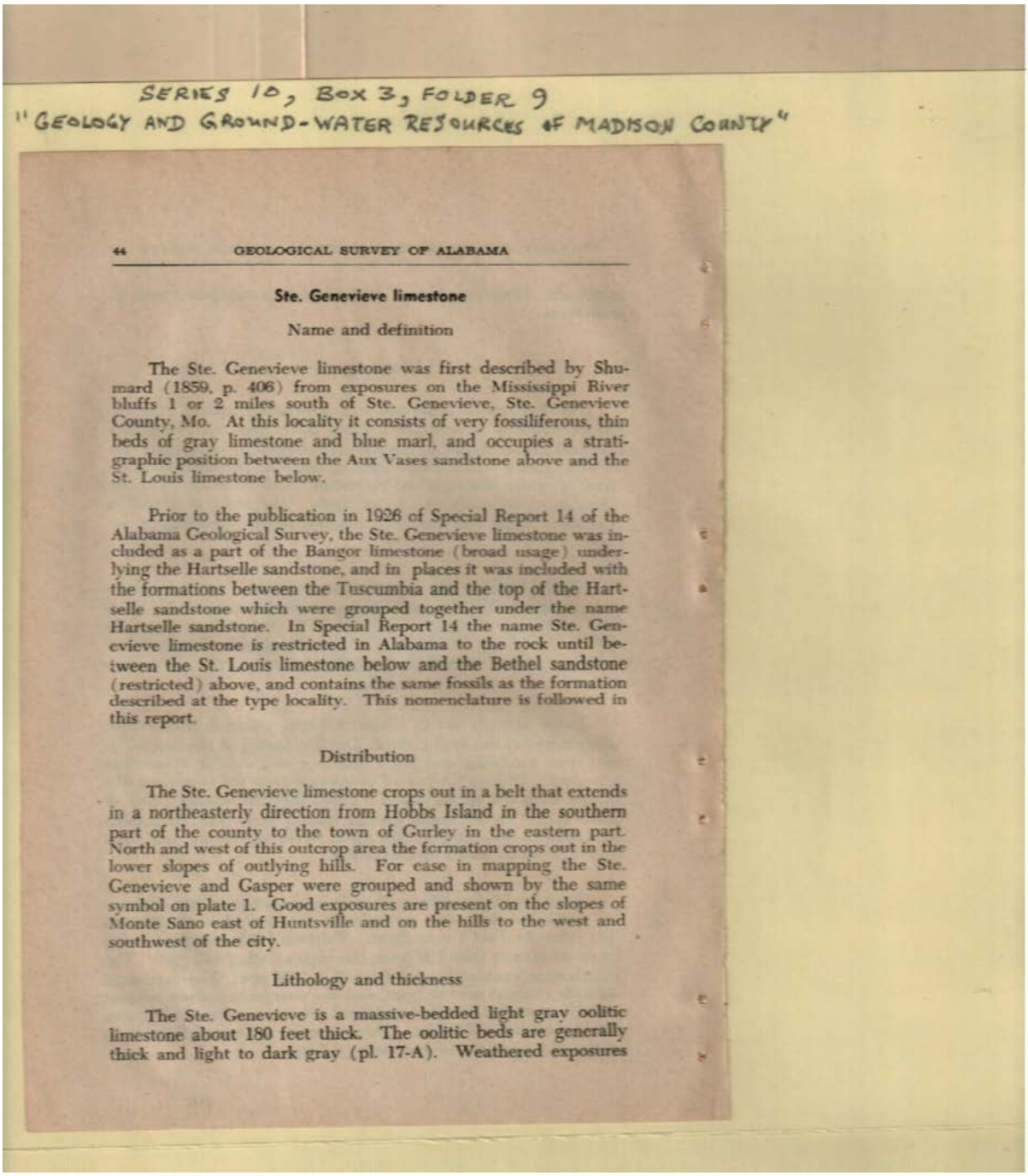

Ste. Genevieve limestone

Name and definition

The Ste. Genevieve limestone was first described by Shumard (1859, p. 406) from exposures on the Mississippi River bluffs 1 or 2 miles south of Ste. Genevieve, Ste. Genevieve County, Mo. At this locality it consists of very fossiliferous, thin beds of gray limestone and blue marl, and occupies a stratigraphic position between the Aux Vases sandstone above and the St. Louis limestone below.

Prior to the publication in 1926 of Special Report 14 of the Alabama Geological Survey, the Ste. Genevieve limestone was included as a part of the Bangor limestone (broad usage) underlying the Hartselle sandstone, and in places it was included with the formations between the Tuscumbia and the top of the Hartselle sandstone which were grouped together under the name Hartselle sandstone. In Special Report 14 the name Ste. Genevieve limestone is restricted in Alabama to the rock until between the St. Louis limestone below and the Bethel sandstone (restricted) above, and contains the same fossils as the formation described at the type locality. This nomenclature is followed in this report.

Distribution

The Ste. Genevieve limestone crops out in a belt that extends in a northeasterly direction from Hobbs Island in the southern part of the county to the town of Gurley in the eastern part. North and west of this outcrop area the formation crops out in the lower slopes of outlying hills. For ease in mapping the Ste. Genevieve and Gasper were grouped and shown by the same symbol on plate 1. Good exposures are present on the slopes of Monte Sano east of Huntsville and on the hills to the west and southwest of the city.

Lithology and thickness

The Ste. Genevieve is a massive-bedded light gray oolitic limestone about 180 feet thick. The oolitic beds are generally thick and light to dark gray (pl. 17-A). Weathered exposures

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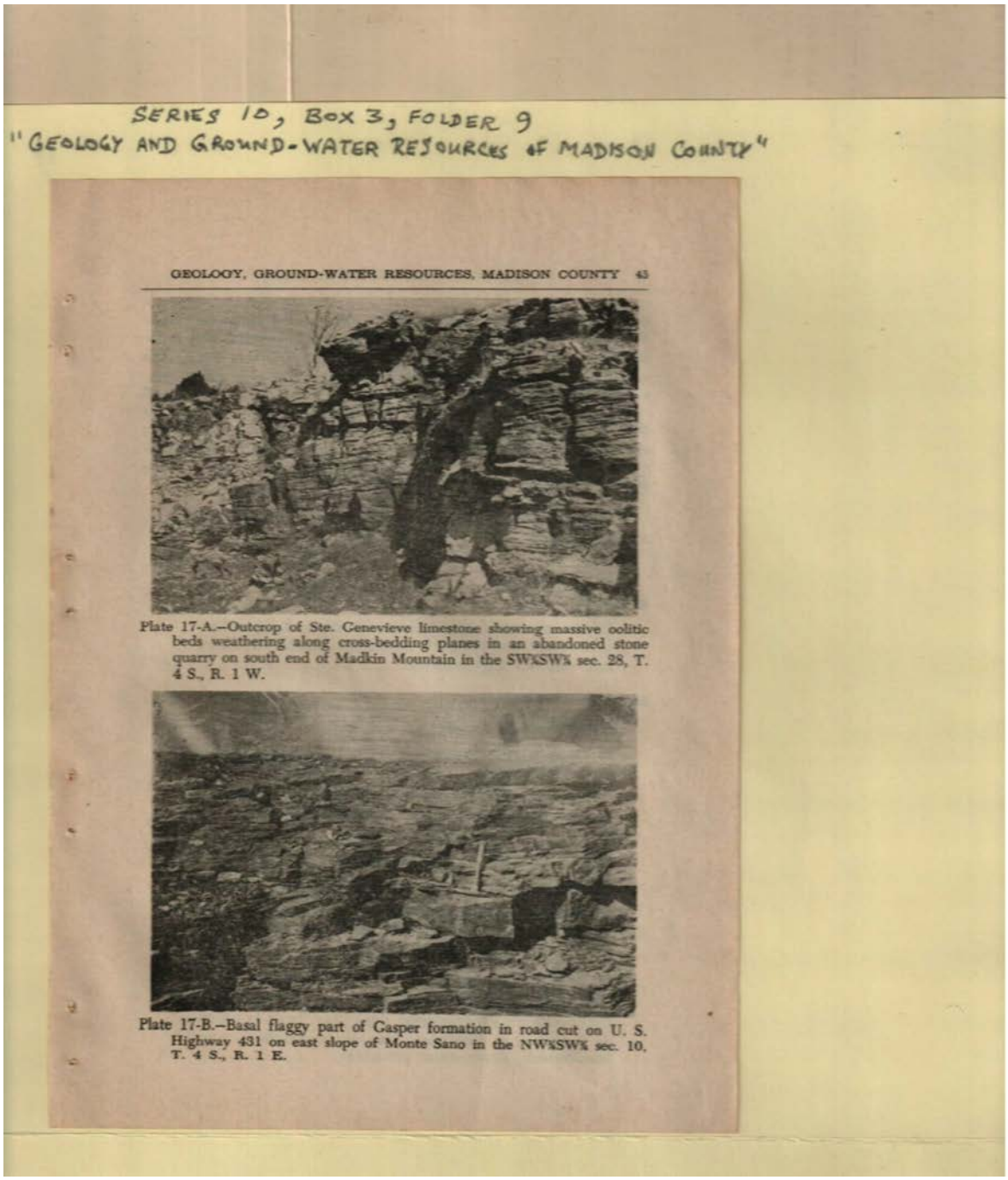

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Plate 17-A.—Outcrop of Ste. Genevieve limestone showing massive oolitic beds weathering along cross-bedding planes in an abandoned stone quarry on south end of Madkin Mountain in the SW¼SW¼ sec. 28, T. 4 S., R. 1 W.

Plate 17-B.—Basal flaggy part of Gasper formation in road cut on U. S. Highway 431 on east slope of Monte Sano in the NW¼SW¼ sec. 10, T. 4 S., R. 1 E.

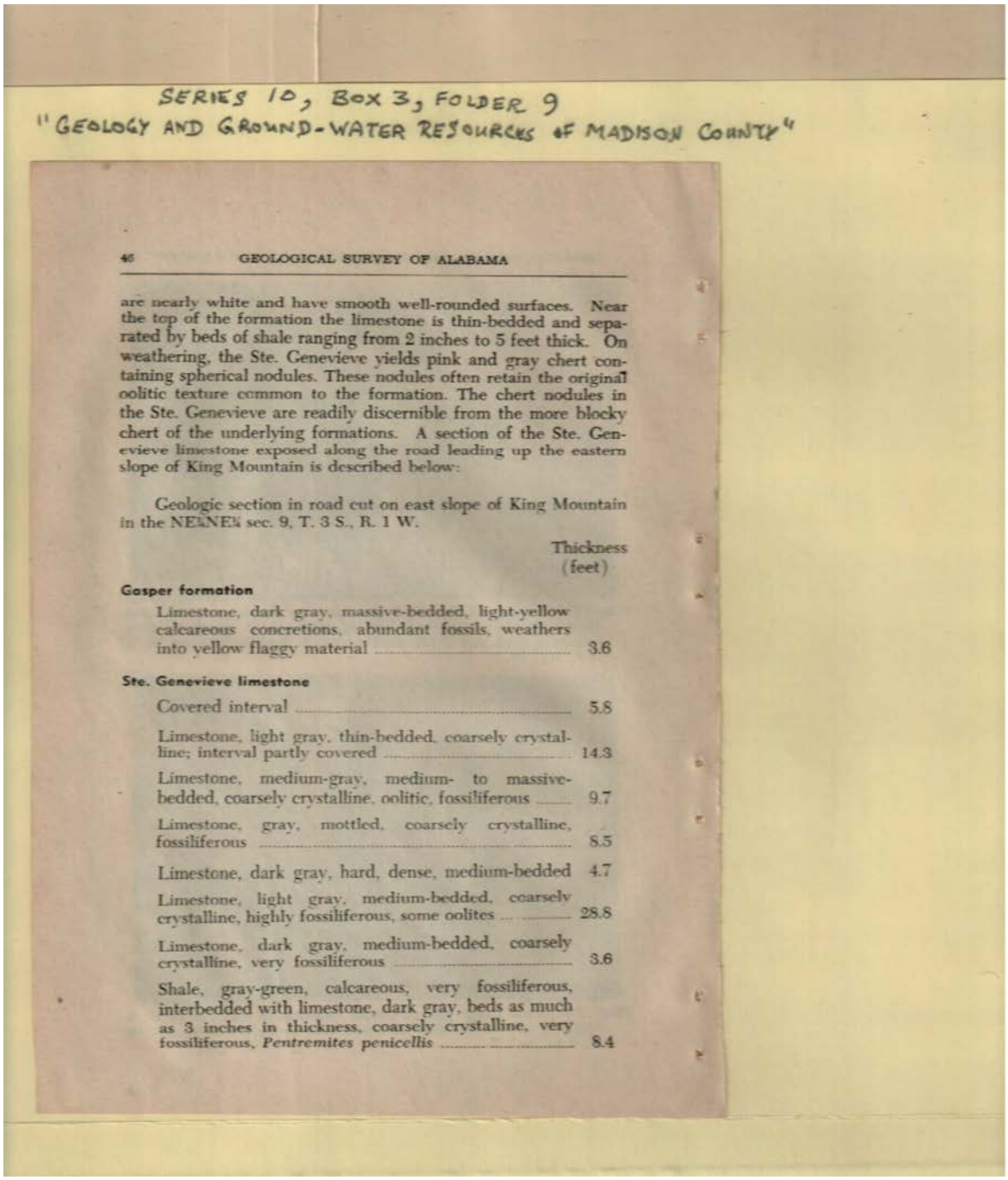
Names:

Gasper Formation

Ste. Genevieve Limestone

Types:

photograph



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are nearly white and have smooth well-rounded surfaces. Near the top of the formation the limestone is thin-bedded and separated by beds of shale ranging from 2 inches to 5 feet thick. On weathering, the Ste. Genevieve yields pink and gray chert containing spherical nodules. These nodules often retain the original oolitic texture common to the formation. The chert nodules in the Ste. Genevieve are readily discernible from the more blocky chert of the underlying formations. A section of the Ste. Genevieve limestone exposed along the road leading up the eastern slope of King Mountain is described below:

Geologic section in road cut on east slope of King Mountain in the NE¼NE¼ sec. 9, T. 3 S., R. 1 W.

	Thickness (feet)
Gasper formation	
Limestone, dark gray, massive-bedded, light-yellow calcareous concretions, abundant fossils, weathers into yellow flaggy material	3.6
Ste. Genevieve limestone	
Covered interval	5.8
Limestone, light gray, thin-bedded, coarsely crystalline; interval partly covered	14.3
Limestone, medium-gray, medium- to massive-bedded, coarsely crystalline, oolitic, fossiliferous	9.7
Limestone, gray, mottled, coarsely crystalline, fossiliferous	8.5
Limestone, dark gray, hard, dense, medium-bedded	4.7
Limestone, light gray, medium-bedded, coarsely crystalline, highly fossiliferous, some oolites	28.8
Limestone, dark gray, medium-bedded, coarsely crystalline, very fossiliferous	3.6
Shale, gray-green, calcareous, very fossiliferous, interbedded with limestone, dark gray, beds as much as 3 inches in thickness, coarsely crystalline, very fossiliferous, *Pentremites penicellis*	8.4

Types:
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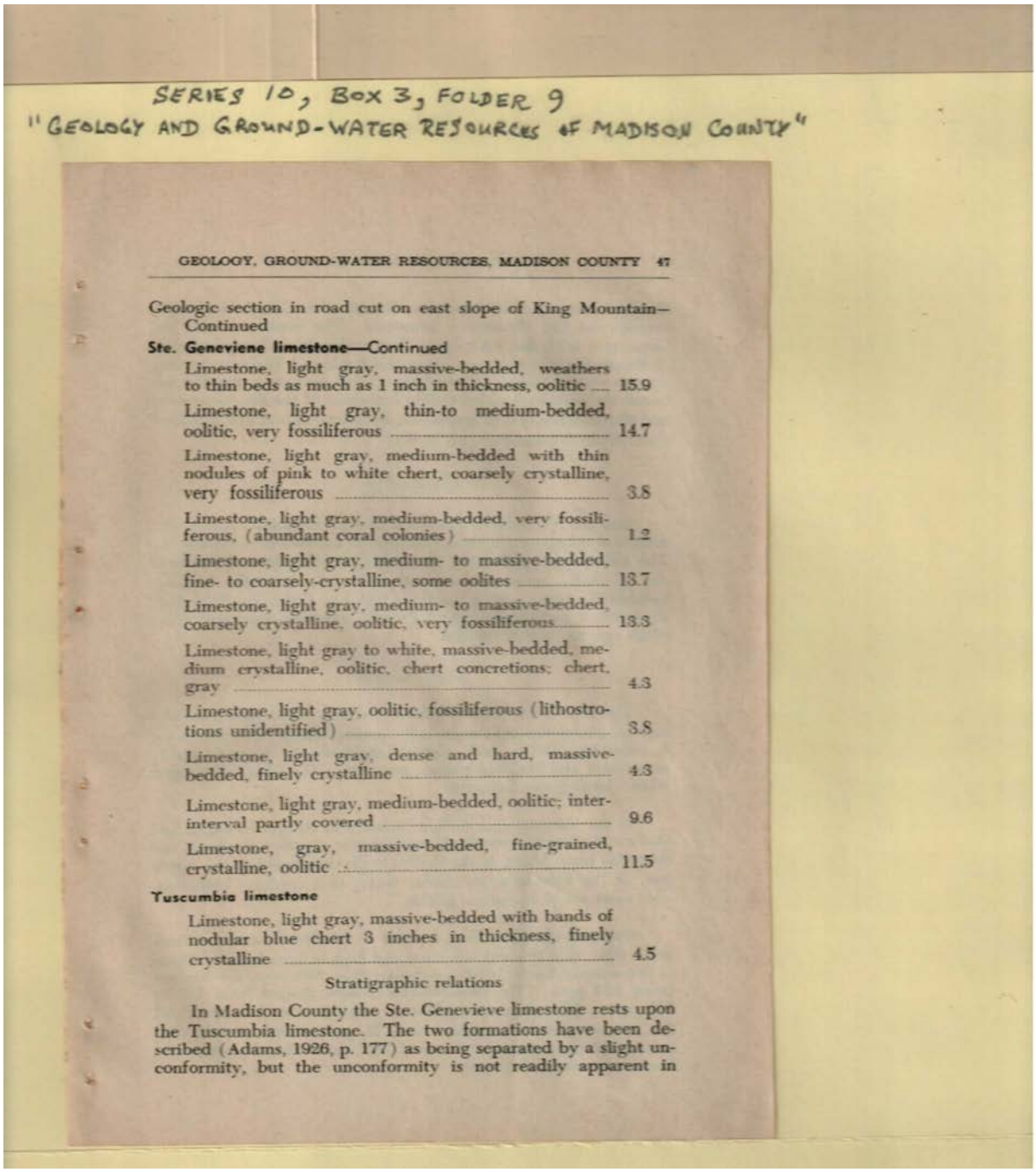

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Geologic section in road cut on east slope of King Mountain—Continued

Ste. Genevieve limestone—Continued

Limestone, light gray, massive-bedded, weathers to thin beds as much as 1 inch in thickness, oolitic	15.9
Limestone, light gray, thin-to medium-bedded, oolitic, very fossiliferous	14.7
Limestone, light gray, medium-bedded with thin nodules of pink to white chert, coarsely crystalline, very fossiliferous	3.8
Limestone, light gray, medium-bedded, very fossiliferous, (abundant coral colonies)	1.2
Limestone, light gray, medium- to massive-bedded, fine- to coarsely-crystalline, some oolites	13.7
Limestone, light gray, medium- to massive-bedded, coarsely crystalline, oolitic, very fossiliferous	13.3
Limestone, light gray to white, massive-bedded, medium crystalline, oolitic, chert concretions; chert, gray	4.3
Limestone, light gray, oolitic, fossiliferous (lithostrotions unidentified)	3.8
Limestone, light gray, dense and hard, massive-bedded, finely crystalline	4.3
Limestone, light gray, medium-bedded, oolitic; interval partly covered	9.6
Limestone, gray, massive-bedded, fine-grained, crystalline, oolitic	11.5

Tuscumbia limestone

Limestone, light gray, massive-bedded with bands of nodular blue chert 3 inches in thickness, finely crystalline	4.5

Stratigraphic relations

In Madison County the Ste. Genevieve limestone rests upon the Tuscumbia limestone. The two formations have been described (Adams, 1926, p. 177) as being separated by a slight unconformity, but the unconformity is not readily apparent in

Types:
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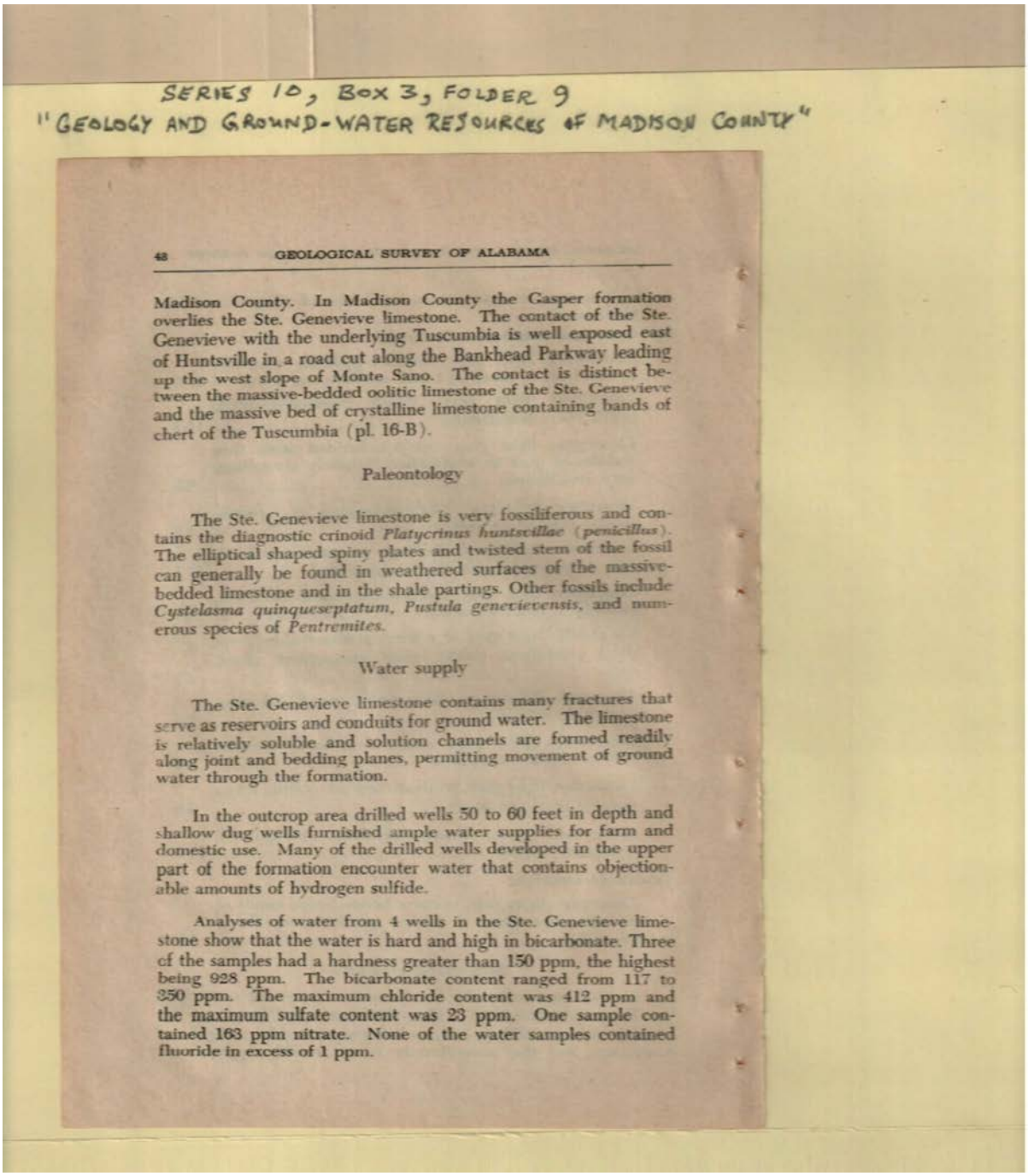

Madison County. In Madison County the Gasper formation overlies the Ste. Genevieve limestone. The contact of the Ste. Genevieve with the underlying Tuscumbia is well exposed east of Huntsville in a road cut along the Bankhead Parkway leading up the west slope of Monte Sano. The contact is distinct between the massive-bedded oolitic limestone of the Ste. Genevieve and the massive bed of crystalline limestone containing bands of chert of the Tuscumbia (pl. 16-B).

Paleontology

The Ste. Genevieve limestone is very fossiliferous and contains the diagnostic crinoid *Platycrinus huntsvillae* (*penicillus*). The elliptical shaped spiny plates and twisted stem of the fossil can generally be found in weathered surfaces of the massive-bedded limestone and in the shale partings. Other fossils include *Cystelasma quinqueseptatum*, *Pustula genevievensis*, and numerous species of *Pentremites*.

Water supply

The Ste. Genevieve limestone contains many fractures that serve as reservoirs and conduits for ground water. The limestone is relatively soluble and solution channels are formed readily along joint and bedding planes, permitting movement of ground water through the formation.

In the outcrop area drilled wells 50 to 60 feet in depth and shallow dug wells furnished ample water supplies for farm and domestic use. Many of the drilled wells developed in the upper part of the formation encounter water that contains objectionable amounts of hydrogen sulfide.

Analyses of water from 4 wells in the Ste. Genevieve limestone show that the water is hard and high in bicarbonate. Three of the samples had a hardness greater than 150 ppm, the highest being 928 ppm. The bicarbonate content ranged from 117 to 350 ppm. The maximum chloride content was 412 ppm and the maximum sulfate content was 23 ppm. One sample contained 163 ppm nitrate. None of the water samples contained fluoride in excess of 1 ppm.

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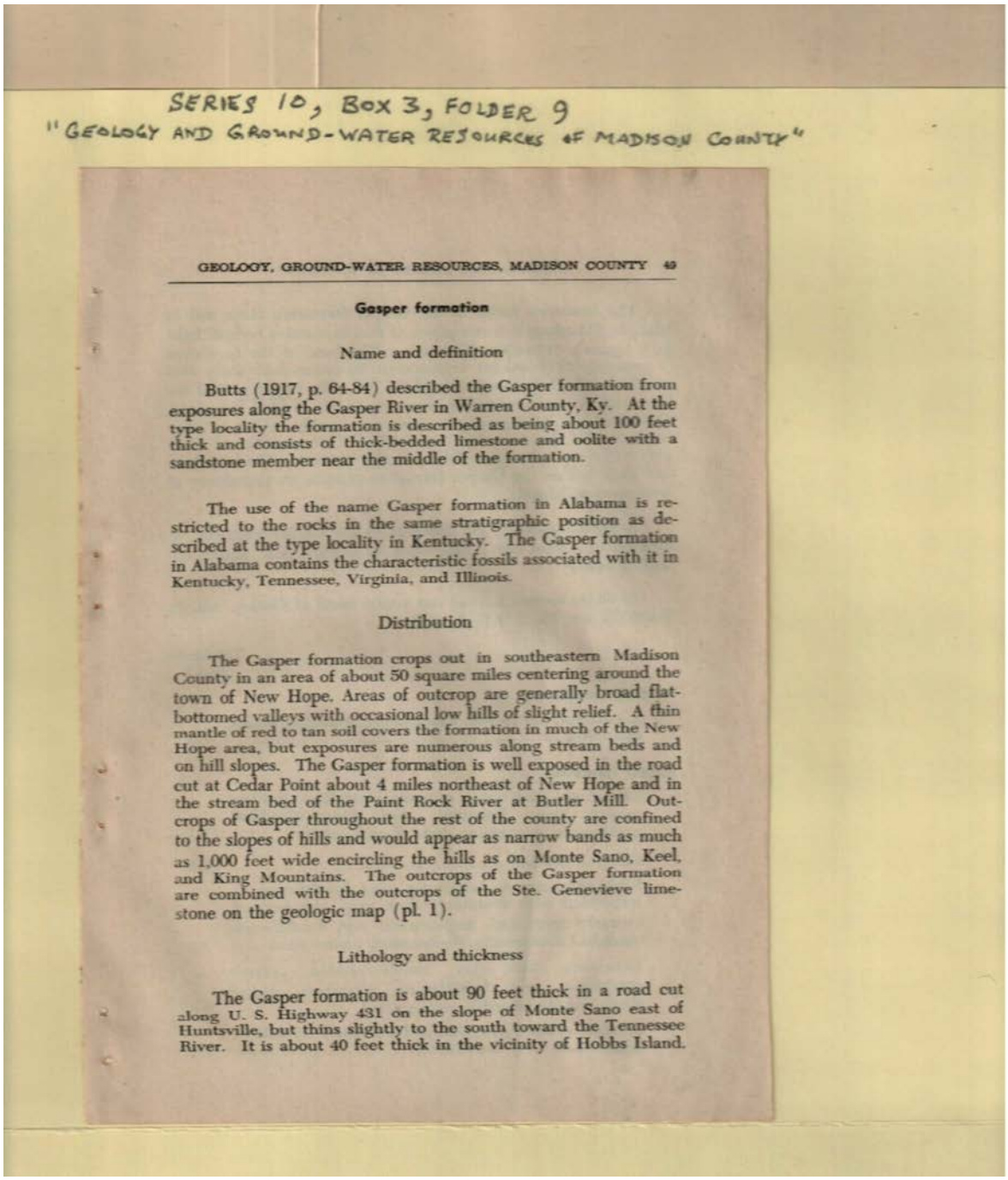
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Gasper formation

Name and definition

Butts (1917, p. 64-84) described the Gasper formation from exposures along the Gasper River in Warren County, Ky. At the type locality the formation is described as being about 100 feet thick and consists of thick-bedded limestone and oolite with a sandstone member near the middle of the formation.

The use of the name Gasper formation in Alabama is restricted to the rocks in the same stratigraphic position as described at the type locality in Kentucky. The Gasper formation in Alabama contains the characteristic fossils associated with it in Kentucky, Tennessee, Virginia, and Illinois.

Distribution

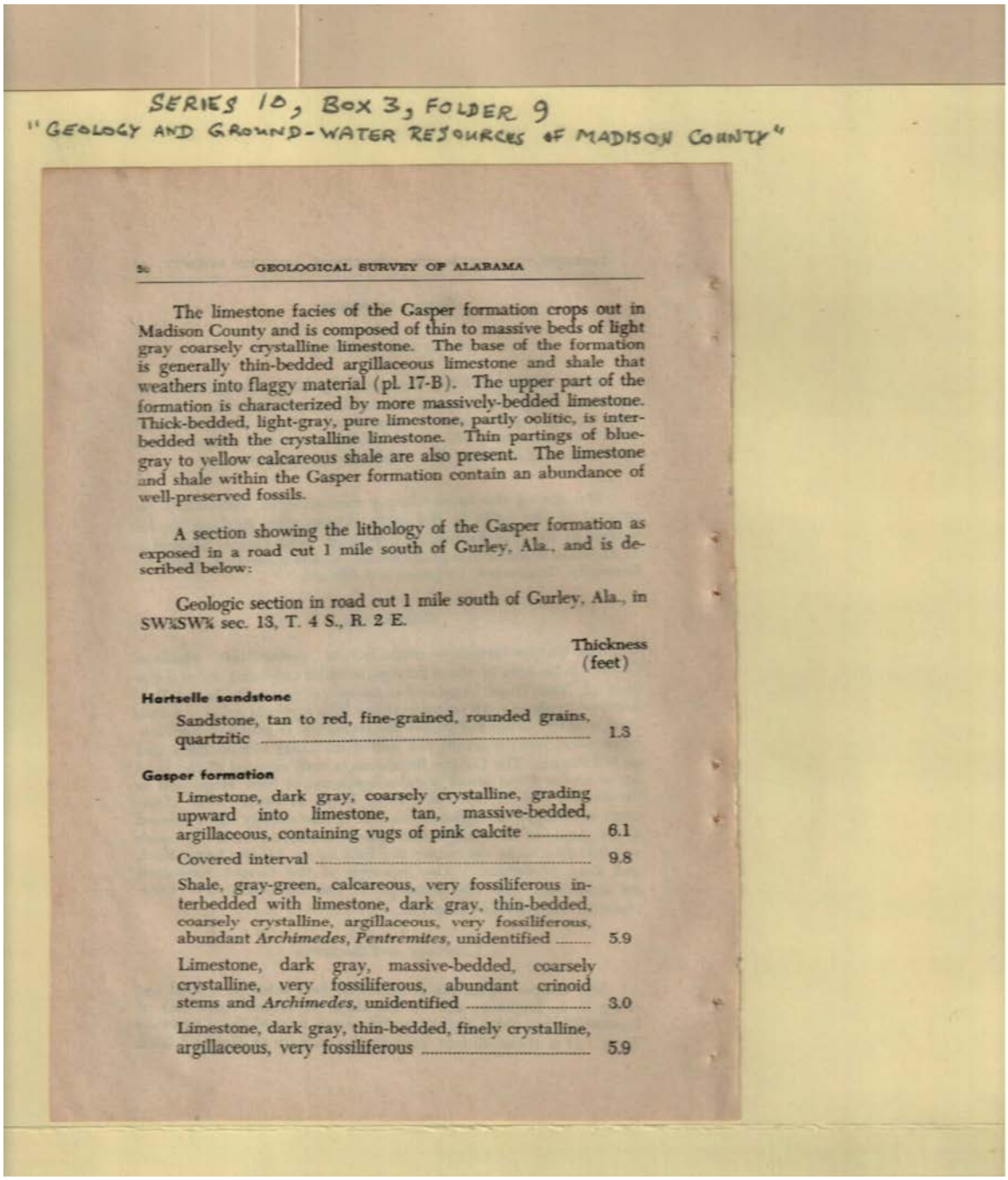
The Gasper formation crops out in southeastern Madison County in an area of about 50 square miles centering around the town of New Hope. Areas of outcrop are generally broad flat-bottomed valleys with occasional low hills of slight relief. A thin mantle of red to tan soil covers the formation in much of the New Hope area, but exposures are numerous along stream beds and on hill slopes. The Gasper formation is well exposed in the road cut at Cedar Point about 4 miles northeast of New Hope and in the stream bed of the Paint Rock River at Butler Mill. Outcrops of Gasper throughout the rest of the county are confined to the slopes of hills and would appear as narrow bands as much as 1,000 feet wide encircling the hills as on Monte Sano, Keel, and King Mountains. The outcrops of the Gasper formation are combined with the outcrops of the Ste. Genevieve limestone on the geologic map (pl. 1).

Lithology and thickness

The Gasper formation is about 90 feet thick in a road cut along U. S. Highway 431 on the slope of Monte Sano east of Huntsville, but thins slightly to the south toward the Tennessee River. It is about 40 feet thick in the vicinity of Hobbs Island.

Names:
Butts,

Types:
booklet



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The limestone facies of the Gasper formation crops out in Madison County and is composed of thin to massive beds of light gray coarsely crystalline limestone. The base of the formation is generally thin-bedded argillaceous limestone and shale that weathers into flaggy material (pl. 17-B). The upper part of the formation is characterized by more massively-bedded limestone. Thick-bedded, light-gray, pure limestone, partly oolitic, is interbedded with the crystalline limestone. Thin partings of blue-gray to yellow calcareous shale are also present. The limestone and shale within the Gasper formation contain an abundance of well-preserved fossils.

A section showing the lithology of the Gasper formation as exposed in a road cut 1 mile south of Gurley, Ala., and is described below:

Geologic section in road cut 1 mile south of Gurley, Ala., in SW¼SW¼ sec. 13, T. 4 S., R. 2 E.

	Thickness (feet)
Hartselle sandstone	
Sandstone, tan to red, fine-grained, rounded grains, quartzitic	1.3
Gasper formation	
Limestone, dark gray, coarsely crystalline, grading upward into limestone, tan, massive-bedded, argillaceous, containing vugs of pink calcite	6.1
Covered interval	9.8
Shale, gray-green, calcareous, very fossiliferous interbedded with limestone, dark gray, thin-bedded, coarsely crystalline, argillaceous, very fossiliferous, abundant *Archimedes*, *Pentremites*, unidentified	5.9
Limestone, dark gray, massive-bedded, coarsely crystalline, very fossiliferous, abundant crinoid stems and *Archimedes*, unidentified	3.0
Limestone, dark gray, thin-bedded, finely crystalline, argillaceous, very fossiliferous	5.9

Types:
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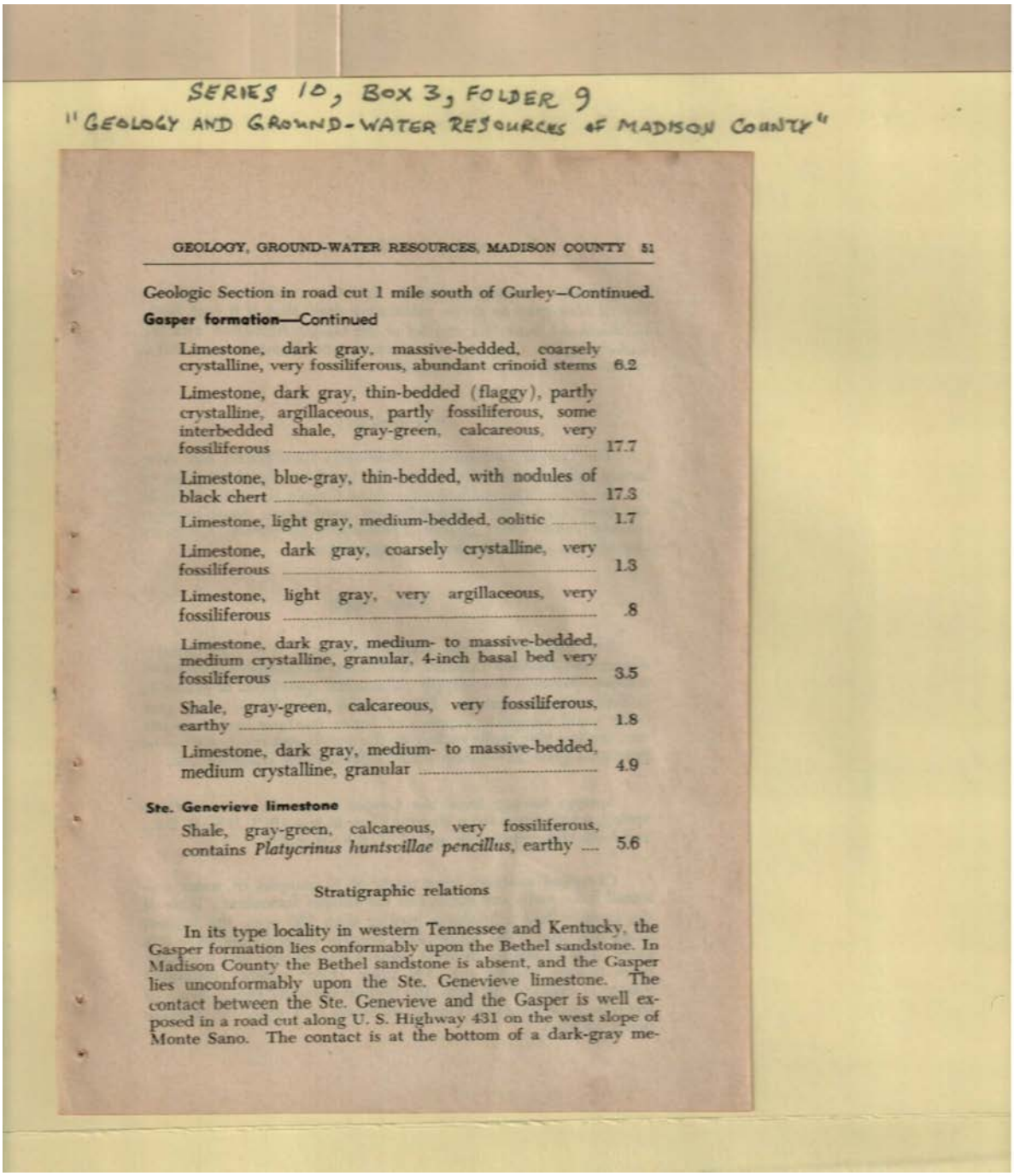

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Geologic Section in road cut 1 mile south of Gurley—Continued.

Gasper formation—Continued

Limestone, dark gray, massive-bedded, coarsely crystalline, very fossiliferous, abundant crinoid stems	6.2
Limestone, dark gray, thin-bedded (flaggy), partly crystalline, argillaceous, partly fossiliferous, some interbedded shale, gray-green, calcareous, very fossiliferous	17.7
Limestone, blue-gray, thin-bedded, with nodules of black chert	17.3
Limestone, light gray, medium-bedded, oolitic	1.7
Limestone, dark gray, coarsely crystalline, very fossiliferous	1.3
Limestone, light gray, very argillaceous, very fossiliferous	.8
Limestone, dark gray, medium- to massive-bedded, medium crystalline, granular, 4-inch basal bed very fossiliferous	3.5
Shale, gray-green, calcareous, very fossiliferous, earthy	1.8
Limestone, dark gray, medium- to massive-bedded, medium crystalline, granular	4.9

Ste. Genevieve limestone

Shale, gray-green, calcareous, very fossiliferous, contains *Platycrinus huntsvillae pencillus*, earthy	5.6

Stratigraphic relations

In its type locality in western Tennessee and Kentucky, the Gasper formation lies conformably upon the Bethel sandstone. In Madison County the Bethel sandstone is absent, and the Gasper lies unconformably upon the Ste. Genevieve limestone. The contact between the Ste. Genevieve and the Gasper is well exposed in a road cut along U. S. Highway 431 on the west slope of Monte Sano. The contact is at the bottom of a dark-gray me-

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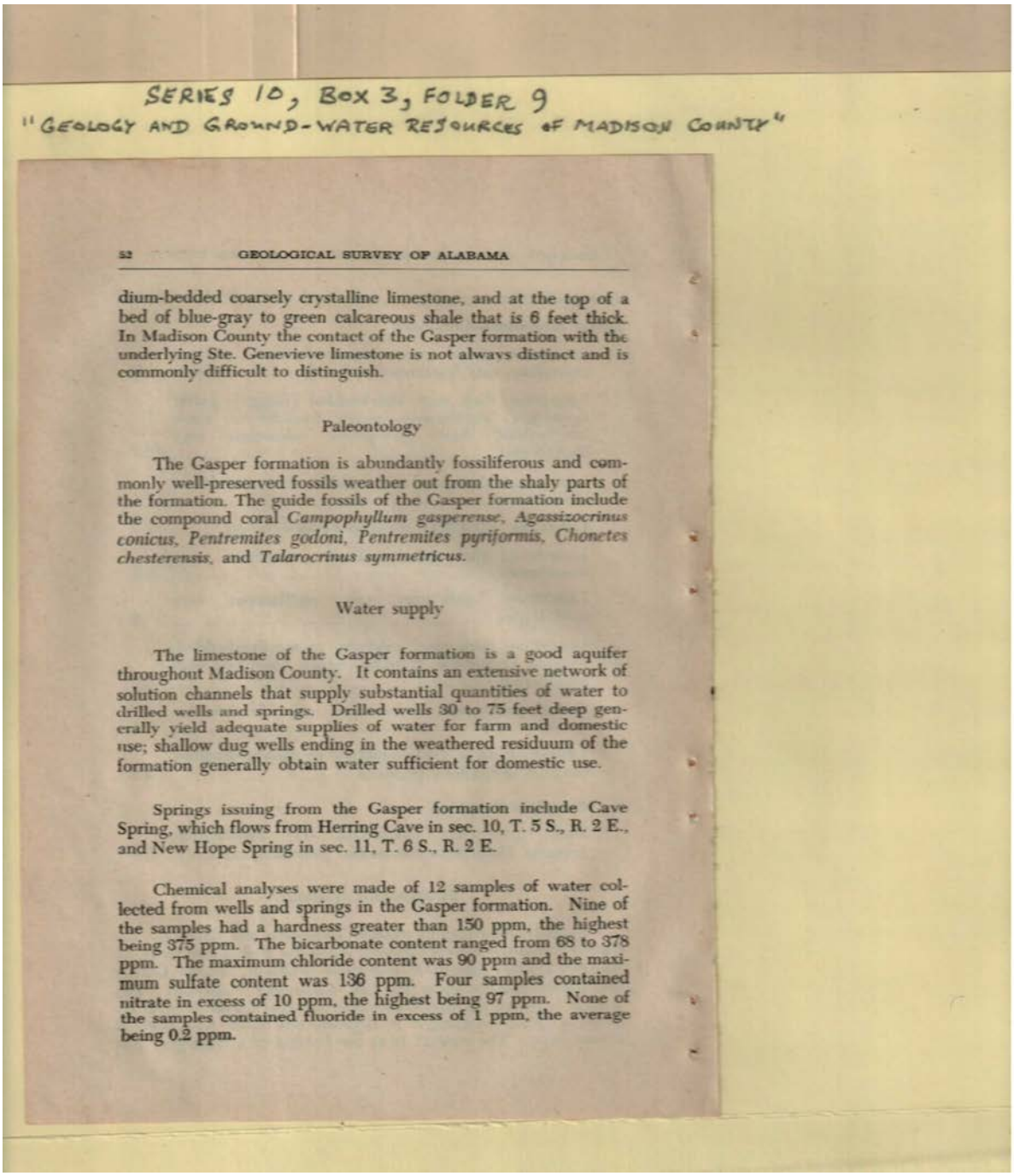

dium-bedded coarsely crystalline limestone, and at the top of a bed of blue-gray to green calcareous shale that is 6 feet thick. In Madison County the contact of the Gasper formation with the underlying Ste. Genevieve limestone is not always distinct and is commonly difficult to distinguish.

Paleontology

The Gasper formation is abundantly fossiliferous and commonly well-preserved fossils weather out from the shaly parts of the formation. The guide fossils of the Gasper formation include the compound coral *Campophyllum gasperense*, *Agassizocrinus conicus*, *Pentremites godoni*, *Pentremites pyriformis*, *Chonetes chesterensis*, and *Talarocrinus symmetricus*.

Water supply

The limestone of the Gasper formation is a good aquifer throughout Madison County. It contains an extensive network of solution channels that supply substantial quantities of water to drilled wells and springs. Drilled wells 30 to 75 feet deep generally yield adequate supplies of water for farm and domestic use; shallow dug wells ending in the weathered residuum of the formation generally obtain water sufficient for domestic use.

Springs issuing from the Gasper formation include Cave Spring, which flows from Herring Cave in sec. 10, T. 5 S., R. 2 E., and New Hope Spring in sec. 11, T. 6 S., R. 2 E.

Chemical analyses were made of 12 samples of water collected from wells and springs in the Gasper formation. Nine of the samples had a hardness greater than 150 ppm, the highest being 375 ppm. The bicarbonate content ranged from 68 to 378 ppm. The maximum chloride content was 90 ppm and the maximum sulfate content was 136 ppm. Four samples contained nitrate in excess of 10 ppm, the highest being 97 ppm. None of the samples contained fluoride in excess of 1 ppm, the average being 0.2 ppm.

Types:
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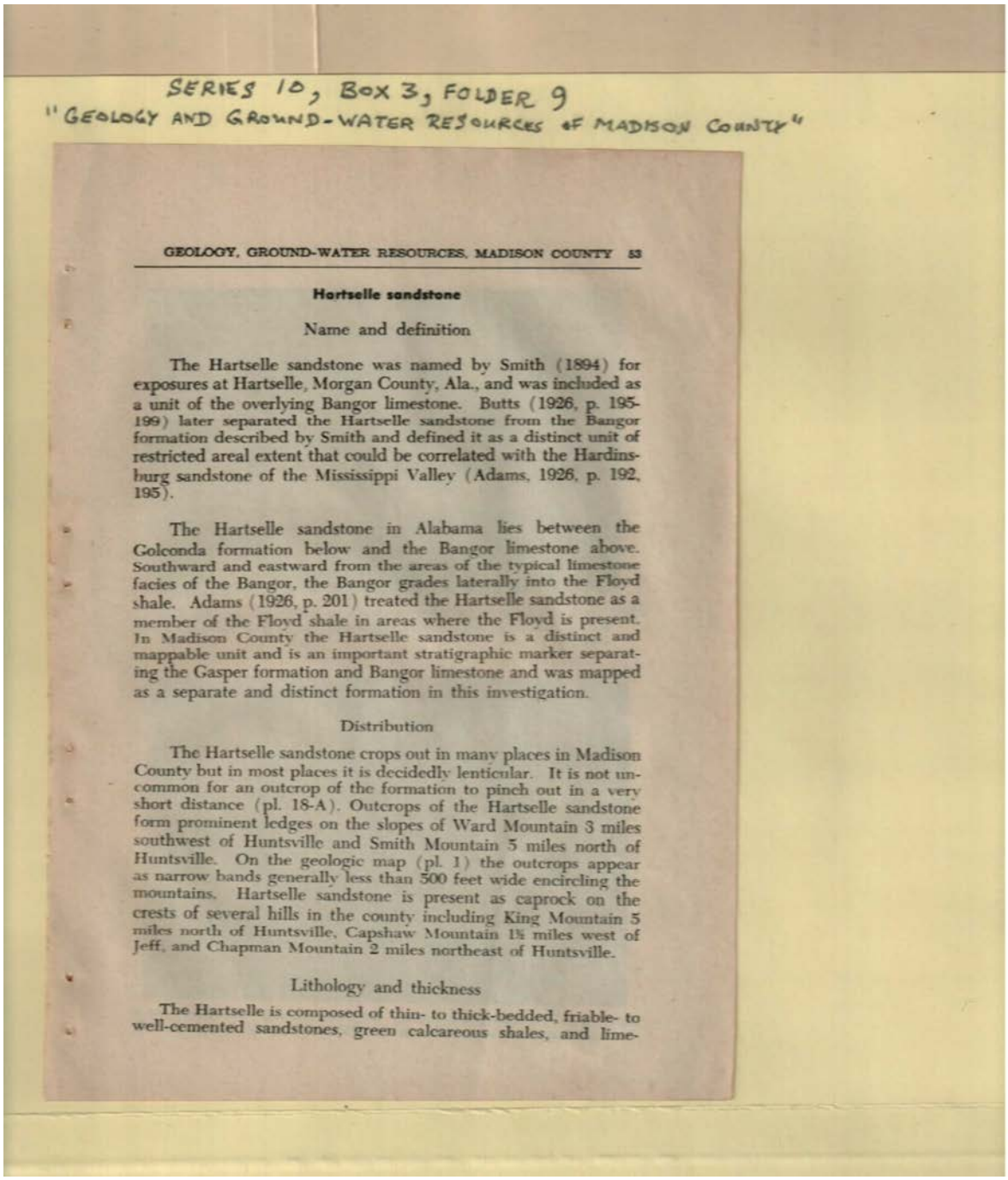

Hartselle sandstone

Name and definition

The Hartselle sandstone was named by Smith (1894) for exposures at Hartselle, Morgan County, Ala., and was included as a unit of the overlying Bangor limestone. Butts (1926, p. 195-199) later separated the Hartselle sandstone from the Bangor formation described by Smith and defined it as a distinct unit of restricted areal extent that could be correlated with the Hardinsburg sandstone of the Mississippi Valley (Adams, 1926, p. 192, 195).

The Hartselle sandstone in Alabama lies between the Golconda formation below and the Bangor limestone above. Southward and eastward from the areas of the typical limestone facies of the Bangor, the Bangor grades laterally into the Floyd shale. Adams (1926, p. 201) treated the Hartselle sandstone as a member of the Floyd shale in areas where the Floyd is present. In Madison County the Hartselle sandstone is a distinct and mappable unit and is an important stratigraphic marker separating the Gasper formation and Bangor limestone and was mapped as a separate and distinct formation in this investigation.

Distribution

The Hartselle sandstone crops out in many places in Madison County but in most places it is decidedly lenticular. It is not uncommon for an outcrop of the formation to pinch out in a very short distance (pl. 18-A). Outcrops of the Hartselle sandstone form prominent ledges on the slopes of Ward Mountain 3 miles southwest of Huntsville and Smith Mountain 5 miles north of Huntsville. On the geologic map (pl. 1) the outcrops appear as narrow bands generally less than 500 feet wide encircling the mountains. Hartselle sandstone is present as caprock on the crests of several hills in the county including King Mountain 5 miles north of Huntsville, Capshaw Mountain 1¾ miles west of Jeff, and Chapman Mountain 2 miles northeast of Huntsville.

Lithology and thickness

The Hartselle is composed of thin- to thick-bedded, friable- to well-cemented sandstones, green calcareous shales, and lime-

Names:
Adams, Butts, Smith,

Types:
booklet

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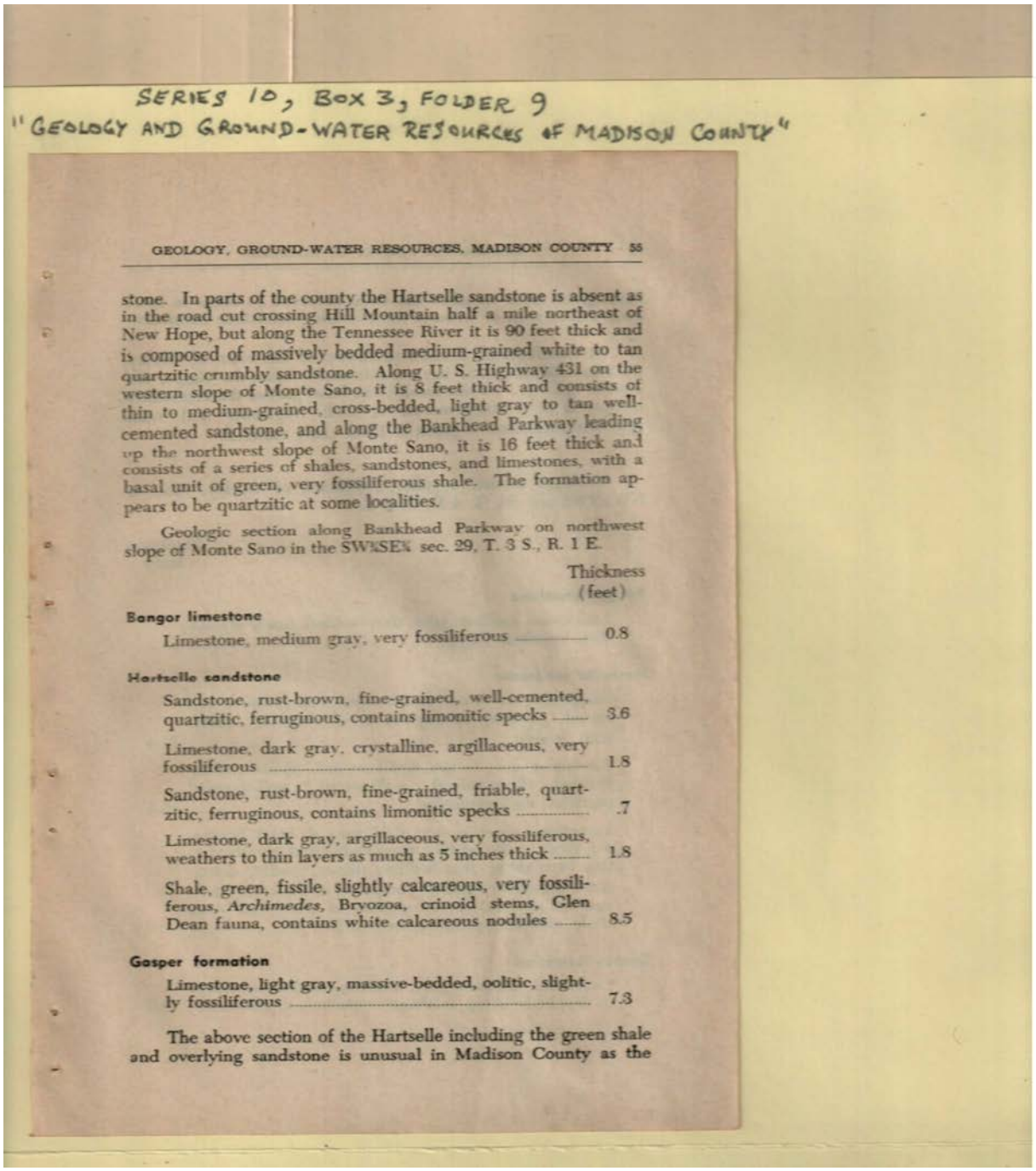
Plate 18-A.—Outcrop of Hartselle sandstone in NW¼NW¼ sec. 34, T. 4 S., R. 2 E., showing basal unconformity and pinchout of Hartselle sandstone.

Plate 18-B.—Unconformable contact between Hartselle sandstone above and Gasper limestone below in the NW¼NW¼ sec. 34, T. 4 S., R. 2 E.

Names:
Hartselle Sandstone

Types:
photograph



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stone. In parts of the county the Hartselle sandstone is absent as in the road cut crossing Hill Mountain half a mile northeast of New Hope, but along the Tennessee River it is 90 feet thick and is composed of massively bedded medium-grained white to tan quartzitic crumbly sandstone. Along U. S. Highway 431 on the western slope of Monte Sano, it is 8 feet thick and consists of thin to medium-grained, cross-bedded, light gray to tan well-cemented sandstone, and along the Bankhead Parkway leading up the northwest slope of Monte Sano, it is 16 feet thick and consists of a series of shales, sandstones, and limestones, with a basal unit of green, very fossiliferous shale. The formation appears to be quartzitic at some localities.

Geologic section along Bankhead Parkway on northwest slope of Monte Sano in the SW¼SE¼ sec. 29, T. 3 S., R. 1 E.

	Thickness (feet)
Bangor limestone	
Limestone, medium gray, very fossiliferous	0.8
Hartselle sandstone	
Sandstone, rust-brown, fine-grained, well-cemented, quartzitic, ferruginous, contains limonitic specks	3.6
Limestone, dark gray, crystalline, argillaceous, very fossiliferous	1.8
Sandstone, rust-brown, fine-grained, friable, quartzitic, ferruginous, contains limonitic specks	.7
Limestone, dark gray, argillaceous, very fossiliferous, weathers to thin layers as much as 5 inches thick	1.8
Shale, green, fissile, slightly calcareous, very fossiliferous, *Archimedes*, Bryozoa, crinoid stems, Glen Dean fauna, contains white calcareous nodules	8.5
Gasper formation	
Limestone, light gray, massive-bedded, oolitic, slightly fossiliferous	7.3

The above section of the Hartselle including the green shale and overlying sandstone is unusual in Madison County as the

Types:
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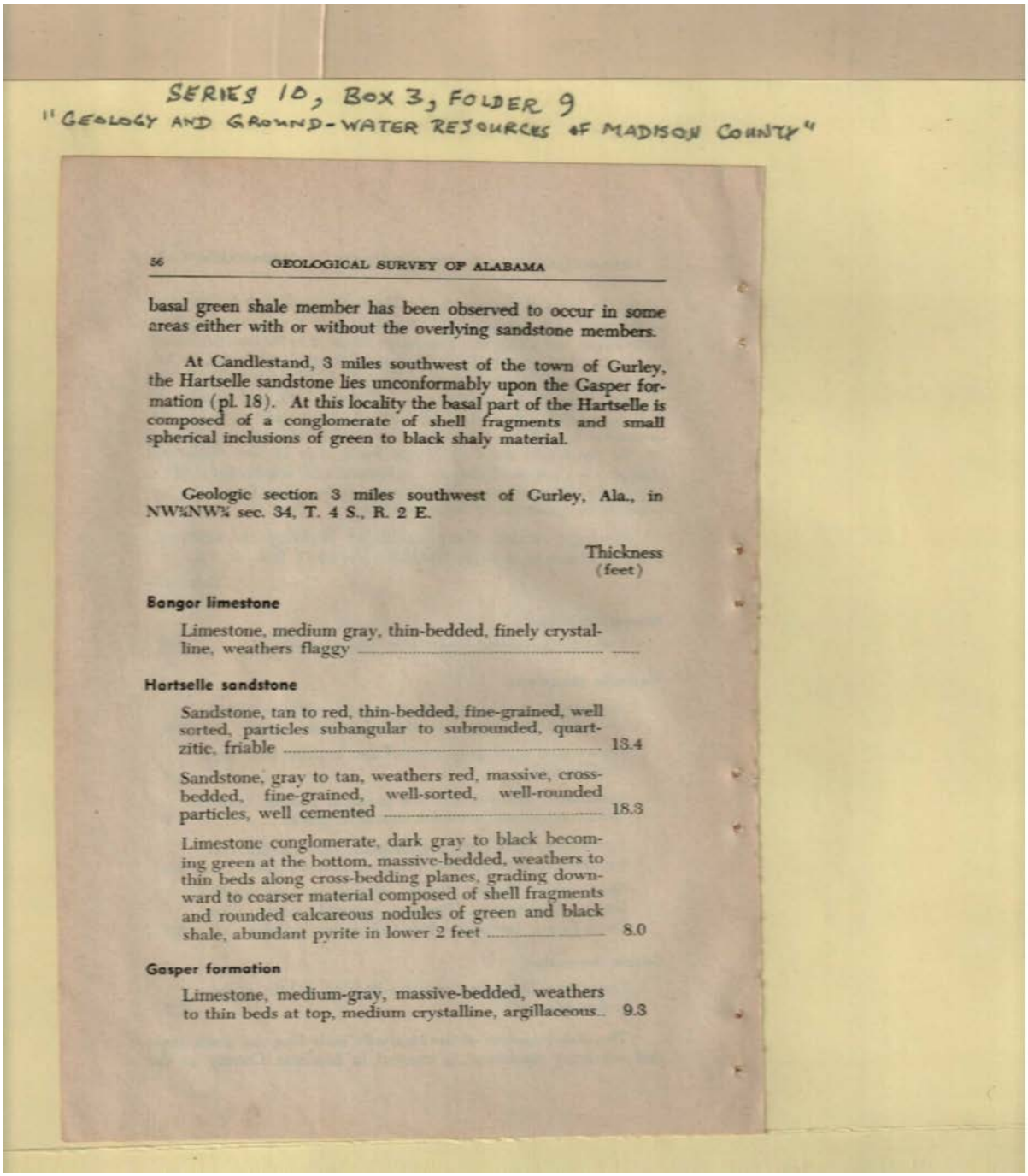

basal green shale member has been observed to occur in some areas either with or without the overlying sandstone members.

At Candlestand, 3 miles southwest of the town of Gurley, the Hartselle sandstone lies unconformably upon the Gasper formation (pl. 18). At this locality the basal part of the Hartselle is composed of a conglomerate of shell fragments and small spherical inclusions of green to black shaly material.

Geologic section 3 miles southwest of Gurley, Ala., in NW¼NW¼ sec. 34, T. 4 S., R. 2 E.

	Thickness (feet)
Bangor limestone	
Limestone, medium gray, thin-bedded, finely crystalline, weathers flaggy	.....
Hartselle sandstone	
Sandstone, tan to red, thin-bedded, fine-grained, well sorted, particles subangular to subrounded, quartzitic, friable	13.4
Sandstone, gray to tan, weathers red, massive, cross-bedded, fine-grained, well-sorted, well-rounded particles, well cemented	18.3
Limestone conglomerate, dark gray to black becoming green at the bottom, massive-bedded, weathers to thin beds along cross-bedding planes, grading downward to coarser material composed of shell fragments and rounded calcareous nodules of green and black shale, abundant pyrite in lower 2 feet	8.0
Gasper formation	
Limestone, medium-gray, massive-bedded, weathers to thin beds at top, medium crystalline, argillaceous	9.3

Types:
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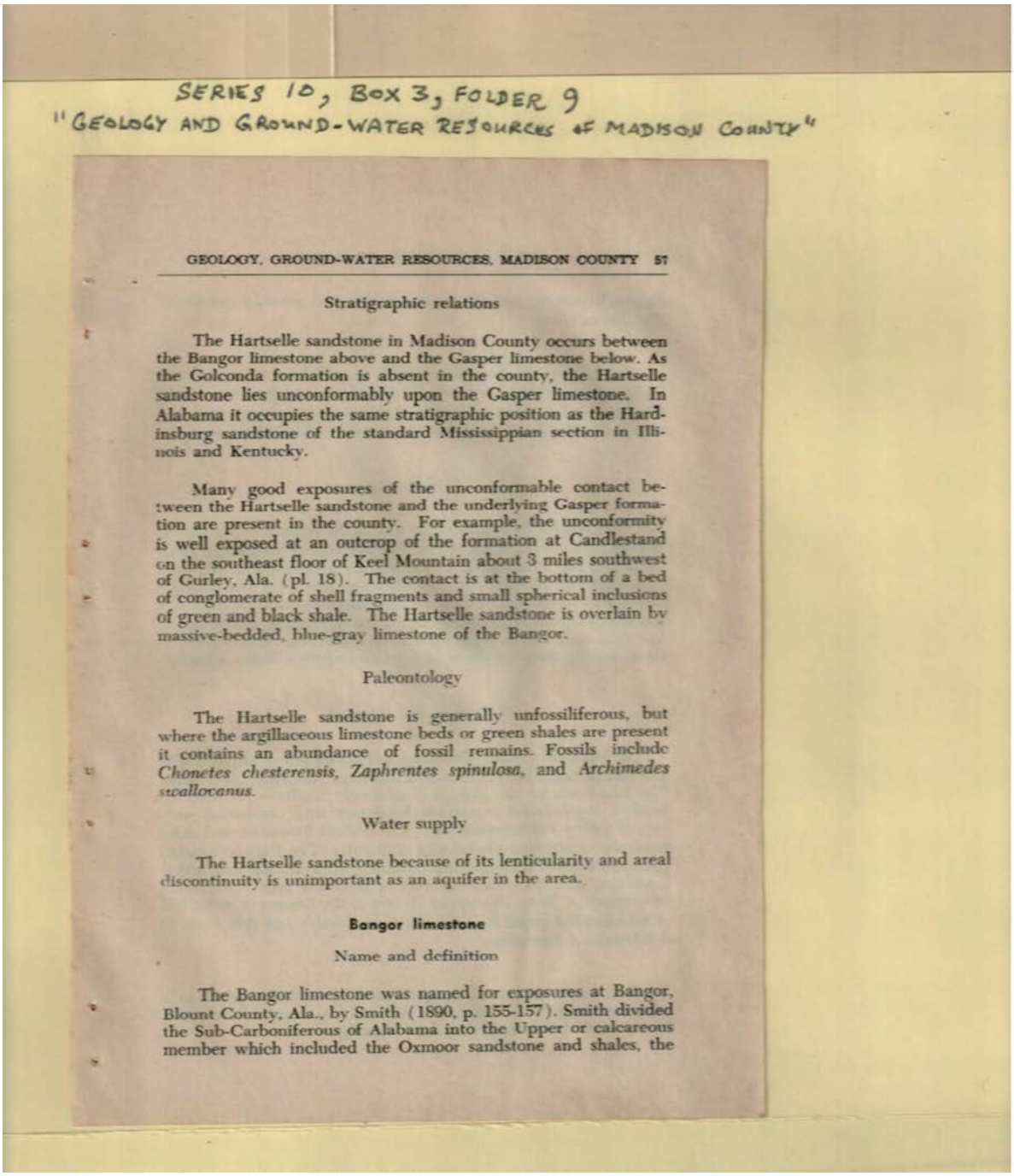


Stratigraphic relations

The Hartselle sandstone in Madison County occurs between the Bangor limestone above and the Gasper limestone below. As the Golconda formation is absent in the county, the Hartselle sandstone lies unconformably upon the Gasper limestone. In Alabama it occupies the same stratigraphic position as the Hardinsburg sandstone of the standard Mississippian section in Illinois and Kentucky.

Many good exposures of the unconformable contact between the Hartselle sandstone and the underlying Gasper formation are present in the county. For example, the unconformity is well exposed at an outcrop of the formation at Candlestand on the southeast floor of Keel Mountain about 3 miles southwest of Gurley, Ala. (pl. 18). The contact is at the bottom of a bed of conglomerate of shell fragments and small spherical inclusions of green and black shale. The Hartselle sandstone is overlain by massive-bedded, blue-gray limestone of the Bangor.

Paleontology

The Hartselle sandstone is generally unfossiliferous, but where the argillaceous limestone beds or green shales are present it contains an abundance of fossil remains. Fossils include *Chonetes chesterensis*, *Zaphrentes spinulosa*, and *Archimedes swallovanus*.

Water supply

The Hartselle sandstone because of its lenticularity and areal discontinuity is unimportant as an aquifer in the area.

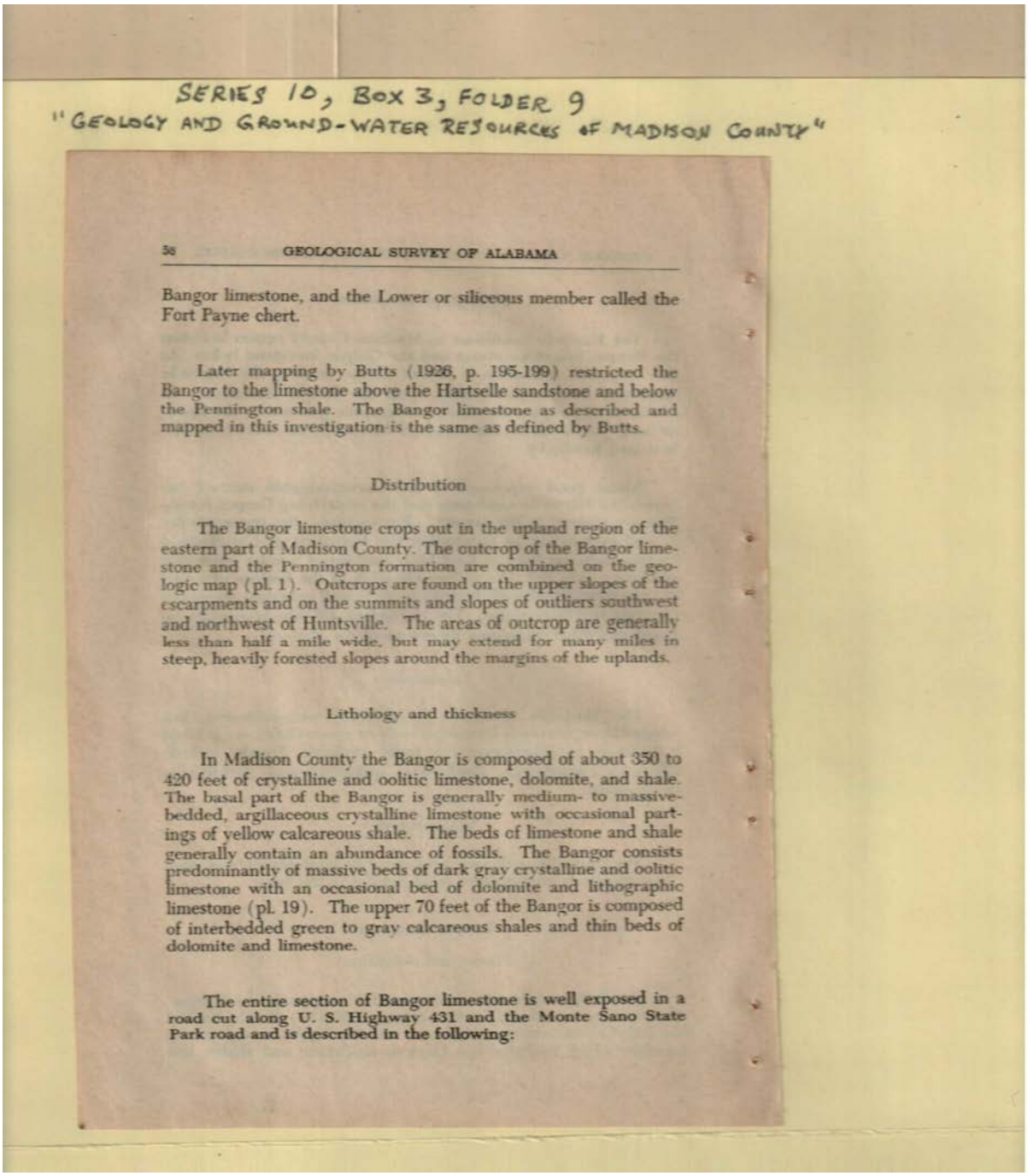
Bangor limestone

Name and definition

The Bangor limestone was named for exposures at Bangor, Blount County, Ala., by Smith (1890, p. 155-157). Smith divided the Sub-Carboniferous of Alabama into the Upper or calcareous member which included the Oxmoor sandstone and shales, the

Names:
Smith,

Types:
booklet



Bangor limestone, and the Lower or siliceous member called the Fort Payne chert.

Later mapping by Butts (1926, p. 195-199) restricted the Bangor to the limestone above the Hartselle sandstone and below the Pennington shale. The Bangor limestone as described and mapped in this investigation is the same as defined by Butts.

Distribution

The Bangor limestone crops out in the upland region of the eastern part of Madison County. The outcrop of the Bangor limestone and the Pennington formation are combined on the geologic map (pl. 1). Outcrops are found on the upper slopes of the escarpments and on the summits and slopes of outliers southwest and northwest of Huntsville. The areas of outcrop are generally less than half a mile wide, but may extend for many miles in steep, heavily forested slopes around the margins of the uplands.

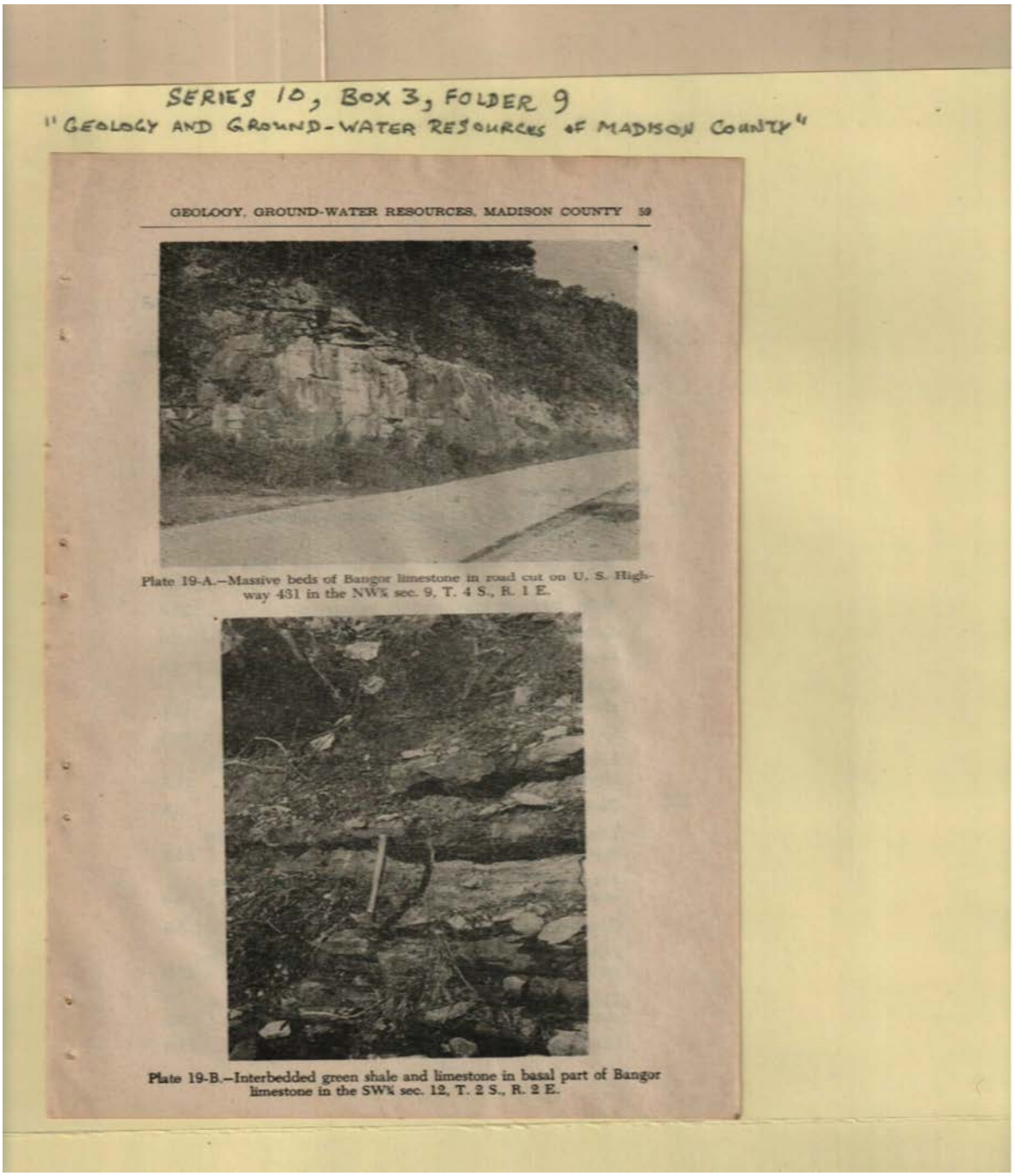
Lithology and thickness

In Madison County the Bangor is composed of about 350 to 420 feet of crystalline and oolitic limestone, dolomite, and shale. The basal part of the Bangor is generally medium- to massive-bedded, argillaceous crystalline limestone with occasional partings of yellow calcareous shale. The beds of limestone and shale generally contain an abundance of fossils. The Bangor consists predominantly of massive beds of dark gray crystalline and oolitic limestone with an occasional bed of dolomite and lithographic limestone (pl. 19). The upper 70 feet of the Bangor is composed of interbedded green to gray calcareous shales and thin beds of dolomite and limestone.

The entire section of Bangor limestone is well exposed in a road cut along U. S. Highway 431 and the Monte Sano State Park road and is described in the following:

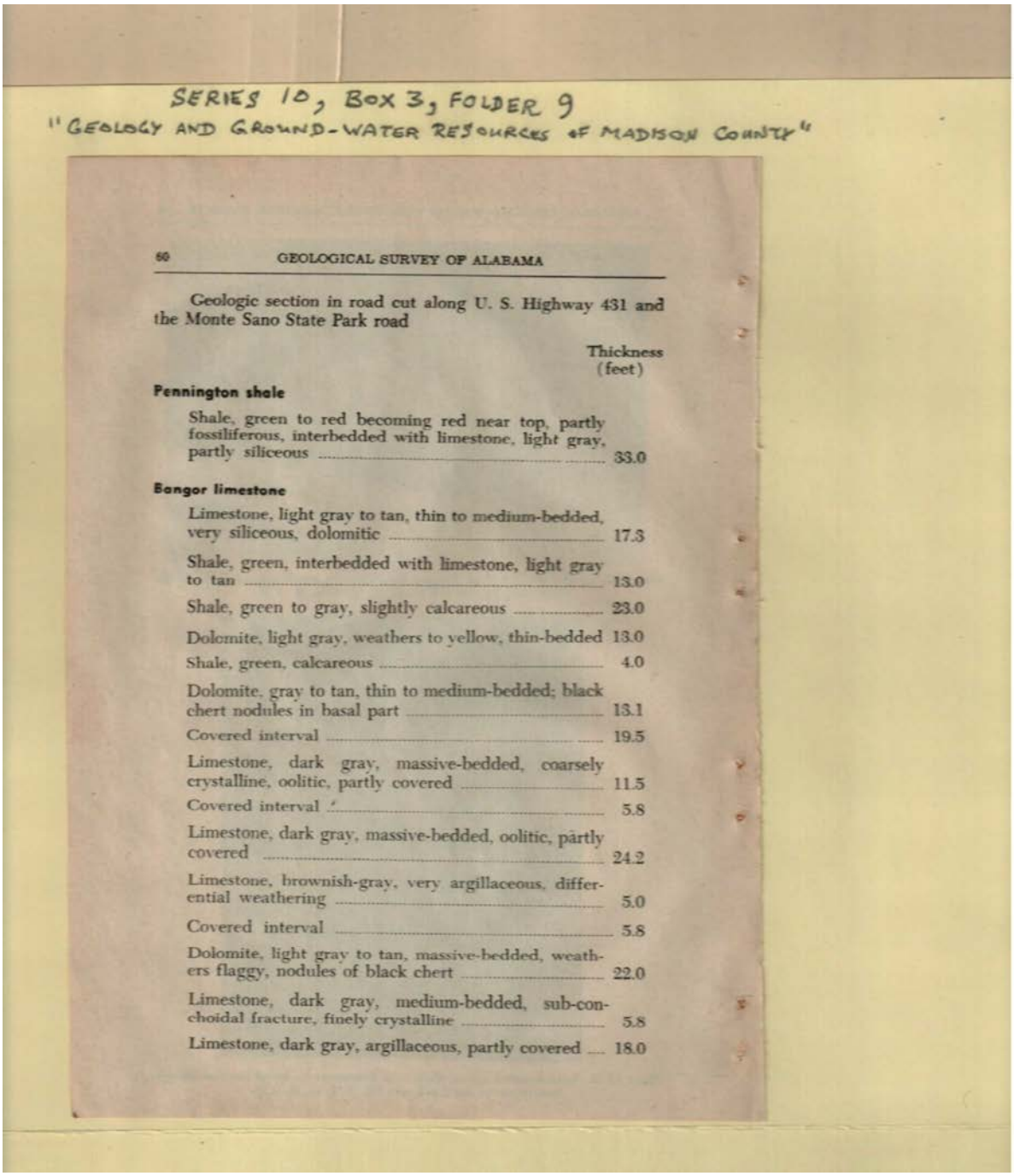
Names:
Butts,

Types:
booklet



Names:
Bangor Limestone

Types:
photograph



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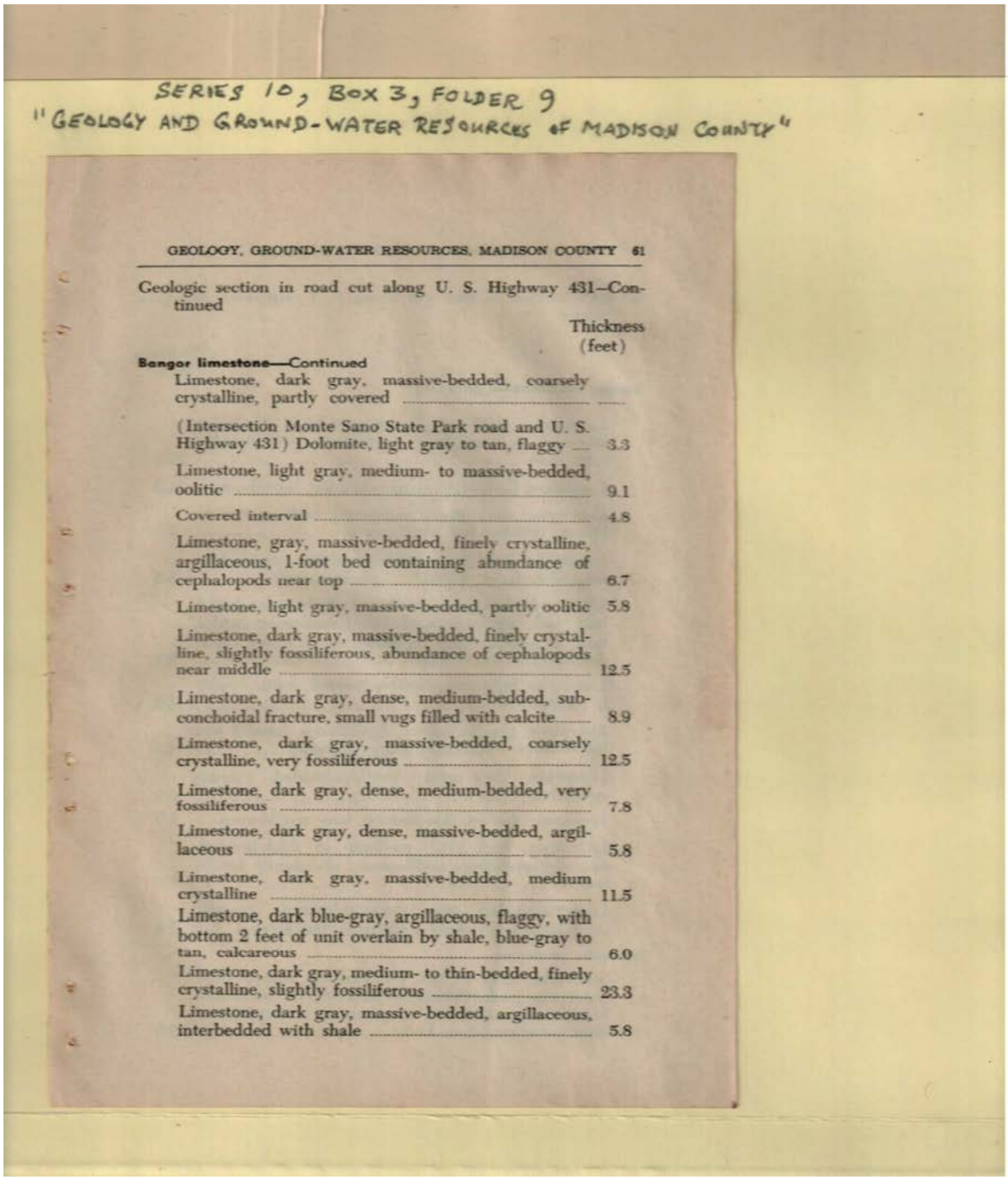
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Geologic section in road cut along U. S. Highway 431 and the Monte Sano State Park road

	Thickness (feet)
Pennington shale	
Shale, green to red becoming red near top, partly fossiliferous, interbedded with limestone, light gray, partly siliceous	33.0
Bangor limestone	
Limestone, light gray to tan, thin to medium-bedded, very siliceous, dolomitic	17.3
Shale, green, interbedded with limestone, light gray to tan	13.0
Shale, green to gray, slightly calcareous	23.0
Dolomite, light gray, weathers to yellow, thin-bedded	13.0
Shale, green, calcareous	4.0
Dolomite, gray to tan, thin to medium-bedded; black chert nodules in basal part	13.1
Covered interval	19.5
Limestone, dark gray, massive-bedded, coarsely crystalline, oolitic, partly covered	11.5
Covered interval	5.8
Limestone, dark gray, massive-bedded, oolitic, partly covered	24.2
Limestone, brownish-gray, very argillaceous, differential weathering	5.0
Covered interval	5.8
Dolomite, light gray to tan, massive-bedded, weathers flaggy, nodules of black chert	22.0
Limestone, dark gray, medium-bedded, sub-conchoidal fracture, finely crystalline	5.8
Limestone, dark gray, argillaceous, partly covered	18.0

Types:
booklet

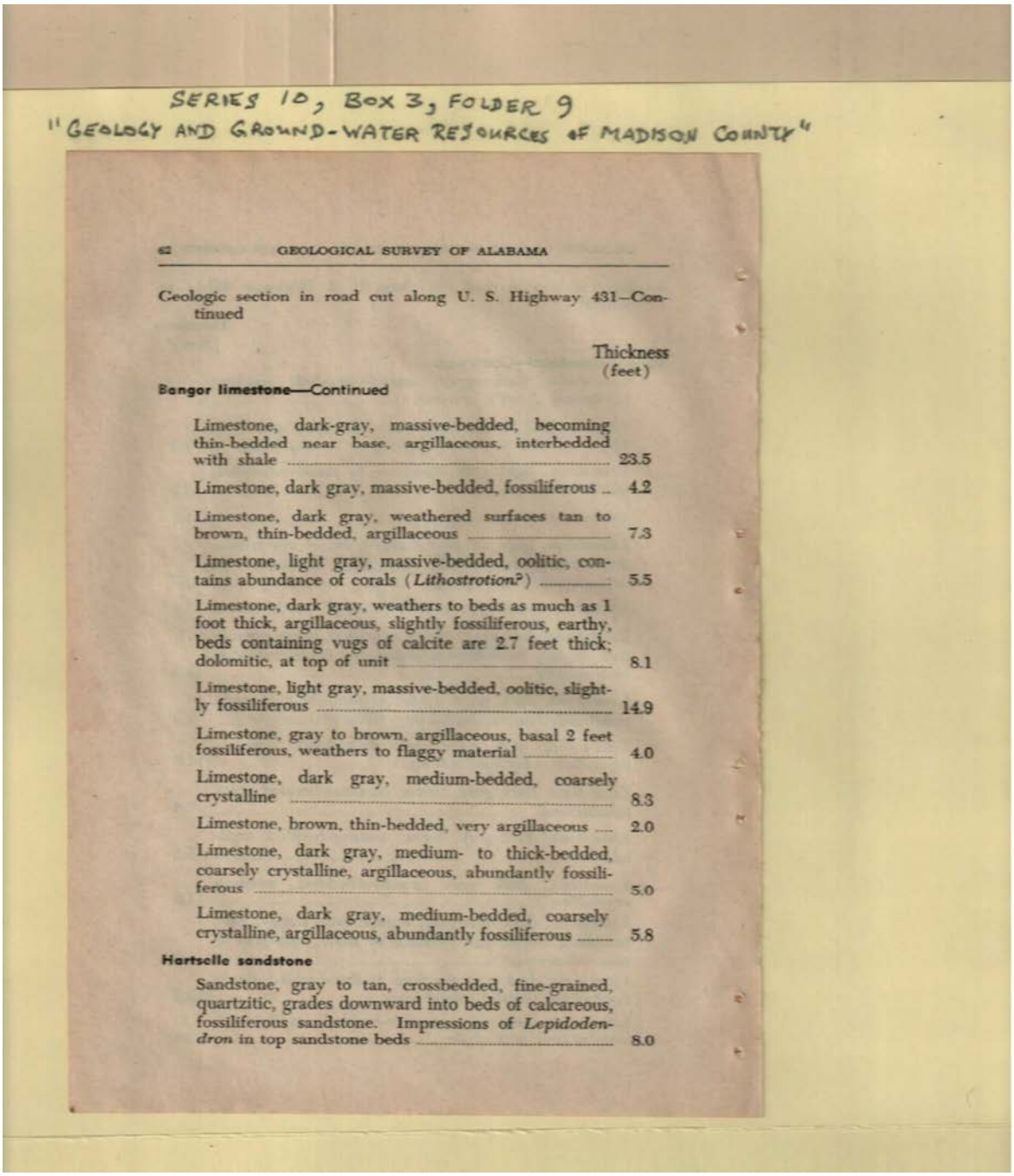


SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Geologic section in road cut along U. S. Highway 431—Continued

	Thickness (feet)
Bangor limestone—Continued	
Limestone, dark gray, massive-bedded, coarsely crystalline, partly covered	.....
(Intersection Monte Sano State Park road and U. S. Highway 431) Dolomite, light gray to tan, flaggy	3.3
Limestone, light gray, medium- to massive-bedded, oolitic	9.1
Covered interval	4.8
Limestone, gray, massive-bedded, finely crystalline, argillaceous, 1-foot bed containing abundance of cephalopods near top	6.7
Limestone, light gray, massive-bedded, partly oolitic	5.8
Limestone, dark gray, massive-bedded, finely crystalline, slightly fossiliferous, abundance of cephalopods near middle	12.5
Limestone, dark gray, dense, medium-bedded, subconchoidal fracture, small vugs filled with calcite	8.9
Limestone, dark gray, massive-bedded, coarsely crystalline, very fossiliferous	12.5
Limestone, dark gray, dense, medium-bedded, very fossiliferous	7.8
Limestone, dark gray, dense, massive-bedded, argillaceous	5.8
Limestone, dark gray, massive-bedded, medium crystalline	11.5
Limestone, dark blue-gray, argillaceous, flaggy, with bottom 2 feet of unit overlain by shale, blue-gray to tan, calcareous	6.0
Limestone, dark gray, medium- to thin-bedded, finely crystalline, slightly fossiliferous	23.3
Limestone, dark gray, massive-bedded, argillaceous, interbedded with shale	5.8

Types:
booklet

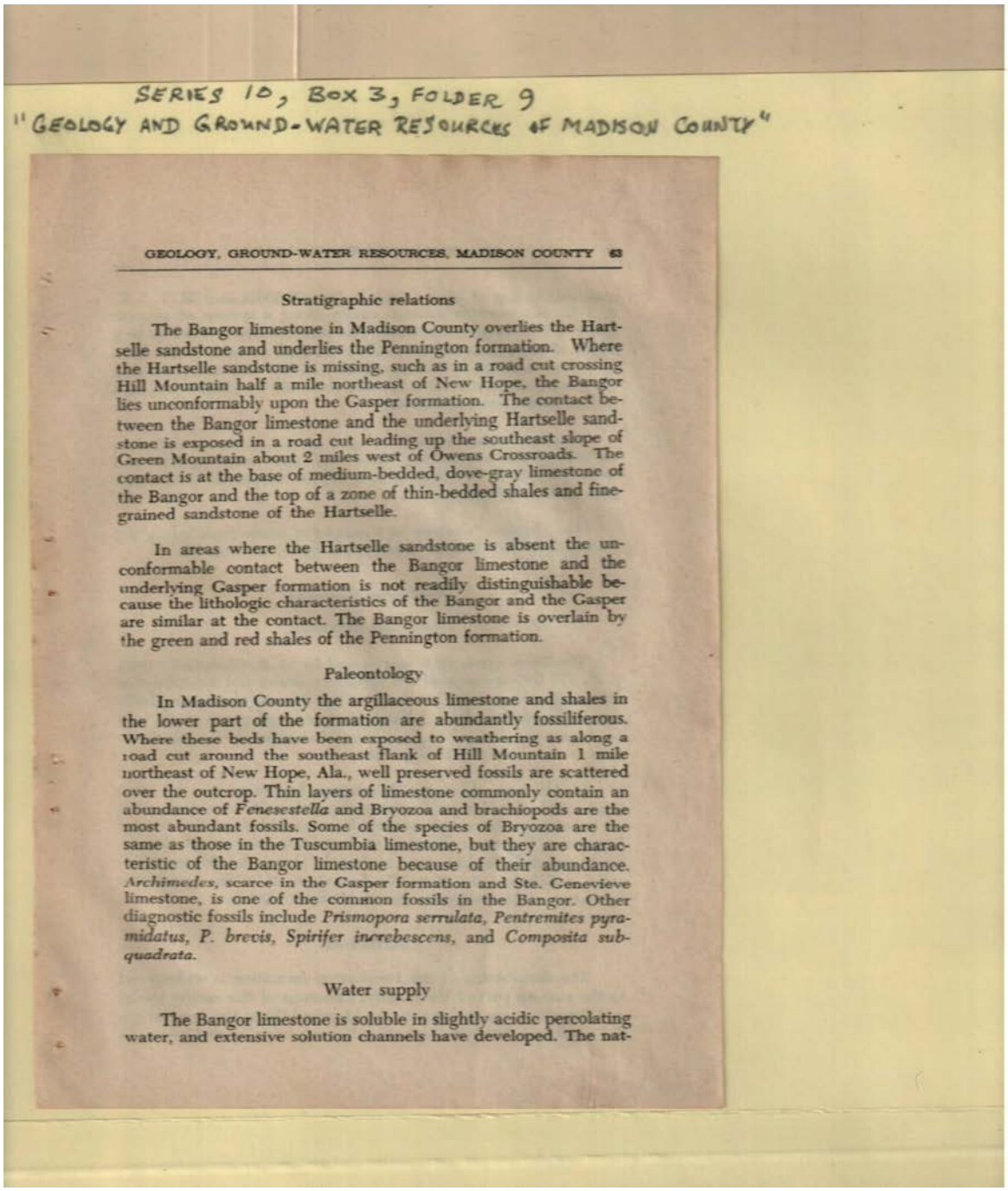


SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Geologic section in road cut along U. S. Highway 431—Continued

	Thickness (feet)
Bangor limestone—Continued	
Limestone, dark-gray, massive-bedded, becoming thin-bedded near base, argillaceous, interbedded with shale	23.5
Limestone, dark gray, massive-bedded, fossiliferous	4.2
Limestone, dark gray, weathered surfaces tan to brown, thin-bedded, argillaceous	7.3
Limestone, light gray, massive-bedded, oolitic, contains abundance of corals (*Lithostrotion*?)	5.5
Limestone, dark gray, weathers to beds as much as 1 foot thick, argillaceous, slightly fossiliferous, earthy, beds containing vugs of calcite are 2.7 feet thick; dolomitic, at top of unit	8.1
Limestone, light gray, massive-bedded, oolitic, slightly fossiliferous	14.9
Limestone, gray to brown, argillaceous, basal 2 feet fossiliferous, weathers to flaggy material	4.0
Limestone, dark gray, medium-bedded, coarsely crystalline	8.3
Limestone, brown, thin-bedded, very argillaceous	2.0
Limestone, dark gray, medium- to thick-bedded, coarsely crystalline, argillaceous, abundantly fossiliferous	5.0
Limestone, dark gray, medium-bedded, coarsely crystalline, argillaceous, abundantly fossiliferous	5.8
Hartselle sandstone	
Sandstone, gray to tan, crossbedded, fine-grained, quartzitic, grades downward into beds of calcareous, fossiliferous sandstone. Impressions of *Lepidodendron* in top sandstone beds	8.0

Types:
booklet



Stratigraphic relations

The Bangor limestone in Madison County overlies the Hartselle sandstone and underlies the Pennington formation. Where the Hartselle sandstone is missing, such as in a road cut crossing Hill Mountain half a mile northeast of New Hope, the Bangor lies unconformably upon the Gasper formation. The contact between the Bangor limestone and the underlying Hartselle sandstone is exposed in a road cut leading up the southeast slope of Green Mountain about 2 miles west of Owens Crossroads. The contact is at the base of medium-bedded, dove-gray limestone of the Bangor and the top of a zone of thin-bedded shales and fine-grained sandstone of the Hartselle.

In areas where the Hartselle sandstone is absent the unconformable contact between the Bangor limestone and the underlying Gasper formation is not readily distinguishable because the lithologic characteristics of the Bangor and the Gasper are similar at the contact. The Bangor limestone is overlain by the green and red shales of the Pennington formation.

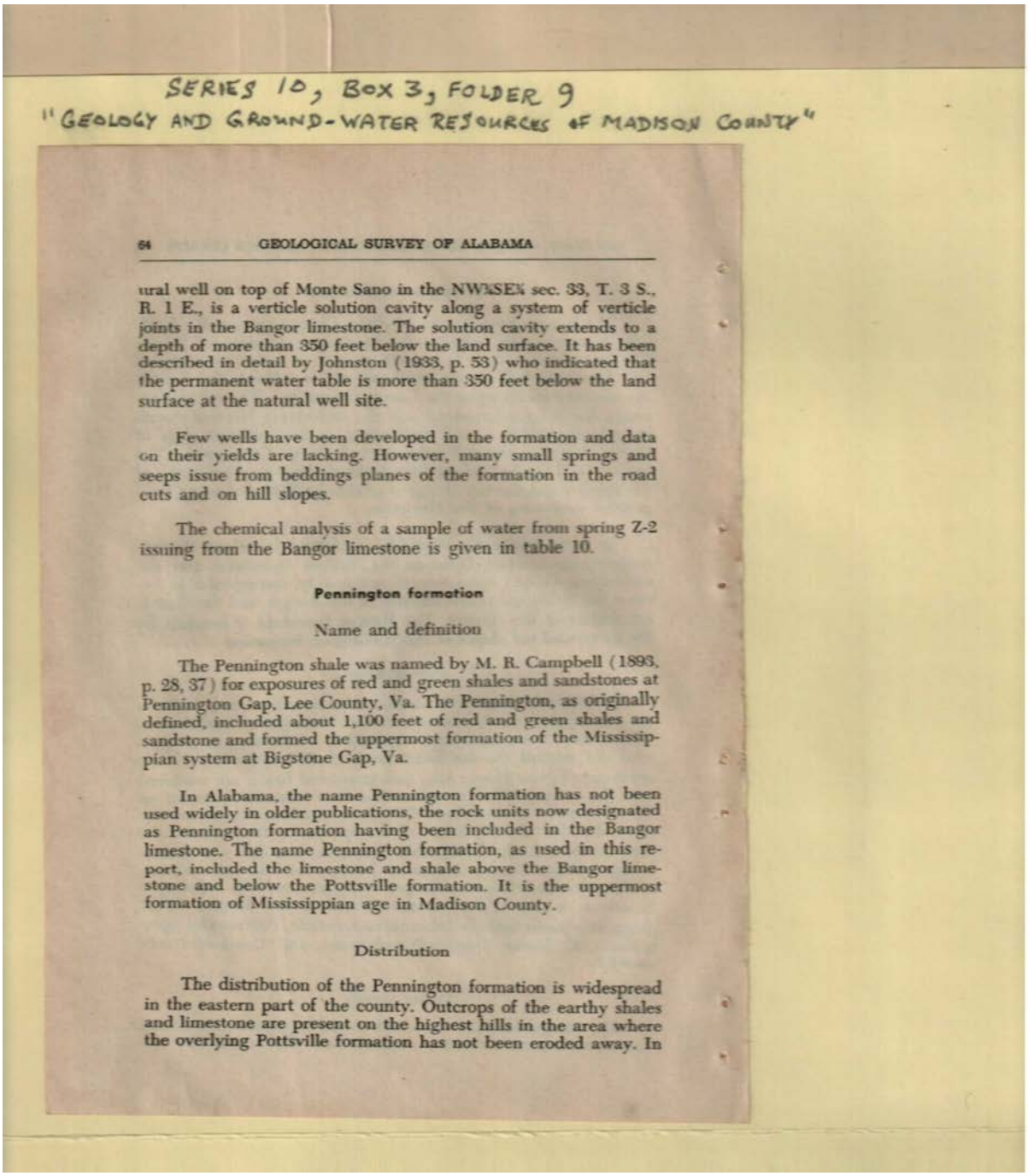
Paleontology

In Madison County the argillaceous limestone and shales in the lower part of the formation are abundantly fossiliferous. Where these beds have been exposed to weathering as along a road cut around the southeast flank of Hill Mountain 1 mile northeast of New Hope, Ala., well preserved fossils are scattered over the outcrop. Thin layers of limestone commonly contain an abundance of *Fenestella* and Bryozoa and brachiopods are the most abundant fossils. Some of the species of Bryozoa are the same as those in the Tuscumbia limestone, but they are characteristic of the Bangor limestone because of their abundance. *Archimedes*, scarce in the Gasper formation and Ste. Genevieve limestone, is one of the common fossils in the Bangor. Other diagnostic fossils include *Prismopora serrulata*, *Pentremites pyramidatus*, *P. brevis*, *Spirifer increbescens*, and *Composita subquadrata*.

Water supply

The Bangor limestone is soluble in slightly acidic percolating water, and extensive solution channels have developed. The nat-

Types:
booklet



ural well on top of Monte Sano in the NW¼SE¼ sec. 33, T. 3 S., R. 1 E., is a verticle solution cavity along a system of verticle joints in the Bangor limestone. The solution cavity extends to a depth of more than 350 feet below the land surface. It has been described in detail by Johnston (1933, p. 53) who indicated that the permanent water table is more than 350 feet below the land surface at the natural well site.

Few wells have been developed in the formation and data on their yields are lacking. However, many small springs and seeps issue from beddings planes of the formation in the road cuts and on hill slopes.

The chemical analysis of a sample of water from spring Z-2 issuing from the Bangor limestone is given in table 10.

Pennington formation

Name and definition

The Pennington shale was named by M. R. Campbell (1893, p. 28, 37) for exposures of red and green shales and sandstones at Pennington Gap, Lee County, Va. The Pennington, as originally defined, included about 1,100 feet of red and green shales and sandstone and formed the uppermost formation of the Mississippian system at Bigstone Gap, Va.

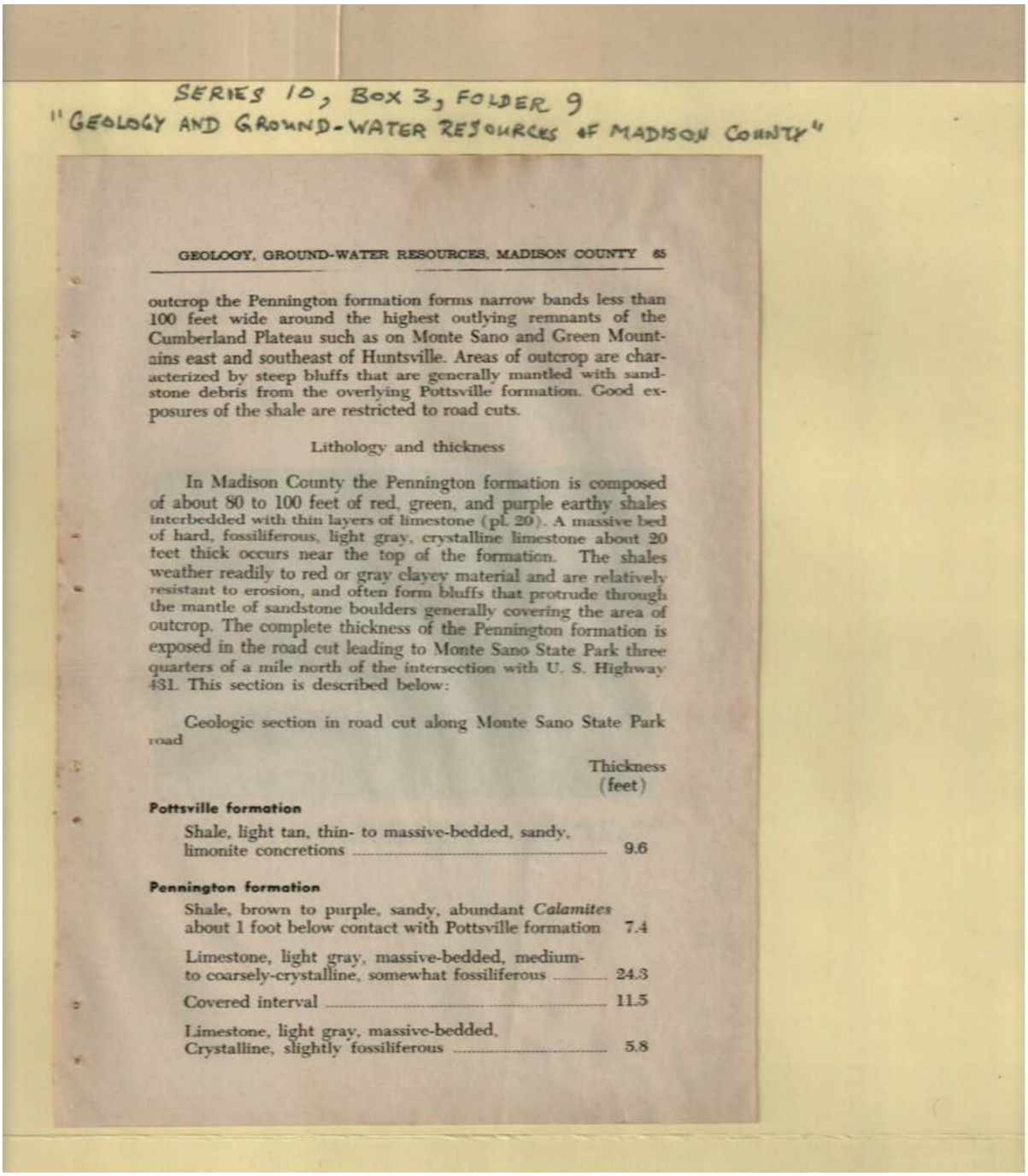
In Alabama, the name Pennington formation has not been used widely in older publications, the rock units now designated as Pennington formation having been included in the Bangor limestone. The name Pennington formation, as used in this report, included the limestone and shale above the Bangor limestone and below the Pottsville formation. It is the uppermost formation of Mississippian age in Madison County.

Distribution

The distribution of the Pennington formation is widespread in the eastern part of the county. Outcrops of the earthy shales and limestone are present on the highest hills in the area where the overlying Pottsville formation has not been eroded away. In

Names:
Campbell, M. R. Johnston,

Types:
booklet



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outcrop the Pennington formation forms narrow bands less than 100 feet wide around the highest outlying remnants of the Cumberland Plateau such as on Monte Sano and Green Mountains east and southeast of Huntsville. Areas of outcrop are characterized by steep bluffs that are generally mantled with sandstone debris from the overlying Pottsville formation. Good exposures of the shale are restricted to road cuts.

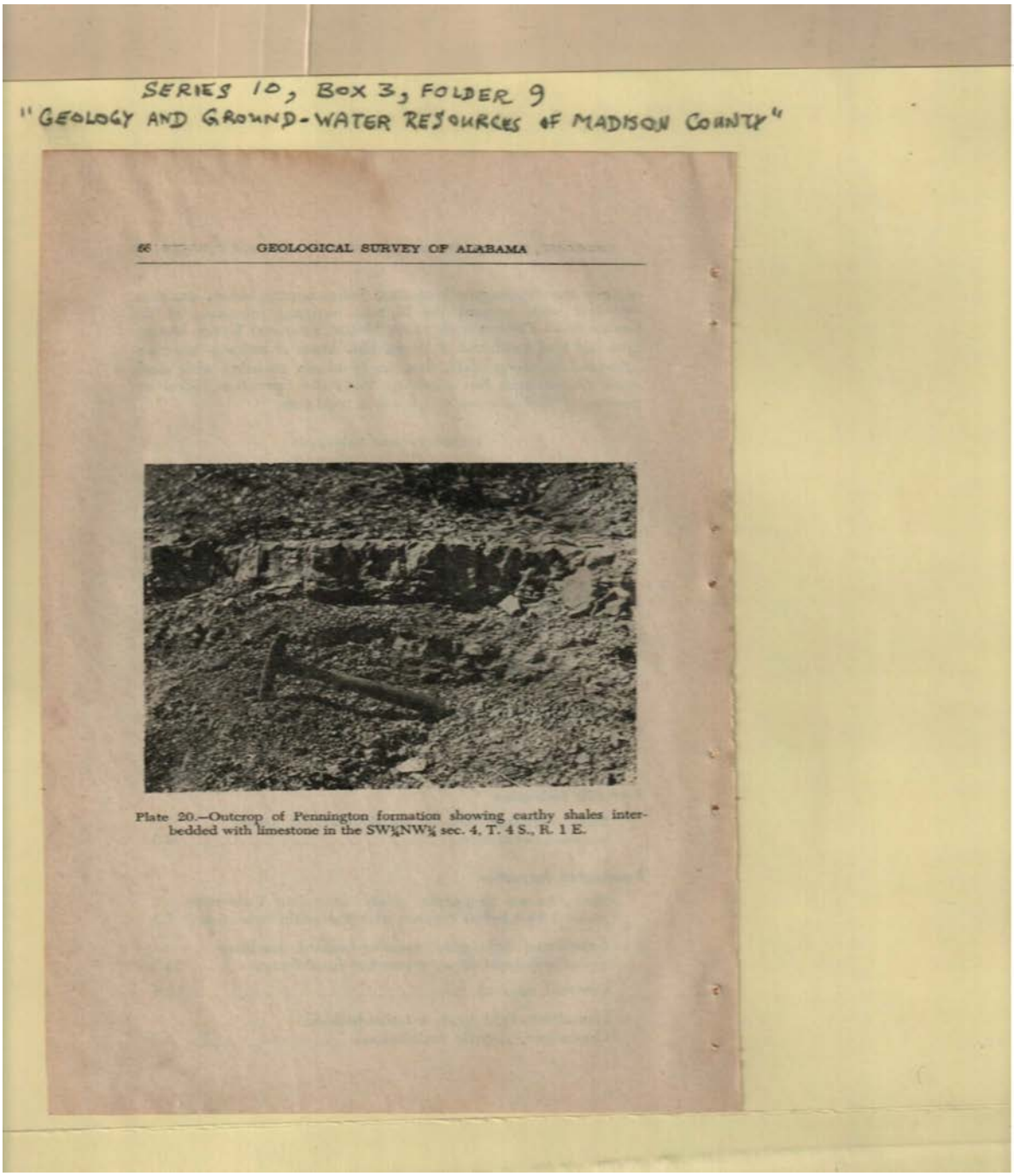
Lithology and thickness

In Madison County the Pennington formation is composed of about 80 to 100 feet of red, green, and purple earthy shales interbedded with thin layers of limestone (pl. 20). A massive bed of hard, fossiliferous, light gray, crystalline limestone about 20 feet thick occurs near the top of the formation. The shales weather readily to red or gray clayey material and are relatively resistant to erosion, and often form bluffs that protrude through the mantle of sandstone boulders generally covering the area of outcrop. The complete thickness of the Pennington formation is exposed in the road cut leading to Monte Sano State Park three quarters of a mile north of the intersection with U. S. Highway 431. This section is described below:

Geologic section in road cut along Monte Sano State Park road

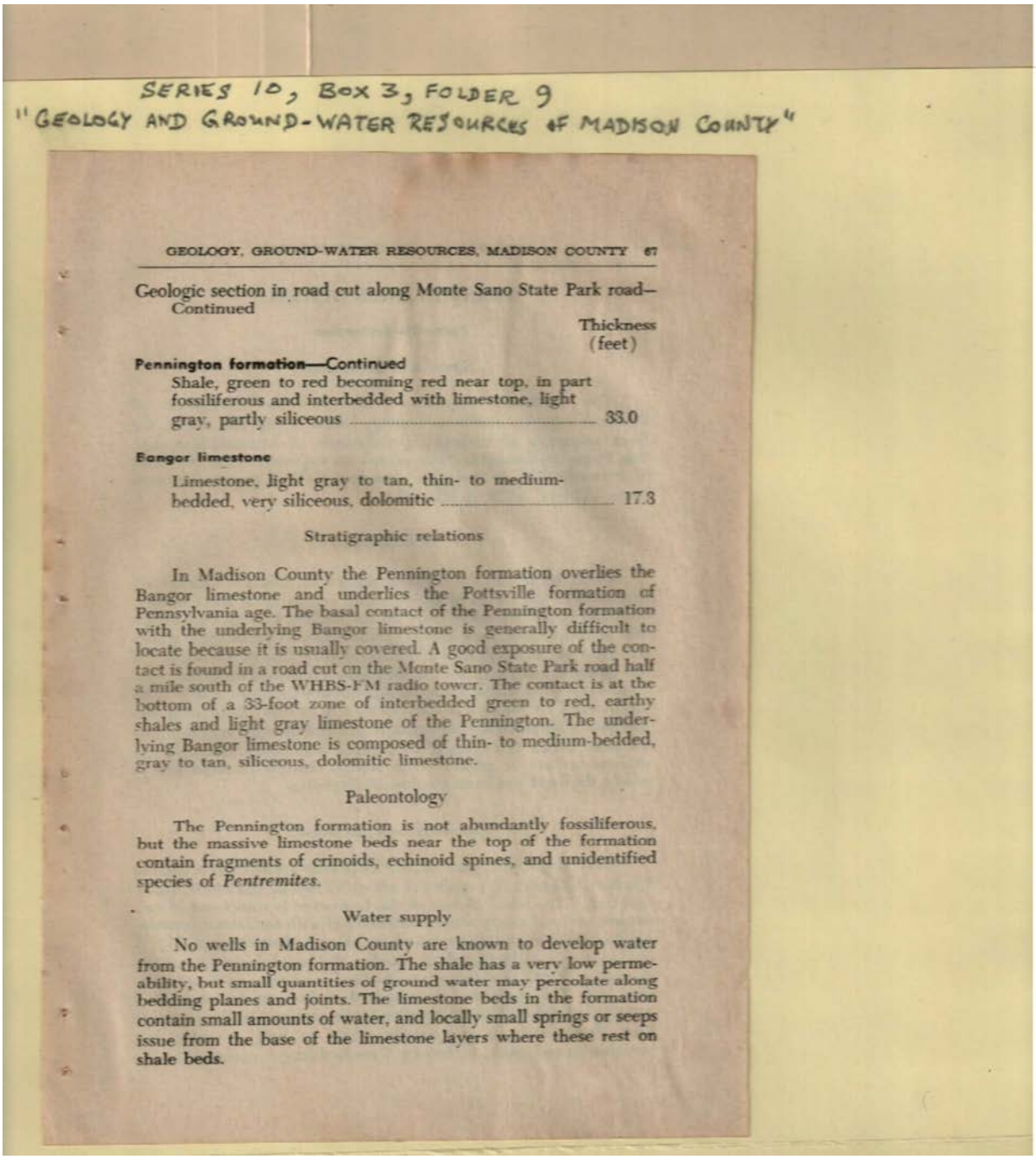
	Thickness (feet)
Pottsville formation	
Shale, light tan, thin- to massive-bedded, sandy, limonite concretions	9.6
Pennington formation	
Shale, brown to purple, sandy, abundant *Calamites* about 1 foot below contact with Pottsville formation	7.4
Limestone, light gray, massive-bedded, medium- to coarsely-crystalline, somewhat fossiliferous	24.3
Covered interval	11.5
Limestone, light gray, massive-bedded, Crystalline, slightly fossiliferous	5.8

Types:
booklet



Names:
Pennington Formation

Types:
photograph



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"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Geologic section in road cut along Monte Sano State Park road—Continued

	Thickness (feet)
Pennington formation—Continued	
Shale, green to red becoming red near top, in part fossiliferous and interbedded with limestone, light gray, partly siliceous	33.0
Bangor limestone	
Limestone, light gray to tan, thin- to medium-bedded, very siliceous, dolomitic	17.3

Stratigraphic relations

In Madison County the Pennington formation overlies the Bangor limestone and underlies the Pottsville formation of Pennsylvania age. The basal contact of the Pennington formation with the underlying Bangor limestone is generally difficult to locate because it is usually covered. A good exposure of the contact is found in a road cut on the Monte Sano State Park road half a mile south of the WHBS-FM radio tower. The contact is at the bottom of a 33-foot zone of interbedded green to red, earthy shales and light gray limestone of the Pennington. The underlying Bangor limestone is composed of thin- to medium-bedded, gray to tan, siliceous, dolomitic limestone.

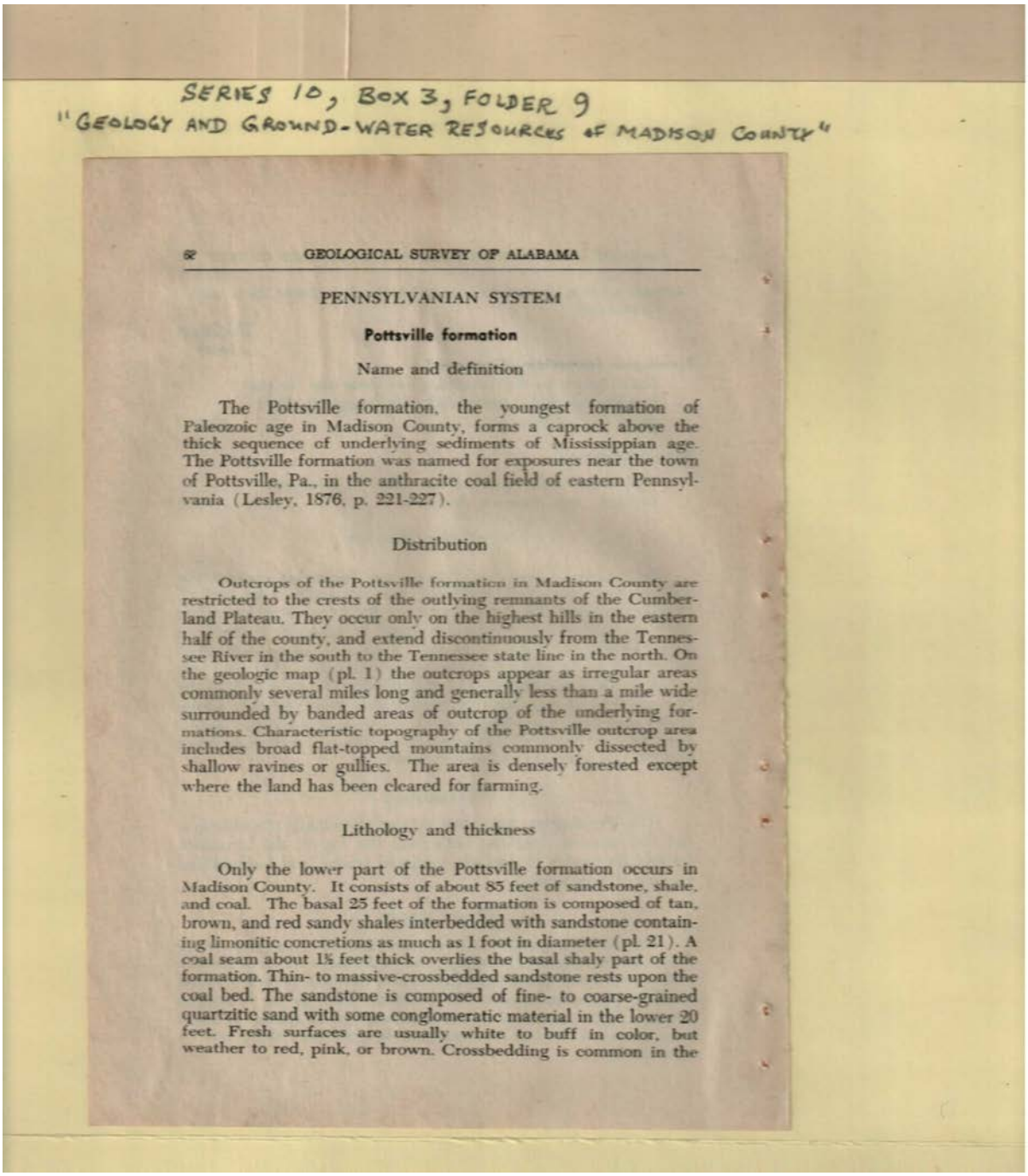
Paleontology

The Pennington formation is not abundantly fossiliferous, but the massive limestone beds near the top of the formation contain fragments of crinoids, echinoid spines, and unidentified species of *Pentremites*.

Water supply

No wells in Madison County are known to develop water from the Pennington formation. The shale has a very low permeability, but small quantities of ground water may percolate along bedding planes and joints. The limestone beds in the formation contain small amounts of water, and locally small springs or seeps issue from the base of the limestone layers where these rest on shale beds.

Types:
booklet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"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

PENNSYLVANIAN SYSTEM

Pottsville formation

Name and definition

The Pottsville formation, the youngest formation of Paleozoic age in Madison County, forms a caprock above the thick sequence of underlying sediments of Mississippian age. The Pottsville formation was named for exposures near the town of Pottsville, Pa., in the anthracite coal field of eastern Pennsylvania (Lesley, 1876, p. 221-227).

Distribution

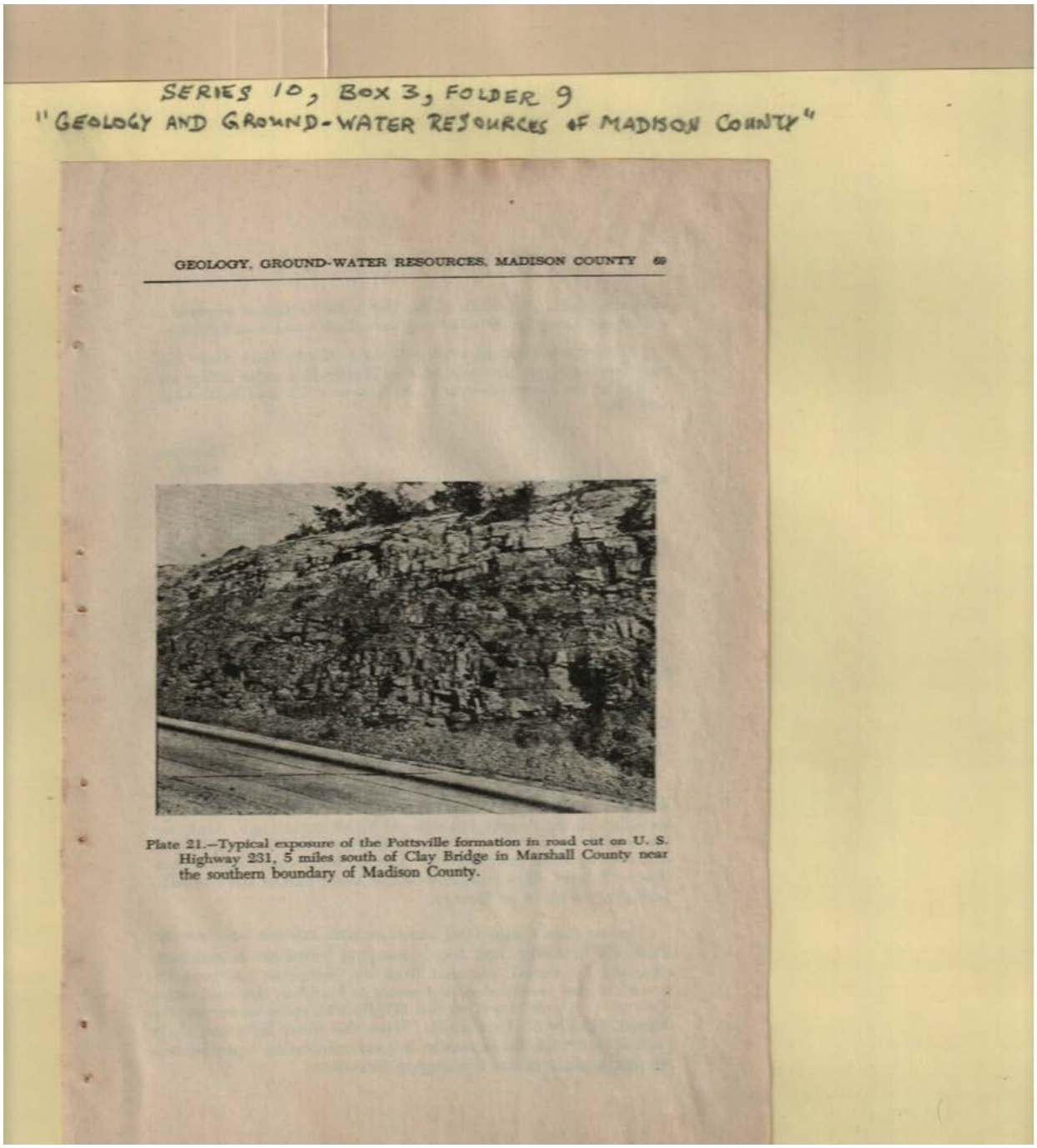
Outcrops of the Pottsville formation in Madison County are restricted to the crests of the outlying remnants of the Cumberland Plateau. They occur only on the highest hills in the eastern half of the county, and extend discontinuously from the Tennessee River in the south to the Tennessee state line in the north. On the geologic map (pl. 1) the outcrops appear as irregular areas commonly several miles long and generally less than a mile wide surrounded by banded areas of outcrop of the underlying formations. Characteristic topography of the Pottsville outcrop area includes broad flat-topped mountains commonly dissected by shallow ravines or gullies. The area is densely forested except where the land has been cleared for farming.

Lithology and thickness

Only the lower part of the Pottsville formation occurs in Madison County. It consists of about 85 feet of sandstone, shale, and coal. The basal 25 feet of the formation is composed of tan, brown, and red sandy shales interbedded with sandstone containing limonitic concretions as much as 1 foot in diameter (pl. 21). A coal seam about 1½ feet thick overlies the basal shaly part of the formation. Thin- to massive-crossbedded sandstone rests upon the coal bed. The sandstone is composed of fine- to coarse-grained quartzitic sand with some conglomeratic material in the lower 20 feet. Fresh surfaces are usually white to buff in color, but weather to red, pink, or brown. Crossbedding is common in the

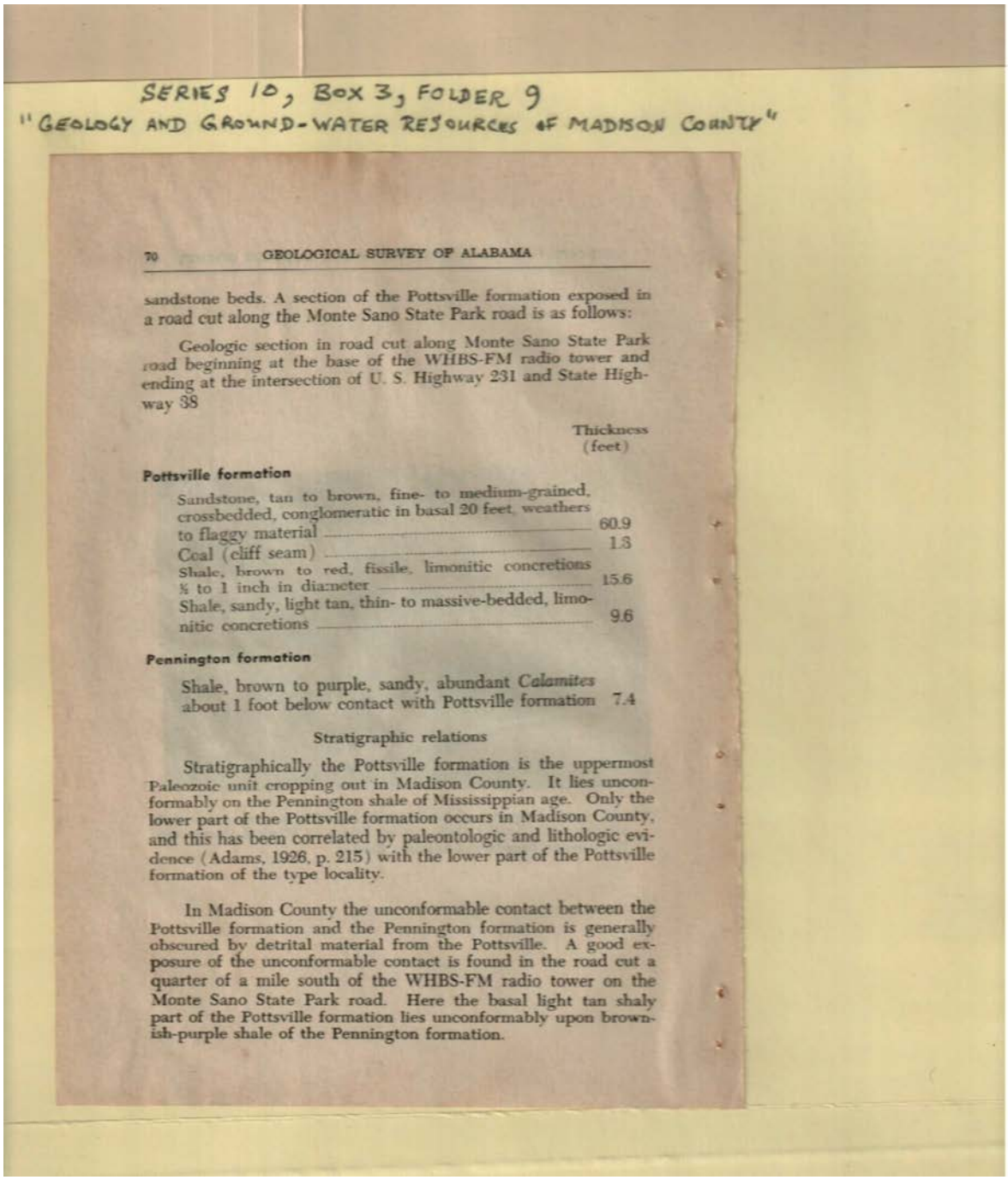
Names:
Pennsylvanian
System

Types:
booklet



Names:
Pottsvile Formation

Types:
photograph



sandstone beds. A section of the Pottsville formation exposed in a road cut along the Monte Sano State Park road is as follows:

Geologic section in road cut along Monte Sano State Park road beginning at the base of the WHBS-FM radio tower and ending at the intersection of U. S. Highway 231 and State Highway 38

	Thickness (feet)
Pottsville formation	
Sandstone, tan to brown, fine- to medium-grained, crossbedded, conglomeratic in basal 20 feet, weathers to flaggy material	60.9
Coal (cliff seam)	1.3
Shale, brown to red, fissile, limonitic concretions ¼ to 1 inch in diameter	15.6
Shale, sandy, light tan, thin- to massive-bedded, limonitic concretions	9.6
Pennington formation	
Shale, brown to purple, sandy, abundant *Calamites* about 1 foot below contact with Pottsville formation	7.4

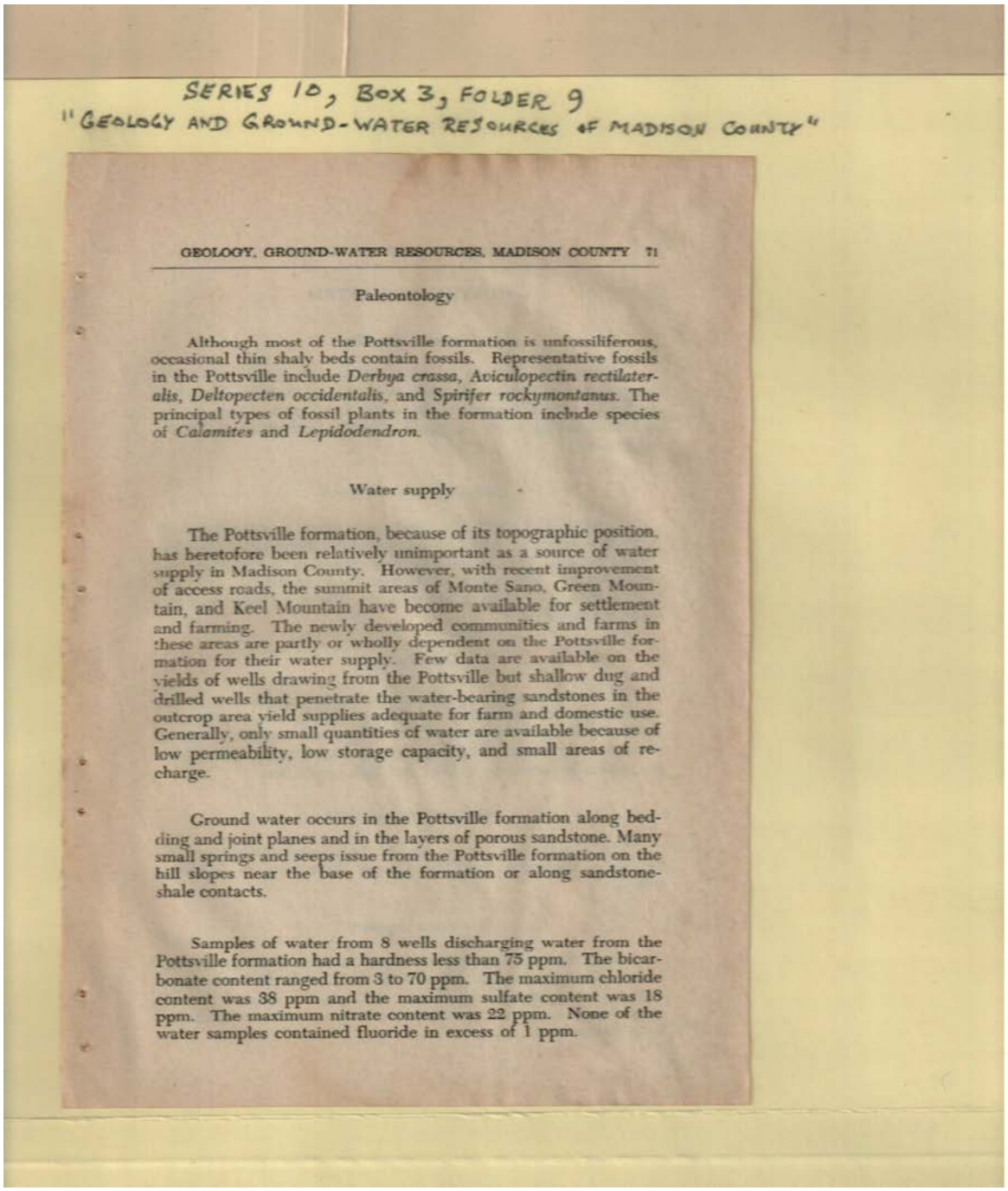
Stratigraphic relations

Stratigraphically the Pottsville formation is the uppermost Paleozoic unit cropping out in Madison County. It lies unconformably on the Pennington shale of Mississippian age. Only the lower part of the Pottsville formation occurs in Madison County, and this has been correlated by paleontologic and lithologic evidence (Adams, 1926, p. 215) with the lower part of the Pottsville formation of the type locality.

In Madison County the unconformable contact between the Pottsville formation and the Pennington formation is generally obscured by detrital material from the Pottsville. A good exposure of the unconformable contact is found in the road cut a quarter of a mile south of the WHBS-FM radio tower on the Monte Sano State Park road. Here the basal light tan shaly part of the Pottsville formation lies unconformably upon brownish-purple shale of the Pennington formation.

Names:
Adams,

Types:
booklet



Paleontology

Although most of the Pottsville formation is unfossiliferous, occasional thin shaly beds contain fossils. Representative fossils in the Pottsville include *Derbya crassa*, *Aviculopectin rectilateralis*, *Deltopecten occidentalis*, and *Spirifer rockymontanus*. The principal types of fossil plants in the formation include species of *Calamites* and *Lepidodendron*.

Water supply

The Pottsville formation, because of its topographic position, has heretofore been relatively unimportant as a source of water supply in Madison County. However, with recent improvement of access roads, the summit areas of Monte Sano, Green Mountain, and Keel Mountain have become available for settlement and farming. The newly developed communities and farms in these areas are partly or wholly dependent on the Pottsville formation for their water supply. Few data are available on the yields of wells drawing from the Pottsville but shallow dug and drilled wells that penetrate the water-bearing sandstones in the outcrop area yield supplies adequate for farm and domestic use. Generally, only small quantities of water are available because of low permeability, low storage capacity, and small areas of recharge.

Ground water occurs in the Pottsville formation along bedding and joint planes and in the layers of porous sandstone. Many small springs and seeps issue from the Pottsville formation on the hill slopes near the base of the formation or along sandstone-shale contacts.

Samples of water from 8 wells discharging water from the Pottsville formation had a hardness less than 75 ppm. The bicarbonate content ranged from 3 to 70 ppm. The maximum chloride content was 38 ppm and the maximum sulfate content was 18 ppm. The maximum nitrate content was 22 ppm. None of the water samples contained fluoride in excess of 1 ppm.

Types:
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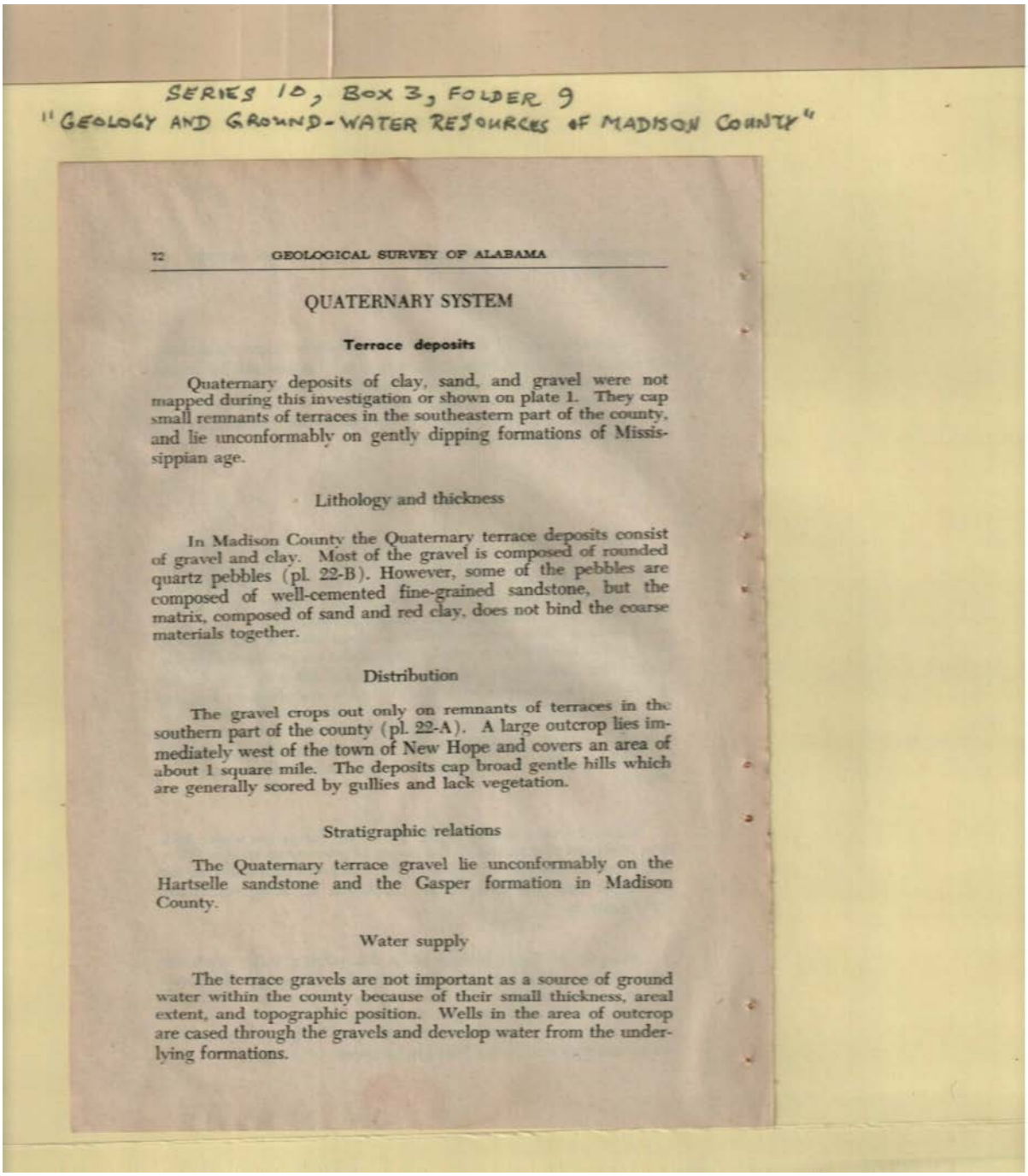


QUATERNARY SYSTEM

Terrace deposits

Quaternary deposits of clay, sand, and gravel were not mapped during this investigation or shown on plate 1. They cap small remnants of terraces in the southeastern part of the county, and lie unconformably on gently dipping formations of Mississippian age.

Lithology and thickness

In Madison County the Quaternary terrace deposits consist of gravel and clay. Most of the gravel is composed of rounded quartz pebbles (pl. 22-B). However, some of the pebbles are composed of well-cemented fine-grained sandstone, but the matrix, composed of sand and red clay, does not bind the coarse materials together.

Distribution

The gravel crops out only on remnants of terraces in the southern part of the county (pl. 22-A). A large outcrop lies immediately west of the town of New Hope and covers an area of about 1 square mile. The deposits cap broad gentle hills which are generally scored by gullies and lack vegetation.

Stratigraphic relations

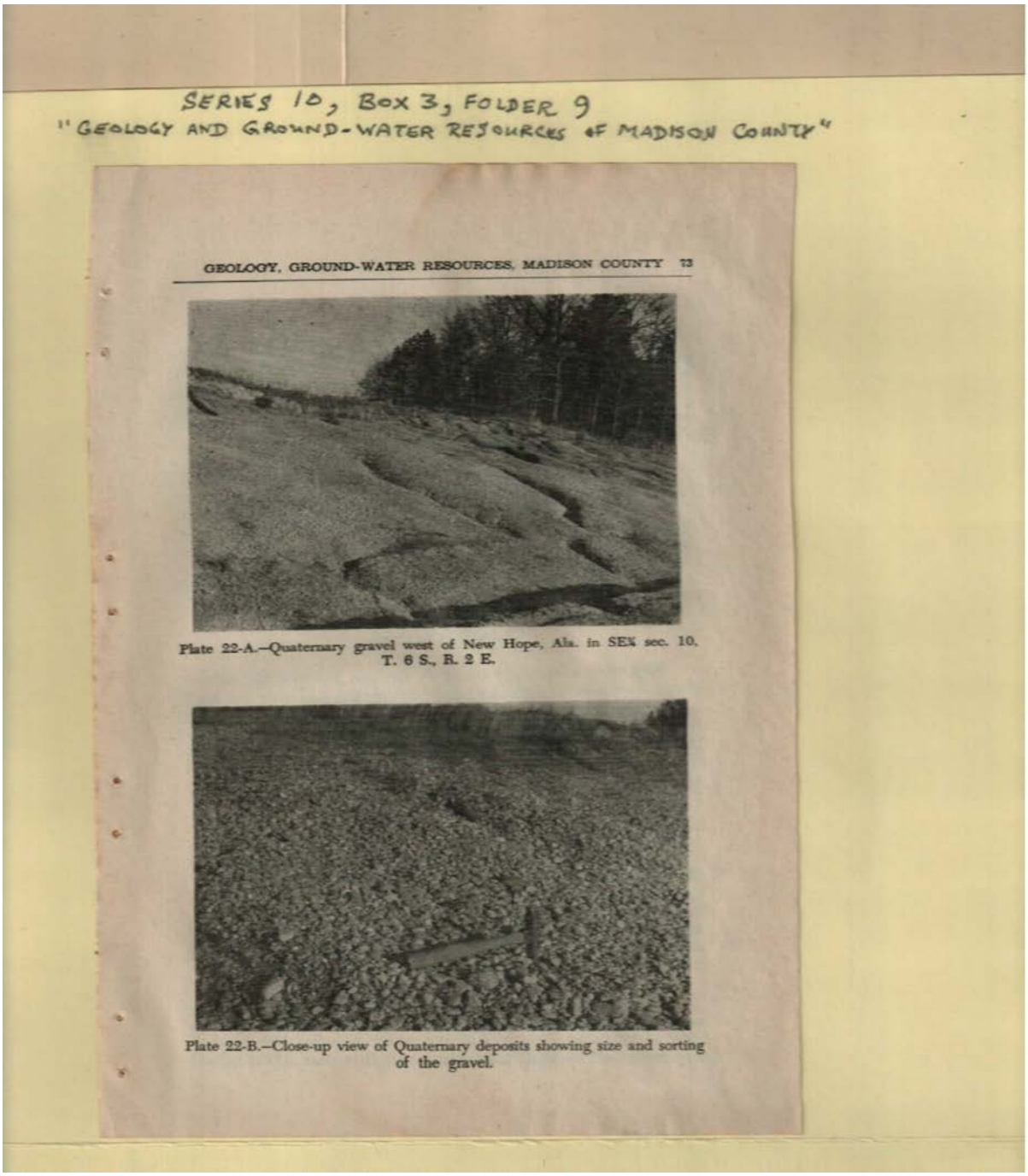
The Quaternary terrace gravel lie unconformably on the Hartselle sandstone and the Gasper formation in Madison County.

Water supply

The terrace gravels are not important as a source of ground water within the county because of their small thickness, areal extent, and topographic position. Wells in the area of outcrop are cased through the gravels and develop water from the underlying formations.

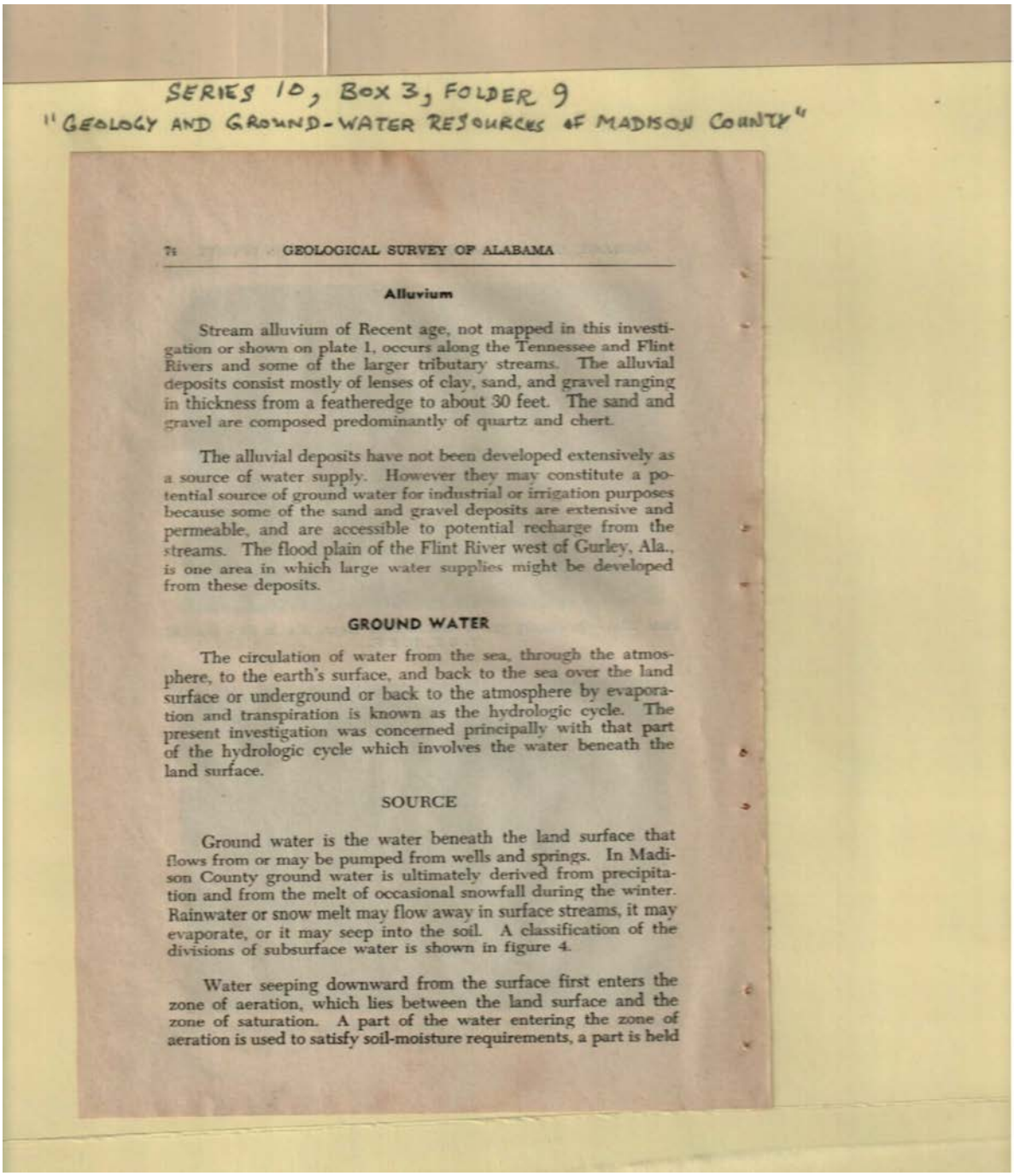
Names:
Quaternary System

Types:
booklet



Names:
Quaternary Gravel

Types:
photograph



Alluvium

Stream alluvium of Recent age, not mapped in this investigation or shown on plate 1, occurs along the Tennessee and Flint Rivers and some of the larger tributary streams. The alluvial deposits consist mostly of lenses of clay, sand, and gravel ranging in thickness from a featheredge to about 30 feet. The sand and gravel are composed predominantly of quartz and chert.

The alluvial deposits have not been developed extensively as a source of water supply. However they may constitute a potential source of ground water for industrial or irrigation purposes because some of the sand and gravel deposits are extensive and permeable, and are accessible to potential recharge from the streams. The flood plain of the Flint River west of Gurley, Ala., is one area in which large water supplies might be developed from these deposits.

GROUND WATER

The circulation of water from the sea, through the atmosphere, to the earth's surface, and back to the sea over the land surface or underground or back to the atmosphere by evaporation and transpiration is known as the hydrologic cycle. The present investigation was concerned principally with that part of the hydrologic cycle which involves the water beneath the land surface.

SOURCE

Ground water is the water beneath the land surface that flows from or may be pumped from wells and springs. In Madison County ground water is ultimately derived from precipitation and from the melt of occasional snowfall during the winter. Rainwater or snow melt may flow away in surface streams, it may evaporate, or it may seep into the soil. A classification of the divisions of subsurface water is shown in figure 4.

Water seeping downward from the surface first enters the zone of aeration, which lies between the land surface and the zone of saturation. A part of the water entering the zone of aeration is used to satisfy soil-moisture requirements, a part is held

Types:
booklet

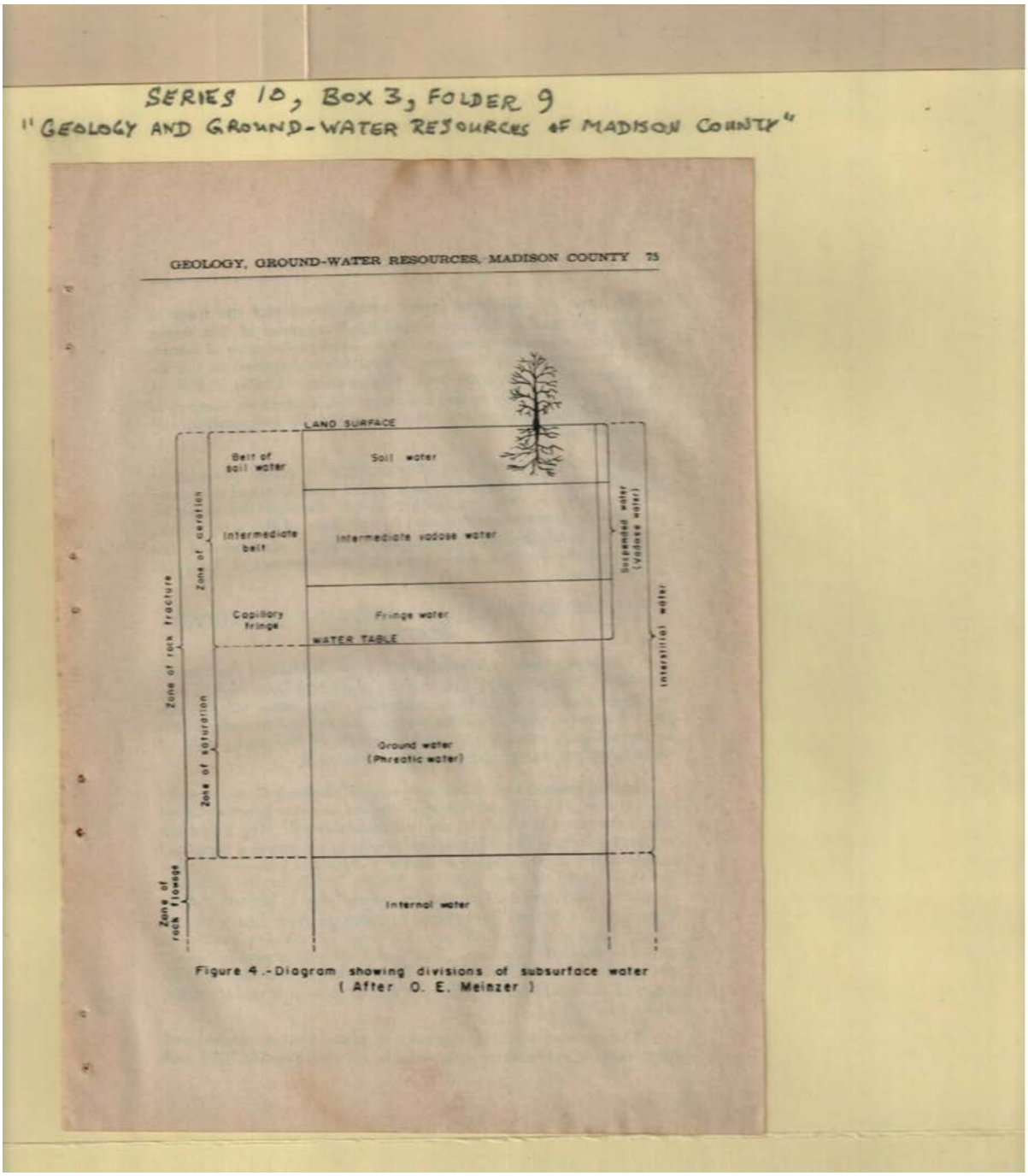
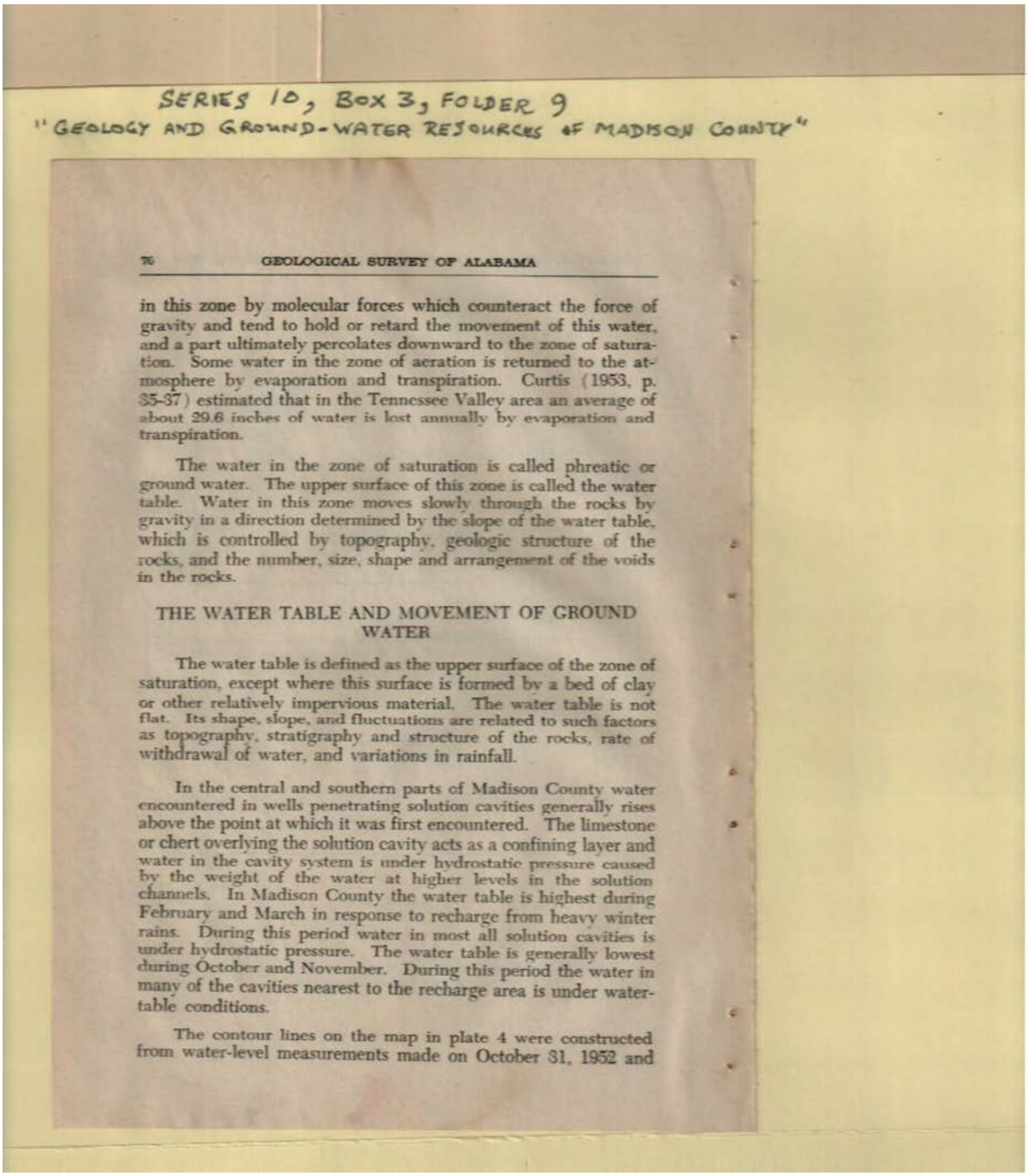


Figure 4.-Diagram showing divisions of subsurface water (After O. E. Meinzer)

Names:
Meinzer, O. E. Subsurface Water

Types:
chart



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in this zone by molecular forces which counteract the force of gravity and tend to hold or retard the movement of this water, and a part ultimately percolates downward to the zone of saturation. Some water in the zone of aeration is returned to the atmosphere by evaporation and transpiration. Curtis (1953, p. 35-37) estimated that in the Tennessee Valley area an average of about 29.6 inches of water is lost annually by evaporation and transpiration.

The water in the zone of saturation is called phreatic or ground water. The upper surface of this zone is called the water table. Water in this zone moves slowly through the rocks by gravity in a direction determined by the slope of the water table, which is controlled by topography, geologic structure of the rocks, and the number, size, shape and arrangement of the voids in the rocks.

THE WATER TABLE AND MOVEMENT OF GROUND WATER

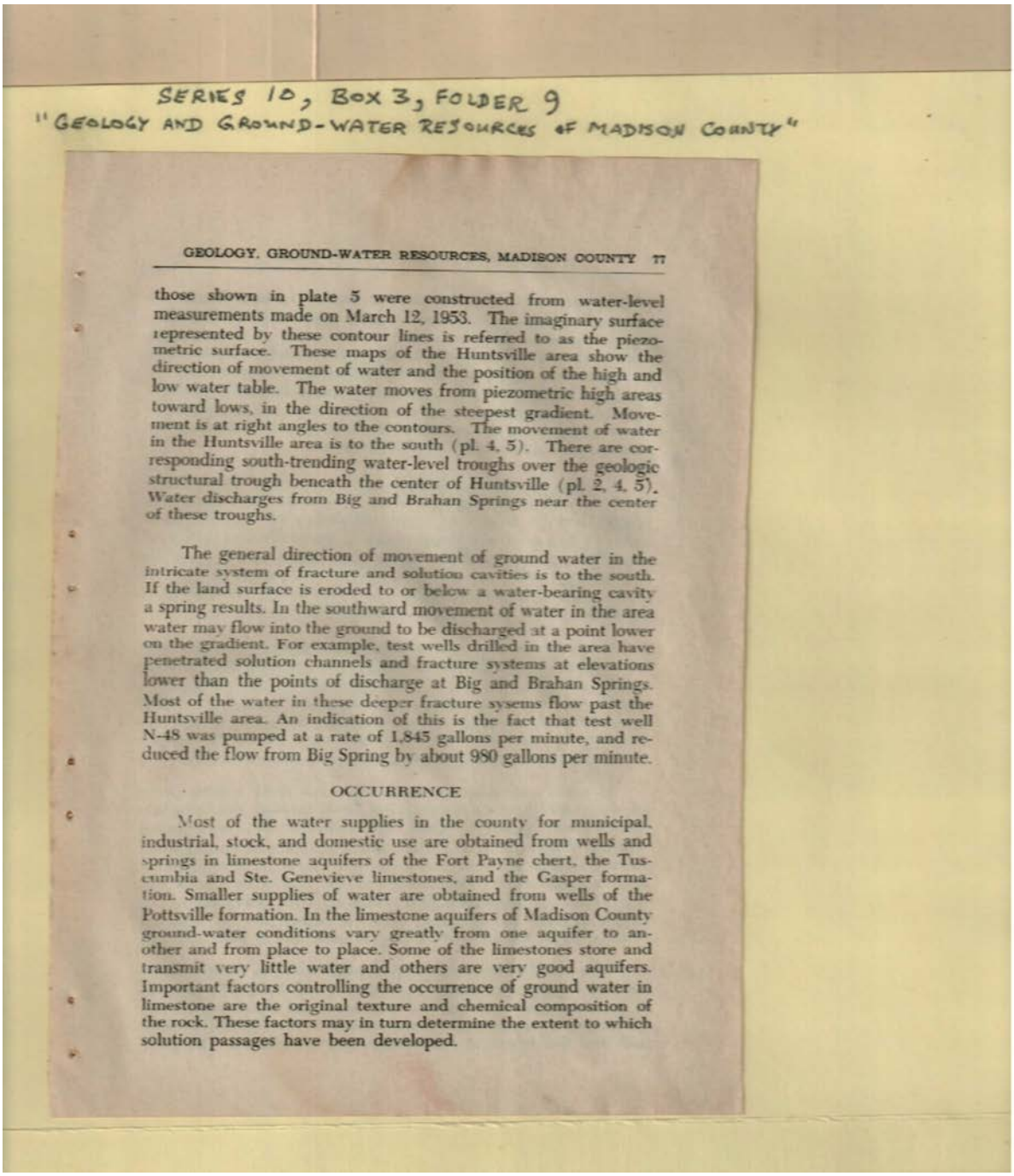
The water table is defined as the upper surface of the zone of saturation, except where this surface is formed by a bed of clay or other relatively impervious material. The water table is not flat. Its shape, slope, and fluctuations are related to such factors as topography, stratigraphy and structure of the rocks, rate of withdrawal of water, and variations in rainfall.

In the central and southern parts of Madison County water encountered in wells penetrating solution cavities generally rises above the point at which it was first encountered. The limestone or chert overlying the solution cavity acts as a confining layer and water in the cavity system is under hydrostatic pressure caused by the weight of the water at higher levels in the solution channels. In Madison County the water table is highest during February and March in response to recharge from heavy winter rains. During this period water in most all solution cavities is under hydrostatic pressure. The water table is generally lowest during October and November. During this period the water in many of the cavities nearest to the recharge area is under water-table conditions.

The contour lines on the map in plate 4 were constructed from water-level measurements made on October 31, 1952 and

Names:
Curtis,

Types:
booklet



those shown in plate 5 were constructed from water-level measurements made on March 12, 1953. The imaginary surface represented by these contour lines is referred to as the piezometric surface. These maps of the Huntsville area show the direction of movement of water and the position of the high and low water table. The water moves from piezometric high areas toward lows, in the direction of the steepest gradient. Movement is at right angles to the contours. The movement of water in the Huntsville area is to the south (pl. 4, 5). There are corresponding south-trending water-level troughs over the geologic structural trough beneath the center of Huntsville (pl. 2, 4, 5). Water discharges from Big and Brahan Springs near the center of these troughs.

The general direction of movement of ground water in the intricate system of fracture and solution cavities is to the south. If the land surface is eroded to or below a water-bearing cavity a spring results. In the southward movement of water in the area water may flow into the ground to be discharged at a point lower on the gradient. For example, test wells drilled in the area have penetrated solution channels and fracture systems at elevations lower than the points of discharge at Big and Brahan Springs. Most of the water in these deeper fracture sysems flow past the Huntsville area. An indication of this is the fact that test well N-48 was pumped at a rate of 1,845 gallons per minute, and reduced the flow from Big Spring by about 980 gallons per minute.

OCCURRENCE

Most of the water supplies in the county for municipal, industrial, stock, and domestic use are obtained from wells and springs in limestone aquifers of the Fort Payne chert, the Tuscumbia and Ste. Genevieve limestones, and the Gasper formation. Smaller supplies of water are obtained from wells of the Pottsville formation. In the limestone aquifers of Madison County ground-water conditions vary greatly from one aquifer to another and from place to place. Some of the limestones store and transmit very little water and others are very good aquifers. Important factors controlling the occurrence of ground water in limestone are the original texture and chemical composition of the rock. These factors may in turn determine the extent to which solution passages have been developed.

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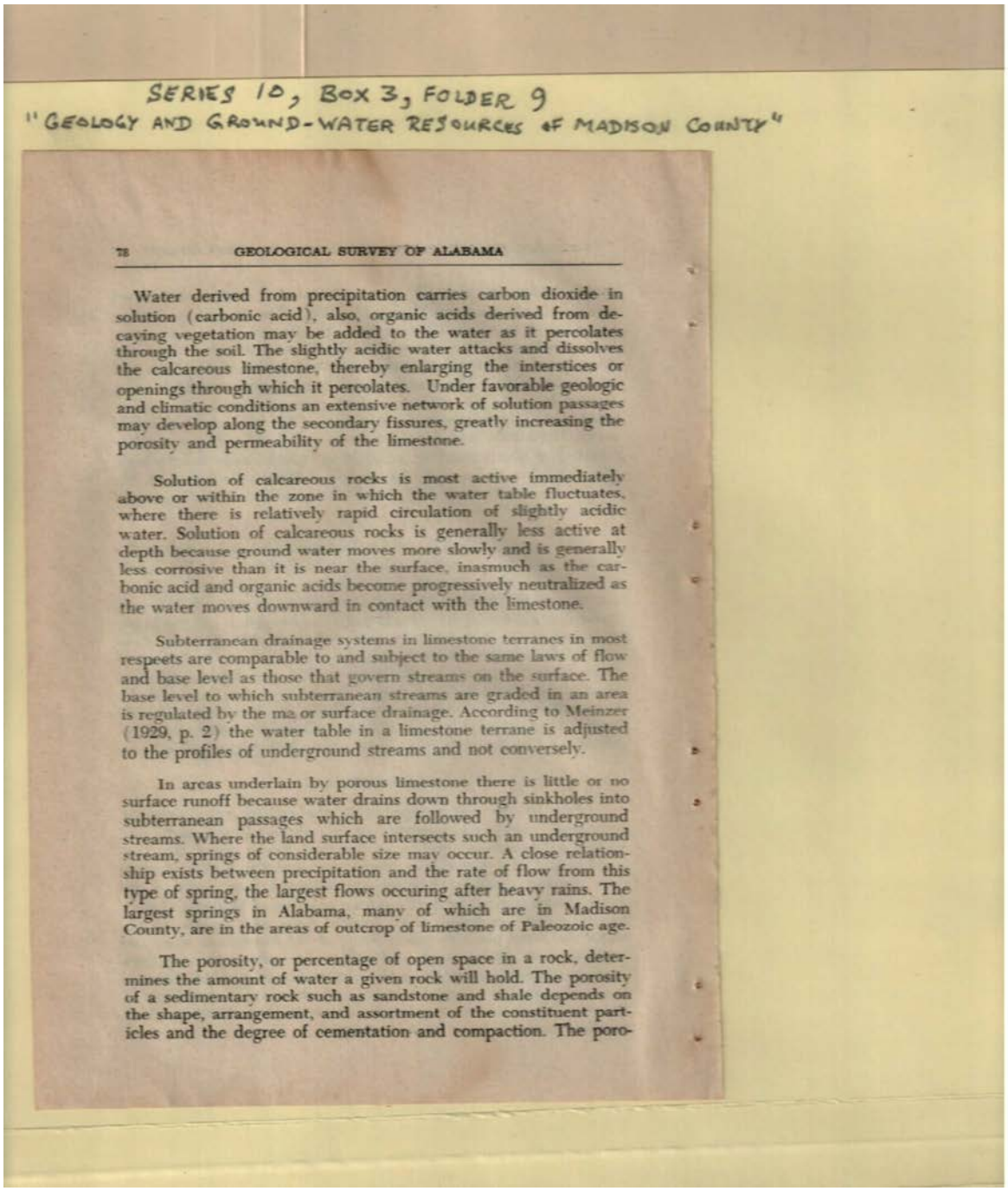

Water derived from precipitation carries carbon dioxide in solution (carbonic acid), also, organic acids derived from decaying vegetation may be added to the water as it percolates through the soil. The slightly acidic water attacks and dissolves the calcareous limestone, thereby enlarging the interstices or openings through which it percolates. Under favorable geologic and climatic conditions an extensive network of solution passages may develop along the secondary fissures, greatly increasing the porosity and permeability of the limestone.

Solution of calcareous rocks is most active immediately above or within the zone in which the water table fluctuates, where there is relatively rapid circulation of slightly acidic water. Solution of calcareous rocks is generally less active at depth because ground water moves more slowly and is generally less corrosive than it is near the surface, inasmuch as the carbonic acid and organic acids become progressively neutralized as the water moves downward in contact with the limestone.

Subterranean drainage systems in limestone terranes in most respects are comparable to and subject to the same laws of flow and base level as those that govern streams on the surface. The base level to which subterranean streams are graded in an area is regulated by the ma or surface drainage. According to Meinzer (1929, p. 2) the water table in a limestone terrane is adjusted to the profiles of underground streams and not conversely.

In areas underlain by porous limestone there is little or no surface runoff because water drains down through sinkholes into subterranean passages which are followed by underground streams. Where the land surface intersects such an underground stream, springs of considerable size may occur. A close relationship exists between precipitation and the rate of flow from this type of spring, the largest flows occuring after heavy rains. The largest springs in Alabama, many of which are in Madison County, are in the areas of outcrop of limestone of Paleozoic age.

The porosity, or percentage of open space in a rock, determines the amount of water a given rock will hold. The porosity of a sedimentary rock such as sandstone and shale depends on the shape, arrangement, and assortment of the constituent particles and the degree of cementation and compaction. The poro-

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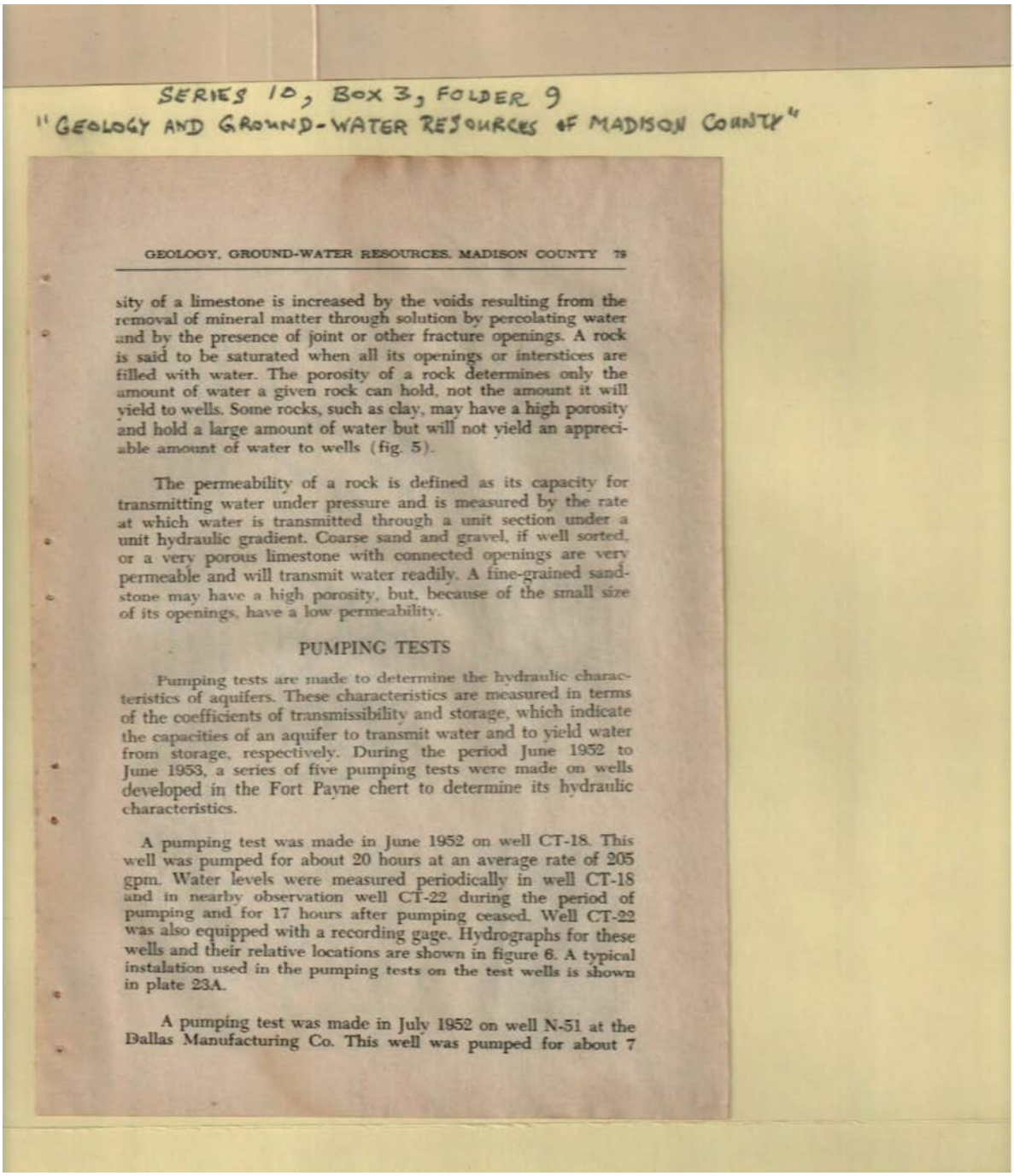
booklet



sity of a limestone is increased by the voids resulting from the removal of mineral matter through solution by percolating water and by the presence of joint or other fracture openings. A rock is said to be saturated when all its openings or interstices are filled with water. The porosity of a rock determines only the amount of water a given rock can hold, not the amount it will yield to wells. Some rocks, such as clay, may have a high porosity and hold a large amount of water but will not yield an appreciable amount of water to wells (fig. 5).

The permeability of a rock is defined as its capacity for transmitting water under pressure and is measured by the rate at which water is transmitted through a unit section under a unit hydraulic gradient. Coarse sand and gravel, if well sorted, or a very porous limestone with connected openings are very permeable and will transmit water readily. A fine-grained sandstone may have a high porosity, but, because of the small size of its openings, have a low permeability.

PUMPING TESTS

Pumping tests are made to determine the hydraulic characteristics of aquifers. These characteristics are measured in terms of the coefficients of transmissibility and storage, which indicate the capacities of an aquifer to transmit water and to yield water from storage, respectively. During the period June 1952 to June 1953, a series of five pumping tests were made on wells developed in the Fort Payne chert to determine its hydraulic characteristics.

A pumping test was made in June 1952 on well CT-18. This well was pumped for about 20 hours at an average rate of 205 gpm. Water levels were measured periodically in well CT-18 and in nearby observation well CT-22 during the period of pumping and for 17 hours after pumping ceased. Well CT-22 was also equipped with a recording gage. Hydrographs for these wells and their relative locations are shown in figure 6. A typical instalation used in the pumping tests on the test wells is shown in plate 23A.

A pumping test was made in July 1952 on well N-51 at the Dallas Manufacturing Co. This well was pumped for about 7

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booklet

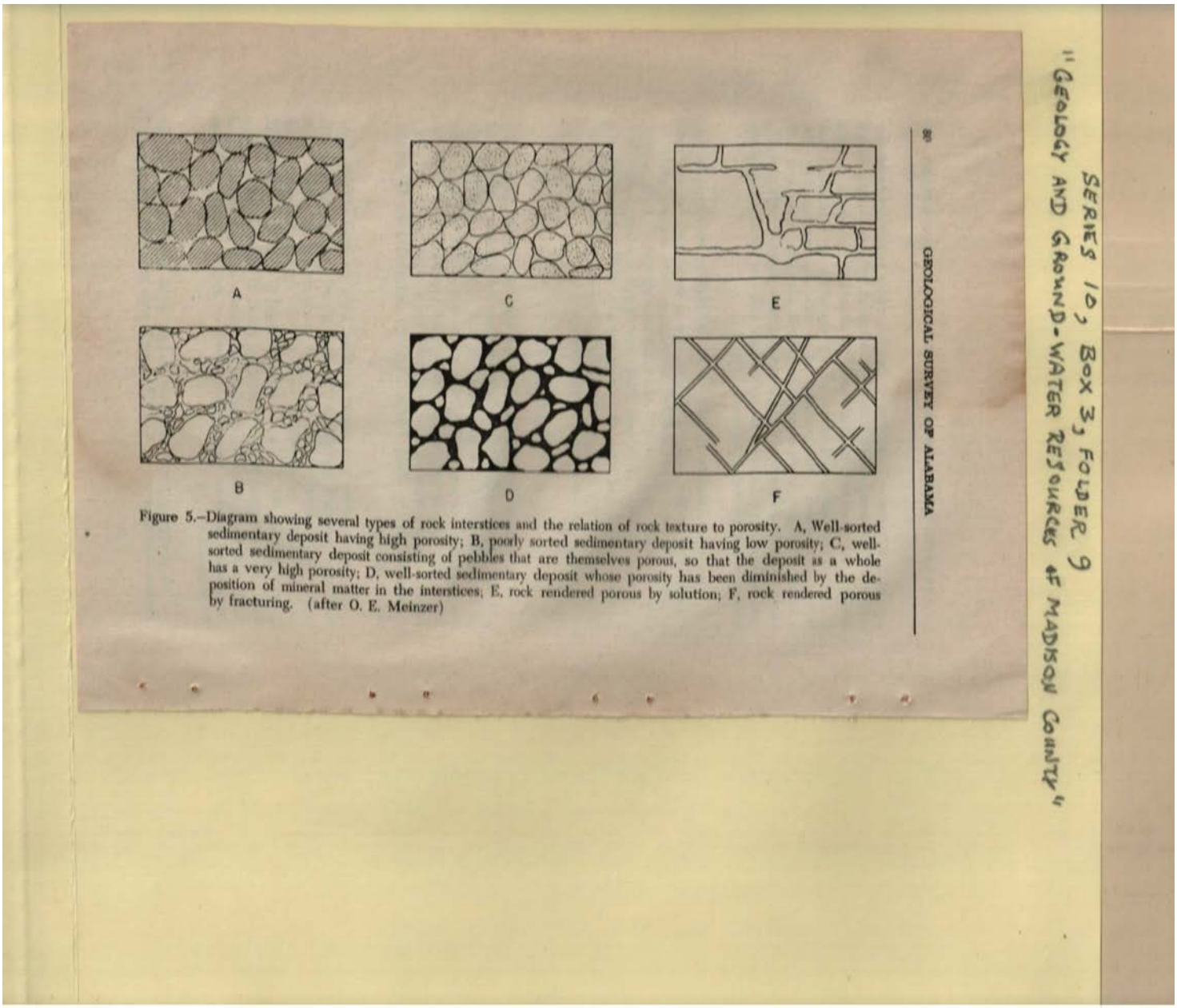

Figure 5.—Diagram showing several types of rock interstices and the relation of rock texture to porosity. A, Well-sorted sedimentary deposit having high porosity; B, poorly sorted sedimentary deposit having low porosity; C, well-sorted sedimentary deposit consisting of pebbles that are themselves porous, so that the deposit as a whole has a very high porosity; D, well-sorted sedimentary deposit whose porosity has been diminished by the deposition of mineral matter in the interstices; E, rock rendered porous by solution; F, rock rendered porous by fracturing. (after O. E. Meinzer)

Names:
Rock Intrerstices

Types:
diagram

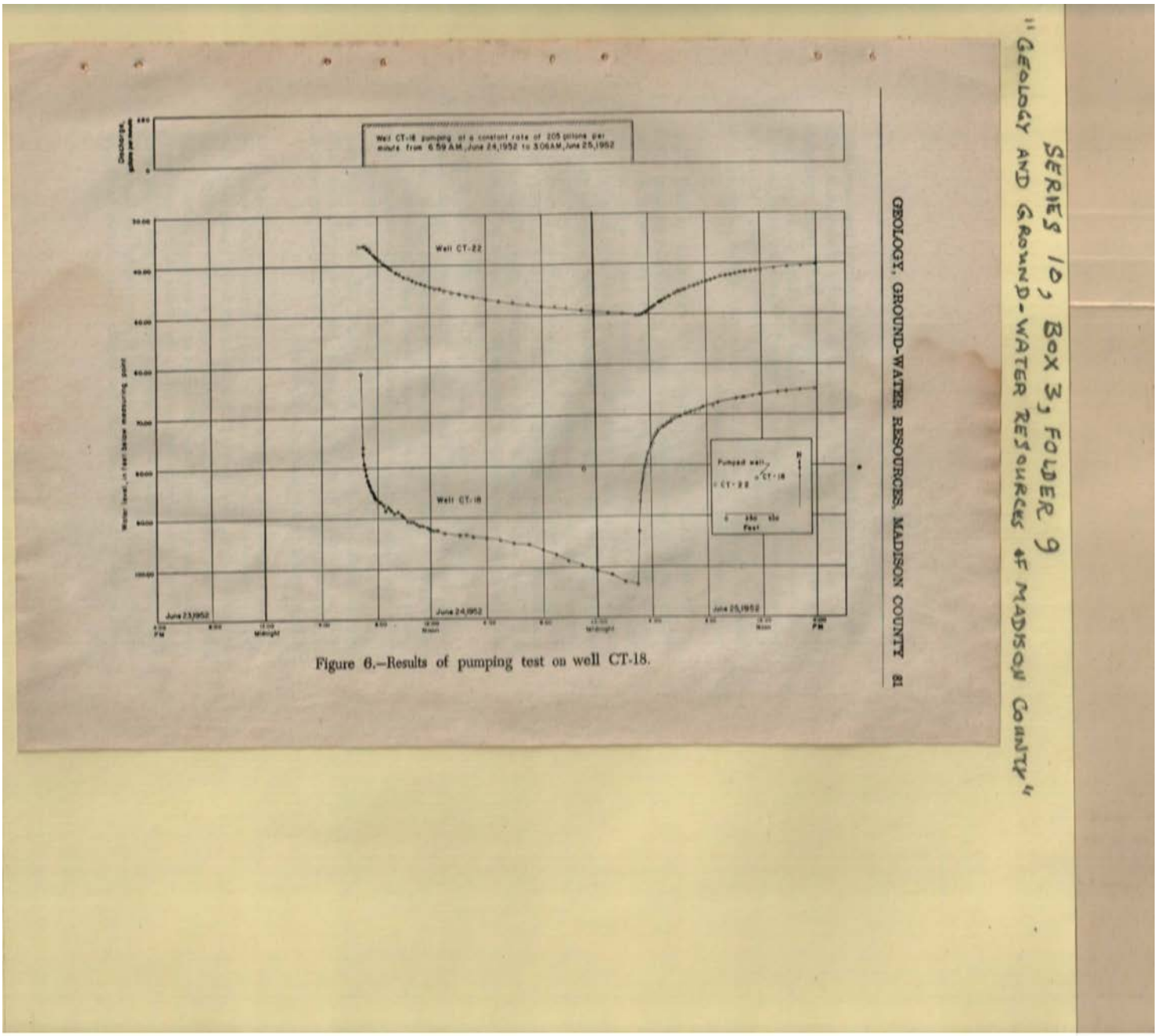

Figure 6.—Results of pumping test on well CT-18.

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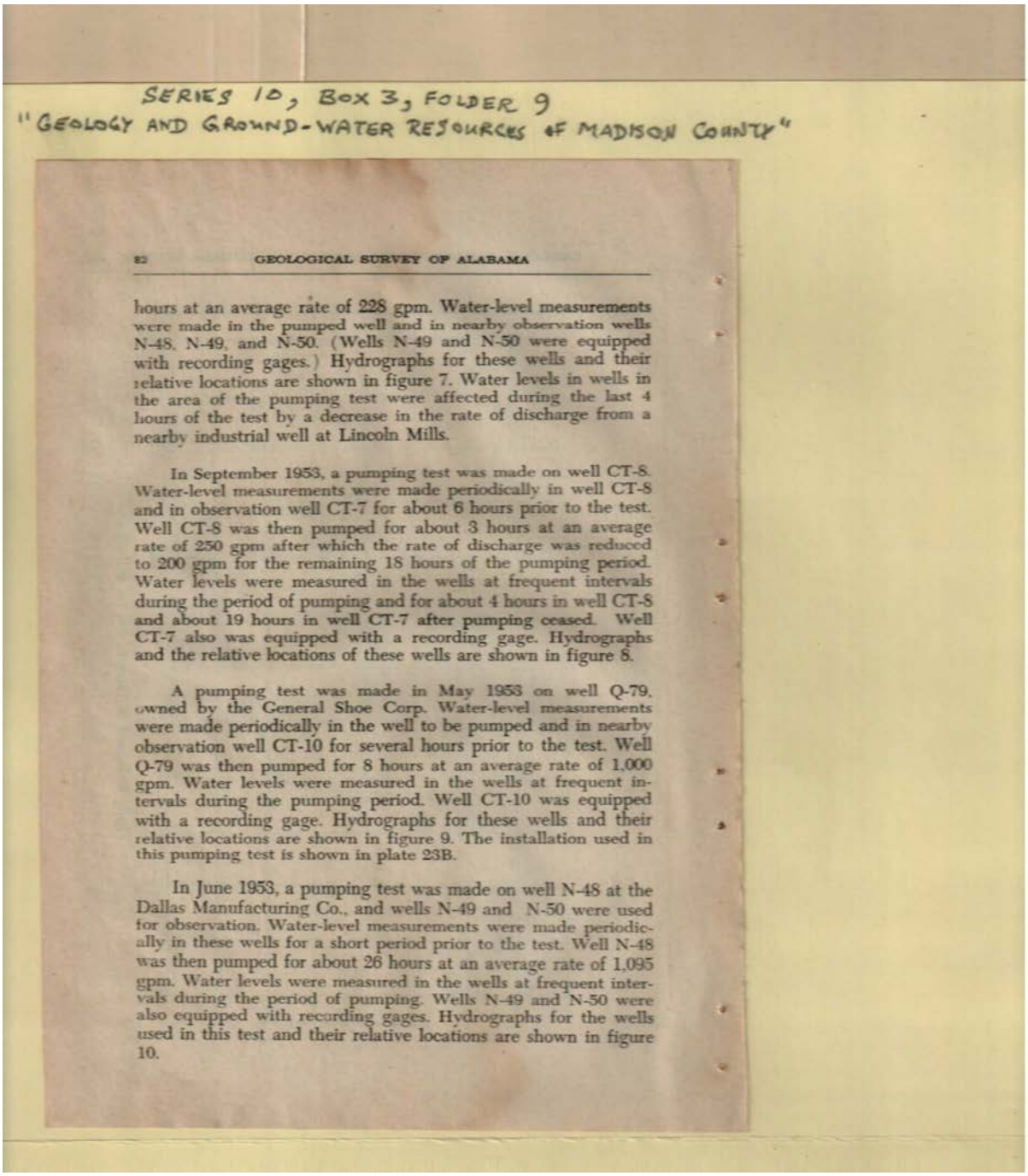
Names:
Pump Test Results

Types:
chart



hours at an average rate of 228 gpm. Water-level measurements were made in the pumped well and in nearby observation wells N-48, N-49, and N-50. (Wells N-49 and N-50 were equipped with recording gages.) Hydrographs for these wells and their relative locations are shown in figure 7. Water levels in wells in the area of the pumping test were affected during the last 4 hours of the test by a decrease in the rate of discharge from a nearby industrial well at Lincoln Mills.

In September 1953, a pumping test was made on well CT-8. Water-level measurements were made periodically in well CT-8 and in observation well CT-7 for about 6 hours prior to the test. Well CT-8 was then pumped for about 3 hours at an average rate of 250 gpm after which the rate of discharge was reduced to 200 gpm for the remaining 18 hours of the pumping period. Water levels were measured in the wells at frequent intervals during the period of pumping and for about 4 hours in well CT-8 and about 19 hours in well CT-7 after pumping ceased. Well CT-7 also was equipped with a recording gage. Hydrographs and the relative locations of these wells are shown in figure 8.

A pumping test was made in May 1953 on well Q-79, owned by the General Shoe Corp. Water-level measurements were made periodically in the well to be pumped and in nearby observation well CT-10 for several hours prior to the test. Well Q-79 was then pumped for 8 hours at an average rate of 1,000 gpm. Water levels were measured in the wells at frequent intervals during the pumping period. Well CT-10 was equipped with a recording gage. Hydrographs for these wells and their relative locations are shown in figure 9. The installation used in this pumping test is shown in plate 23B.

In June 1953, a pumping test was made on well N-48 at the Dallas Manufacturing Co., and wells N-49 and N-50 were used for observation. Water-level measurements were made periodically in these wells for a short period prior to the test. Well N-48 was then pumped for about 26 hours at an average rate of 1,095 gpm. Water levels were measured in the wells at frequent intervals during the period of pumping. Wells N-49 and N-50 were also equipped with recording gages. Hydrographs for the wells used in this test and their relative locations are shown in figure 10.

Types:
booklet

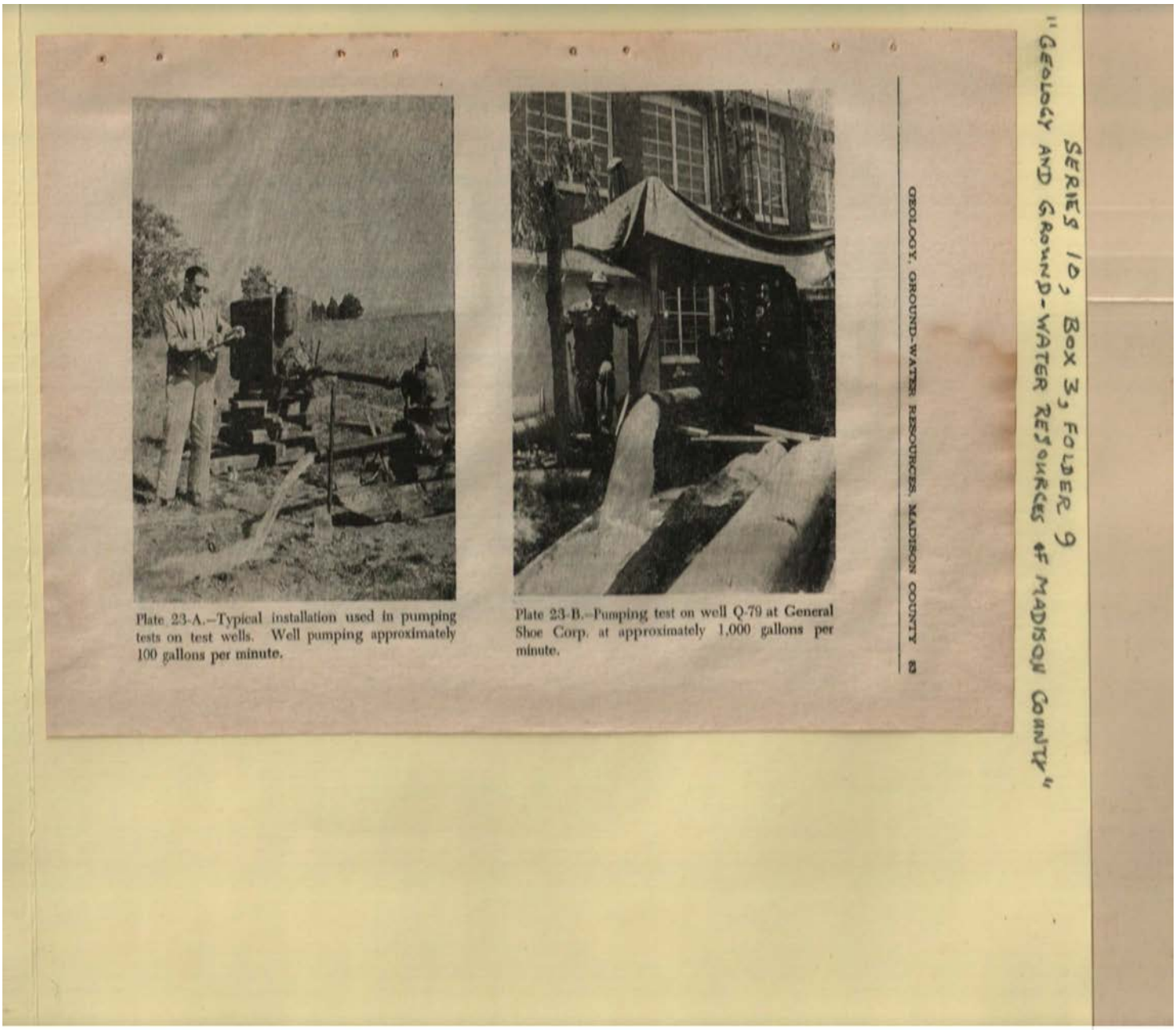


Plate 23-A.—Typical installation used in pumping tests on test wells. Well pumping approximately 100 gallons per minute.

Plate 23-B.—Pumping test on well Q-79 at General Shoe Corp. at approximately 1,000 gallons per minute.

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"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Pumping Tests

Types:
photograph

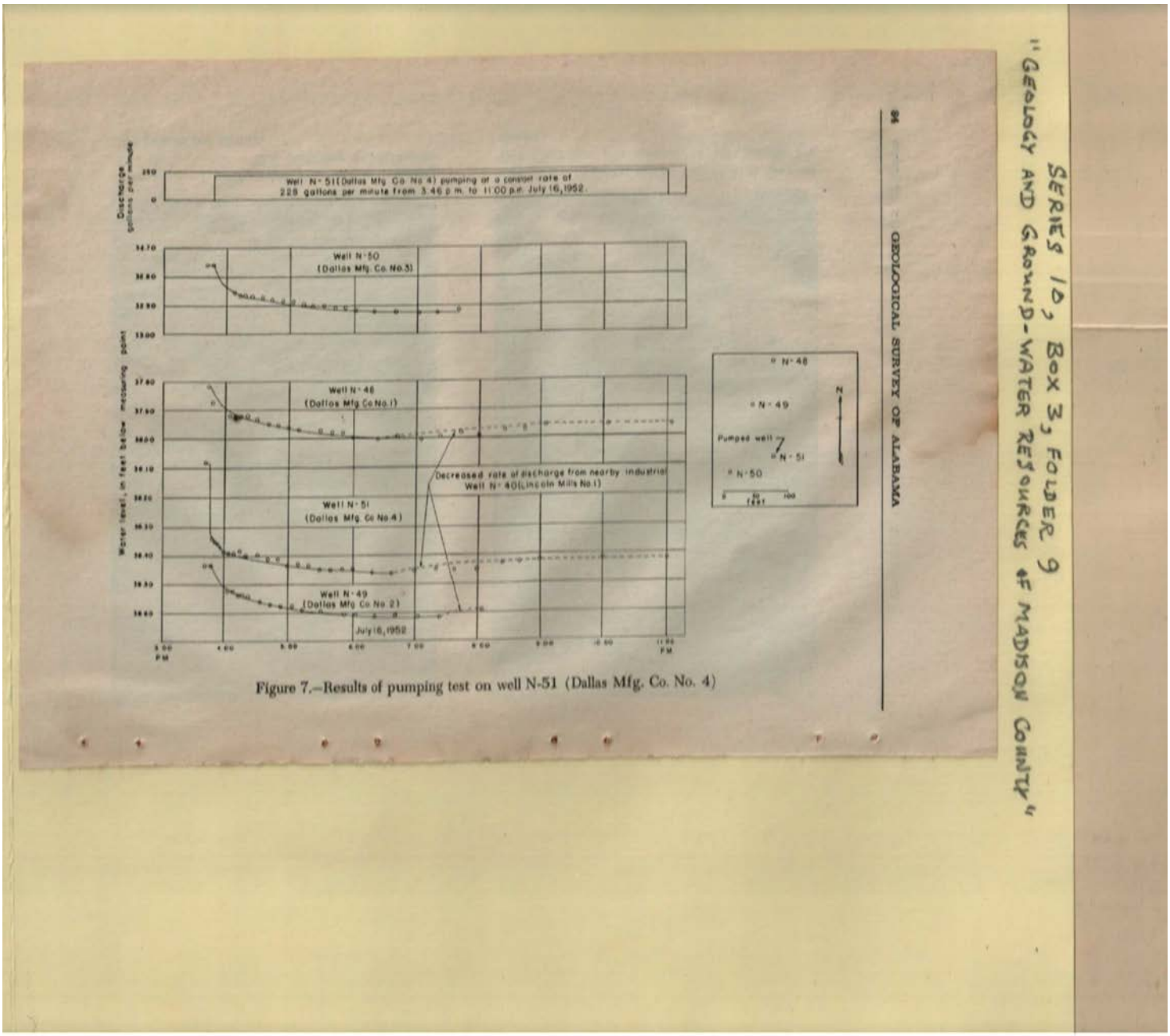

Figure 7.—Results of pumping test on well N-51 (Dallas Mfg. Co. No. 4)

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"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Pump Test Results

Types:
chart

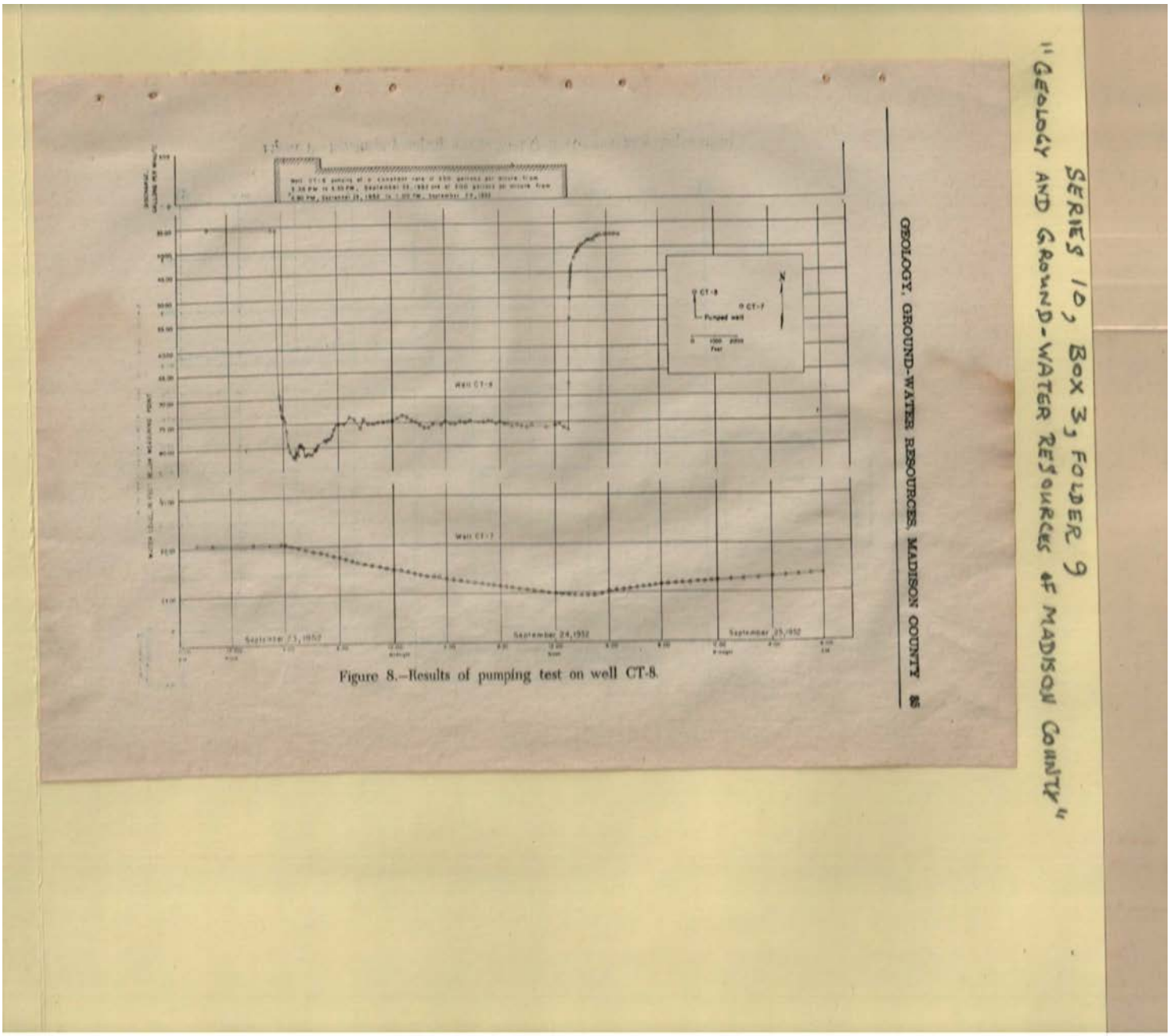

Figure 8.—Results of pumping test on well CT-8.

Names:
Pump Test Results

Types:
chart

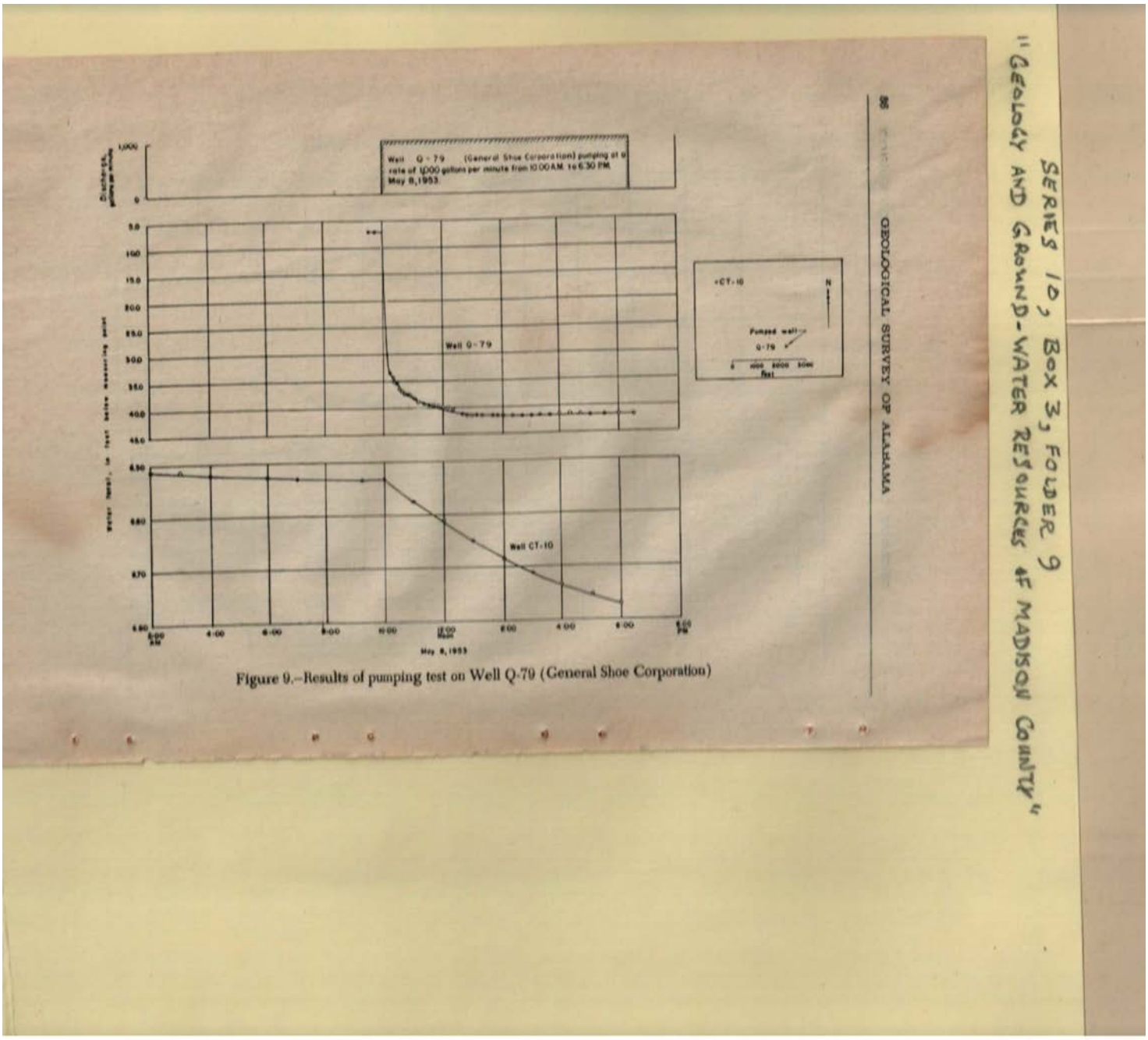

Figure 9.—Results of pumping test on Well Q-79 (General Shoe Corporation)

98 GEOLOGICAL SURVEY OF ALABAMA

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"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Pump Test Results

Types:
chart

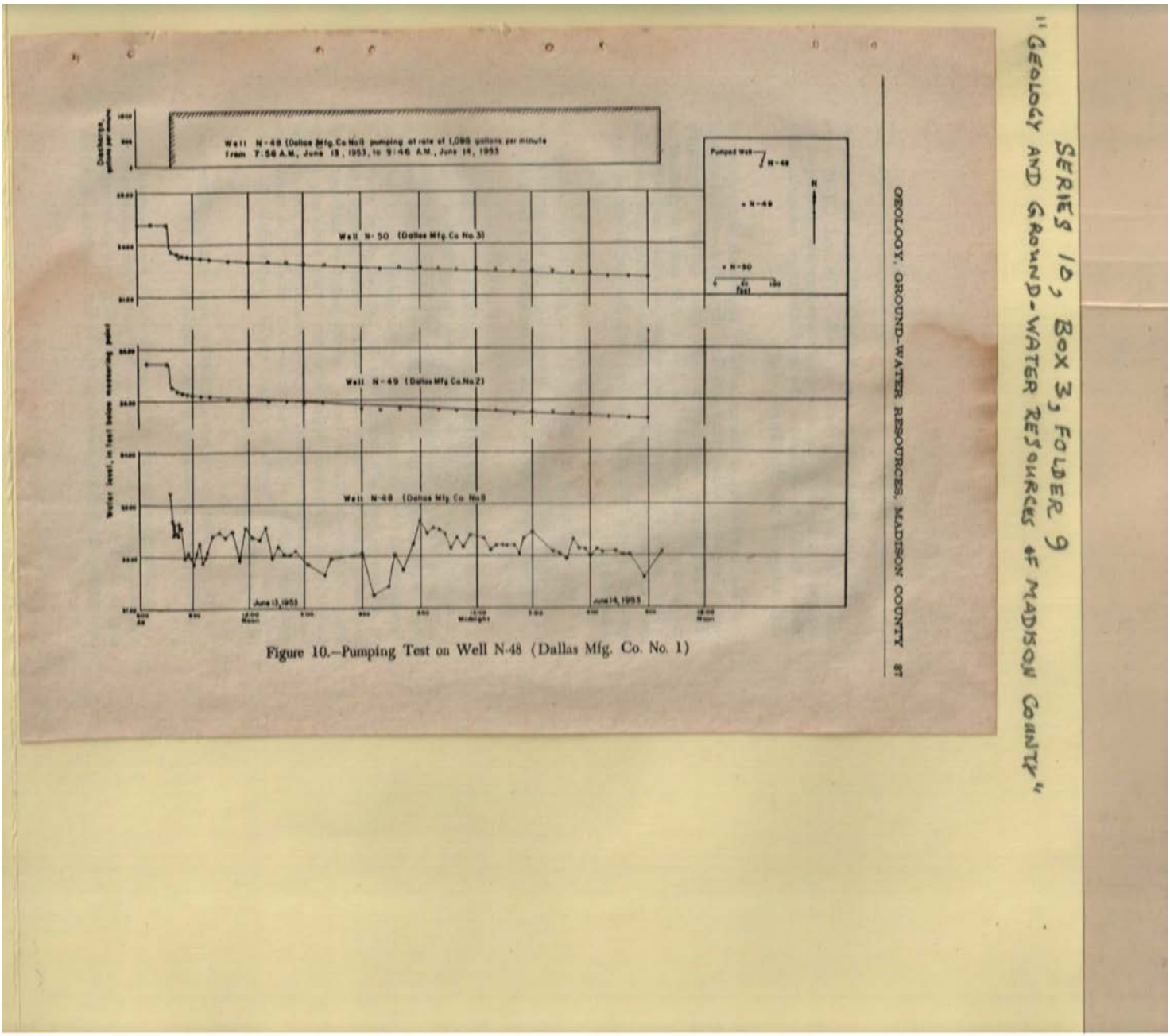
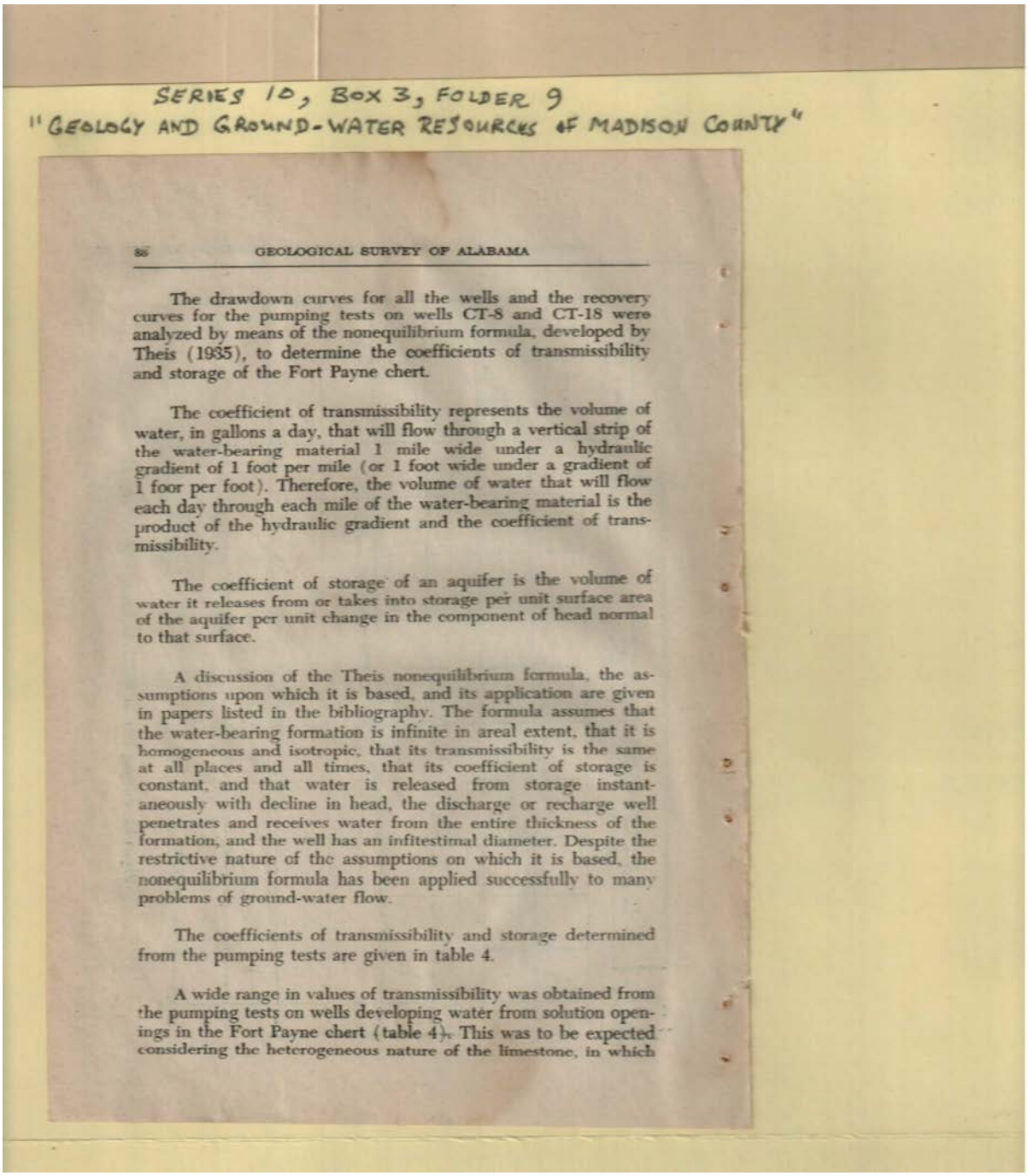


Figure 10.—Pumping Test on Well N-48 (Dallas Mfg. Co. No. 1)

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Pump Test Results

Types:
chart



The drawdown curves for all the wells and the recovery curves for the pumping tests on wells CT-8 and CT-18 were analyzed by means of the nonequilibrium formula, developed by Theis (1935), to determine the coefficients of transmissibility and storage of the Fort Payne chert.

The coefficient of transmissibility represents the volume of water, in gallons a day, that will flow through a vertical strip of the water-bearing material 1 mile wide under a hydraulic gradient of 1 foot per mile (or 1 foot wide under a gradient of 1 foor per foot). Therefore, the volume of water that will flow each day through each mile of the water-bearing material is the product of the hydraulic gradient and the coefficient of transmissibility.

The coefficient of storage of an aquifer is the volume of water it releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface.

A discussion of the Theis nonequilibrium formula, the assumptions upon which it is based, and its application are given in papers listed in the bibliography. The formula assumes that the water-bearing formation is infinite in areal extent, that it is homogeneous and isotropic, that its transmissibility is the same at all places and all times, that its coefficient of storage is constant, and that water is released from storage instantaneously with decline in head, the discharge or recharge well penetrates and receives water from the entire thickness of the formation, and the well has an infitestimal diameter. Despite the restrictive nature of the assumptions on which it is based, the nonequilibrium formula has been applied successfully to many problems of ground-water flow.

The coefficients of transmissibility and storage determined from the pumping tests are given in table 4.

A wide range in values of transmissibility was obtained from the pumping tests on wells developing water from solution openings in the Fort Payne chert (table 4). This was to be expected considering the heterogeneous nature of the limestone, in which

Names:
Theis,

Types:
booklet

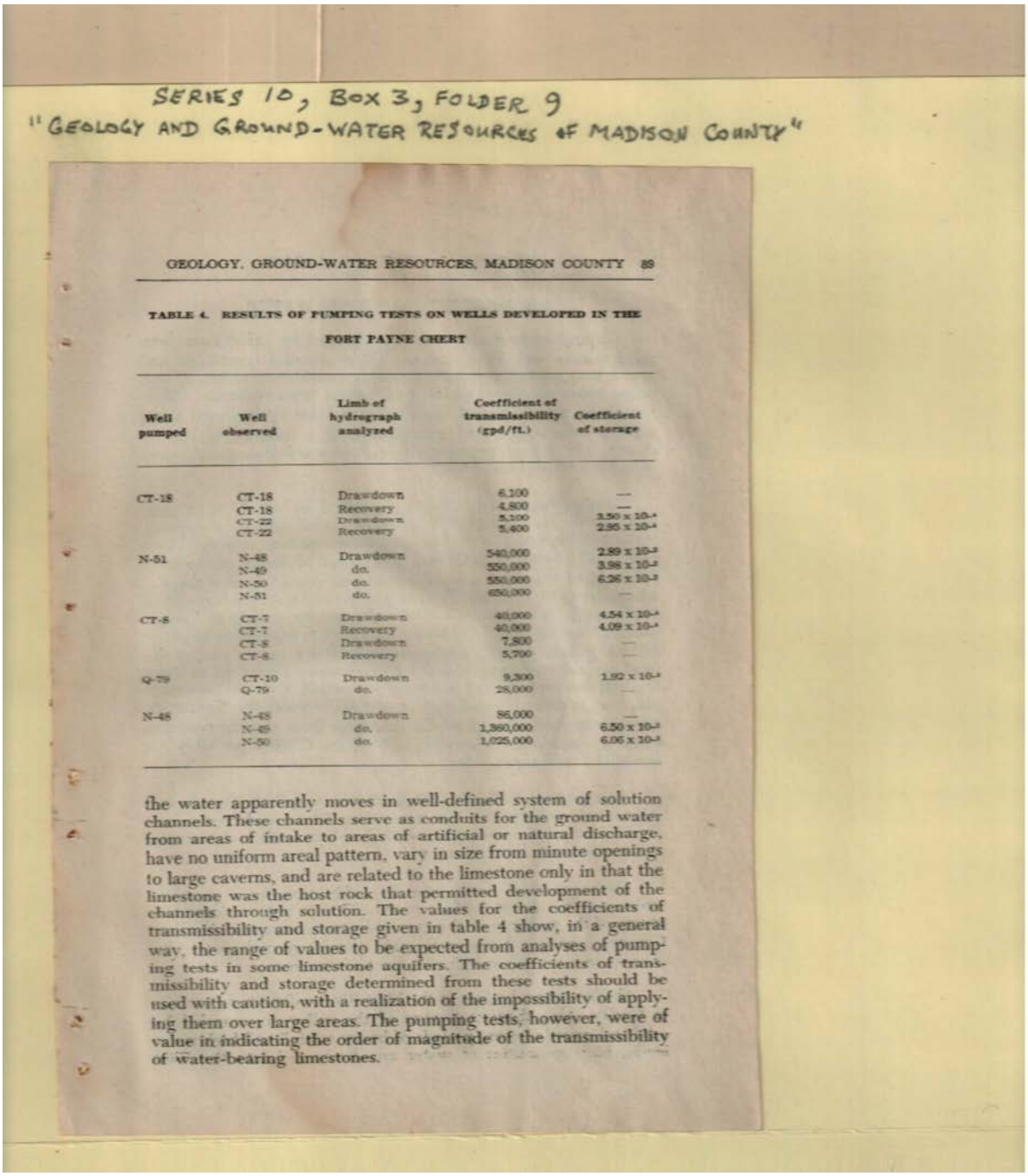


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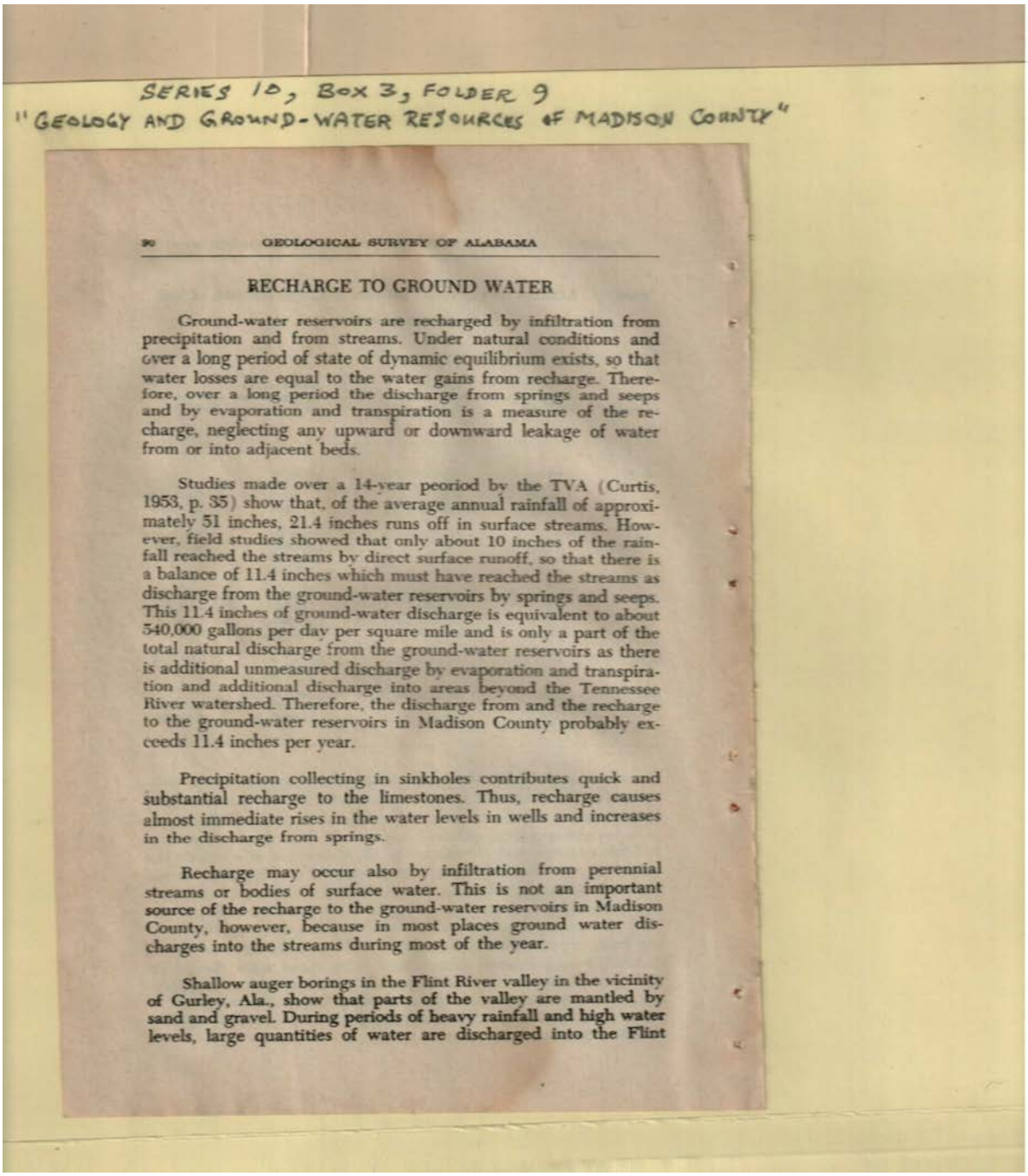
TABLE 4. RESULTS OF PUMPING TESTS ON WELLS DEVELOPED IN THE FORT PAYNE CHERT

Well pumped	Well observed	Limb of hydrograph analyzed	Coefficient of transmissibility (gpd/ft.)	Coefficient of storage
CT-18	CT-18	Drawdown	6,100	—
	CT-18	Recovery	4,800	—
	CT-22	Drawdown	5,100	3.50×10^{-4}
	CT-22	Recovery	5,400	2.95×10^{-4}
N-51	N-48	Drawdown	540,000	2.89×10^{-3}
	N-49	do.	550,000	3.98×10^{-3}
	N-50	do.	550,000	6.26×10^{-3}
	N-51	do.	650,000	—
CT-8	CT-7	Drawdown	40,000	4.54×10^{-4}
	CT-7	Recovery	40,000	4.09×10^{-4}
	CT-8	Drawdown	7,800	—
	CT-8	Recovery	5,700	—
Q-79	CT-10	Drawdown	9,300	1.92×10^{-3}
	Q-79	do.	28,000	—
N-48	N-48	Drawdown	86,000	—
	N-48	do.	1,360,000	6.50×10^{-3}
	N-50	do.	1,025,000	6.06×10^{-3}

the water apparently moves in well-defined system of solution channels. These channels serve as conduits for the ground water from areas of intake to areas of artificial or natural discharge, have no uniform areal pattern, vary in size from minute openings to large caverns, and are related to the limestone only in that the limestone was the host rock that permitted development of the channels through solution. The values for the coefficients of transmissibility and storage given in table 4 show, in a general way, the range of values to be expected from analyses of pumping tests in some limestone aquifers. The coefficients of transmissibility and storage determined from these tests should be used with caution, with a realization of the impossibility of applying them over large areas. The pumping tests, however, were of value in indicating the order of magnitude of the transmissibility of water-bearing limestones.

Names:
Pump Test Results

Types:
chart



RECHARGE TO GROUND WATER

Ground-water reservoirs are recharged by infiltration from precipitation and from streams. Under natural conditions and over a long period of state of dynamic equilibrium exists, so that water losses are equal to the water gains from recharge. Therefore, over a long period the discharge from springs and seeps and by evaporation and transpiration is a measure of the recharge, neglecting any upward or downward leakage of water from or into adjacent beds.

Studies made over a 14-year peoriod by the TVA (Curtis, 1953, p. 35) show that, of the average annual rainfall of approximately 51 inches, 21.4 inches runs off in surface streams. However, field studies showed that only about 10 inches of the rainfall reached the streams by direct surface runoff, so that there is a balance of 11.4 inches which must have reached the streams as discharge from the ground-water reservoirs by springs and seeps. This 11.4 inches of ground-water discharge is equivalent to about 540,000 gallons per day per square mile and is only a part of the total natural discharge from the ground-water reservoirs as there is additional unmeasured discharge by evaporation and transpiration and additional discharge into areas beyond the Tennessee River watershed. Therefore, the discharge from and the recharge to the ground-water reservoirs in Madison County probably exceeds 11.4 inches per year.

Precipitation collecting in sinkholes contributes quick and substantial recharge to the limestones. Thus, recharge causes almost immediate rises in the water levels in wells and increases in the discharge from springs.

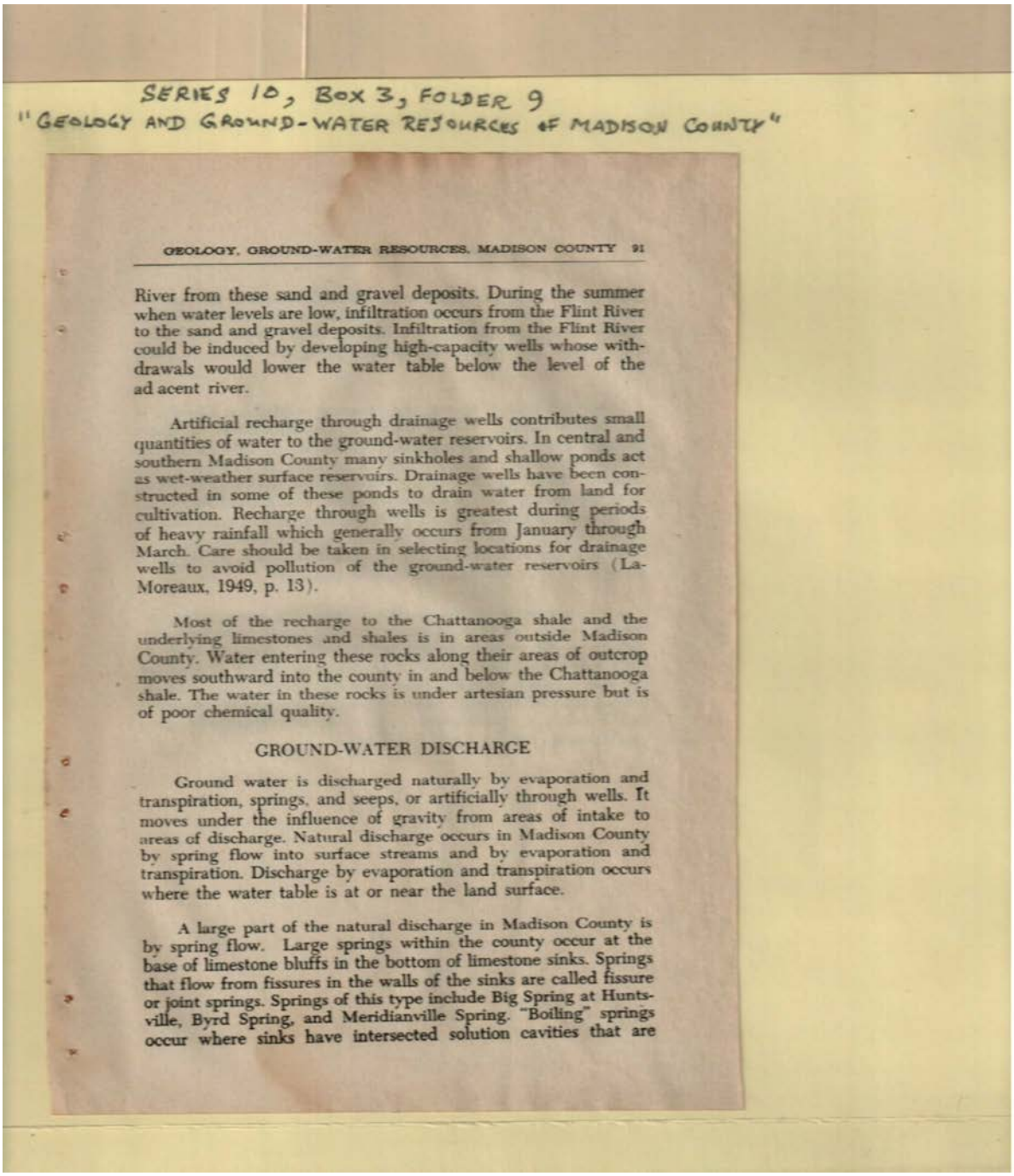
Recharge may occur also by infiltration from perennial streams or bodies of surface water. This is not an important source of the recharge to the ground-water reservoirs in Madison County, however, because in most places ground water discharges into the streams during most of the year.

Shallow auger borings in the Flint River valley in the vicinity of Gurley, Ala., show that parts of the valley are mantled by sand and gravel. During periods of heavy rainfall and high water levels, large quantities of water are discharged into the Flint

Names:
Curtis,

Recharge to Ground Water

Types:
booklet



River from these sand and gravel deposits. During the summer when water levels are low, infiltration occurs from the Flint River to the sand and gravel deposits. Infiltration from the Flint River could be induced by developing high-capacity wells whose withdrawals would lower the water table below the level of the ad acent river.

Artificial recharge through drainage wells contributes small quantities of water to the ground-water reservoirs. In central and southern Madison County many sinkholes and shallow ponds act as wet-weather surface reservoirs. Drainage wells have been constructed in some of these ponds to drain water from land for cultivation. Recharge through wells is greatest during periods of heavy rainfall which generally occurs from January through March. Care should be taken in selecting locations for drainage wells to avoid pollution of the ground-water reservoirs (La-Moreaux, 1949, p. 13).

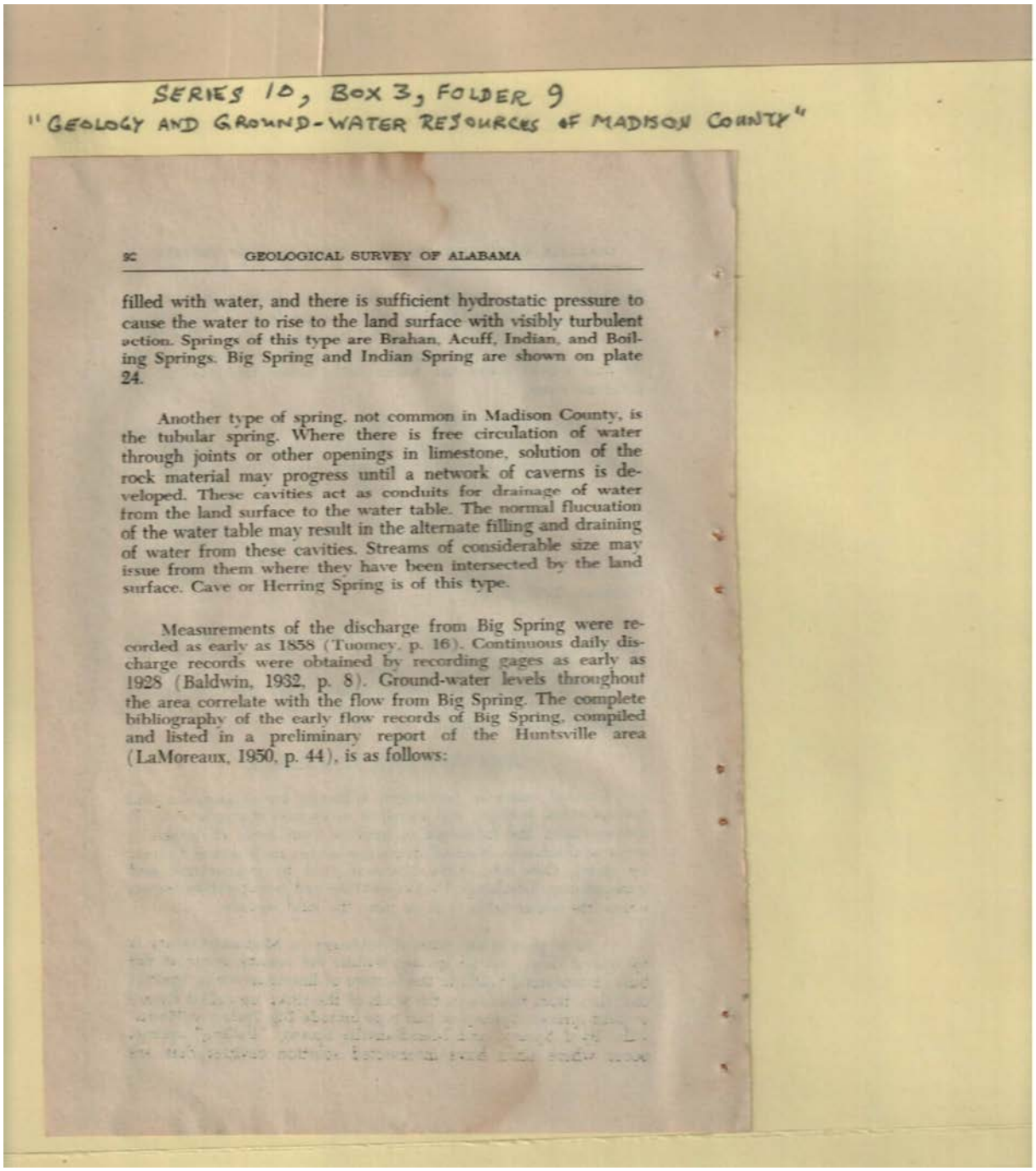
Most of the recharge to the Chattanooga shale and the underlying limestones and shales is in areas outside Madison County. Water entering these rocks along their areas of outcrop moves southward into the county in and below the Chattanooga shale. The water in these rocks is under artesian pressure but is of poor chemical quality.

GROUND-WATER DISCHARGE

Ground water is discharged naturally by evaporation and transpiration, springs, and seeps, or artificially through wells. It moves under the influence of gravity from areas of intake to areas of discharge. Natural discharge occurs in Madison County by spring flow into surface streams and by evaporation and transpiration. Discharge by evaporation and transpiration occurs where the water table is at or near the land surface.

A large part of the natural discharge in Madison County is by spring flow. Large springs within the county occur at the base of limestone bluffs in the bottom of limestone sinks. Springs that flow from fissures in the walls of the sinks are called fissure or joint springs. Springs of this type include Big Spring at Huntsville, Byrd Spring, and Meridianville Spring. "Boiling" springs occur where sinks have intersected solution cavities that are

Types:
booklet



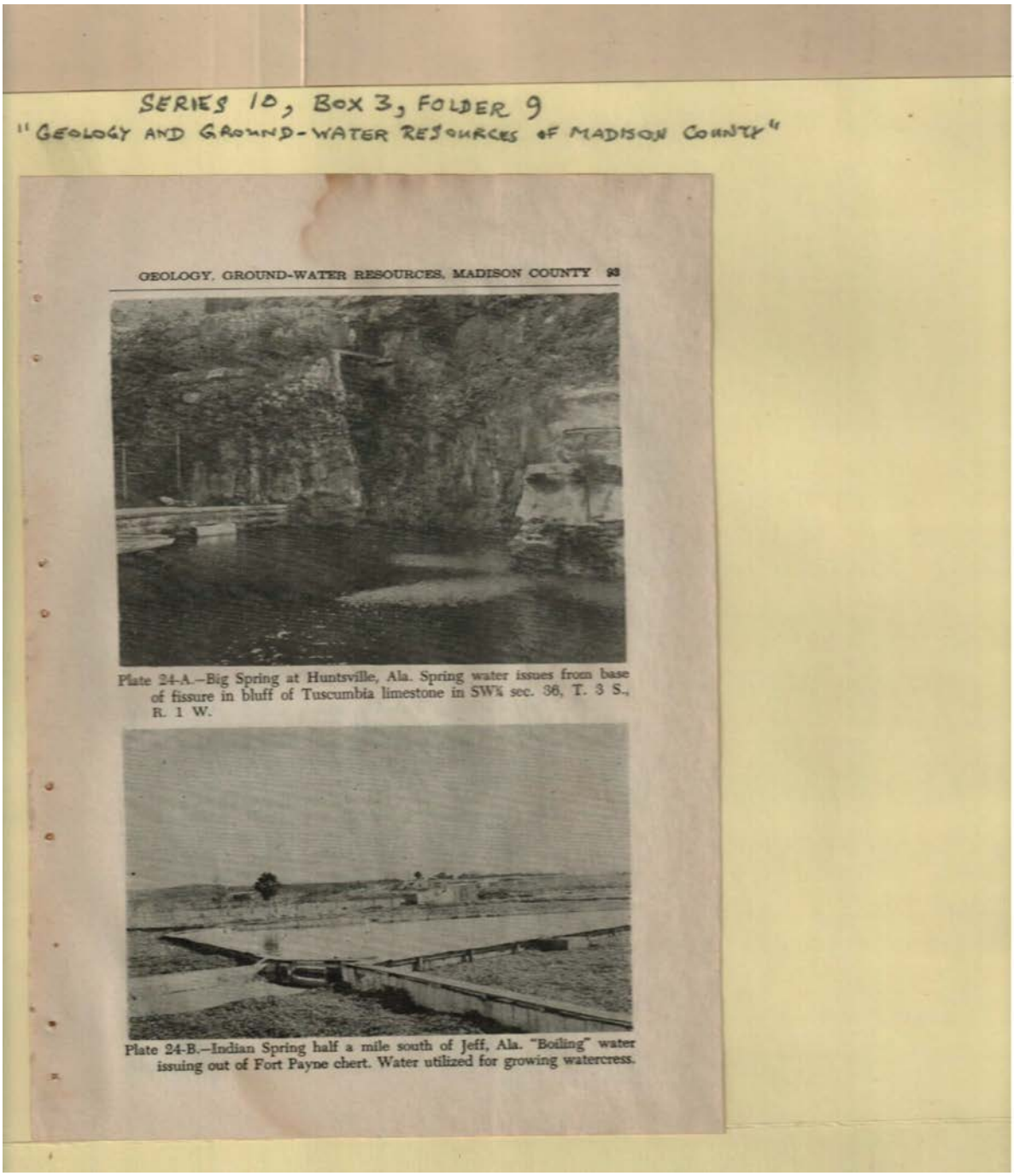
filled with water, and there is sufficient hydrostatic pressure to cause the water to rise to the land surface with visibly turbulent action. Springs of this type are Brahan, Acuff, Indian, and Boiling Springs. Big Spring and Indian Spring are shown on plate 24.

Another type of spring, not common in Madison County, is the tubular spring. Where there is free circulation of water through joints or other openings in limestone, solution of the rock material may progress until a network of caverns is developed. These cavities act as conduits for drainage of water from the land surface to the water table. The normal flucuation of the water table may result in the alternate filling and draining of water from these cavities. Streams of considerable size may issue from them where they have been intersected by the land surface. Cave or Herring Spring is of this type.

Measurements of the discharge from Big Spring were recorded as early as 1858 (Tuomey, p. 16). Continuous daily discharge records were obtained by recording gages as early as 1928 (Baldwin, 1932, p. 8). Ground-water levels throughout the area correlate with the flow from Big Spring. The complete bibliography of the early flow records of Big Spring, compiled and listed in a preliminary report of the Huntsville area (LaMoreaux, 1950, p. 44), is as follows:

Names:
Baldwin LaMoreaux, Tuomey,

Types:
booklet



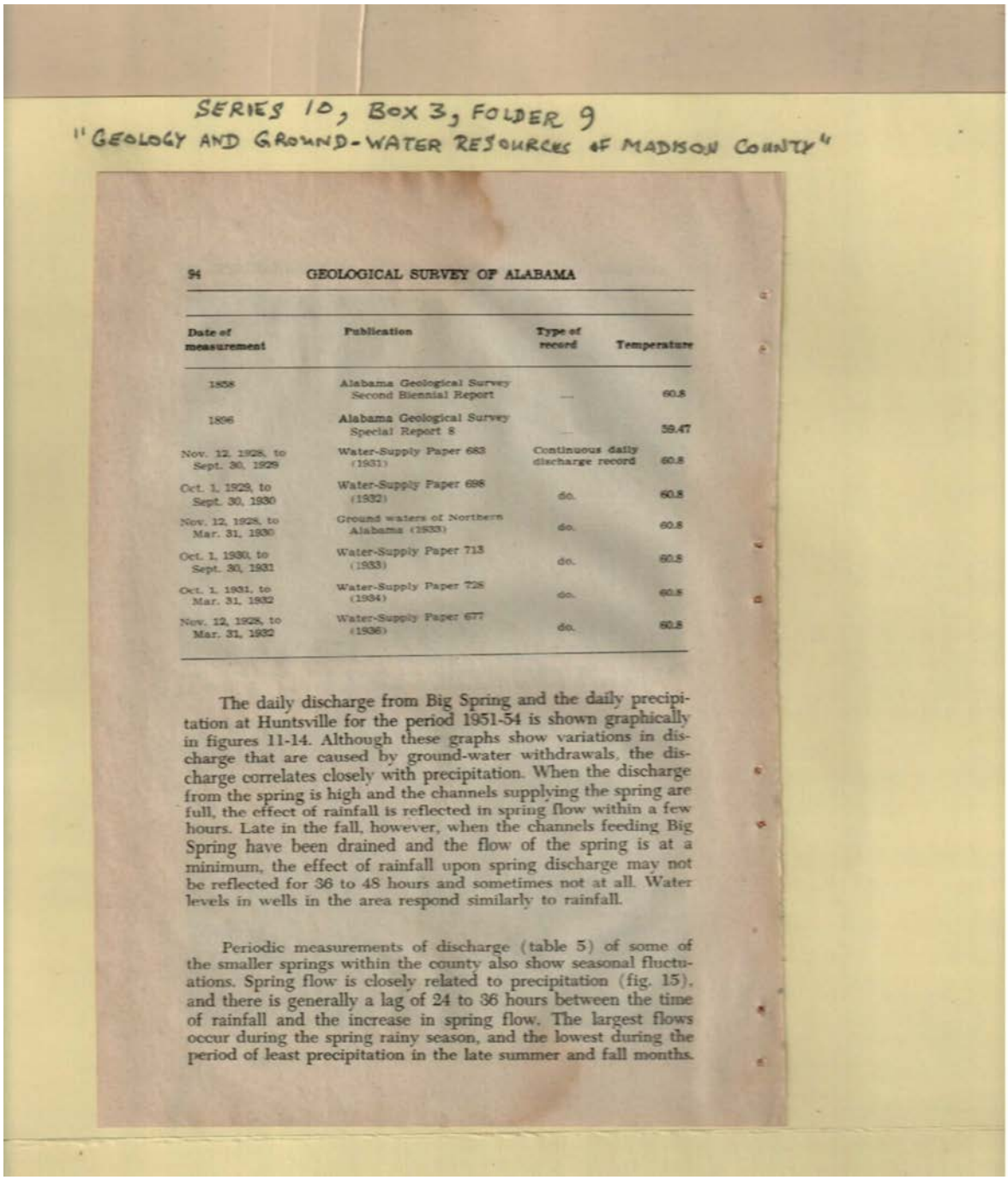
Names:

Big Spring in Huntsville

Indian Spring in Jeff

Types:

photograph



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Date of measurement	Publication	Type of record	Temperature
1858	Alabama Geological Survey Second Biennial Report	—	60.8
1896	Alabama Geological Survey Special Report 8	—	59.47
Nov. 12, 1928, to Sept. 30, 1929	Water-Supply Paper 683 (1931)	Continuous daily discharge record	60.8
Oct. 1, 1929, to Sept. 30, 1930	Water-Supply Paper 698 (1932)	do.	60.8
Nov. 12, 1928, to Mar. 31, 1930	Ground waters of Northern Alabama (1933)	do.	60.8
Oct. 1, 1930, to Sept. 30, 1931	Water-Supply Paper 713 (1933)	do.	60.8
Oct. 1, 1931, to Mar. 31, 1932	Water-Supply Paper 728 (1934)	do.	60.8
Nov. 12, 1928, to Mar. 31, 1932	Water-Supply Paper 677 (1936)	do.	60.8

The daily discharge from Big Spring and the daily precipitation at Huntsville for the period 1951-54 is shown graphically in figures 11-14. Although these graphs show variations in discharge that are caused by ground-water withdrawals, the discharge correlates closely with precipitation. When the discharge from the spring is high and the channels supplying the spring are full, the effect of rainfall is reflected in spring flow within a few hours. Late in the fall, however, when the channels feeding Big Spring have been drained and the flow of the spring is at a minimum, the effect of rainfall upon spring discharge may not be reflected for 36 to 48 hours and sometimes not at all. Water levels in wells in the area respond similarly to rainfall.

Periodic measurements of discharge (table 5) of some of the smaller springs within the county also show seasonal fluctuations. Spring flow is closely related to precipitation (fig. 15), and there is generally a lag of 24 to 36 hours between the time of rainfall and the increase in spring flow. The largest flows occur during the spring rainy season, and the lowest during the period of least precipitation in the late summer and fall months.

Types:
booklet

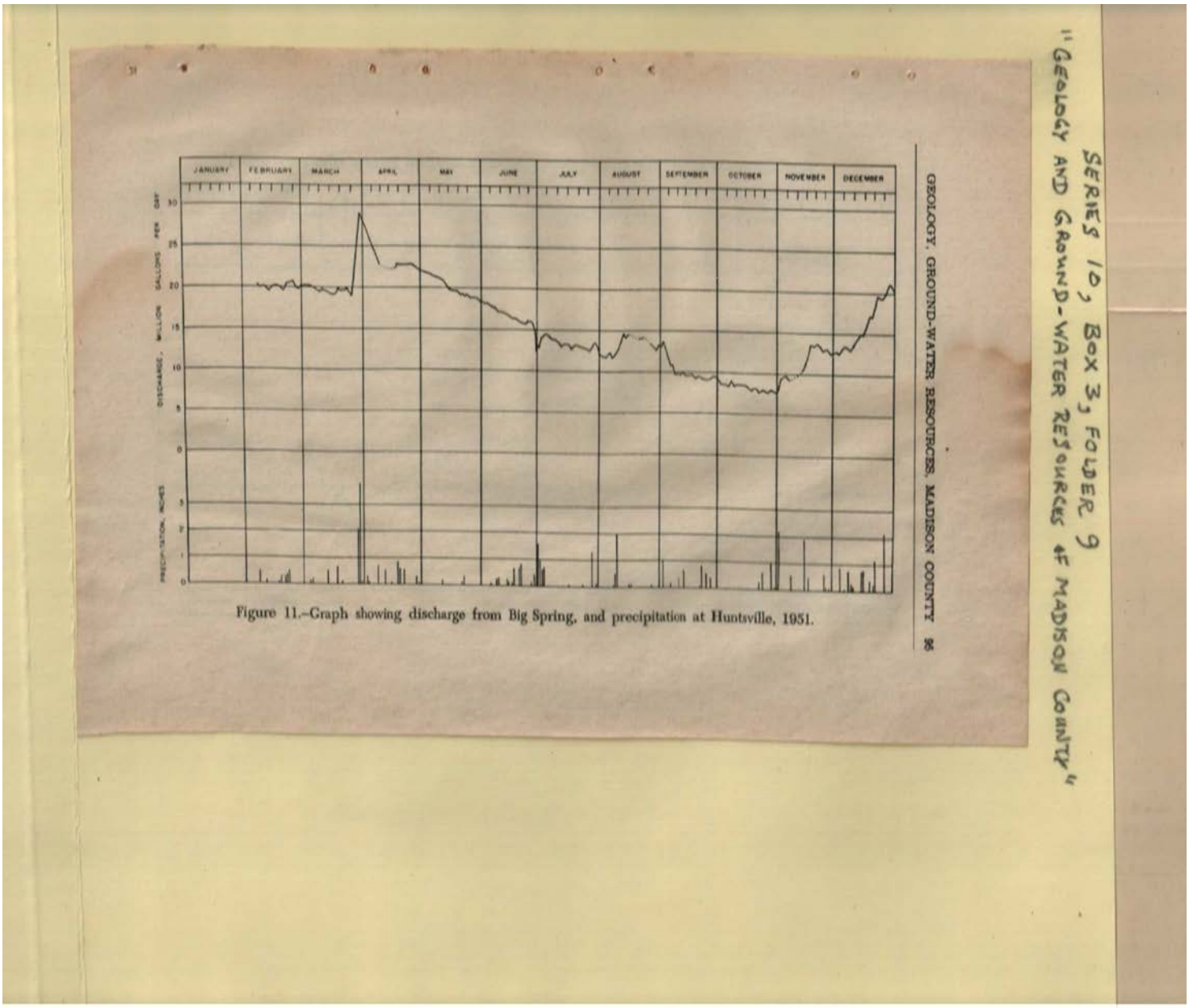


Figure 11.–Graph showing discharge from Big Spring, and precipitation at Huntsville, 1951.

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Big Spring Discharge, 1951

Types:
chart

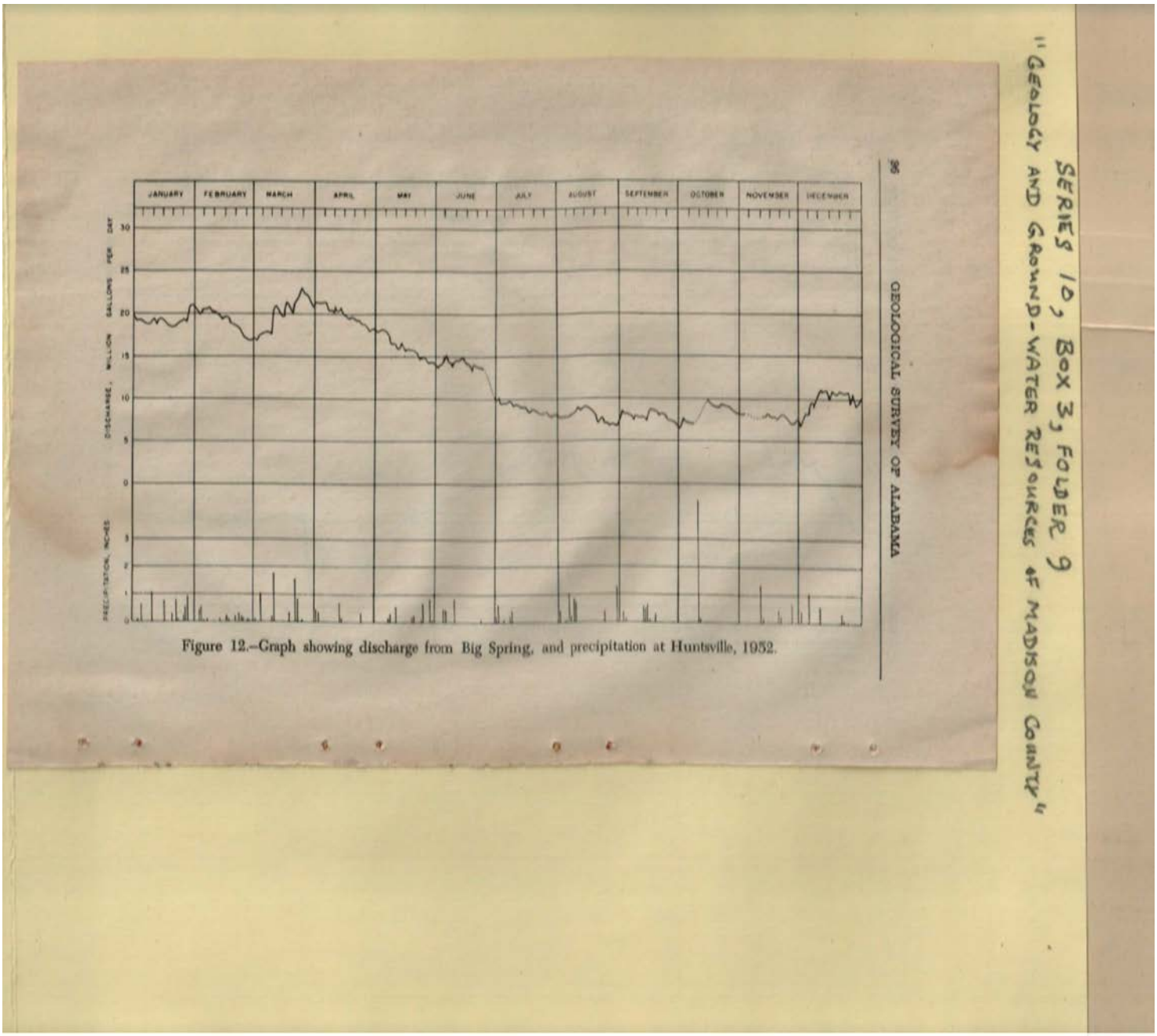


Figure 12.—Graph showing discharge from Big Spring, and precipitation at Huntsville, 1952.

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Big Spring Discharge, 1952

Types:
chart

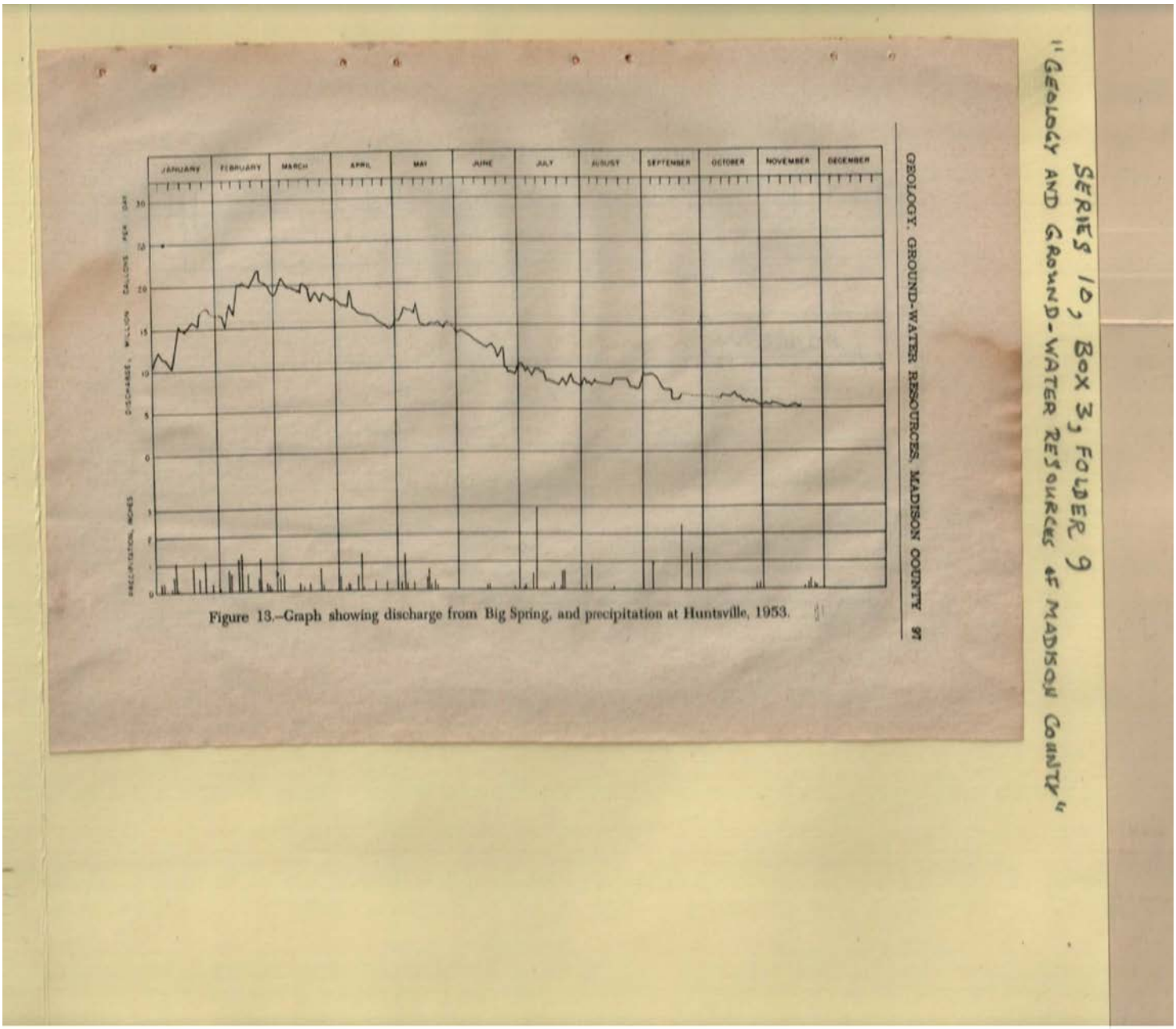


Figure 13.–Graph showing discharge from Big Spring, and precipitation at Huntsville, 1953.

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Big Spring Discharge, 1953

Types:
chart

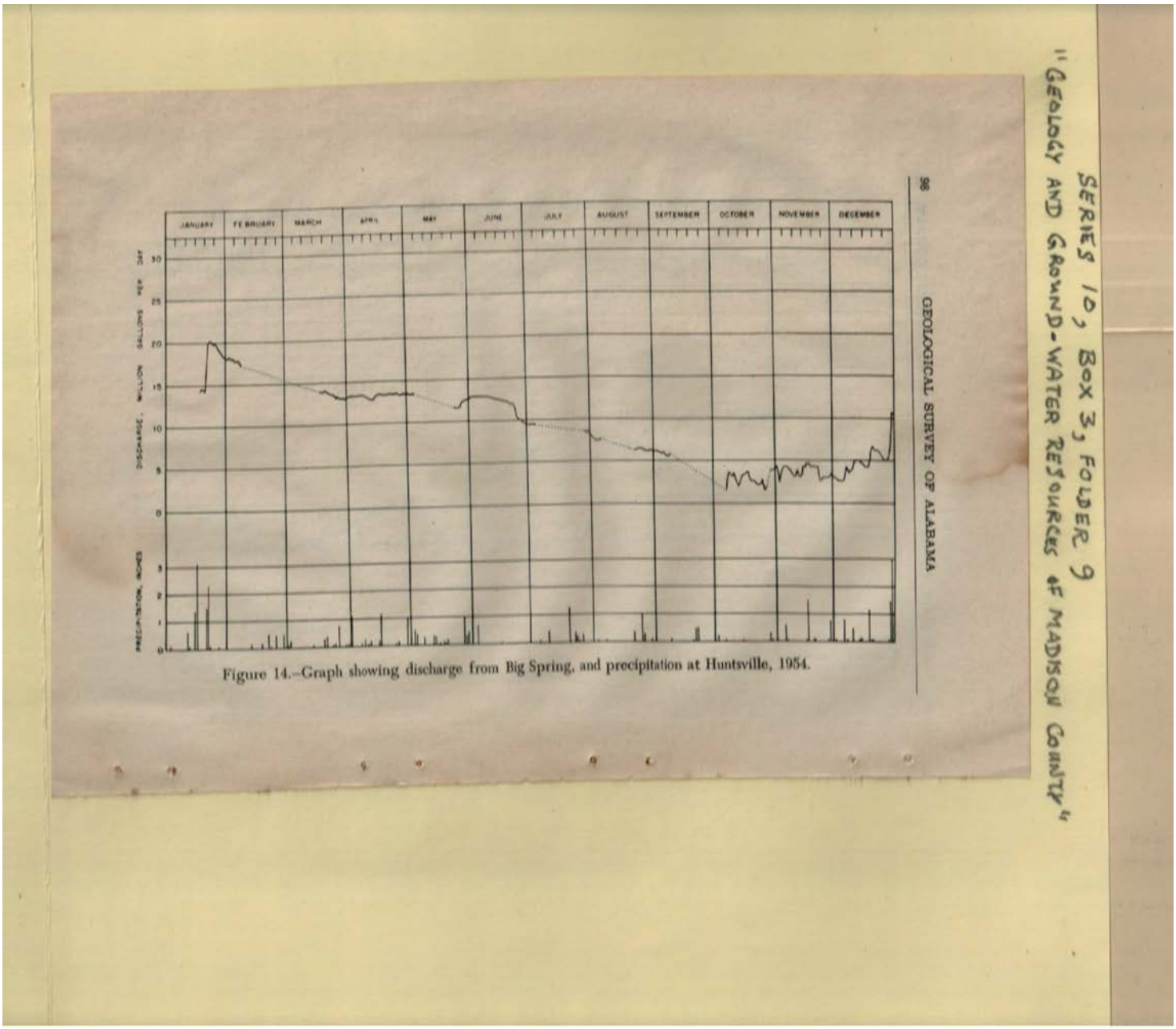


Figure 14.–Graph showing discharge from Big Spring, and precipitation at Huntsville, 1954.

Names:

Big Spring Discharge, 1954

Types:

chart

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

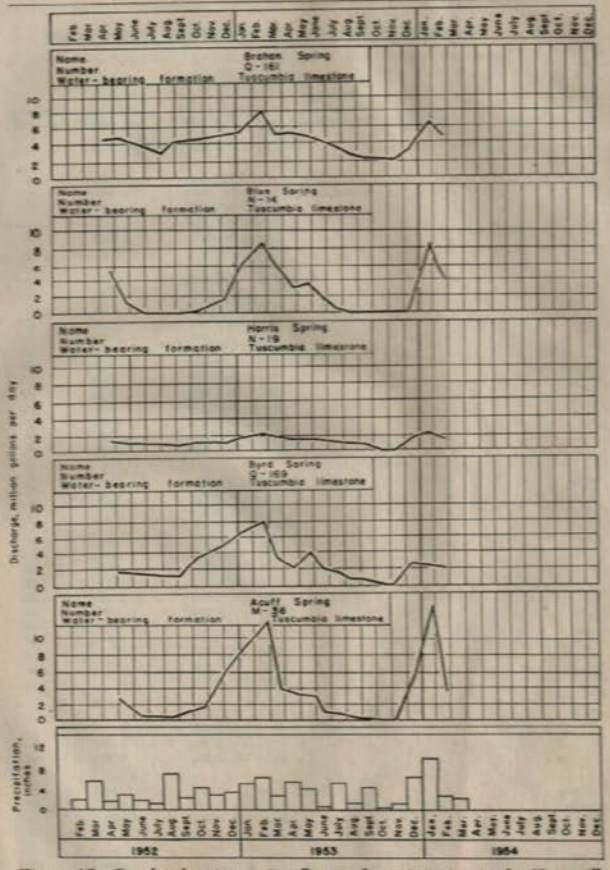


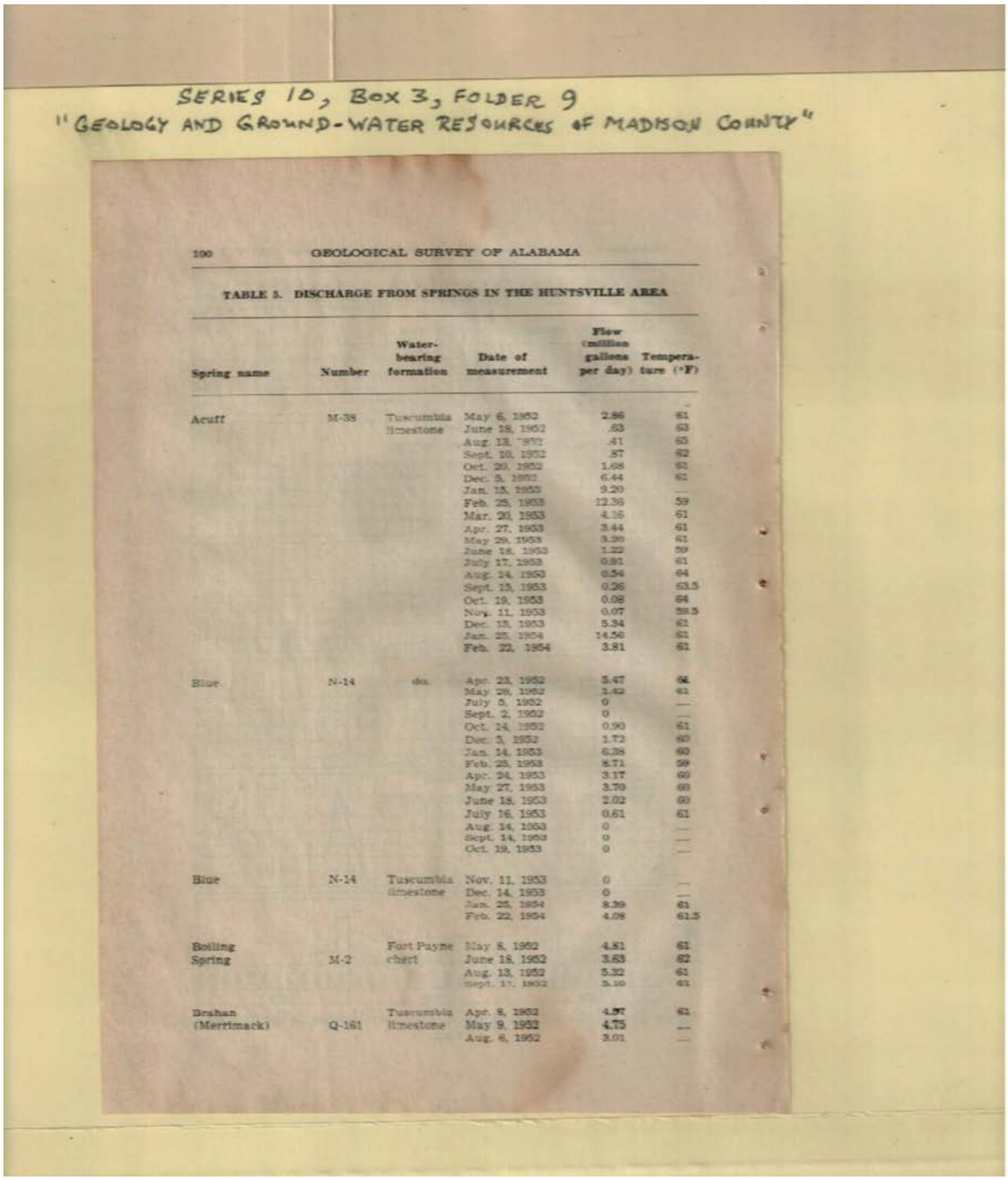
Figure 15.—Graphs showing spring flow and precipitation in the Huntsville area.

Names:

Spring Flow and Precipitation

Types:

chart



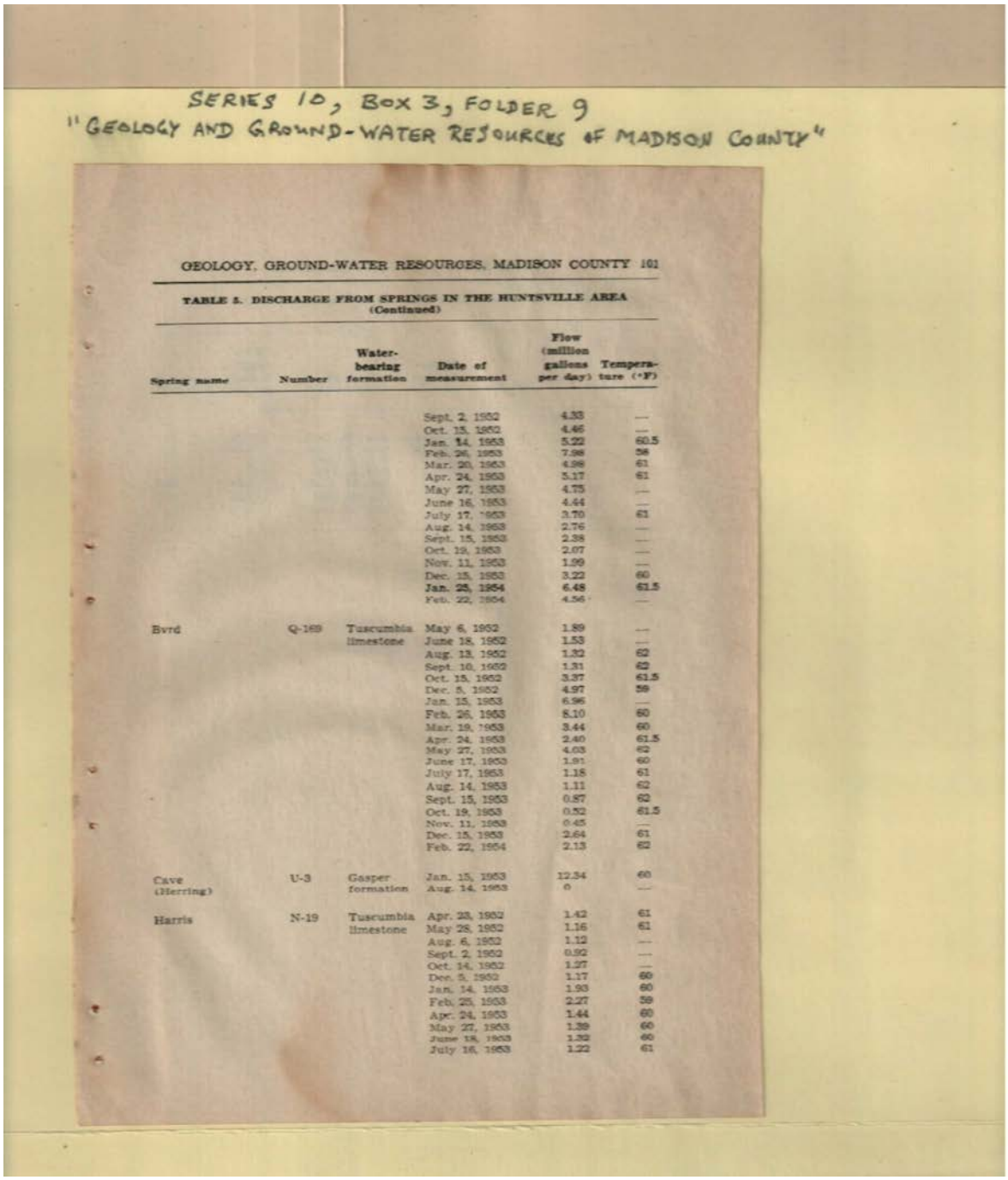
100 GEOLOGICAL SURVEY OF ALABAMA

TABLE 5. DISCHARGE FROM SPRINGS IN THE HUNTSVILLE AREA

Spring name	Number	Water-bearing formation	Date of measurement	Flow (million gallons per day)	Temperature (°F)
Acuff	M-38	Tuscumbia limestone	May 6, 1952	2.86	61
			June 18, 1952	.63	63
			Aug. 13, 1952	.41	65
			Sept. 10, 1952	.87	62
			Oct. 20, 1952	1.68	61
			Dec. 5, 1952	6.44	61
			Jan. 15, 1953	9.20	—
			Feb. 25, 1953	12.36	59
			Mar. 20, 1953	4.16	61
			Apr. 27, 1953	3.44	61
			May 29, 1953	3.20	61
			June 16, 1953	1.22	59
			July 17, 1953	0.81	61
			Aug. 14, 1953	0.54	64
			Sept. 15, 1953	0.26	63.5
			Oct. 19, 1953	0.08	64
			Nov. 11, 1953	0.07	59.5
			Dec. 15, 1953	5.34	61
			Jan. 25, 1954	14.56	61
			Feb. 22, 1954	3.81	61
Blue	N-14	do.	Apr. 23, 1952	5.47	64
			May 28, 1952	1.62	61
			July 5, 1952	0	—
			Sept. 2, 1952	0	—
			Oct. 14, 1952	0.90	61
			Dec. 5, 1952	1.72	60
			Jan. 14, 1953	6.38	60
			Feb. 25, 1953	8.71	59
			Apr. 24, 1953	3.17	60
			May 27, 1953	3.70	60
			June 18, 1953	2.02	60
			July 16, 1953	0.61	61
			Aug. 14, 1953	0	—
			Sept. 14, 1953	0	—
			Oct. 19, 1953	0	—
Blue	N-14	Tuscumbia limestone	Nov. 11, 1953	0	—
			Dec. 14, 1953	0	—
			Jan. 25, 1954	8.39	61
			Feb. 22, 1954	4.08	61.5
Boiling Spring	M-2	Fort Payne chert	May 8, 1952	4.81	61
			June 18, 1952	3.63	62
			Aug. 13, 1952	5.32	61
			Sept. 17, 1952	5.10	61
Brahan (Merrimack)	Q-161	Tuscumbia limestone	Apr. 8, 1952	4.97	61
			May 9, 1952	4.75	—
			Aug. 6, 1952	3.01	—

Names:
Discharge from Springs

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

TABLE 5. DISCHARGE FROM SPRINGS IN THE HUNTSVILLE AREA (Continued)

Spring name	Number	Water-bearing formation	Date of measurement	Flow (million gallons per day)	Temperature (°F)
			Sept. 2, 1952	4.33	—
			Oct. 15, 1952	4.46	—
			Jan. 14, 1953	5.22	60.5
			Feb. 26, 1953	7.98	58
			Mar. 20, 1953	4.98	61
			Apr. 24, 1953	5.17	61
			May 27, 1953	4.75	—
			June 16, 1953	4.44	—
			July 17, 1953	3.70	61
			Aug. 14, 1953	2.76	—
			Sept. 15, 1953	2.38	—
			Oct. 19, 1953	2.07	—
			Nov. 11, 1953	1.99	—
			Dec. 15, 1953	3.22	60
			Jan. 25, 1954	6.48	61.5
			Feb. 22, 1954	4.56	—
Byrd	Q-169	Tuscumbia limestone	May 6, 1952	1.89	—
			June 18, 1952	1.53	—
			Aug. 13, 1952	1.32	62
			Sept. 10, 1952	1.31	62
			Oct. 15, 1952	3.37	61.5
			Dec. 5, 1952	4.97	59
			Jan. 15, 1953	6.96	—
			Feb. 26, 1953	8.10	60
			Mar. 19, 1953	3.44	60
			Apr. 24, 1953	2.40	61.5
			May 27, 1953	4.03	62
			June 17, 1953	1.91	60
			July 17, 1953	1.18	61
			Aug. 14, 1953	1.11	62
			Sept. 15, 1953	0.87	62
			Oct. 19, 1953	0.52	61.5
			Nov. 11, 1953	0.45	—
			Dec. 15, 1953	2.64	61
			Feb. 22, 1954	2.13	62
Cave (Herring)	U-3	Gasper formation	Jan. 15, 1953	12.34	60
			Aug. 14, 1953	0	—
Harris	N-19	Tuscumbia limestone	Apr. 23, 1952	1.42	61
			May 28, 1952	1.16	61
			Aug. 6, 1952	1.12	—
			Sept. 2, 1952	0.92	—
			Oct. 14, 1952	1.27	—
			Dec. 5, 1952	1.17	60
			Jan. 14, 1953	1.93	60
			Feb. 25, 1953	2.27	59
			Apr. 24, 1953	1.44	60
			May 27, 1953	1.39	60
			June 18, 1953	1.20	60
			July 16, 1953	1.22	61

Names:
Discharge from
Springs

Types:
chart

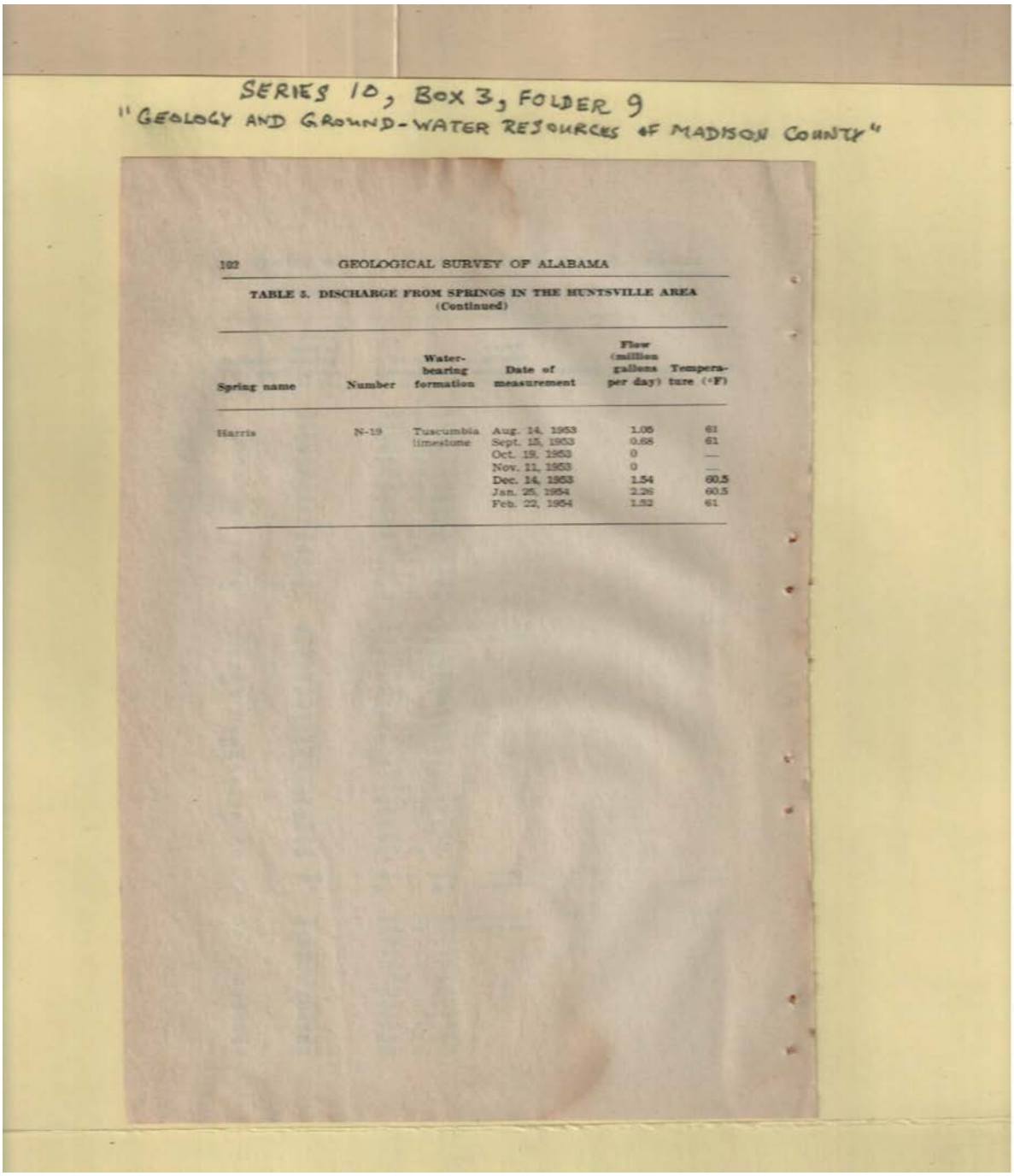
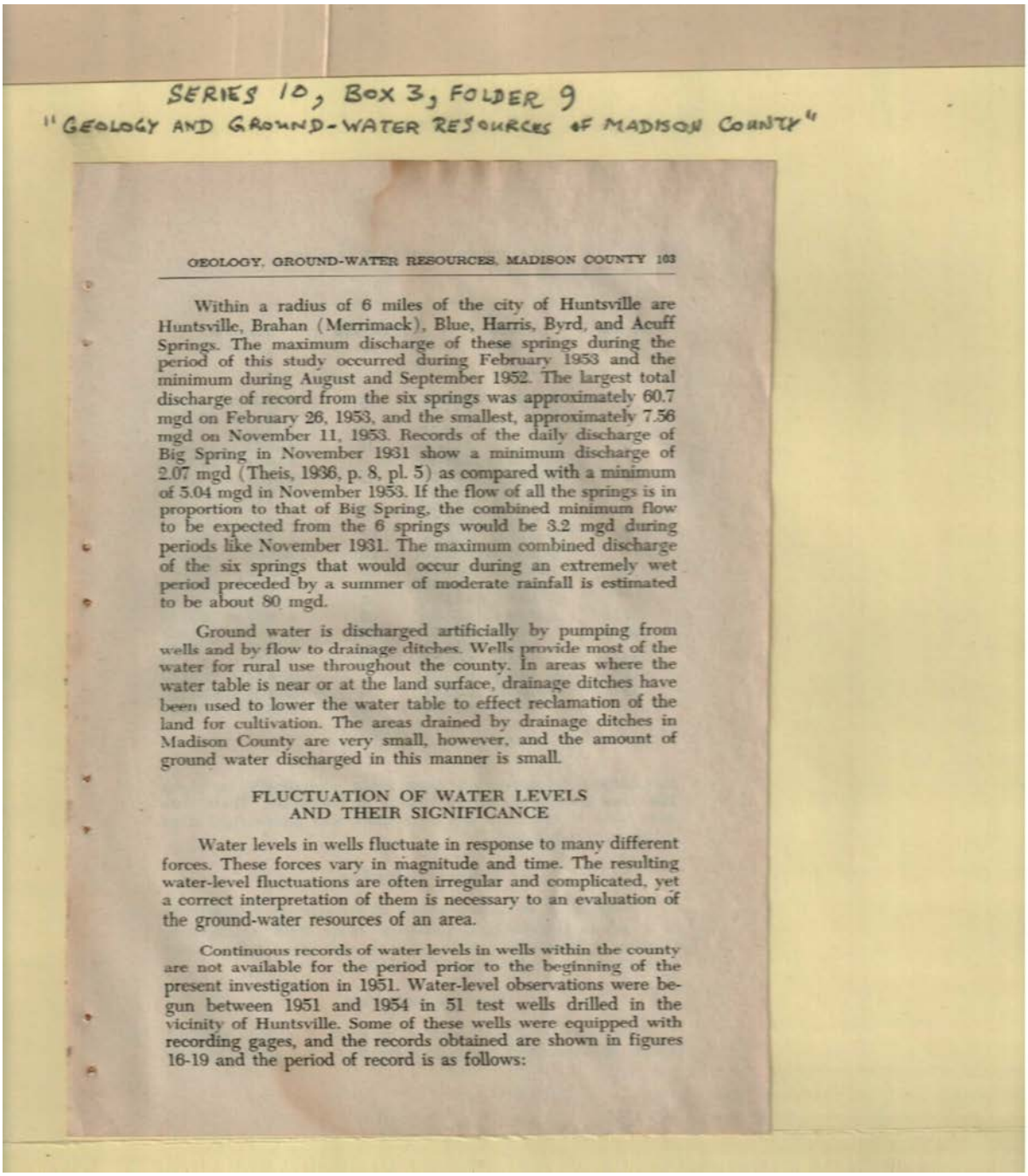


TABLE 5. DISCHARGE FROM SPRINGS IN THE HUNTSVILLE AREA (Continued)

Spring name	Number	Water-bearing formation	Date of measurement	Flow (million gallons per day)	Temperature (°F)
Harris	N-19	Tuscumbia limestone	Aug. 14, 1953	1.05	61
			Sept. 15, 1953	0.68	61
			Oct. 19, 1953	0	—
			Nov. 11, 1953	0	—
			Dec. 14, 1953	1.54	60.5
			Jan. 25, 1954	2.26	60.5
			Feb. 22, 1954	1.32	61

Names:
Discharge from
Springs

Types:
chart



Within a radius of 6 miles of the city of Huntsville are Huntsville, Brahan (Merrimack), Blue, Harris, Byrd, and Acuff Springs. The maximum discharge of these springs during the period of this study occurred during February 1953 and the minimum during August and September 1952. The largest total discharge of record from the six springs was approximately 60.7 mgd on February 26, 1953, and the smallest, approximately 7.56 mgd on November 11, 1953. Records of the daily discharge of Big Spring in November 1931 show a minimum discharge of 2.07 mgd (Theis, 1936, p. 8, pl. 5) as compared with a minimum of 5.04 mgd in November 1953. If the flow of all the springs is in proportion to that of Big Spring, the combined minimum flow to be expected from the 6 springs would be 3.2 mgd during periods like November 1931. The maximum combined discharge of the six springs that would occur during an extremely wet period preceded by a summer of moderate rainfall is estimated to be about 80 mgd.

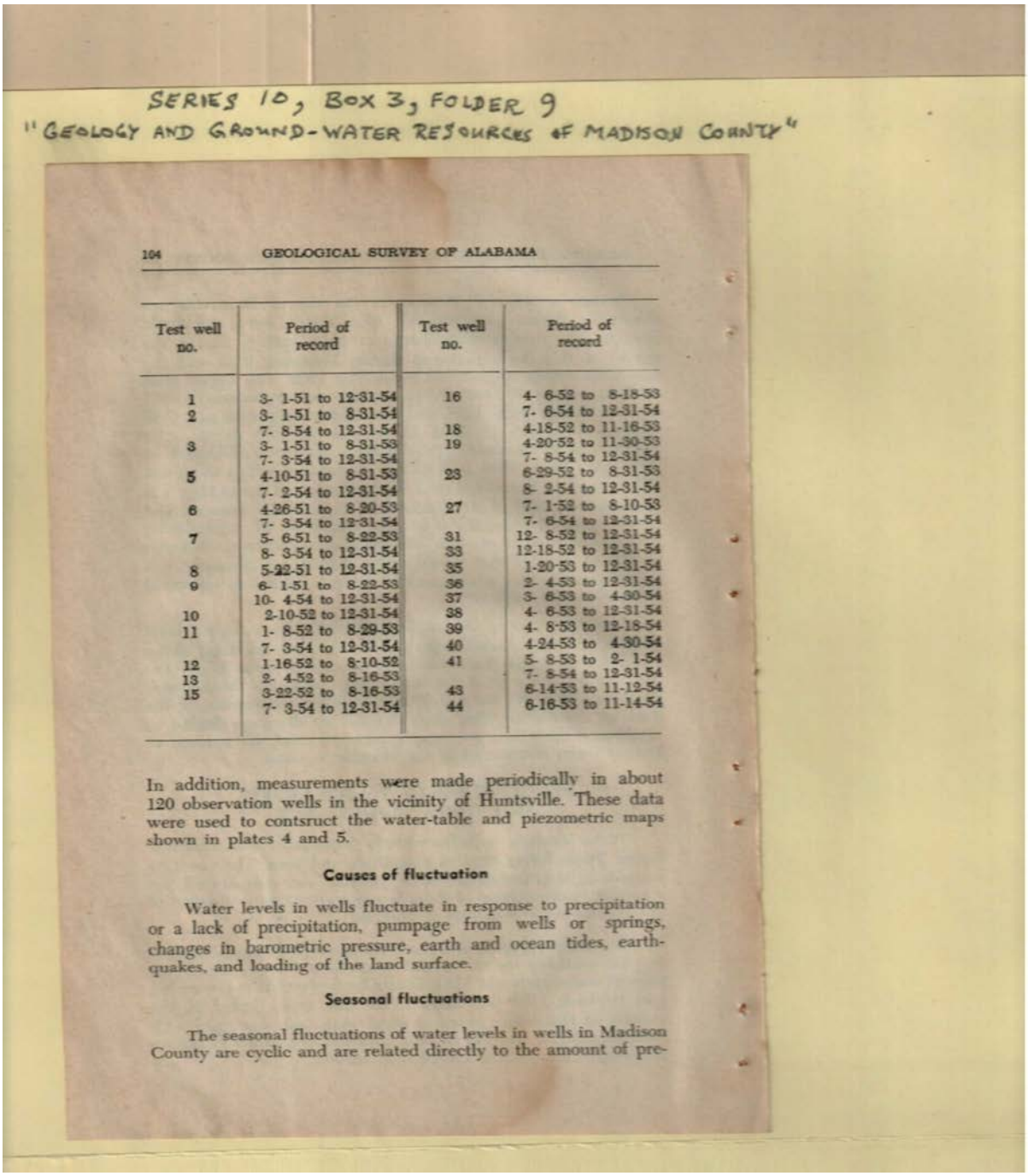
Ground water is discharged artificially by pumping from wells and by flow to drainage ditches. Wells provide most of the water for rural use throughout the county. In areas where the water table is near or at the land surface, drainage ditches have been used to lower the water table to effect reclamation of the land for cultivation. The areas drained by drainage ditches in Madison County are very small, however, and the amount of ground water discharged in this manner is small.

FLUCTUATION OF WATER LEVELS AND THEIR SIGNIFICANCE

Water levels in wells fluctuate in response to many different forces. These forces vary in magnitude and time. The resulting water-level fluctuations are often irregular and complicated, yet a correct interpretation of them is necessary to an evaluation of the ground-water resources of an area.

Continuous records of water levels in wells within the county are not available for the period prior to the beginning of the present investigation in 1951. Water-level observations were begun between 1951 and 1954 in 51 test wells drilled in the vicinity of Huntsville. Some of these wells were equipped with recording gages, and the records obtained are shown in figures 16-19 and the period of record is as follows:

Types:
booklet



Test well no.	Period of record	Test well no.	Period of record
1	3- 1-51 to 12-31-54	16	4- 6-52 to 8-18-53
2	3- 1-51 to 8-31-54		7- 6-54 to 12-31-54
	7- 8-54 to 12-31-54	18	4-18-52 to 11-16-53
3	3- 1-51 to 8-31-53	19	4-20-52 to 11-30-53
	7- 3-54 to 12-31-54		7- 8-54 to 12-31-54
5	4-10-51 to 8-31-53	23	6-29-52 to 8-31-53
	7- 2-54 to 12-31-54		8- 2-54 to 12-31-54
6	4-26-51 to 8-20-53	27	7- 1-52 to 8-10-53
	7- 3-54 to 12-31-54		7- 6-54 to 12-31-54
7	5- 6-51 to 8-22-53	31	12- 8-52 to 12-31-54
	8- 3-54 to 12-31-54	33	12-18-52 to 12-31-54
8	5-22-51 to 12-31-54	35	1-20-53 to 12-31-54
9	6- 1-51 to 8-22-53	36	2- 4-53 to 12-31-54
	10- 4-54 to 12-31-54	37	3- 6-53 to 4-30-54
10	2-10-52 to 12-31-54	38	4- 6-53 to 12-31-54
11	1- 8-52 to 8-29-53	39	4- 8-53 to 12-18-54
	7- 3-54 to 12-31-54	40	4-24-53 to 4-30-54
12	1-16-52 to 8-10-52	41	5- 8-53 to 2- 1-54
13	2- 4-52 to 8-16-53		7- 8-54 to 12-31-54
15	3-22-52 to 8-16-53	43	6-14-53 to 11-12-54
	7- 3-54 to 12-31-54	44	6-16-53 to 11-14-54

In addition, measurements were made periodically in about 120 observation wells in the vicinity of Huntsville. These data were used to contsruct the water-table and piezometric maps shown in plates 4 and 5.

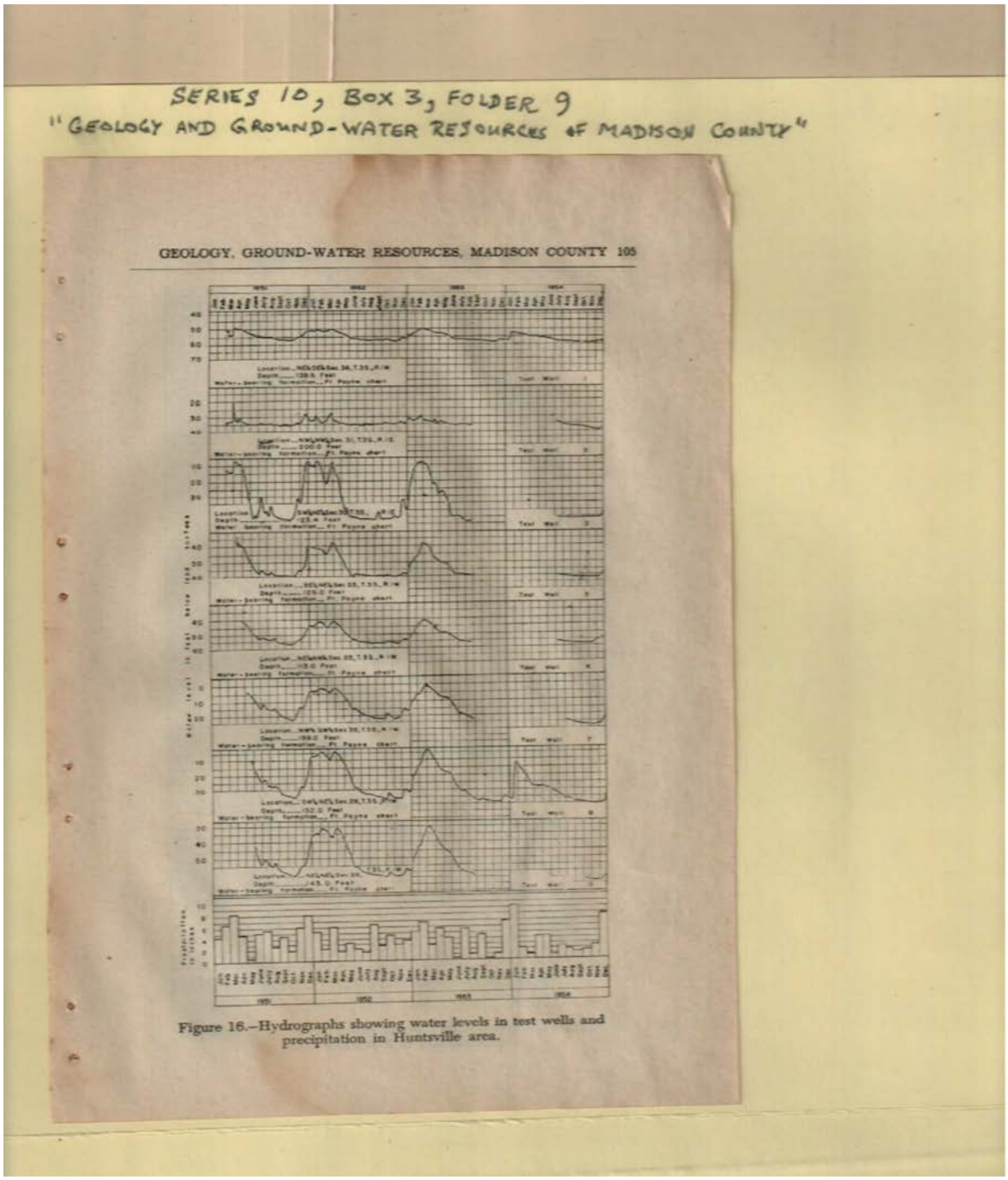
Causes of fluctuation

Water levels in wells fluctuate in response to precipitation or a lack of precipitation, pumpage from wells or springs, changes in barometric pressure, earth and ocean tides, earthquakes, and loading of the land surface.

Seasonal fluctuations

The seasonal fluctuations of water levels in wells in Madison County are cyclic and are related directly to the amount of pre-

Types:
booklet



Names:
Water Levels in Test Wells

Types:
chart

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

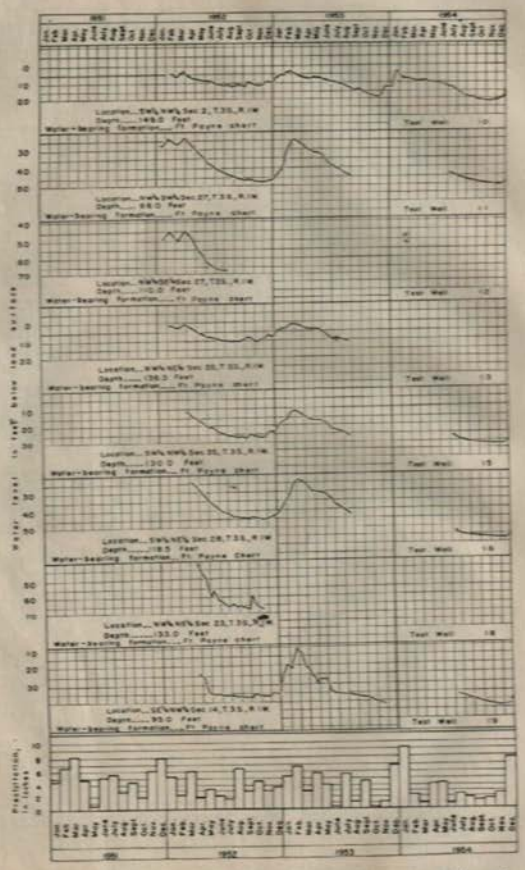
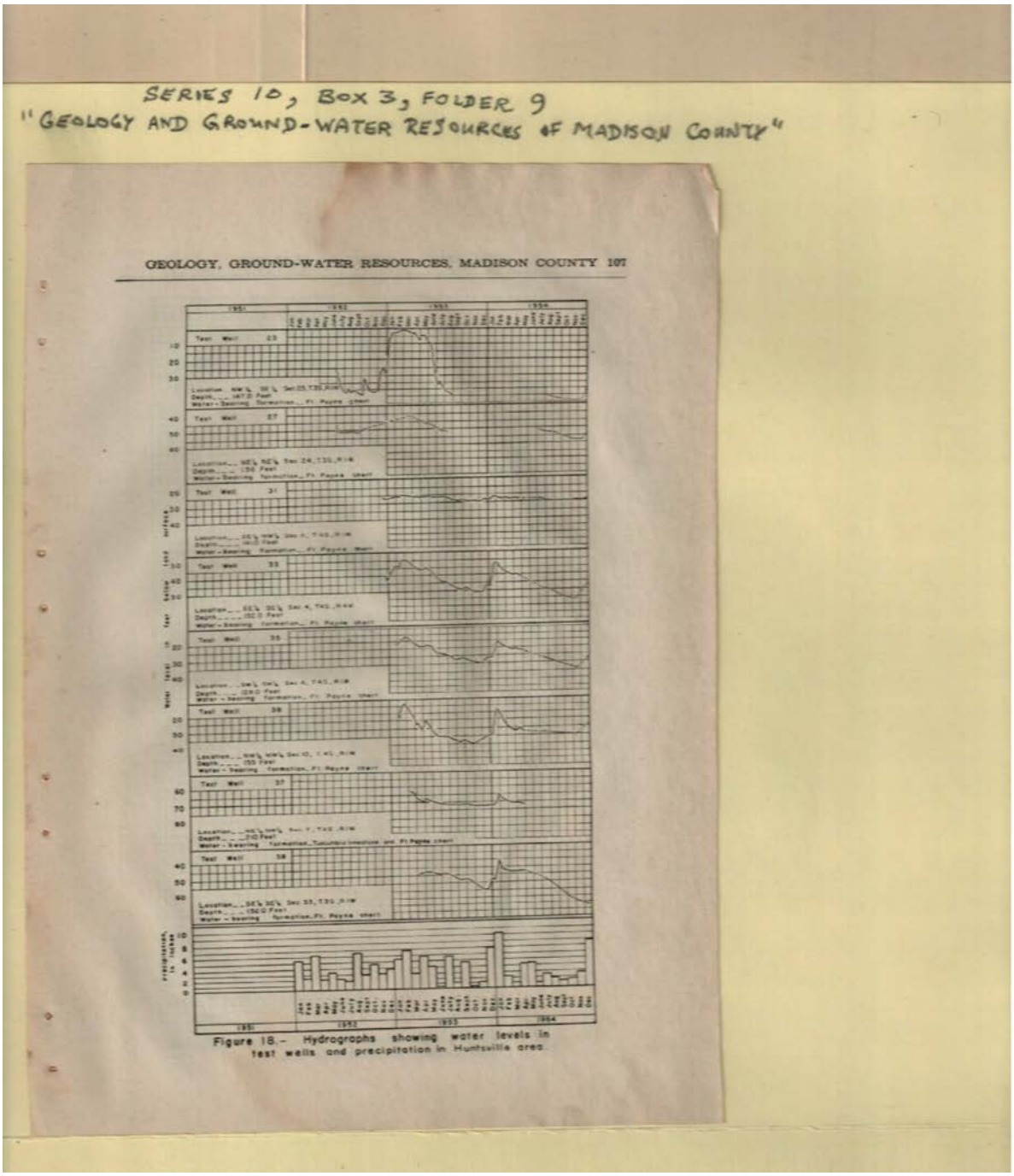


Figure 17.—Hydrographs showing water levels in test wells and precipitation in Huntsville area.

Names:
Water Levels in Test Wells

Types:
chart



Names:
Water Levels in Test Wells

Types:
chart

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

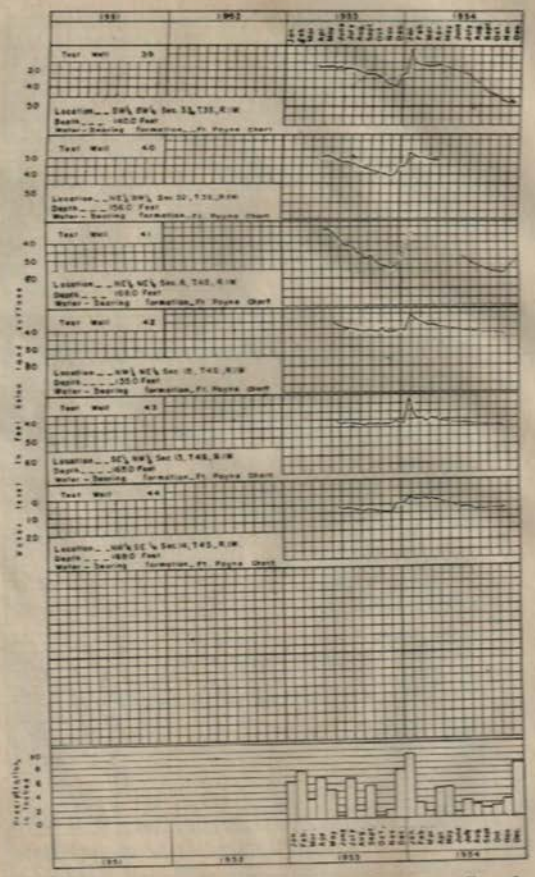
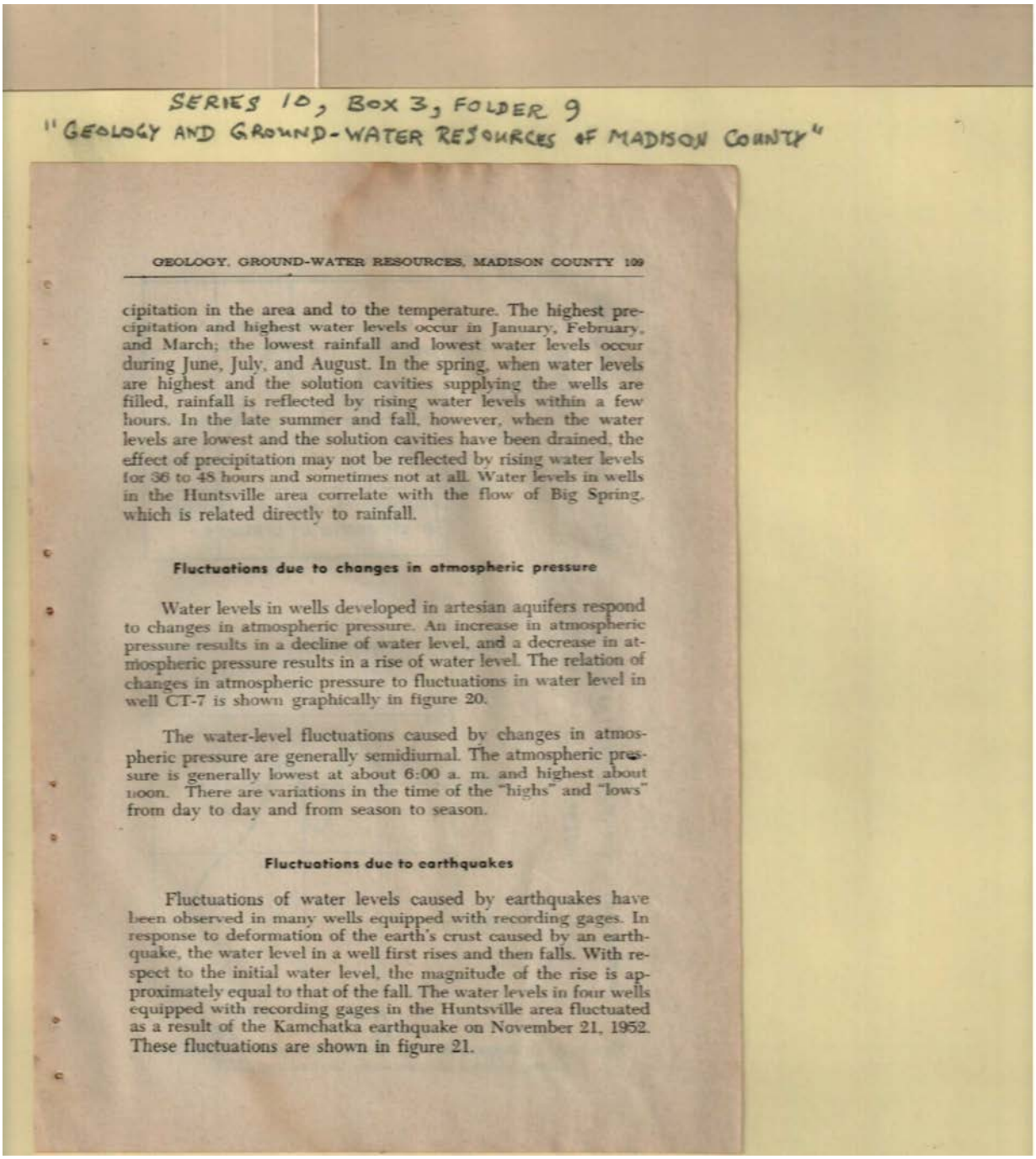


Figure 19.—Hydrographs showing water levels in test wells and precipitation in Huntsville area.

Names:
Water Levels in Test Wells

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

cipitation in the area and to the temperature. The highest precipitation and highest water levels occur in January, February, and March; the lowest rainfall and lowest water levels occur during June, July, and August. In the spring, when water levels are highest and the solution cavities supplying the wells are filled, rainfall is reflected by rising water levels within a few hours. In the late summer and fall, however, when the water levels are lowest and the solution cavities have been drained, the effect of precipitation may not be reflected by rising water levels for 36 to 48 hours and sometimes not at all. Water levels in wells in the Huntsville area correlate with the flow of Big Spring, which is related directly to rainfall.

Fluctuations due to changes in atmospheric pressure

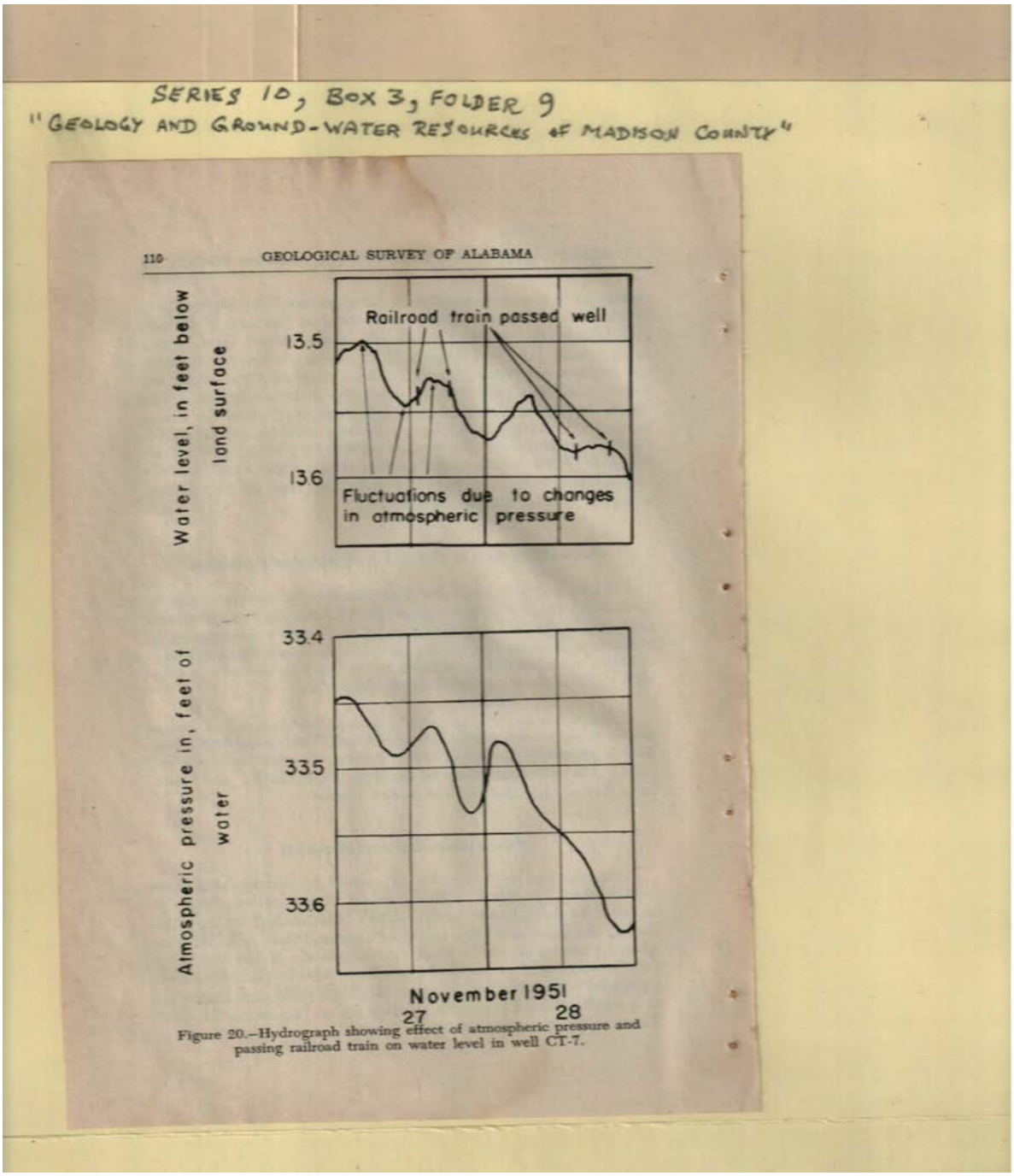
Water levels in wells developed in artesian aquifers respond to changes in atmospheric pressure. An increase in atmospheric pressure results in a decline of water level, and a decrease in atmospheric pressure results in a rise of water level. The relation of changes in atmospheric pressure to fluctuations in water level in well CT-7 is shown graphically in figure 20.

The water-level fluctuations caused by changes in atmospheric pressure are generally semidiurnal. The atmospheric pressure is generally lowest at about 6:00 a. m. and highest about noon. There are variations in the time of the "highs" and "lows" from day to day and from season to season.

Fluctuations due to earthquakes

Fluctuations of water levels caused by earthquakes have been observed in many wells equipped with recording gages. In response to deformation of the earth's crust caused by an earthquake, the water level in a well first rises and then falls. With respect to the initial water level, the magnitude of the rise is approximately equal to that of the fall. The water levels in four wells equipped with recording gages in the Huntsville area fluctuated as a result of the Kamchatka earthquake on November 21, 1952. These fluctuations are shown in figure 21.

Types:
booklet



Names:

Train's Effect on Water Level

Types:

chart

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

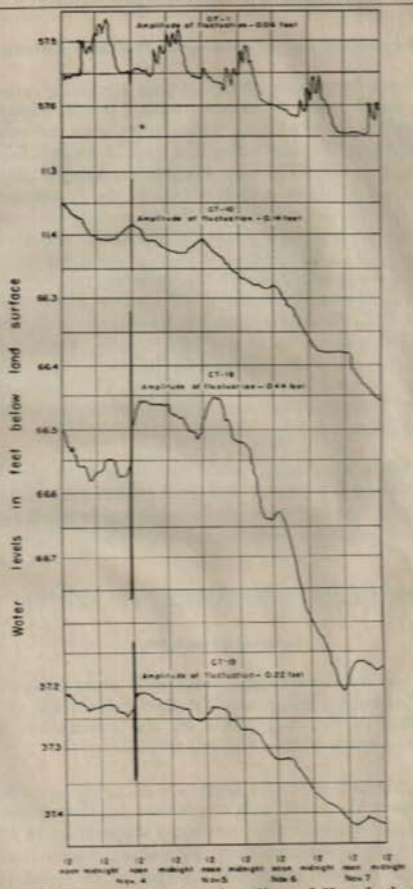
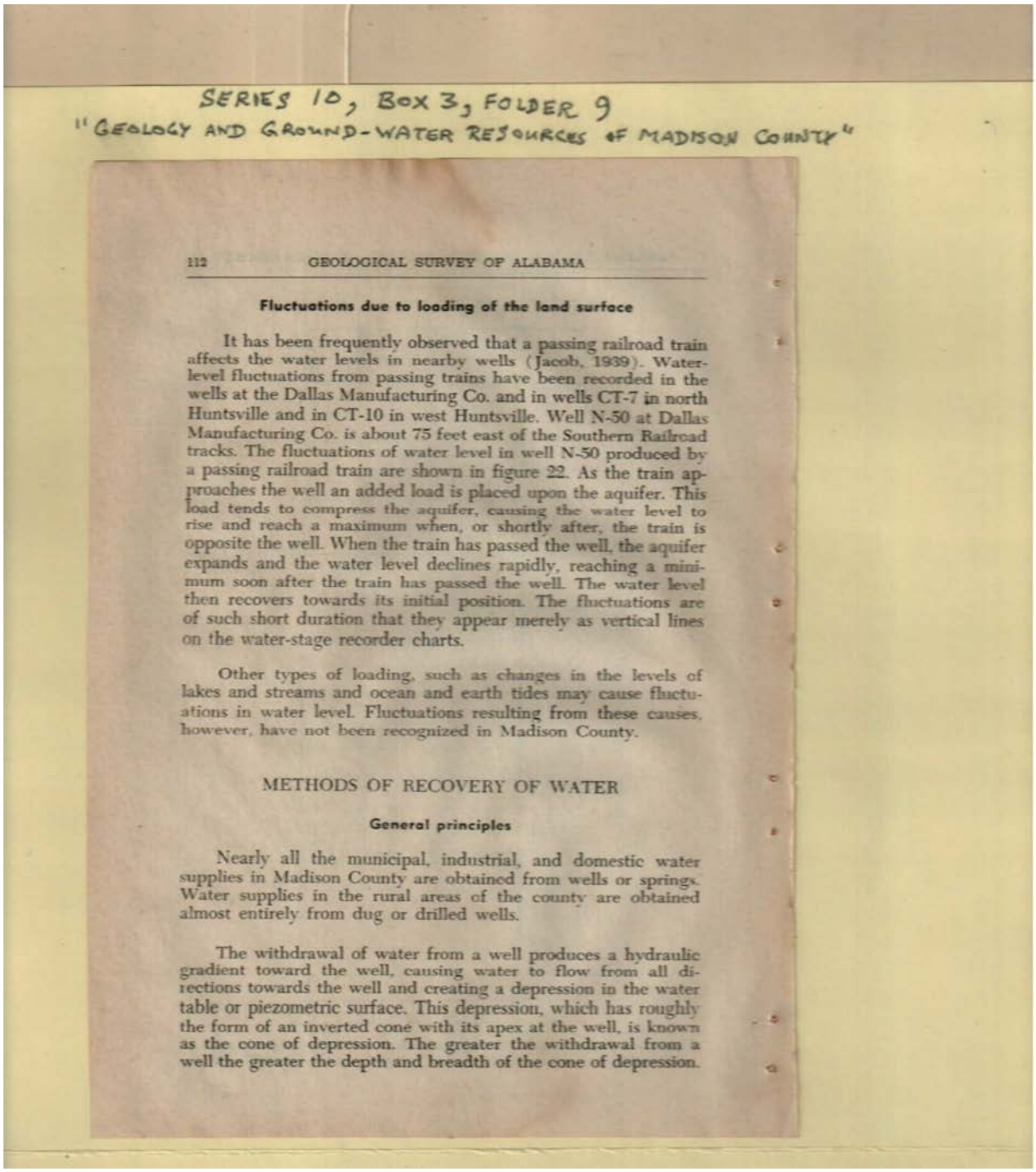


Figure 21.—Hydrographs showing the effect of Kamchatka earthquake of November 4, 1952 on water level in test wells in the Huntsville area.

Names:
Kamchatka
Earthquake Effect

Types:
chart



Fluctuations due to loading of the land surface

It has been frequently observed that a passing railroad train affects the water levels in nearby wells (Jacob, 1939). Water-level fluctuations from passing trains have been recorded in the wells at the Dallas Manufacturing Co. and in wells CT-7 in north Huntsville and in CT-10 in west Huntsville. Well N-50 at Dallas Manufacturing Co. is about 75 feet east of the Southern Railroad tracks. The fluctuations of water level in well N-50 produced by a passing railroad train are shown in figure 22. As the train approaches the well an added load is placed upon the aquifer. This load tends to compress the aquifer, causing the water level to rise and reach a maximum when, or shortly after, the train is opposite the well. When the train has passed the well, the aquifer expands and the water level declines rapidly, reaching a minimum soon after the train has passed the well. The water level then recovers towards its initial position. The fluctuations are of such short duration that they appear merely as vertical lines on the water-stage recorder charts.

Other types of loading, such as changes in the levels of lakes and streams and ocean and earth tides may cause fluctuations in water level. Fluctuations resulting from these causes, however, have not been recognized in Madison County.

METHODS OF RECOVERY OF WATER

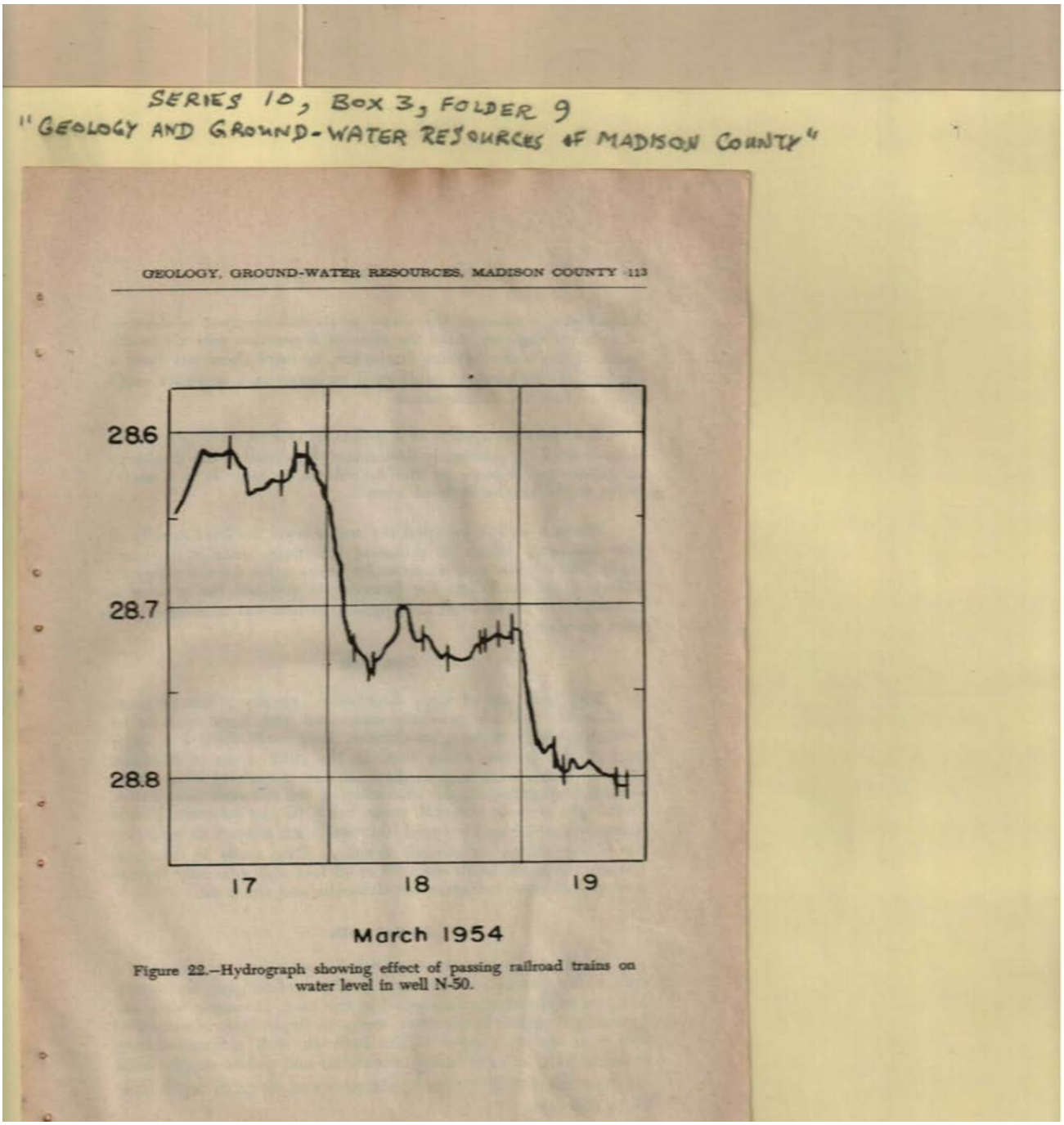
General principles

Nearly all the municipal, industrial, and domestic water supplies in Madison County are obtained from wells or springs. Water supplies in the rural areas of the county are obtained almost entirely from dug or drilled wells.

The withdrawal of water from a well produces a hydraulic gradient toward the well, causing water to flow from all directions towards the well and creating a depression in the water table or piezometric surface. This depression, which has roughly the form of an inverted cone with its apex at the well, is known as the cone of depression. The greater the withdrawal from a well the greater the depth and breadth of the cone of depression.

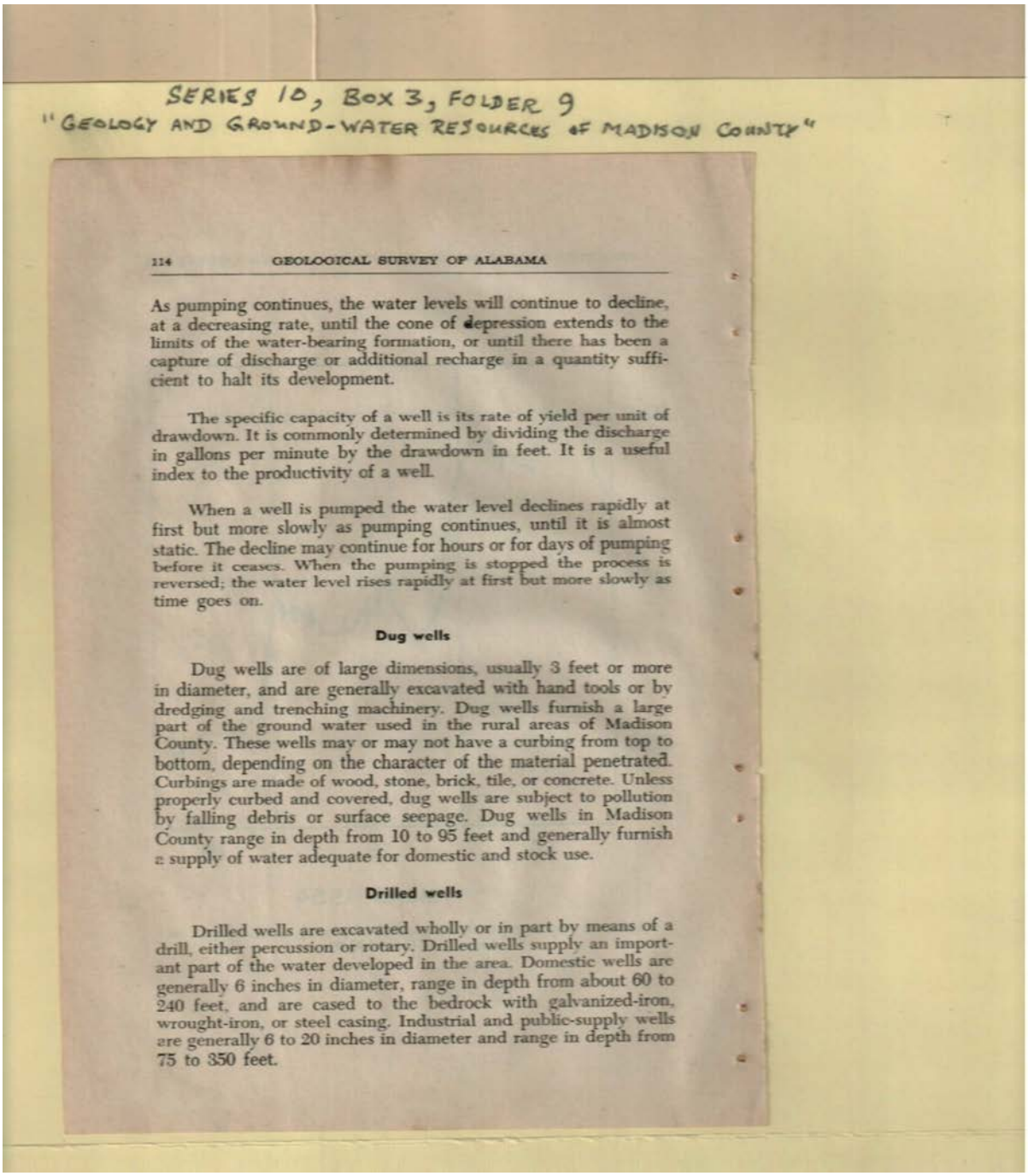
Names:
Jacob,

Types:
booklet



Names:
Train's Effect on Water Level

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

As pumping continues, the water levels will continue to decline, at a decreasing rate, until the cone of depression extends to the limits of the water-bearing formation, or until there has been a capture of discharge or additional recharge in a quantity sufficient to halt its development.

The specific capacity of a well is its rate of yield per unit of drawdown. It is commonly determined by dividing the discharge in gallons per minute by the drawdown in feet. It is a useful index to the productivity of a well.

When a well is pumped the water level declines rapidly at first but more slowly as pumping continues, until it is almost static. The decline may continue for hours or for days of pumping before it ceases. When the pumping is stopped the process is reversed; the water level rises rapidly at first but more slowly as time goes on.

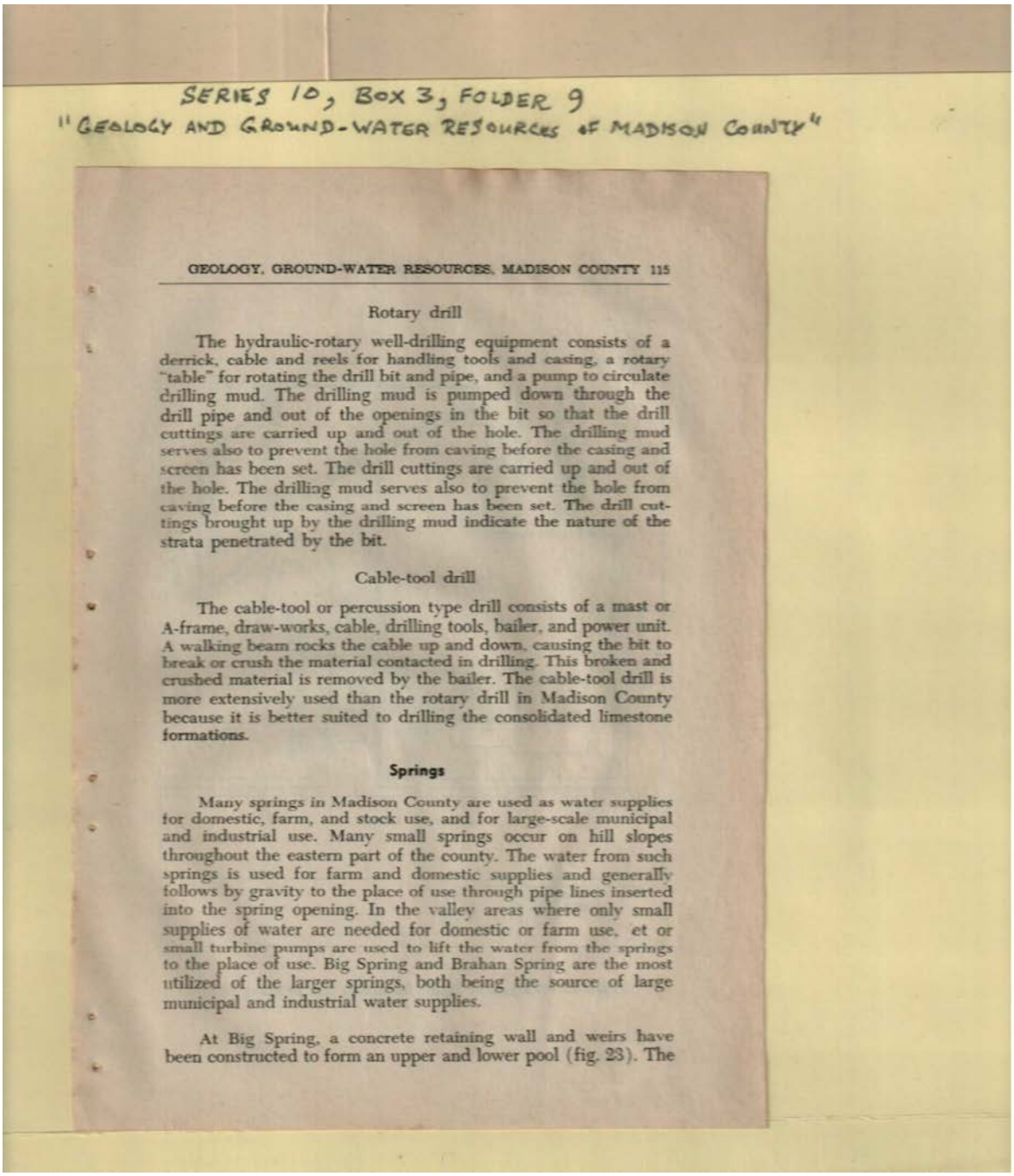
Dug wells

Dug wells are of large dimensions, usually 3 feet or more in diameter, and are generally excavated with hand tools or by dredging and trenching machinery. Dug wells furnish a large part of the ground water used in the rural areas of Madison County. These wells may or may not have a curbing from top to bottom, depending on the character of the material penetrated. Curbings are made of wood, stone, brick, tile, or concrete. Unless properly curbed and covered, dug wells are subject to pollution by falling debris or surface seepage. Dug wells in Madison County range in depth from 10 to 95 feet and generally furnish a supply of water adequate for domestic and stock use.

Drilled wells

Drilled wells are excavated wholly or in part by means of a drill, either percussion or rotary. Drilled wells supply an important part of the water developed in the area. Domestic wells are generally 6 inches in diameter, range in depth from about 60 to 240 feet, and are cased to the bedrock with galvanized-iron, wrought-iron, or steel casing. Industrial and public-supply wells are generally 6 to 20 inches in diameter and range in depth from 75 to 350 feet.

Types:
booklet



Rotary drill

The hydraulic-rotary well-drilling equipment consists of a derrick, cable and reels for handling tools and casing, a rotary "table" for rotating the drill bit and pipe, and a pump to circulate drilling mud. The drilling mud is pumped down through the drill pipe and out of the openings in the bit so that the drill cuttings are carried up and out of the hole. The drilling mud serves also to prevent the hole from caving before the casing and screen has been set. The drill cuttings are carried up and out of the hole. The drilling mud serves also to prevent the hole from caving before the casing and screen has been set. The drill cuttings brought up by the drilling mud indicate the nature of the strata penetrated by the bit.

Cable-tool drill

The cable-tool or percussion type drill consists of a mast or A-frame, draw-works, cable, drilling tools, bailer, and power unit. A walking beam rocks the cable up and down, causing the bit to break or crush the material contacted in drilling. This broken and crushed material is removed by the bailer. The cable-tool drill is more extensively used than the rotary drill in Madison County because it is better suited to drilling the consolidated limestone formations.

Springs

Many springs in Madison County are used as water supplies for domestic, farm, and stock use, and for large-scale municipal and industrial use. Many small springs occur on hill slopes throughout the eastern part of the county. The water from such springs is used for farm and domestic supplies and generally follows by gravity to the place of use through pipe lines inserted into the spring opening. In the valley areas where only small supplies of water are needed for domestic or farm use, et or small turbine pumps are used to lift the water from the springs to the place of use. Big Spring and Brahan Spring are the most utilized of the larger springs, both being the source of large municipal and industrial water supplies.

At Big Spring, a concrete retaining wall and weirs have been constructed to form an upper and lower pool (fig. 23). The

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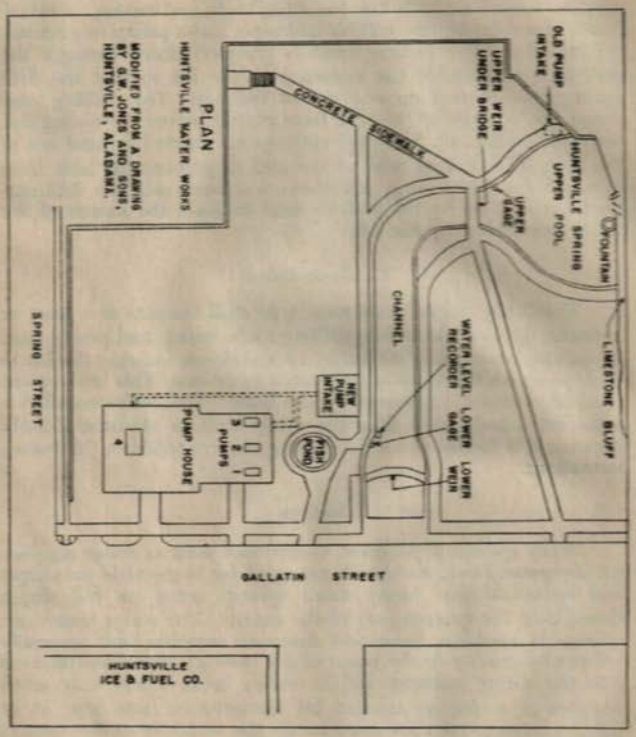
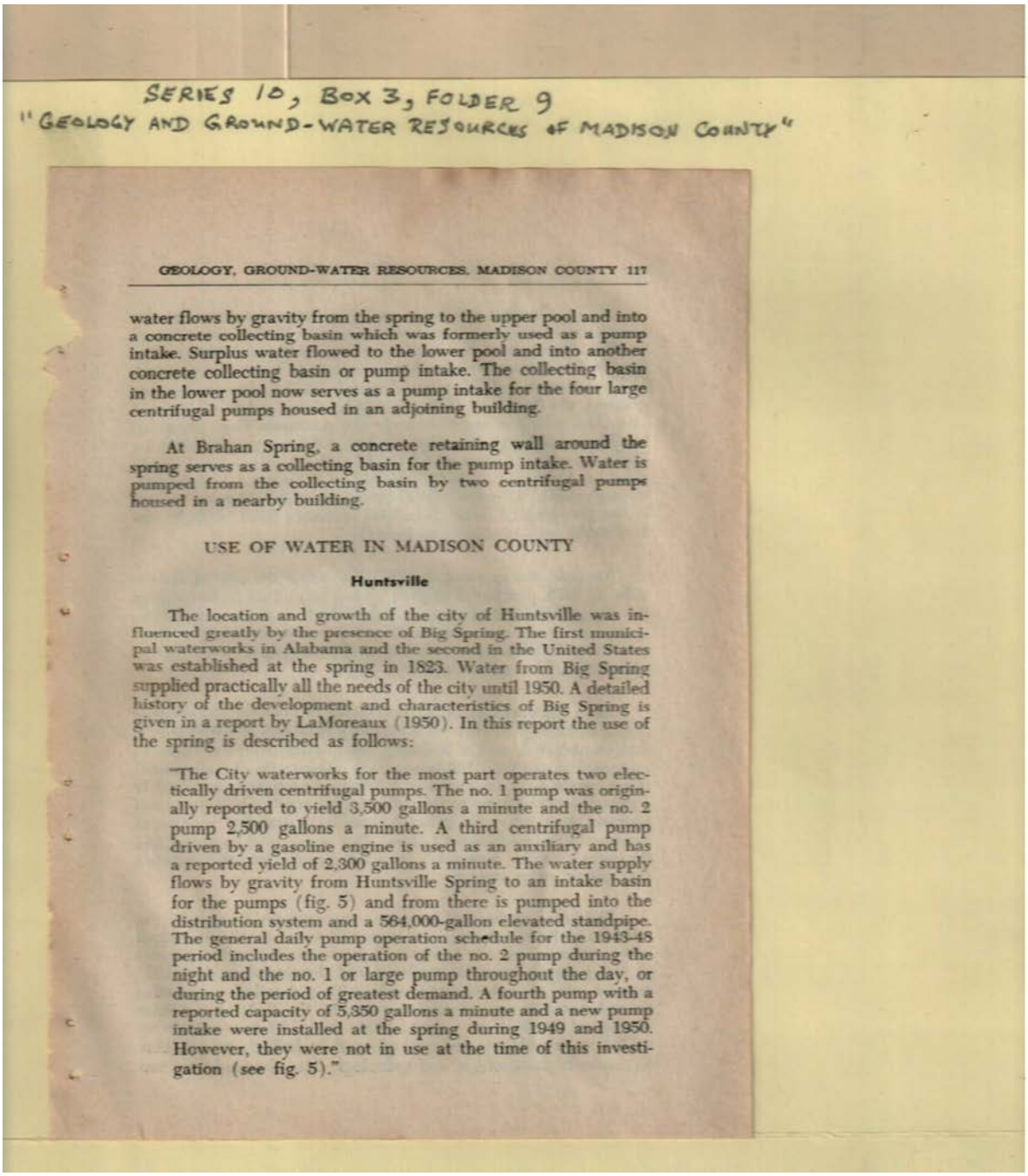


Figure 23.–Diagram of Huntsville Spring and pumping plant.

Names:
Huntsville Spring
Pumping Plant

Types:
diagram



water flows by gravity from the spring to the upper pool and into a concrete collecting basin which was formerly used as a pump intake. Surplus water flowed to the lower pool and into another concrete collecting basin or pump intake. The collecting basin in the lower pool now serves as a pump intake for the four large centrifugal pumps housed in an adjoining building.

At Brahan Spring, a concrete retaining wall around the spring serves as a collecting basin for the pump intake. Water is pumped from the collecting basin by two centrifugal pumps housed in a nearby building.

USE OF WATER IN MADISON COUNTY

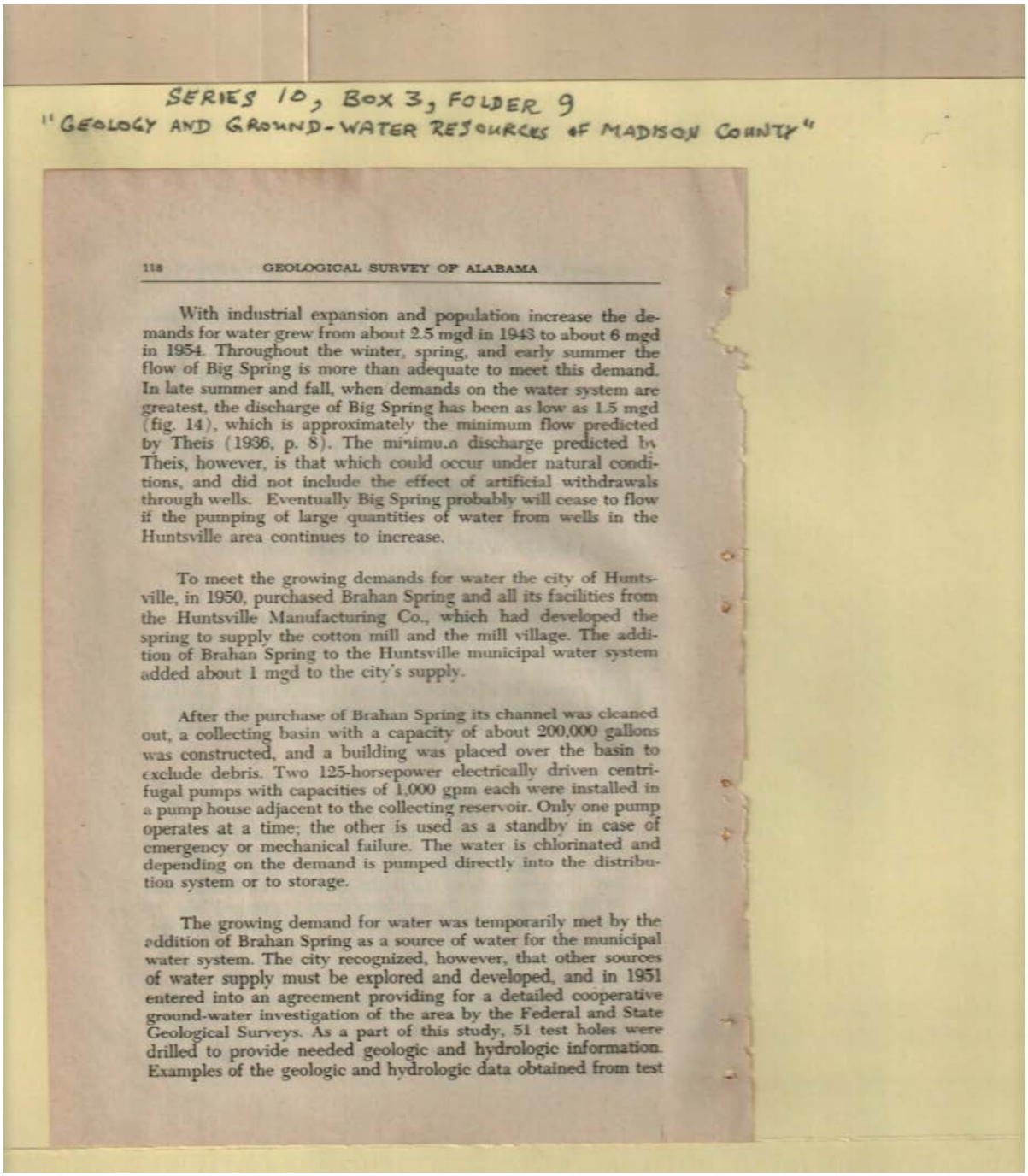
Huntsville

The location and growth of the city of Huntsville was influenced greatly by the presence of Big Spring. The first municipal waterworks in Alabama and the second in the United States was established at the spring in 1823. Water from Big Spring supplied practically all the needs of the city until 1950. A detailed history of the development and characteristics of Big Spring is given in a report by LaMoreaux (1950). In this report the use of the spring is described as follows:

> "The City waterworks for the most part operates two electically driven centrifugal pumps. The no. 1 pump was originally reported to yield 3,500 gallons a minute and the no. 2 pump 2,500 gallons a minute. A third centrifugal pump driven by a gasoline engine is used as an auxiliary and has a reported yield of 2,300 gallons a minute. The water supply flows by gravity from Huntsville Spring to an intake basin for the pumps (fig. 5) and from there is pumped into the distribution system and a 564,000-gallon elevated standpipe. The general daily pump operation schedule for the 1943-48 period includes the operation of the no. 2 pump during the night and the no. 1 or large pump throughout the day, or during the period of greatest demand. A fourth pump with a reported capacity of 5,350 gallons a minute and a new pump intake were installed at the spring during 1949 and 1950. However, they were not in use at the time of this investigation (see fig. 5)."

Names:
LaMoreaux,

Types:
booklet



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With industrial expansion and population increase the demands for water grew from about 2.5 mgd in 1943 to about 6 mgd in 1954. Throughout the winter, spring, and early summer the flow of Big Spring is more than adequate to meet this demand. In late summer and fall, when demands on the water system are greatest, the discharge of Big Spring has been as low as 1.5 mgd (fig. 14), which is approximately the minimum flow predicted by Theis (1936, p. 8). The minimum discharge predicted by Theis, however, is that which could occur under natural conditions, and did not include the effect of artificial withdrawals through wells. Eventually Big Spring probably will cease to flow if the pumping of large quantities of water from wells in the Huntsville area continues to increase.

To meet the growing demands for water the city of Huntsville, in 1950, purchased Brahan Spring and all its facilities from the Huntsville Manufacturing Co., which had developed the spring to supply the cotton mill and the mill village. The addition of Brahan Spring to the Huntsville municipal water system added about 1 mgd to the city's supply.

After the purchase of Brahan Spring its channel was cleaned out, a collecting basin with a capacity of about 200,000 gallons was constructed, and a building was placed over the basin to exclude debris. Two 125-horsepower electrically driven centrifugal pumps with capacities of 1,000 gpm each were installed in a pump house adjacent to the collecting reservoir. Only one pump operates at a time; the other is used as a standby in case of emergency or mechanical failure. The water is chlorinated and depending on the demand is pumped directly into the distribution system or to storage.

The growing demand for water was temporarily met by the addition of Brahan Spring as a source of water for the municipal water system. The city recognized, however, that other sources of water supply must be explored and developed, and in 1951 entered into an agreement providing for a detailed cooperative ground-water investigation of the area by the Federal and State Geological Surveys. As a part of this study, 51 test holes were drilled to provide needed geologic and hydrologic information. Examples of the geologic and hydrologic data obtained from test

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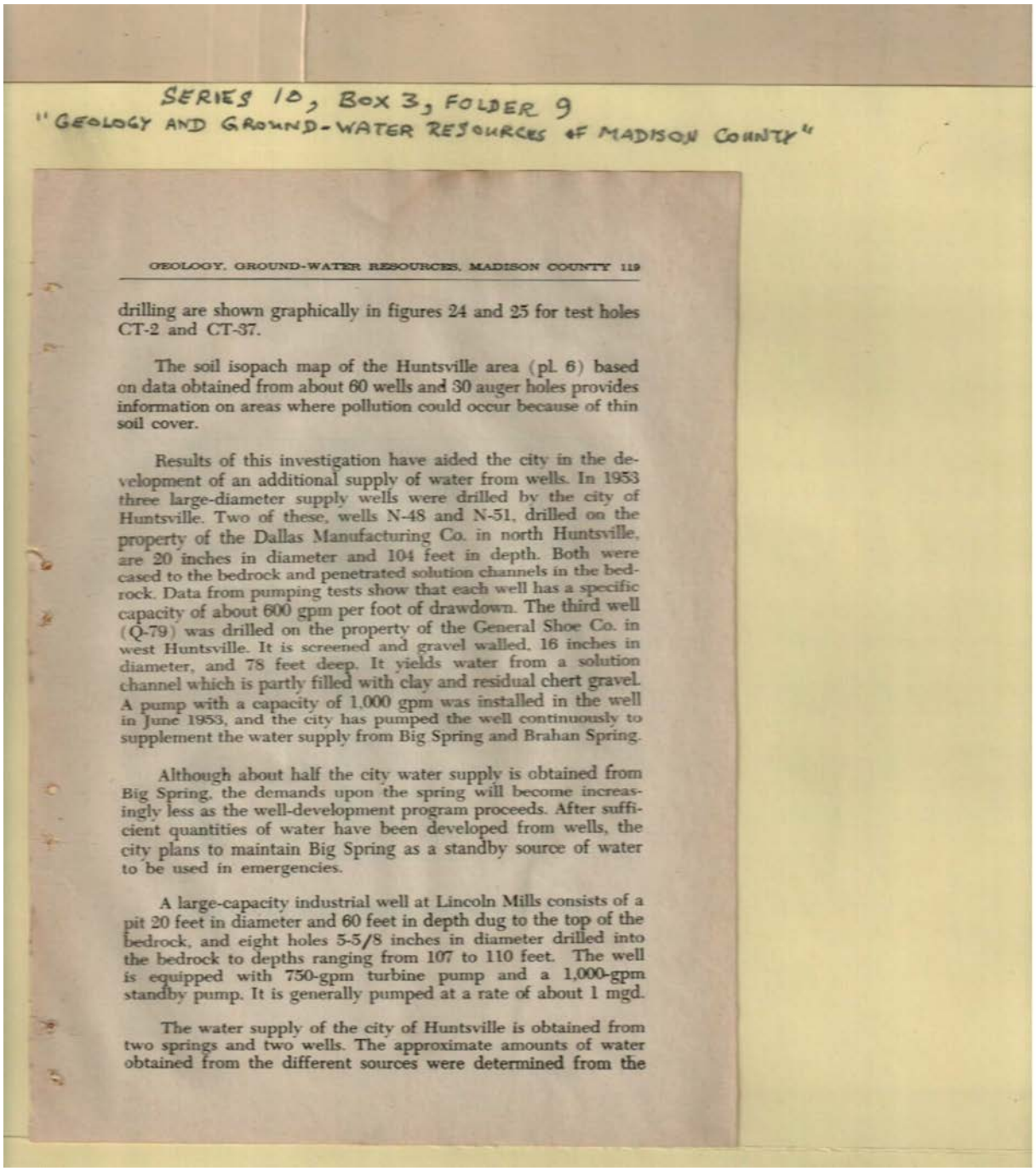

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drilling are shown graphically in figures 24 and 25 for test holes CT-2 and CT-37.

The soil isopach map of the Huntsville area (pl. 6) based on data obtained from about 60 wells and 30 auger holes provides information on areas where pollution could occur because of thin soil cover.

Results of this investigation have aided the city in the development of an additional supply of water from wells. In 1953 three large-diameter supply wells were drilled by the city of Huntsville. Two of these, wells N-48 and N-51, drilled on the property of the Dallas Manufacturing Co. in north Huntsville, are 20 inches in diameter and 104 feet in depth. Both were cased to the bedrock and penetrated solution channels in the bedrock. Data from pumping tests show that each well has a specific capacity of about 600 gpm per foot of drawdown. The third well (Q-79) was drilled on the property of the General Shoe Co. in west Huntsville. It is screened and gravel walled, 16 inches in diameter, and 78 feet deep. It yields water from a solution channel which is partly filled with clay and residual chert gravel. A pump with a capacity of 1,000 gpm was installed in the well in June 1953, and the city has pumped the well continuously to supplement the water supply from Big Spring and Brahan Spring.

Although about half the city water supply is obtained from Big Spring, the demands upon the spring will become increasingly less as the well-development program proceeds. After sufficient quantities of water have been developed from wells, the city plans to maintain Big Spring as a standby source of water to be used in emergencies.

A large-capacity industrial well at Lincoln Mills consists of a pit 20 feet in diameter and 60 feet in depth dug to the top of the bedrock, and eight holes 5-5/8 inches in diameter drilled into the bedrock to depths ranging from 107 to 110 feet. The well is equipped with 750-gpm turbine pump and a 1,000-gpm standby pump. It is generally pumped at a rate of about 1 mgd.

The water supply of the city of Huntsville is obtained from two springs and two wells. The approximate amounts of water obtained from the different sources were determined from the

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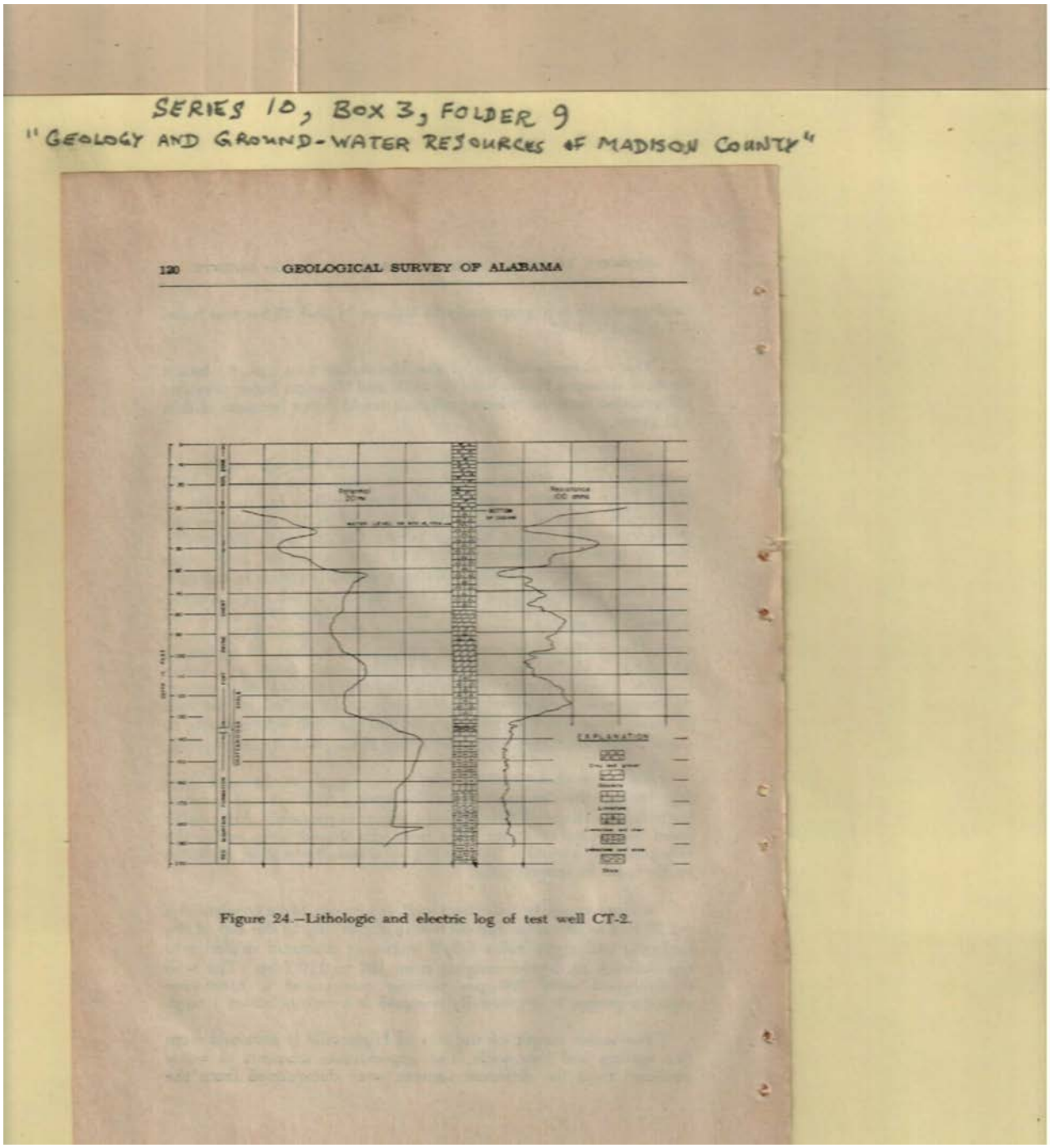
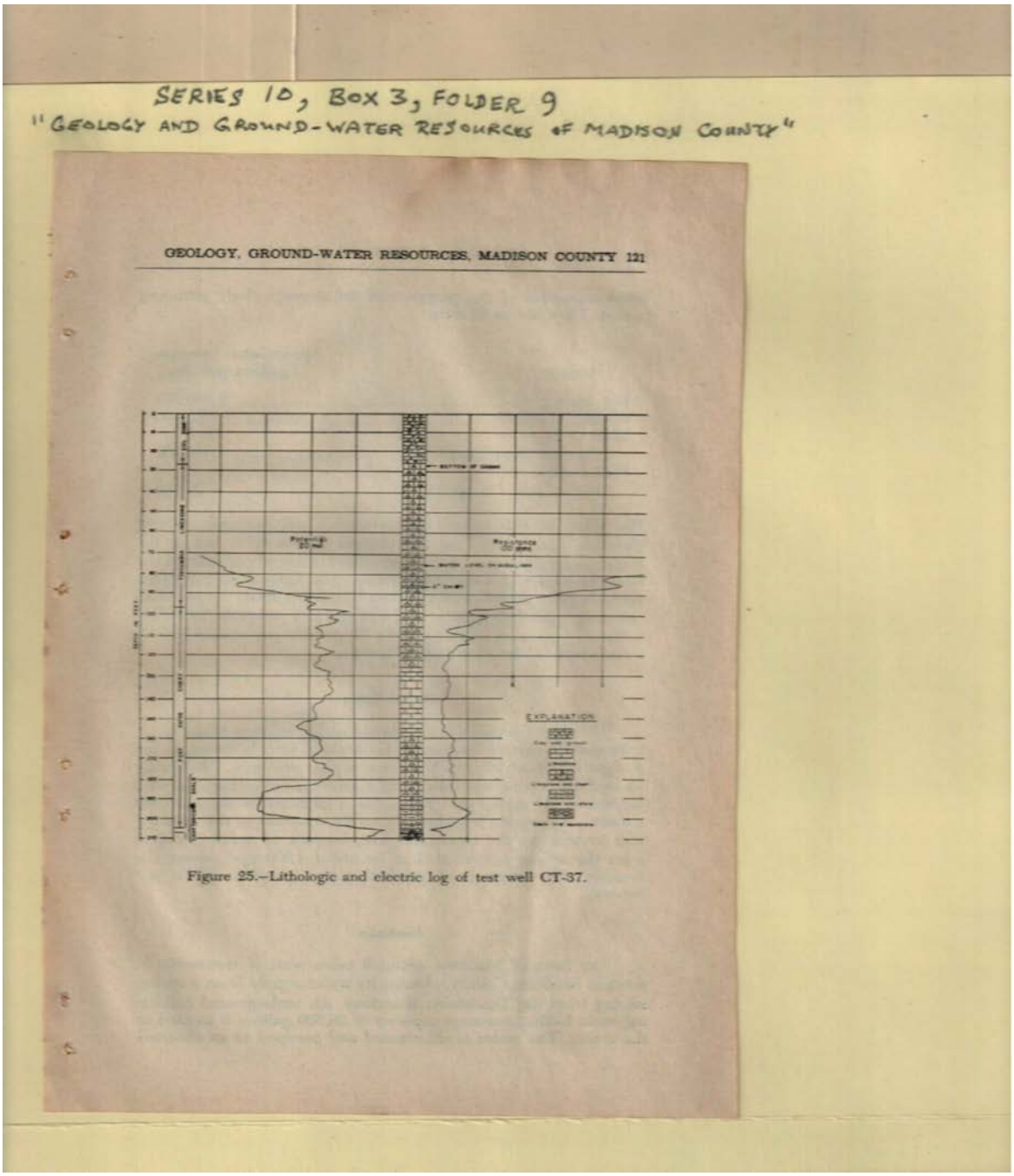


Figure 24.—Lithologic and electric log of test well CT-2.

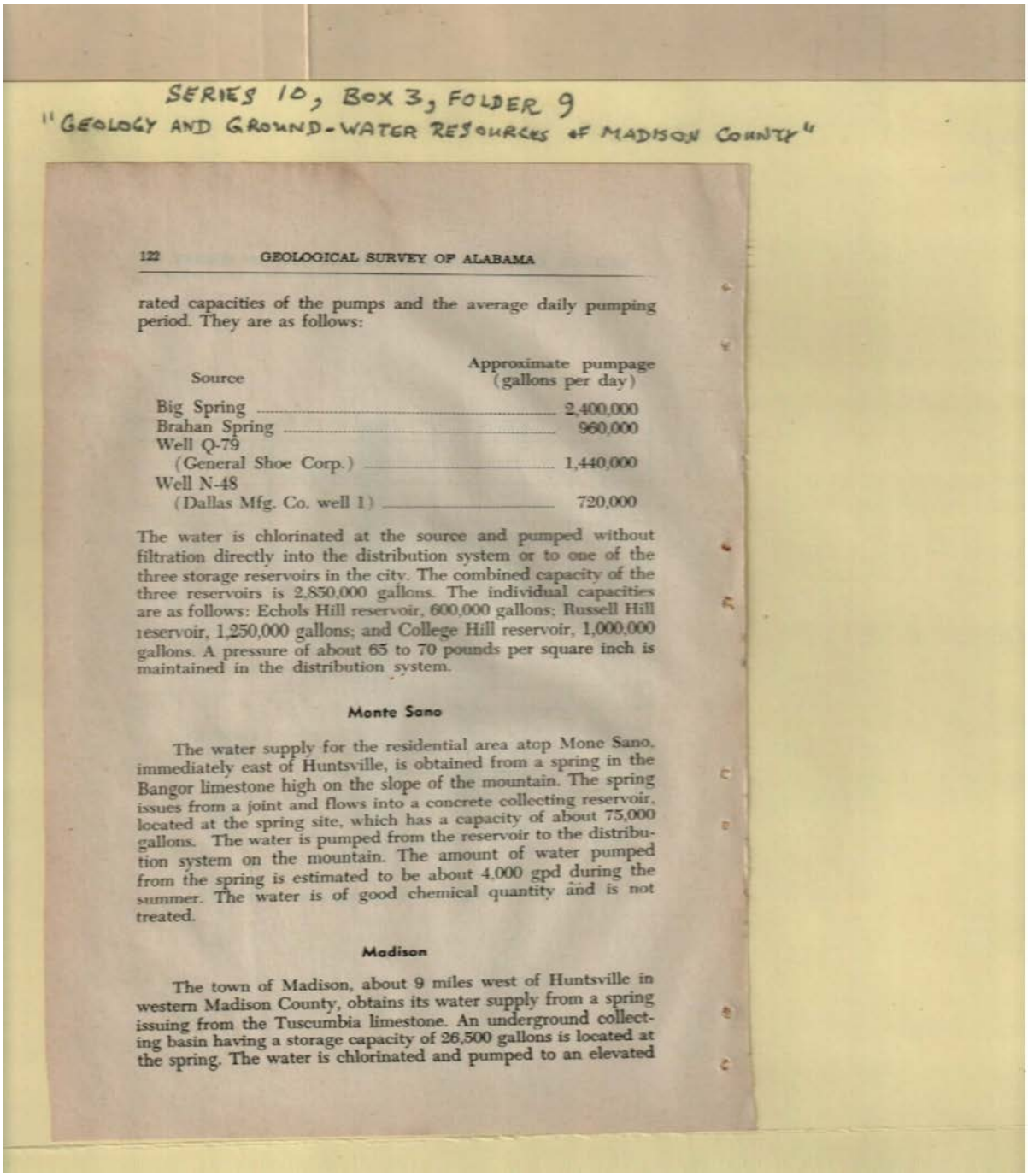
Names:
Log of Test Well

Types:
chart



Names:
Log of Test Well

Types:
chart



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rated capacities of the pumps and the average daily pumping period. They are as follows:

Source	Approximate pumpage (gallons per day)
Big Spring	2,400,000
Brahan Spring	960,000
Well Q-79 (General Shoe Corp.)	1,440,000
Well N-48 (Dallas Mfg. Co. well 1)	720,000

The water is chlorinated at the source and pumped without filtration directly into the distribution system or to one of the three storage reservoirs in the city. The combined capacity of the three reservoirs is 2,850,000 gallons. The individual capacities are as follows: Echols Hill reservoir, 600,000 gallons; Russell Hill reservoir, 1,250,000 gallons; and College Hill reservoir, 1,000,000 gallons. A pressure of about 65 to 70 pounds per square inch is maintained in the distribution system.

Monte Sano

The water supply for the residential area atop Mone Sano, immediately east of Huntsville, is obtained from a spring in the Bangor limestone high on the slope of the mountain. The spring issues from a joint and flows into a concrete collecting reservoir, located at the spring site, which has a capacity of about 75,000 gallons. The water is pumped from the reservoir to the distribution system on the mountain. The amount of water pumped from the spring is estimated to be about 4,000 gpd during the summer. The water is of good chemical quantity and is not treated.

Madison

The town of Madison, about 9 miles west of Huntsville in western Madison County, obtains its water supply from a spring issuing from the Tuscumbia limestone. An underground collecting basin having a storage capacity of 26,500 gallons is located at the spring. The water is chlorinated and pumped to an elevated

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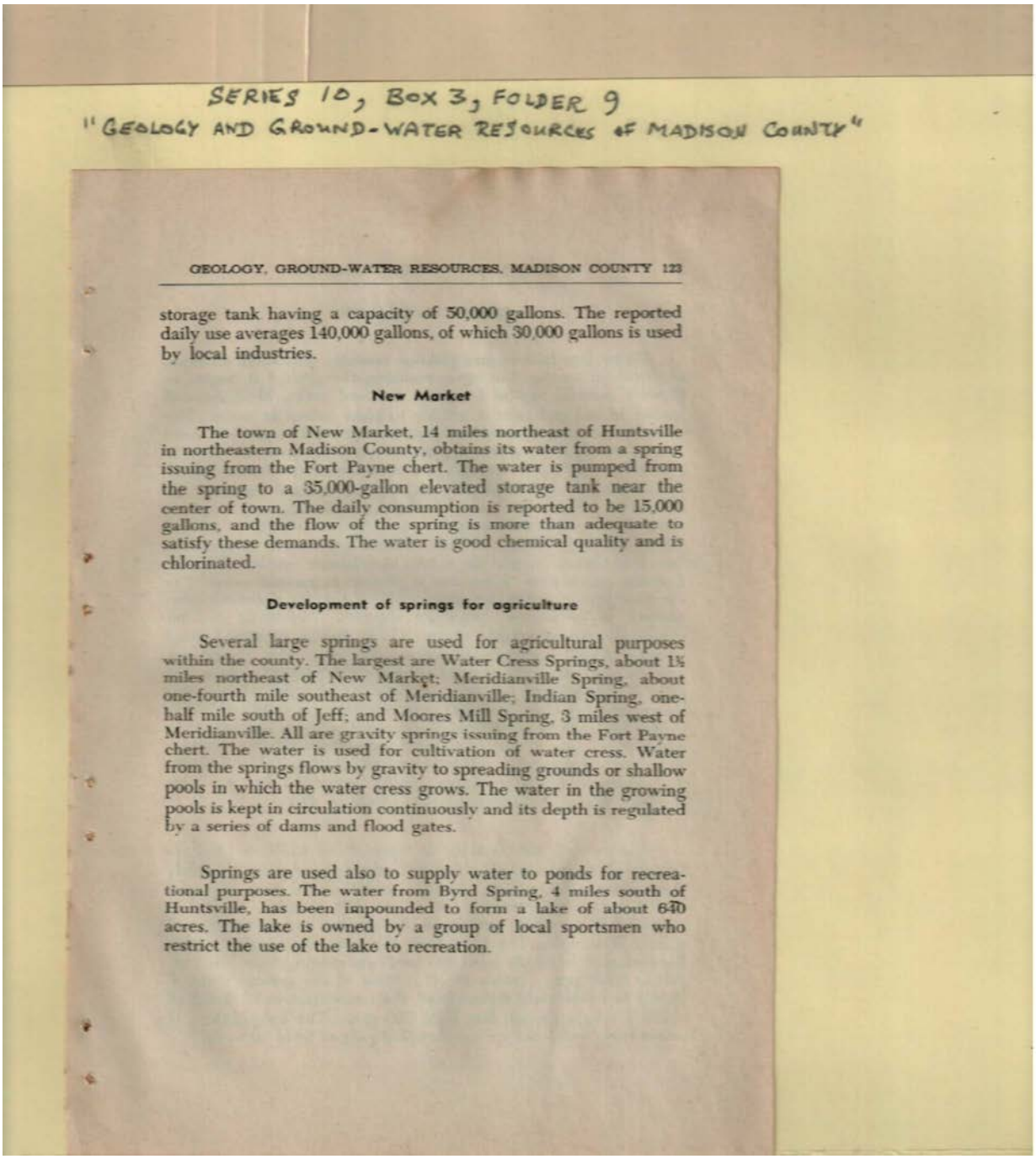

storage tank having a capacity of 50,000 gallons. The reported daily use averages 140,000 gallons, of which 30,000 gallons is used by local industries.

New Market

The town of New Market, 14 miles northeast of Huntsville in northeastern Madison County, obtains its water from a spring issuing from the Fort Payne chert. The water is pumped from the spring to a 35,000-gallon elevated storage tank near the center of town. The daily consumption is reported to be 15,000 gallons, and the flow of the spring is more than adequate to satisfy these demands. The water is good chemical quality and is chlorinated.

Development of springs for agriculture

Several large springs are used for agricultural purposes within the county. The largest are Water Cress Springs, about 1¾ miles northeast of New Market; Meridianville Spring, about one-fourth mile southeast of Meridianville; Indian Spring, one-half mile south of Jeff; and Moores Mill Spring, 3 miles west of Meridianville. All are gravity springs issuing from the Fort Payne chert. The water is used for cultivation of water cress. Water from the springs flows by gravity to spreading grounds or shallow pools in which the water cress grows. The water in the growing pools is kept in circulation continuously and its depth is regulated by a series of dams and flood gates.

Springs are used also to supply water to ponds for recreational purposes. The water from Byrd Spring, 4 miles south of Huntsville, has been impounded to form a lake of about 640 acres. The lake is owned by a group of local sportsmen who restrict the use of the lake to recreation.

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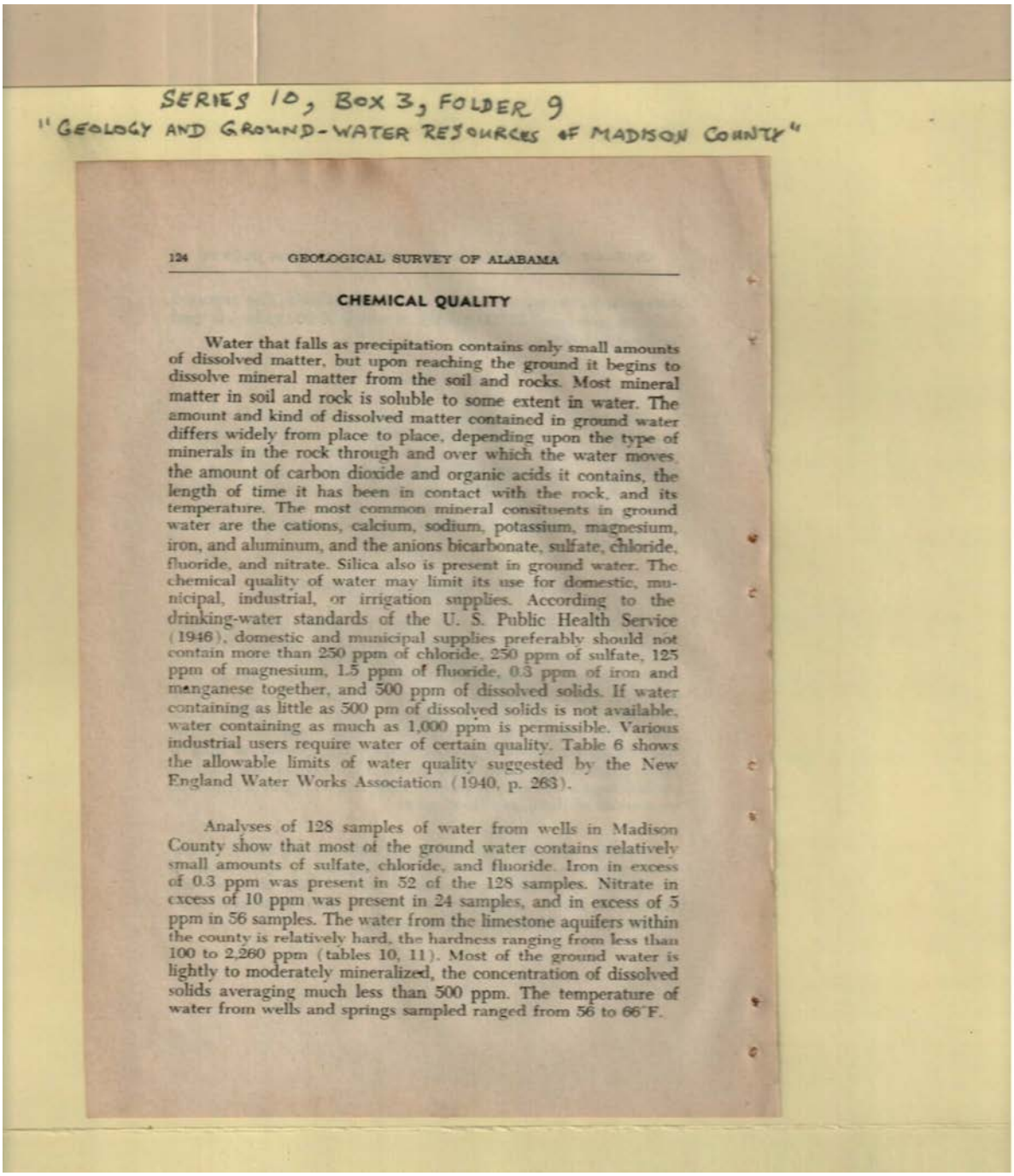

CHEMICAL QUALITY

Water that falls as precipitation contains only small amounts of dissolved matter, but upon reaching the ground it begins to dissolve mineral matter from the soil and rocks. Most mineral matter in soil and rock is soluble to some extent in water. The amount and kind of dissolved matter contained in ground water differs widely from place to place, depending upon the type of minerals in the rock through and over which the water moves, the amount of carbon dioxide and organic acids it contains, the length of time it has been in contact with the rock, and its temperature. The most common mineral consituents in ground water are the cations, calcium, sodium, potassium, magnesium, iron, and aluminum, and the anions bicarbonate, sulfate, chloride, fluoride, and nitrate. Silica also is present in ground water. The chemical quality of water may limit its use for domestic, municipal, industrial, or irrigation supplies. According to the drinking-water standards of the U. S. Public Health Service (1946), domestic and municipal supplies preferably should not contain more than 250 ppm of chloride, 250 ppm of sulfate, 125 ppm of magnesium, 1.5 ppm of fluoride, 0.3 ppm of iron and manganese together, and 500 ppm of dissolved solids. If water containing as little as 500 pm of dissolved solids is not available, water containing as much as 1,000 ppm is permissible. Various industrial users require water of certain quality. Table 6 shows the allowable limits of water quality suggested by the New England Water Works Association (1940, p. 263).

Analyses of 128 samples of water from wells in Madison County show that most of the ground water contains relatively small amounts of sulfate, chloride, and fluoride. Iron in excess of 0.3 ppm was present in 52 of the 128 samples. Nitrate in excess of 10 ppm was present in 24 samples, and in excess of 5 ppm in 56 samples. The water from the limestone aquifers within the county is relatively hard, the hardness ranging from less than 100 to 2,260 ppm (tables 10, 11). Most of the ground water is lightly to moderately mineralized, the concentration of dissolved solids averaging much less than 500 ppm. The temperature of water from wells and springs sampled ranged from 56 to 66°F.

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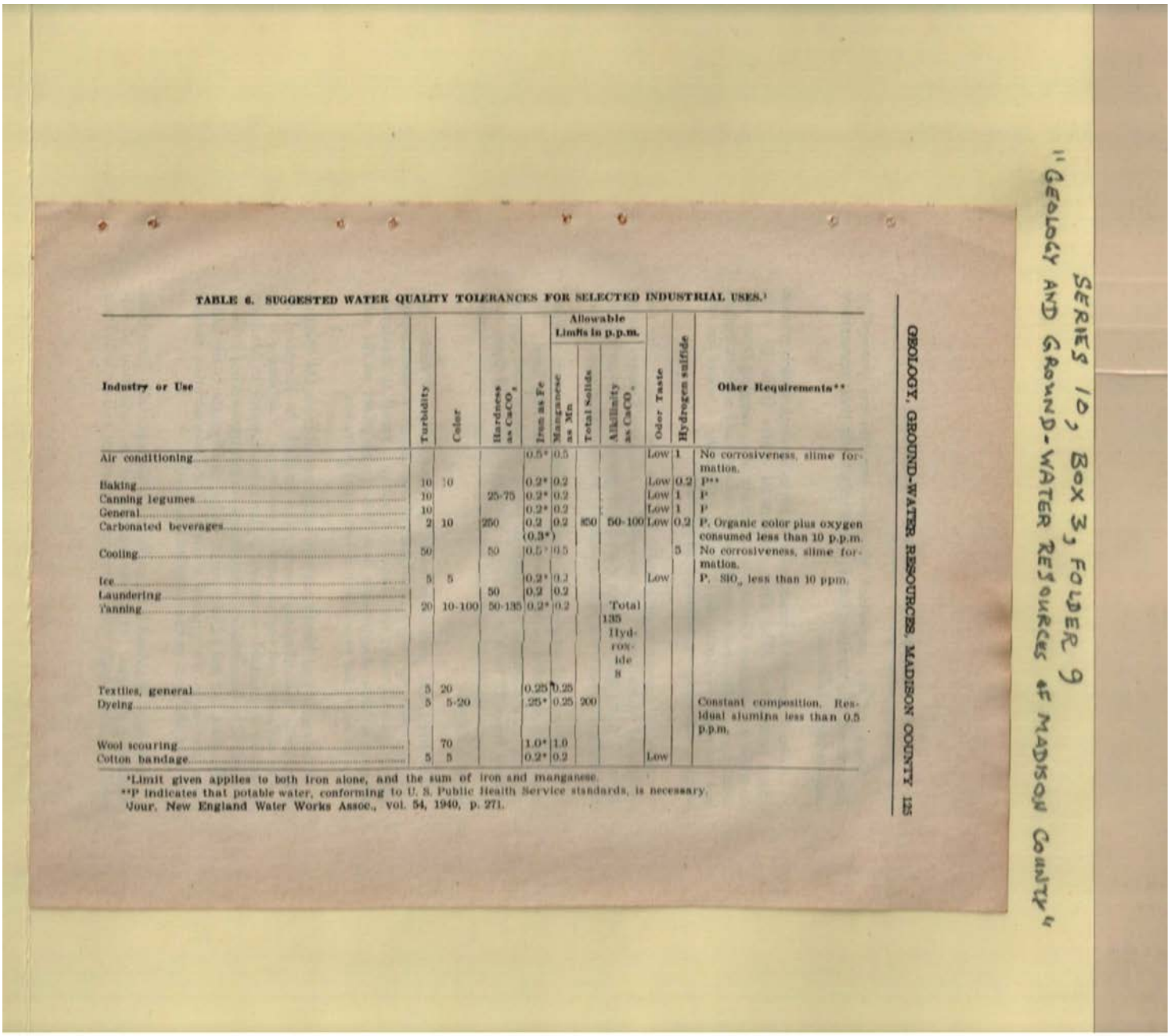

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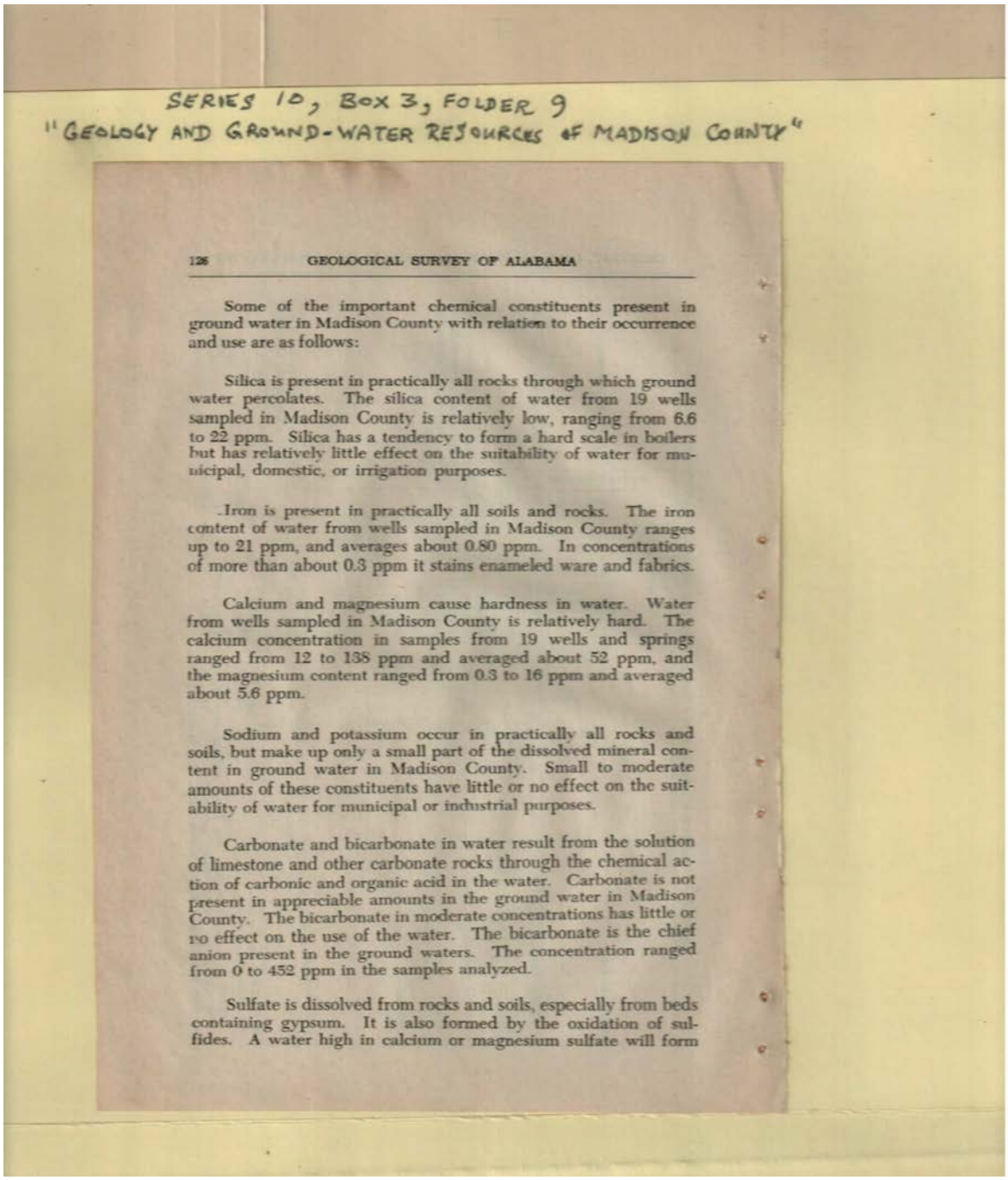
TABLE 6. SUGGESTED WATER QUALITY TOLERANCES FOR SELECTED INDUSTRIAL USES.[1]

Industry or Use	Turbidity	Color	Hardness as $CaCO_3$	Allowable Limits in p.p.m. Iron as Fe	Manganese as Mn	Total Solids	Alkalinity as $CaCO_3$	Odor Taste	Hydrogen sulfide	Other Requirements**
Air conditioning				0.5*	0.5			Low	1	No corrosiveness, slime formation.
Baking	10	10		0.2*	0.2			Low	0.2	P***
Canning legumes	10		25-75	0.2*	0.2			Low	1	P
General	10			0.2*	0.2			Low	1	P
Carbonated beverages	2	10	250	0.2 (0.3*)	0.2	850	50-100	Low	0.2	P. Organic color plus oxygen consumed less than 10 p.p.m.
Cooling	50		50	0.5*	0.5				5	No corrosiveness, slime formation.
Ice	5	5		0.2*	0.2			Low		P. SiO_2 less than 10 ppm.
Laundering			50	0.2	0.2					
Tanning	20	10-100	50-135	0.2*	0.2		Total 135 Hydroxide 8			
Textiles, general	5	20		0.25	0.25					
Dyeing	5	5-20		.25*	0.25	200				Constant composition. Residual alumina less than 0.5 p.p.m.
Wool scouring		70		1.0*	1.0					
Cotton bandage	5	5		0.2*	0.2			Low		

*Limit given applies to both iron alone, and the sum of iron and manganese.
**P indicates that potable water, conforming to U. S. Public Health Service standards, is necessary.
Jour. New England Water Works Assoc., vol. 54, 1940, p. 271.

Names:
Water Quality

Types:
chart



Some of the important chemical constituents present in ground water in Madison County with relation to their occurrence and use are as follows:

Silica is present in practically all rocks through which ground water percolates. The silica content of water from 19 wells sampled in Madison County is relatively low, ranging from 6.6 to 22 ppm. Silica has a tendency to form a hard scale in boilers but has relatively little effect on the suitability of water for municipal, domestic, or irrigation purposes.

Iron is present in practically all soils and rocks. The iron content of water from wells sampled in Madison County ranges up to 21 ppm, and averages about 0.80 ppm. In concentrations of more than about 0.3 ppm it stains enameled ware and fabrics.

Calcium and magnesium cause hardness in water. Water from wells sampled in Madison County is relatively hard. The calcium concentration in samples from 19 wells and springs ranged from 12 to 138 ppm and averaged about 52 ppm, and the magnesium content ranged from 0.3 to 16 ppm and averaged about 5.6 ppm.

Sodium and potassium occur in practically all rocks and soils, but make up only a small part of the dissolved mineral content in ground water in Madison County. Small to moderate amounts of these constituents have little or no effect on the suitability of water for municipal or industrial purposes.

Carbonate and bicarbonate in water result from the solution of limestone and other carbonate rocks through the chemical action of carbonic and organic acid in the water. Carbonate is not present in appreciable amounts in the ground water in Madison County. The bicarbonate in moderate concentrations has little or no effect on the use of the water. The bicarbonate is the chief anion present in the ground waters. The concentration ranged from 0 to 452 ppm in the samples analyzed.

Sulfate is dissolved from rocks and soils, especially from beds containing gypsum. It is also formed by the oxidation of sulfides. A water high in calcium or magnesium sulfate will form

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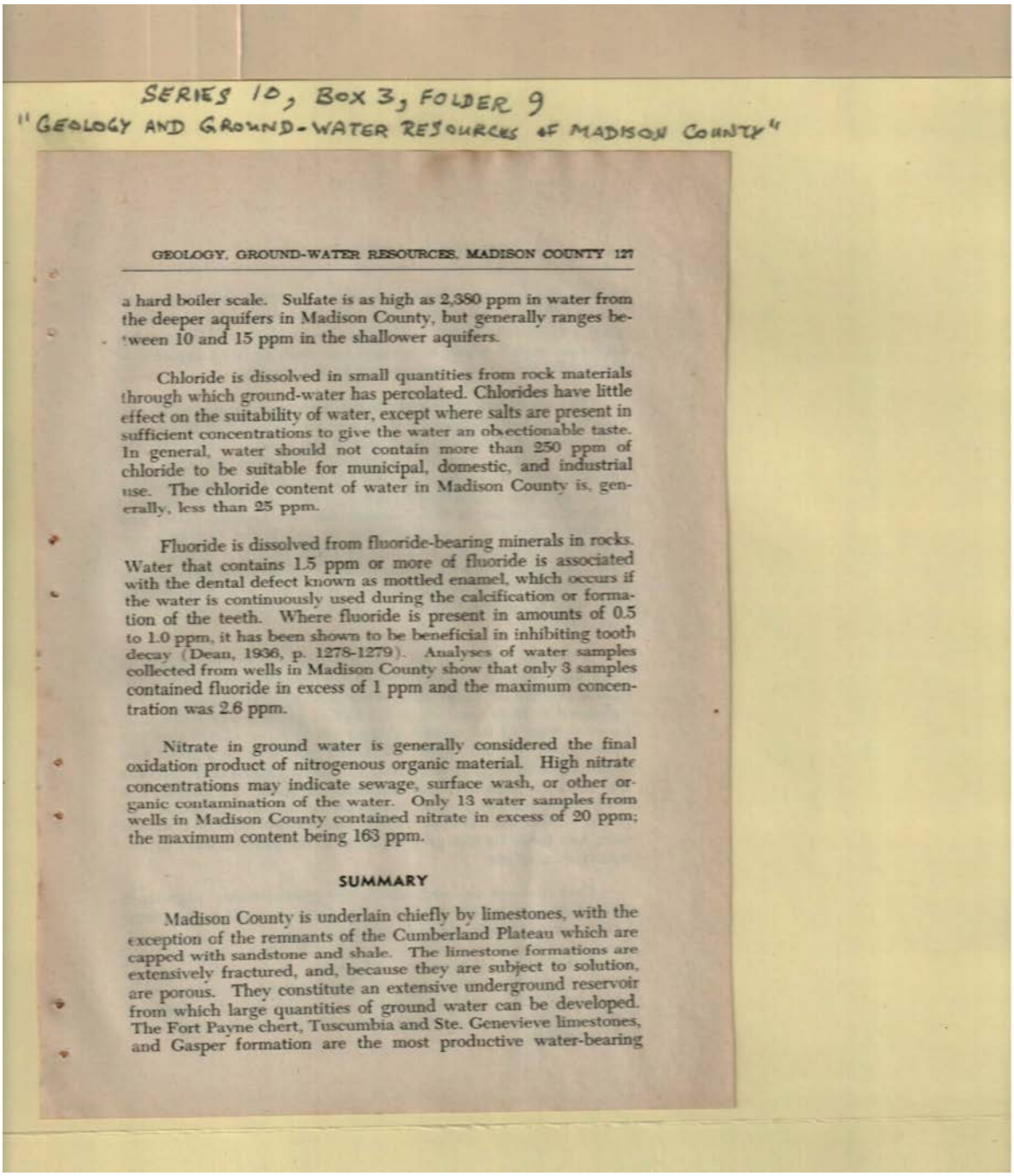

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a hard boiler scale. Sulfate is as high as 2,380 ppm in water from the deeper aquifers in Madison County, but generally ranges between 10 and 15 ppm in the shallower aquifers.

Chloride is dissolved in small quantities from rock materials through which ground-water has percolated. Chlorides have little effect on the suitability of water, except where salts are present in sufficient concentrations to give the water an objectionable taste. In general, water should not contain more than 250 ppm of chloride to be suitable for municipal, domestic, and industrial use. The chloride content of water in Madison County is, generally, less than 25 ppm.

Fluoride is dissolved from fluoride-bearing minerals in rocks. Water that contains 1.5 ppm or more of fluoride is associated with the dental defect known as mottled enamel, which occurs if the water is continuously used during the calcification or formation of the teeth. Where fluoride is present in amounts of 0.5 to 1.0 ppm, it has been shown to be beneficial in inhibiting tooth decay (Dean, 1936, p. 1278-1279). Analyses of water samples collected from wells in Madison County show that only 3 samples contained fluoride in excess of 1 ppm and the maximum concentration was 2.6 ppm.

Nitrate in ground water is generally considered the final oxidation product of nitrogenous organic material. High nitrate concentrations may indicate sewage, surface wash, or other organic contamination of the water. Only 13 water samples from wells in Madison County contained nitrate in excess of 20 ppm; the maximum content being 163 ppm.

SUMMARY

Madison County is underlain chiefly by limestones, with the exception of the remnants of the Cumberland Plateau which are capped with sandstone and shale. The limestone formations are extensively fractured, and, because they are subject to solution, are porous. They constitute an extensive underground reservoir from which large quantities of ground water can be developed. The Fort Payne chert, Tuscumbia and Ste. Genevieve limestones, and Gasper formation are the most productive water-bearing

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Dean,

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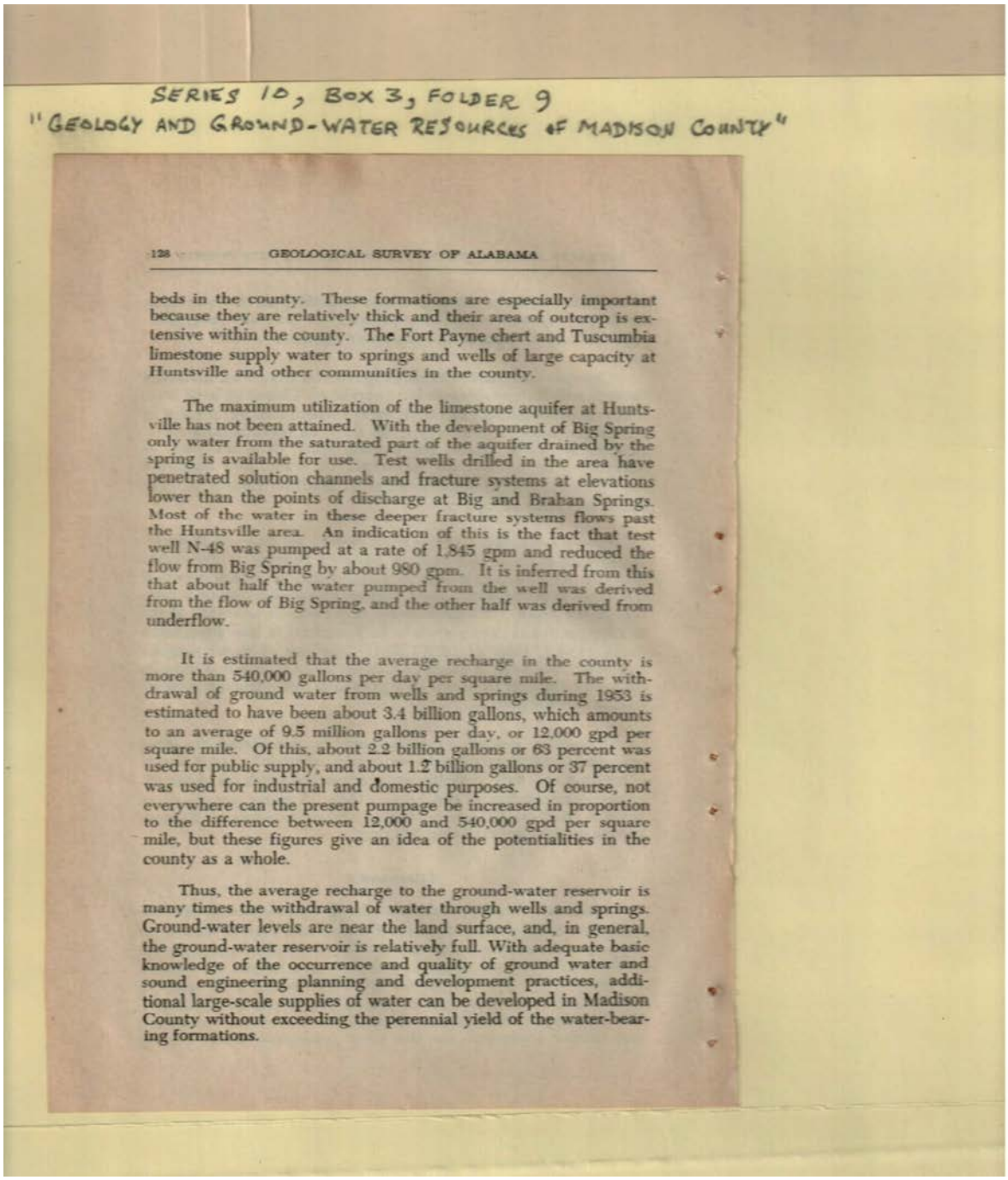

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beds in the county. These formations are especially important because they are relatively thick and their area of outcrop is extensive within the county. The Fort Payne chert and Tuscumbia limestone supply water to springs and wells of large capacity at Huntsville and other communities in the county.

The maximum utilization of the limestone aquifer at Huntsville has not been attained. With the development of Big Spring only water from the saturated part of the aquifer drained by the spring is available for use. Test wells drilled in the area have penetrated solution channels and fracture systems at elevations lower than the points of discharge at Big and Brahan Springs. Most of the water in these deeper fracture systems flows past the Huntsville area. An indication of this is the fact that test well N-48 was pumped at a rate of 1,845 gpm and reduced the flow from Big Spring by about 980 gpm. It is inferred from this that about half the water pumped from the well was derived from the flow of Big Spring, and the other half was derived from underflow.

It is estimated that the average recharge in the county is more than 540,000 gallons per day per square mile. The withdrawal of ground water from wells and springs during 1953 is estimated to have been about 3.4 billion gallons, which amounts to an average of 9.5 million gallons per day, or 12,000 gpd per square mile. Of this, about 2.2 billion gallons or 63 percent was used for public supply, and about 1.2 billion gallons or 37 percent was used for industrial and domestic purposes. Of course, not everywhere can the present pumpage be increased in proportion to the difference between 12,000 and 540,000 gpd per square mile, but these figures give an idea of the potentialities in the county as a whole.

Thus, the average recharge to the ground-water reservoir is many times the withdrawal of water through wells and springs. Ground-water levels are near the land surface, and, in general, the ground-water reservoir is relatively full. With adequate basic knowledge of the occurrence and quality of ground water and sound engineering planning and development practices, additional large-scale supplies of water can be developed in Madison County without exceeding the perennial yield of the water-bearing formations.

Names:
Big Spring

Types:
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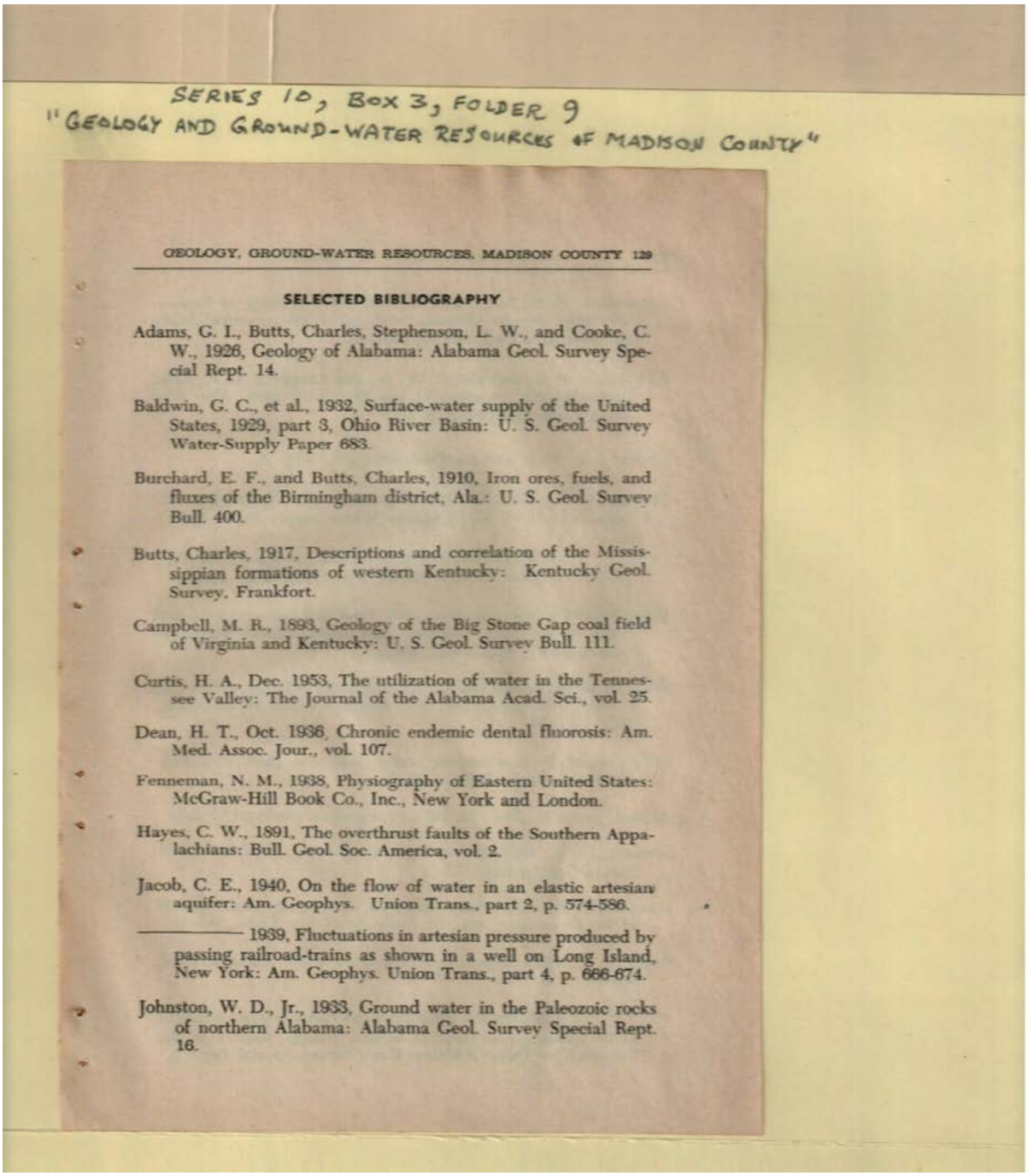

SELECTED BIBLIOGRAPHY

Adams, G. I., Butts, Charles, Stephenson, L. W., and Cooke, C. W., 1926, Geology of Alabama: Alabama Geol. Survey Special Rept. 14.

Baldwin, G. C., et al., 1932, Surface-water supply of the United States, 1929, part 3, Ohio River Basin: U. S. Geol. Survey Water-Supply Paper 683.

Burchard, E. F., and Butts, Charles, 1910, Iron ores, fuels, and fluxes of the Birmingham district, Ala.: U. S. Geol. Survey Bull. 400.

Butts, Charles, 1917, Descriptions and correlation of the Mississippian formations of western Kentucky: Kentucky Geol. Survey, Frankfort.

Campbell, M. R., 1893, Geology of the Big Stone Gap coal field of Virginia and Kentucky: U. S. Geol. Survey Bull. 111.

Curtis, H. A., Dec. 1953, The utilization of water in the Tennessee Valley: The Journal of the Alabama Acad. Sci., vol. 25.

Dean, H. T., Oct. 1936, Chronic endemic dental fluorosis: Am. Med. Assoc. Jour., vol. 107.

Fenneman, N. M., 1938, Physiography of Eastern United States: McGraw-Hill Book Co., Inc., New York and London.

Hayes, C. W., 1891, The overthrust faults of the Southern Appalachians: Bull. Geol. Soc. America, vol. 2.

Jacob, C. E., 1940, On the flow of water in an elastic artesian aquifer: Am. Geophys. Union Trans., part 2, p. 574-586.

———— 1939, Fluctuations in artesian pressure produced by passing railroad-trains as shown in a well on Long Island, New York: Am. Geophys. Union Trans., part 4, p. 666-674.

Johnston, W. D., Jr., 1933, Ground water in the Paleozoic rocks of northern Alabama: Alabama Geol. Survey Special Rept. 16.

Names:

Adams, G. I.
Baldwin, G. C.
Burchard, E. F.
Butts, Charles
Campbell, M. R.
Cooke, C. W.
Curtis, H. A.
Dean, H. T.
Fenneman, N. M.
Hayes, C. W.
Jacob, C. E.
Johnston, W. D., Jr.
Stephenson, L. W.

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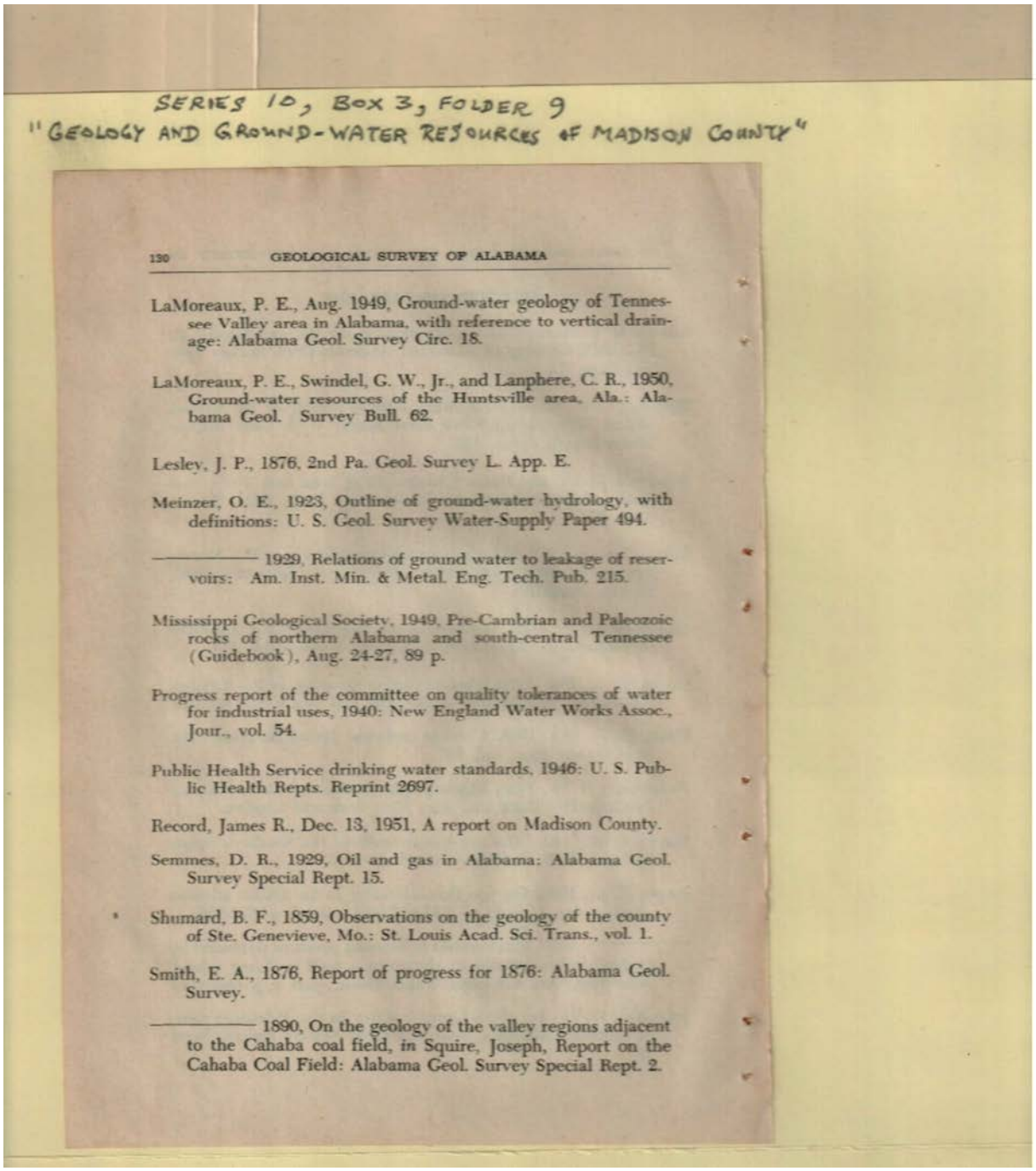


SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

LaMoreaux, P. E., Aug. 1949, Ground-water geology of Tennessee Valley area in Alabama, with reference to vertical drainage: Alabama Geol. Survey Circ. 18.

LaMoreaux, P. E., Swindel, G. W., Jr., and Lanphere, C. R., 1950, Ground-water resources of the Huntsville area, Ala.: Alabama Geol. Survey Bull. 62.

Lesley, J. P., 1876, 2nd Pa. Geol. Survey L. App. E.

Meinzer, O. E., 1923, Outline of ground-water hydrology, with definitions: U. S. Geol. Survey Water-Supply Paper 494.

———— 1929, Relations of ground water to leakage of reservoirs: Am. Inst. Min. & Metal. Eng. Tech. Pub. 215.

Mississippi Geological Society, 1949, Pre-Cambrian and Paleozoic rocks of northern Alabama and south-central Tennessee (Guidebook), Aug. 24-27, 89 p.

Progress report of the committee on quality tolerances of water for industrial uses, 1940: New England Water Works Assoc., Jour., vol. 54.

Public Health Service drinking water standards, 1946: U. S. Public Health Repts. Reprint 2697.

Record, James R., Dec. 13, 1951, A report on Madison County.

Semmes, D. R., 1929, Oil and gas in Alabama: Alabama Geol. Survey Special Rept. 15.

Shumard, B. F., 1859, Observations on the geology of the county of Ste. Genevieve, Mo.: St. Louis Acad. Sci. Trans., vol. 1.

Smith, E. A., 1876, Report of progress for 1876: Alabama Geol. Survey.

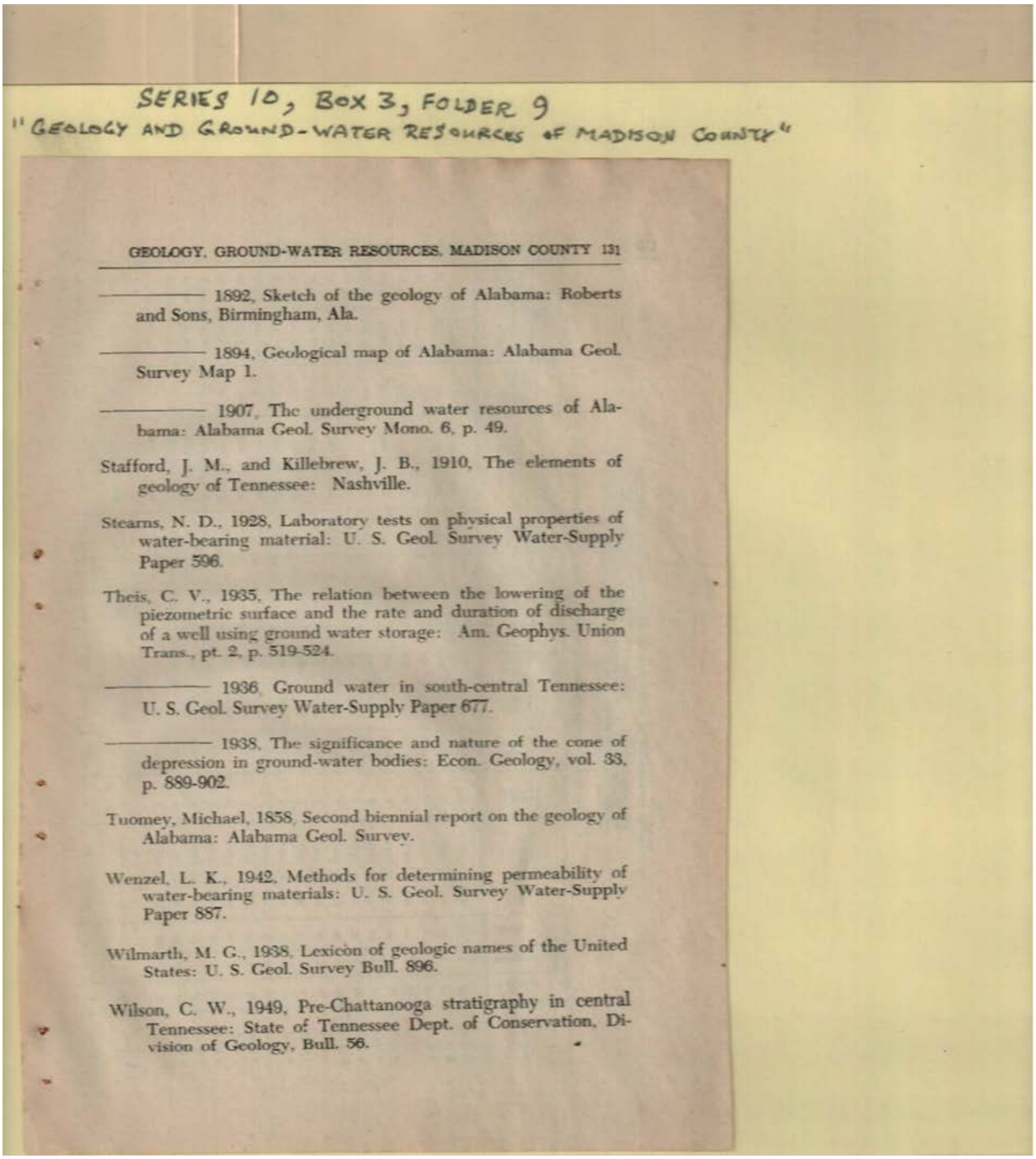
———— 1890, On the geology of the valley regions adjacent to the Cahaba coal field, *in* Squire, Joseph, Report on the Cahaba Coal Field: Alabama Geol. Survey Special Rept. 2.

Names:

LaMoreaux, P. E.
Lanphere, C. R.
Lesley, J. P.
Meinzer, O. E.
Record, James R.
Semmes, D. R.
Shumard, B. F.
Smith, E. A.
Squire, Joseph
Swindel, G. W., Jr.

Types:

booklet



———— 1892, Sketch of the geology of Alabama: Roberts and Sons, Birmingham, Ala.

———— 1894, Geological map of Alabama: Alabama Geol. Survey Map 1.

———— 1907, The underground water resources of Alabama: Alabama Geol. Survey Mono. 6, p. 49.

Stafford, J. M., and Killebrew, J. B., 1910, The elements of geology of Tennessee: Nashville.

Stearns, N. D., 1928, Laboratory tests on physical properties of water-bearing material: U. S. Geol. Survey Water-Supply Paper 596.

Theis, C. V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground water storage: Am. Geophys. Union Trans., pt. 2, p. 519-524.

———— 1936, Ground water in south-central Tennessee: U. S. Geol. Survey Water-Supply Paper 677.

———— 1938, The significance and nature of the cone of depression in ground-water bodies: Econ. Geology, vol. 33, p. 889-902.

Tuomey, Michael, 1858, Second biennial report on the geology of Alabama: Alabama Geol. Survey.

Wenzel, L. K., 1942, Methods for determining permeability of water-bearing materials: U. S. Geol. Survey Water-Supply Paper 887.

Wilmarth, M. G., 1938, Lexicon of geologic names of the United States: U. S. Geol. Survey Bull. 896.

Wilson, C. W., 1949, Pre-Chattanooga stratigraphy in central Tennessee: State of Tennessee Dept. of Conservation, Division of Geology, Bull. 56.

Names:

Killebrew, J. B.
Stafford, J. M.
Stearns, N. D.
Theis, C. V.
Tuomey, Michael
Wenzel, L. K.
Wilmarth, M. G.
Wilson, C. W.

Types:

booklet

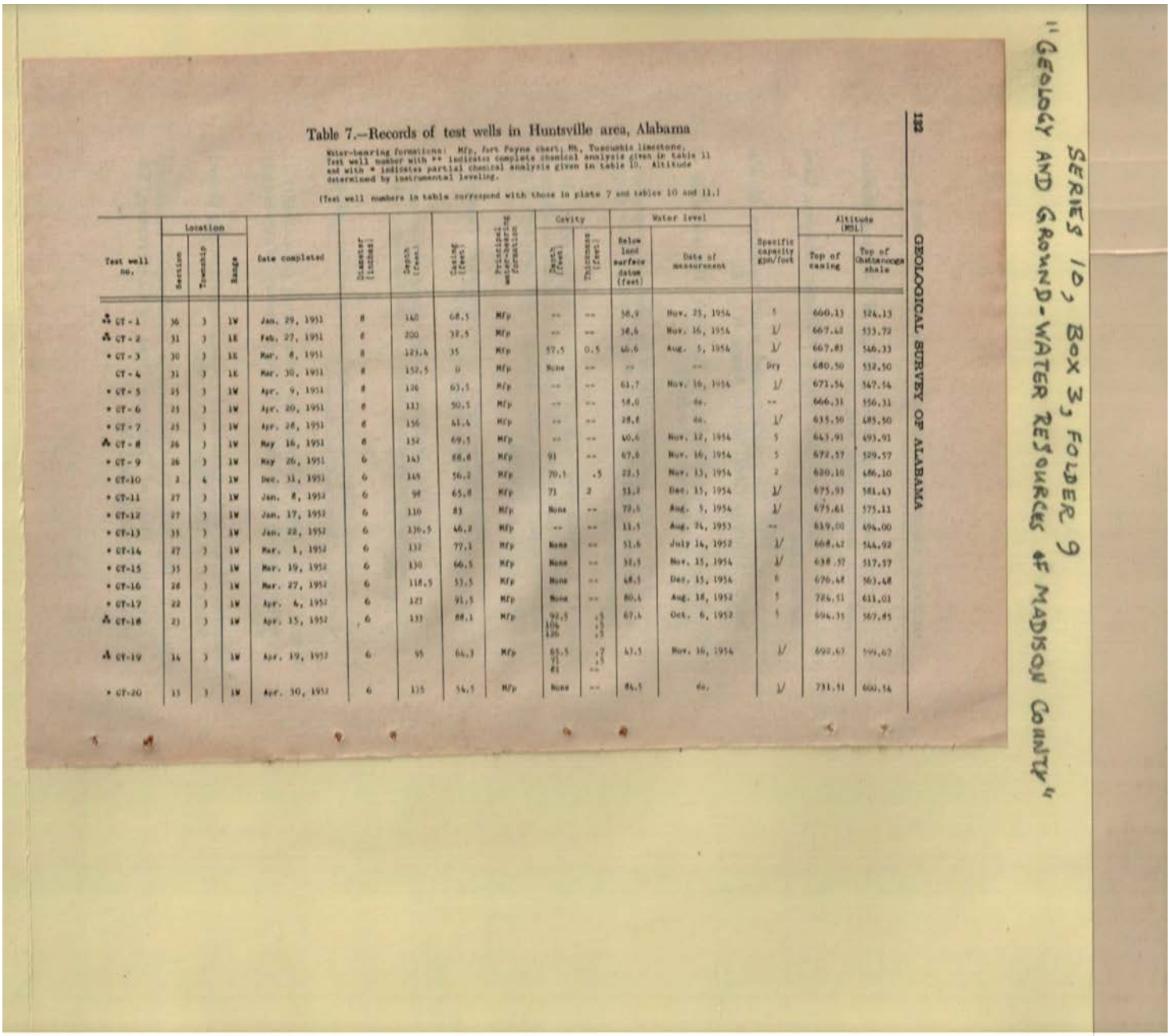


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Table 7.—Records of test wells in Huntsville area, Alabama

Water-bearing formations: Mfp, Fort Payne chert; Mt, Tuscumbia limestone.
Test well number with ** indicates complete chemical analysis given in table 11 and with * indicates partial chemical analysis given in table 10. Altitude determined by instrumental leveling.

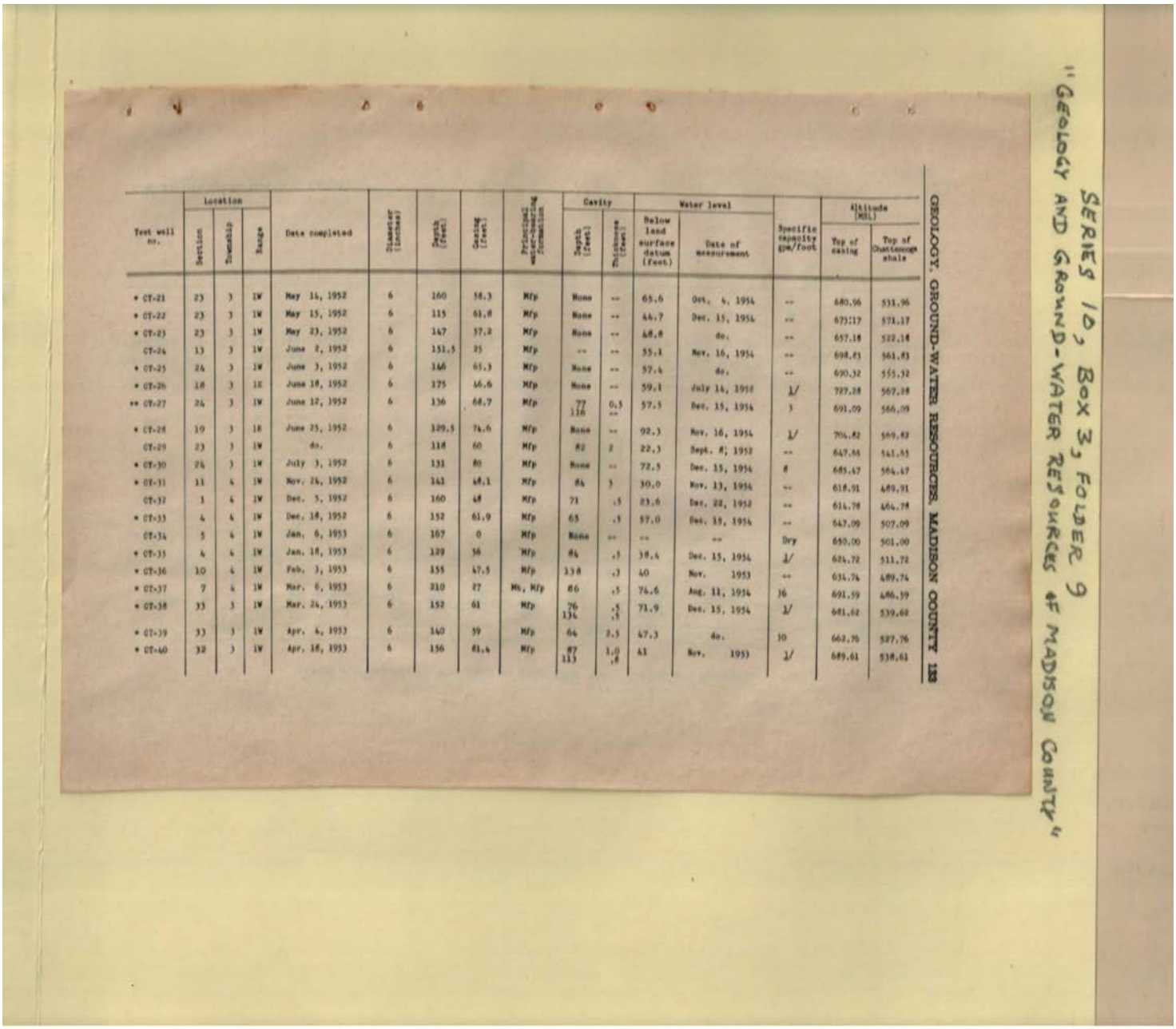
(Test well numbers in table correspond with those in plate 7 and tables 10 and 11.)

Test well no.	Location: Section	Location: Township	Location: Range	Date completed	Diameter (inches)	Depth (feet)	Casing (feet)	Principal water-bearing formation	Cavity: Depth (feet)	Cavity: Thickness (feet)	Water level: Below land surface datum (feet)	Water level: Date of measurement	Specific capacity gpm/foot	Altitude (MSL): Top of casing	Altitude (MSL): Top of Chattanooga shale
⁂ CT-1	36	3	1W	Jan. 29, 1951	8	140	68.5	Mfp	--	--	58.9	Nov. 25, 1954	5	660.13	526.13
⁂ CT-2	31	3	1E	Feb. 27, 1951	8	200	32.5	Mfp	--	--	38.6	Nov. 16, 1954	1/	667.48	533.72
* CT-3	30	3	1E	Mar. 8, 1951	8	123.4	35	Mfp	57.5	0.5	46.6	Aug. 5, 1954	1/	667.83	546.33
CT-4	31	3	1E	Mar. 30, 1951	8	152.5	0	Mfp	None	--	--	--	Dry	680.50	532.50
* CT-5	25	3	1W	Apr. 9, 1951	8	126	63.5	Mfp	--	--	61.7	Nov. 16, 1954	1/	671.54	547.54
* CT-6	25	3	1W	Apr. 20, 1951	8	133	50.5	Mfp	--	--	58.0	do.	--	666.31	556.31
* CT-7	25	3	1W	Apr. 28, 1951	8	156	63.4	Mfp	--	--	28.8	do.	1/	635.50	485.50
⁂ CT-8	26	3	1W	May 16, 1951	8	152	69.5	Mfp	--	--	40.6	Nov. 12, 1954	5	643.91	493.91
* CT-9	26	3	1W	May 26, 1951	6	143	88.8	Mfp	91	--	67.8	Nov. 16, 1954	5	672.57	529.57
* CT-10	2	4	1W	Dec. 31, 1951	6	148	56.2	Mfp	70.5	.5	22.3	Nov. 13, 1954	2	620.10	486.10
* CT-11	27	3	1W	Jan. 8, 1952	6	98	65.8	Mfp	71	2	51.2	Dec. 15, 1954	1/	675.93	581.43
* CT-12	27	3	1W	Jan. 17, 1952	6	110	83	Mfp	None	--	78.6	Aug. 5, 1954	1/	675.61	575.11
* CT-13	35	3	1W	Jan. 22, 1952	6	130.5	46.2	Mfp	--	--	11.5	Aug. 24, 1953	--	539.00	494.00
* CT-14	27	3	1W	Mar. 1, 1952	6	132	77.1	Mfp	None	--	51.6	July 14, 1952	1/	668.42	544.92
* CT-15	35	3	1W	Mar. 19, 1952	6	130	66.5	Mfp	None	--	32.5	Nov. 15, 1954	1/	638.57	517.57
* CT-16	28	3	1W	Mar. 27, 1952	6	118.5	53.5	Mfp	None	--	48.5	Dec. 15, 1954	5	676.48	563.48
* CT-17	22	3	1W	Apr. 4, 1952	6	121	91.5	Mfp	None	--	80.4	Aug. 18, 1952	5	724.51	611.01
⁂ CT-18	23	3	1W	Apr. 15, 1952	6	133	88.1	Mfp	92.5 106 120	.5 .5 .5	67.4	Oct. 6, 1952	5	694.31	567.85
⁂ CT-19	14	3	1W	Apr. 19, 1952	6	95	64.3	Mfp	65.5 71 81	.5 .5 --	43.5	Nov. 16, 1954	1/	692.67	599.67
* CT-20	15	3	1W	Apr. 30, 1952	6	135	54.5	Mfp	None	--	86.5	do.	1/	731.51	600.54

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Test Well Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 133

Test well no.	Location: Section	Location: Township	Location: Range	Date completed	Diameter (inches)	Depth (feet)	Casing (feet)	Principal water-bearing formation	Cavity: Depth (feet)	Cavity: Thickness (feet)	Water level: Below land surface datum (feet)	Water level: Date of measurement	Specific capacity gpm/foot	Altitude (MSL): Top of casing	Altitude (MSL): Top of Chattanooga shale
• CT-21	23	3	1W	May 14, 1952	6	160	58.3	Mfp	None	--	65.6	Oct. 4, 1954	--	680.96	531.96
• CT-22	23	3	1W	May 15, 1952	6	115	61.8	Mfp	None	--	44.7	Dec. 15, 1954	--	673.17	571.17
• CT-23	23	3	1W	May 23, 1952	6	147	57.2	Mfp	None	--	48.8	do.	--	657.18	522.18
CT-24	13	3	1W	June 2, 1952	6	151.5	25	Mfp	--	--	55.1	Nov. 16, 1954	--	698.83	561.83
• CT-25	24	3	1W	June 3, 1952	6	146	65.3	Mfp	None	--	57.4	do.	--	690.32	555.32
• CT-26	18	3	1E	June 18, 1952	6	175	46.6	Mfp	None	--	59.1	July 14, 1955	1/	727.28	567.28
•• CT-27	24	3	1W	June 12, 1952	6	136	68.7	Mfp	77 116	0.5 --	57.5	Dec. 15, 1954	3	691.09	566.09
• CT-28	19	3	1E	June 25, 1952	6	189.5	74.6	Mfp	None	--	92.3	Nov. 16, 1954	1/	704.82	569.82
CT-29	23	3	1W	do.	6	118	60	Mfp	82	2	22.3	Sept. 8, 1952	--	647.55	541.55
• CT-30	24	3	1W	July 3, 1952	6	131	80	Mfp	None	--	72.5	Dec. 15, 1954	8	685.47	564.47
• CT-31	11	4	1W	Nov. 24, 1952	6	141	48.1	Mfp	84	3	30.0	Nov. 13, 1954	--	618.91	489.91
CT-32	1	4	1W	Dec. 5, 1952	6	160	48	Mfp	71	.5	23.6	Dec. 22, 1952	--	614.78	464.78
• CT-33	4	4	1W	Dec. 18, 1952	6	152	61.9	Mfp	65	.5	57.0	Dec. 15, 1954	--	647.09	507.09
CT-34	5	4	1W	Jan. 6, 1953	6	167	0	Mfp	None	--	--	--	Dry	650.00	501.00
• CT-35	4	4	1W	Jan. 18, 1953	6	189	56	Mfp	84	.5	38.4	Dec. 15, 1954	1/	624.72	511.72
• CT-36	10	4	1W	Feb. 3, 1953	6	155	47.5	Mfp	138	.3	40	Nov. 1953	--	634.74	489.74
• CT-37	7	4	1W	Mar. 6, 1953	6	210	27	Ms, Mfp	86	.5	74.6	Aug. 11, 1954	16	691.59	486.59
• CT-38	33	3	1W	Mar. 24, 1953	6	152	61	Mfp	76 134	.5 .5	71.9	Dec. 15, 1954	1/	681.62	539.62
• CT-39	33	3	1W	Apr. 4, 1953	6	140	59	Mfp	64	2.5	47.3	do.	10	662.76	587.76
• CT-40	32	3	1W	Apr. 18, 1953	6	156	81.4	Mfp	87 113	1.0 .8	41	Nov. 1953	1/	689.61	538.61

Names:
Test Well Records

Types:
chart

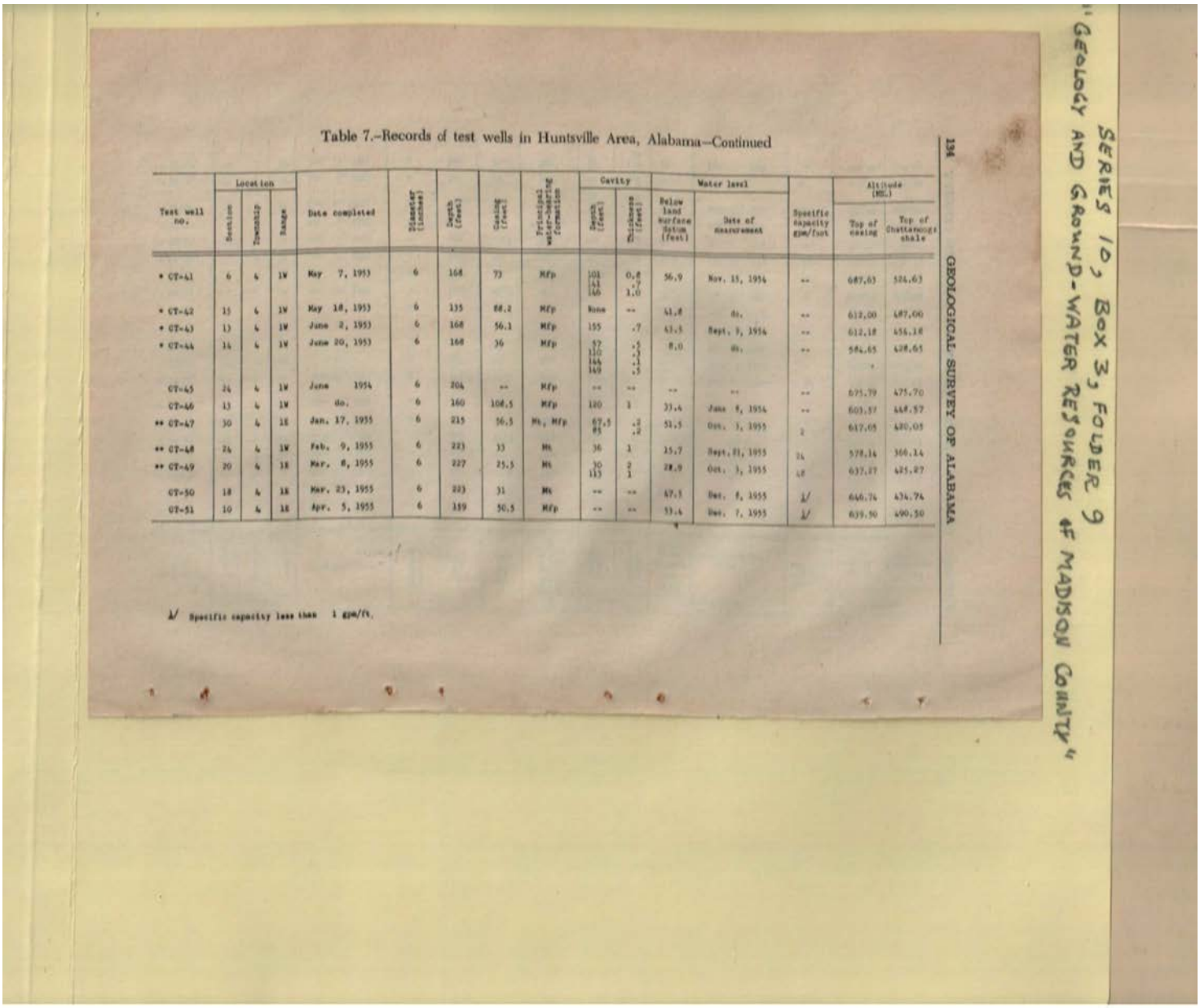


Table 7.–Records of test wells in Huntsville Area, Alabama–Continued

Test well no.	Location: Section	Location: Township	Location: Range	Date completed	Diameter (inches)	Depth (feet)	Casing (feet)	Principal water-bearing formation	Cavity: Depth (feet)	Cavity: Thickness (feet)	Water level: Below land surface datum (feet)	Water level: Date of measurement	Specific capacity gpm/foot	Altitude (MSL): Top of casing	Altitude (MSL): Top of Chattanooga shale
• CT-41	6	4	1W	May 7, 1953	6	168	73	Mfp	101 121 138	0.6 .7 1.0	56.9	Nov. 15, 1954	--	687.63	524.63
• CT-42	15	4	1W	May 18, 1953	6	135	88.2	Mfp	None	--	41.8	do.	--	612.00	487.00
• CT-43	13	4	1W	June 2, 1953	6	168	56.1	Mfp	155	.7	43.5	Sept. 9, 1954	--	612.18	456.18
• CT-44	14	4	1W	June 20, 1953	6	168	36	Mfp	57 110 144 149	.5 .5 .5 .5	8.0	do.	--	584.65	428.65
CT-45	24	4	1W	June 1954	6	204	--	Mfp	--	--	--	--	--	675.79	475.70
CT-46	13	4	1W	do.	6	160	108.5	Mfp	120	1	33.4	June 8, 1954	--	603.57	448.57
•• CT-47	30	4	1E	Jan. 17, 1955	6	215	56.5	Mt, Mfp	67.5 85	.5 .5	51.5	Oct. 3, 1955	2	617.05	420.05
•• CT-48	24	4	1W	Feb. 9, 1955	6	223	33	Mt	36	1	25.7	Sept. 21, 1955	24	578.14	368.14
•• CT-49	20	4	1E	Mar. 8, 1955	6	227	25.5	Mt	20 113	2 1	28.9	Oct. 3, 1955	48	637.27	425.27
CT-50	18	4	1E	Mar. 23, 1955	6	223	31	Mt	--	--	47.1	Dec. 8, 1955	1/	646.74	434.74
CT-51	10	4	1E	Apr. 5, 1955	6	159	50.5	Mfp	--	--	53.4	Dec. 7, 1955	1/	639.50	490.50

1/ Specific capacity less than 1 gpm/ft.

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SERIES 10, BOX 3, FOLDER 9
GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Test Well Records

Types:
chart

Table 8.–Records of Wells and springs in Madison County, Alabama

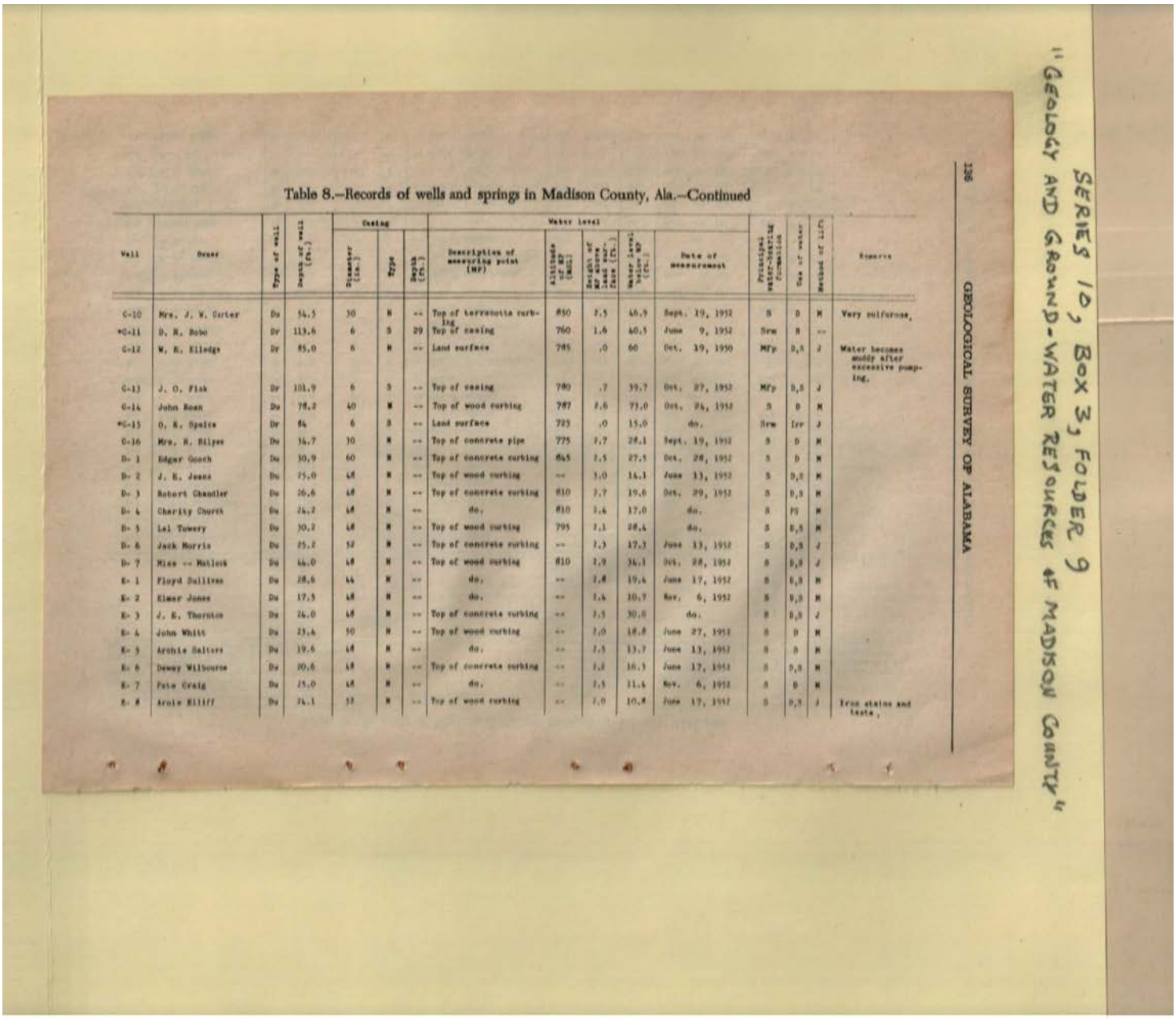
Well no.: Numbers correspond to those in plates 6 and 7 and tables 10 and 11; * indicates partial chemical analysis given in table 10; ** indicates complete chemical analysis given in table 11.
Type of well: Dr, drilled; Du, dug.
Depth of well and water level: Depths shown in feet are reported; those in feet and tenths are measured.
Altitude: Altitudes determined by aneroid barometer.
Type of casing: C, concrete; N, none; R, rock or stone; S, steel; T, tile.
Method of lift: [illegible], deep well cylinder; Cf, centrifugal; J, jet; H, manual; T, turbine.
Use: D, domestic; Dr, drainage; Ind, industrial; Irr, irrigation; N, none; PS, public supply; S, stock; Sch, school; R, recreation.
Water-bearing formation: Oc, Chickamauga limestone; Srm, Red Mountain formation; Dc, Chattanooga shale; Mfp, Fort Payne chert; Mt, Tuscumbia limestone; Ms, Ste. Genevieve limestone; Mg, Gasper formation; Mh, Hartselle sandstone; Mb, Bangor limestone; Ppv, Pottsville formation; S, soil zone; A, alluvium.

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (MSL)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
B-1	Stella Bradford	Dr	66.7	6	S	55	Top of casing	910	1.7	46.0	June 17, 1952	Mfp	D,S	H	
B-2	F. R. Scivally	Dr	62.4	6	S	--	do.	865	1.5	45.4	do.	Mt	D	H	
B-3	Andrew Kilpatrick	Du	37.6	48	N	--	Top of wood curbing	840	3.9	34.1	Nov. 3, 1952	S	D	H	
*B-4	Miss Edna Walker	Dr	96.5	6	S	--	Top of casing	865	.9	85.6	June 10, 1952	Mfp	D,S	H	
B-5	C. J. Walker	Dr	88.9	6	S	46	do.	898	.5	85.6	June 17, 1952	Mfp	D	H	Sulfurous.
B-6	J. B. Greene	Dr	106	6	S	30	do.	948	3.5	58	do.	Mfp	D	H	Do.
B-7	L. B. White	Dr	96	6	S	42	Land surface	855	.0	60	July 1952	Mfp	D,S	J	
B-8	Dick Walker	Dr	58.8	6	S	--	Top of casing	820	1.1	52.7	Oct. 30, 1952	Mfp	D,S	J	
B-9	L. V. Gates	Du	40.6	48	N	--	Top of curbing	832	2.2	37.3	do.	S	D, Ind	J	Do.
*B-10	W. R. Jones	Dr	62.1	6	S	20	Top of casing	820	--	42.4	June 11, 1952	Mfp	D	H	
B-11	B. H. Berry	Du	58.2	30	R	--	Top of rock curbing	790	3.3	51.8	Oct. 30, 1952	S	D	H	
B-12	H. M. Cochran	Dr	101.9	6	S	95	Top of casing	880	3.1	70.0	Sept. 19, 1952	Mfp	D,S	H	
B-13	Paul Ricketts	Du	89.2	30	N	--	Top of wood curbing	--	2.5	85.0	do.	S	D	H	
B-14	E. W. Hillis	Dr	99.9	6	S	20	Top of casing	800	1.0	95.6	do.	Mfp	D	H	
B-15	J. O. Underwood	Dr	102.5	6	S	--	do.	830	1.0	90.8	Sept. 12, 1952	Mfp	D	H	
C-1	J. Plunkett	Du	26.8	48	N	--	Top of wood curbing	845	3.0	13.9	Nov. 4, 1952	S	D,S	H	
C-2	E. H. Hunter	Du	26.9	30	N	--	Top of concrete curbing	815	2.3	24.3	Oct. 28, 1952	S	D	H	
C-3	W. W. Hill	Dr	72.7	6	S	--	Top of casing	815	.9	23.6	do.	Mfp	D	J	
*C-4	Leland Hobbs	Dr	60.0	6	S	--	do.	967	2.1	12.3	June 10, 1952	Mfp	N	--	
C-5	Roy Hill	Du	22.6	48	N	--	Top of wood curbing	785	2.4	9.8	Oct. 27, 1952	S	D,S	H	
C-6	A. L. Scott	Du	54.6	48	N	--	Top of concrete curbing	882	2.7	53.0	Nov. 4, 1952	S	D	H	
C-7	C. M. Hubert	Du	53.4	40	N	--	do.	785	2.2	47.9	Oct. 29, 1952	S	D,S	H	
*C-8	Miss Flossie Tanner	Dr	60	6	S	30	Land surface	745	.0	--	June 15, 1949	Srm	D,S	J	
*C-9	Mason Bridges	Dr	123.5	6	S	--	Top of casing	842	2.9	85.6	June 10, 1952	Mfp	S	H	Do.

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

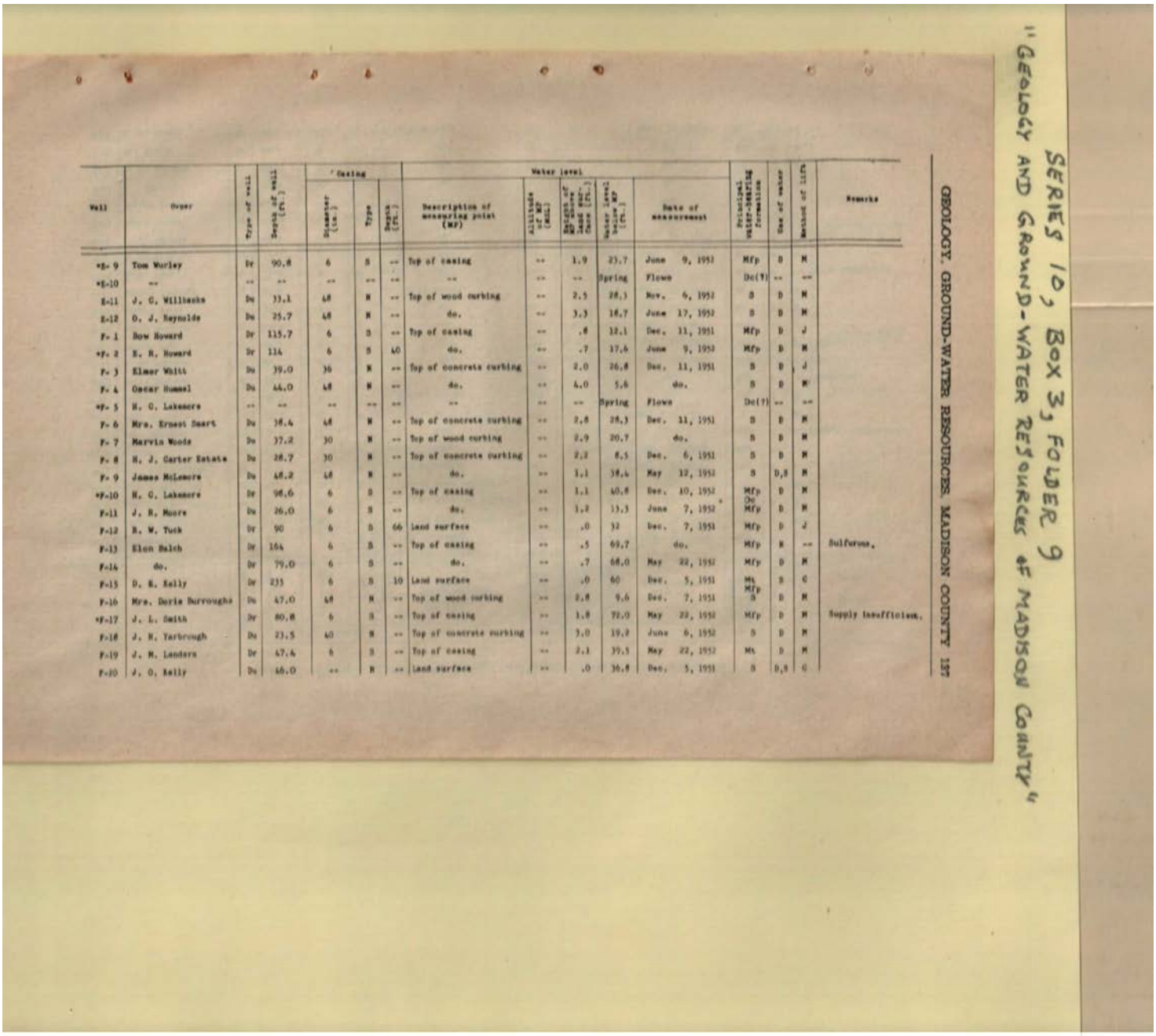
136 GEOLOGICAL SURVEY OF ALABAMA

Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (Ft.)	Casing			Water level				Principal water-bearing formation	Use of water	Method of lift	Remarks
				Diameter (In.)	Type	Depth (Ft.)	Description of measuring point (MP)	Altitude of MP (Ft.)	Height of MP above land surface (Ft.)	Water level below MP (Ft.)	Date of measurement				
G-10	Mrs. J. W. Carter	Du	34.5	30	R	--	Top of terracotta curbing	850	2.5	46.9	Sept. 19, 1952	S	D	H	Very sulfurous.
*G-11	D. H. Bobo	Dr	113.6	6	S	29	Top of casing	760	1.6	40.5	June 9, 1952	Stw	S	--	
G-12	W. E. Elledge	Dr	85.0	6	W	--	Land surface	785	.0	60	Oct. 19, 1950	Mfp	D,S	J	Water becomes muddy after excessive pumping.
G-13	J. O. Fisk	Dr	101.9	6	S	--	Top of casing	780	.7	39.7	Oct. 27, 1952	Mfp	D,S	J	
G-14	John Bean	Du	78.2	40	W	--	Top of wood curbing	787	2.6	71.0	Oct. 24, 1952	S	D	H	
*G-15	O. E. Speice	Dr	84	6	S	--	Land surface	725	.0	15.0	do.	Stw	Irr	J	
G-16	Mrs. H. Silyes	Du	34.7	30	R	--	Top of concrete pipe	775	2.7	28.1	Sept. 19, 1952	S	D	H	
D- 1	Edgar Gooch	Du	30.9	60	R	--	Top of concrete curbing	845	2.5	27.5	Oct. 28, 1952	S	D	H	
D- 2	J. E. Jones	Du	25.0	48	R	--	Top of wood curbing	--	3.0	14.1	June 13, 1952	S	D,S	H	
D- 3	Robert Chandler	Du	26.6	48	R	--	Top of concrete curbing	810	2.7	19.6	Oct. 29, 1952	S	D,S	H	
D- 4	Charity Church	Du	24.2	48	R	--	do.	810	1.6	17.0	do.	S	PS	H	
D- 5	Lal Towery	Du	30.2	48	R	--	Top of wood curbing	795	2.1	28.4	do.	S	D,S	H	
D- 6	Jack Morris	Du	25.2	32	R	--	Top of concrete curbing	--	1.3	17.3	June 13, 1952	S	D,S	J	
D- 7	Miss -- Matlock	Du	44.0	48	R	--	Top of wood curbing	810	2.9	34.1	Oct. 28, 1952	S	D,S	J	
E- 1	Floyd Sullivan	Du	28.6	44	R	--	do.	--	2.8	19.4	June 17, 1952	S	D,S	H	
E- 2	Elmer Jones	Du	17.5	48	R	--	do.	--	1.4	10.7	Nov. 6, 1952	S	D,S	H	
E- 3	J. E. Thornton	Du	24.0	48	R	--	Top of concrete curbing	--	2.5	30.0	do.	S	D,S	J	
E- 4	John Whitt	Du	23.4	30	R	--	Top of wood curbing	--	2.0	18.8	June 27, 1952	S	D	H	
E- 5	Archie Salters	Du	19.6	48	R	--	do.	--	2.5	13.7	June 13, 1952	S	D	H	
E- 6	Dewey Wilbourne	Du	20.6	48	R	--	Top of concrete curbing	--	1.2	16.3	June 17, 1952	S	D,S	H	
E- 7	Pete Craig	Du	25.0	48	R	--	do.	--	2.5	11.4	Nov. 6, 1952	S	D	H	
E- 8	Arnie Elliff	Du	24.1	32	R	--	Top of wood curbing	--	2.0	10.8	June 17, 1952	S	D,S	J	Iron stains and taste.

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 137

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
*E- 9	Tom Worley	Dr	90.8	6	S	--	Top of casing	--	1.9	23.7	June 9, 1952	Mfp	D	N	
*E-10	--	--	--	--	--	--	--	--	--	Spring	Flows	Dc(?)	--	--	
E-11	J. G. Williams	Du	33.1	48	N	--	Top of wood curbing	--	2.5	28.3	Nov. 6, 1952	S	D	N	
E-12	O. J. Reynolds	Du	25.7	48	N	--	do.	--	3.3	18.7	June 17, 1952	S	D	N	
F- 1	Bow Howard	Dr	115.7	6	S	--	Top of casing	--	.8	12.1	Dec. 11, 1951	Mfp	D	J	
*F- 2	E. R. Howard	Dr	114	6	S	40	do.	--	.7	17.6	June 9, 1952	Mfp	D	N	
F- 3	Elmer Whitt	Du	39.0	36	N	--	Top of concrete curbing	--	2.0	26.8	Dec. 11, 1951	S	D	J	
F- 4	Oscar Hummel	Du	44.0	48	N	--	do.	--	4.0	5.6	do.	S	D	N	
*F- 5	H. O. Lakemore	--	--	--	--	--	--	--	--	Spring	Flows	Dc(?)	--	--	
F- 6	Mrs. Ernest Smart	Du	38.4	48	N	--	Top of concrete curbing	--	2.8	28.3	Dec. 11, 1951	S	D	N	
F- 7	Marvin Woods	Du	37.2	30	N	--	Top of wood curbing	--	2.9	20.7	do.	S	D	N	
F- 8	H. J. Carter Estate	Du	28.7	30	N	--	Top of concrete curbing	--	2.2	8.5	Dec. 6, 1951	S	D	N	
F- 9	James McLemore	Du	48.2	48	N	--	do.	--	1.1	38.4	May 12, 1952	S	D,S	N	
*F-10	H. O. Lakemore	Dr	98.6	6	S	--	Top of casing	--	1.1	40.8	Dec. 10, 1952	Mfp Dr	D	N	
F-11	J. R. Moore	Du	26.0	6	S	--	do.	--	1.2	13.3	June 7, 1952	Mfp	D	N	
F-12	R. W. Tuck	Dr	90	6	S	66	Land surface	--	.0	32	Dec. 7, 1951	Mfp	D	J	
F-13	Elon Balch	Dr	164	6	S	--	Top of casing	--	.5	69.7	do.	Mfp	N	--	Sulfurous.
F-14	do.	Dr	79.0	6	S	--	do.	--	.7	68.0	May 22, 1952	Mfp	D	N	
F-15	D. E. Kelly	Dr	231	6	S	10	Land surface	--	.0	60	Dec. 5, 1951	Mk Mfp	S	C	
F-16	Mrs. Doris Burroughs	Du	47.0	48	N	--	Top of wood curbing	--	2.8	9.6	Dec. 7, 1951	S	D	N	
*F-17	J. L. Smith	Dr	80.8	6	S	--	Top of casing	--	1.8	72.0	May 22, 1952	Mfp	D	N	Supply insufficient.
F-18	J. H. Yarbrough	Du	23.5	40	N	--	Top of concrete curbing	--	3.0	19.2	June 6, 1952	S	D	N	
F-19	J. M. Landers	Dr	47.4	6	S	--	Top of casing	--	2.1	39.5	May 22, 1952	Mk	D	N	
F-20	J. O. Kelly	Du	46.0	--	N	--	Land surface	--	.0	36.8	Dec. 5, 1951	S	D,S	C	

Types:
chart

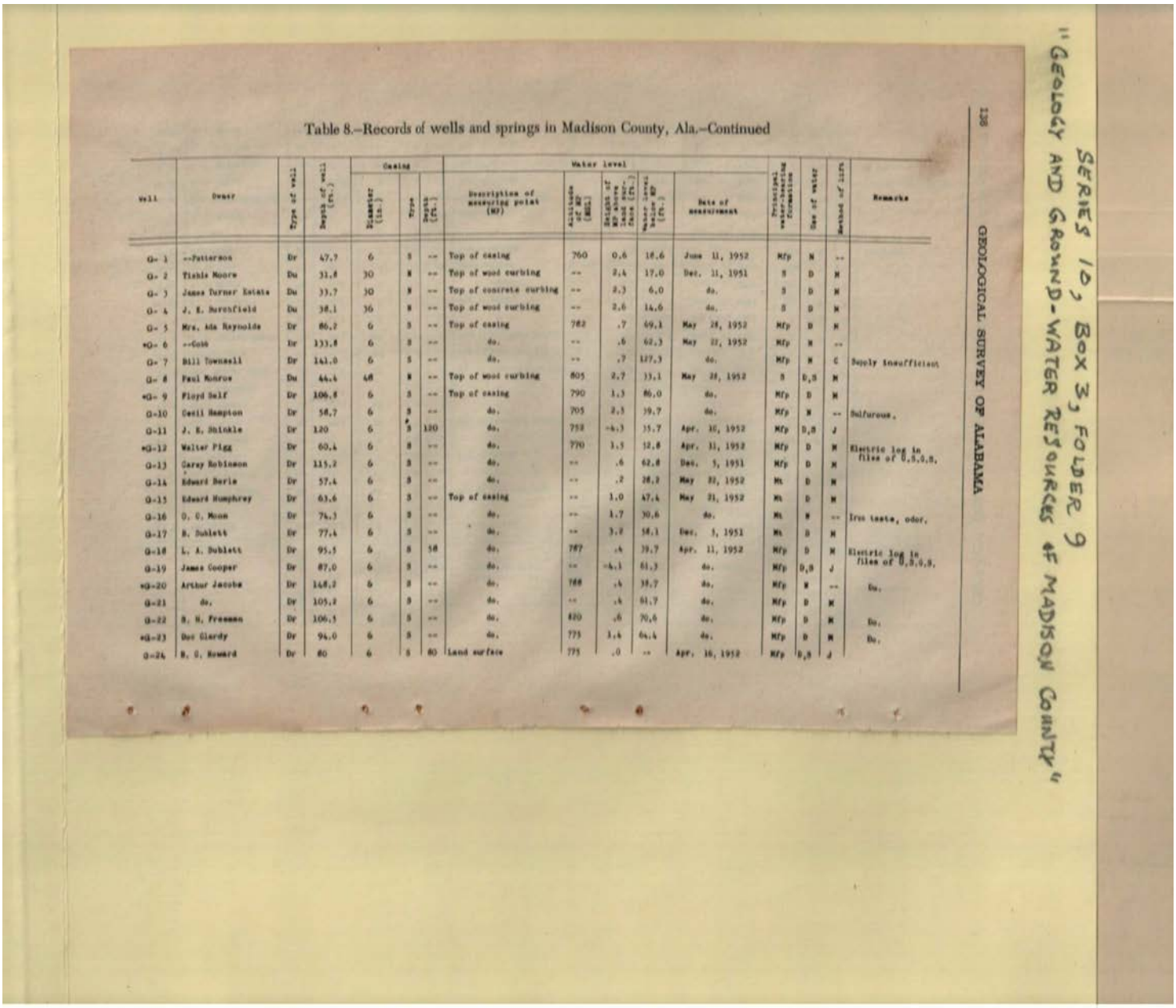


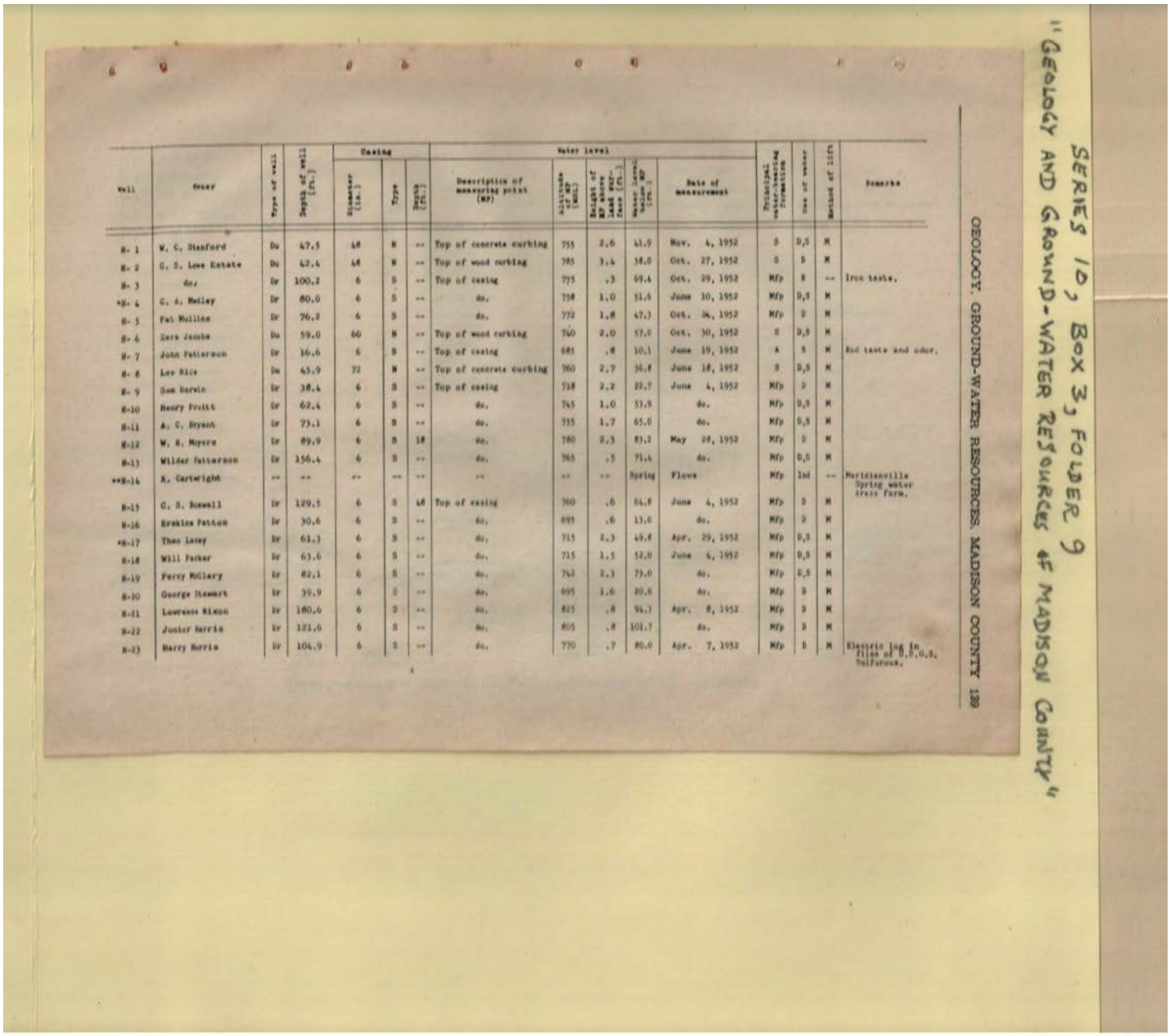
Table 8.–Records of wells and springs in Madison County, Ala.–Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
G- 1	--Patterson	Dr	47.7	6	S	--	Top of casing	760	0.6	18.6	June 11, 1952	Mfp	N	--	
G- 2	Tinnie Moore	Du	31.8	30	W	--	Top of wood curbing	--	2.4	17.0	Dec. 11, 1951	S	D	N	
G- 3	James Turner Estate	Du	33.7	30	W	--	Top of concrete curbing	--	2.3	6.0	do.	S	D	N	
G- 4	J. E. Burnsfield	Du	38.1	36	W	--	Top of wood curbing	--	2.6	14.6	do.	S	D	N	
G- 5	Mrs. Ada Reynolds	Dr	86.2	6	S	--	Top of casing	782	.7	69.1	May 28, 1952	Mfp	D	N	
*G- 6	--Cobb	Dr	133.8	6	S	--	do.	--	.6	62.3	May 22, 1952	Mfp	N	--	
G- 7	Bill Townsell	Dr	141.0	6	S	--	do.	--	.7	127.3	do.	Mfp	N	C	Supply insufficient
G- 8	Paul Monroe	Du	44.4	48	W	--	Top of wood curbing	805	2.7	33.1	May 28, 1952	S	D,S	N	
*G- 9	Floyd Self	Dr	106.8	6	S	--	Top of casing	790	1.3	86.0	do.	Mfp	D	N	
G-10	Cecil Hampton	Dr	58.7	6	S	--	do.	705	2.3	39.7	do.	Mfp	N	--	Sulfurous.
G-11	J. E. Shinkle	Dr	120	6	S	120	do.	752	-4.3	35.7	Apr. 16, 1952	Mfp	D,S	J	
*G-12	Walter Pigg	Dr	60.4	6	S	--	do.	770	1.5	12.8	Apr. 11, 1952	Mfp	D	N	Electric log in files of G.S.A.B.
G-13	Carey Robinson	Dr	115.2	6	S	--	do.	--	.6	62.8	Dec. 5, 1951	Mfp	D	N	
G-14	Edward Berle	Dr	57.4	6	S	--	do.	--	.2	28.2	May 22, 1952	Mt	D	N	
G-15	Edward Humphrey	Dr	63.6	6	S	--	Top of casing	--	1.0	47.4	May 21, 1952	Mt	D	N	
G-16	O. O. Moon	Dr	74.3	6	S	--	do.	--	1.7	30.6	do.	Mt	N	--	Iron taste, odor.
G-17	B. Dublett	Dr	77.4	6	S	--	do.	--	3.2	58.1	Dec. 5, 1951	Mt	D	N	
G-18	L. A. Dublett	Dr	95.5	6	S	58	do.	787	.4	39.7	Apr. 11, 1952	Mfp	D	N	Electric log in files of G.S.A.B.
G-19	James Cooper	Dr	87.0	6	S	--	do.	--	-4.1	61.3	do.	Mfp	D,S	J	
*G-20	Arthur Jacobs	Dr	148.2	6	S	--	do.	788	.4	38.7	do.	Mfp	N	--	Do.
G-21	do.	Dr	105.2	6	S	--	do.	--	.4	61.7	do.	Mfp	D	N	
G-22	B. H. Freeman	Dr	106.5	6	S	--	do.	820	.6	70.6	do.	Mfp	D	N	Do.
*G-23	Dee Glardy	Dr	94.0	6	S	--	do.	775	1.4	64.4	do.	Mfp	D	N	Do.
G-24	B. O. Howard	Dr	80	6	S	80	Land surface	775	.0	--	Apr. 16, 1952	Mfp	D,S	J	

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (msl.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formations	Use of water	Method of lift	Remarks
M- 1	W. C. Stanford	Du	47.5	48	N	--	Top of concrete curbing	755	2.6	41.9	Nov. 4, 1952	S	D,S	N	
M- 2	C. S. Lowe Estate	Du	42.4	48	N	--	Top of wood curbing	785	3.4	38.0	Oct. 27, 1952	S	D	N	
M- 3	do.	Dr	100.2	6	S	--	Top of casing	775	.3	69.4	Oct. 29, 1952	Mfp	N	--	Iron taste.
*M- 4	C. A. Melley	Dr	80.0	6	S	--	do.	758	1.0	51.6	June 10, 1952	Mfp	D,S	N	
M- 5	Pat Mullins	Dr	76.2	6	S	--	do.	772	1.8	47.3	Oct. 24, 1952	Mfp	D	N	
M- 6	Zera Jacobs	Du	59.0	60	N	--	Top of wood curbing	740	2.0	57.0	Oct. 30, 1952	S	D,S	N	
M- 7	John Patterson	Dr	16.6	6	S	--	Top of casing	685	.8	10.1	June 19, 1952	A	S	N	Bad taste and odor.
M- 8	Lee Rice	Du	45.9	72	N	--	Top of concrete curbing	760	2.7	36.8	June 18, 1952	S	D,S	N	
M- 9	Sam Darwin	Dr	38.4	6	S	--	Top of casing	718	2.2	22.7	June 4, 1952	Mfp	D	N	
M-10	Henry Pruitt	Dr	62.4	6	S	--	do.	745	1.0	53.9	do.	Mfp	D,S	N	
M-11	A. C. Bryant	Dr	73.1	6	S	--	do.	755	1.7	65.0	do.	Mfp	D,S	N	
M-12	W. H. Myers	Dr	89.9	6	S	18	do.	780	2.3	83.2	May 28, 1952	Mfp	D	N	
M-13	Wilder Patterson	Dr	156.4	6	S	--	do.	765	.5	71.4	do.	Mfp	D,S	N	
**M-14	K. Cartwright	--	--	--	--	--	--	--	--	--	Spring Flows	Mfp	Ind	--	Meridianville Spring water cress farm.
M-15	C. B. Boswell	Dr	129.5	6	S	48	Top of casing	760	.6	84.8	June 4, 1952	Mfp	D	N	
M-16	Erskine Patton	Dr	30.6	6	S	--	do.	695	.6	13.0	do.	Mfp	D	N	
*M-17	Theo Lacey	Dr	61.3	6	S	--	do.	715	2.3	49.8	Apr. 29, 1952	Mfp	D,S	N	
M-18	Will Parker	Dr	63.6	6	S	--	do.	715	1.5	52.0	June 4, 1952	Mfp	D,S	N	
M-19	Percy McClary	Dr	82.1	6	S	--	do.	742	2.3	73.0	do.	Mfp	D,S	N	
M-20	George Stewart	Dr	39.9	6	S	--	do.	695	1.6	30.8	do.	Mfp	D	N	
M-21	Lawrence Nixon	Dr	180.6	6	S	--	do.	825	.8	94.3	Apr. 8, 1952	Mfp	D	N	
M-22	Junior Harris	Dr	121.6	6	S	--	do.	805	.8	101.7	do.	Mfp	D	N	
M-23	Harry Harris	Dr	104.9	6	S	--	do.	770	.7	80.0	Apr. 7, 1952	Mfp	D	N	Electric log in files of U.S.G.S. Tuscaloosa.

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 139

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Types:
chart

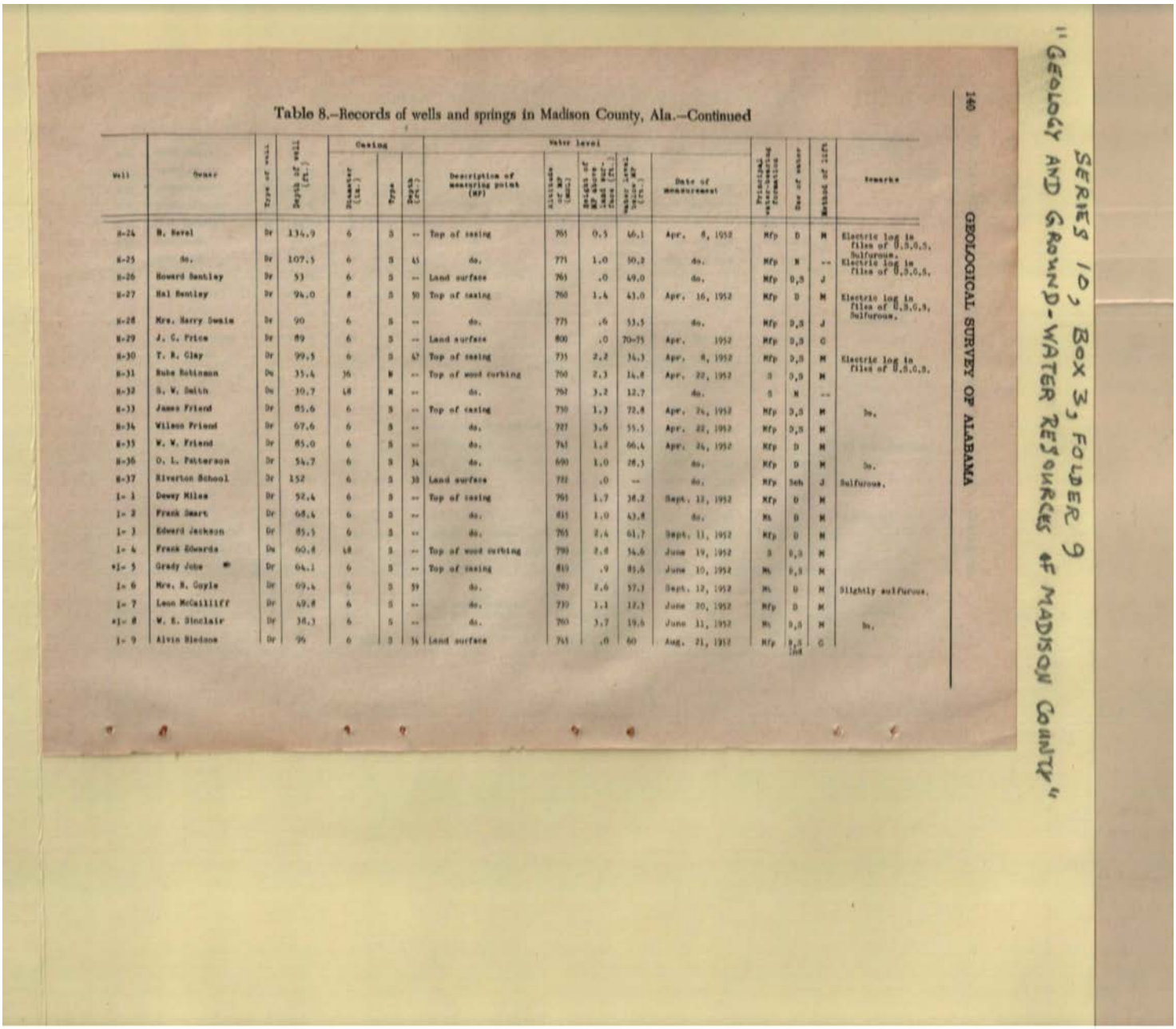


Table 8.–Records of wells and springs in Madison County, Ala.–Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Depth to water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
6-24	B. Revel	Dr	134.9	6	S	--	Top of casing	761	0.5	46.1	Apr. 8, 1952	Mfp	D	N	Electric log in files of U.S.G.S. Sulfurous.
6-25	do.	Dr	107.5	6	S	45	do.	771	1.0	50.2	do.	Mfp	N	--	Electric log in files of U.S.G.S.
6-26	Howard Bentley	Dr	53	6	S	--	Land surface	761	.0	49.0	do.	Mfp	D,S	J	
6-27	Hal Bentley	Dr	94.0	8	S	50	Top of casing	760	1.4	43.0	Apr. 16, 1952	Mfp	D	N	Electric log in files of U.S.G.S. Sulfurous.
6-28	Mrs. Harry Swain	Dr	90	6	S	--	do.	775	.6	53.5	do.	Mfp	D,S	J	
6-29	J. C. Price	Dr	89	6	S	--	Land surface	800	.0	70-75	Apr. 1952	Mfp	D,S	C	
6-30	T. R. Clay	Dr	99.5	6	S	47	Top of casing	771	2.2	34.3	Apr. 8, 1952	Mfp	D,S	N	Electric log in files of U.S.G.S.
6-31	Rube Robinson	Du	35.4	36	W	--	Top of wood curbing	760	2.3	14.8	Apr. 22, 1952	S	D,S	N	
6-32	S. W. Smith	Du	30.7	48	W	--	do.	762	3.2	12.7	do.	S	N	--	
6-33	James Friend	Dr	85.6	6	S	--	Top of casing	730	1.3	72.8	Apr. 24, 1952	Mfp	D,S	N	Do.
6-34	Wilson Friend	Dr	67.6	6	S	--	do.	727	3.6	55.5	Apr. 22, 1952	Mfp	D,S	N	
6-35	W. W. Friend	Dr	85.0	6	S	--	do.	741	1.2	66.4	Apr. 24, 1952	Mfp	D	N	
6-36	O. L. Patterson	Dr	54.7	6	S	34	do.	690	1.0	28.3	do.	Mfp	D	N	Do.
6-37	Riverton School	Dr	152	6	S	38	Land surface	721	.0	--	do.	Mfp	Sch	J	Sulfurous.
7- 1	Dewey Miles	Dr	52.4	6	S	--	Top of casing	761	1.7	38.2	Sept. 11, 1952	Mfp	D	N	
7- 2	Frank Smart	Dr	68.4	6	S	--	do.	611	1.0	43.8	do.	Ms	D	N	
7- 3	Edward Jackson	Dr	85.5	6	S	--	do.	765	2.4	41.7	Sept. 11, 1952	Mfp	D	N	
7- 4	Frank Edwards	Du	60.8	48	S	--	Top of wood curbing	799	2.8	34.6	June 19, 1952	S	D,S	N	
*7- 5	Grady Jobe	Dr	64.1	6	S	--	Top of casing	810	.9	85.6	June 10, 1952	Ms	D,S	N	
7- 6	Mrs. B. Coyle	Dr	89.4	6	S	59	do.	780	2.6	57.3	Sept. 12, 1952	Ms	D	N	Slightly sulfurous.
7- 7	Leon McCaliliff	Dr	49.8	6	S	--	do.	739	1.1	12.3	June 20, 1952	Mfp	D	N	
*7- 8	W. E. Sinclair	Dr	38.3	6	S	--	do.	760	3.7	19.6	June 11, 1952	Ms	D,S	N	Do.
7- 9	Alvin Bledsoe	Dr	96	6	S	34	Land surface	741	.0	60	Aug. 21, 1952	Mfp	D,S Ind	C	

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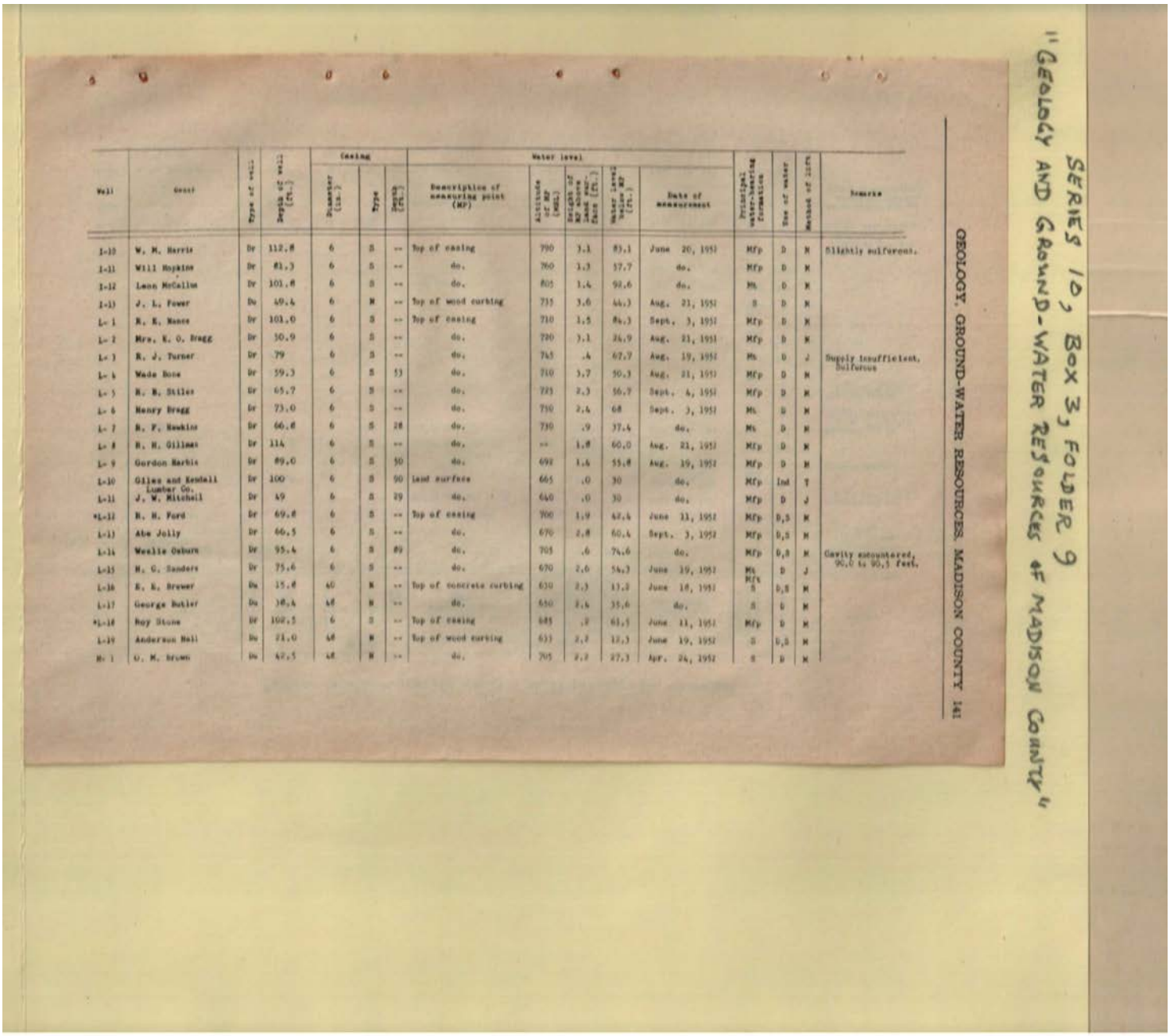
SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (msl.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
L-10	W. M. Harris	Dr	112.8	6	S	--	Top of casing	790	3.1	83.1	June 20, 1951	Mfp	D	N	Slightly sulfurous.
L-11	Will Hopkins	Dr	81.3	6	S	--	do.	760	1.3	57.7	do.	Mfp	D	N	
L-12	Leon McCallum	Dr	101.8	6	S	--	do.	805	1.4	92.6	do.	Ms	D	N	
L-13	J. L. Fowler	Du	49.4	6	N	--	Top of wood curbing	735	3.6	44.3	Aug. 21, 1951	S	D	N	
L- 1	R. E. Nance	Dr	101.0	6	S	--	Top of casing	710	1.5	84.3	Sept. 3, 1951	Mfp	D	N	
L- 2	Mrs. E. O. Bragg	Dr	30.9	6	S	--	do.	720	3.1	24.9	Aug. 21, 1951	Mfp	D	N	
L- 3	R. J. Turner	Dr	79	6	S	--	do.	745	.4	67.7	Aug. 19, 1951	Ms	D	J	Supply insufficient. Sulfurous
L- 4	Wade Bone	Dr	59.3	6	S	53	do.	710	3.7	50.3	Aug. 21, 1951	Mfp	D	N	
L- 5	R. B. Stiles	Dr	65.7	6	S	--	do.	725	2.3	56.7	Sept. 4, 1951	Mfp	D	N	
L- 6	Henry Bragg	Dr	73.0	6	S	--	do.	730	2.4	68	Sept. 3, 1951	Ms	D	N	
L- 7	R. F. Hawkins	Dr	66.8	6	S	28	do.	730	.9	37.4	do.	Ms	D	N	
L- 8	R. H. Gillmer	Dr	114	6	S	--	do.	--	1.8	60.0	Aug. 21, 1951	Mfp	D	N	
L- 9	Gordon Harbin	Dr	89.0	6	S	50	do.	698	1.4	55.8	Aug. 19, 1951	Mfp	D	N	
L-10	Giles and Kendall Lumber Co.	Dr	100	6	S	90	Land surface	665	.0	30	do.	Mfp	Ind	T	
L-11	J. W. Mitchell	Dr	49	6	S	29	do.	640	.0	30	do.	Mfp	D	J	
*L-12	R. H. Ford	Dr	69.8	6	S	--	Top of casing	700	1.9	42.4	June 11, 1951	Mfp	D,S	N	
L-13	Abe Jolly	Dr	66.5	6	S	--	do.	670	2.8	60.4	Sept. 3, 1951	Mfp	D,S	N	
L-14	Weslie Osburn	Dr	95.4	6	S	89	do.	705	.6	74.6	do.	Mfp	D,S	N	Cavity encountered, 90.0 to 90.5 feet.
L-15	H. G. Sanders	Dr	75.6	6	S	--	do.	670	2.0	54.3	June 19, 1951	Ms	D	J	
L-16	E. E. Brewer	Du	15.8	60	N	--	Top of concrete curbing	630	2.3	13.8	June 18, 1951	Mfs	S	D,S	N
L-17	George Butler	Du	38.4	48	N	--	do.	650	2.4	35.6	do.	S	S	N	
*L-18	Roy Stone	Dr	102.5	6	S	--	Top of casing	685	.9	61.5	June 11, 1951	Mfp	D	N	
L-19	Anderson Hall	Du	21.0	48	N	--	Top of wood curbing	633	2.7	12.3	June 19, 1951	S	D,S	N	
M- 1	O. M. Brown	Du	42.5	48	N	--	do.	705	2.2	27.3	Apr. 24, 1952	S	D	N	

Types:
chart

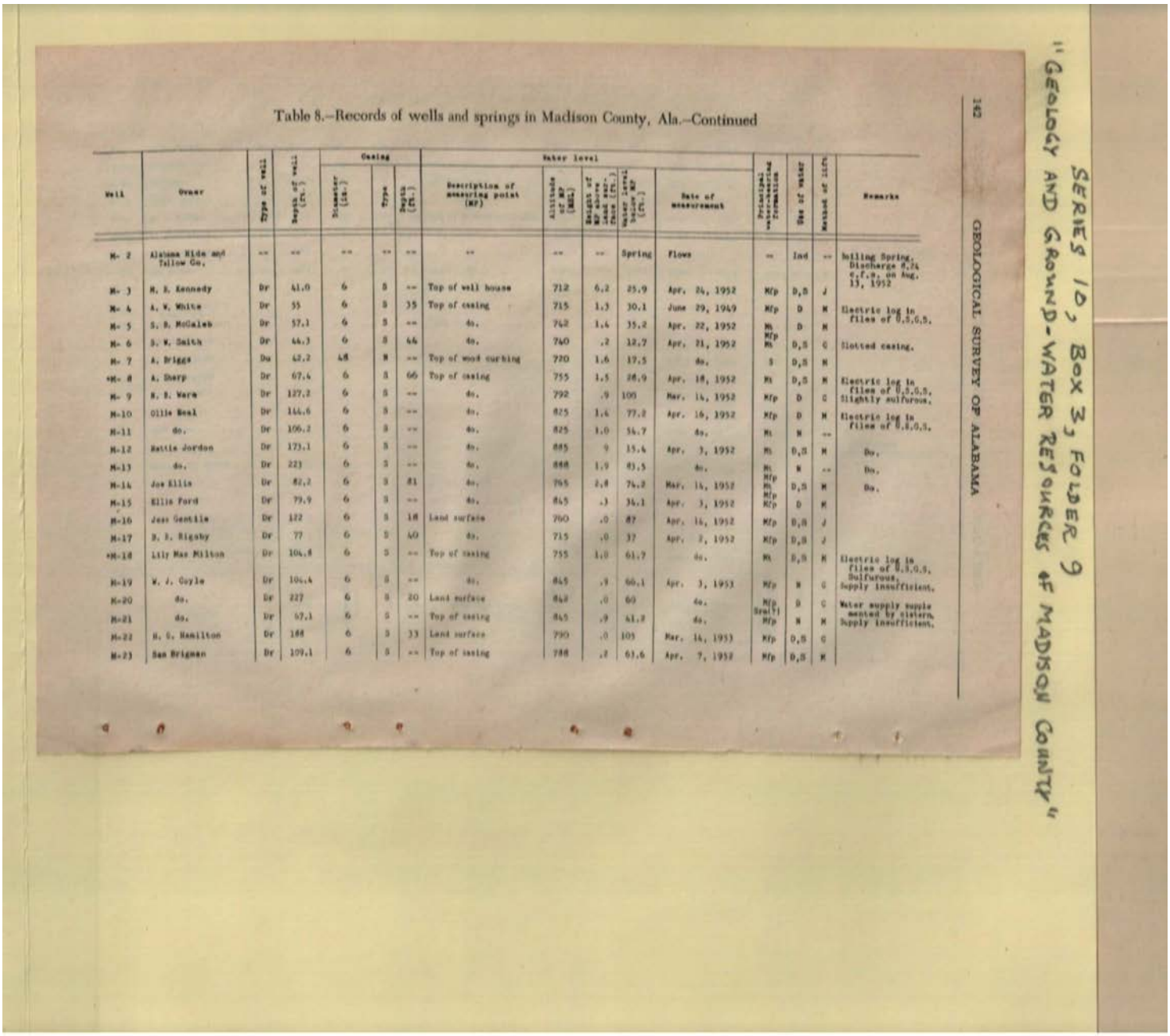


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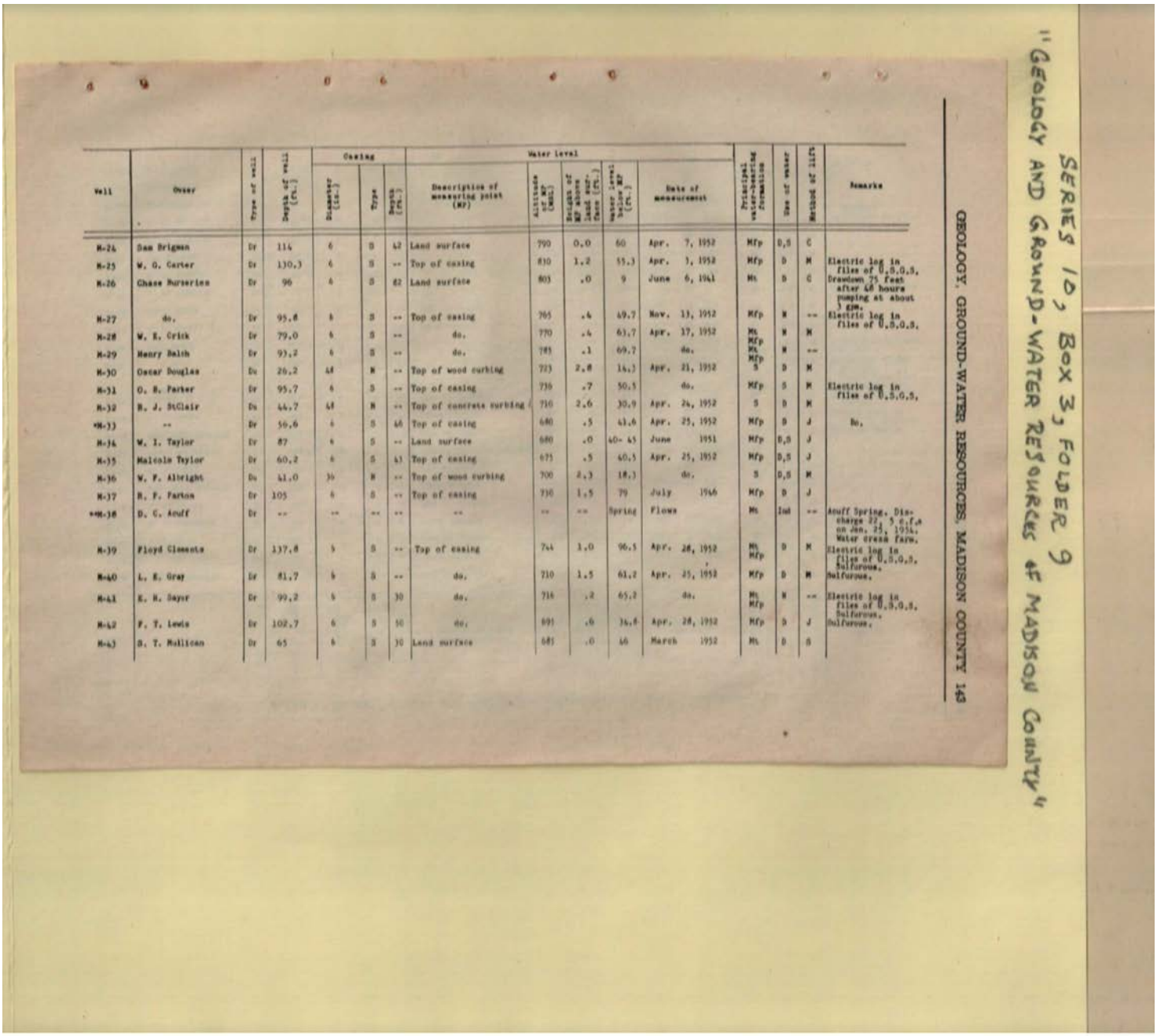
Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M- 2	Alabama Hide and Tallow Co.	--	--	--	--	--	--	--	--	Spring	Flows	--	Ind	--	Boiling Spring. Discharge 8.24 c.f.s. on Aug. 13, 1952
M- 3	M. S. Kennedy	Dr	41.0	6	S	--	Top of well house	712	6.2	25.9	Apr. 24, 1952	Mfp	D,S	J	
M- 4	A. W. White	Dr	55	6	S	35	Top of casing	715	1.3	30.1	June 29, 1949	Mfp	D	M	Electric log in files of U.S.G.S.
M- 5	S. B. McCaleb	Dr	57.1	6	S	--	do.	742	1.4	35.2	Apr. 22, 1952	Mk	D	M	
M- 6	S. W. Smith	Dr	44.3	6	S	44	do.	740	.2	12.7	Apr. 21, 1952	Mk Mfp	D,S	C	Slotted casing.
M- 7	A. Briggs	Du	42.2	48	M	--	Top of wood curbing	720	1.6	17.5	do.	S	D,S	M	
M- 8	A. Sharp	Dr	67.4	6	S	66	Top of casing	755	1.5	28.9	Apr. 18, 1952	Mk	D,S	M	Electric log in files of U.S.G.S.
M- 9	H. H. Ware	Dr	127.2	6	S	--	do.	792	.9	100	Mar. 14, 1952	Mfp	D	C	Slightly sulfurous.
M-10	Ollie Beal	Dr	144.6	6	S	--	do.	825	1.6	77.2	Apr. 16, 1952	Mfp	D	M	Electric log in files of U.S.G.S.
M-11	do.	Dr	106.2	6	S	--	do.	825	1.0	54.7	do.	Mk	N	--	
M-12	Mattie Jordon	Dr	173.1	6	S	--	do.	885	9	15.4	Apr. 3, 1952	Mk	D,S	M	Do.
M-13	do.	Dr	223	6	S	--	do.	888	1.9	43.5	do.	Mk	N	--	Do.
M-14	Joe Ellis	Dr	82.2	6	S	81	do.	765	2.8	74.2	Mar. 14, 1952	Mfp Mk	D,S	M	Do.
M-15	Ellis Ford	Dr	79.9	6	S	--	do.	845	.3	34.1	Apr. 3, 1952	Mfp	D	M	
M-16	Jess Gentile	Dr	122	6	S	18	Land surface	760	.0	87	Apr. 14, 1952	Mfp	D,S	J	
M-17	B. B. Rigsby	Dr	77	6	S	40	do.	715	.0	37	Apr. 3, 1952	Mfp	D,S	J	
M-18	Lily Mae Milton	Dr	104.8	6	S	--	Top of casing	755	1.0	61.7	do.	Mk	D,S	M	Electric log in files of U.S.G.S. Sulfurous.
M-19	W. J. Coyle	Dr	104.4	6	S	--	do.	845	.9	66.1	Apr. 3, 1952	Mfp	N	C	Supply insufficient.
M-20	do.	Dr	227	6	S	20	Land surface	842	.0	60	do.	Mfp Gravel	D	C	Water supply supplemented by cistern.
M-21	do.	Dr	67.1	6	S	--	Top of casing	845	.9	41.2	do.	Mfp	N	M	Supply insufficient.
M-22	H. G. Hamilton	Dr	168	6	S	33	Land surface	790	.0	105	Mar. 14, 1952	Mfp	D,S	C	
M-23	Sam Brigman	Dr	109.1	6	S	--	Top of casing	788	.2	61.6	Apr. 7, 1952	Mfp	D,S	M	

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water Level: Description of measuring point (MP)	Water Level: Altitude of MP (msl.)	Water Level: Height of MP above land surface (ft.)	Water Level: Depth to water below MP (ft.)	Water Level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M-24	Dan Brigman	Dr	114	6	S	42	Land surface	790	0.0	60	Apr. 7, 1952	Mfp	D,S	C	
M-25	W. O. Carter	Dr	130.3	6	S	--	Top of casing	810	1.2	55.3	Apr. 1, 1952	Mfp	D	N	Electric log in files of U.S.G.S.
M-26	Chase Nurseries	Dr	96	6	S	82	Land surface	803	.0	9	June 6, 1941	Mt	D	C	Drawdown 75 feet after 48 hours pumping at about 3 gpm.
M-27	do.	Dr	95.8	6	S	--	Top of casing	765	.4	49.7	Nov. 13, 1952	Mfp	N	--	Electric log in files of U.S.G.S.
M-28	W. E. Crick	Dr	79.0	6	S	--	do.	770	.4	63.7	Apr. 17, 1952	Mt Mfp	N	N	
M-29	Henry Balch	Dr	93.2	6	S	--	do.	785	.1	69.7	do.	Mt Mfp	N	--	
M-30	Oscar Douglas	Du	26.2	48	M	--	Top of wood curbing	723	2.8	14.3	Apr. 21, 1952	S	D	N	
M-31	O. B. Parker	Dr	95.7	6	S	--	Top of casing	736	.7	50.5	do.	Mfp	S	N	Electric log in files of U.S.G.S.
M-32	B. J. StClair	Du	44.7	48	M	--	Top of concrete curbing	716	2.6	30.9	Apr. 24, 1952	S	D	N	
*M-33	--	Dr	56.6	6	S	46	Top of casing	680	.5	41.6	Apr. 25, 1952	Mfp	D	J	Do.
M-34	W. I. Taylor	Dr	87	6	S	--	Land surface	680	.0	40- 45	June 1951	Mfp	D,S	J	
M-35	Malcolm Taylor	Dr	60.2	6	S	43	Top of casing	675	.5	40.5	Apr. 25, 1952	Mfp	D,S	J	
M-36	W. F. Albright	Du	41.0	36	M	--	Top of wood curbing	700	2.3	18.3	do.	S	D,S	N	
M-37	R. F. Parton	Dr	105	6	S	--	Top of casing	730	1.5	79	July 1946	Mfp	D	J	
**M-38	D. C. Acuff	Dr	--	--	--	--	--	--	--	Spring	Flows	Mt	Ind	--	Acuff Spring. Discharge 22. 5 c.f.s on Jan. 25, 1954. Water cress farm.
M-39	Floyd Clements	Dr	137.8	6	S	--	Top of casing	744	1.0	96.5	Apr. 28, 1952	Mt Mfp	D	N	Electric log in files of U.S.G.S. Sulfurous.
M-40	L. E. Gray	Dr	81.7	6	S	--	do.	710	1.5	61.2	Apr. 25, 1952	Mfp	D	N	Sulfurous.
M-41	E. H. Sayer	Dr	99.2	6	S	30	do.	716	.2	65.2	do.	Mt Mfp	N	--	Electric log in files of U.S.G.S. Sulfurous.
M-42	F. T. Lewis	Dr	102.7	6	S	30	do.	691	.6	34.4	Apr. 28, 1952	Mfp	D	J	Sulfurous.
M-43	B. T. Mullican	Dr	65	6	S	30	Land surface	681	.0	46	March 1952	Mt	D	S	

Types:
chart

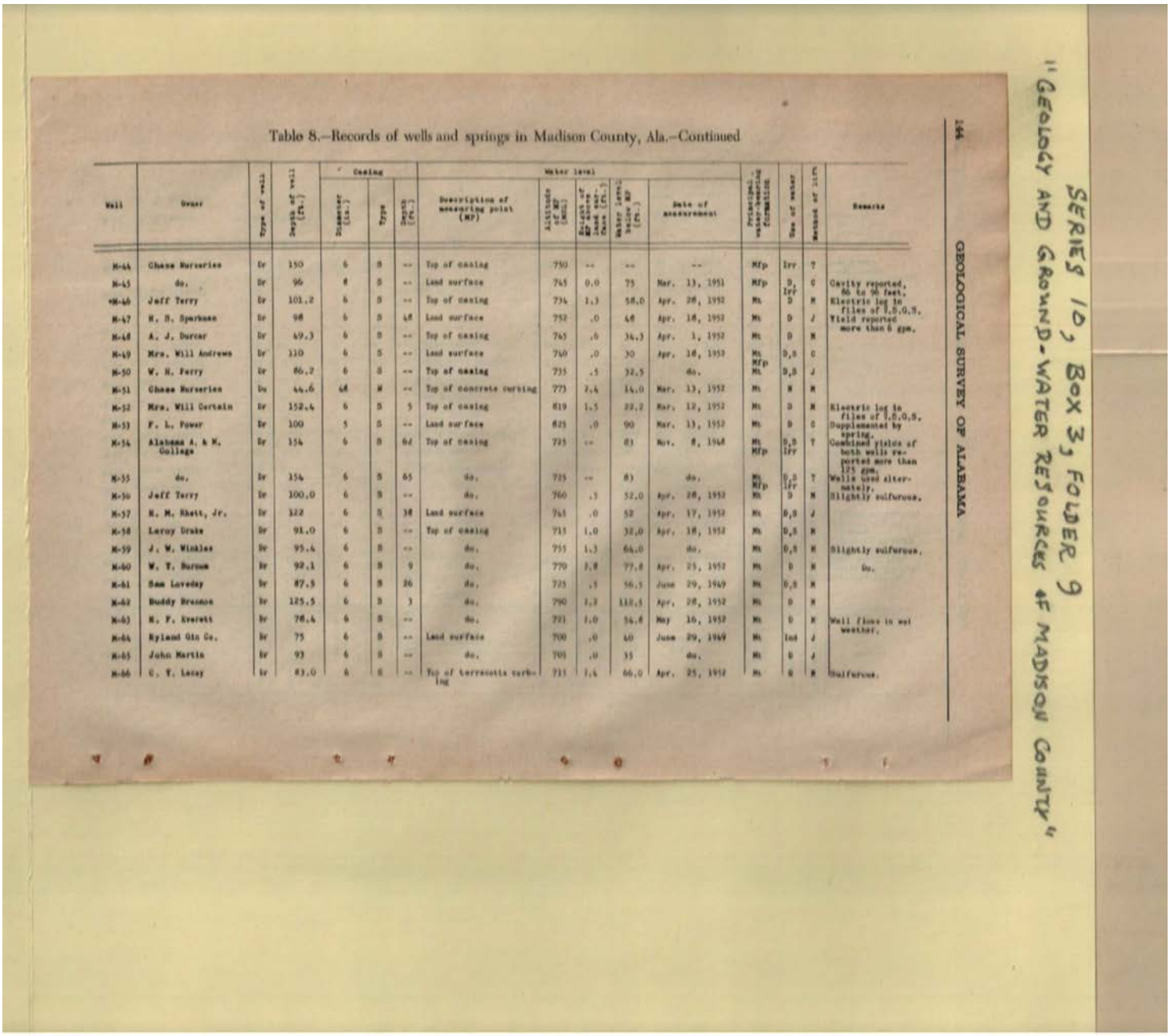


Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (Ft.)	Casing: Diameter (In.)	Casing: Type	Casing: Depth (Ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (Mean)	Water level: Height of MP above land surface (Ft.)	Water level: Water level below MP (Ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M-44	Chase Nurseries	Dr	150	6	S	--	Top of casing	750	--	--	--	Mfp	Irr	T	
M-45	do.	Dr	96	8	S	--	Land surface	745	0.0	75	Mar. 13, 1951	Mfp	D, Irr	C	Cavity reported, 86 to 96 feet.
M-46	Jeff Terry	Dr	101.2	6	S	--	Top of casing	734	1.3	58.0	Apr. 28, 1952	Mt	D	M	Electric log in files of U.S.G.S.
M-47	H. B. Sparkman	Dr	98	6	S	48	Land surface	752	.0	48	Apr. 18, 1952	Mt	D	J	Yield reported more than 6 gpm.
M-48	A. J. Durrar	Dr	49.3	6	S	--	Top of casing	745	.6	34.3	Apr. 1, 1952	Mt	D	M	
M-49	Mrs. Will Andrews	Dr	110	6	S	--	Land surface	740	.0	30	Apr. 18, 1952	Mt Mfp	D,S	C	
M-50	W. H. Perry	Dr	86.2	6	S	--	Top of casing	735	.5	32.5	do.	Mt	D,S	J	
M-51	Chase Nurseries	Un	44.6	48	W	--	Top of concrete curbing	773	2.4	14.0	Mar. 13, 1952	Mt	N	M	
M-52	Mrs. Will Certain	Dr	152.4	6	S	5	Top of casing	819	1.5	22.2	Mar. 12, 1952	Mt	D	M	Electric log in files of U.S.G.S.
M-53	F. L. Power	Dr	100	5	S	--	Land surface	825	.0	90	Mar. 13, 1952	Mt	D	C	Supplemented by spring.
M-54	Alabama A. & M. College	Dr	154	6	S	62	Top of casing	725	--	83	Nov. 8, 1948	Mt Mfp	D,S Irr	T	Combined yields of both wells reported more than 125 gpm.
M-55	do.	Dr	154	6	S	65	do.	725	--	83	do.	Mt Mfp	D,S Irr	T	Wells used alternately.
M-56	Jeff Terry	Dr	100.0	6	S	--	do.	760	.5	52.0	Apr. 28, 1952	Mt	D	M	Slightly sulfurous.
M-57	H. M. Rhett, Jr.	Dr	122	6	S	38	Land surface	765	.0	52	Apr. 17, 1952	Mt	D,S	J	
M-58	Leroy Drake	Dr	91.0	6	S	--	Top of casing	715	1.0	32.0	Apr. 18, 1952	Mt	D,S	M	
M-59	J. W. Winkles	Dr	95.4	6	S	--	do.	755	1.3	64.0	do.	Mt	D,S	M	Slightly sulfurous.
M-60	W. T. Burrum	Dr	92.1	6	S	9	do.	770	2.8	77.8	Apr. 25, 1952	Mt	D	M	do.
M-61	Sam Loveday	Dr	87.5	6	S	26	do.	725	.5	56.5	June 29, 1949	Mt	D,S	M	
M-62	Buddy Brannon	Dr	125.5	6	S	3	do.	790	1.2	118.5	Apr. 28, 1952	Mt	D	M	
M-63	H. F. Everett	Dr	78.4	6	S	--	do.	721	1.0	54.8	May 16, 1952	Mt	D	M	Well flows in wet weather.
M-64	Ryland Gin Co.	Dr	75	6	S	--	Land surface	700	.0	40	June 29, 1949	Mt	Ind	J	
M-65	John Martin	Dr	93	6	S	--	do.	705	.0	35	do.	Mt	D	J	
M-66	C. T. Lacey	Dr	83.0	6	S	--	Top of terracotta curbing	715	1.4	66.0	Apr. 25, 1952	Mt	D	M	Sulfurous.

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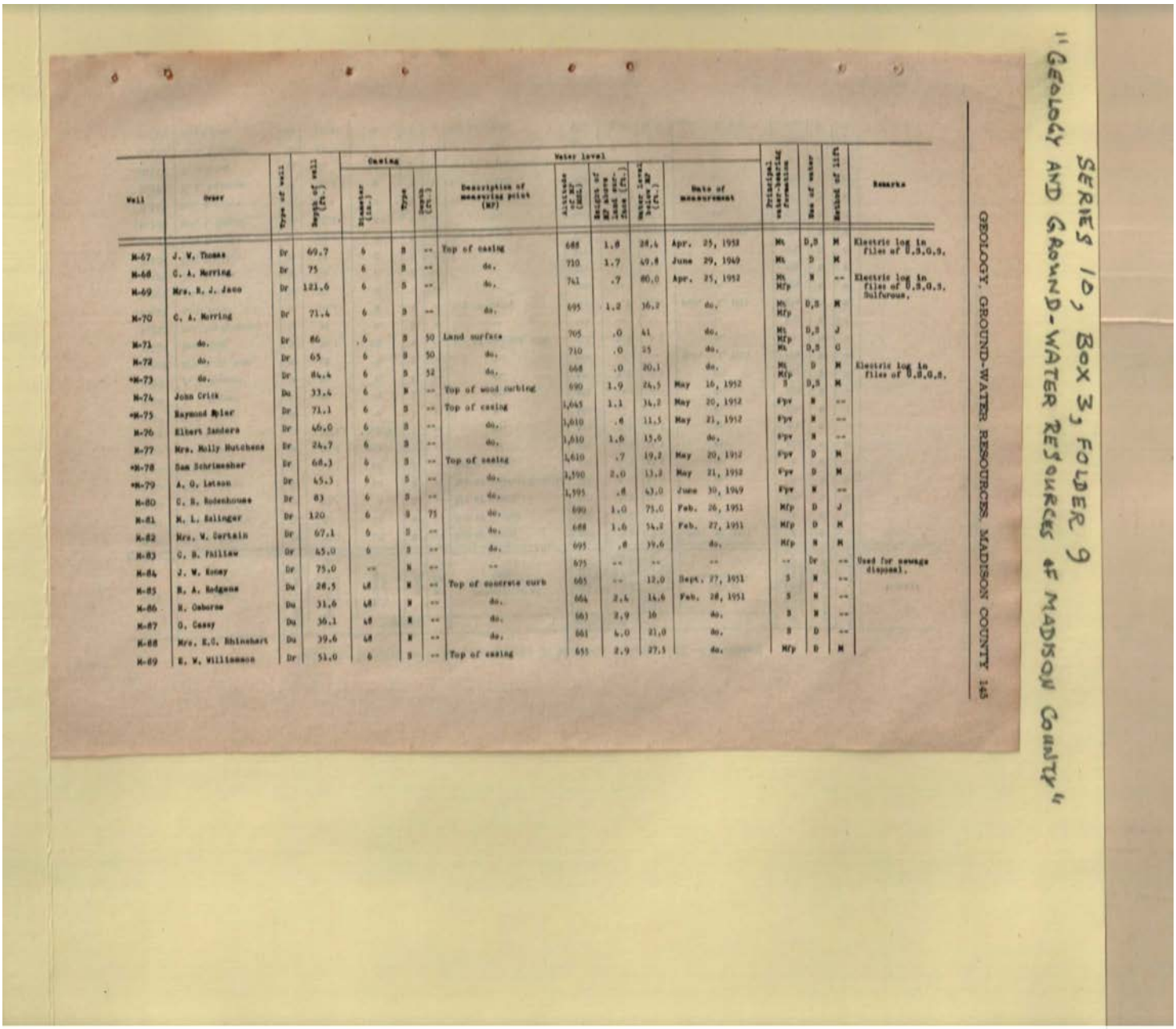
SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart

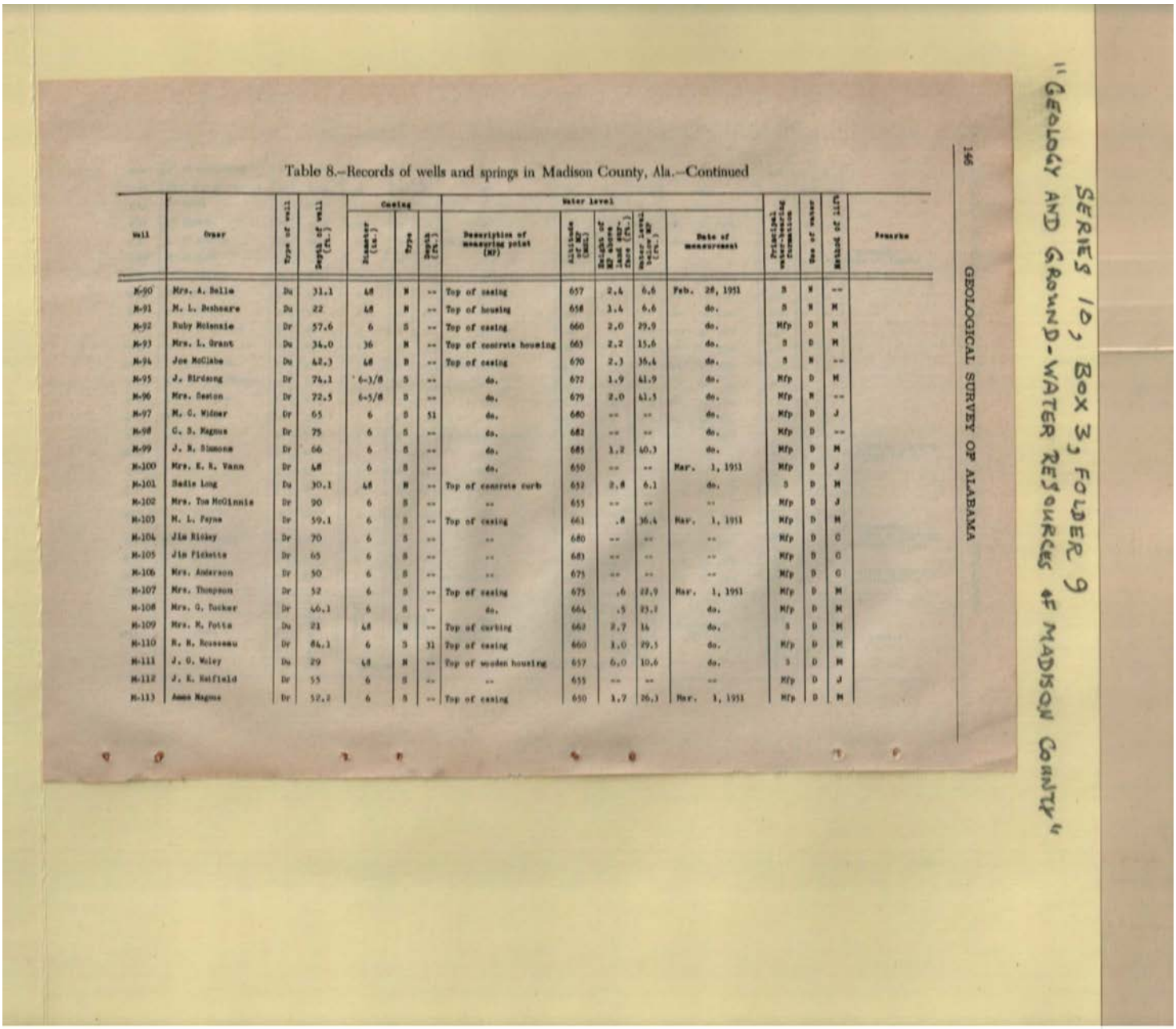


SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 145

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (feet)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M-67	J. W. Thomas	Dr	69.7	6	S	--	Top of casing	688	1.8	28.4	Apr. 25, 1952	Ms	D,S	M	Electric log in files of U.S.G.S.
M-68	G. A. Herring	Dr	75	6	S	--	do.	710	1.7	49.8	June 29, 1949	Ms	D	M	
M-69	Mrs. E. J. Jeco	Dr	121.6	6	S	--	do.	741	.7	80.0	Apr. 25, 1952	Ms Mfp	N	--	Electric log in files of U.S.G.S. Sulfurous.
M-70	G. A. Herring	Dr	71.4	6	S	--	do.	695	1.2	36.2	do.	Ms Mfp	D,S	M	
M-71	do.	Dr	86	6	S	50	Land surface	705	.0	41	do.	Ms Mfp	D,S	J	
M-72	do.	Dr	65	6	S	50	do.	710	.0	55	do.	Ms	D,S	C	
M-73	do.	Dr	84.4	6	S	52	do.	668	.0	20.1	do.	Ms Mfp	D	M	Electric log in files of U.S.G.S.
M-74	John Crick	Du	33.4	6	W	--	Top of wood curbing	690	1.9	24.5	May 16, 1952	S	D,S	M	
M-75	Raymond Myler	Dr	71.1	6	S	--	Top of casing	1,645	1.1	34.2	May 20, 1952	Pyv	N	--	
M-76	Elbert Sanders	Dr	46.0	6	S	--	do.	1,610	.6	11.5	May 21, 1952	Pyv	N	--	
M-77	Mrs. Molly Hutchens	Dr	24.7	6	S	--	do.	1,610	1.6	15.6	do.	Pyv	N	--	
M-78	Sam Schrimsher	Dr	68.3	6	S	--	Top of casing	1,610	.7	19.2	May 20, 1952	Pyv	D	M	
M-79	A. G. Letson	Dr	45.3	6	S	--	do.	1,590	2.0	13.2	May 21, 1952	Pyv	D	M	
M-80	C. B. Rodenhouse	Dr	83	6	S	--	do.	1,595	.8	43.0	June 30, 1949	Pyv	N	--	
M-81	M. L. Ballinger	Dr	120	6	S	75	do.	690	1.0	75.0	Feb. 26, 1951	Mfp	D	J	
M-82	Mrs. W. Curtain	Dr	67.1	6	S	--	do.	688	1.6	54.2	Feb. 27, 1951	Mfp	D	M	
M-83	C. B. Fallow	Dr	45.0	6	S	--	do.	695	.8	39.6	do.	Mfp	N	M	
M-84	J. W. Roney	Dr	75.0	--	N	--	--	675	--	--	--	--	Dr	--	Used for sewage disposal.
M-85	E. A. Hodgens	Du	28.5	48	W	--	Top of concrete curb	665	--	12.0	Sept. 27, 1951	S	N	--	
M-86	H. Osborne	Du	31.6	48	W	--	do.	664	2.4	14.6	Feb. 28, 1951	S	N	--	
M-87	O. Casey	Du	36.1	48	W	--	do.	661	2.9	16	do.	S	N	--	
M-88	Mrs. E.O. Rhinehart	Du	39.6	48	W	--	do.	661	4.0	21.0	do.	S	D	--	
M-89	E. W. Williamson	Dr	51.0	6	S	--	Top of casing	651	2.9	27.5	do.	Mfp	D	M	

Types:
chart



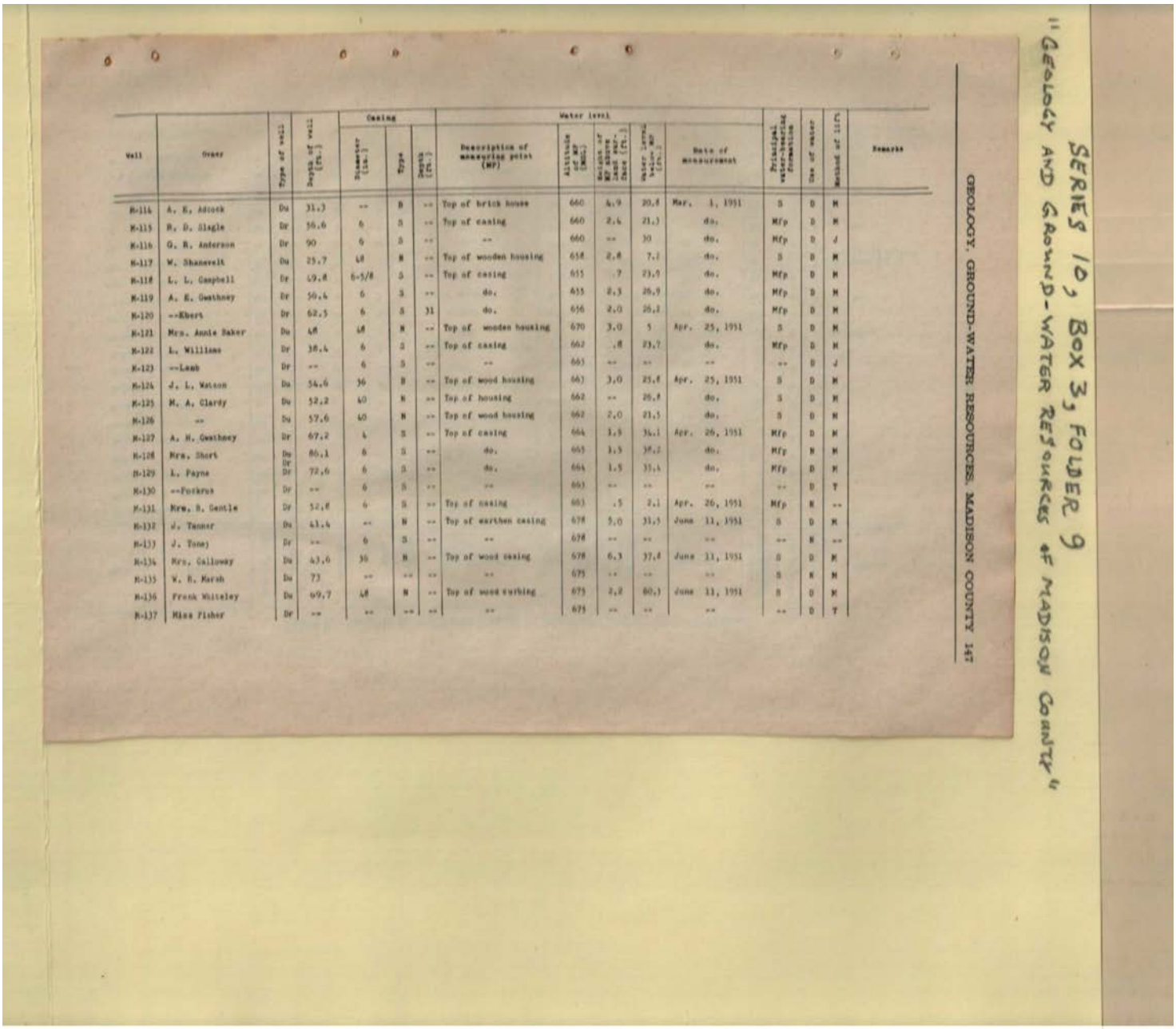
SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M-90	Mrs. A. Belle	Du	31.1	48	M	--	Top of casing	657	2.4	6.6	Feb. 28, 1951	S	N	--	
M-91	M. L. Desheare	Du	22	48	M	--	Top of housing	658	1.4	6.6	do.	S	N	N	
M-92	Ruby Holcombe	Dr	57.6	6	S	--	Top of casing	660	2.0	29.9	do.	Mfp	D	N	
M-93	Mrs. L. Grant	Du	34.0	36	M	--	Top of concrete housing	663	2.2	15.6	do.	S	D	N	
M-94	Joe McClabe	Du	42.3	48	M	--	Top of casing	670	2.3	35.4	do.	S	N	--	
M-95	J. Birdsong	Dr	74.1	6-3/8	S	--	do.	672	1.9	41.9	do.	Mfp	D	N	
M-96	Mrs. Seston	Dr	72.5	6-5/8	S	--	do.	679	2.0	41.5	do.	Mfp	N	--	
M-97	M. C. Widner	Dr	65	6	S	51	do.	680	--	--	do.	Mfp	D	J	
M-98	C. S. Magnus	Dr	75	6	S	--	do.	682	--	--	do.	Mfp	D	--	
M-99	J. R. Simmons	Dr	66	6	S	--	do.	685	1.2	40.3	do.	Mfp	D	N	
M-100	Mrs. E. R. Vann	Dr	48	6	S	--	do.	650	--	--	Mar. 1, 1951	Mfp	D	J	
M-101	Sadie Long	Du	30.1	48	M	--	Top of concrete curb	652	2.8	6.1	do.	S	D	N	
M-102	Mrs. Tom McGinnis	Dr	90	6	S	--	--	655	--	--	--	Mfp	D	J	
M-103	M. L. Payne	Dr	59.1	6	S	--	Top of casing	661	.8	36.4	Mar. 1, 1951	Mfp	D	N	
M-104	Jim Rickey	Dr	70	6	S	--	--	680	--	--	--	Mfp	D	C	
M-105	Jim Pickette	Dr	65	6	S	--	--	681	--	--	--	Mfp	D	C	
M-106	Mrs. Anderson	Dr	50	6	S	--	--	675	--	--	--	Mfp	D	C	
M-107	Mrs. Thompson	Dr	52	6	S	--	Top of casing	675	.6	22.9	Mar. 1, 1951	Mfp	D	N	
M-108	Mrs. G. Tucker	Dr	46.1	6	S	--	do.	664	.5	23.7	do.	Mfp	D	N	
M-109	Mrs. M. Fotta	Du	21	48	M	--	Top of curbing	662	2.7	14	do.	S	D	N	
M-110	E. B. Rousseau	Dr	84.1	6	S	31	Top of casing	660	1.0	29.5	do.	Mfp	D	N	
M-111	J. O. Wiley	Du	29	48	M	--	Top of wooden housing	657	6.0	10.6	do.	S	D	N	
M-112	J. K. Hatfield	Dr	55	6	S	--	--	655	--	--	--	Mfp	D	J	
M-113	Amos Magnus	Dr	52.2	6	S	--	Top of casing	650	1.7	26.3	Mar. 1, 1951	Mfp	D	N	

Names:
Wells and Springs
Records

Types:
chart



Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (msl)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M-114	A. E. Adcock	Du	31.3	--	B	--	Top of brick house	660	4.9	20.8	Mar. 1, 1951	S	D	M	
M-115	R. D. Slagle	Dr	56.6	6	S	--	Top of casing	660	2.4	21.3	do.	Mfp	D	M	
M-116	G. R. Anderson	Dr	90	6	S	--	--	660	--	30	do.	Mfp	D	J	
M-117	W. Shanevelt	Du	25.7	48	B	--	Top of wooden housing	658	2.8	7.1	do.	S	D	M	
M-118	L. L. Campbell	Dr	49.8	6-5/8	S	--	Top of casing	655	.7	23.9	do.	Mfp	D	M	
M-119	A. E. Gwathney	Dr	50.4	6	S	--	do.	655	2.3	26.9	do.	Mfp	D	M	
M-120	--Ebert	Dr	62.5	6	S	31	do.	656	2.0	28.2	do.	Mfp	D	M	
M-121	Mrs. Annie Baker	Du	48	48	B	--	Top of wooden housing	670	3.0	5	Apr. 25, 1951	S	D	M	
M-122	L. Williams	Dr	38.4	6	S	--	Top of casing	662	.8	23.7	do.	Mfp	D	M	
M-123	--Lamb	Dr	--	6	S	--	--	663	--	--	--	--	D	J	
M-124	J. L. Watson	Du	34.6	36	B	--	Top of wood housing	663	3.0	25.8	Apr. 25, 1951	S	D	M	
M-125	M. A. Clardy	Du	32.2	40	B	--	Top of housing	662	--	28.8	do.	S	D	M	
M-126	--	Du	37.6	40	B	--	Top of wood housing	662	2.0	21.5	do.	S	D	M	
M-127	A. H. Gwathney	Dr	67.2	4	S	--	Top of casing	664	1.5	34.1	Apr. 26, 1951	Mfp	D	M	
M-128	Mrs. Short	Du Dr	86.1	6	S	--	do.	665	1.5	38.2	do.	Mfp	N	M	
M-129	L. Payne	Dr	72.6	6	S	--	do.	664	1.5	33.4	do.	Mfp	D	M	
M-130	--Forkrus	Dr	--	6	S	--	--	663	--	--	--	--	D	T	
M-131	Mrs. B. Gentle	Dr	52.8	6	S	--	Top of casing	663	.5	2.1	Apr. 26, 1951	Mfp	N	--	
M-132	J. Tanner	Du	41.4	--	B	--	Top of earthen casing	678	3.0	31.5	June 11, 1951	S	D	M	
M-133	J. Tone)	Dr	--	6	S	--	--	678	--	--	--	--	N	--	
M-134	Mrs. Calloway	Du	43.6	36	B	--	Top of wood casing	678	6.3	37.8	June 11, 1951	S	D	M	
M-135	W. B. Marsh	Du	73	--	--	--	--	675	--	--	--	S	N	M	
M-136	Frank Whiteley	Du	99.7	48	B	--	Top of wood curbing	675	2.2	80.3	June 11, 1951	S	D	M	
M-137	Miss Fisher	Dr	--	--	--	--	--	675	--	--	--	--	D	T	

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 147

SERIES 10, Box 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Types:
chart

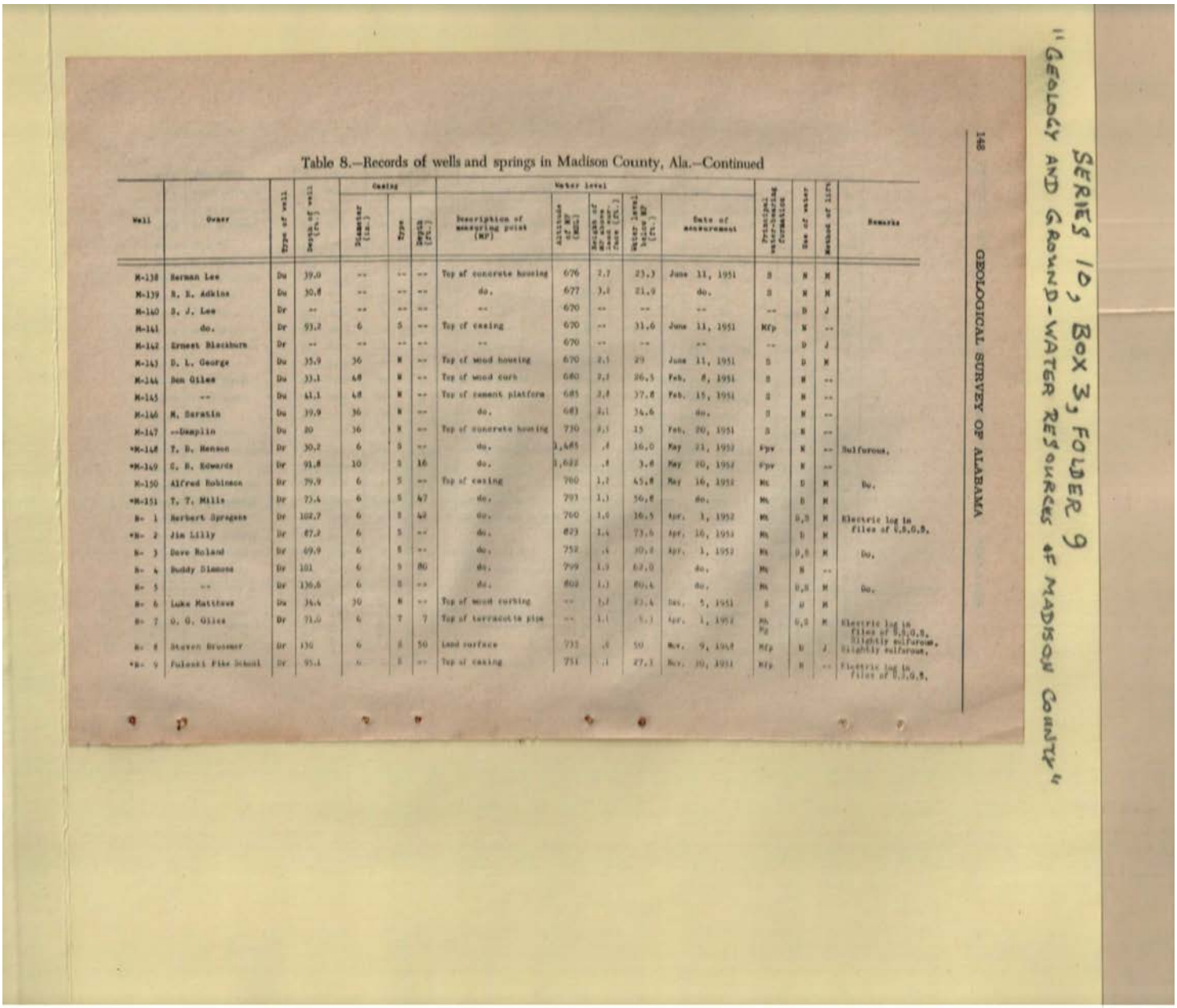


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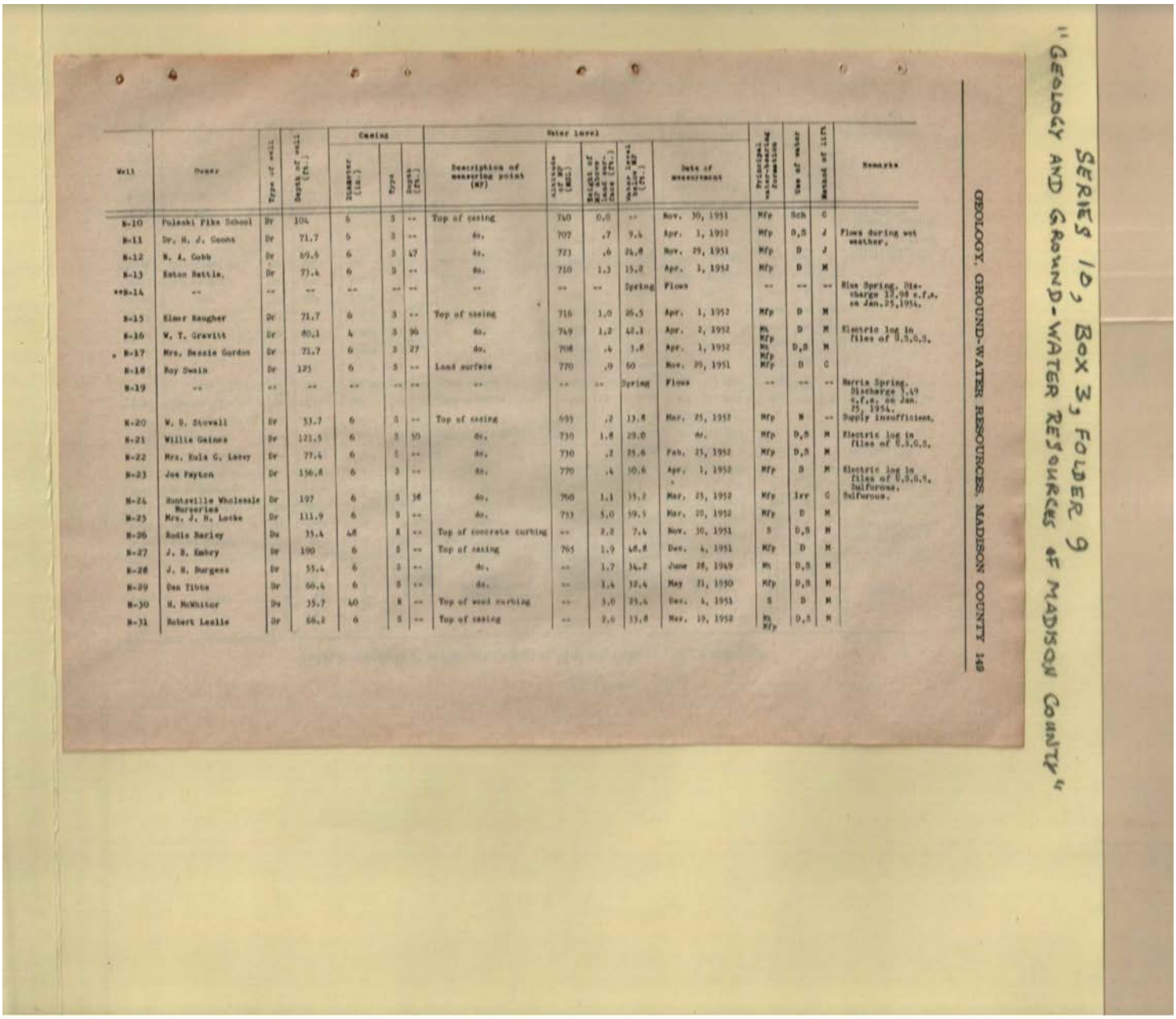
Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M-138	Herman Lee	Du	39.0	--	--	--	Top of concrete housing	676	2.7	23.3	June 11, 1951	S	H	H	
M-139	R. E. Adkins	Du	30.8	--	--	--	do.	677	3.1	21.9	do.	S	H	H	
M-140	S. J. Lee	Dr	--	--	--	--	--	670	--	--	--	--	D	J	
M-141	do.	Dr	93.2	6	S	--	Top of casing	670	--	31.6	June 11, 1951	Mfp	H	--	
M-142	Ernest Blackburn	Dr	--	--	--	--	--	670	--	--	--	--	D	J	
M-143	D. L. George	Du	35.9	36	H	--	Top of wood housing	670	2.1	29	June 11, 1951	S	D	H	
M-144	Ben Giles	Du	33.1	48	H	--	Top of wood curb	680	2.1	26.5	Feb. 8, 1951	S	H	--	
M-145	--	Du	41.1	48	H	--	Top of cement platform	685	2.8	37.8	Feb. 15, 1951	S	H	--	
M-146	M. Beratis	Du	39.9	36	H	--	do.	681	2.1	34.6	do.	S	H	--	
M-147	--Dauplin	Du	20	36	H	--	Top of concrete housing	730	2.1	15	Feb. 20, 1951	S	H	--	
*M-148	T. B. Henson	Dr	30.2	6	S	--	do.	1,685	.8	16.0	May 21, 1952	Fpv	H	--	Sulfurous.
*M-149	C. B. Edwards	Dr	91.8	10	S	16	do.	1,682	.8	3.8	May 20, 1952	Fpv	H	--	
M-150	Alfred Robinson	Dr	79.9	6	S	--	Top of casing	760	1.2	45.8	May 16, 1952	Mk	D	H	Do.
*M-151	T. T. Mills	Dr	73.4	6	S	47	do.	793	1.3	56.8	do.	Mk	D	H	
B- 1	Herbert Sprague	Dr	102.7	6	S	42	do.	760	1.0	36.5	Apr. 1, 1952	Mk	D,S	H	Electric log in files of U.S.G.S.
*B- 2	Jim Lilly	Dr	87.2	6	S	--	do.	823	1.4	73.6	Apr. 16, 1952	Mk	D	H	
B- 3	Dave Roland	Dr	69.9	6	S	--	do.	752	.4	30.8	Apr. 1, 1952	Mk	D,S	H	Do.
B- 4	Buddy Simmons	Dr	101	6	S	80	do.	799	1.3	62.0	do.	Mk	S	--	
B- 5	--	Dr	130.8	6	S	--	do.	802	1.1	80.4	do.	Mk	D,S	H	Do.
B- 6	Luke Matthews	Du	34.4	30	H	--	Top of wood curbing	--	1.2	23.4	Dec. 5, 1951	S	D	H	
B- 7	O. G. Giles	Dr	71.0	6	T	7	Top of terracotta pipe	--	1.1	5.1	Apr. 1, 1952	Mk, Fp	D,S	H	Electric log in files of U.S.G.S. Slightly sulfurous.
B- 8	Steven Brosmer	Dr	130	6	S	50	Land surface	731	.8	50	Nov. 9, 1948	Mfp	D	J	Slightly sulfurous.
*B- 9	Fulcoat Fire School	Dr	95.1	6	S	--	Top of casing	751	.1	47.1	Nov. 30, 1951	Mfp	H	--	Electric log in files of U.S.G.S.

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 149

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Depth to water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M-10	Pulaski Pike School	Dr	104	6	S	--	Top of casing	740	0.8	--	Nov. 30, 1951	Mfp	Sch	C	
M-11	Dr. H. J. Goons	Dr	71.7	6	S	--	do.	707	.7	9.4	Apr. 1, 1952	Mfp	D,S	J	Flows during wet weather.
M-12	N. A. Gobb	Dr	69.6	6	S	47	do.	721	.6	24.8	Nov. 29, 1951	Mfp	D	J	
M-13	Eston Battle,	Dr	73.4	6	S	--	do.	710	1.3	15.8	Apr. 1, 1952	Mfp	D	M	
**M-14	--	--	--	--	--	--	--	--	--	Spring	Flows		--	--	--	Blue Spring. Discharge 17.98 c.f.s. on Jan.25,1954.
M-15	Elmer Baugher	Dr	71.7	6	S	--	Top of casing	716	1.0	26.5	Apr. 1, 1952	Mfp	D	M	
M-16	W. T. Gravitt	Dr	80.1	4	S	96	do.	749	1.2	42.3	Apr. 2, 1952	Mt Mfp	D	M	Electric log in files of U.S.G.S.
M-17	Mrs. Bessie Gordon	Dr	71.7	6	S	27	do.	708	.4	3.8	Apr. 1, 1952	Mt Mfp	D,S	M	
M-18	Roy Swain	Dr	125	6	S	--	Land surface	770	.0	60	Nov. 29, 1951	Mfp	D	C	
M-19	--	--	--	--	--	--	--	--	--	Spring	Flows		--	--	--	Harris Spring. Discharge 7.49 c.f.s. on Jan. 25, 1954.
M-20	W. B. Stovall	Dr	53.7	6	S	--	Top of casing	693	.2	13.8	Mar. 25, 1952	Mfp	N	--	Supply insufficient.
M-21	Willie Gaines	Dr	121.5	6	S	50	do.	730	1.8	29.0	do.	Mfp	D,S	M	Electric log in files of U.S.G.S.
M-22	Mrs. Eula G. Lacy	Dr	77.4	6	S	--	do.	730	.2	25.6	Feb. 25, 1952	Mfp	D,S	M	
M-23	Joe Payton	Dr	156.8	6	S	--	do.	770	.4	30.6	Apr. 1, 1952	Mfp	S	M	Electric log in files of U.S.G.S. Sulfurous.
M-24	Huntsville Wholesale Nurseries	Dr	197	6	S	36	do.	760	1.1	33.2	Mar. 25, 1952	Mfp	Irr	C	Sulfurous.
M-25	Mrs. J. H. Locke	Dr	111.9	6	S	--	do.	753	5.0	59.5	Mar. 20, 1952	Mfp	D	M	
M-26	Rodie Harley	Du	35.4	48	S	--	Top of concrete curbing	--	2.2	7.4	Nov. 30, 1951	S	D,S	M	
M-27	J. B. Embry	Dr	100	6	S	--	Top of casing	765	1.9	48.8	Dec. 4, 1951	Mfp	D	M	
M-28	J. H. Burgess	Dr	55.4	6	S	--	do.	--	1.7	34.2	June 28, 1949	Mt	D,S	M	
M-29	Dan Tibbs	Dr	60.4	6	S	--	do.	--	1.4	32.4	May 31, 1950	Mfp	D,S	M	
M-30	H. McWhitor	Du	35.7	40	S	--	Top of wood curbing	--	3.0	25.4	Dec. 4, 1951	S	D	M	
M-31	Robert Leslie	Dr	66.2	6	S	--	Top of casing	--	2.0	33.8	Mar. 19, 1952	Mt Mfp	D,S	M	

Types:
chart

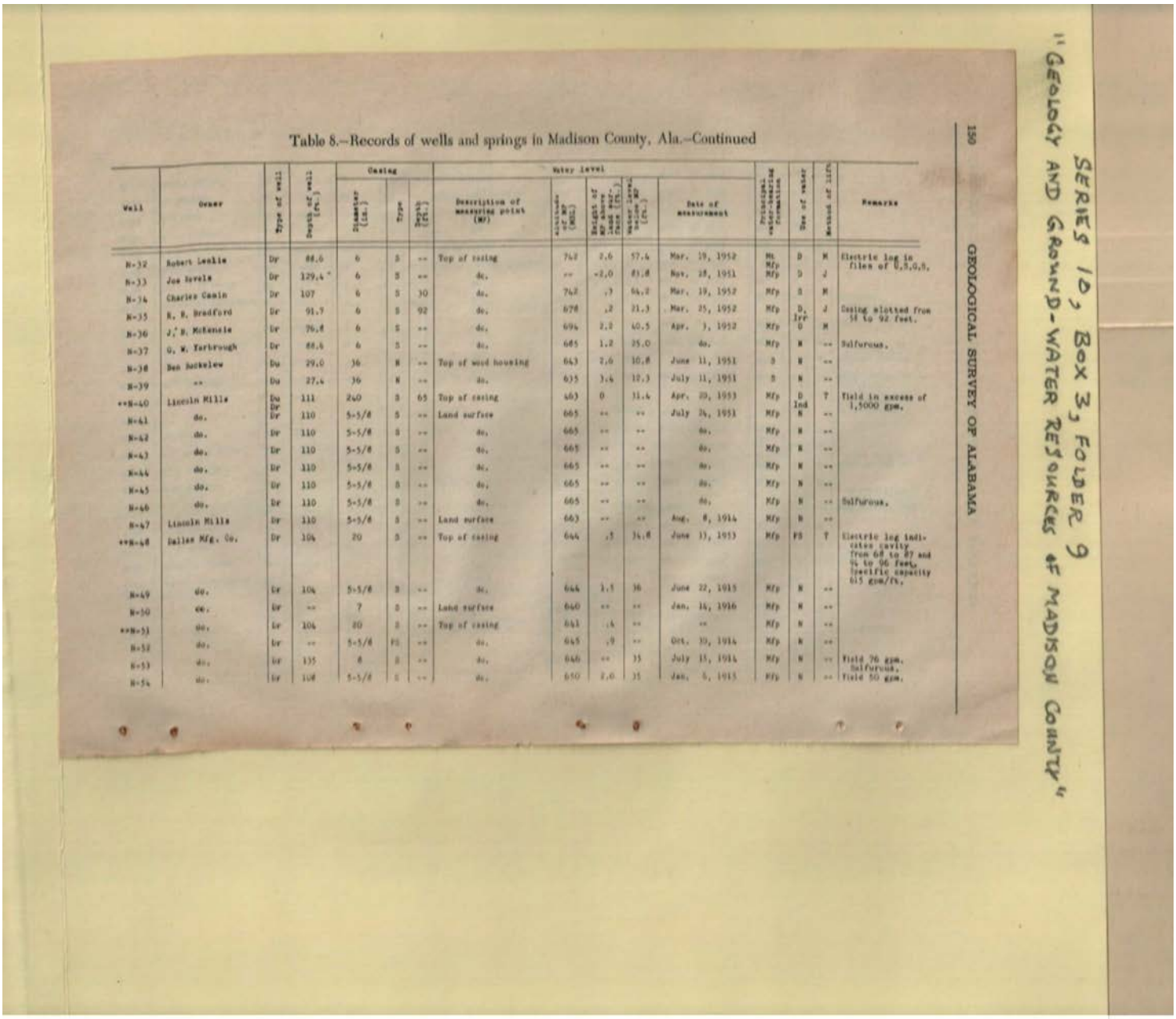


Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft. above MSL)	Water level: Height of MP above land-surface datum (ft.)	Water level: Depth to water below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M-32	Robert Leslie	Dr	88.6	6	S	--	Top of casing	742	2.6	57.4	Mar. 19, 1952	Mt Mfp	D	M	Electric log in files of U.S.G.S.
M-33	Joe Revels	Dr	129.4	6	S	--	do.	--	-2.0	81.8	Nov. 28, 1951	Mfp	D	J	
M-34	Charles Cowin	Dr	107	6	S	30	do.	742	.7	64.2	Mar. 19, 1952	Mfp	S	M	
M-35	E. B. Bradford	Dr	91.7	6	S	92	do.	678	.2	31.3	Mar. 25, 1952	Mfp	D, Irr	J	Casing slotted from 58 to 92 feet.
M-36	J. B. McKenzie	Dr	76.8	6	S	--	do.	696	2.2	40.5	Apr. 3, 1952	Mfp	D	M	
M-37	O. W. Yarbrough	Dr	88.6	6	S	--	do.	685	1.2	35.0	do.	Mfp	N	--	Sulfurous.
M-38	Ben Buckelew	Du	29.0	36	M	--	Top of wood housing	643	2.6	10.8	June 11, 1951	S	N	--	
M-39	--	Du	27.4	36	M	--	do.	635	3.4	12.3	July 11, 1951	S	N	--	
**M-40	Lincoln Mills	Du Dr	111	240	S	65	Top of casing	683	0	11.4	Apr. 23, 1953	Mfp	D Ind	T	Yield in excess of 1,5000 gpm.
M-41	do.	Dr	110	5-5/8	S	--	Land surface	665	--	--	July 24, 1951	Mfp	N	--	
M-42	do.	Dr	110	5-5/8	S	--	do.	665	--	--	do.	Mfp	N	--	
M-43	do.	Dr	110	5-5/8	S	--	do.	665	--	--	do.	Mfp	N	--	
M-44	do.	Dr	110	5-5/8	S	--	do.	665	--	--	do.	Mfp	N	--	
M-45	do.	Dr	110	5-5/8	S	--	do.	665	--	--	do.	Mfp	N	--	
M-46	do.	Dr	110	5-5/8	S	--	do.	665	--	--	do.	Mfp	N	--	Sulfurous.
M-47	Lincoln Mills	Dr	110	5-5/8	S	--	Land surface	663	--	--	Aug. 8, 1914	Mfp	N	--	
**M-48	Dallas Mfg. Co.	Dr	104	20	S	--	Top of casing	644	.5	34.8	June 13, 1953	Mfp	PS	T	Electric log indicates cavity from 68 to 87 and 94 to 96 feet. Specific capacity 615 gpm/ft.
M-49	do.	Dr	104	5-5/8	S	--	do.	644	1.5	36	June 22, 1915	Mfp	N	--	
M-50	do.	Dr	--	7	S	--	Land surface	640	--	--	Jan. 14, 1916	Mfp	N	--	
**M-51	do.	Dr	104	20	S	--	Top of casing	641	.4	--	--	Mfp	N	--	
M-52	do.	Dr	--	5-5/8	PS	--	do.	645	.9	--	Oct. 19, 1914	Mfp	N	--	
M-53	do.	Dr	135	8	S	--	do.	646	--	35	July 15, 1914	Mfp	N	--	Yield 76 gpm. Sulfurous.
M-54	do.	Dr	108	5-5/8	S	--	do.	650	2.0	35	Jan. 5, 1915	Mfp	N	--	Yield 50 gpm.

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SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
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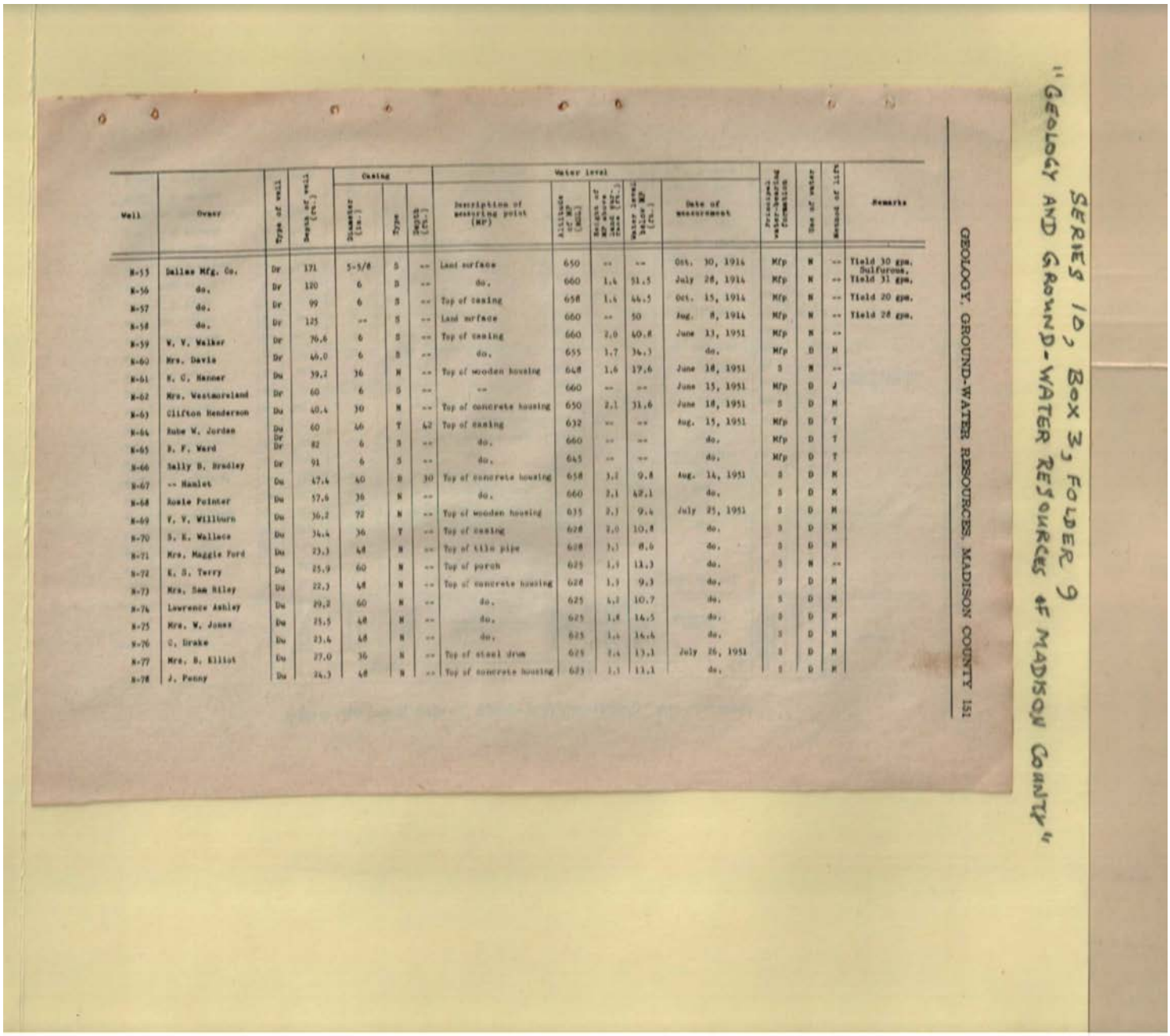
Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (msl)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Record of life	Remarks
M-55	Dallas Mfg. Co.	Dr	171	5-5/8	S	--	Land surface	650	--	--	Oct. 30, 1914	Mfp	N	--	Yield 30 gpm. Sulfurous.
M-56	do.	Dr	120	6	S	--	do.	660	1.4	51.5	July 28, 1914	Mfp	N	--	Yield 31 gpm.
M-57	do.	Dr	99	6	S	--	Top of casing	658	1.4	44.5	Oct. 15, 1914	Mfp	N	--	Yield 20 gpm.
M-58	do.	Dr	125	--	S	--	Land surface	660	--	50	Aug. 8, 1914	Mfp	N	--	Yield 28 gpm.
M-59	W. V. Walker	Dr	70.6	6	S	--	Top of casing	660	2.0	40.8	June 13, 1951	Mfp	N	--	
M-60	Mrs. Davis	Dr	46.0	6	S	--	do.	655	1.7	34.3	do.	Mfp	D	N	
M-61	E. C. Hanner	Du	39.2	36	N	--	Top of wooden housing	648	1.6	17.6	June 18, 1951	S	N	--	
M-62	Mrs. Westmoreland	Dr	60	6	S	--	--	660	--	--	June 15, 1951	Mfp	D	J	
M-63	Clifton Henderson	Du	40.4	30	N	--	Top of concrete housing	650	2.1	31.6	June 18, 1951	S	D	N	
M-64	Rube W. Jordan	Du Dr	60	46	T	42	Top of casing	632	--	--	Aug. 15, 1951	Mfp	D	T	
M-65	B. F. Ward	Dr	82	6	S	--	do.	660	--	--	do.	Mfp	D	T	
M-66	Sally B. Bradley	Dr	91	6	S	--	do.	645	--	--	do.	Mfp	D	T	
M-67	-- Hamlet	Du	47.4	40	N	30	Top of concrete housing	658	3.8	9.8	Aug. 14, 1951	S	D	N	
M-68	Rosie Pointer	Du	57.6	36	N	--	do.	660	2.1	42.1	do.	S	D	N	
M-69	V. V. Willburn	Du	36.2	72	N	--	Top of wooden housing	635	2.3	9.4	July 25, 1951	S	D	N	
M-70	S. E. Wallace	Du	34.4	36	T	--	Top of casing	628	2.0	10.8	do.	S	D	N	
M-71	Mrs. Maggie Ford	Du	23.3	48	N	--	Top of tile pipe	628	3.1	8.6	do.	S	D	N	
M-72	E. S. Terry	Du	25.9	60	N	--	Top of porch	625	1.5	11.3	do.	S	N	--	
M-73	Mrs. Sam Riley	Du	22.3	48	N	--	Top of concrete housing	628	1.3	9.3	do.	S	D	N	
M-74	Lawrence Ashley	Du	29.2	60	N	--	do.	625	4.3	10.7	do.	S	D	N	
M-75	Mrs. W. Jones	Du	25.5	48	N	--	do.	625	1.8	14.5	do.	S	D	N	
M-76	C. Drake	Du	23.4	48	N	--	do.	625	1.4	14.4	do.	S	D	N	
M-77	Mrs. B. Elliot	Du	27.0	36	N	--	Top of steel drum	625	3.4	13.1	July 26, 1951	S	D	N	
M-78	J. Penny	Du	24.3	48	N	--	Top of concrete housing	623	1.3	11.1	do.	S	D	N	

Types:
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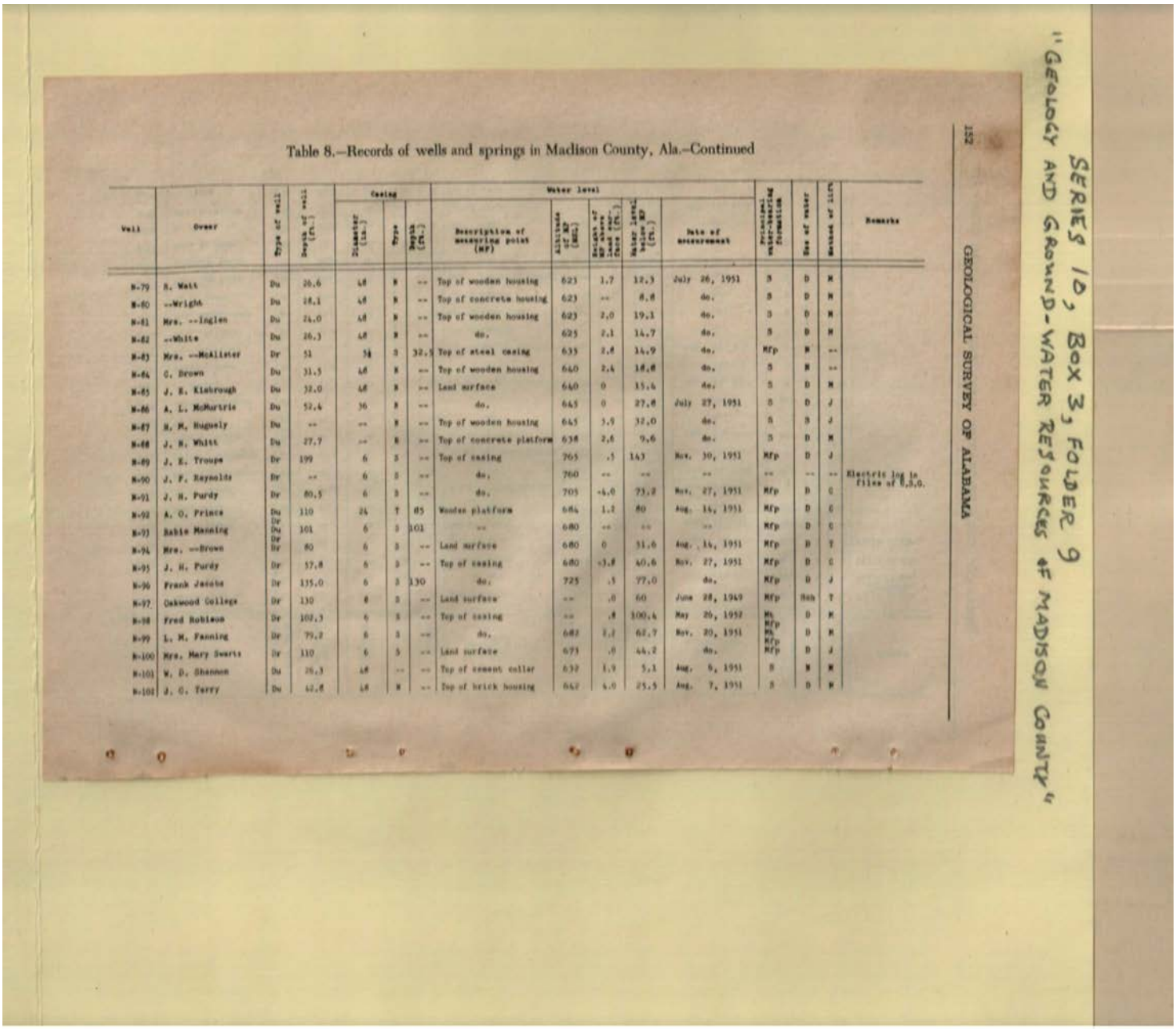

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

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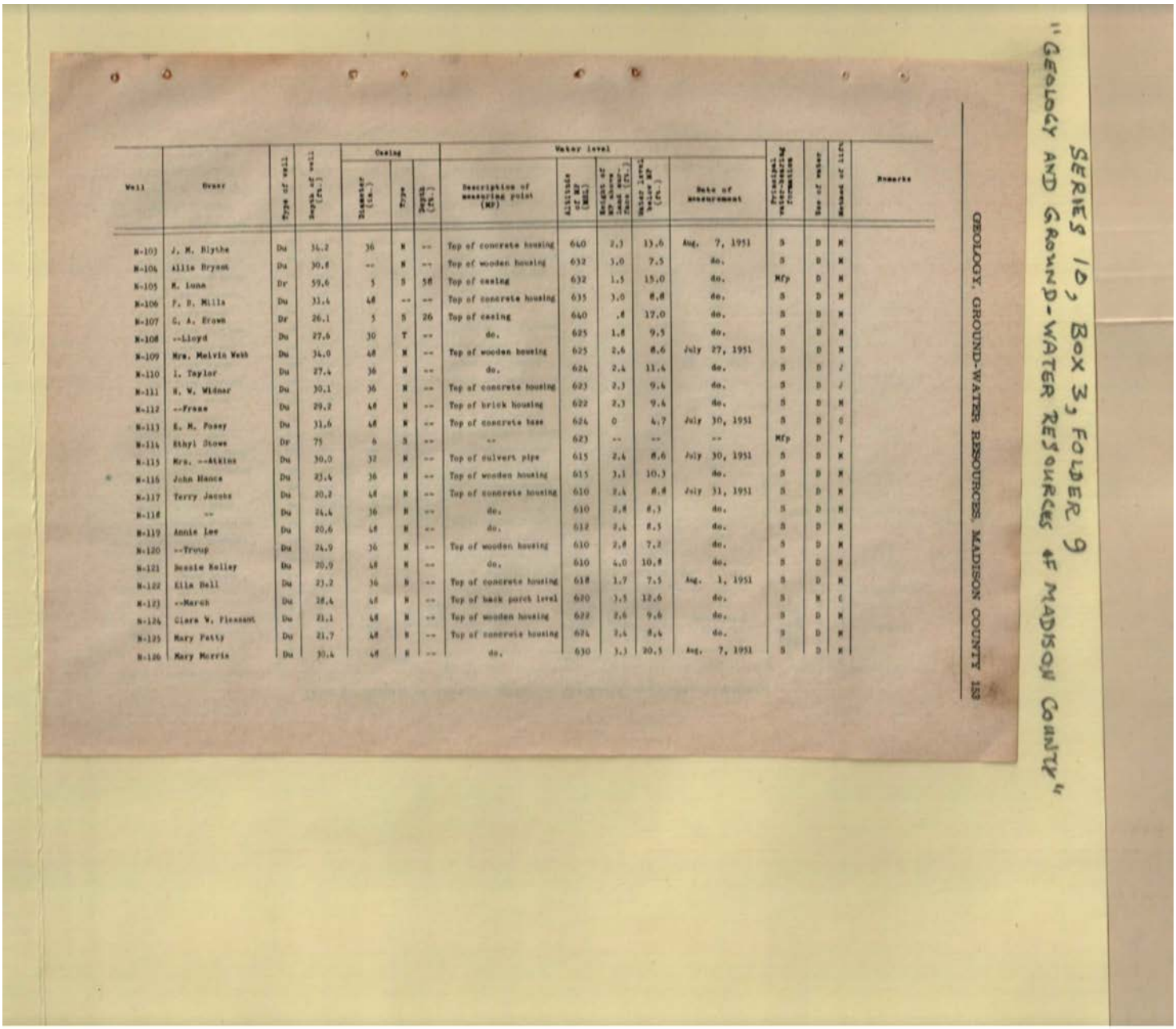
Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Depth to water below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Quality of water	Remarks
M-79	R. Watt	Du	20.6	48	R	--	Top of wooden housing	623	1.7	12.3	July 26, 1951	S	D	M	
M-80	--Wright	Du	18.1	48	R	--	Top of concrete housing	623	--	8.8	do.	S	D	M	
M-81	Mrs. --Inglen	Du	24.0	48	R	--	Top of wooden housing	623	2.0	19.1	do.	S	D	M	
M-82	--White	Du	26.3	48	R	--	do.	625	2.1	14.7	do.	S	D	M	
M-83	Mrs. --McAlister	Dr	51	3½	S	32.5	Top of steel casing	635	2.8	14.9	do.	Mfp	N	--	
M-84	C. Brown	Du	31.5	48	R	--	Top of wooden housing	640	2.4	18.8	do.	S	N	--	
M-85	J. E. Kimbrough	Du	32.0	48	R	--	Land surface	640	0	15.4	do.	S	D	M	
M-86	A. L. McMurtrie	Du	52.4	36	R	--	do.	645	0	27.8	July 27, 1951	S	D	J	
M-87	H. M. Huguely	Du	--	--	R	--	Top of wooden housing	645	3.9	32.0	do.	S	D	J	
M-88	J. N. Whitt	Du	27.7	--	R	--	Top of concrete platform	638	2.6	9.6	do.	S	D	M	
M-89	J. E. Troupe	Dr	199	6	S	--	Top of casing	765	.5	143	Nov. 30, 1951	Mfp	D	J	
M-90	J. F. Reynolds	Dr	--	6	S	--	do.	760	--	--	--	--	--	--	Electric log in files of G.S.A.
M-91	J. H. Purdy	Dr	80.5	6	S	--	do.	705	-4.0	73.2	Nov. 27, 1951	Mfp	D	C	
M-92	A. O. Prince	Du	110	24	T	85	Wooden platform	684	1.2	80	Aug. 14, 1951	Mfp	D	C	
M-93	Bable Manning	Du Dr	101	6	S	101	--	680	--	--	--	Mfp	D	C	
M-94	Mrs. --Brown	Dr	80	6	S	--	Land surface	680	0	31.6	Aug. 14, 1951	Mfp	D	T	
M-95	J. H. Purdy	Dr	57.8	6	S	--	Top of casing	680	+3.8	40.6	Nov. 27, 1951	Mfp	D	C	
M-96	Frank Jacobs	Dr	135.0	6	S	130	do.	725	.5	77.0	do.	Mfp	D	J	
M-97	Oakwood College	Dr	130	8	S	--	Land surface	--	.0	60	June 28, 1949	Mfp	Non	T	
M-98	Fred Robinson	Dr	102.3	6	S	--	Top of casing	--	.8	100.4	May 26, 1952	Mfp	D	M	
M-99	L. M. Fanning	Dr	79.2	6	S	--	do.	682	1.2	62.7	Nov. 20, 1951	Mfp	D	M	
M-100	Mrs. Mary Swarts	Dr	110	6	S	--	Land surface	671	.0	44.2	do.	Mfp	D	J	
M-101	W. D. Shannon	Du	26.3	48	--	--	Top of cement collar	632	1.9	5.1	Aug. 6, 1951	S	N	M	
M-102	J. C. Terry	Du	42.8	48	R	--	Top of brick housing	642	4.0	25.5	Aug. 7, 1951	S	D	M	

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 133

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft. MSL)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Record of log	Remarks
M-103	J. M. Blythe	Du	34.2	36	M	--	Top of concrete housing	640	2.3	13.6	Aug. 7, 1951	S	D	X	
M-104	Allie Bryant	Du	30.8	--	M	--	Top of wooden housing	632	3.0	7.5	do.	S	D	X	
M-105	M. Luna	Dr	59.6	5	S	58	Top of casing	632	1.5	15.0	do.	Mfp	D	X	
M-106	F. D. Mills	Du	31.4	48	--	--	Top of concrete housing	635	3.0	8.8	do.	S	D	X	
M-107	G. A. Brown	Dr	26.1	5	S	26	Top of casing	640	.8	17.0	do.	S	D	X	
M-108	--Lloyd	Du	27.6	30	T	--	do.	625	1.8	9.5	do.	S	D	X	
M-109	Mrs. Melvin Webb	Du	34.0	48	M	--	Top of wooden housing	625	2.6	8.6	July 27, 1951	S	D	X	
M-110	I. Taylor	Du	27.4	36	M	--	do.	624	2.4	11.4	do.	S	D	/	
M-111	H. W. Widner	Du	30.1	36	M	--	Top of concrete housing	623	2.3	9.4	do.	S	D	/	
M-112	--Frame	Du	29.2	48	M	--	Top of brick housing	622	2.3	9.4	do.	S	D	X	
M-113	E. M. Posey	Du	31.6	48	M	--	Top of concrete base	624	0	4.7	July 30, 1951	S	D	C	
M-114	Ethyl Stowe	Dr	75	6	S	--	--	623	--	--	--	Mfp	D	T	
M-115	Mrs. --Atkins	Du	30.0	32	M	--	Top of culvert pipe	615	2.4	8.6	July 30, 1951	S	D	X	
M-116	John Hance	Du	23.4	36	M	--	Top of wooden housing	615	3.1	10.3	do.	S	D	X	
M-117	Terry Jacobs	Du	30.2	48	M	--	Top of concrete housing	610	2.4	8.8	July 31, 1951	S	D	X	
M-118	--	Du	24.4	36	M	--	do.	610	2.8	8.3	do.	S	D	X	
M-119	Annie Lee	Du	20.6	48	M	--	do.	612	2.4	8.5	do.	S	D	X	
M-120	--Troup	Du	24.9	36	M	--	Top of wooden housing	610	2.8	7.2	do.	S	D	X	
M-121	Bessie Kelley	Du	20.9	48	M	--	do.	610	4.0	10.8	do.	S	D	X	
M-122	Ella Bell	Du	23.2	36	M	--	Top of concrete housing	618	1.7	7.5	Aug. 1, 1951	S	D	X	
M-123	--March	Du	28.4	48	M	--	Top of back porch level	620	3.5	12.6	do.	S	M	C	
M-124	Clara W. Pleasant	Du	21.1	48	M	--	Top of wooden housing	622	2.6	9.6	do.	S	D	X	
M-125	Mary Patty	Du	21.7	48	M	--	Top of concrete housing	624	2.4	8.4	do.	S	D	X	
M-126	Mary Morris	Du	30.4	48	M	--	do.	630	3.3	20.5	Aug. 7, 1951	S	D	X	

Types:
chart

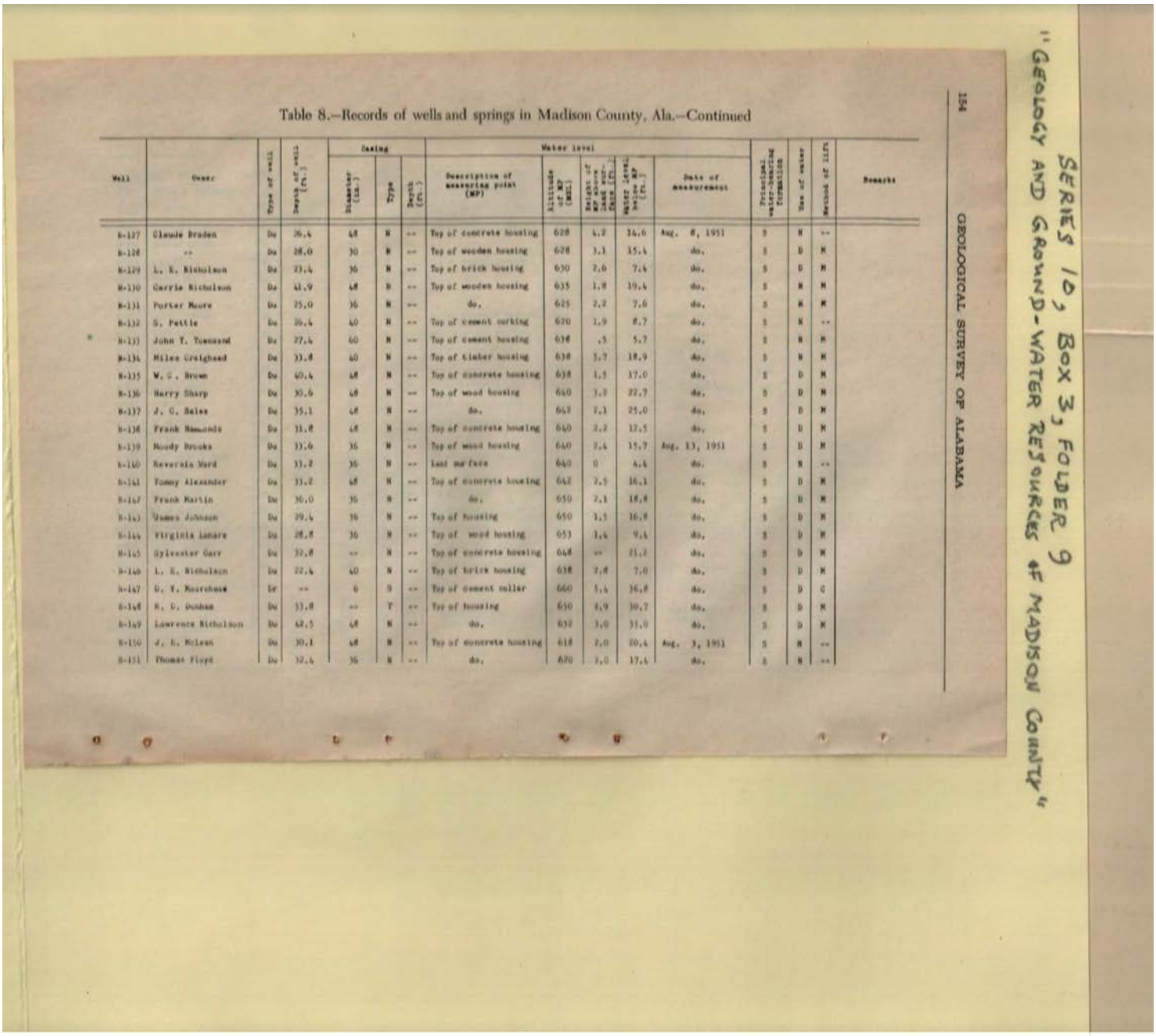


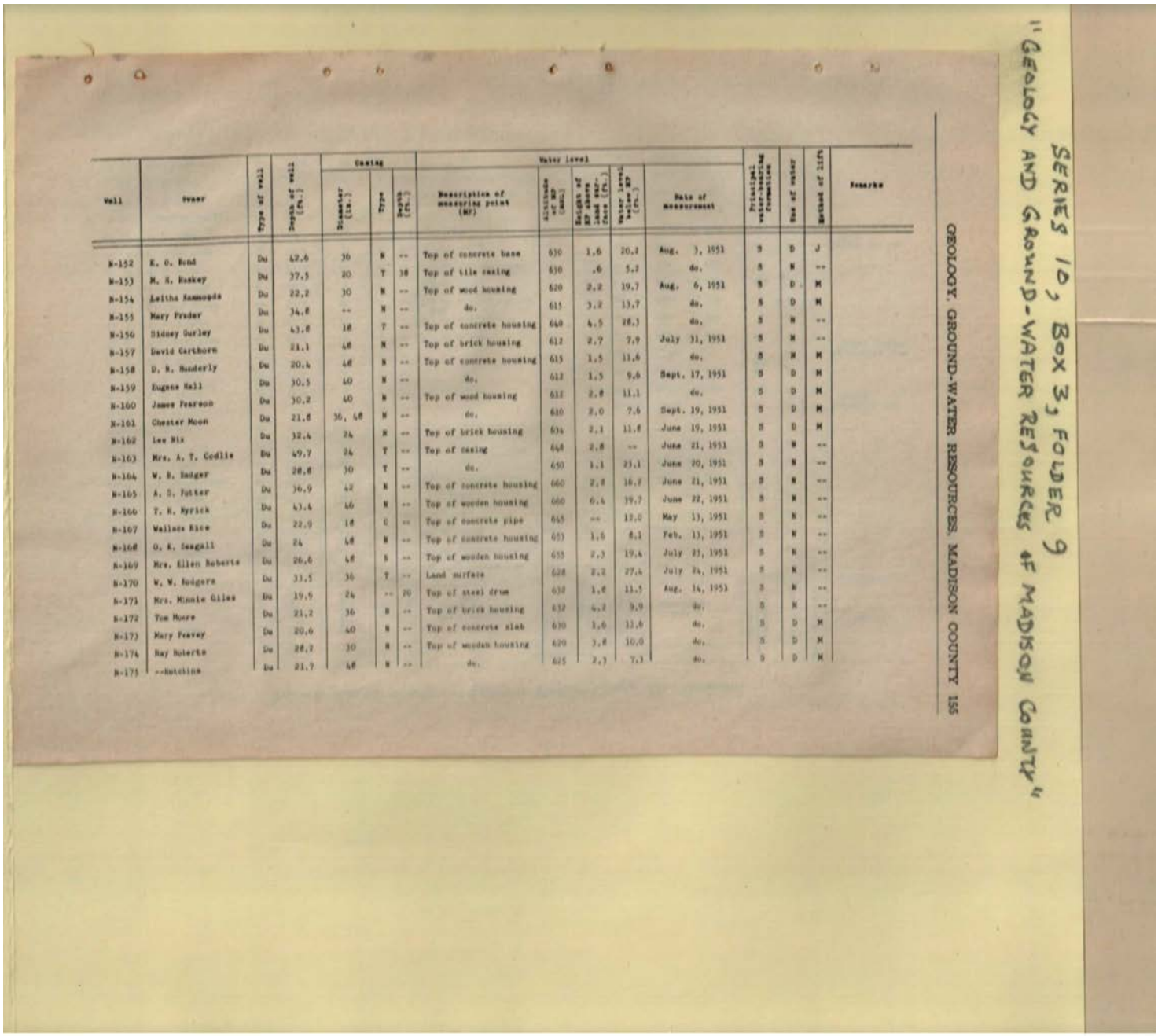
Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (msl.)	Water level: Height of MP above land surface (ft.)	Water level: Depth to water (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Record of yield	Remarks
M-127	Claude Braden	Du	26.4	48	M	--	Top of concrete housing	628	4.2	14.6	Aug. 8, 1951	t	H	--	
M-128	--	Du	28.0	30	M	--	Top of wooden housing	628	3.1	15.4	do.	t	D	X	
M-129	L. E. Nicholson	Du	23.4	36	M	--	Top of brick housing	630	2.6	7.4	do.	t	D	X	
M-130	Carrie Nicholson	Du	41.9	48	B	--	Top of wooden housing	635	1.8	19.4	do.	t	H	X	
M-131	Porter Moore	Du	25.0	36	M	--	do.	625	2.2	7.6	do.	t	H	X	
M-132	S. Pettie	Du	26.4	40	M	--	Top of cement curbing	620	1.9	8.7	do.	t	H	--	
M-133	John T. Townsend	Du	27.4	60	M	--	Top of cement housing	638	.5	5.7	do.	t	H	X	
M-134	Miles Creighead	Du	33.8	40	M	--	Top of timber housing	638	5.7	18.9	do.	t	H	X	
M-135	W. C. Brown	Du	40.4	48	M	--	Top of concrete housing	638	1.5	17.0	do.	t	D	X	
M-136	Harry Sharp	Du	30.6	48	M	--	Top of wood housing	640	3.3	22.7	do.	t	D	X	
M-137	J. C. Bales	Du	35.1	48	M	--	do.	643	2.1	25.0	do.	t	D	X	
M-138	Frank Hammonds	Du	31.8	48	M	--	Top of concrete housing	640	3.2	12.5	do.	t	D	X	
M-139	Moody Brooks	Du	33.6	36	M	--	Top of wood housing	640	3.4	15.7	Aug. 13, 1951	t	D	X	
M-140	Reversia Ward	Du	33.2	36	M	--	Land surface	640	0	4.4	do.	t	H	--	
M-141	Tommy Alexander	Du	33.2	48	M	--	Top of concrete housing	642	2.5	16.1	do.	t	D	X	
M-142	Frank Martin	Du	36.0	36	M	--	do.	650	2.1	18.8	do.	t	D	X	
M-143	James Johnson	Du	29.4	36	M	--	Top of housing	650	1.5	16.8	do.	t	D	X	
M-144	Virginia Lanare	Du	28.8	36	M	--	Top of wood housing	651	1.4	9.4	do.	t	D	X	
M-145	Sylvester Carr	Du	32.8	--	M	--	Top of concrete housing	648	--	21.2	do.	t	D	X	
M-146	L. E. Nicholson	Du	22.4	40	M	--	Top of brick housing	638	2.8	7.0	do.	t	D	X	
M-147	U. T. Moorehead	Ir	--	6	S	--	Top of cement collar	660	1.4	36.8	do.	t	D	C	
M-148	R. D. Dunham	Du	33.8	--	T	--	Top of housing	650	2.9	30.7	do.	t	D	X	
M-149	Lawrence Nicholson	Du	42.5	48	M	--	do.	632	3.0	33.0	do.	t	D	X	
M-150	J. A. McLean	Du	30.1	48	M	--	Top of concrete housing	618	2.0	20.4	Aug. 3, 1951	t	H	--	
M-151	Thomas Floyd	Du	32.4	36	M	--	do.	620	3.0	17.4	do.	t	H	--	

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 135

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
M-152	E. O. Bond	Du	42.6	36	H	--	Top of concrete base	630	1.6	20.1	Aug. 3, 1951	S	D	J	
M-153	M. S. Haskey	Du	37.5	20	T	38	Top of tile casing	630	.6	5.2	do.	S	H	--	
M-154	Leitha Hammonds	Du	22.2	30	H	--	Top of wood housing	620	2.2	19.7	Aug. 6, 1951	S	D	H	
M-155	Mary Frader	Du	34.8	--	H	--	do.	615	3.2	13.7	do.	S	D	H	
M-156	Sidney Gurley	Du	43.8	18	T	--	Top of concrete housing	640	4.5	28.3	do.	S	H	--	
M-157	David Carthorn	Du	21.1	48	H	--	Top of brick housing	612	2.7	7.9	July 31, 1951	S	H	--	
M-158	D. H. Sunderly	Du	20.4	48	H	--	Top of concrete housing	615	1.5	11.6	do.	S	H	H	
M-159	Eugene Hall	Du	30.5	40	H	--	do.	612	1.5	9.6	Sept. 17, 1951	S	D	H	
M-160	James Pearson	Du	30.2	40	H	--	Top of wood housing	611	2.8	11.1	do.	S	D	H	
M-161	Chester Moon	Du	21.8	36, 48	H	--	do.	610	2.0	7.6	Sept. 19, 1951	S	D	H	
M-162	Lee Nix	Du	32.4	24	H	--	Top of brick housing	634	2.1	11.8	June 19, 1951	S	D	H	
M-163	Mrs. A. T. Godlie	Du	49.7	24	T	--	Top of casing	648	2.8	--	June 21, 1951	S	H	--	
M-164	W. B. Badger	Du	28.8	30	T	--	do.	650	1.1	23.1	June 20, 1951	S	H	--	
M-165	A. S. Futter	Du	36.9	42	H	--	Top of concrete housing	660	2.8	16.2	June 21, 1951	S	H	--	
M-166	T. H. Myrick	Du	43.4	46	H	--	Top of wooden housing	660	6.4	39.7	June 22, 1951	S	H	--	
M-167	Wallace Rice	Du	22.9	18	C	--	Top of concrete pipe	665	--	13.0	May 13, 1951	S	H	--	
M-168	O. K. Seagall	Du	24	48	H	--	Top of concrete housing	653	1.6	8.1	Feb. 13, 1951	S	H	--	
M-169	Mrs. Ellen Roberts	Du	26.6	48	H	--	Top of wooden housing	655	2.3	19.4	July 23, 1951	S	H	--	
M-170	W. W. Rodgers	Du	33.5	36	T	--	Land surface	628	2.2	27.4	July 24, 1951	S	H	--	
M-171	Mrs. Minnie Giles	Du	19.9	24	--	20	Top of steel drum	630	1.8	11.5	Aug. 14, 1951	S	H	--	
M-172	Tom Moore	Du	21.2	36	H	--	Top of brick housing	632	4.2	9.9	do.	S	H	--	
M-173	Mary Feaver	Du	20.6	40	H	--	Top of concrete slab	630	1.6	11.6	do.	S	D	H	
M-174	Ray Roberts	Du	28.2	30	H	--	Top of wooden housing	620	3.8	10.0	do.	S	D	H	
M-175	--Hutchins	Du	21.7	48	H	--	do.	625	2.3	7.3	do.	S	D	H	

Types:
chart

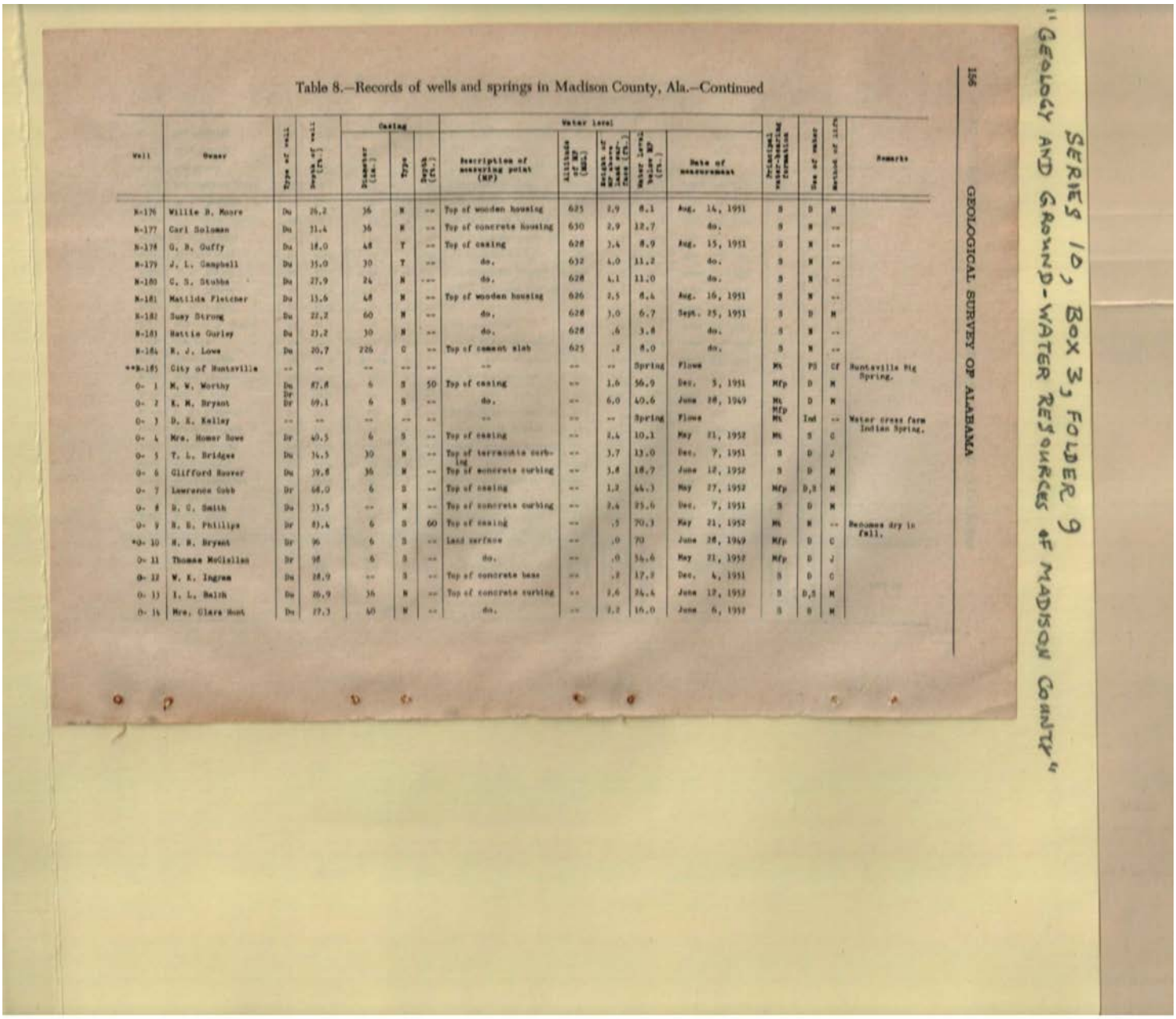


Table 8.—Records of wells and springs in Madison County, Ala.—Continued

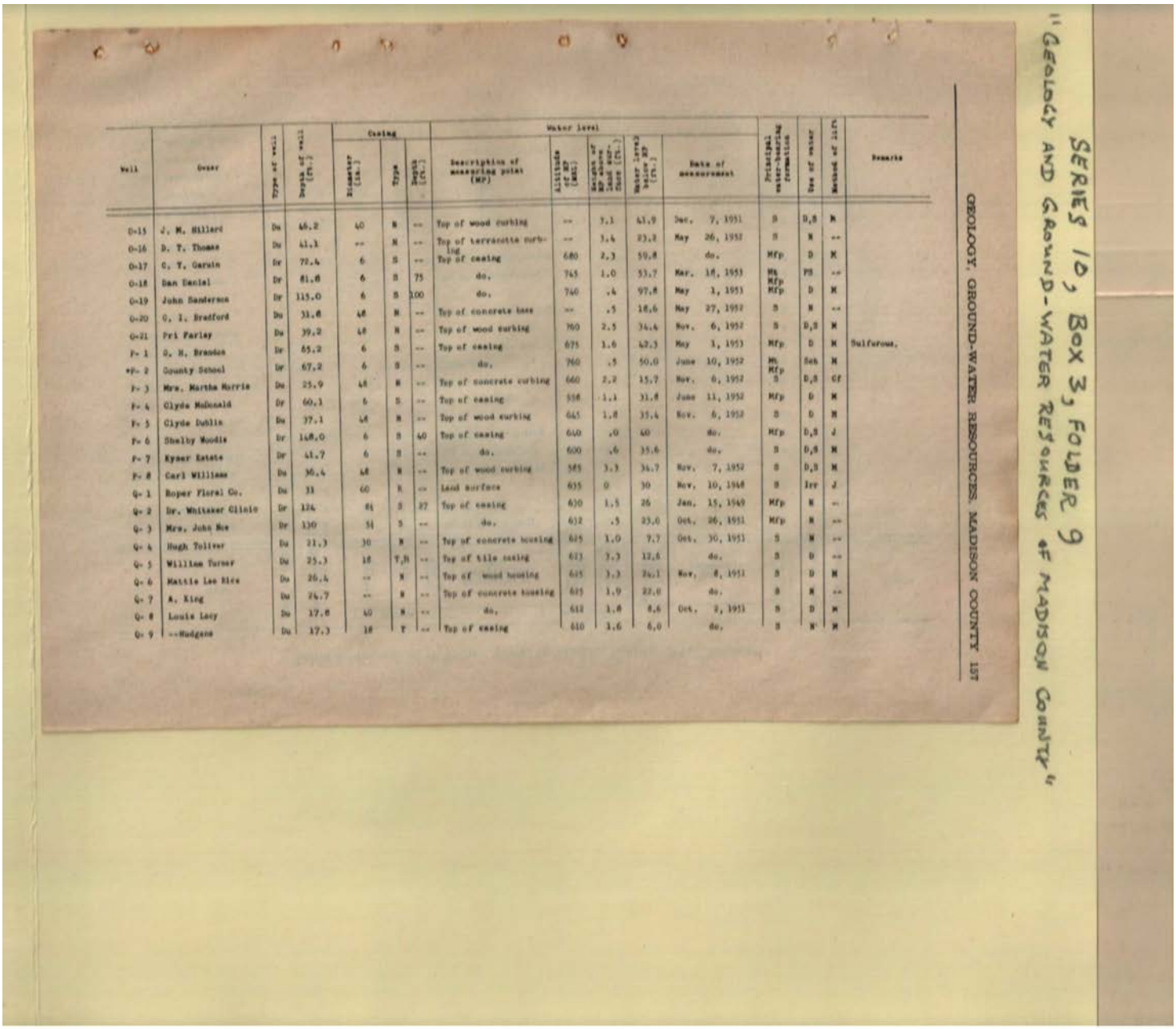
156 GEOLOGICAL SURVEY OF ALABAMA

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (MSL)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Quality of water	Remarks
M-176	Willie B. Moore	Du	26.2	36	M	--	Top of wooden housing	625	2.9	8.1	Aug. 14, 1951	S	D	M	
M-177	Carl Solomon	Du	31.4	36	M	--	Top of concrete housing	630	2.9	12.7	do.	S	M	--	
M-178	G. B. Guffy	Du	18.0	48	T	--	Top of casing	628	3.4	8.9	Aug. 15, 1951	S	M	--	
M-179	J. L. Campbell	Du	35.0	30	T	--	do.	632	4.0	11.2	do.	S	M	--	
M-180	C. S. Stubbs	Du	27.9	24	M	---	do.	628	4.1	11.0	do.	S	M	--	
M-181	Matilda Fletcher	Du	13.6	48	M	--	Top of wooden housing	626	2.5	8.4	Aug. 16, 1951	S	M	--	
M-182	Suey Strong	Du	22.2	60	M	--	do.	628	3.0	6.7	Sept. 25, 1951	S	D	M	
M-183	Hattie Gurley	Du	21.2	30	M	--	do.	628	.6	3.8	do.	S	M	--	
M-184	R. J. Lowe	Du	20.7	226	C	--	Top of cement slab	625	.2	8.0	do.	S	M	--	
**M-185	City of Huntsville	--	--	--	--	--	--	--	--	Spring	Flows	Mt	PS	Cf	Huntsville Big Spring.
O- 1	M. W. Worthy	Du Dr	87.8	6	S	50	Top of casing	--	1.6	56.9	Dec. 5, 1951	Mfp	D	M	
O- 2	E. M. Bryant	Dr	69.1	6	S	--	do.	--	6.0	40.6	June 28, 1949	Mt Mfp	D	M	
O- 3	D. E. Kelley	--	--	--	--	--	--	--	--	Spring	Flows	Mt	Ind	--	Water cress farm Indian Spring.
O- 4	Mrs. Homer Howe	Dr	40.5	6	S	--	Top of casing	--	2.4	10.1	May 21, 1952	Mt	S	C	
O- 5	T. L. Bridges	Du	34.5	30	M	--	Top of terracotta curbing	--	3.7	13.0	Dec. 7, 1951	S	D	J	
O- 6	Clifford Hoover	Du	39.8	36	M	--	Top of concrete curbing	--	3.8	18.7	June 12, 1952	S	D	M	
O- 7	Lawrence Cobb	Dr	68.0	6	S	--	Top of casing	--	1.2	44.3	May 27, 1952	Mfp	D,S	M	
O- 8	B. C. Smith	Du	33.5	--	M	--	Top of concrete curbing	--	2.4	25.6	Dec. 7, 1951	S	D	M	
O- 9	R. E. Phillips	Dr	83.4	6	S	60	Top of casing	--	.5	70.3	May 21, 1952	Mt	M	--	Becomes dry in fall.
*O- 10	H. H. Bryant	Dr	96	6	S	--	Land surface	--	.0	70	June 28, 1949	Mfp	D	C	
O- 11	Thomas McClellan	Dr	98	6	S	--	do.	--	.0	54.6	May 21, 1952	Mfp	D	J	
O- 12	W. K. Ingram	Du	28.9	--	S	--	Top of concrete base	--	.2	17.2	Dec. 4, 1951	S	D	C	
O- 13	I. L. Smith	Du	26.9	36	M	--	Top of concrete curbing	--	2.6	24.4	June 12, 1952	S	D,S	M	
O- 14	Mrs. Clara Hunt	Du	27.3	40	M	--	do.	--	2.2	16.0	June 6, 1952	S	S	M	

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 157

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
O-15	J. M. Hillard	Du	46.2	40	N	--	Top of wood curbing	--	3.1	41.9	Dec. 7, 1951	S	D,S	N	
O-16	D. T. Thomas	Du	41.1	--	N	--	Top of terracotta curbing	--	3.4	23.3	May 26, 1952	S	N	--	
O-17	G. T. Garvin	Dr	72.4	6	S	--	Top of casing	680	2.3	59.8	do.	Mfp	D	N	
O-18	Dan Daniel	Dr	81.8	6	S	75	do.	745	1.0	53.7	Mar. 18, 1953	Ms Mfp	PS	--	
O-19	John Sanderson	Dr	115.0	6	S	100	do.	760	.4	97.8	May 1, 1953	Mfp	D	N	
O-20	O. I. Bradford	Du	31.8	48	N	--	Top of concrete base	--	.5	18.6	May 27, 1952	S	N	--	
O-21	Pri Farley	Du	39.2	48	N	--	Top of wood curbing	760	2.5	34.4	Nov. 6, 1952	S	D,S	N	
P- 1	O. H. Brandon	Dr	65.2	6	S	--	Top of casing	675	1.6	42.3	May 1, 1953	Mfp	D	N	Sulfurous.
*P- 2	County School	Dr	67.2	6	S	--	do.	760	.5	50.0	June 10, 1952	Ms Mfp	Sch	N	
P- 3	Mrs. Martha Morris	Du	25.9	48	N	--	Top of concrete curbing	660	2.2	15.7	Nov. 6, 1952	S	D,S	Cf	
P- 4	Clyde McDonald	Dr	60.1	6	S	--	Top of casing	558	1.1	31.8	June 11, 1952	Mfp	D	N	
P- 5	Clyde Dublin	Du	37.1	48	N	--	Top of wood curbing	645	1.8	35.4	Nov. 6, 1952	S	D	N	
P- 6	Shelby Woodle	Dr	148.0	6	S	40	Top of casing	640	.0	40	do.	Mfp	D,S	J	
P- 7	Kyser Estate	Dr	41.7	6	S	--	do.	600	.6	35.6	do.	S	D,S	N	
P- 8	Carl Williams	Du	36.4	48	N	--	Top of wood curbing	585	3.3	34.7	Nov. 7, 1952	S	D,S	N	
Q- 1	Roper Floral Co.	Du	31	60	N	--	Land surface	635	0	30	Nov. 10, 1948	S	Irr	J	
Q- 2	Dr. Whitaker Clinic	Dr	124	84	S	27	Top of casing	630	1.5	26	Jan. 15, 1949	Mfp	N	--	
Q- 3	Mrs. John Roe	Dr	130	54	S	--	do.	612	.5	23.0	Oct. 26, 1951	Mfp	N	--	
Q- 4	Hugh Tolliver	Du	21.3	30	N	--	Top of concrete housing	625	1.0	7.7	Oct. 30, 1951	S	N	--	
Q- 5	William Turner	Du	25.3	18	T,N	--	Top of tile casing	613	3.3	12.6	do.	S	D	--	
Q- 6	Mattie Lee Rice	Du	26.4	--	N	--	Top of wood housing	625	3.3	24.1	Nov. 8, 1951	S	D	N	
Q- 7	A. King	Du	24.7	--	N	--	Top of concrete housing	625	1.9	22.0	do.	S	N	--	
Q- 8	Louis Lacy	Du	17.8	40	N	--	do.	618	1.8	8.6	Oct. 2, 1951	S	D	N	
Q- 9	--Hudgens	Du	17.3	18	T	--	Top of casing	610	1.6	6.0	do.	S	N	N	

Types:
chart

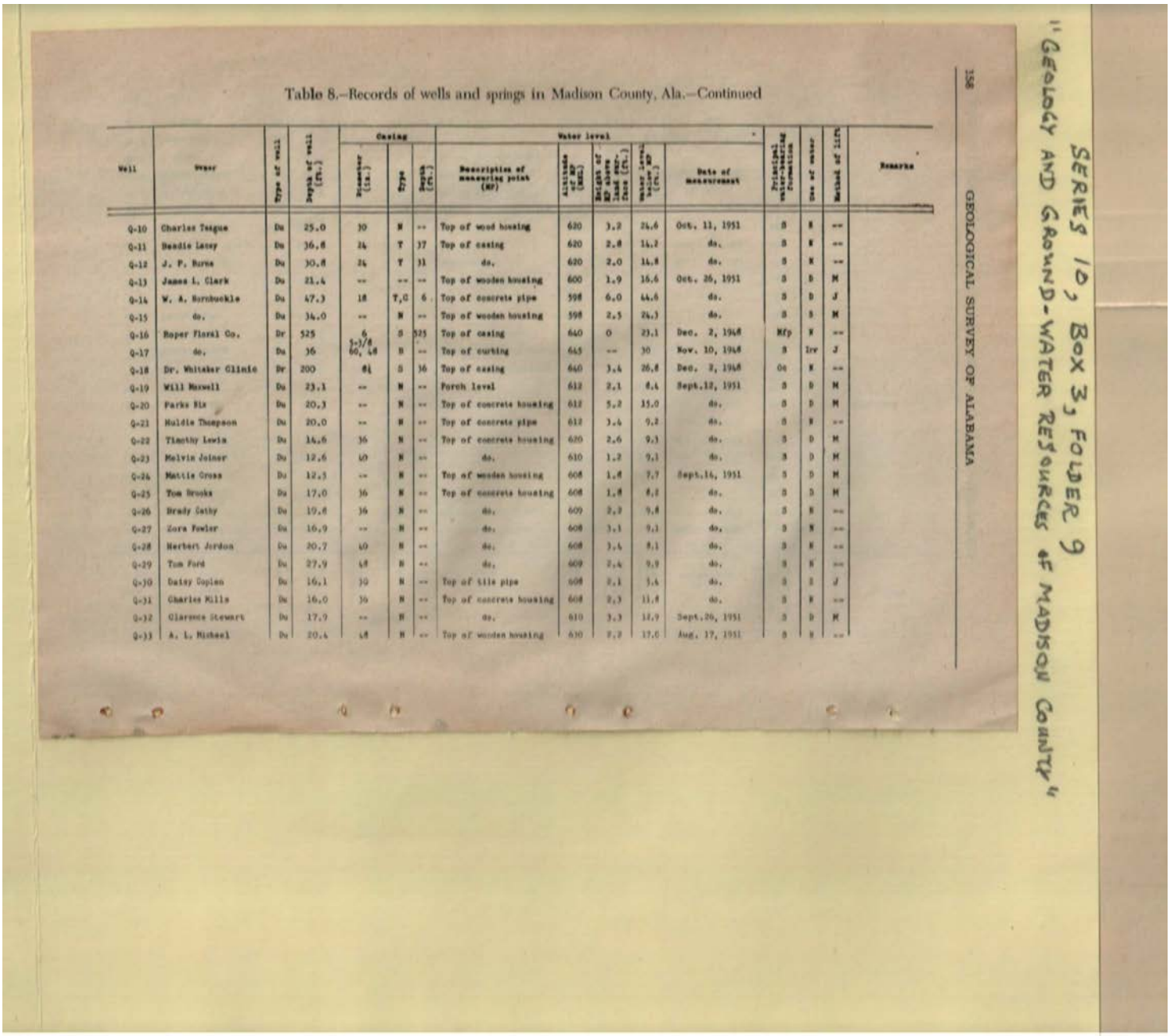


Table 8.—Records of wells and springs in Madison County, Ala.—Continued

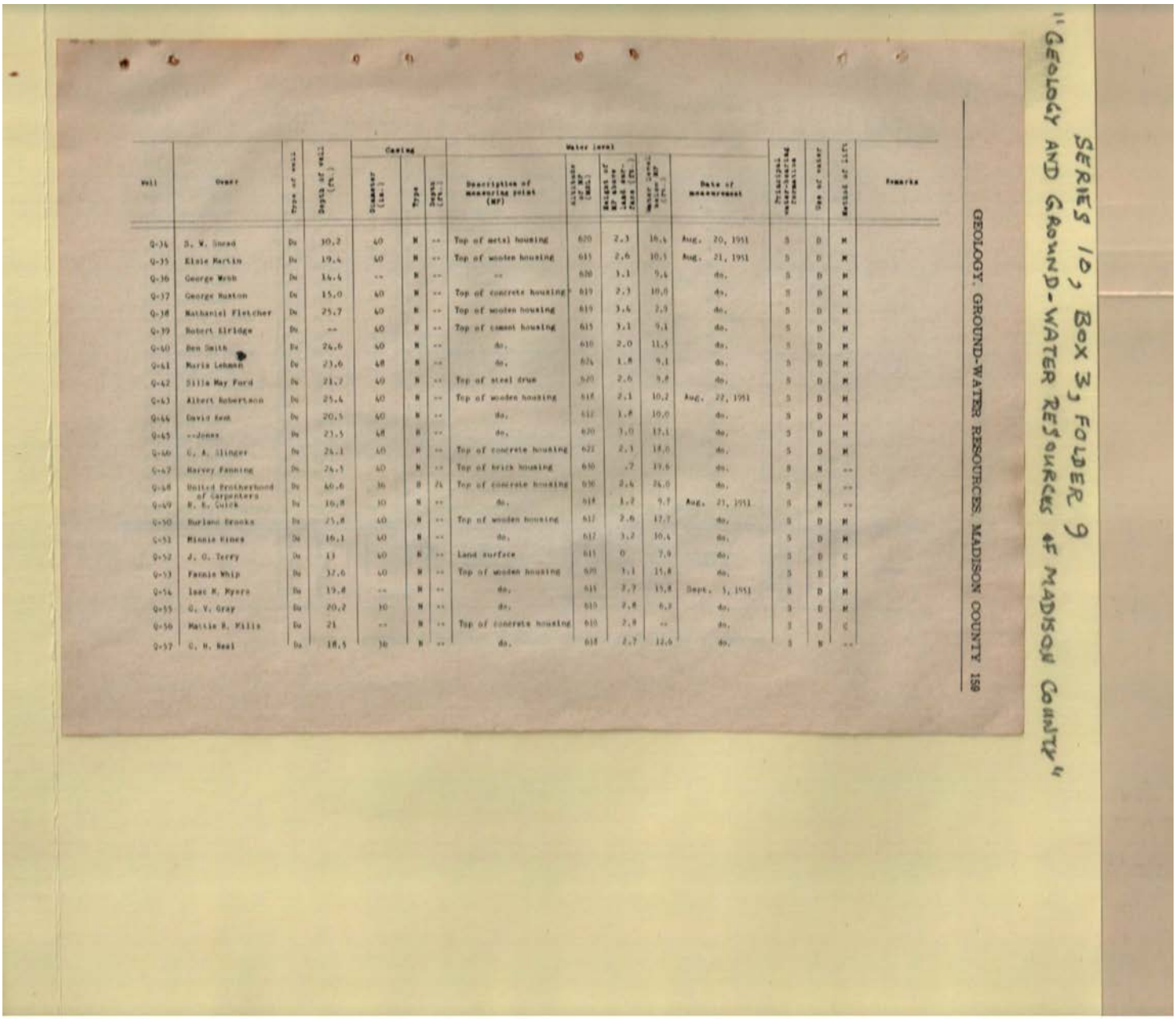
Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land-surface datum (ft.)	Water level: Water level above MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
Q-10	Charles Teague	Du	25.0	30	H	--	Top of wood housing	620	3.2	24.6	Oct. 11, 1951	S	H	--	
Q-11	Beadie Lacey	Du	36.8	24	T	37	Top of casing	620	2.8	14.2	do.	S	H	--	
Q-12	J. P. Burns	Du	30.8	24	T	31	do.	620	2.0	14.8	do.	S	H	--	
Q-13	James L. Clark	Du	21.4	--	--	--	Top of wooden housing	600	1.9	16.6	Oct. 26, 1951	S	D	M	
Q-14	W. A. Hornbuckle	Du	47.3	18	T,C	6	Top of concrete pipe	598	6.0	44.6	do.	S	D	J	
Q-15	do.	Du	34.0	--	H	--	Top of wooden housing	598	2.5	24.3	do.	S	S	M	
Q-16	Roper Floral Co.	Dr	525	6 5-3/8	S	525	Top of casing	640	0	23.1	Dec. 2, 1948	Mfp	H	--	
Q-17	do.	Du	36	60, 48	B	--	Top of curbing	645	--	30	Nov. 10, 1948	S	Irr	J	
Q-18	Dr. Whitaker Clinic	Dr	200	8	S	36	Top of casing	640	3.4	26.8	Dec. 3, 1948	Ok	H	--	
Q-19	Will Maxwell	Du	23.1	--	H	--	Porch level	612	2.1	8.4	Sept.12, 1951	S	D	M	
Q-20	Parks Nix	Du	20.3	--	H	--	Top of concrete housing	612	5.2	15.0	do.	S	D	M	
Q-21	Huldie Thompson	Du	20.0	--	H	--	Top of concrete pipe	612	3.4	9.2	do.	S	H	--	
Q-22	Timothy Lewis	Du	14.6	36	H	--	Top of concrete housing	620	2.6	9.3	do.	S	D	M	
Q-23	Melvin Joiner	Du	12.6	40	H	--	do.	610	1.2	9.1	do.	S	D	M	
Q-24	Mattie Cross	Du	12.3	--	H	--	Top of wooden housing	606	1.8	7.7	Sept.14, 1951	S	D	M	
Q-25	Tom Brooks	Du	17.0	36	H	--	Top of concrete housing	606	1.8	8.2	do.	S	D	M	
Q-26	Brady Cathy	Du	10.8	36	H	--	do.	609	2.2	9.8	do.	S	H	--	
Q-27	Zora Fowler	Du	16.9	--	H	--	do.	608	3.1	9.1	do.	S	H	--	
Q-28	Herbert Jordon	Du	20.7	40	H	--	do.	608	3.4	8.1	do.	S	H	--	
Q-29	Tom Ford	Du	27.9	48	H	--	do.	609	2.4	9.9	do.	S	H	--	
Q-30	Daisy Copien	Du	16.1	30	H	--	Top of tile pipe	608	2.1	3.4	do.	S	I	J	
Q-31	Charles Mills	Du	16.0	36	H	--	Top of concrete housing	608	2.3	11.8	do.	S	H	--	
Q-32	Clarence Stewart	Du	17.9	--	H	--	do.	610	3.3	12.9	Sept.26, 1951	S	D	M	
Q-33	A. L. Michael	Du	20.4	48	H	--	Top of wooden housing	630	2.2	17.0	Aug. 17, 1951	S	H	--	

158 GEOLOGICAL SURVEY OF ALABAMA

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 159

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (feet)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (feet)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Quality of water	Remarks
Q-34	S. W. Snead	Dr	30.2	40	N	--	Top of metal housing	620	2.3	16.4	Aug. 20, 1951	S	D	X	
Q-35	Elsie Martin	Dr	19.4	40	N	--	Top of wooden housing	615	2.6	10.5	Aug. 21, 1951	S	D	X	
Q-36	George Webb	Dr	14.4	--	N	--	--	620	3.1	9.4	do.	S	D	X	
Q-37	George Huston	Dr	15.0	40	N	--	Top of concrete housing	619	2.3	10.0	do.	S	D	X	
Q-38	Nathaniel Fletcher	Dr	25.7	40	N	--	Top of wooden housing	619	3.4	2.5	do.	S	D	X	
Q-39	Robert Elridge	Dr	--	40	N	--	Top of cement housing	615	3.1	9.1	do.	S	D	X	
Q-40	Ben Smith	Dr	24.6	40	N	--	do.	610	2.0	11.5	do.	S	D	X	
Q-41	Marie Lehman	Dr	23.6	48	N	--	do.	624	1.8	9.1	do.	S	D	X	
Q-42	Ella May Ford	Dr	21.7	40	N	--	Top of steel drum	620	2.6	9.8	do.	S	D	X	
Q-43	Albert Robertson	Dr	25.4	40	N	--	Top of wooden housing	616	2.1	10.2	Aug. 22, 1951	S	D	X	
Q-44	David Kem	Dr	20.5	40	N	--	do.	612	1.8	10.0	do.	S	D	X	
Q-45	--Jones	Dr	21.5	48	N	--	do.	620	3.0	17.1	do.	S	D	X	
Q-46	C. A. Slinger	Dr	24.1	40	N	--	Top of concrete housing	622	2.1	18.0	do.	S	D	X	
Q-47	Harvey Fanning	Dr	24.3	40	N	--	Top of brick housing	630	.7	19.6	do.	S	N	--	
Q-48	United Brotherhood of Carpenters	Dr	40.6	36	S	24	Top of concrete housing	630	2.6	24.0	do.	S	N	--	
Q-49	H. E. Culck	Dr	16.8	30	N	--	do.	618	1.2	9.7	Aug. 21, 1951	S	N	--	
Q-50	Burlene Brooks	Dr	23.8	40	N	--	Top of wooden housing	617	2.6	17.7	do.	S	D	X	
Q-51	Minnie Kines	Dr	16.1	40	N	--	do.	617	3.2	10.4	do.	S	D	X	
Q-52	J. O. Terry	Dr	13	40	N	--	Land surface	611	0	7.9	do.	S	D	C	
Q-53	Fannie Whip	Dr	32.0	40	N	--	Top of wooden housing	620	3.1	15.8	do.	S	D	X	
Q-54	Isac K. Myers	Dr	19.8	--	N	--	do.	615	2.7	15.8	Sept. 5, 1951	S	D	X	
Q-55	O. V. Gray	Dr	20.2	30	N	--	do.	610	2.8	6.3	do.	S	D	X	
Q-56	Mattie B. Mills	Dr	21	--	N	--	Top of concrete housing	610	2.9	--	do.	S	D	C	
Q-57	C. H. Neal	Dr	18.5	36	N	--	do.	618	2.7	12.6	do.	S	N	--	

Types:
chart

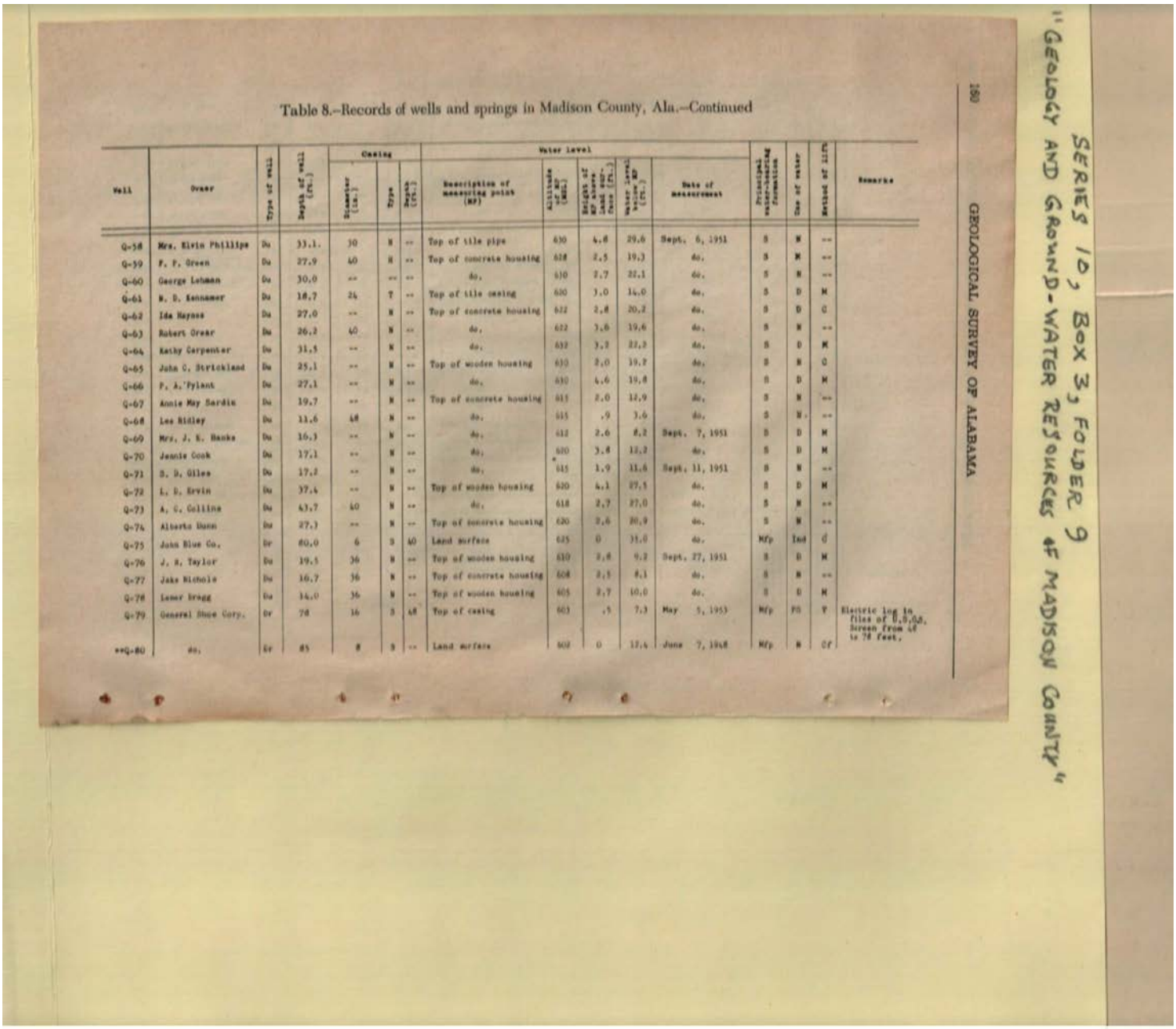
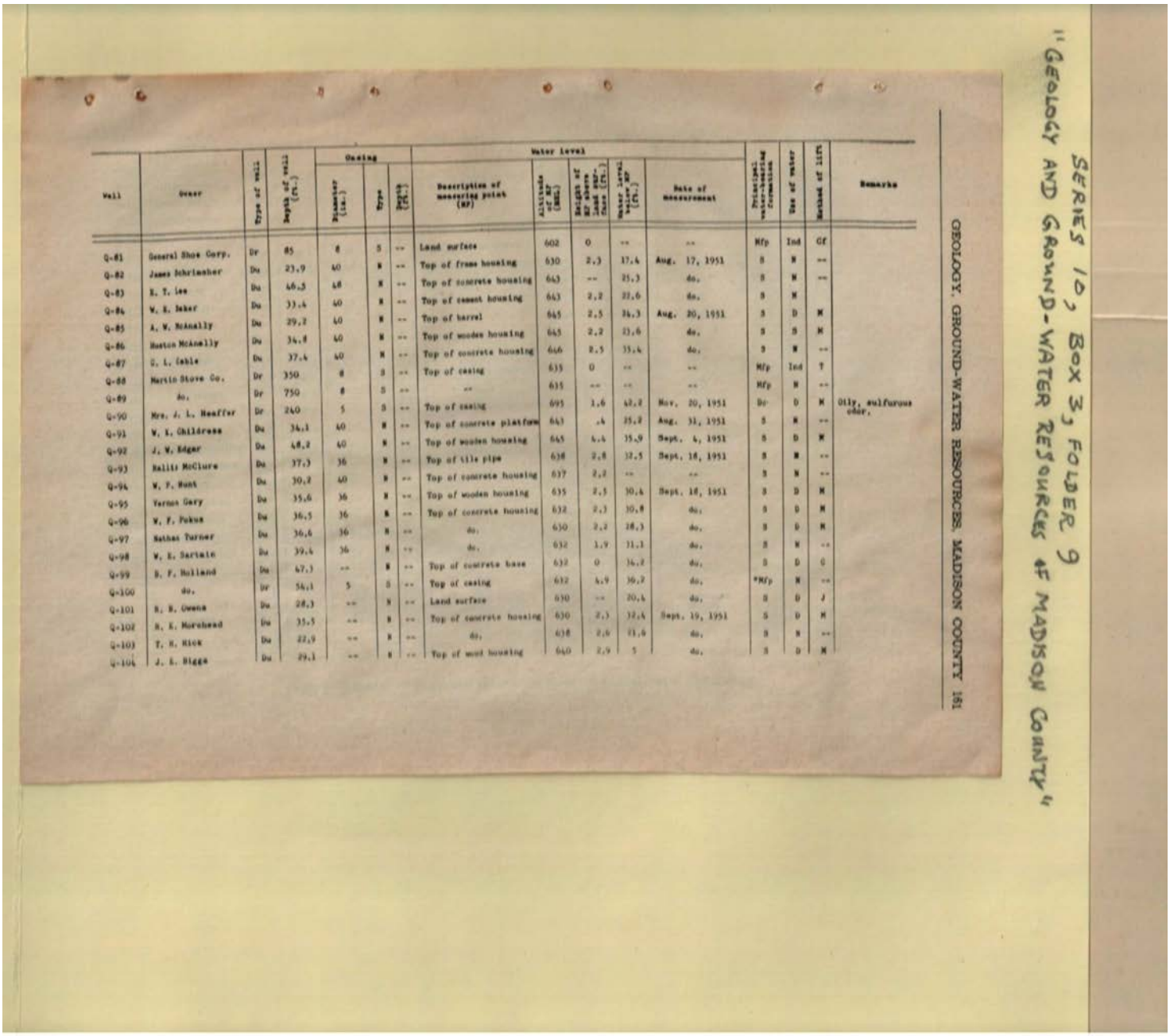


Table 8.–Records of wells and springs in Madison County, Ala.–Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (feet)	Water level: Height of MP above land surface (ft.)	Water level: Below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
Q-58	Mrs. Elvin Phillips	Du	33.1	30	H	--	Top of tile pipe	630	4.8	29.6	Sept. 6, 1951	S	H	--	
Q-59	F. P. Green	Du	27.9	40	H	--	Top of concrete housing	628	2.5	19.3	do.	S	H	--	
Q-60	George Lehman	Du	30.0	--	--	--	do.	630	2.7	22.1	do.	S	H	--	
Q-61	W. D. Kennamer	Du	18.7	24	T	--	Top of tile casing	630	3.0	14.0	do.	S	D	K	
Q-62	Ida Haynes	Du	27.0	--	H	--	Top of concrete housing	622	2.8	20.2	do.	S	D	C	
Q-63	Robert Grear	Du	26.2	40	H	--	do.	622	3.6	19.6	do.	S	H	--	
Q-64	Kathy Carpenter	Du	31.5	--	H	--	do.	632	3.2	22.2	do.	S	D	K	
Q-65	John C. Strickland	Du	25.1	--	H	--	Top of wooden housing	630	2.0	19.7	do.	S	H	C	
Q-66	F. A. Pylant	Du	27.1	--	H	--	do.	630	4.6	19.8	do.	S	D	K	
Q-67	Annie May Sardin	Du	19.7	--	H	--	Top of concrete housing	617	2.0	12.9	do.	S	H	--	
Q-68	Lee Ridley	Du	11.6	48	H	--	do.	615	.9	3.6	do.	S	H	--	
Q-69	Mrs. J. E. Hanks	Du	16.3	--	H	--	do.	612	2.6	8.2	Sept. 7, 1951	S	D	K	
Q-70	Jennie Cook	Du	17.1	--	H	--	do.	610	3.8	12.2	do.	S	D	K	
Q-71	S. D. Giles	Du	17.2	--	H	--	do.	615	1.9	11.6	Sept. 11, 1951	S	H	--	
Q-72	L. D. Ervin	Du	37.4	--	H	--	Top of wooden housing	620	4.1	27.5	do.	S	D	K	
Q-73	A. C. Collins	Du	43.7	40	H	--	do.	618	2.7	27.0	do.	S	H	--	
Q-74	Alberta Dunn	Du	27.3	--	H	--	Top of concrete housing	620	2.6	20.9	do.	S	H	--	
Q-75	John Blue Co.	Dr	80.0	6	S	40	Land surface	625	0	31.0	do.	Mfp	Ind	C	
Q-76	J. R. Taylor	Du	19.5	36	H	--	Top of wooden housing	610	2.8	9.2	Sept. 27, 1951	S	D	K	
Q-77	Jake Nichols	Du	16.7	36	H	--	Top of concrete housing	608	2.5	8.1	do.	S	H	--	
Q-78	Lemar Bragg	Du	14.0	36	H	--	Top of wooden housing	605	2.7	10.0	do.	S	D	K	
Q-79	General Shoe Corp.	Dr	78	16	S	48	Top of casing	603	.5	7.3	May 5, 1953	Mfp	PS	T	Electric log in files of U.S.G.S. Screen from 48 to 78 feet.
*Q-80	do.	Dr	85	8	S	--	Land surface	602	0	17.4	June 7, 1948	Mfp	H	Cf	

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY, 151

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Altitude of MP (ft.)	Height of MP above land surface (ft.)	Water level below MP (ft.)	Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
Q-81	General Shoe Corp.	Dr	85	8	S	--	Land surface	602	0	--	--	Mfp	Ind	Gf	
Q-82	James Schriesher	Du	23.9	40	W	--	Top of frame housing	630	2.3	17.4	Aug. 17, 1951	S	W	--	
Q-83	E. T. Lee	Du	46.3	48	W	--	Top of concrete housing	643	--	25.3	do.	S	W	--	
Q-84	W. E. Baker	Du	33.4	40	W	--	Top of cement housing	643	2.2	22.6	do.	S	W		
Q-85	A. W. McAnally	Du	29.2	40	W	--	Top of barrel	645	2.5	24.3	Aug. 20, 1951	S	D	W	
Q-86	Huston McAnally	Du	34.8	40	W	--	Top of wooden housing	645	2.2	23.6	do.	S	S	W	
Q-87	G. L. Cable	Du	37.4	40	W	--	Top of concrete housing	646	2.5	33.4	do.	S	W	--	
Q-88	Martin Stove Co.	Dr	350	8	S	--	Top of casing	635	0	--	--	Mfp	Ind	T	
Q-89	do.	Dr	750	8	S	--	--	635	--	--	--	Mfp	N	--	
Q-90	Mrs. J. L. Heaffer	Dr	240	5	S	--	Top of casing	695	1.6	42.2	Nov. 20, 1951	Do	D	W	Oily, sulfurous odor.
Q-91	W. L. Childress	Du	34.1	40	W	--	Top of concrete platform	643	.4	25.2	Aug. 31, 1951	S	W	--	
Q-92	J. W. Edgar	Du	48.2	40	W	--	Top of wooden housing	645	4.4	35.9	Sept. 4, 1951	S	D	W	
Q-93	Hallie McClure	Du	37.3	36	W	--	Top of tile pipe	638	2.8	32.5	Sept. 18, 1951	S	W	--	
Q-94	W. P. Hunt	Du	30.2	40	W	--	Top of concrete housing	637	2.2	--	--	S	W	--	
Q-95	Vernon Gary	Du	35.6	36	W	--	Top of wooden housing	635	2.5	30.4	Sept. 18, 1951	S	D	W	
Q-96	W. F. Pokus	Du	36.5	36	W	--	Top of concrete housing	632	2.3	30.8	do.	S	D	W	
Q-97	Nathan Turner	Du	36.6	36	W	--	do.	630	2.2	28.3	do.	S	D	W	
Q-98	W. E. Sartain	Du	39.4	36	W	--	do.	632	1.9	31.1	do.	S	W	--	
Q-99	B. F. Holland	Du	47.3	--	W	--	Top of concrete base	632	0	36.2	do.	S	D	G	
Q-100	do.	Dr	54.1	5	S	--	Top of casing	632	4.9	36.2	do.	*Mfp	N	--	
Q-101	R. B. Owens	Du	28.3	--	W	--	Land surface	630	--	20.4	do.	S	D	J	
Q-102	R. E. Morehead	Du	35.5	--	W	--	Top of concrete housing	630	2.3	32.4	Sept. 19, 1951	S	D	W	
Q-103	T. H. Nick	Du	22.9	--	W	--	do.	638	2.6	21.6	do.	S	W	--	
Q-104	J. L. Biggs	Du	29.1	--	W	--	Top of wood housing	640	2.9	5	do.	S	D	W	

Types:
chart

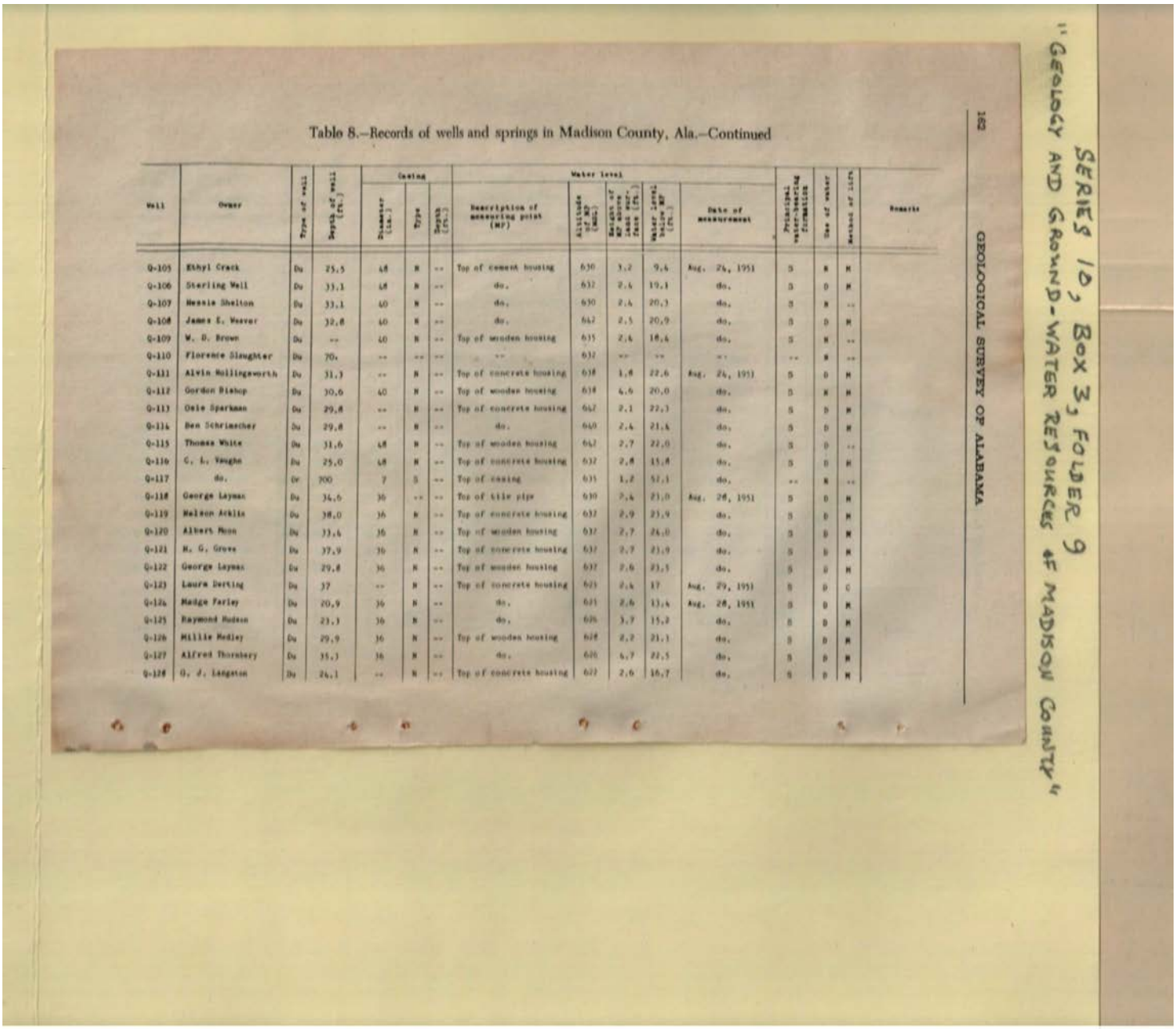


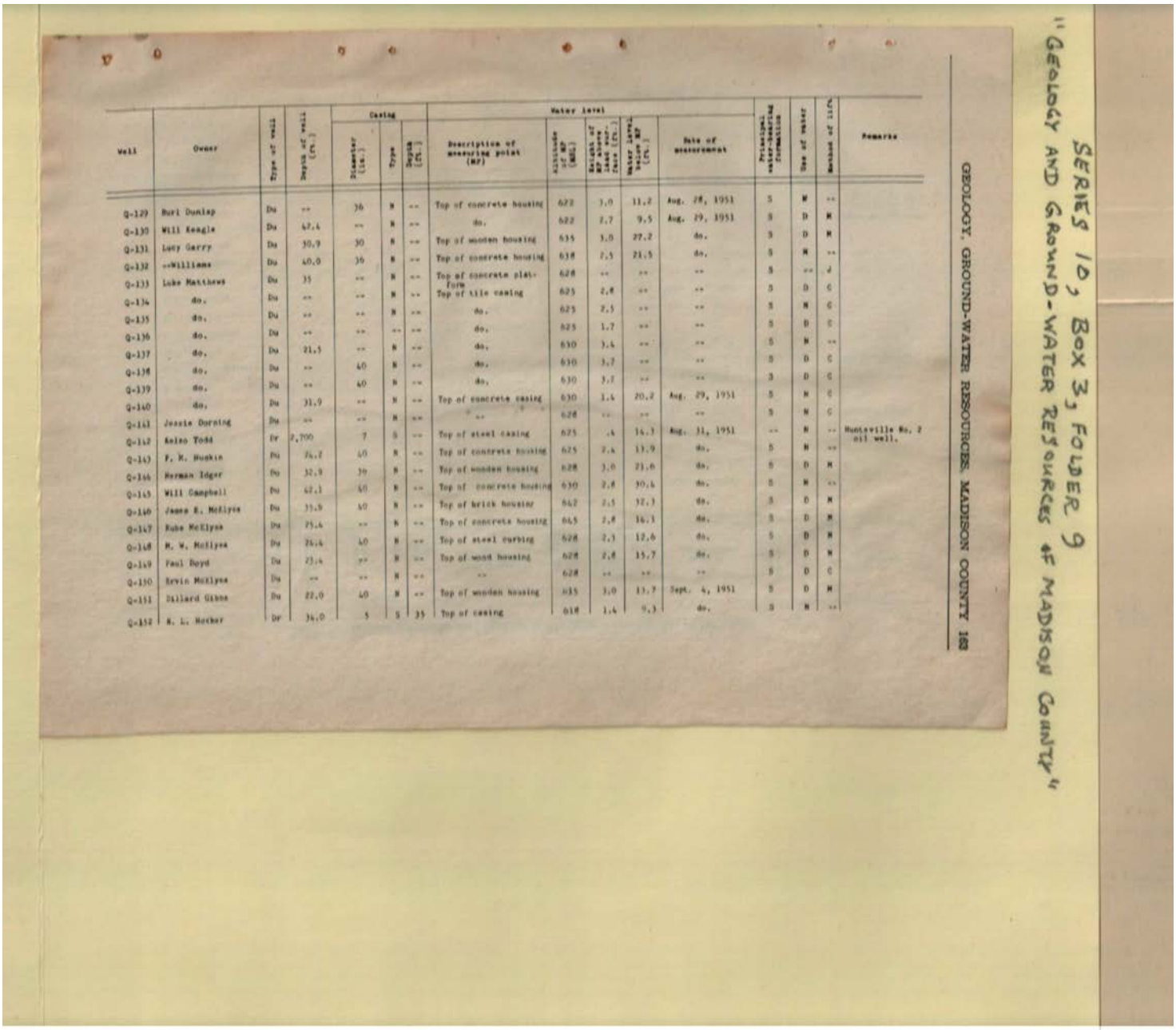
Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (Ft.)	Casing			Water level				Principal water-bearing formation	Use of water	Method of lift	Remarks
				Diameter (In.)	Type	Depth (Ft.)	Description of measuring point (MP)	Altitude of MP (Ft. above MSL)	Height of MP above land surface (Ft.)	Water level below MP (Ft.)	Date of measurement				
Q-105	Ethyl Crack	Du	25.5	48	R	--	Top of cement housing	630	3.2	9.4	Aug. 24, 1951	S	H	H	
Q-106	Sterling Well	Du	33.1	48	R	--	do.	632	2.4	19.1	do.	S	D	H	
Q-107	Hennie Shelton	Du	33.1	40	R	--	do.	630	2.4	20.3	do.	S	H	--	
Q-108	James E. Weaver	Du	32.8	40	R	--	do.	642	2.5	20.9	do.	S	D	H	
Q-109	W. B. Brown	Du	--	40	R	--	Top of wooden housing	635	2.4	18.4	do.	S	H	--	
Q-110	Florence Slaughter	Du	70+	--	--	--	--	632	--	--	--	--	H	--	
Q-111	Alvin Hollingsworth	Du	31.3	--	R	--	Top of concrete housing	638	1.8	22.6	Aug. 24, 1951	S	D	H	
Q-112	Gordon Bishop	Du	30.6	40	R	--	Top of wooden housing	638	4.6	20.0	do.	S	H	H	
Q-113	Dale Sparkman	Du	29.8	--	R	--	Top of concrete housing	642	2.1	22.3	do.	S	D	H	
Q-114	Ben Schriescher	Du	29.8	--	R	--	do.	640	2.4	21.4	do.	S	D	H	
Q-115	Thomas White	Du	31.6	48	R	--	Top of wooden housing	642	2.7	22.0	do.	S	D	--	
Q-116	C. L. Vaughn	Du	25.0	48	R	--	Top of concrete housing	632	2.8	15.8	do.	S	D	H	
Q-117	do.	Dr	700	7	S	--	Top of casing	635	1.2	57.1	do.	--	H	--	
Q-118	George Layman	Du	34.6	36	--	--	Top of tile pipe	630	2.4	21.0	Aug. 28, 1951	S	D	H	
Q-119	Nelson Acklin	Du	38.0	36	R	--	Top of concrete housing	632	2.9	23.9	do.	S	D	H	
Q-120	Albert Moon	Du	33.4	36	R	--	Top of wooden housing	637	2.7	24.0	do.	S	D	H	
Q-121	H. G. Grove	Du	37.9	36	R	--	Top of concrete housing	632	2.7	21.9	do.	S	D	H	
Q-122	George Layman	Du	29.8	36	R	--	Top of wooden housing	637	2.6	23.5	do.	S	D	H	
Q-123	Laura Derting	Du	37	--	R	--	Top of concrete housing	623	2.4	17	Aug. 29, 1951	S	D	C	
Q-124	Madge Farley	Du	20.9	36	R	--	do.	631	2.6	13.4	Aug. 28, 1951	S	D	H	
Q-125	Raymond Hudson	Du	21.3	36	R	--	do.	635	3.7	15.2	do.	S	D	H	
Q-126	Millie Medley	Du	29.9	36	R	--	Top of wooden housing	628	2.2	21.1	do.	S	D	H	
Q-127	Alfred Thornbery	Du	35.3	36	R	--	do.	626	4.7	22.5	do.	S	D	H	
Q-128	O. J. Langston	Du	24.1	--	R	--	Top of concrete housing	622	2.6	16.7	do.	S	D	H	

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 163

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Description of measuring point (MP)	Altitude of MP (ft.)	Height of MP above land surface (ft.)	Water level below MP (ft.)	Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
Q-129	Burl Dunlap	Du	--	36	H	--	Top of concrete housing	622	3.0	11.2	Aug. 28, 1951	S	H	--	
Q-130	Will Keagle	Du	47.4	--	H	--	do.	622	2.7	9.5	Aug. 29, 1951	S	D	H	
Q-131	Lucy Garry	Du	30.9	30	H	--	Top of wooden housing	635	3.0	27.2	do.	S	D	H	
Q-132	--Williams	Du	40.0	36	H	--	Top of concrete housing	638	2.5	21.5	do.	S	H	--	
Q-133	Luke Matthews	Du	35	--	H	--	Top of concrete platform	628	--	--	--	S	--	J	
Q-134	do.	Du	--	--	H	--	Top of tile casing	625	2.8	--	--	S	D	C	
Q-135	do.	Du	--	--	H	--	do.	625	2.5	--	--	S	H	C	
Q-136	do.	Du	--	--	--	--	do.	625	1.7	--	--	S	D	C	
Q-137	do.	Du	21.5	--	H	--	do.	630	3.4	--	--	S	H	--	
Q-138	do.	Du	--	40	H	--	do.	630	3.7	--	--	S	D	C	
Q-139	do.	Du	--	40	H	--	do.	630	3.7	--	--	S	D	C	
Q-140	do.	Du	31.9	--	H	--	Top of concrete casing	630	1.4	20.2	Aug. 29, 1951	S	H	C	
Q-141	Jessie Durning	Du	--	--	H	--	--	628	--	--	--	S	H	C	
Q-142	Kelso Todd	Dr	2,700	7	S	--	Top of steel casing	625	.4	14.3	Aug. 31, 1951	--	H	--	Huntsville No. 2 oil well.
Q-143	F. H. Huskin	Du	74.7	40	H	--	Top of concrete housing	625	2.4	13.9	do.	S	H	--	
Q-144	Herman Edgar	Du	32.9	30	H	--	Top of wooden housing	628	3.0	21.6	do.	S	D	H	
Q-145	Will Campbell	Du	47.1	40	H	--	Top of concrete housing	630	2.8	30.4	do.	S	H	--	
Q-146	James E. McElyea	Du	33.9	40	H	--	Top of brick housing	642	2.5	32.3	do.	S	D	H	
Q-147	Rube McElyea	Du	25.4	--	H	--	Top of concrete housing	645	2.8	16.1	do.	S	D	H	
Q-148	M. W. McElyea	Du	24.4	40	H	--	Top of steel curbing	628	2.3	12.6	do.	S	D	H	
Q-149	Paul Boyd	Du	23.4	30	H	--	Top of wood housing	628	2.8	15.7	do.	S	D	H	
Q-150	Ervin McElyea	Du	--	--	H	--	--	628	--	--	--	S	D	C	
Q-151	Dillard Gibbs	Du	22.0	40	H	--	Top of wooden housing	635	3.0	13.7	Sept. 4, 1951	S	D	H	
Q-152	H. L. Hocker	Dr	34.0	5	S	35	Top of casing	618	1.4	9.3	do.	S	H	--	

Types:
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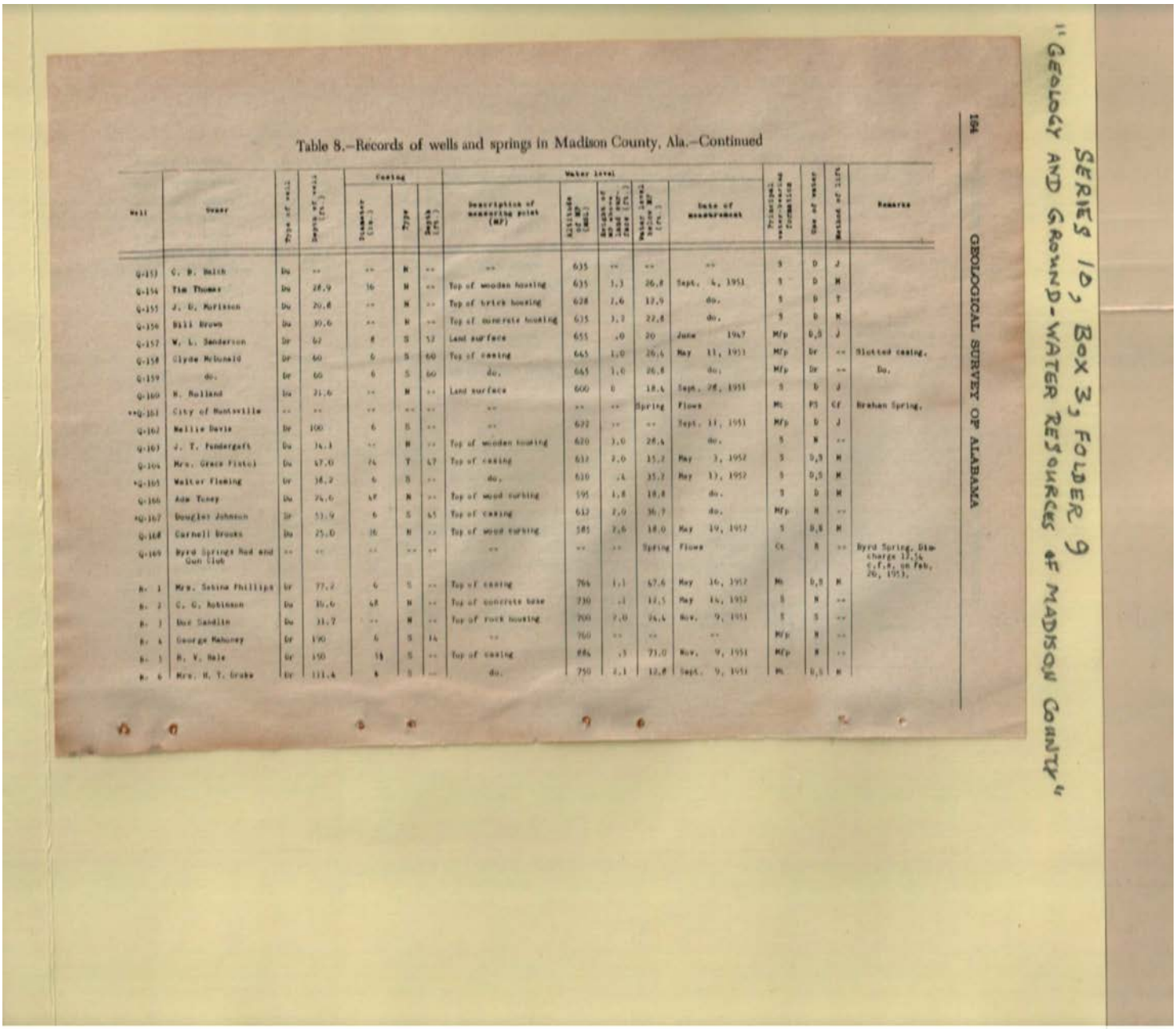

Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft. above msl)	Water level: Height of MP above land surface (ft.)	Water level: Depth to water below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
Q-153	C. B. Walsh	Du	--	--	N	--	--	635	--	--	--	S	D	J	
Q-154	Tim Thomas	Du	28.9	36	N	--	Top of wooden housing	635	1.3	26.8	Sept. 4, 1951	S	D	N	
Q-155	J. B. Harrison	Du	20.8	--	N	--	Top of brick housing	628	2.6	17.9	do.	S	D	T	
Q-156	Bill Brown	Du	30.6	--	N	--	Top of concrete housing	635	3.3	22.8	do.	S	D	N	
Q-157	W. L. Sanderson	Dr	67	8	S	52	Land surface	651	.0	20	June 1947	Mfp	D,S	J	
Q-158	Clyde McDonald	Dr	60	6	S	60	Top of casing	665	1.0	26.4	May 11, 1951	Mfp	Ir	--	Slotted casing.
Q-159	do.	Dr	60	6	S	60	do.	665	1.0	26.8	do.	Mfp	Ir	--	Do.
Q-160	N. Holland	Du	21.6	--	N	--	Land surface	600	0	18.4	Sept. 28, 1951	S	D	J	
**Q-161	City of Huntsville	--	--	--	--	--	--	--	--	Spring	Flows	Mt	PS	Cf	Brahan Spring.
Q-162	Nellie Davis	Dr	100	6	S	--	--	622	--	--	Sept. 11, 1951	Mfp	D	J	
Q-163	J. T. Pendergraft	Du	34.1	--	N	--	Top of wooden housing	620	3.0	28.4	do.	S	N	--	
Q-164	Mrs. Grace Fiske	Du	47.0	24	T	47	Top of casing	632	2.0	35.2	May 3, 1952	S	D,S	N	
*Q-165	Walter Fleming	Dr	38.2	6	S	--	do.	630	.4	35.2	May 13, 1952	S	D,S	N	
Q-166	Ada Toney	Du	24.6	48	N	--	Top of wood curbing	595	1.8	18.8	do.	S	D	N	
*Q-167	Douglas Johnson	Dr	53.9	6	S	45	Top of casing	612	2.0	36.7	do.	Mfp	N	--	
Q-168	Carnell Brooks	Du	25.0	36	N	--	Top of wood curbing	585	2.6	18.0	May 19, 1952	S	D,S	N	
Q-169	Byrd Springs Rod and Gun Club	--	--	--	--	--	--	--	--	Spring	Flows	Cc	R	--	Byrd Spring. Discharge 12.34 c.f.s. on Feb. 26, 1953.
A- 1	Mrs. Selma Phillips	Dr	77.2	6	S	--	Top of casing	764	1.1	47.6	May 16, 1952	Mt	D,S	N	
A- 2	C. C. Robinson	Du	35.6	48	N	--	Top of concrete base	730	.1	17.5	May 16, 1952	S	N	--	
A- 3	Doc Sandlin	Du	31.7	--	N	--	Top of rock housing	700	2.0	24.4	Nov. 9, 1951	S	S	--	
A- 4	George Mahoney	Dr	190	6	S	14	--	760	--	--	--	Mfp	N	--	
A- 5	R. V. Hale	Dr	150	5	S	--	Top of casing	884	.3	71.0	Nov. 9, 1951	Mfp	N	--	
A- 6	Mrs. H. T. Drake	Dr	111.4	6	S	--	do.	750	2.1	12.8	Sept. 9, 1951	Mt	D,S	N	

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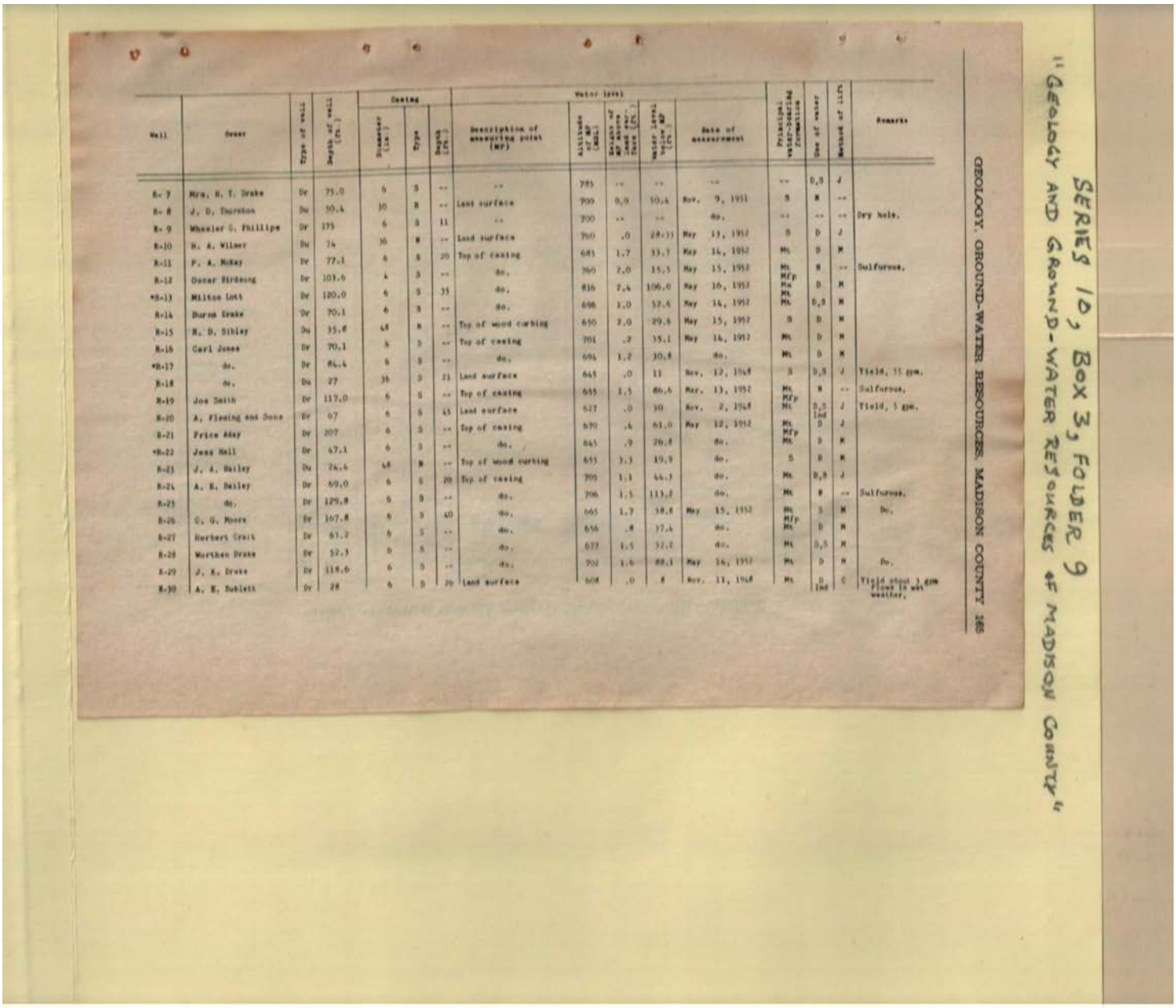
SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 185

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft. msl.)	Water level: Height of MP above land surface (ft.)	Water level: Depth to water below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
B-7	Mrs. B. T. Drake	Dr	75.0	6	S	--	--	785	--	--	--	--	D,S	J	
B-8	J. O. Thurston	Du	30.4	30	B	--	Land surface	700	0.0	30.4	Nov. 9, 1951	S	H	--	
B-9	Wheeler G. Phillips	Dr	175	6	S	11	--	700	--	--	do.	--	--	--	Dry hole.
B-10	H. A. Wilmer	Du	14	30	H	--	Land surface	760	.0	28.3)	May 13, 1952	S	D	J	
B-11	F. A. McKay	Dr	77.1	6	S	20	Top of casing	685	1.7	33.7	May 14, 1952	Mt	D	H	
B-12	Oscar Birdsong	Dr	103.6	4	S	--	do.	760	2.0	15.5	May 15, 1952	Mt Mfp Mt	H	--	Sulfurous.
*B-13	Milton Lott	Dr	120.0	6	S	35	do.	816	2.4	106.0	May 16, 1952	Mt	D	H	
B-14	Burns Drake	Dr	70.1	6	S	--	do.	698	1.0	52.6	May 14, 1952	Mt	D,S	H	
B-15	H. D. Sibley	Du	35.6	48	H	--	Top of wood curbing	650	2.0	29.6	May 15, 1952	S	D	H	
B-16	Carl Jones	Dr	70.1	6	S	--	Top of casing	701	.2	55.1	May 14, 1952	Mt	D	H	
*B-17	do.	Dr	84.4	6	S	--	do.	694	1.2	30.8	do.	Mt	D	H	
B-18	do.	Du	27	36	S	21	Land surface	645	.0	11	Nov. 12, 1948	S	D,S	J	Yield, 35 gpm.
B-19	Joe Smith	Dr	117.0	6	S	--	Top of casing	655	1.5	86.6	Mar. 13, 1952	Mt Mfp Mt	H	--	Sulfurous.
B-20	A. Fleming and Sons	Dr	67	6	S	45	Land surface	627	.0	30	Nov. 2, 1948	Mt	D,S Ind	J	Yield, 5 gpm.
B-21	Price Alley	Dr	207	6	S	--	Top of casing	670	.4	61.0	May 12, 1952	Mt Mfp Mt	D	J	
*B-22	Jess Hall	Dr	47.1	6	S	--	do.	645	.9	26.8	do.		D	H	
B-23	J. A. Bailey	Du	24.4	48	H	--	Top of wood curbing	655	3.3	19.9	do.	S	D	H	
B-24	A. E. Bailey	Dr	69.0	6	S	20	Top of casing	709	1.1	44.3	do.	Mt	D,S	J	
B-25	do.	Dr	129.8	6	S	--	do.	706	1.5	113.2	do.	Mt	H	--	Sulfurous.
B-26	C. G. Moore	Dr	107.8	6	S	40	do.	665	1.7	38.8	May 15, 1952	Mt Mfp Mt	S	H	Do.
B-27	Herbert Grait	Dr	61.2	6	S	--	do.	656	.8	37.4	do.		D	H	
B-28	Worthen Drake	Dr	52.3	6	S	--	do.	677	1.5	32.2	do.	Mt	D,S	H	
B-29	J. K. Drake	Dr	118.6	6	S	--	do.	702	1.6	88.1	May 16, 1952	Mt	D	H	Do.
B-30	A. E. Dublett	Dr	28	6	S	20	Land surface	608	.0	8	Nov. 11, 1948	Mt	D Ind	C	Yield about 3 gpm flows in wet weather.

Types:
chart

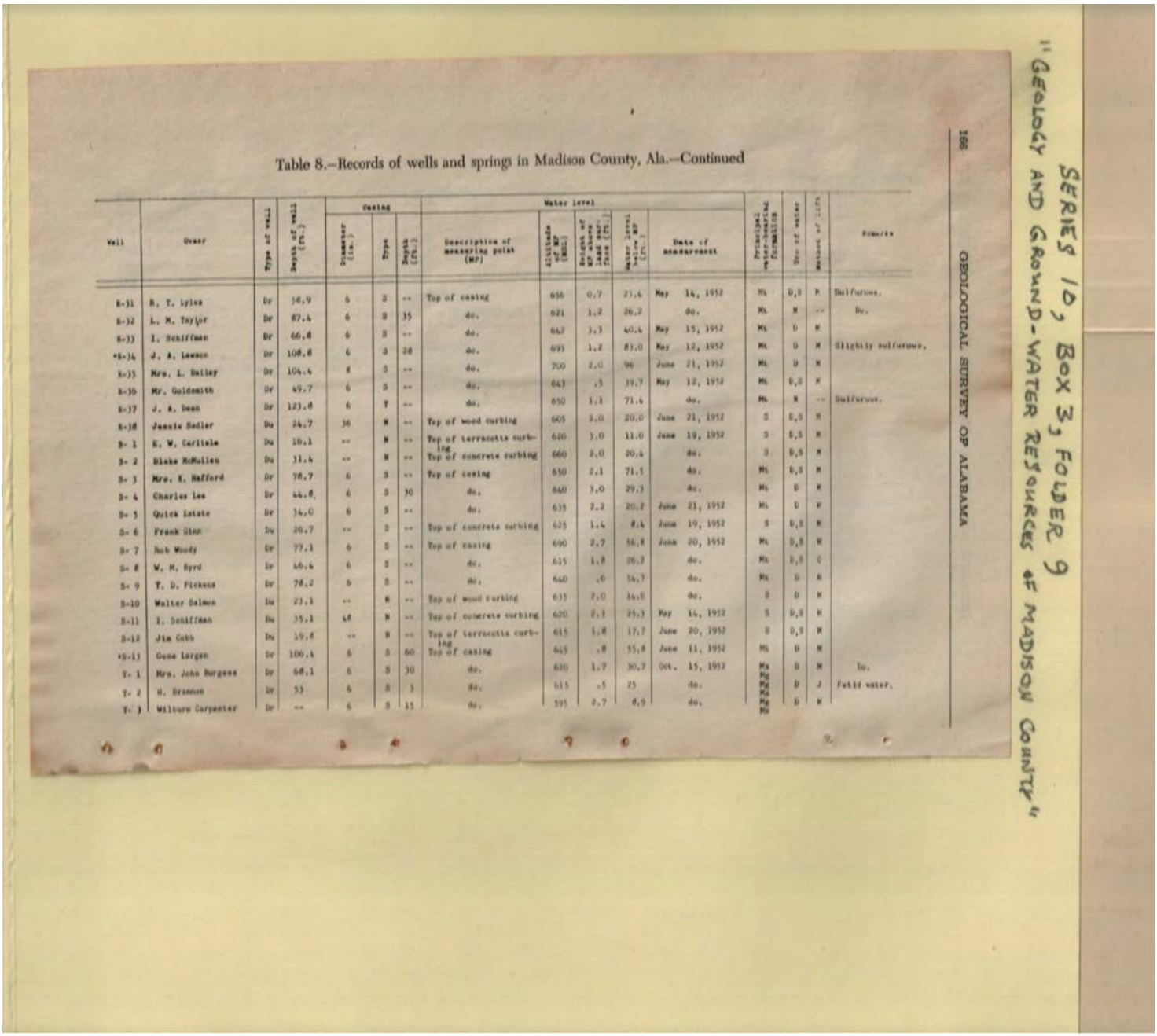


Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
S-31	R. T. Lyles	Dr	58.9	6	S	--	Top of casing	656	0.7	21.4	May 14, 1952	Mt	D,S	N	Sulfurous.
S-32	L. M. Taylor	Dr	87.4	6	S	35	do.	621	1.2	26.2	do.	Mt	N	--	Do.
S-33	I. Schiffman	Dr	66.8	6	S	--	do.	647	1.3	40.4	May 15, 1952	Mt	D	N	
*S-34	J. A. Lawson	Dr	108.8	6	S	28	do.	695	1.2	83.0	May 12, 1952	Mt	D	N	Slightly sulfurous.
S-35	Mrs. L. Bailey	Dr	104.4	8	S	--	do.	700	2.0	96	June 21, 1952	Mt	D	N	
S-36	Mr. Goldsmith	Dr	49.7	6	S	--	do.	643	.5	39.7	May 12, 1952	Mt	D,S	N	
S-37	J. A. Dean	Dr	123.8	6	T	--	do.	650	1.1	71.4	do.	Mt	N	--	Sulfurous.
S-38	Jessie Sadler	Du	24.7	36	N	--	Top of wood curbing	605	3.0	20.0	June 21, 1952	S	D,S	N	
S- 1	E. W. Carlisle	Du	10.1	--	N	--	Top of terracotta curbing	620	3.0	11.0	June 19, 1952	S	D,S	N	
S- 2	Blake McMullen	Du	31.4	--	N	--	Top of concrete curbing	660	2.0	20.4	do.	S	D,S	N	
S- 3	Mrs. E. Safford	Dr	78.7	6	S	--	Top of casing	650	2.1	71.5	do.	Mt	D,S	N	
S- 4	Charles Lee	Dr	44.8	6	S	30	do.	640	3.0	29.3	do.	Mt	D	N	
S- 5	Quick Estate	Dr	34.0	6	S	--	do.	635	2.2	20.2	June 21, 1952	Mt	D	N	
S- 6	Frank Dion	Du	26.7	--	S	--	Top of concrete curbing	625	1.4	8.4	June 19, 1952	S	D,S	N	
S- 7	Bob Woody	Dr	77.1	6	S	--	Top of casing	690	2.7	56.8	June 20, 1952	Mt	D,S	N	
S- 8	W. M. Byrd	Dr	46.4	6	S	--	do.	615	1.8	28.3	do.	Mt	D,S	C	
S- 9	T. D. Pickens	Dr	78.2	6	S	--	do.	640	.6	34.7	do.	Mt	D	N	
S-10	Walter Salmon	Du	23.1	--	N	--	Top of wood curbing	635	2.0	14.6	do.	S	D	N	
S-11	I. Schiffman	Du	35.1	48	N	--	Top of concrete curbing	620	2.3	25.3	May 14, 1952	S	D,S	N	
S-12	Jim Cobb	Du	19.8	--	N	--	Top of terracotta curbing	615	1.8	17.7	June 20, 1952	S	D,S	N	
*S-13	Gene Largen	Dr	106.4	6	S	60	Top of casing	665	.8	55.8	June 11, 1952	Mt	D	N	
T- 1	Mrs. John Burgess	Dr	68.1	6	S	30	do.	630	1.7	30.7	Oct. 15, 1952	Ma	D	N	Do.
T- 2	H. Brannon	Dr	53	6	S	3	do.	615	.5	25	do.	[illegible]	D	J	Fetid water.
T- 3	Wilburn Carpenter	Dr	--	6	S	15	do.	595	2.7	8.9	do.	[illegible]	D	N	

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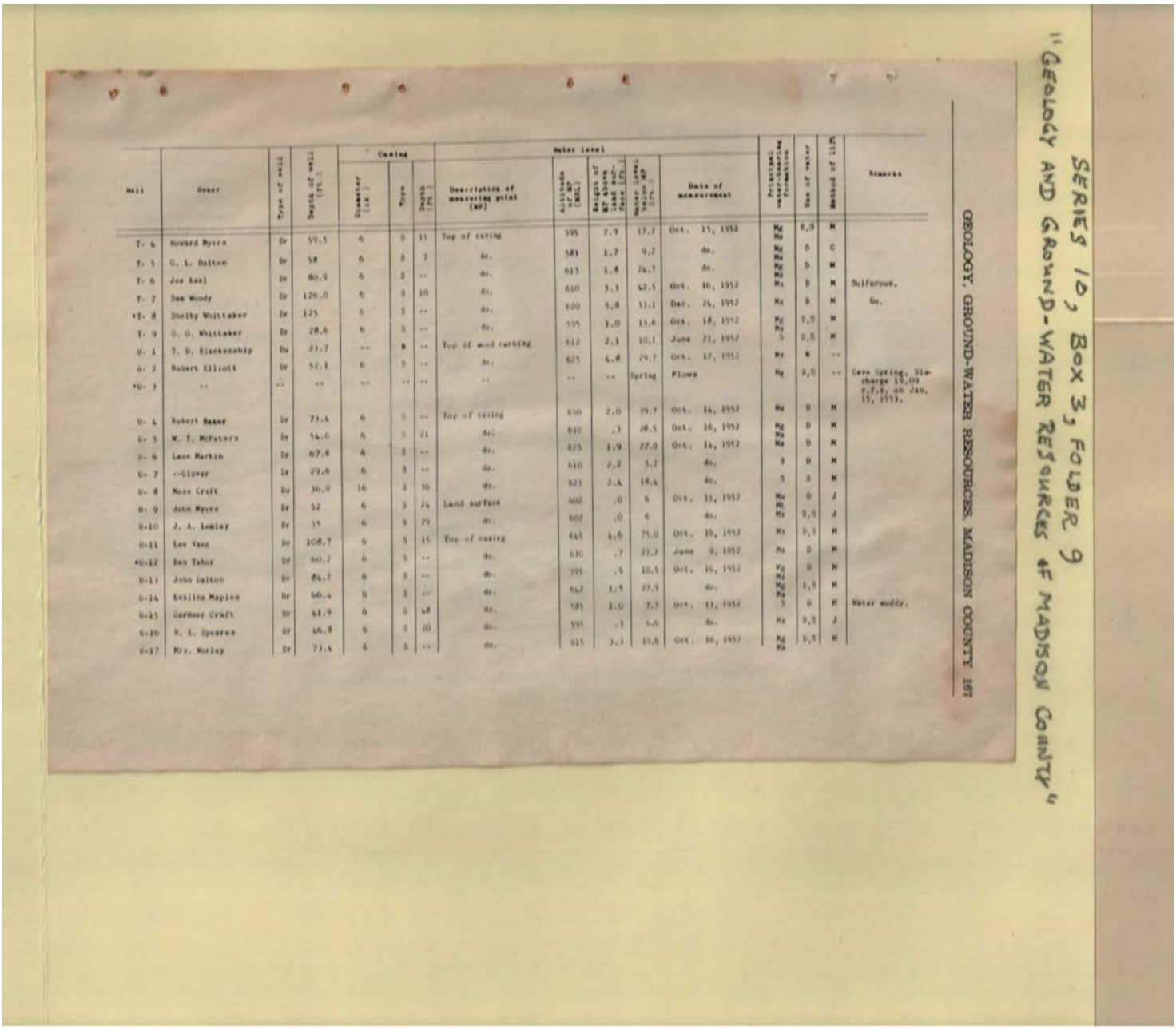
SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:

Wells and Springs
Records

Types:

chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 167

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Depth to water (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
T- 4	Howard Myers	Dr	59.5	6	S	15	Top of casing	595	2.9	17.2	Oct. 15, 1952	Mz	D,S	N	
T- 5	G. L. Dalton	Dr	58	6	S	7	do.	581	1.2	9.2	do.	Mz	D	C	
T- 6	Joe Keel	Dr	80.9	6	S	--	do.	615	1.8	24.7	do.	Mz	D	N	
T- 7	Sam Woody	Dr	126.0	6	S	10	do.	610	3.3	42.5	Oct. 16, 1952	Ks	D	N	Sulfurous.
*T- 8	Shelby Whittaker	Dr	125	6	S	--	do.	620	5.8	33.1	Dec. 24, 1952	Ks	D	N	Do.
T- 9	O. O. Whittaker	Dr	28.6	6	S	--	do.	595	1.0	13.6	Oct. 18, 1952	Mz	D,S	N	
U- 1	T. D. Blankenship	Du	23.7	--	B	--	Top of wood curbing	612	2.1	10.1	June 21, 1952	S	D,S	N	
U- 2	Robert Elliott	Dr	52.1	6	S	--	do.	625	4.8	29.7	Oct. 17, 1952	Ks	N	--	
*U- 3	--	--	--	--	--	--	--	--	--	Spring	Flows	Mz	D,S	--	Cave Spring. Discharge 19.09 c.f.s. on Jan. 15, 1953.
U- 4	Robert Baker	Dr	73.4	6	S	--	Top of casing	610	2.0	39.7	Oct. 14, 1952	Ks	D	N	
U- 5	W. T. McFatters	Dr	54.0	6	S	21	do.	630	.3	28.5	Oct. 16, 1952	Mz	D	N	
U- 6	Leon Martin	Dr	67.8	6	S	--	do.	625	1.9	22.0	Oct. 14, 1952	Ks	D	N	
U- 7	--Glover	Dr	29.6	6	S	--	do.	610	2.2	5.3	do.	S	D	N	
U- 8	Moss Craft	Du	36.0	36	S	36	do.	623	2.4	18.4	do.	S	S	N	
U- 9	John Myers	Dr	32	6	S	24	Land surface	602	.0	6	Oct. 11, 1952	Mz	D	J	
U-10	J. A. Lemley	Dr	35	6	S	29	do.	602	.0	6	do.	Mz	D,S	J	
U-11	Lee Vann	Dr	108.7	6	S	15	Top of casing	645	4.6	71.0	Oct. 16, 1952	Ks	D,S	N	
*U-12	Ben Tabor	Dr	60.2	6	S	--	do.	630	.7	23.2	June 9, 1952	Ks	D	N	
U-13	John Dalton	Dr	84.2	6	S	--	do.	595	.5	10.5	Oct. 16, 1952	Mz	D	N	
U-14	Evaline Maples	Dr	66.4	6	S	--	do.	642	1.5	27.9	do.	Mz	D,S	N	
U-15	Gardner Craft	Dr	41.9	6	S	48	do.	581	1.0	7.3	Oct. 11, 1952	S	D	N	Water muddy.
U-16	R. E. Spearce	Dr	46.8	6	S	20	do.	595	.1	6.6	do.	Ks	D,S	J	
U-17	Mrs. Worley	Dr	73.4	6	S	--	do.	615	3.1	19.8	Oct. 16, 1952	Mz	D,S	N	

Types:
chart

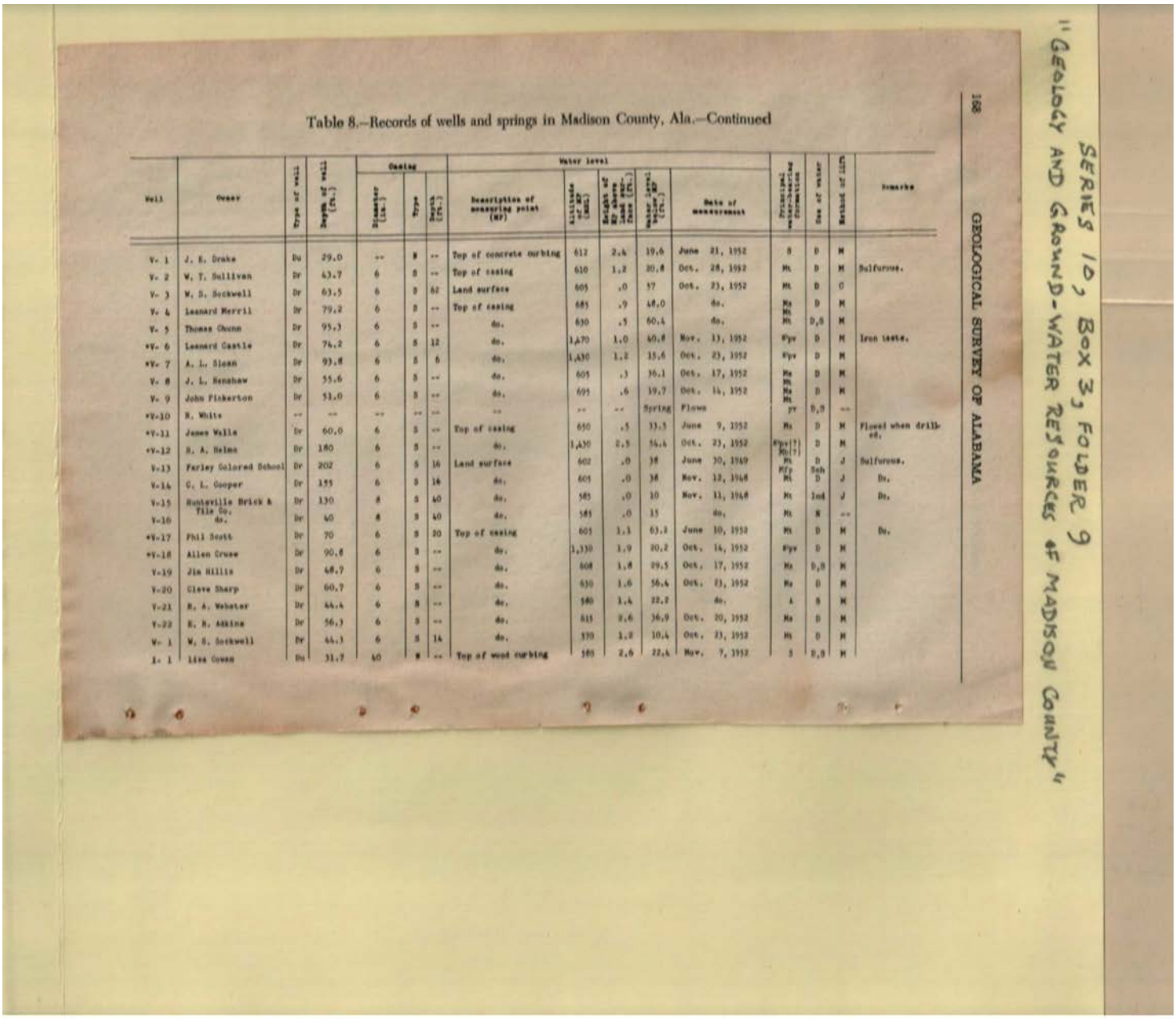


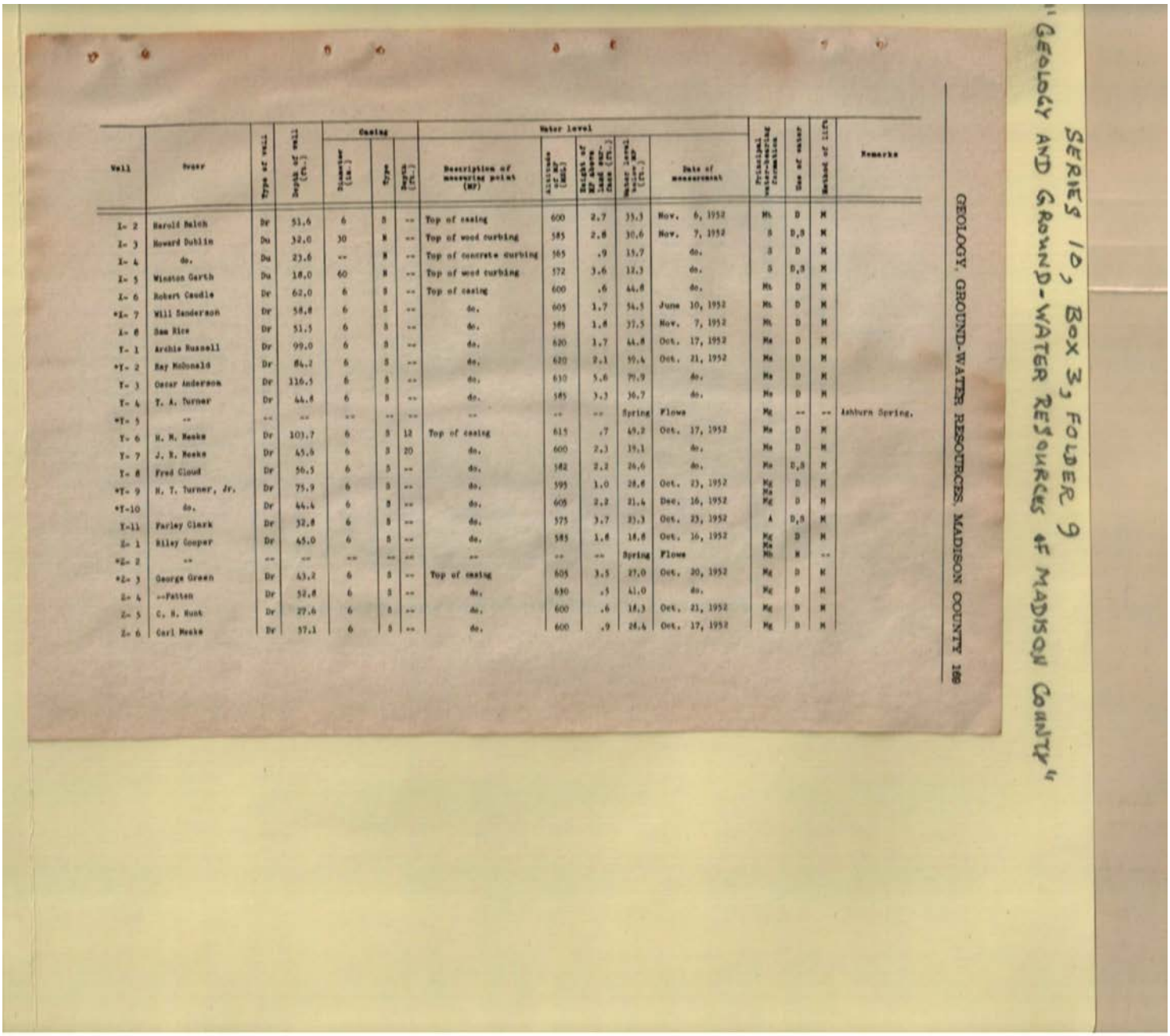
Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (ft.)	Water level: Height of MP above land surface (ft.)	Water level: Depth to water (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Method of lift	Remarks
V- 1	J. E. Drake	Du	29.0	--	B	--	Top of concrete curbing	612	2.4	19.6	June 21, 1952	S	D	H	
V- 2	W. T. Sullivan	Dr	43.7	6	S	--	Top of casing	610	1.2	20.8	Oct. 28, 1952	Mt	D	H	Sulfurous.
V- 3	W. S. Sockwell	Dr	63.5	6	S	62	Land surface	605	.0	57	Oct. 23, 1952	Mt	D	C	
V- 4	Leonard Merril	Dr	79.2	6	S	--	Top of casing	685	.9	48.0	do.	Mt	D	H	
V- 5	Thomas Chunn	Dr	95.3	6	S	--	do.	630	.5	60.4	do.	Mt	D,S	H	
*V- 6	Leonard Castle	Dr	76.2	6	S	12	do.	1,470	1.0	40.8	Nov. 13, 1952	Ppv	D	H	Iron taste.
*V- 7	A. L. Sloan	Dr	93.8	6	S	6	do.	1,430	1.2	15.6	Oct. 23, 1952	Ppv	D	H	
V- 8	J. L. Henshaw	Dr	55.6	6	S	--	do.	605	.3	36.1	Oct. 17, 1952	Mt	D	H	
V- 9	John Pinkerton	Dr	51.0	6	S	--	do.	695	.6	19.7	Oct. 14, 1952	Mt	D	H	
*V-10	R. White	--	--	--	--	--	--	--	--	Spring	Flows	pv	D,S	--	
*V-11	James Wells	Dr	60.0	6	S	--	Top of casing	650	.5	33.5	June 9, 1952	Mt	D	H	Flowed when drilled.
*V-12	R. A. Helms	Dr	180	6	S	--	do.	1,430	2.5	54.4	Oct. 23, 1952	Ppv(?) Mt(?)	D	H	
V-13	Farley Colored School	Dr	202	6	S	16	Land surface	602	.0	38	June 30, 1949	Mt Pfr	D	J	Sulfurous.
V-14	C. L. Cooper	Dr	155	6	S	14	do.	605	.0	38	Nov. 12, 1948	Mt	D	J	Do.
V-15	Huntsville Brick & Tile Co.	Dr	130	8	S	40	do.	585	.0	10	Nov. 11, 1948	Mt	Ind	J	Do.
V-16	do.	Dr	40	8	S	40	do.	585	.0	15	do.	Mt	N	--	
*V-17	Phil Scott	Dr	70	6	S	20	Top of casing	605	1.1	63.1	June 10, 1952	Mt	D	H	Do.
*V-18	Allen Cruse	Dr	90.8	6	S	--	do.	1,330	1.9	20.2	Oct. 14, 1952	Ppv	D	H	
V-19	Jim Hillis	Dr	48.7	6	S	--	do.	608	1.8	29.5	Oct. 17, 1952	Mt	D,S	H	
V-20	Cleve Sharp	Dr	60.7	6	S	--	do.	630	1.6	56.4	Oct. 23, 1952	Mt	D	H	
V-21	R. A. Webster	Dr	44.4	6	S	--	do.	580	1.4	22.2	do.	A	S	H	
V-22	E. R. Atkins	Dr	56.3	6	S	--	do.	615	2.6	36.9	Oct. 20, 1952	Mt	D	H	
W- 1	W. S. Sockwell	Dr	44.3	6	S	14	do.	570	1.2	10.4	Oct. 23, 1952	Mt	D	H	
I- 1	Lisa Cowan	Du	31.7	40	B	--	Top of wood curbing	580	2.6	22.4	Nov. 7, 1952	S	D,S	H	

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Wells and Springs
Records

Types:
chart

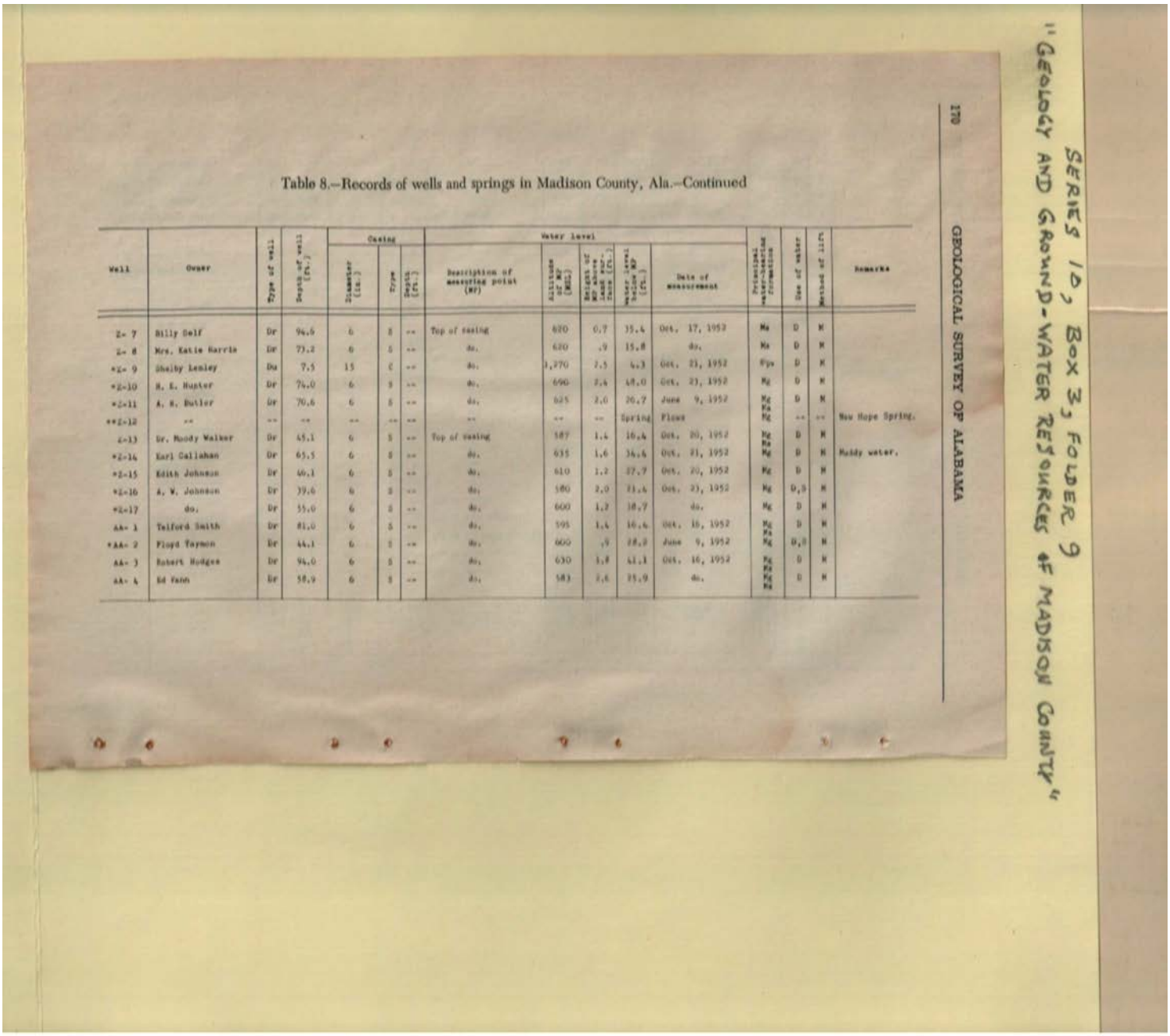


SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 169

Well	Owner	Type of well	Depth of well (ft.)	Casing: Diameter (in.)	Casing: Type	Casing: Depth (ft.)	Water level: Description of measuring point (MP)	Water level: Altitude of MP (msl.)	Water level: Height of MP above land surface (ft.)	Water level: Water level below MP (ft.)	Water level: Date of measurement	Principal water-bearing formation	Use of water	Record of well	Remarks
I- 2	Harold Balch	Dr	51.6	6	S	--	Top of casing	600	2.7	33.3	Nov. 6, 1952	Mt.	D	X	
I- 3	Howard Dublin	Du	32.0	30	B	--	Top of wood curbing	585	2.8	30.6	Nov. 7, 1952	S	D,S	X	
I- 4	do.	Du	23.6	--	B	--	Top of concrete curbing	585	.9	19.7	do.	S	D	X	
I- 5	Winston Garth	Du	18.0	60	B	--	Top of wood curbing	572	3.6	12.3	do.	S	D,S	X	
I- 6	Robert Caudle	Dr	62.0	6	S	--	Top of casing	600	.6	44.8	do.	Mt	D	X	
*I- 7	Will Sanderson	Dr	58.8	6	S	--	do.	605	1.7	54.5	June 10, 1952	Mt	D	X	
I- 8	Sam Rice	Dr	51.5	6	S	--	do.	585	1.8	37.5	Nov. 7, 1952	Mt	D	X	
Y- 1	Archie Russell	Dr	99.0	6	S	--	do.	620	1.7	44.8	Oct. 17, 1952	Ma	D	X	
*Y- 2	Ray McDonald	Dr	84.2	6	S	--	do.	620	2.1	59.4	Oct. 21, 1952	Ma	D	X	
Y- 3	Oscar Anderson	Dr	116.5	6	S	--	do.	610	5.6	79.9	do.	Ma	D	X	
Y- 4	T. A. Turner	Dr	44.8	6	S	--	do.	585	3.3	36.7	do.	Ma	D	X	
*Y- 5	--	--	--	--	--	--	--	--	--	Spring	Flows	Mg	--	--	Ashburn Spring.
Y- 6	H. M. Meeks	Dr	103.7	6	S	12	Top of casing	615	.7	49.2	Oct. 17, 1952	Ma	D	X	
Y- 7	J. R. Meeks	Dr	45.6	6	S	20	do.	600	2.3	19.1	do.	Ma	D	X	
Y- 8	Fred Cloud	Dr	56.5	6	S	--	do.	582	2.2	26.6	do.	Ma	D,S	X	
*Y- 9	H. T. Turner, Jr.	Dr	75.9	6	S	--	do.	595	1.0	28.8	Oct. 23, 1952	Mg	D	X	
*Y-10	do.	Dr	44.4	6	S	--	do.	605	2.2	21.4	Dec. 16, 1952	Mg	D	X	
Y-11	Farley Clark	Dr	32.8	6	S	--	do.	575	3.7	23.3	Oct. 23, 1952	A	D,S	X	
Z- 1	Riley Cooper	Dr	45.0	6	S	--	do.	585	1.8	18.8	Oct. 16, 1952	Mg	D	X	
*Z- 2	--	--	--	--	--	--	--	--	--	Spring	Flows	Mg	X	--	
*Z- 3	George Green	Dr	43.2	6	S	--	Top of casing	605	3.5	27.0	Oct. 20, 1952	Mg	D	X	
Z- 4	--Patten	Dr	52.8	6	S	--	do.	630	.5	41.0	do.	Mg	D	X	
Z- 5	C. H. Hunt	Dr	27.6	6	S	--	do.	600	.6	18.3	Oct. 21, 1952	Mg	D	X	
Z- 6	Carl Meeks	Dr	57.1	6	S	--	do.	600	.9	28.4	Oct. 17, 1952	Mg	D	X	

Types:
chart



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Table 8.—Records of wells and springs in Madison County, Ala.—Continued

Well	Owner	Type of well	Depth of well (ft.)	Casing			Water level					Use of water	Use of water	Remarks
				Diameter (in.)	Type	Depth (ft.)	Description of measuring point (MP)	Altitude of MP (MSL)	Height of MP above land surface (ft.)	Water level below MP (ft.)	Date of measurement	Principal water-bearing formation			
Z- 7	Billy Self	Dr	94.6	6	S	--	Top of casing	620	0.7	35.4	Oct. 17, 1952	Ma	D	H	
Z- 8	Mrs. Katie Harris	Dr	73.2	6	S	--	do.	620	.9	15.8	do.	Ma	D	H	
*Z- 9	Shelby Lemley	Du	7.5	15	C	--	do.	1,270	2.5	4.3	Oct. 21, 1952	Pys	D	H	
*Z-10	H. E. Hunter	Dr	74.0	6	S	--	do.	690	2.4	48.0	Oct. 23, 1952	Mg	D	H	
*Z-11	A. H. Butler	Dr	70.6	6	S	--	do.	625	2.0	26.7	June 9, 1952	Mg	D	H	
**Z-12	--	--	--	--	--	--	--	--	--	Spring	Flows	Mg	--	--	New Hope Spring.
Z-13	Dr. Moody Walker	Dr	45.1	6	S	--	Top of casing	587	1.4	16.4	Oct. 20, 1952	Mg	D	H	
*Z-14	Earl Callahan	Dr	65.5	6	S	--	do.	635	1.6	34.4	Oct. 21, 1952	Mg	D	H	Muddy water.
*Z-15	Edith Johnson	Dr	40.1	6	S	--	do.	610	1.2	27.7	Oct. 20, 1952	Mg	D	H	
*Z-16	A. W. Johnson	Dr	39.6	6	S	--	do.	580	2.0	21.4	Oct. 21, 1952	Mg	D,S	H	
*Z-17	do.	Dr	55.0	6	S	--	do.	600	1.2	38.7	do.	Mg	D	H	
AA- 1	Telford Smith	Dr	81.0	6	S	--	do.	595	1.4	16.4	Oct. 16, 1952	Mg	D	H	
*AA- 2	Floyd Taymon	Dr	44.1	6	S	--	do.	600	.9	28.2	June 9, 1952	Mg	D,S	H	
AA- 3	Robert Hodges	Dr	94.0	6	S	--	do.	630	1.8	41.1	Oct. 16, 1952	Mg	D	H	
AA- 4	Ed Fann	Dr	58.9	6	S	--	do.	583	2.6	35.9	do.	Mg	D	H	

Names:
Wells and Springs
Records

Types:
chart

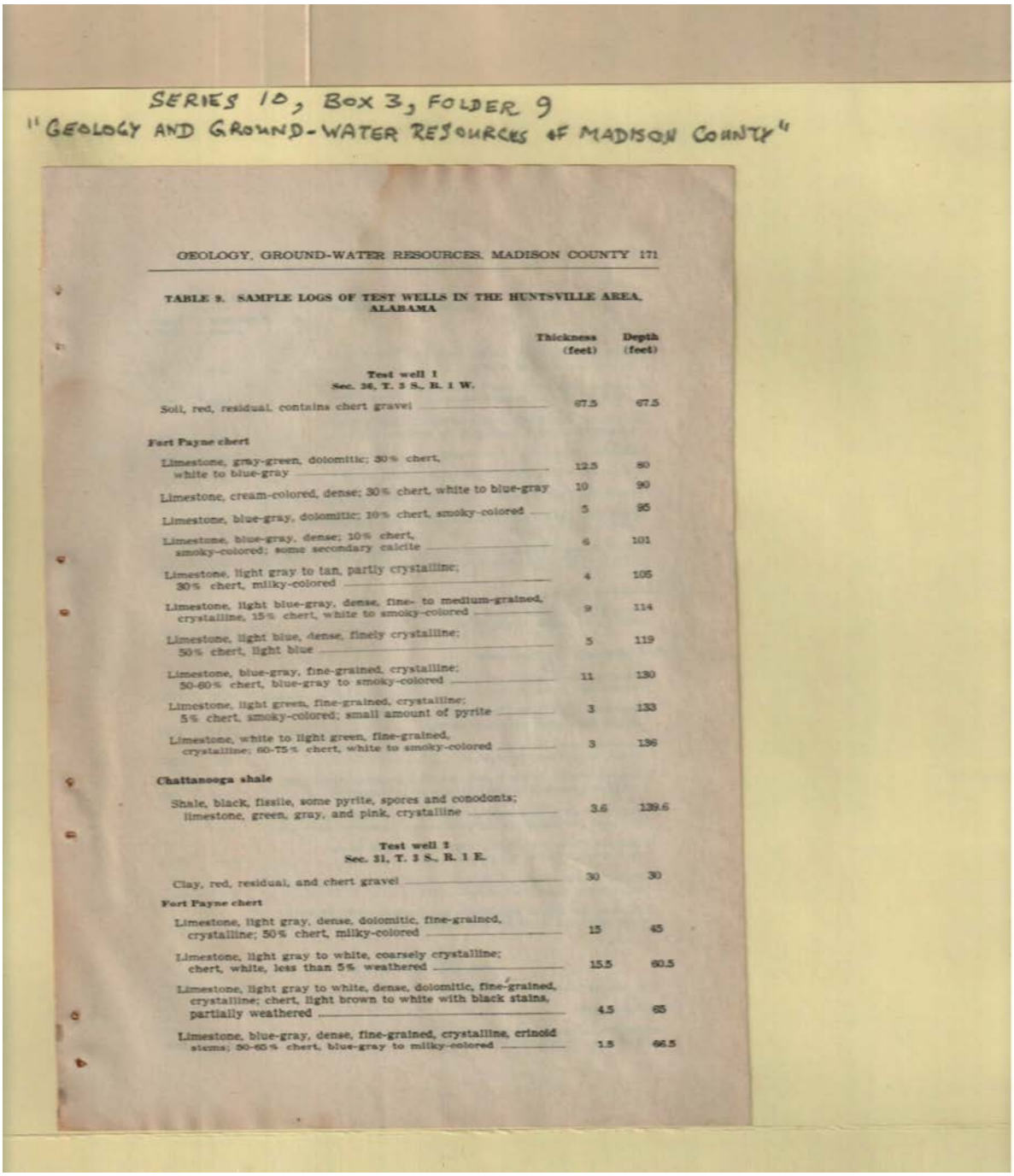


TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA

	Thickness (feet)	Depth (feet)
Test well 1 Sec. 36, T. 3 S., R. 1 W.		
Soil, red, residual, contains chert gravel	67.5	67.5
Fort Payne chert		
Limestone, gray-green, dolomitic; 30% chert, white to blue-gray	12.5	80
Limestone, cream-colored, dense; 30% chert, white to blue-gray	10	90
Limestone, blue-gray, dolomitic; 10% chert, smoky-colored	5	95
Limestone, blue-gray, dense; 10% chert, smoky-colored; some secondary calcite	6	101
Limestone, light gray to tan, partly crystalline; 30% chert, milky-colored	4	105
Limestone, light blue-gray, dense, fine- to medium-grained, crystalline, 15% chert, white to smoky-colored	9	114
Limestone, light blue, dense, finely crystalline; 50% chert, light blue	5	119
Limestone, blue-gray, fine-grained, crystalline; 50-60% chert, blue-gray to smoky-colored	11	130
Limestone, light green, fine-grained, crystalline; 5% chert, smoky-colored; small amount of pyrite	3	133
Limestone, white to light green, fine-grained, crystalline; 60-75% chert, white to smoky-colored	3	136
Chattanooga shale		
Shale, black, fissile, some pyrite, spores and conodonts; limestone, green, gray, and pink, crystalline	3.6	139.6
Test well 2 Sec. 31, T. 3 S., R. 1 E.		
Clay, red, residual, and chert gravel	30	30
Fort Payne chert		
Limestone, light gray, dense, dolomitic, fine-grained, crystalline; 50% chert, milky-colored	15	45
Limestone, light gray to white, coarsely crystalline; chert, white, less than 5% weathered	15.5	60.5
Limestone, light gray to white, dense, dolomitic, fine-grained, crystalline; chert, light brown to white with black stains, partially weathered	4.5	65
Limestone, blue-gray, dense, fine-grained, crystalline, crinoid stems; 50-65% chert, blue-gray to milky-colored	1.5	66.5

Names:
Test Well Logs

Types:
booklet

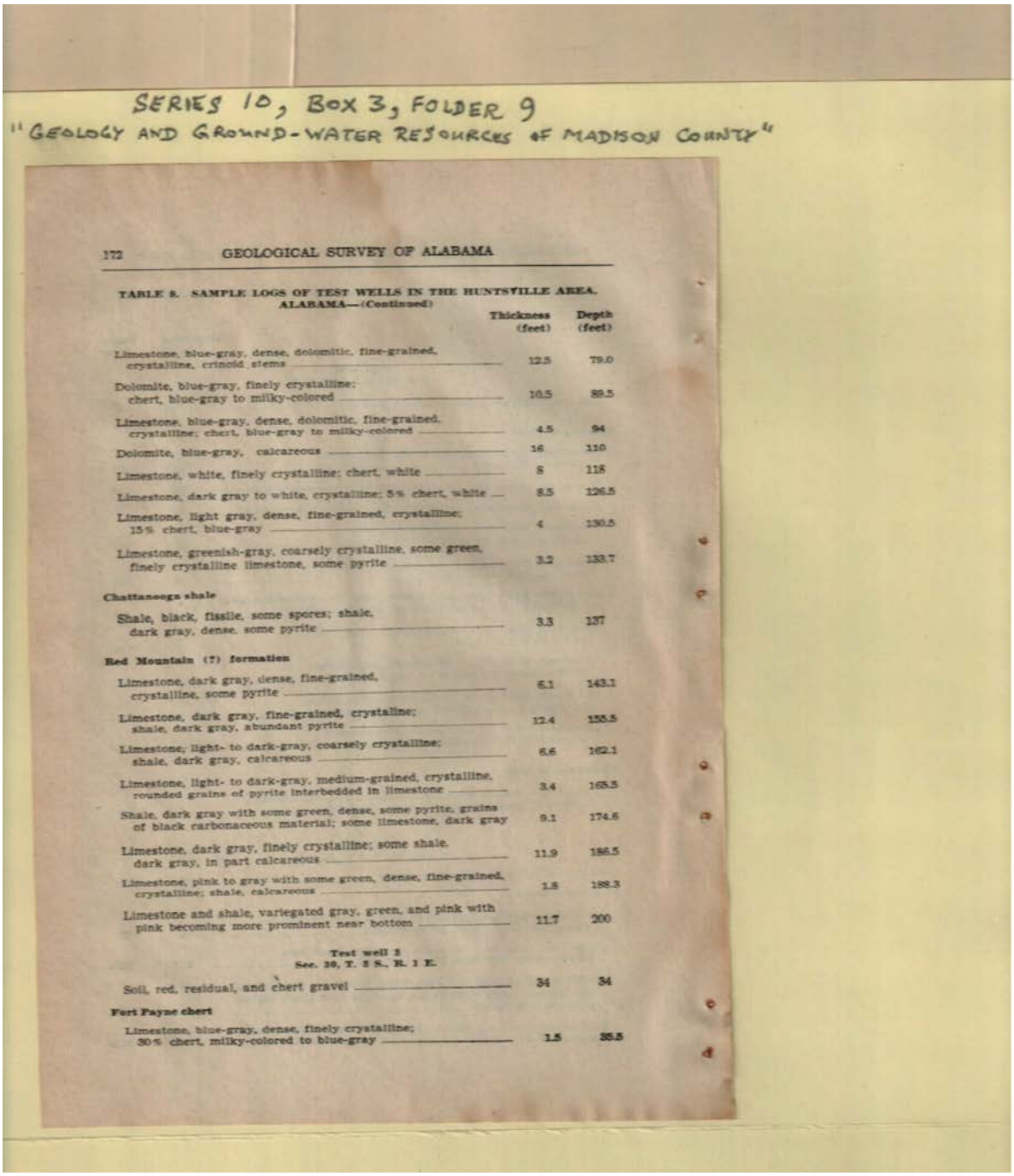


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TABLE 8. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

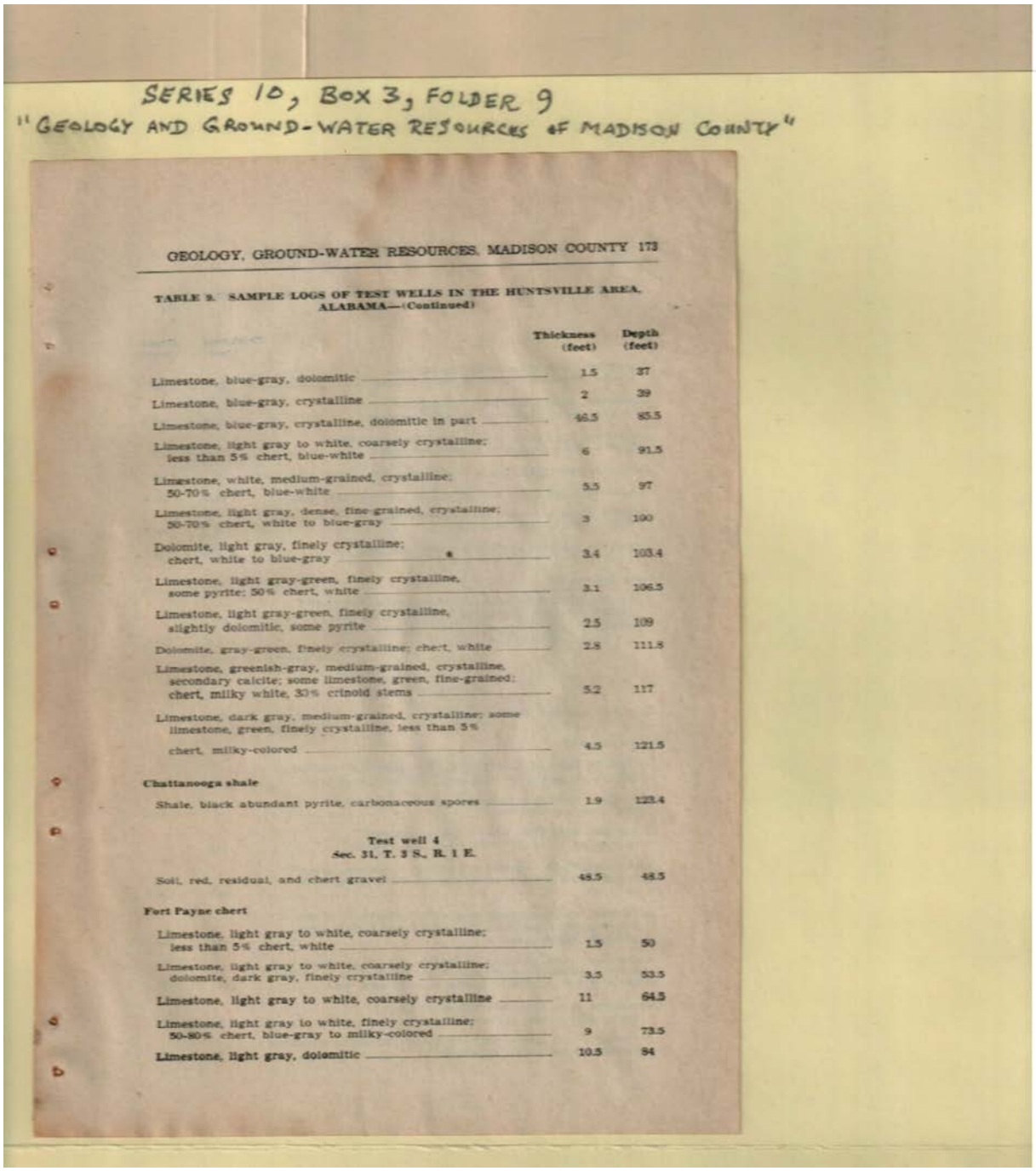
	Thickness (feet)	Depth (feet)
Limestone, blue-gray, dense, dolomitic, fine-grained, crystalline, crinoid stems	12.5	79.0
Dolomite, blue-gray, finely crystalline; chert, blue-gray to milky-colored	10.5	89.5
Limestone, blue-gray, dense, dolomitic, fine-grained, crystalline; chert, blue-gray to milky-colored	4.5	94
Dolomite, blue-gray, calcareous	16	110
Limestone, white, finely crystalline; chert, white	8	118
Limestone, dark gray to white, crystalline; 5% chert, white	8.5	126.5
Limestone, light gray, dense, fine-grained, crystalline; 15% chert, blue-gray	4	130.5
Limestone, greenish-gray, coarsely crystalline, some green, finely crystalline limestone, some pyrite	3.2	133.7
Chattanooga shale		
Shale, black, fissile, some spores; shale, dark gray, dense, some pyrite	3.3	137
Red Mountain (?) formation		
Limestone, dark gray, dense, fine-grained, crystalline, some pyrite	6.1	143.1
Limestone, dark gray, fine-grained, crystalline; shale, dark gray, abundant pyrite	12.4	155.5
Limestone, light- to dark-gray, coarsely crystalline; shale, dark gray, calcareous	6.6	162.1
Limestone, light- to dark-gray, medium-grained, crystalline, rounded grains of pyrite interbedded in limestone	3.4	165.5
Shale, dark gray with some green, dense, some pyrite, grains of black carbonaceous material; some limestone, dark gray	9.1	174.6
Limestone, dark gray, finely crystalline; some shale, dark gray, in part calcareous	11.9	186.5
Limestone, pink to gray with some green, dense, fine-grained, crystalline; shale, calcareous	1.8	188.3
Limestone and shale, variegated gray, green, and pink with pink becoming more prominent near bottom	11.7	200
Test well 2 **Sec. 30, T. 3 S., R. 1 E.**		
Soil, red, residual, and chert gravel	34	34
Fort Payne chert		
Limestone, blue-gray, dense, finely crystalline; 30% chert, milky-colored to blue-gray	1.5	35.5

Names:

Sample Logs of Test Wells

Types:

booklet



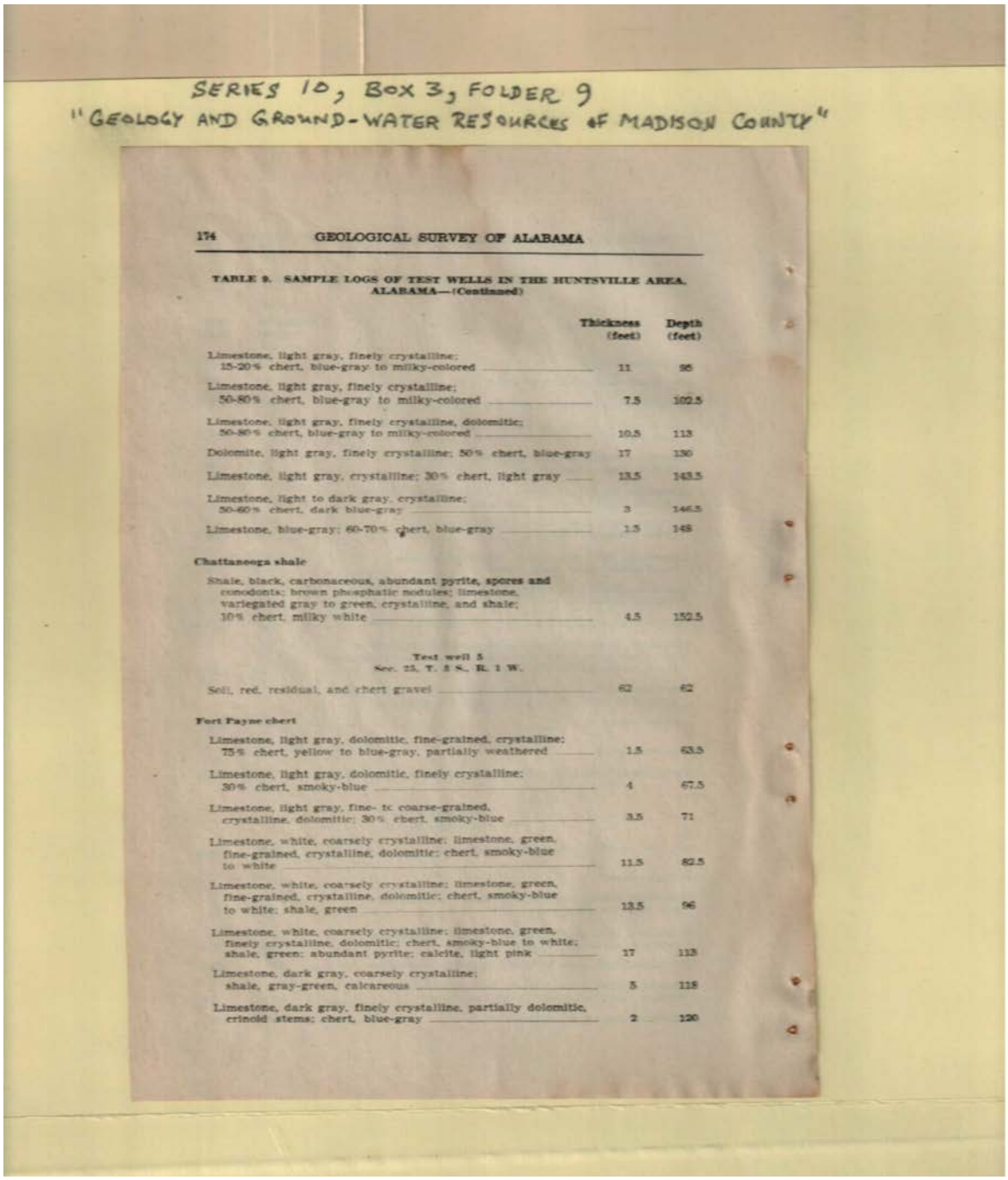
GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 173

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, blue-gray, dolomitic	1.5	37
Limestone, blue-gray, crystalline	2	39
Limestone, blue-gray, crystalline, dolomitic in part	46.5	85.5
Limestone, light gray to white, coarsely crystalline; less than 5% chert, blue-white	6	91.5
Limestone, white, medium-grained, crystalline; 50-70% chert, blue-white	5.5	97
Limestone, light gray, dense, fine-grained, crystalline; 50-70% chert, white to blue-gray	3	100
Dolomite, light gray, finely crystalline; chert, white to blue-gray	3.4	103.4
Limestone, light gray-green, finely crystalline, some pyrite; 50% chert, white	3.1	106.5
Limestone, light gray-green, finely crystalline, slightly dolomitic, some pyrite	2.5	109
Dolomite, gray-green, finely crystalline; chert, white	2.8	111.8
Limestone, greenish-gray, medium-grained, crystalline, secondary calcite; some limestone, green, fine-grained; chert, milky white, 30% crinoid stems	5.2	117
Limestone, dark gray, medium-grained, crystalline; some limestone, green, finely crystalline, less than 5% chert, milky-colored	4.5	121.5
Chattanooga shale		
Shale, black abundant pyrite, carbonaceous spores	1.9	123.4
Test well 4 **Sec. 31, T. 3 S., R. 1 E.**		
Soil, red, residual, and chert gravel	48.5	48.5
Fort Payne chert		
Limestone, light gray to white, coarsely crystalline; less than 5% chert, white	1.5	50
Limestone, light gray to white, coarsely crystalline; dolomite, dark gray, finely crystalline	3.5	53.5
Limestone, light gray to white, coarsely crystalline	11	64.5
Limestone, light gray to white, finely crystalline; 50-80% chert, blue-gray to milky-colored	9	73.5
Limestone, light gray, dolomitic	10.5	84

Names:
Sample Logs of Test Wells

Types:
booklet



174 GEOLOGICAL SURVEY OF ALABAMA

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray, finely crystalline; 15-20% chert, blue-gray to milky-colored	11	95
Limestone, light gray, finely crystalline; 50-80% chert, blue-gray to milky-colored	7.5	102.5
Limestone, light gray, finely crystalline, dolomitic; 50-80% chert, blue-gray to milky-colored	10.5	113
Dolomite, light gray, finely crystalline; 50% chert, blue-gray	17	130
Limestone, light gray, crystalline; 30% chert, light gray	13.5	143.5
Limestone, light to dark gray, crystalline; 50-60% chert, dark blue-gray	3	146.5
Limestone, blue-gray; 60-70% chert, blue-gray	1.5	148
Chattanooga shale		
Shale, black, carbonaceous, abundant pyrite, spores and conodonts; brown phosphatic nodules; limestone, variegated gray to green, crystalline, and shale; 10% chert, milky white	4.5	152.5
Test well 5 **Sec. 25, T. 3 S., R. 1 W.**		
Soil, red, residual, and chert gravel	62	62
Fort Payne chert		
Limestone, light gray, dolomitic, fine-grained, crystalline; 75% chert, yellow to blue-gray, partially weathered	1.5	63.5
Limestone, light gray, dolomitic, finely crystalline; 30% chert, smoky-blue	4	67.5
Limestone, light gray, fine- to coarse-grained, crystalline, dolomitic; 30% chert, smoky-blue	3.5	71
Limestone, white, coarsely crystalline; limestone, green, fine-grained, crystalline, dolomitic; chert, smoky-blue to white	11.5	82.5
Limestone, white, coarsely crystalline; limestone, green, fine-grained, crystalline, dolomitic; chert, smoky-blue to white; shale, green	13.5	96
Limestone, white, coarsely crystalline; limestone, green, finely crystalline, dolomitic; chert, smoky-blue to white; shale, green; abundant pyrite; calcite, light pink	17	113
Limestone, dark gray, coarsely crystalline; shale, gray-green, calcareous	5	118
Limestone, dark gray, finely crystalline, partially dolomitic, crinoid stems; chert, blue-gray	2	120

Names:
Sample Logs of Test Wells

Types:
booklet

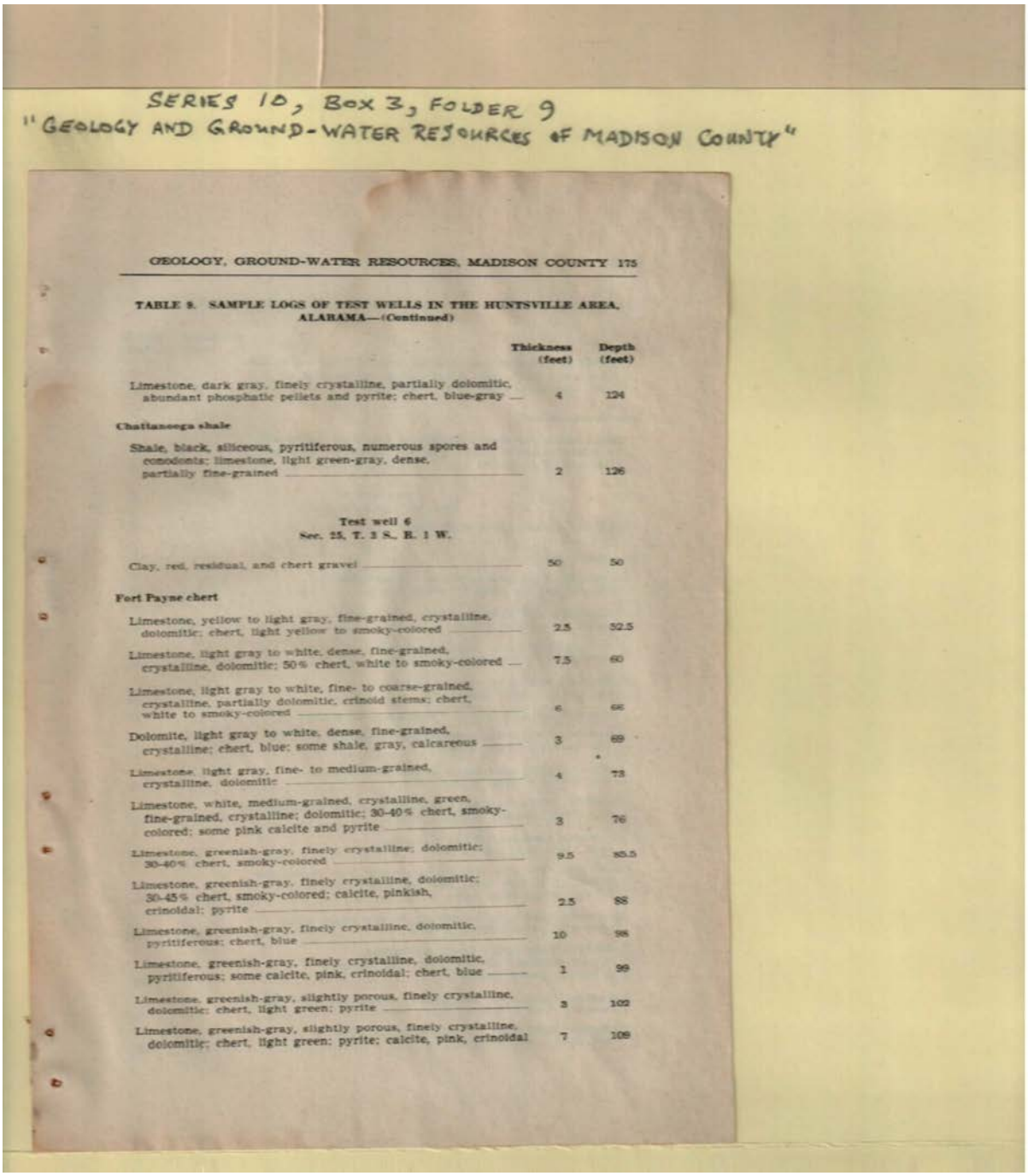
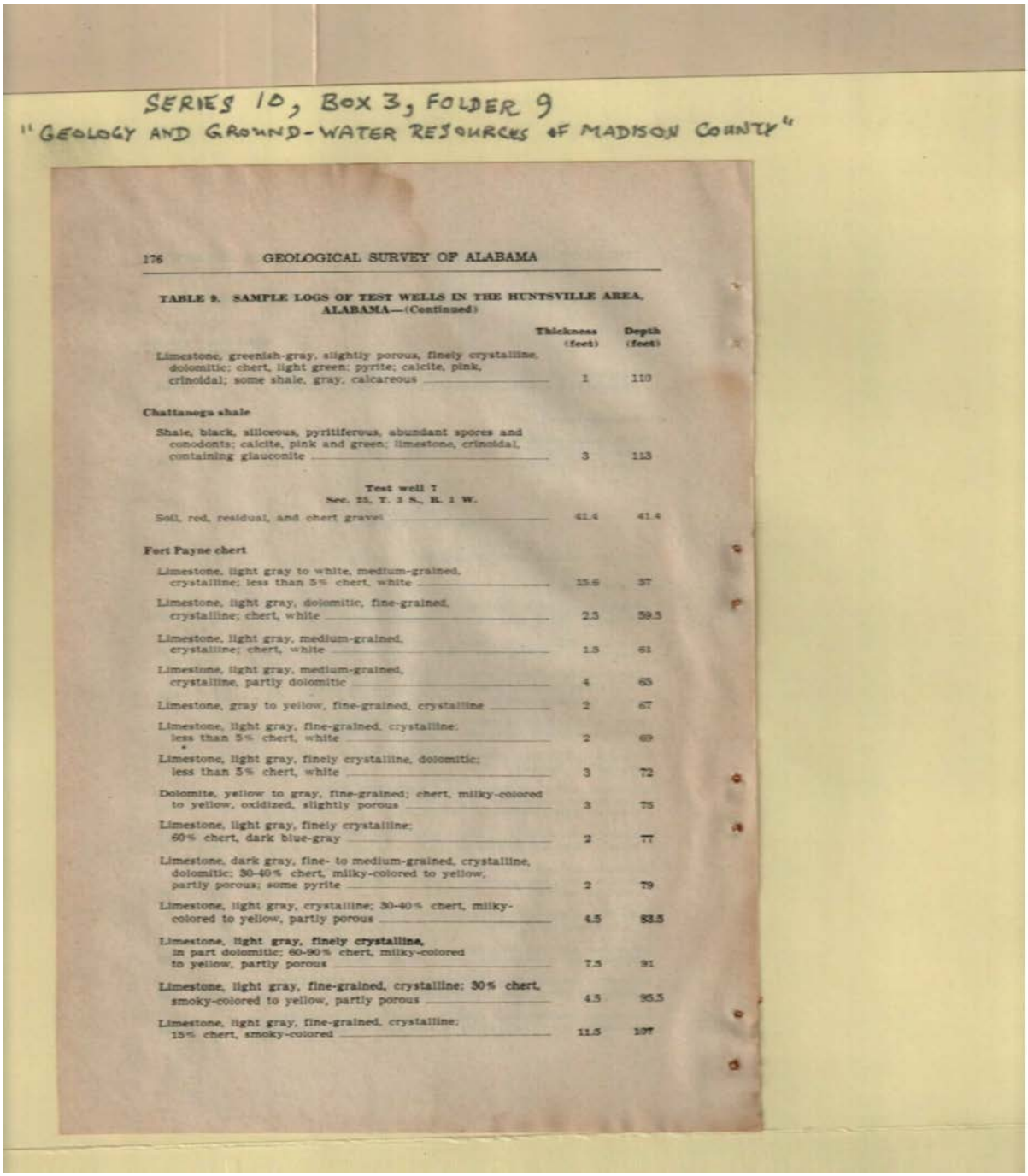


TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, dark gray, finely crystalline, partially dolomitic, abundant phosphatic pellets and pyrite; chert, blue-gray	4	124
Chattanooga shale		
Shale, black, siliceous, pyritiferous, numerous spores and conodonts; limestone, light green-gray, dense, partially fine-grained	2	126
Test well 6 Sec. 25, T. 3 S., R. 1 W.		
Clay, red, residual, and chert gravel	50	50
Fort Payne chert		
Limestone, yellow to light gray, fine-grained, crystalline, dolomitic; chert, light yellow to smoky-colored	2.5	52.5
Limestone, light gray to white, dense, fine-grained, crystalline, dolomitic; 50% chert, white to smoky-colored	7.5	60
Limestone, light gray to white, fine- to coarse-grained, crystalline, partially dolomitic, crinoid stems; chert, white to smoky-colored	6	66
Dolomite, light gray to white, dense, fine-grained, crystalline; chert, blue; some shale, gray, calcareous	3	69
Limestone, light gray, fine- to medium-grained, crystalline, dolomitic	4	73
Limestone, white, medium-grained, crystalline, green, fine-grained, crystalline; dolomitic; 30-40% chert, smoky-colored; some pink calcite and pyrite	3	76
Limestone, greenish-gray, finely crystalline; dolomitic; 30-40% chert, smoky-colored	9.5	85.5
Limestone, greenish-gray, finely crystalline, dolomitic; 30-45% chert, smoky-colored; calcite, pinkish, crinoidal; pyrite	2.5	88
Limestone, greenish-gray, finely crystalline, dolomitic, pyritiferous; chert, blue	10	98
Limestone, greenish-gray, finely crystalline, dolomitic, pyritiferous; some calcite, pink, crinoidal; chert, blue	1	99
Limestone, greenish-gray, slightly porous, finely crystalline, dolomitic; chert, light green; pyrite	3	102
Limestone, greenish-gray, slightly porous, finely crystalline, dolomitic; chert, light green; pyrite; calcite, pink, crinoidal	7	109

Names:
Sample Logs of Test Wells

Types:
booklet



176 GEOLOGICAL SURVEY OF ALABAMA

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, greenish-gray, slightly porous, finely crystalline, dolomitic; chert, light green; pyrite; calcite, pink, crinoidal; some shale, gray, calcareous	1	110
Chattanooga shale		
Shale, black, siliceous, pyritiferous, abundant spores and conodonts; calcite, pink and green; limestone, crinoidal, containing glauconite	3	113
Test well 7 **Sec. 25, T. 3 S., R. 1 W.**		
Soil, red, residual, and chert gravel	41.4	41.4
Fort Payne chert		
Limestone, light gray to white, medium-grained, crystalline; less than 5% chert, white	15.6	57
Limestone, light gray, dolomitic, fine-grained, crystalline; chert, white	2.5	59.5
Limestone, light gray, medium-grained, crystalline; chert, white	1.5	61
Limestone, light gray, medium-grained, crystalline, partly dolomitic	4	65
Limestone, gray to yellow, fine-grained, crystalline	2	67
Limestone, light gray, fine-grained, crystalline; less than 5% chert, white	2	69
Limestone, light gray, finely crystalline, dolomitic; less than 5% chert, white	3	72
Dolomite, yellow to gray, fine-grained; chert, milky-colored to yellow, oxidized, slightly porous	3	75
Limestone, light gray, finely crystalline; 60% chert, dark blue-gray	2	77
Limestone, dark gray, fine- to medium-grained, crystalline, dolomitic; 30-40% chert, milky-colored to yellow, partly porous; some pyrite	2	79
Limestone, light gray, crystalline; 30-40% chert, milky-colored to yellow, partly porous	4.5	83.5
Limestone, light gray, finely crystalline, in part dolomitic; 60-90% chert, milky-colored to yellow, partly porous	7.5	91
Limestone, light gray, fine-grained, crystalline; 30% chert, smoky-colored to yellow, partly porous	4.5	95.5
Limestone, light gray, fine-grained, crystalline; 15% chert, smoky-colored	11.5	107

Names:
Sample Logs of Test Wells

Types:
booklet

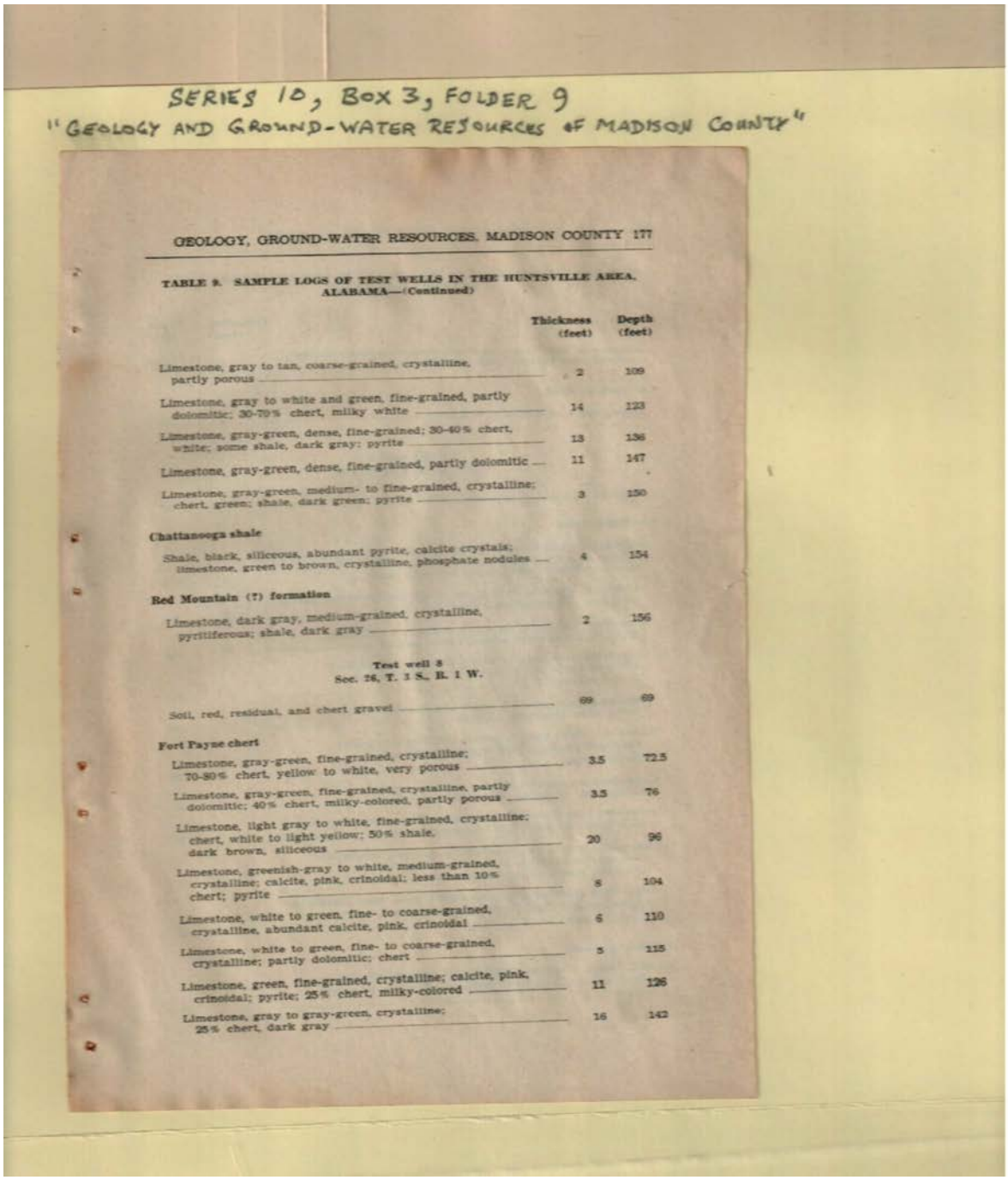


TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, gray to tan, coarse-grained, crystalline, partly porous	2	109
Limestone, gray to white and green, fine-grained, partly dolomitic; 30-70% chert, milky white	14	123
Limestone, gray-green, dense, fine-grained; 30-40% chert, white; some shale, dark gray; pyrite	13	136
Limestone, gray-green, dense, fine-grained, partly dolomitic	11	147
Limestone, gray-green, medium- to fine-grained, crystalline; chert, green; shale, dark green; pyrite	3	150
Chattanooga shale		
Shale, black, siliceous, abundant pyrite, calcite crystals; limestone, green to brown, crystalline, phosphate nodules	4	154
Red Mountain (?) formation		
Limestone, dark gray, medium-grained, crystalline, pyritiferous; shale, dark gray	2	156
Test well 8 **Sec. 26, T. 3 S., R. 1 W.**		
Soil, red, residual, and chert gravel	69	69
Fort Payne chert		
Limestone, gray-green, fine-grained, crystalline; 70-80% chert, yellow to white, very porous	3.5	72.5
Limestone, gray-green, fine-grained, crystalline, partly dolomitic; 40% chert, milky-colored, partly porous	3.5	76
Limestone, light gray to white, fine-grained, crystalline; chert, white to light yellow; 50% shale, dark brown, siliceous	20	96
Limestone, greenish-gray to white, medium-grained, crystalline; calcite, pink, crinoidal; less than 10% chert; pyrite	8	104
Limestone, white to green, fine- to coarse-grained, crystalline, abundant calcite, pink, crinoidal	6	110
Limestone, white to green, fine- to coarse-grained, crystalline; partly dolomitic; chert	5	115
Limestone, green, fine-grained, crystalline; calcite, pink, crinoidal; pyrite; 25% chert, milky-colored	11	126
Limestone, gray to gray-green, crystalline; 25% chert, dark gray	16	142

Names:
Sample Logs of Test Wells

Types:
booklet

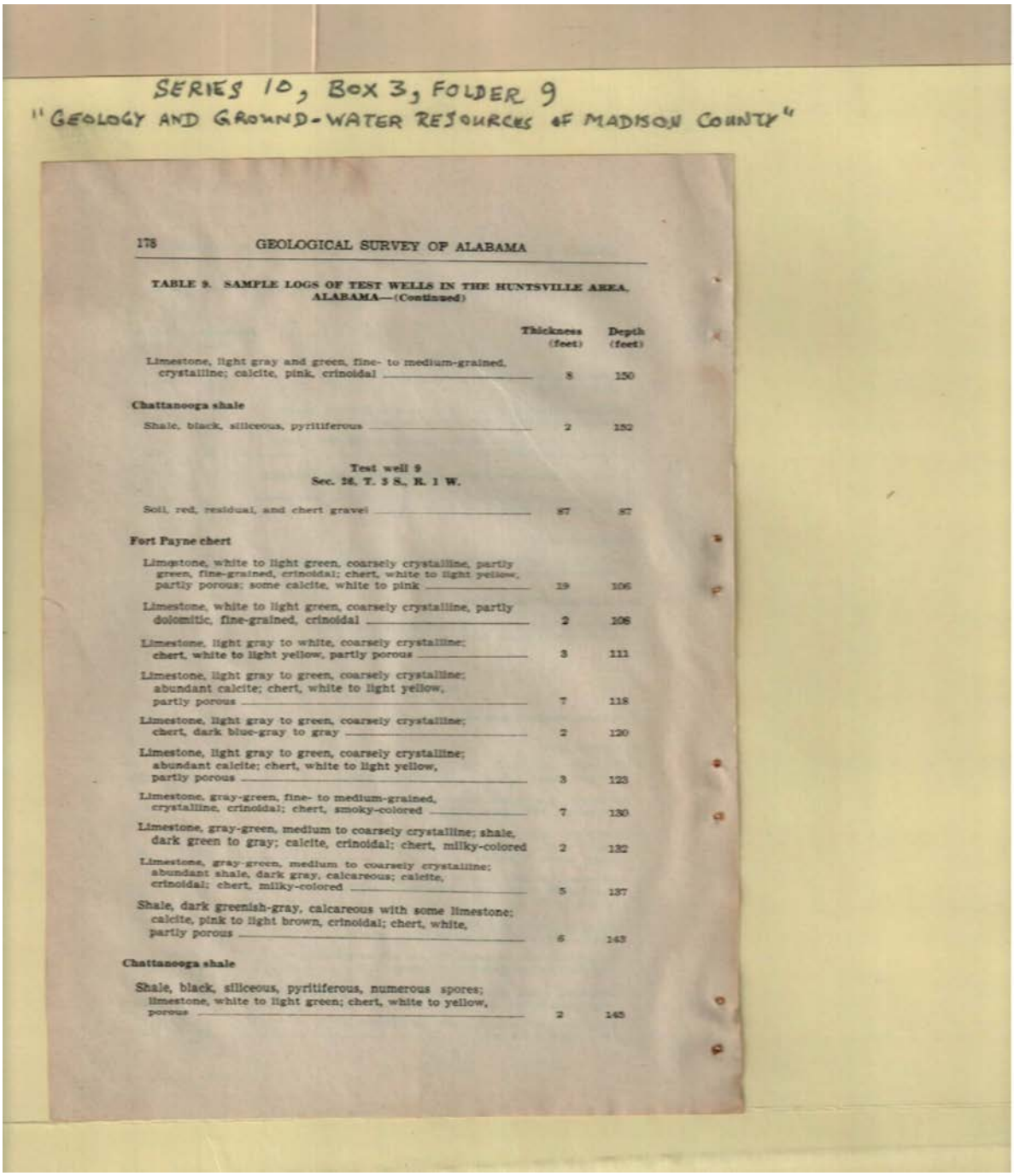


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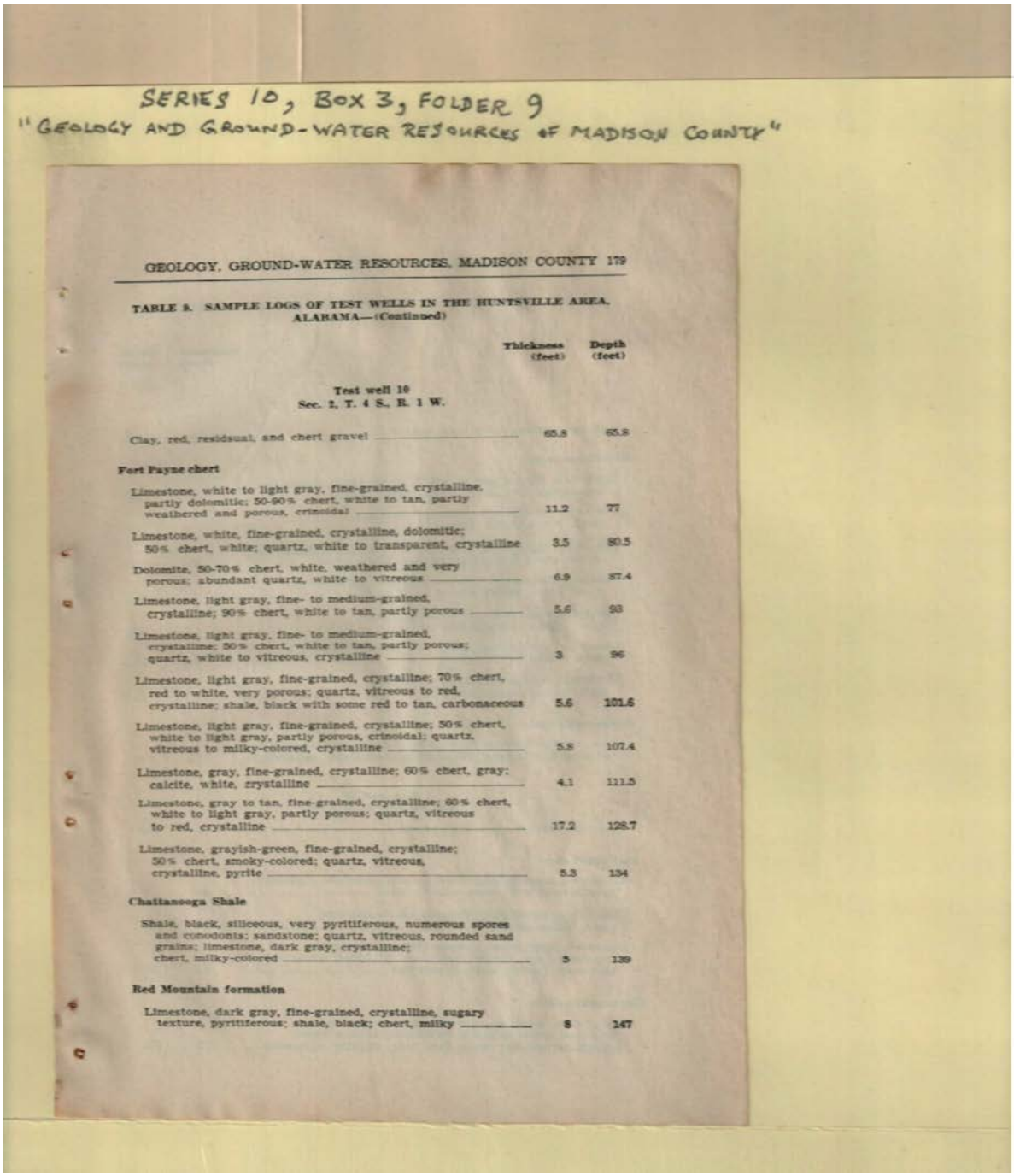
TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray and green, fine- to medium-grained, crystalline; calcite, pink, crinoidal	8	150
Chattanooga shale		
Shale, black, siliceous, pyritiferous	2	152
Test well 9		
Sec. 26, T. 3 S., R. 1 W.		
Soil, red, residual, and chert gravel	87	87
Fort Payne chert		
Limestone, white to light green, coarsely crystalline, partly green, fine-grained, crinoidal; chert, white to light yellow, partly porous; some calcite, white to pink	19	106
Limestone, white to light green, coarsely crystalline, partly dolomitic, fine-grained, crinoidal	2	108
Limestone, light gray to white, coarsely crystalline; chert, white to light yellow, partly porous	3	111
Limestone, light gray to green, coarsely crystalline; abundant calcite; chert, white to light yellow, partly porous	7	118
Limestone, light gray to green, coarsely crystalline; chert, dark blue-gray to gray	2	120
Limestone, light gray to green, coarsely crystalline; abundant calcite; chert, white to light yellow, partly porous	3	123
Limestone, gray-green, fine- to medium-grained, crystalline, crinoidal; chert, smoky-colored	7	130
Limestone, gray-green, medium to coarsely crystalline; shale, dark green to gray; calcite, crinoidal; chert, milky-colored	2	132
Limestone, gray-green, medium to coarsely crystalline; abundant shale, dark gray, calcareous; calcite, crinoidal; chert, milky-colored	5	137
Shale, dark greenish-gray, calcareous with some limestone; calcite, pink to light brown, crinoidal; chert, white, partly porous	6	143
Chattanooga shale		
Shale, black, siliceous, pyritiferous, numerous spores; limestone, white to light green; chert, white to yellow, porous	2	145

Names:
Sample Logs of Test Wells

Types:
booklet



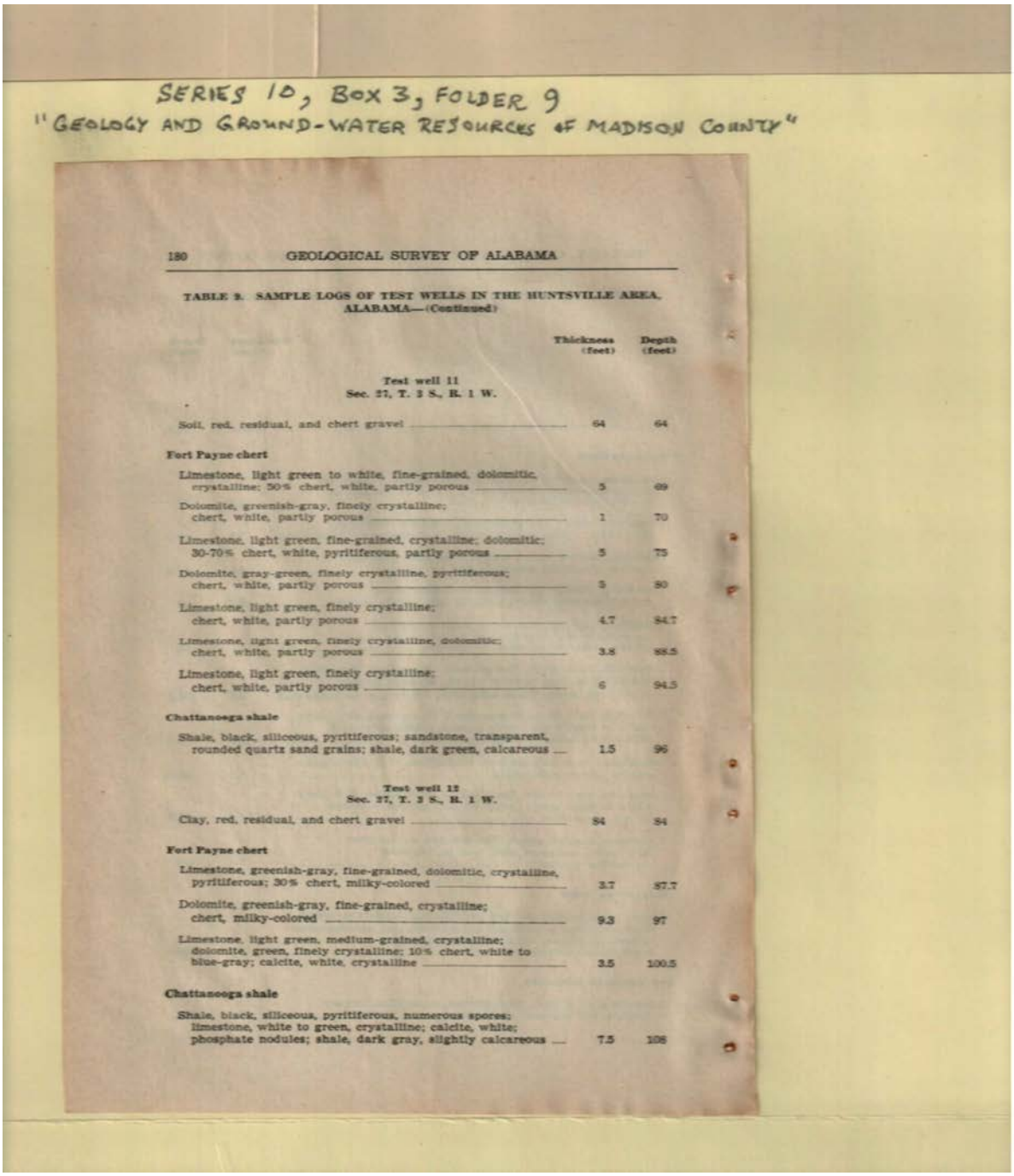
GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 179

TABLE 8. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Test well 10 **Sec. 2, T. 4 S., R. 1 W.**		
Clay, red, residual, and chert gravel	65.8	65.8
Fort Payne chert		
Limestone, white to light gray, fine-grained, crystalline, partly dolomitic; 50-90% chert, white to tan, partly weathered and porous, crinoidal	11.2	77
Limestone, white, fine-grained, crystalline, dolomitic; 50% chert, white; quartz, white to transparent, crystalline	3.5	80.5
Dolomite, 50-70% chert, white, weathered and very porous; abundant quartz, white to vitreous	6.9	87.4
Limestone, light gray, fine- to medium-grained, crystalline; 90% chert, white to tan, partly porous	5.6	93
Limestone, light gray, fine- to medium-grained, crystalline; 50% chert, white to tan, partly porous; quartz, white to vitreous, crystalline	3	96
Limestone, light gray, fine-grained, crystalline; 70% chert, red to white, very porous; quartz, vitreous to red, crystalline; shale, black with some red to tan, carbonaceous	5.6	101.6
Limestone, light gray, fine-grained, crystalline; 50% chert, white to light gray, partly porous, crinoidal; quartz, vitreous to milky-colored, crystalline	5.8	107.4
Limestone, gray, fine-grained, crystalline; 60% chert, gray; calcite, white, crystalline	4.1	111.5
Limestone, gray to tan, fine-grained, crystalline; 60% chert, white to light gray, partly porous; quartz, vitreous to red, crystalline	17.2	128.7
Limestone, grayish-green, fine-grained, crystalline; 50% chert, smoky-colored; quartz, vitreous, crystalline, pyrite	5.3	134
Chattanooga Shale		
Shale, black, siliceous, very pyritiferous, numerous spores and conodonts; sandstone; quartz, vitreous, rounded sand grains; limestone, dark gray, crystalline; chert, milky-colored	5	139
Red Mountain formation		
Limestone, dark gray, fine-grained, crystalline, sugary texture, pyritiferous; shale, black; chert, milky	8	147

Names:
Sample Logs of Test Wells

Types:
booklet



180 GEOLOGICAL SURVEY OF ALABAMA

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Test well 11 **Sec. 27, T. 3 S., R. 1 W.**		
Soil, red, residual, and chert gravel	64	64
Fort Payne chert		
Limestone, light green to white, fine-grained, dolomitic, crystalline; 50% chert, white, partly porous	5	69
Dolomite, greenish-gray, finely crystalline; chert, white, partly porous	1	70
Limestone, light green, fine-grained, crystalline; dolomitic; 30-70% chert, white, pyritiferous, partly porous	5	75
Dolomite, gray-green, finely crystalline, pyritiferous; chert, white, partly porous	5	80
Limestone, light green, finely crystalline; chert, white, partly porous	4.7	84.7
Limestone, light green, finely crystalline, dolomitic; chert, white, partly porous	3.8	88.5
Limestone, light green, finely crystalline; chert, white, partly porous	6	94.5
Chattanooga shale		
Shale, black, siliceous, pyritiferous; sandstone, transparent, rounded quartz sand grains; shale, dark green, calcareous	1.5	96
Test well 12 **Sec. 27, T. 3 S., R. 1 W.**		
Clay, red, residual, and chert gravel	84	84
Fort Payne chert		
Limestone, greenish-gray, fine-grained, dolomitic, crystalline, pyritiferous; 30% chert, milky-colored	3.7	87.7
Dolomite, greenish-gray, fine-grained, crystalline; chert, milky-colored	9.3	97
Limestone, light green, medium-grained, crystalline; dolomite, green, finely crystalline; 10% chert, white to blue-gray; calcite, white, crystalline	3.5	100.5
Chattanooga shale		
Shale, black, siliceous, pyritiferous, numerous spores; limestone, white to green, crystalline; calcite, white; phosphate nodules; shale, dark gray, slightly calcareous	7.5	108

Names:
Sample Logs of Test Wells

Types:
booklet

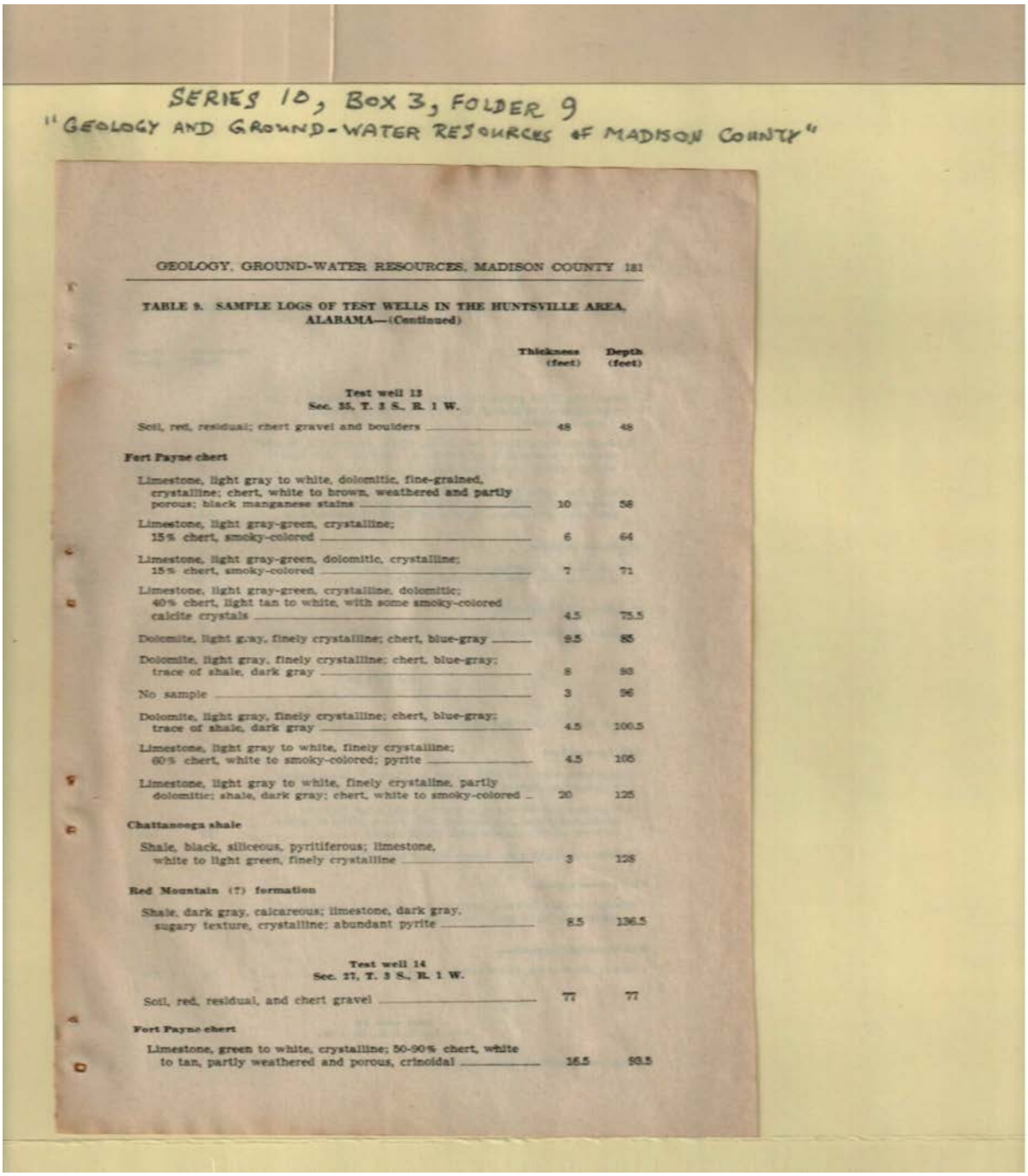


TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Test well 13 **Sec. 35, T. 3 S., R. 1 W.**		
Soil, red, residual; chert gravel and boulders	48	48
Fort Payne chert		
Limestone, light gray to white, dolomitic, fine-grained, crystalline; chert, white to brown, weathered and partly porous; black manganese stains	10	58
Limestone, light gray-green, crystalline; 15% chert, smoky-colored	6	64
Limestone, light gray-green, dolomitic, crystalline; 15% chert, smoky-colored	7	71
Limestone, light gray-green, crystalline, dolomitic; 40% chert, light tan to white, with some smoky-colored calcite crystals	4.5	75.5
Dolomite, light gray, finely crystalline; chert, blue-gray	9.5	85
Dolomite, light gray, finely crystalline; chert, blue-gray; trace of shale, dark gray	8	93
No sample	3	96
Dolomite, light gray, finely crystalline; chert, blue-gray; trace of shale, dark gray	4.5	100.5
Limestone, light gray to white, finely crystalline; 60% chert, white to smoky-colored; pyrite	4.5	105
Limestone, light gray to white, finely crystaline, partly dolomitic; shale, dark gray; chert, white to smoky-colored	20	125
Chattanooga shale		
Shale, black, siliceous, pyritiferous; limestone, white to light green, finely crystalline	3	128
Red Mountain (?) formation		
Shale, dark gray, calcareous; limestone, dark gray, sugary texture, crystalline; abundant pyrite	8.5	136.5
Test well 14 **Sec. 27, T. 3 S., R. 1 W.**		
Soil, red, residual, and chert gravel	77	77
Fort Payne chert		
Limestone, green to white, crystalline; 50-90% chert, white to tan, partly weathered and porous, crinoidal	16.5	93.5

Names:
Sample Logs of Test Wells

Types:
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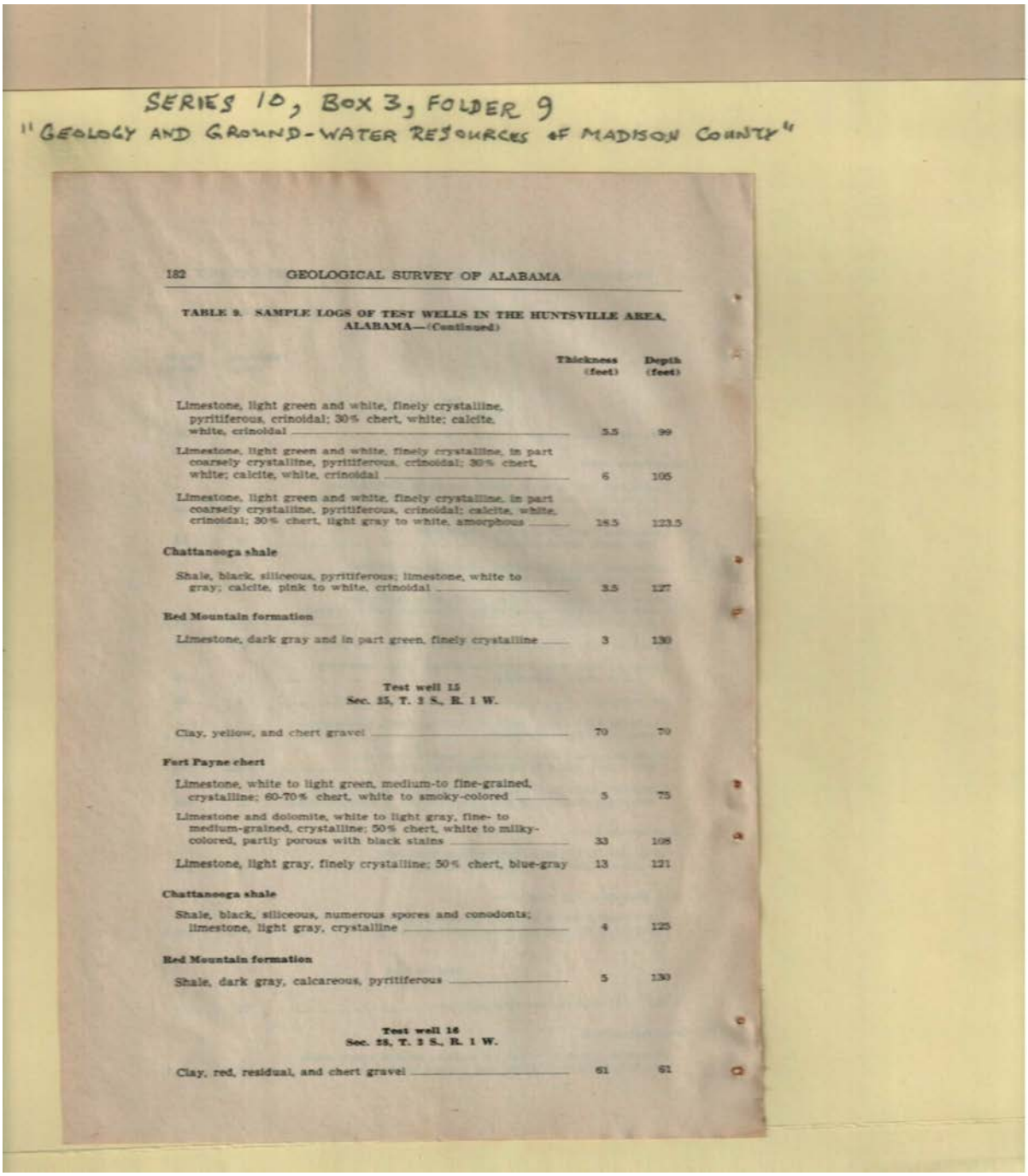

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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light green and white, finely crystalline, pyritiferous, crinoidal; 30% chert, white; calcite, white, crinoidal	5.5	99
Limestone, light green and white, finely crystalline, in part coarsely crystalline, pyritiferous, crinoidal; 30% chert, white; calcite, white, crinoidal	6	105
Limestone, light green and white, finely crystalline, in part coarsely crystalline, pyritiferous, crinoidal; calcite, white, crinoidal; 30% chert, light gray to white, amorphous	18.5	123.5
Chattanooga shale		
Shale, black, siliceous, pyritiferous; limestone, white to gray; calcite, pink to white, crinoidal	3.5	127
Red Mountain formation		
Limestone, dark gray and in part green, finely crystalline	3	130
Test well 15 Sec. 25, T. 3 S., R. 1 W.		
Clay, yellow, and chert gravel	70	70
Fort Payne chert		
Limestone, white to light green, medium-to fine-grained, crystalline; 60-70% chert, white to smoky-colored	5	75
Limestone and dolomite, white to light gray, fine- to medium-grained, crystalline; 50% chert, white to milky-colored, partly porous with black stains	33	108
Limestone, light gray, finely crystalline; 50% chert, blue-gray	13	121
Chattanooga shale		
Shale, black, siliceous, numerous spores and conodonts; limestone, light gray, crystalline	4	125
Red Mountain formation		
Shale, dark gray, calcareous, pyritiferous	5	130
Test well 16 Sec. 25, T. 3 S., R. 1 W.		
Clay, red, residual, and chert gravel	61	61

Names:
Sample Logs of Test Wells

Types:
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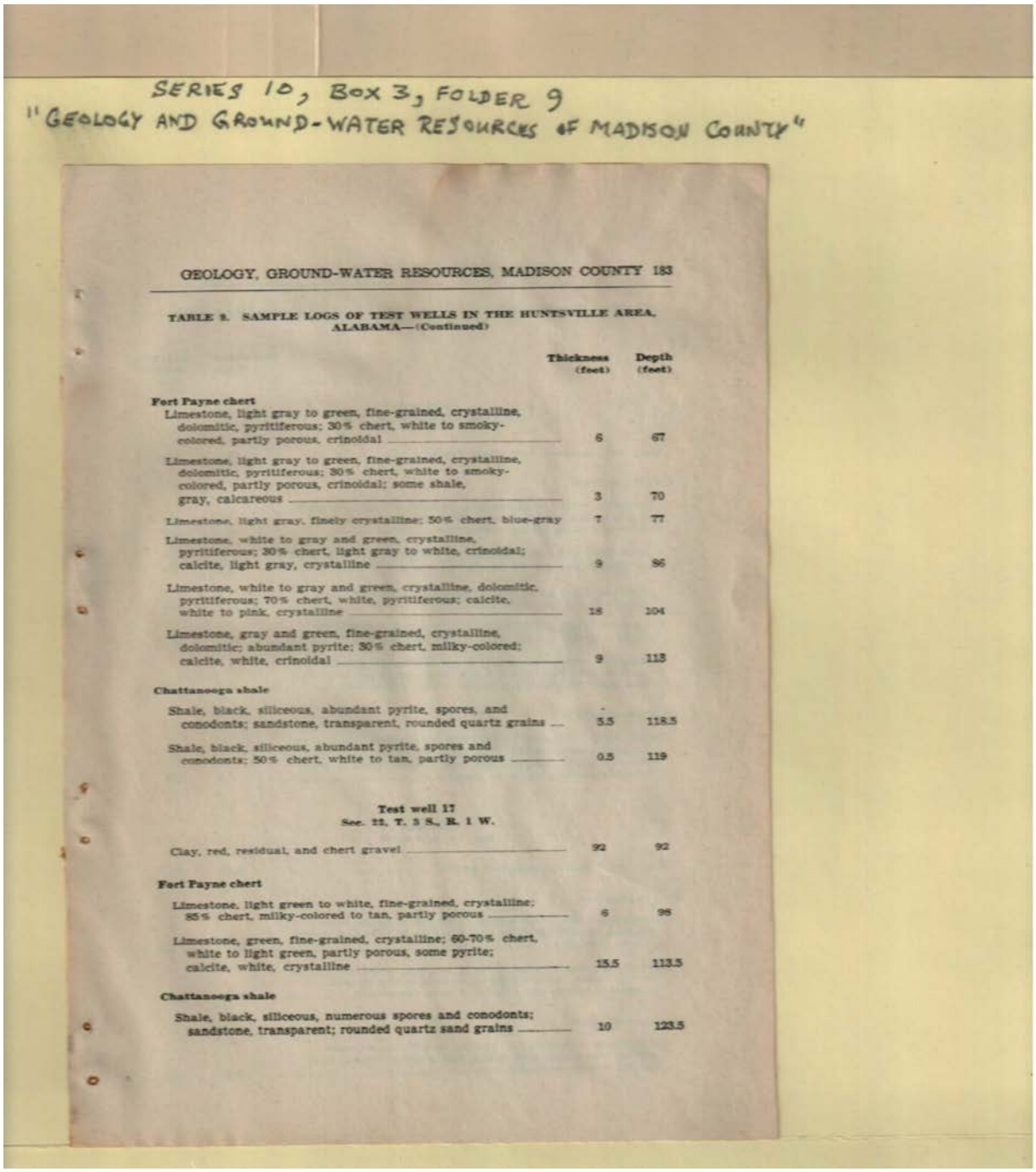

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Fort Payne chert		
Limestone, light gray to green, fine-grained, crystalline, dolomitic, pyritiferous; 30% chert, white to smoky-colored, partly porous, crinoidal	6	67
Limestone, light gray to green, fine-grained, crystalline, dolomitic, pyritiferous; 30% chert, white to smoky-colored, partly porous, crinoidal; some shale, gray, calcareous	3	70
Limestone, light gray, finely crystalline; 50% chert, blue-gray	7	77
Limestone, white to gray and green, crystalline, pyritiferous; 30% chert, light gray to white, crinoidal; calcite, light gray, crystalline	9	86
Limestone, white to gray and green, crystalline, dolomitic, pyritiferous; 70% chert, white, pyritiferous; calcite, white to pink, crystalline	18	104
Limestone, gray and green, fine-grained, crystalline, dolomitic; abundant pyrite; 30% chert, milky-colored; calcite, white, crinoidal	9	113
Chattanooga shale		
Shale, black, siliceous, abundant pyrite, spores, and conodonts; sandstone, transparent, rounded quartz grains	5.5	118.5
Shale, black, siliceous, abundant pyrite, spores and conodonts; 50% chert, white to tan, partly porous	0.5	119
Test well 17 **Sec. 22, T. 3 S., R. 1 W.**		
Clay, red, residual, and chert gravel	92	92
Fort Payne chert		
Limestone, light green to white, fine-grained, crystalline; 85% chert, milky-colored to tan, partly porous	6	98
Limestone, green, fine-grained, crystalline; 60-70% chert, white to light green, partly porous, some pyrite; calcite, white, crystalline	15.5	113.5
Chattanooga shale		
Shale, black, siliceous, numerous spores and conodonts; sandstone, transparent; rounded quartz sand grains	10	123.5

Names:
Sample Logs of Test Wells

Types:
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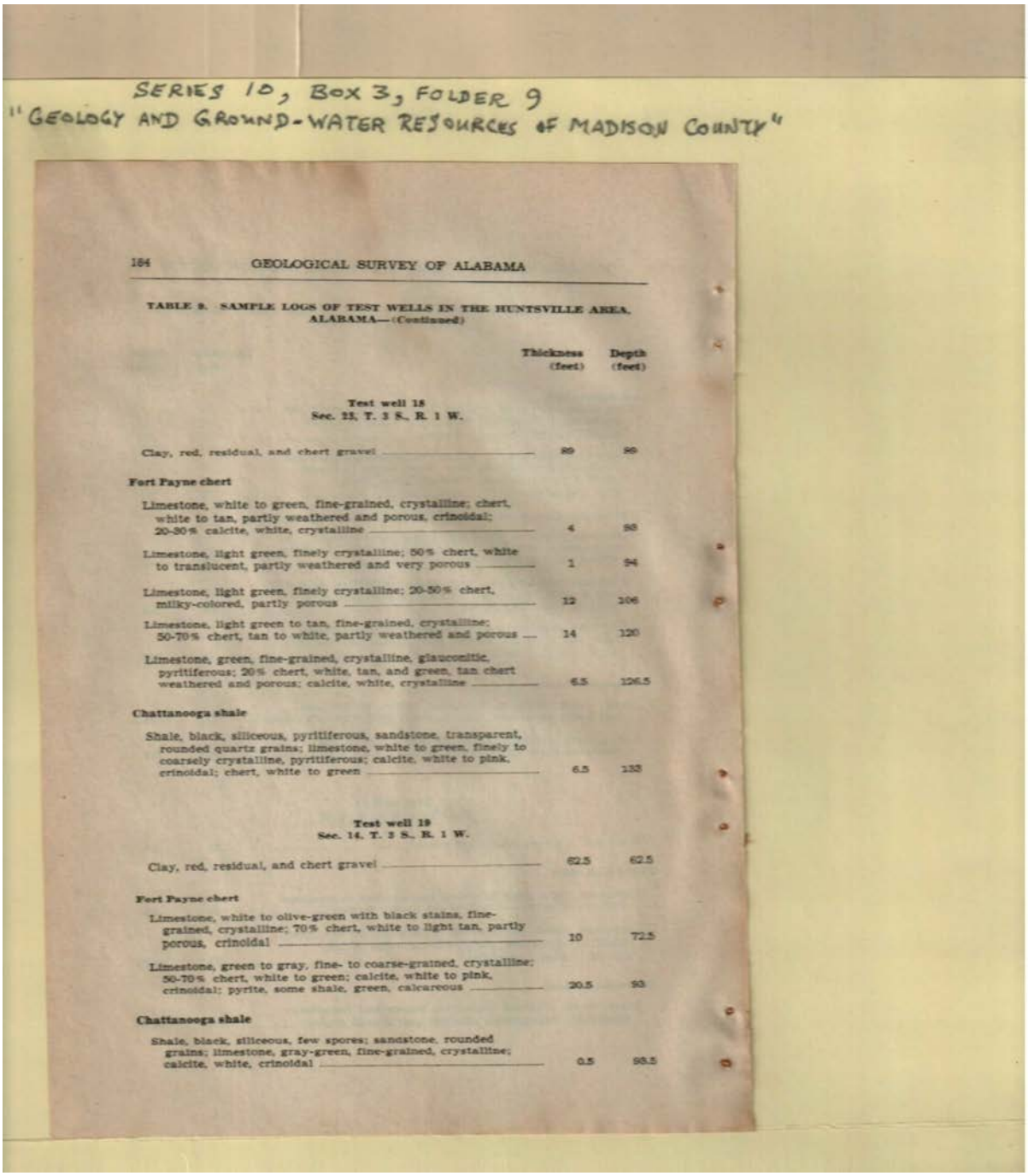

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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Test well 18 **Sec. 25, T. 3 S., R. 1 W.**		
Clay, red, residual, and chert gravel	89	89
Fort Payne chert		
Limestone, white to green, fine-grained, crystalline; chert, white to tan, partly weathered and porous, crinoidal; 20-30% calcite, white, crystalline	4	93
Limestone, light green, finely crystalline; 50% chert, white to translucent, partly weathered and very porous	1	94
Limestone, light green, finely crystalline; 20-50% chert, milky-colored, partly porous	12	106
Limestone, light green to tan, fine-grained, crystalline; 50-70% chert, tan to white, partly weathered and porous	14	120
Limestone, green, fine-grained, crystalline, glauconitic, pyritiferous; 20% chert, white, tan, and green, tan chert weathered and porous; calcite, white, crystalline	6.5	126.5
Chattanooga shale		
Shale, black, siliceous, pyritiferous, sandstone, transparent, rounded quartz grains; limestone, white to green, finely to coarsely crystalline, pyritiferous; calcite, white to pink, crinoidal; chert, white to green	6.5	133
Test well 19 **Sec. 14, T. 3 S., R. 1 W.**		
Clay, red, residual, and chert gravel	62.5	62.5
Fort Payne chert		
Limestone, white to olive-green with black stains, fine-grained, crystalline; 70% chert, white to light tan, partly porous, crinoidal	10	72.5
Limestone, green to gray, fine- to coarse-grained, crystalline; 50-70% chert, white to green; calcite, white to pink, crinoidal; pyrite, some shale, green, calcareous	20.5	93
Chattanooga shale		
Shale, black, siliceous, few spores; sandstone, rounded grains; limestone, gray-green, fine-grained, crystalline; calcite, white, crinoidal	0.5	93.5

Names:
Sample Logs of Test Wells

Types:
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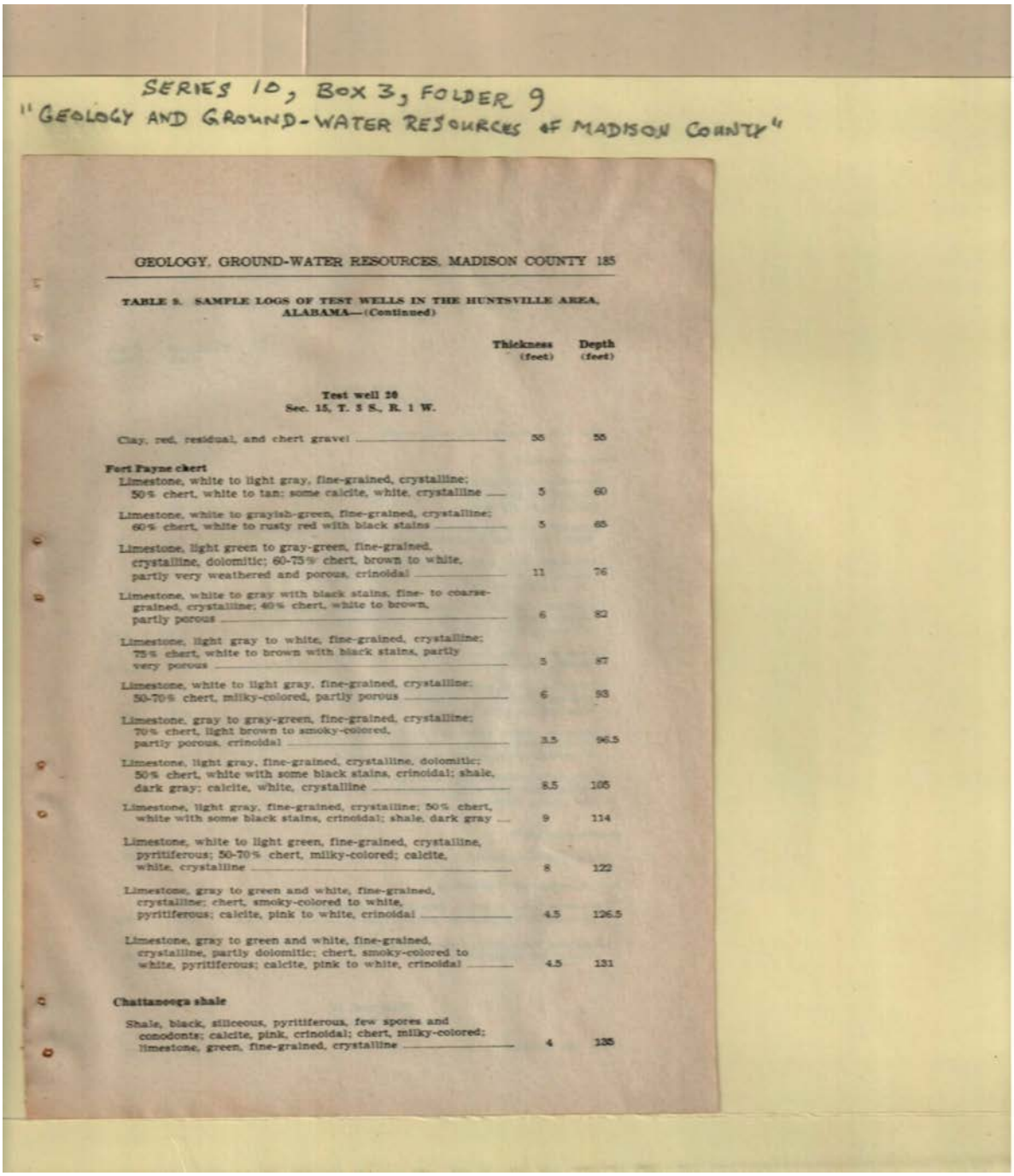

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Test well 20 **Sec. 15, T. 5 S., R. 1 W.**		
Clay, red, residual, and chert gravel	55	55
Fort Payne chert		
Limestone, white to light gray, fine-grained, crystalline; 50% chert, white to tan; some calcite, white, crystalline	5	60
Limestone, white to grayish-green, fine-grained, crystalline; 60% chert, white to rusty red with black stains	5	65
Limestone, light green to gray-green, fine-grained, crystalline, dolomitic; 60-75% chert, brown to white, partly very weathered and porous, crinoidal	11	76
Limestone, white to gray with black stains, fine- to coarse-grained, crystalline; 40% chert, white to brown, partly porous	6	82
Limestone, light gray to white, fine-grained, crystalline; 75% chert, white to brown with black stains, partly very porous	5	87
Limestone, white to light gray, fine-grained, crystalline; 50-70% chert, milky-colored, partly porous	6	93
Limestone, gray to gray-green, fine-grained, crystalline; 70% chert, light brown to smoky-colored, partly porous, crinoidal	3.5	96.5
Limestone, light gray, fine-grained, crystalline, dolomitic; 50% chert, white with some black stains, crinoidal; shale, dark gray; calcite, white, crystalline	8.5	105
Limestone, light gray, fine-grained, crystalline; 50% chert, white with some black stains, crinoidal; shale, dark gray	9	114
Limestone, white to light green, fine-grained, crystalline, pyritiferous; 50-70% chert, milky-colored; calcite, white, crystalline	8	122
Limestone, gray to green and white, fine-grained, crystalline; chert, smoky-colored to white, pyritiferous; calcite, pink to white, crinoidal	4.5	126.5
Limestone, gray to green and white, fine-grained, crystalline, partly dolomitic; chert, smoky-colored to white, pyritiferous; calcite, pink to white, crinoidal	4.5	131
Chattanooga shale		
Shale, black, siliceous, pyritiferous, few spores and conodonts; calcite, pink, crinoidal; chert, milky-colored; limestone, green, fine-grained, crystalline	4	135

Names:
Sample Logs of Test Wells

Types:
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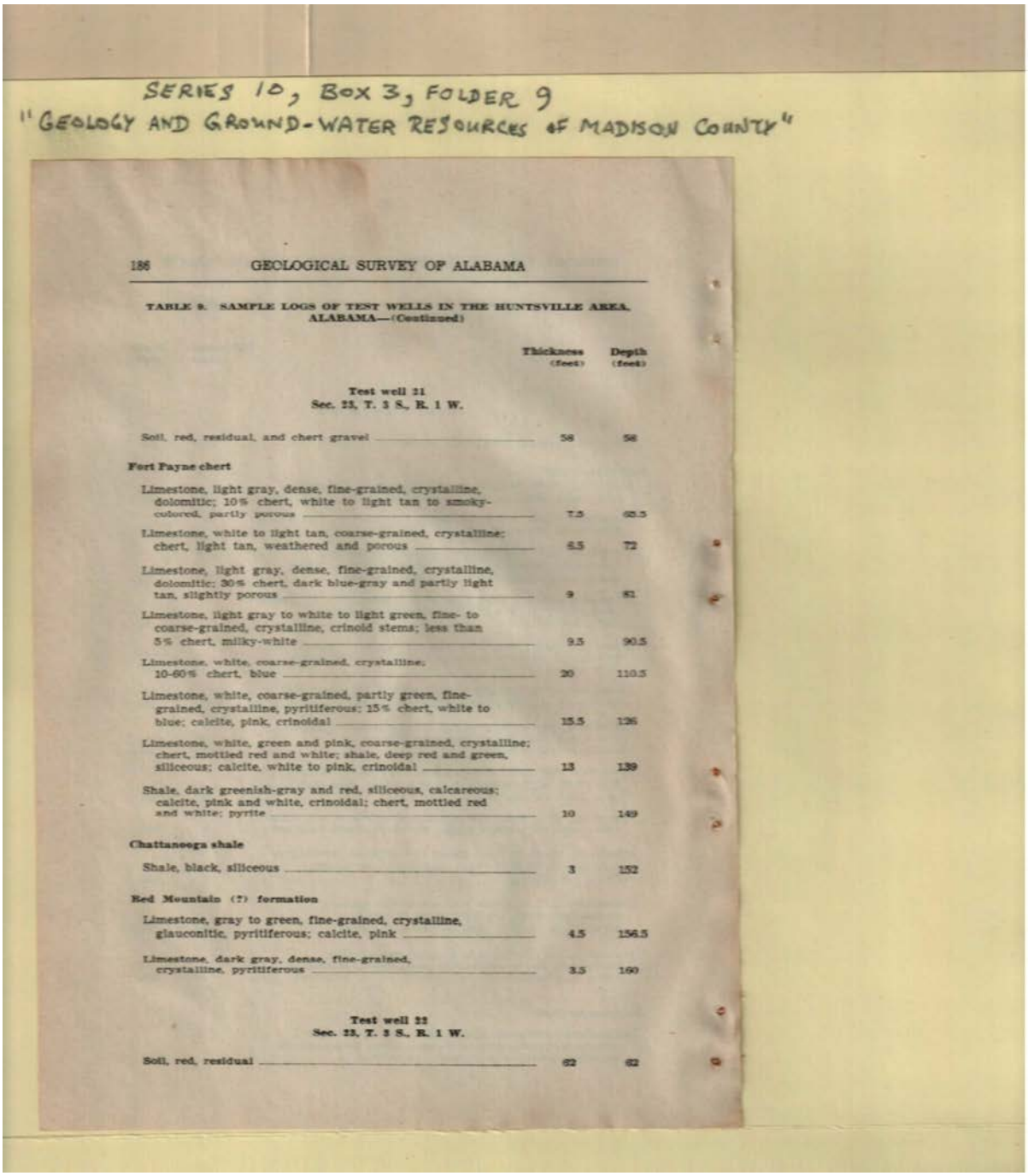

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Test well 21 **Sec. 23, T. 3 S., R. 1 W.**		
Soil, red, residual, and chert gravel	58	58
Fort Payne chert		
Limestone, light gray, dense, fine-grained, crystalline, dolomitic; 10% chert, white to light tan to smoky-colored, partly porous	7.5	65.5
Limestone, white to light tan, coarse-grained, crystalline; chert, light tan, weathered and porous	6.5	72
Limestone, light gray, dense, fine-grained, crystalline, dolomitic; 30% chert, dark blue-gray and partly light tan, slightly porous	9	81
Limestone, light gray to white to light green, fine- to coarse-grained, crystalline, crinoid stems; less than 5% chert, milky-white	9.5	90.5
Limestone, white, coarse-grained, crystalline; 10-60% chert, blue	20	110.5
Limestone, white, coarse-grained, partly green, fine-grained, crystalline, pyritiferous; 15% chert, white to blue; calcite, pink, crinoidal	15.5	126
Limestone, white, green and pink, coarse-grained, crystalline; chert, mottled red and white; shale, deep red and green, siliceous; calcite, white to pink, crinoidal	13	139
Shale, dark greenish-gray and red, siliceous, calcareous; calcite, pink and white, crinoidal; chert, mottled red and white; pyrite	10	149
Chattanooga shale		
Shale, black, siliceous	3	152
Red Mountain (?) formation		
Limestone, gray to green, fine-grained, crystalline, glauconitic, pyritiferous; calcite, pink	4.5	156.5
Limestone, dark gray, dense, fine-grained, crystalline, pyritiferous	3.5	160
Test well 22 **Sec. 23, T. 3 S., R. 1 W.**		
Soil, red, residual	62	62

Names:
Sample Logs of Test Wells

Types:
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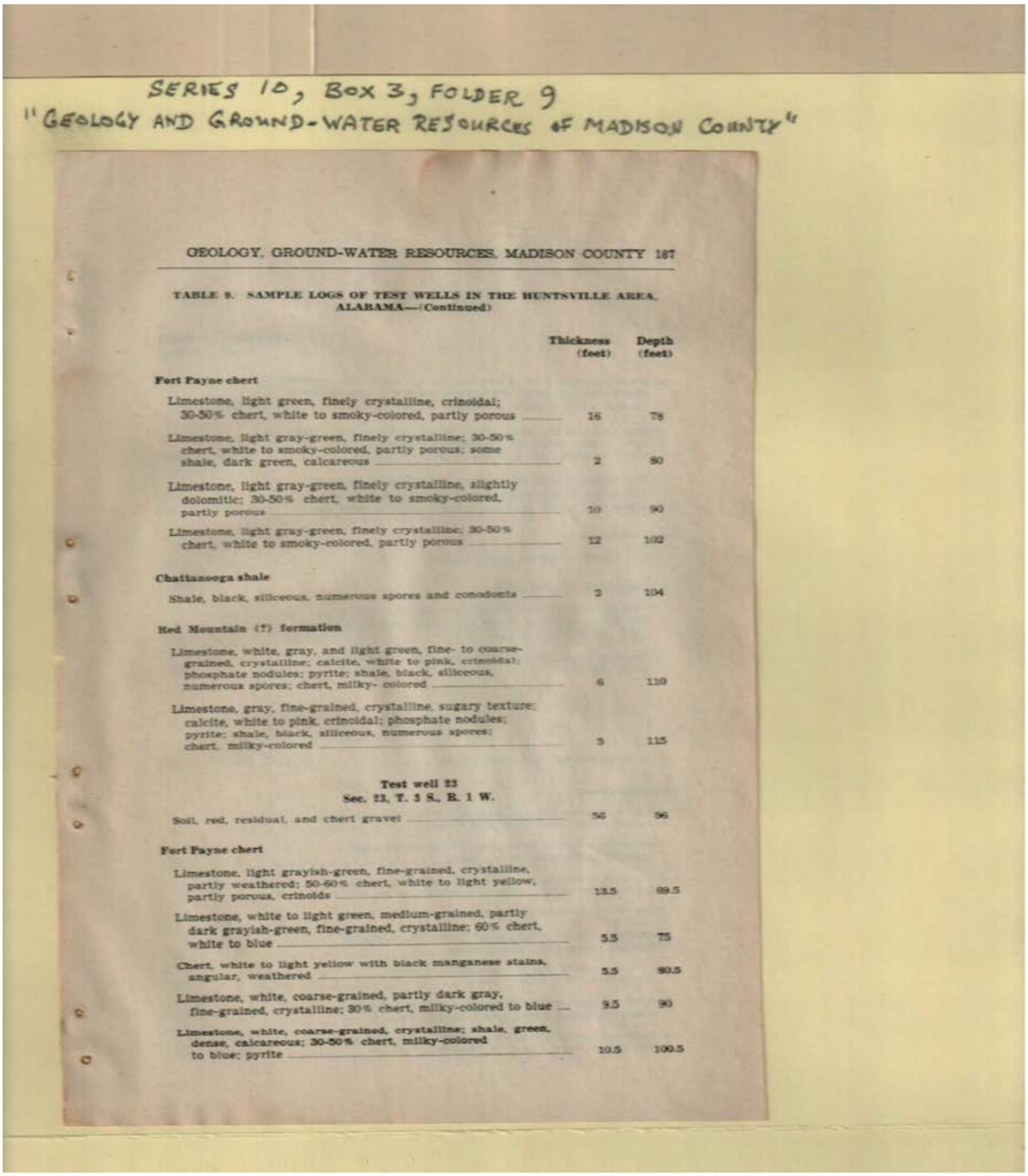

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Fort Payne chert		
Limestone, light green, finely crystalline, crinoidal; 30-50% chert, white to smoky-colored, partly porous	16	78
Limestone, light gray-green, finely crystalline; 30-50% chert, white to smoky-colored, partly porous; some shale, dark green, calcareous	2	80
Limestone, light gray-green, finely crystalline, slightly dolomitic; 30-50% chert, white to smoky-colored, partly porous	10	90
Limestone, light gray-green, finely crystalline; 30-50% chert, white to smoky-colored, partly porous	12	102
Chattanooga shale		
Shale, black, siliceous, numerous spores and conodonts	2	104
Red Mountain (?) formation		
Limestone, white, gray, and light green, fine- to coarse-grained, crystalline; calcite, white to pink, crinoidal; phosphate nodules; pyrite; shale, black, siliceous, numerous spores; chert, milky- colored	6	110
Limestone, gray, fine-grained, crystalline, sugary texture; calcite, white to pink, crinoidal; phosphate nodules; pyrite; shale, black, siliceous, numerous spores; chert, milky-colored	5	115
Test well 23 **Sec. 23, T. 3 S., R. 1 W.**		
Soil, red, residual, and chert gravel	56	56
Fort Payne chert		
Limestone, light grayish-green, fine-grained, crystalline, partly weathered; 50-60% chert, white to light yellow, partly porous, crinoids	13.5	69.5
Limestone, white to light green, medium-grained, partly dark grayish-green, fine-grained, crystalline; 60% chert, white to blue	5.5	75
Chert, white to light yellow with black manganese stains, angular, weathered	5.5	80.5
Limestone, white, coarse-grained, partly dark gray, fine-grained, crystalline; 30% chert, milky-colored to blue	9.5	90
Limestone, white, coarse-grained, crystalline; shale, green, dense, calcareous; 30-50% chert, milky-colored to blue; pyrite	10.5	100.5

Names:

Sample Logs of Test Wells

Types:

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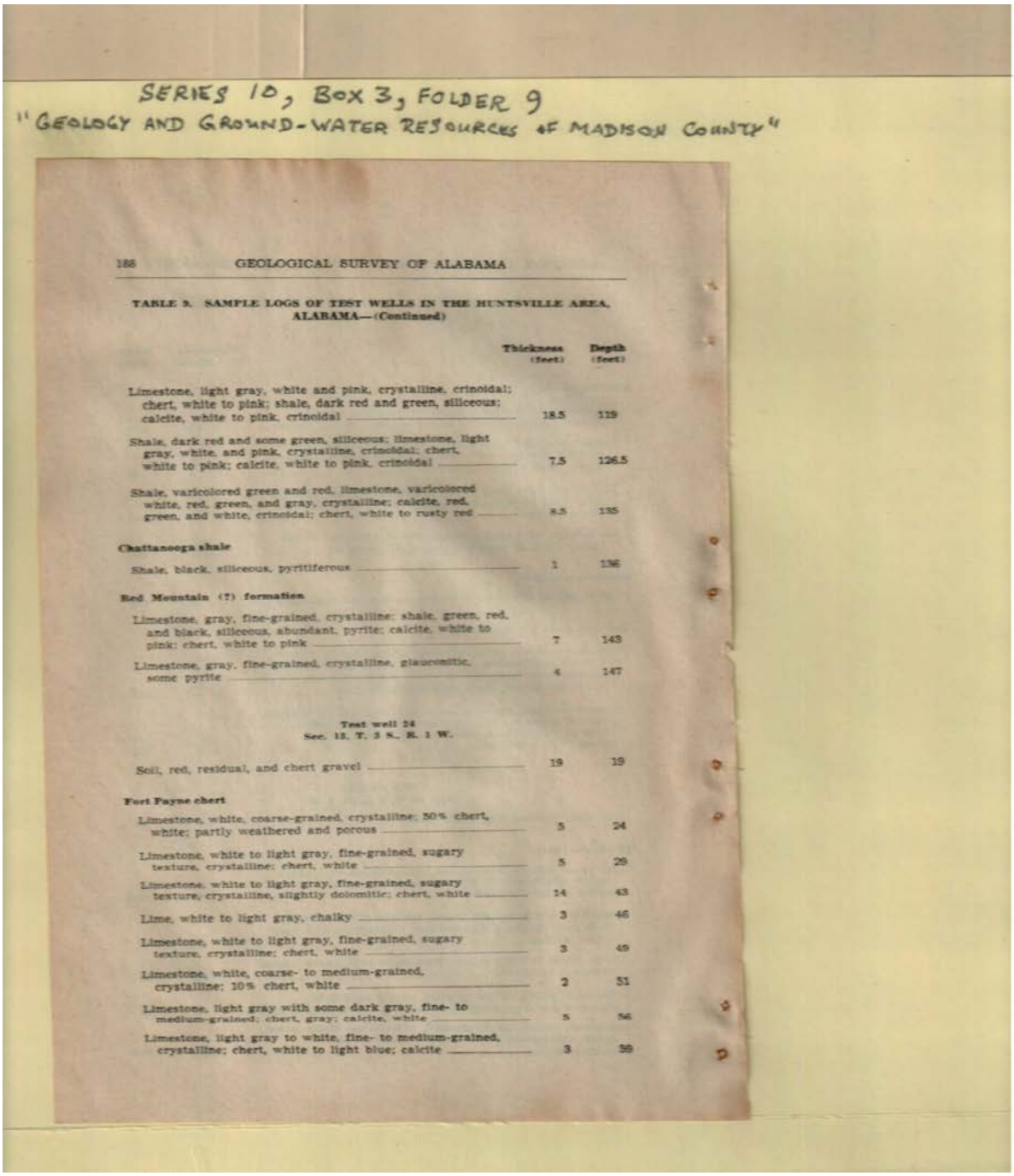
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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray, white and pink, crystalline, crinoidal; chert, white to pink; shale, dark red and green, siliceous; calcite, white to pink, crinoidal	18.5	119
Shale, dark red and some green, siliceous; limestone, light gray, white, and pink, crystalline, crinoidal; chert, white to pink; calcite, white to pink, crinoidal	7.5	126.5
Shale, varicolored green and red, limestone, varicolored white, red, green, and gray, crystalline; calcite, red, green, and white, crinoidal; chert, white to rusty red	8.5	135
Chattanooga shale		
Shale, black, siliceous, pyritiferous	1	136
Red Mountain (?) formation		
Limestone, gray, fine-grained, crystalline; shale, green, red, and black, siliceous, abundant, pyrite; calcite, white to pink; chert, white to pink	7	143
Limestone, gray, fine-grained, crystalline, glauconitic, some pyrite	4	147
Test well 24 **Sec. 12, T. 3 S., R. 1 W.**		
Soil, red, residual, and chert gravel	19	19
Fort Payne chert		
Limestone, white, coarse-grained, crystalline; 50% chert, white; partly weathered and porous	5	24
Limestone, white to light gray, fine-grained, sugary texture, crystalline; chert, white	5	29
Limestone, white to light gray, fine-grained, sugary texture, crystalline, slightly dolomitic; chert, white	14	43
Lime, white to light gray, chalky	3	46
Limestone, white to light gray, fine-grained, sugary texture, crystalline; chert, white	3	49
Limestone, white, coarse- to medium-grained, crystalline; 10% chert, white	2	51
Limestone, light gray with some dark gray, fine- to medium-grained; chert, gray; calcite, white	5	56
Limestone, light gray to white, fine- to medium-grained, crystalline; chert, white to light blue; calcite	3	59

Names:
Sample Logs of Test Wells

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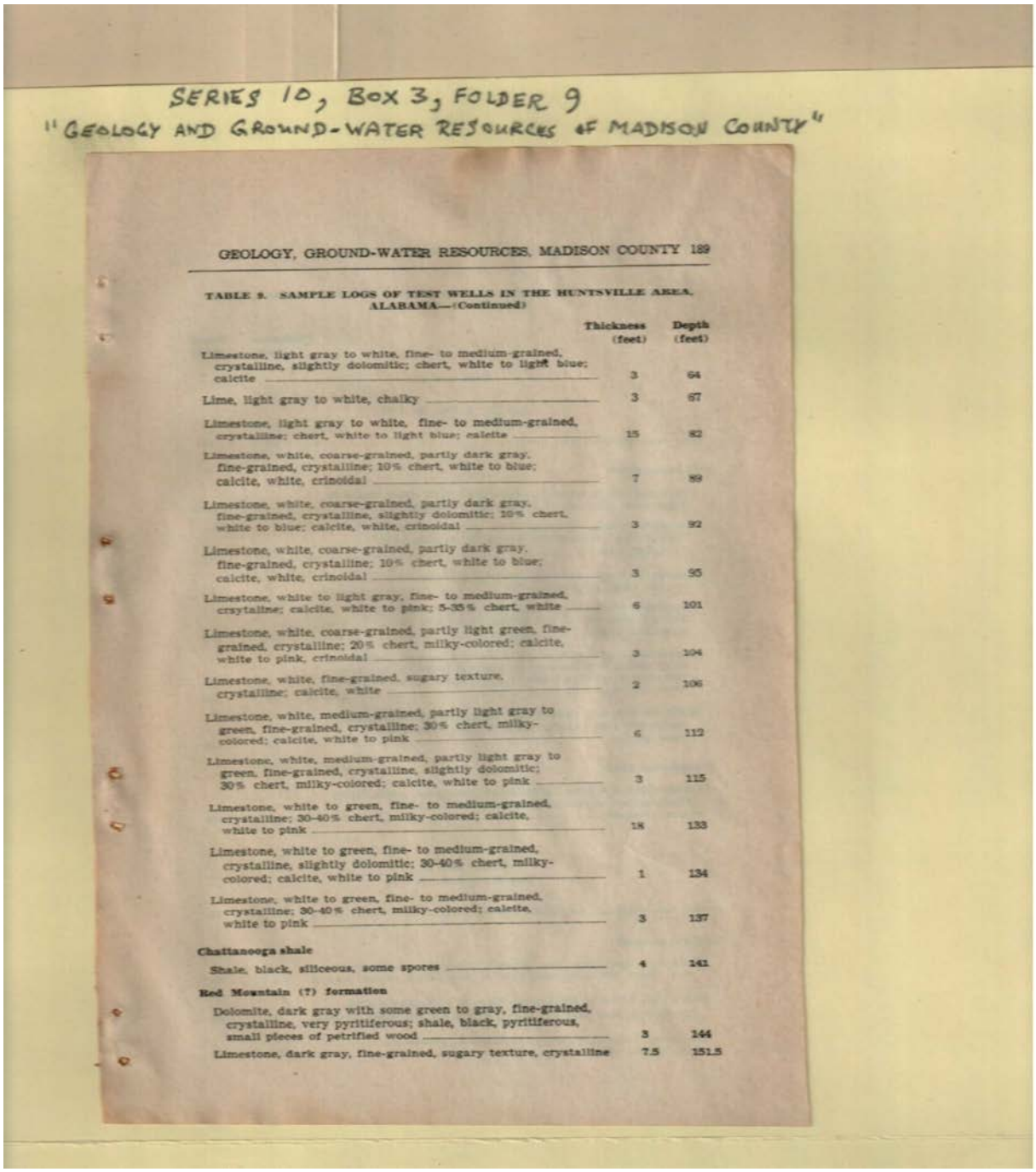

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray to white, fine- to medium-grained, crystalline, slightly dolomitic; chert, white to light blue; calcite	3	64
Lime, light gray to white, chalky	3	67
Limestone, light gray to white, fine- to medium-grained, crystalline; chert, white to light blue; calcite	15	82
Limestone, white, coarse-grained, partly dark gray, fine-grained, crystalline; 10% chert, white to blue; calcite, white, crinoidal	7	89
Limestone, white, coarse-grained, partly dark gray, fine-grained, crystalline, slightly dolomitic; 10% chert, white to blue; calcite, white, crinoidal	3	92
Limestone, white, coarse-grained, partly dark gray, fine-grained, crystalline; 10% chert, white to blue; calcite, white, crinoidal	3	95
Limestone, white to light gray, fine- to medium-grained, crystalline; calcite, white to pink; 5-35% chert, white	6	101
Limestone, white, coarse-grained, partly light green, fine-grained, crystalline; 20% chert, milky-colored; calcite, white to pink, crinoidal	3	104
Limestone, white, fine-grained, sugary texture, crystalline; calcite, white	2	106
Limestone, white, medium-grained, partly light gray to green, fine-grained, crystalline; 30% chert, milky-colored; calcite, white to pink	6	112
Limestone, white, medium-grained, partly light gray to green, fine-grained, crystalline, slightly dolomitic; 30% chert, milky-colored; calcite, white to pink	3	115
Limestone, white to green, fine- to medium-grained, crystalline; 30-40% chert, milky-colored; calcite, white to pink	18	133
Limestone, white to green, fine- to medium-grained, crystalline, slightly dolomitic; 30-40% chert, milky-colored; calcite, white to pink	1	134
Limestone, white to green, fine- to medium-grained, crystalline; 30-40% chert, milky-colored; calcite, white to pink	3	137
Chattanooga shale		
Shale, black, siliceous, some spores	4	141
Red Mountain (?) formation		
Dolomite, dark gray with some green to gray, fine-grained, crystalline, very pyritiferous; shale, black, pyritiferous, small pieces of petrified wood	3	144
Limestone, dark gray, fine-grained, sugary texture, crystalline	7.5	151.5

Names:
Sample Logs of Test Wells

Types:
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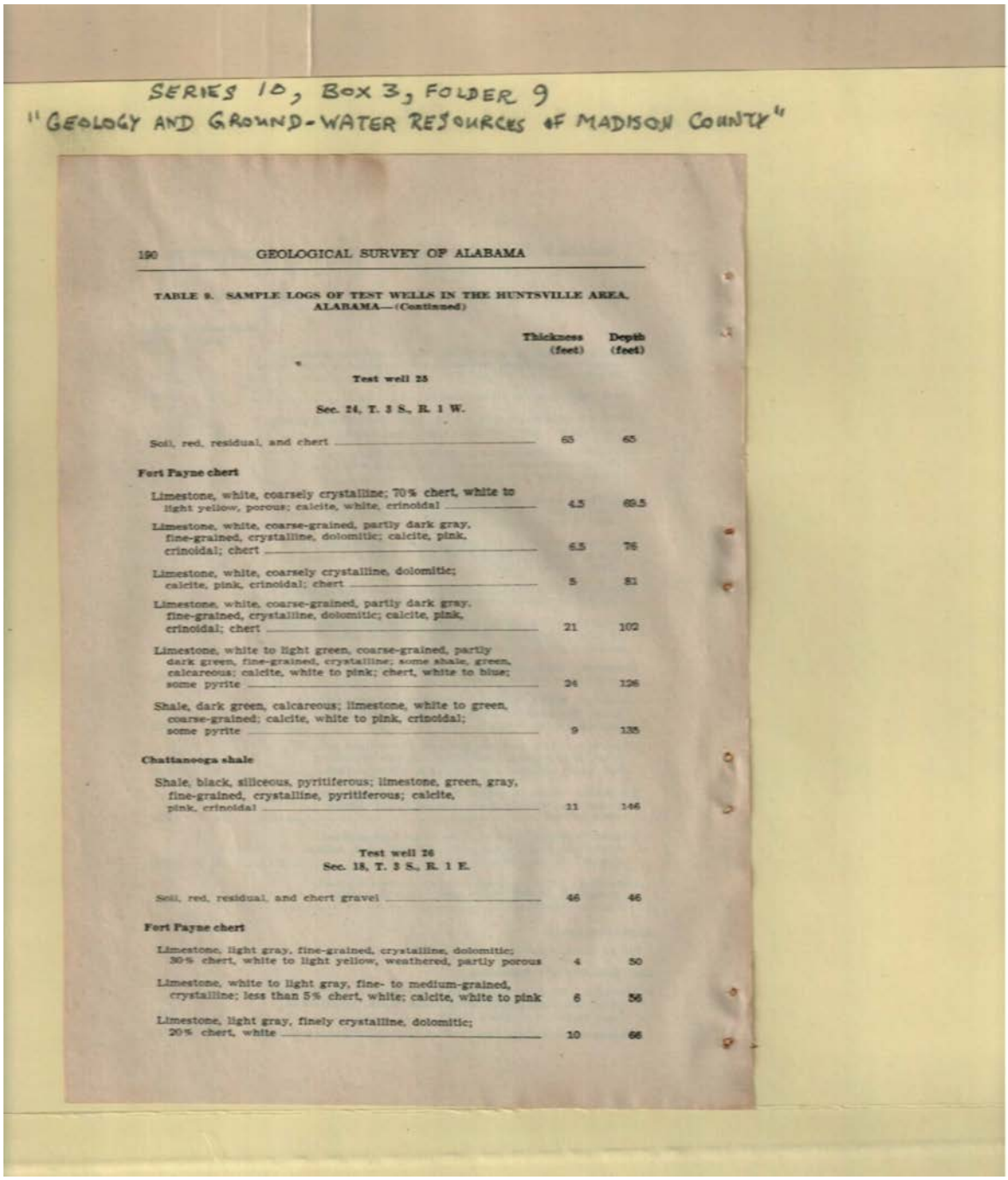

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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Test well 25		
Sec. 24, T. 3 S., R. 1 W.		
Soil, red, residual, and chert	65	65
Fort Payne chert		
Limestone, white, coarsely crystalline; 70% chert, white to light yellow, porous; calcite, white, crinoidal	4.5	69.5
Limestone, white, coarse-grained, partly dark gray, fine-grained, crystalline, dolomitic; calcite, pink, crinoidal; chert	6.5	76
Limestone, white, coarsely crystalline, dolomitic; calcite, pink, crinoidal; chert	5	81
Limestone, white, coarse-grained, partly dark gray, fine-grained, crystalline, dolomitic; calcite, pink, crinoidal; chert	21	102
Limestone, white to light green, coarse-grained, partly dark green, fine-grained, crystalline; some shale, green, calcareous; calcite, white to pink; chert, white to blue; some pyrite	24	126
Shale, dark green, calcareous; limestone, white to green, coarse-grained; calcite, white to pink, crinoidal; some pyrite	9	135
Chattanooga shale		
Shale, black, siliceous, pyritiferous; limestone, green, gray, fine-grained, crystalline, pyritiferous; calcite, pink, crinoidal	11	146
Test well 26		
Sec. 18, T. 3 S., R. 1 E.		
Soil, red, residual, and chert gravel	46	46
Fort Payne chert		
Limestone, light gray, fine-grained, crystalline, dolomitic; 30% chert, white to light yellow, weathered, partly porous	4	50
Limestone, white to light gray, fine- to medium-grained, crystalline; less than 5% chert, white; calcite, white to pink	6	56
Limestone, light gray, finely crystalline, dolomitic; 20% chert, white	10	66

Names:

Sample Logs of Test Wells

Types:

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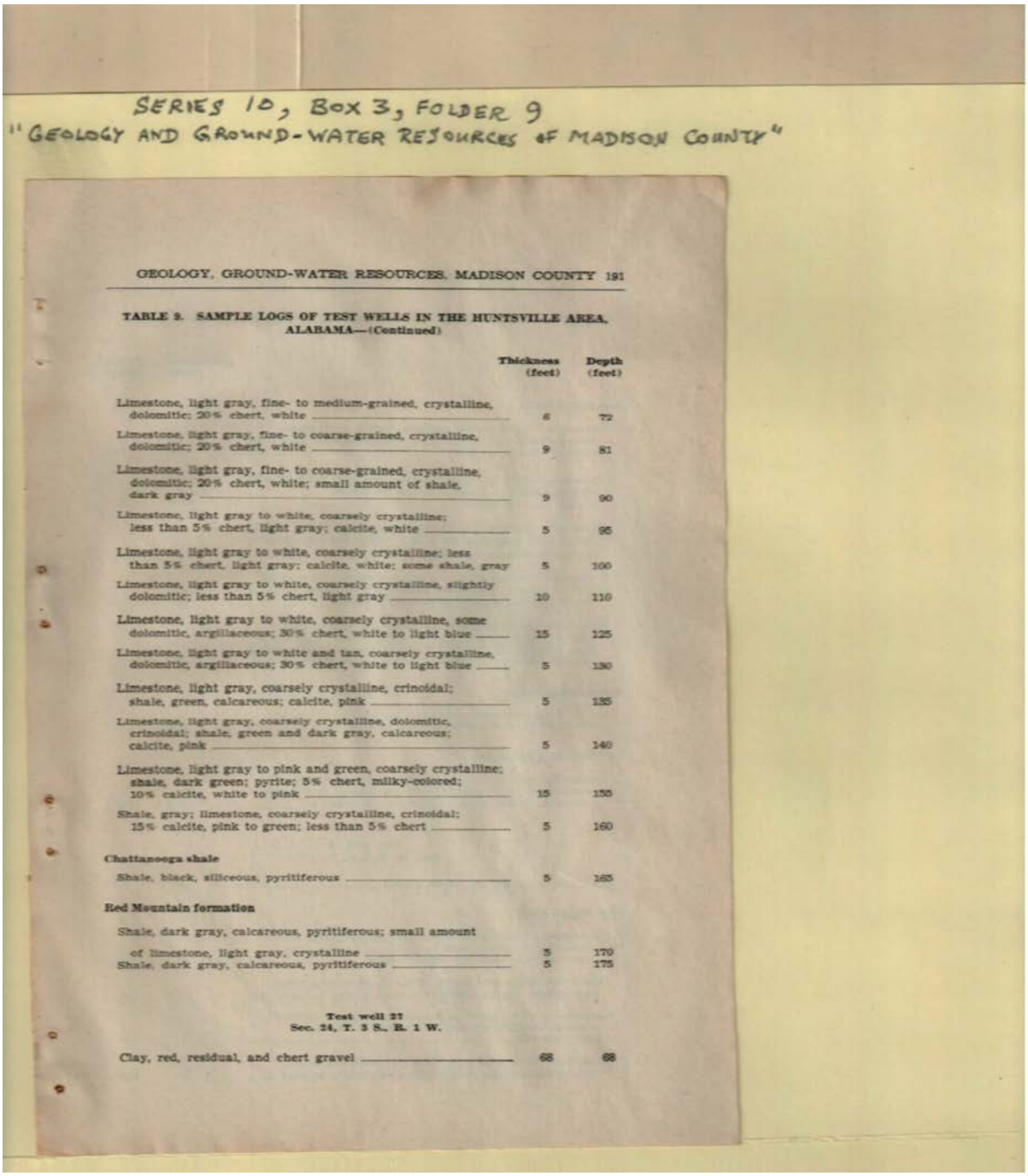

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray, fine- to medium-grained, crystalline, dolomitic; 20% chert, white	6	72
Limestone, light gray, fine- to coarse-grained, crystalline, dolomitic; 20% chert, white	9	81
Limestone, light gray, fine- to coarse-grained, crystalline, dolomitic; 20% chert, white; small amount of shale, dark gray	9	90
Limestone, light gray to white, coarsely crystalline; less than 5% chert, light gray; calcite, white	5	95
Limestone, light gray to white, coarsely crystalline; less than 5% chert, light gray; calcite, white; some shale, gray	5	100
Limestone, light gray to white, coarsely crystalline, slightly dolomitic; less than 5% chert, light gray	10	110
Limestone, light gray to white, coarsely crystalline, some dolomitic, argillaceous; 30% chert, white to light blue	15	125
Limestone, light gray to white and tan, coarsely crystalline, dolomitic, argillaceous; 30% chert, white to light blue	5	130
Limestone, light gray, coarsely crystalline, crinoidal; shale, green, calcareous; calcite, pink	5	135
Limestone, light gray, coarsely crystalline, dolomitic, crinoidal; shale, green and dark gray, calcareous; calcite, pink	5	140
Limestone, light gray to pink and green, coarsely crystalline; shale, dark green; pyrite; 5% chert, milky-colored; 10% calcite, white to pink	15	155
Shale, gray; limestone, coarsely crystalline, crinoidal; 15% calcite, pink to green; less than 5% chert	5	160
Chattanooga shale		
Shale, black, siliceous, pyritiferous	5	165
Red Mountain formation		
Shale, dark gray, calcareous, pyritiferous; small amount of limestone, light gray, crystalline	5	170
Shale, dark gray, calcareous, pyritiferous	5	175
Test well 27 Sec. 24, T. 3 S., R. 1 W.		
Clay, red, residual, and chert gravel	68	68

Names:
Sample Logs of Test Wells

Types:
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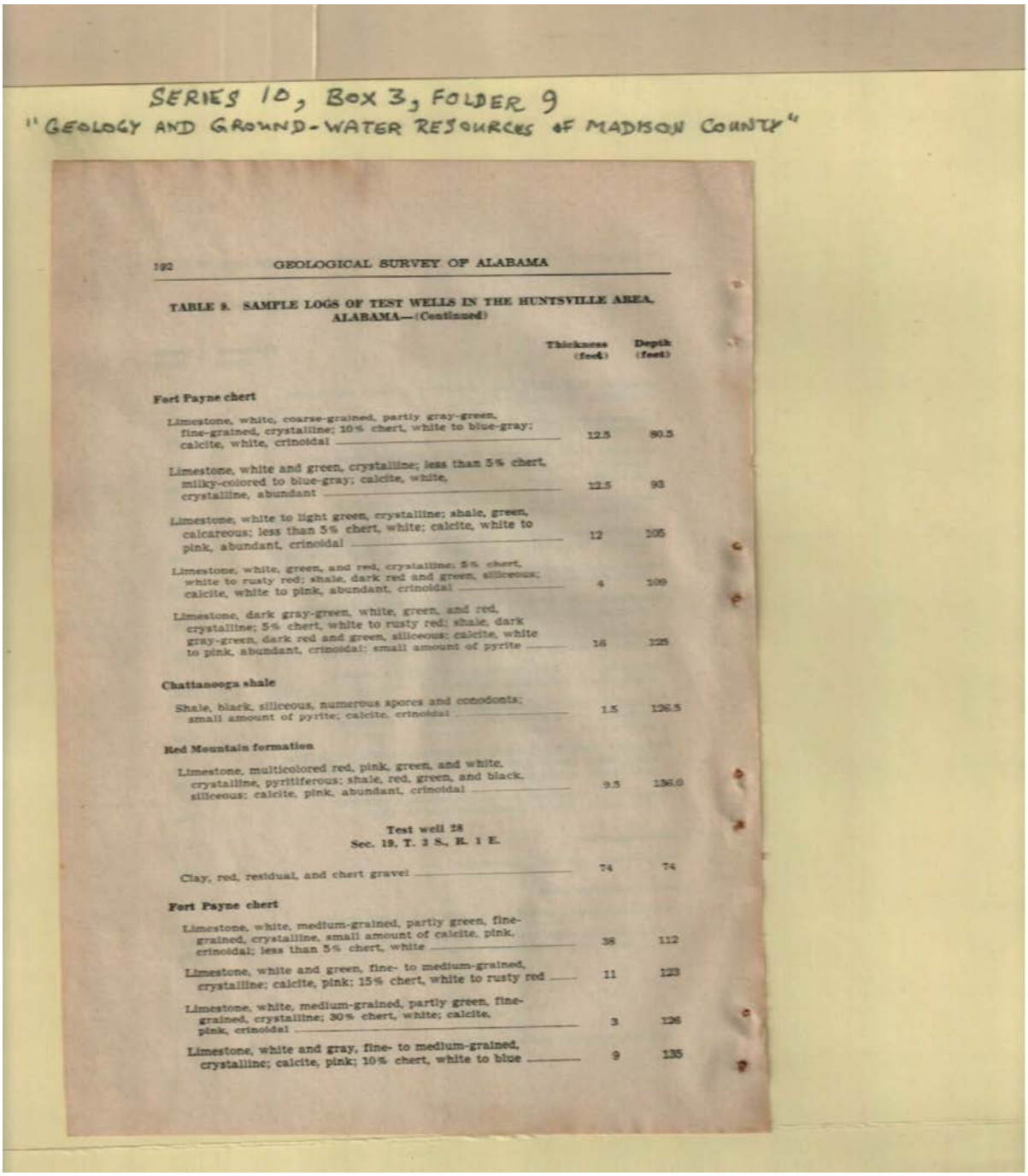

192 GEOLOGICAL SURVEY OF ALABAMA

TABLE 8. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Fort Payne chert		
Limestone, white, coarse-grained, partly gray-green, fine-grained, crystalline; 10% chert, white to blue-gray; calcite, white, crinoidal	12.5	80.5
Limestone, white and green, crystalline; less than 5% chert, milky-colored to blue-gray; calcite, white, crystalline, abundant	12.5	93
Limestone, white to light green, crystalline; shale, green, calcareous; less than 5% chert, white; calcite, white to pink, abundant, crinoidal	12	105
Limestone, white, green, and red, crystalline; 5% chert, white to rusty red; shale, dark red and green, siliceous; calcite, white to pink, abundant, crinoidal	4	109
Limestone, dark gray-green, white, green, and red, crystalline; 5% chert, white to rusty red; shale, dark gray-green, dark red and green, siliceous; calcite, white to pink, abundant, crinoidal; small amount of pyrite	16	125
Chattanooga shale		
Shale, black, siliceous, numerous spores and conodonts; small amount of pyrite; calcite, crinoidal	1.5	126.5
Red Mountain formation		
Limestone, multicolored red, pink, green, and white, crystalline, pyritiferous; shale, red, green, and black, siliceous; calcite, pink, abundant, crinoidal	9.5	136.0
Test well 28 **Sec. 19, T. 3 S., R. 1 E.**		
Clay, red, residual, and chert gravel	74	74
Fort Payne chert		
Limestone, white, medium-grained, partly green, fine-grained, crystalline, small amount of calcite, pink, crinoidal; less than 5% chert, white	38	112
Limestone, white and green, fine- to medium-grained, crystalline; calcite, pink; 15% chert, white to rusty red	11	123
Limestone, white, medium-grained, partly green, fine-grained, crystalline; 30% chert, white; calcite, pink, crinoidal	3	126
Limestone, white and gray, fine- to medium-grained, crystalline; calcite, pink; 10% chert, white to blue	9	135

Names:
Sample Logs of Test Wells

Types:
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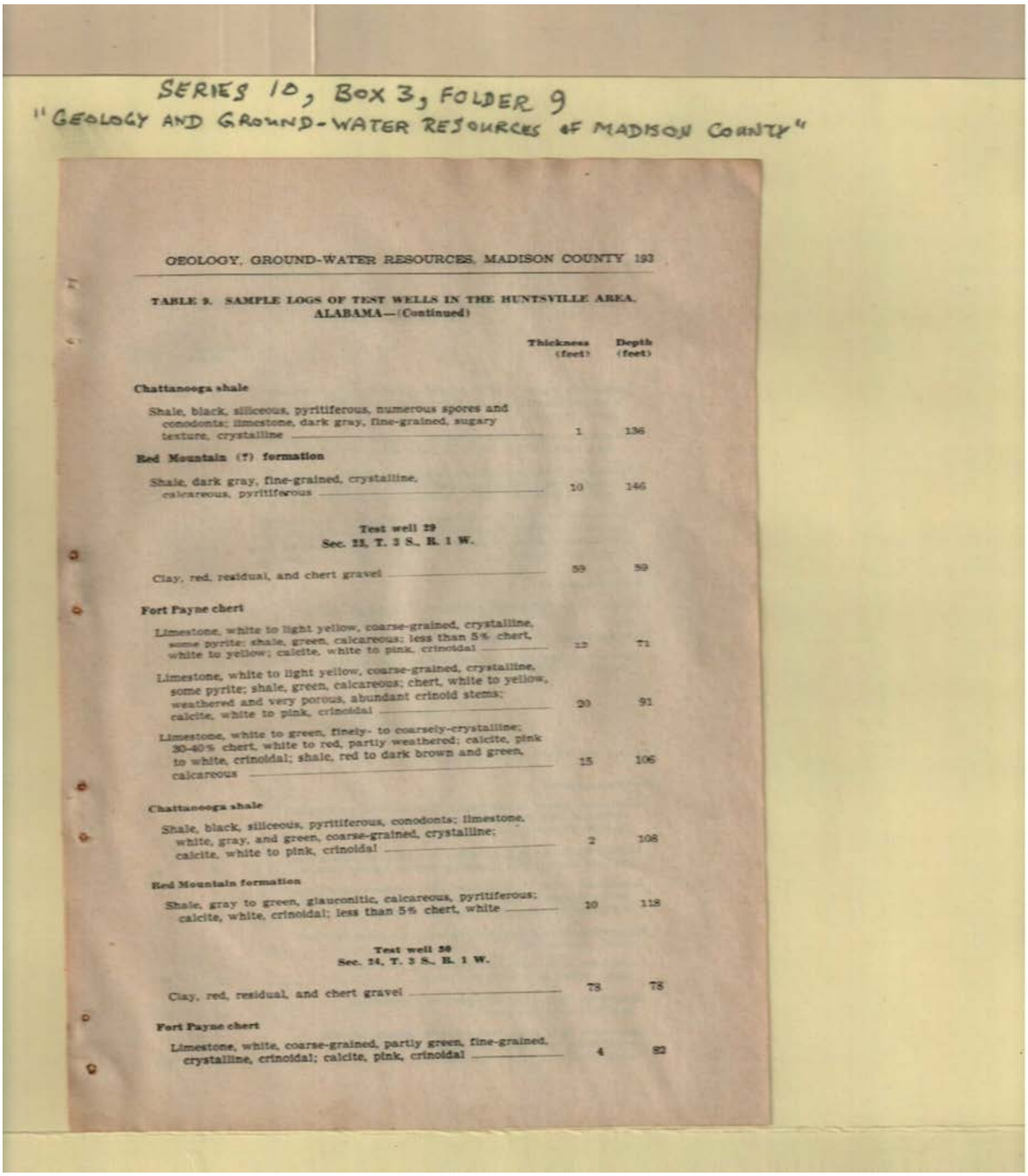

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Chattanooga shale		
Shale, black, siliceous, pyritiferous, numerous spores and conodonts; limestone, dark gray, fine-grained, sugary texture, crystalline	1	136
Red Mountain (?) formation		
Shale, dark gray, fine-grained, crystalline, calcareous, pyritiferous	10	146
Test well 29 Sec. 23, T. 3 S., R. 1 W.		
Clay, red, residual, and chert gravel	59	59
Fort Payne chert		
Limestone, white to light yellow, coarse-grained, crystalline, some pyrite; shale, green, calcareous; less than 5% chert, white to yellow; calcite, white to pink, crinoidal	12	71
Limestone, white to light yellow, coarse-grained, crystalline, some pyrite; shale, green, calcareous; chert, white to yellow, weathered and very porous, abundant crinoid stems; calcite, white to pink, crinoidal	20	91
Limestone, white to green, finely- to coarsely-crystalline; 30-40% chert, white to red, partly weathered; calcite, pink to white, crinoidal; shale, red to dark brown and green, calcareous	15	106
Chattanooga shale		
Shale, black, siliceous, pyritiferous, conodonts; limestone, white, gray, and green, coarse-grained, crystalline; calcite, white to pink, crinoidal	2	108
Red Mountain formation		
Shale, gray to green, glauconitic, calcareous, pyritiferous; calcite, white, crinoidal; less than 5% chert, white	10	118
Test well 30 Sec. 24, T. 3 S., R. 1 W.		
Clay, red, residual, and chert gravel	78	78
Fort Payne chert		
Limestone, white, coarse-grained, partly green, fine-grained, crystalline, crinoidal; calcite, pink, crinoidal	4	82

Names:

Sample Logs of Test Wells

Types:

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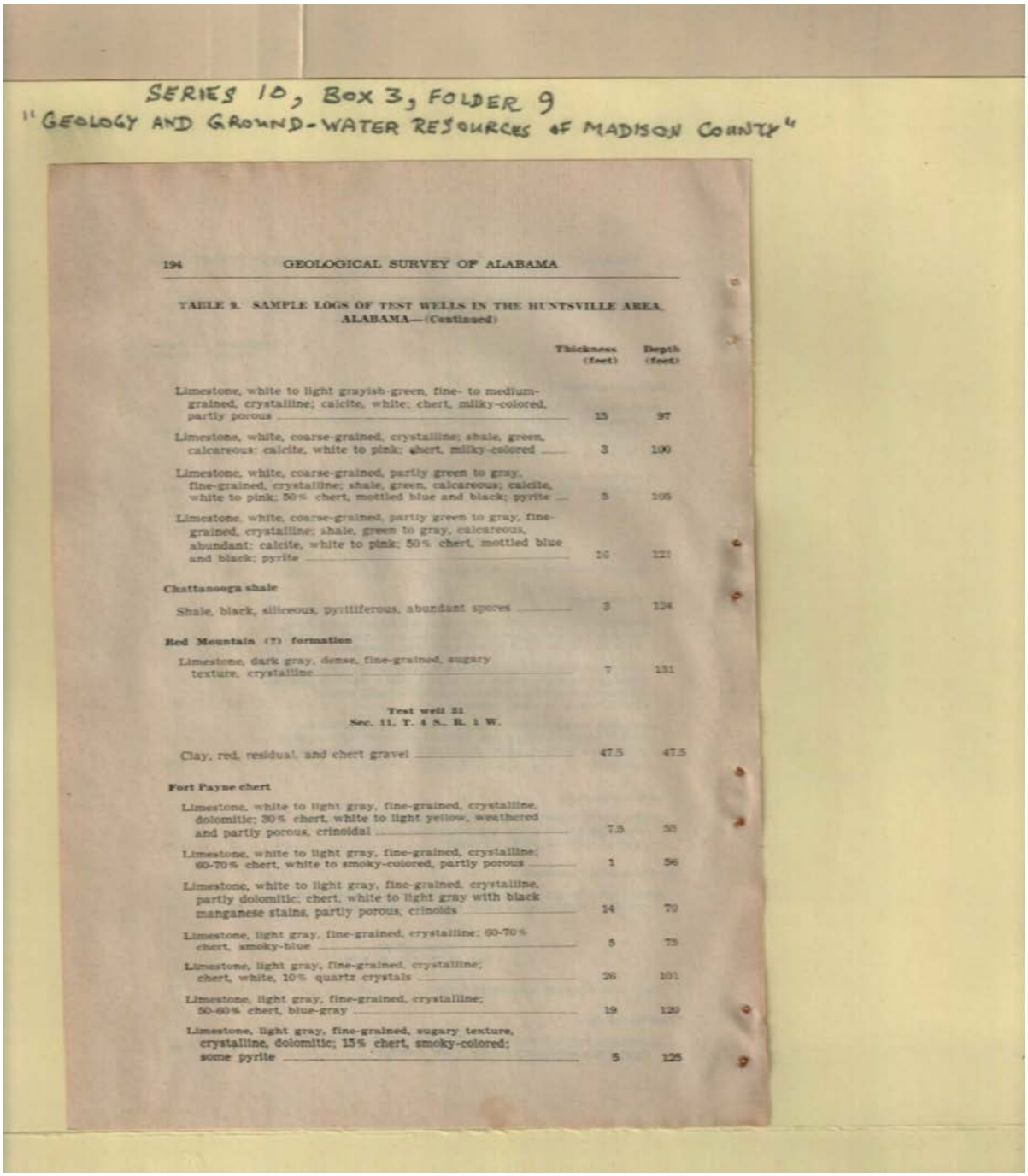


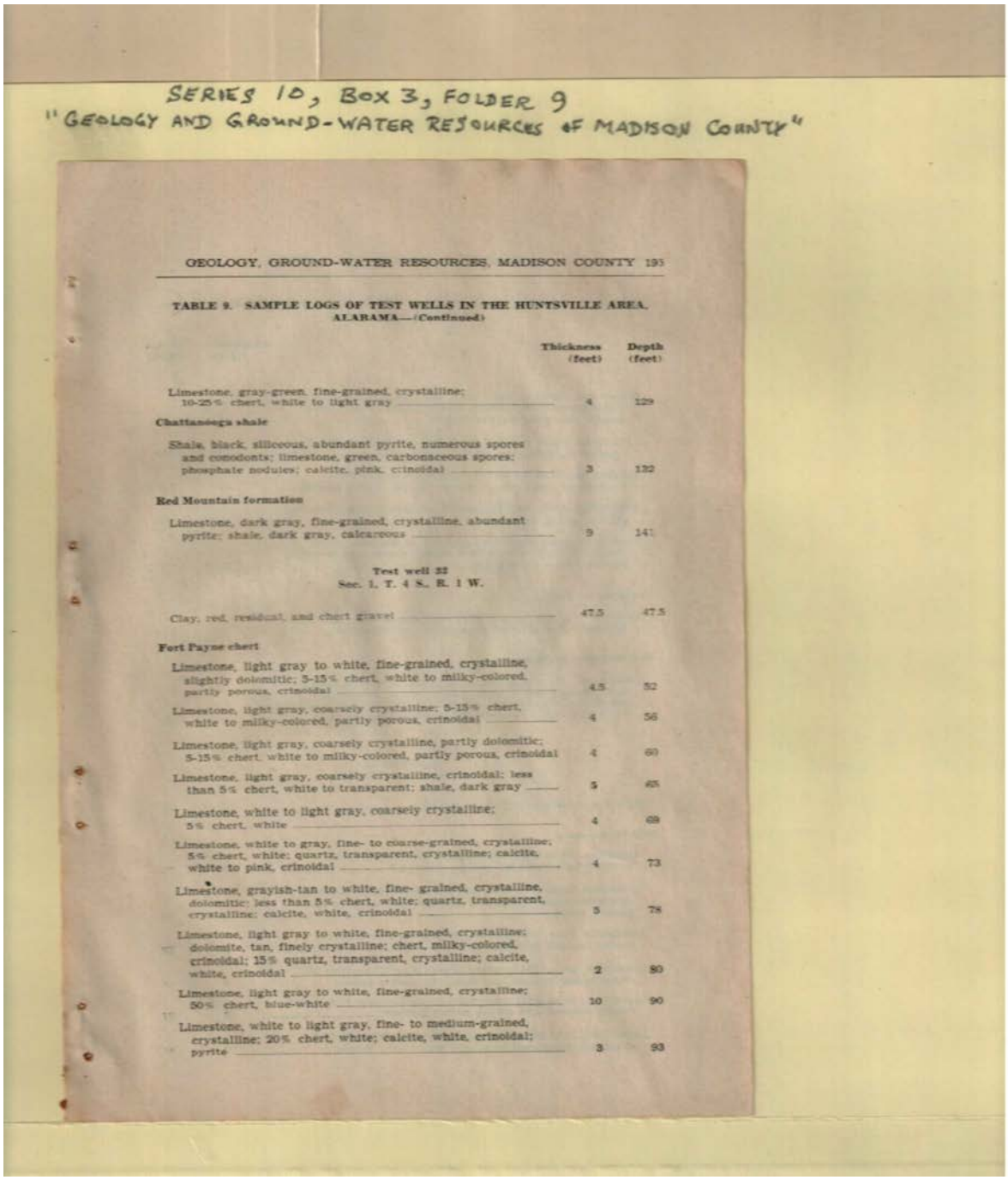
194 GEOLOGICAL SURVEY OF ALABAMA

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, white to light grayish-green, fine- to medium-grained, crystalline; calcite, white; chert, milky-colored, partly porous	15	97
Limestone, white, coarse-grained, crystalline; shale, green, calcareous; calcite, white to pink; chert, milky-colored	3	100
Limestone, white, coarse-grained, partly green to gray, fine-grained, crystalline; shale, green, calcareous; calcite, white to pink; 50% chert, mottled blue and black; pyrite	5	105
Limestone, white, coarse-grained, partly green to gray, fine-grained, crystalline; shale, green to gray, calcareous, abundant; calcite, white to pink; 50% chert, mottled blue and black; pyrite	16	121
Chattanooga shale		
Shale, black, siliceous, pyritiferous, abundant spores	3	124
Red Mountain (?) formation		
Limestone, dark gray, dense, fine-grained, sugary texture, crystalline	7	131
Test well 21 **Sec. 11, T. 4 S., R. 1 W.**		
Clay, red, residual, and chert gravel	47.5	47.5
Fort Payne chert		
Limestone, white to light gray, fine-grained, crystalline, dolomitic; 30% chert, white to light yellow, weathered and partly porous, crinoidal	7.5	55
Limestone, white to light gray, fine-grained, crystalline; 60-70% chert, white to smoky-colored, partly porous	1	56
Limestone, white to light gray, fine-grained, crystalline, partly dolomitic; chert, white to light gray with black manganese stains, partly porous, crinoids	14	70
Limestone, light gray, fine-grained, crystalline; 60-70% chert, smoky-blue	5	75
Limestone, light gray, fine-grained, crystalline; chert, white, 10% quartz crystals	26	101
Limestone, light gray, fine-grained, crystalline; 50-60% chert, blue-gray	19	120
Limestone, light gray, fine-grained, sugary texture, crystalline, dolomitic; 15% chert, smoky-colored; some pyrite	5	125

Names:
Sample Logs of Test Wells

Types:
booklet



GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 195

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA.—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, gray-green, fine-grained, crystalline; 10-25% chert, white to light gray	4	129
Chattanooga shale		
Shale, black, siliceous, abundant pyrite, numerous spores and conodonts; limestone, green, carbonaceous spores; phosphate nodules; calcite, pink, crinoidal	3	132
Red Mountain formation		
Limestone, dark gray, fine-grained, crystalline, abundant pyrite; shale, dark gray, calcareous	9	141
Test well 32 **Sec. 1, T. 4 S., R. 1 W.**		
Clay, red, residual, and chert gravel	47.5	47.5
Fort Payne chert		
Limestone, light gray to white, fine-grained, crystalline, slightly dolomitic; 5-15% chert, white to milky-colored, partly porous, crinoidal	4.5	52
Limestone, light gray, coarsely crystalline; 5-15% chert, white to milky-colored, partly porous, crinoidal	4	56
Limestone, light gray, coarsely crystalline, partly dolomitic; 5-15% chert, white to milky-colored, partly porous, crinoidal	4	60
Limestone, light gray, coarsely crystalline, crinoidal; less than 5% chert, white to transparent; shale, dark gray	5	65
Limestone, white to light gray, coarsely crystalline; 5% chert, white	4	69
Limestone, white to gray, fine- to coarse-grained, crystalline; 5% chert, white; quartz, transparent, crystalline; calcite, white to pink, crinoidal	4	73
Limestone, grayish-tan to white, fine- grained, crystalline, dolomitic; less than 5% chert, white; quartz, transparent, crystalline; calcite, white, crinoidal	5	78
Limestone, light gray to white, fine-grained, crystalline; dolomite, tan, finely crystalline; chert, milky-colored, crinoidal; 15% quartz, transparent, crystalline; calcite, white, crinoidal	2	80
Limestone, light gray to white, fine-grained, crystalline; 50% chert, blue-white	10	90
Limestone, white to light gray, fine- to medium-grained, crystalline; 20% chert, white; calcite, white, crinoidal; pyrite	3	93

Names:
Sample Logs of Test Wells

Types:
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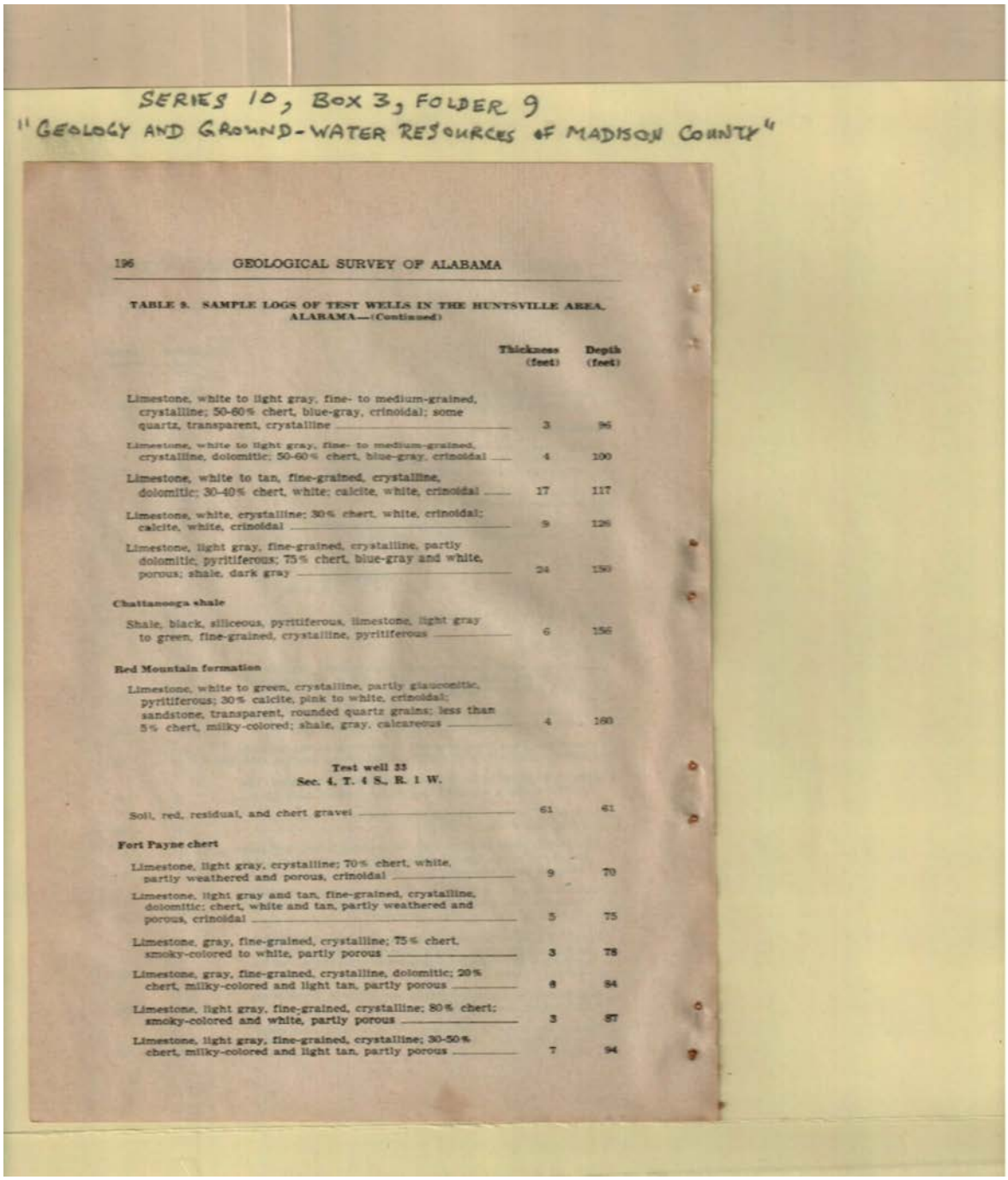

196 GEOLOGICAL SURVEY OF ALABAMA

TABLE 8. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA.—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, white to light gray, fine- to medium-grained, crystalline; 50-60% chert, blue-gray, crinoidal; some quartz, transparent, crystalline	3	96
Limestone, white to light gray, fine- to medium-grained, crystalline, dolomitic; 50-60% chert, blue-gray, crinoidal	4	100
Limestone, white to tan, fine-grained, crystalline, dolomitic; 30-40% chert, white; calcite, white, crinoidal	17	117
Limestone, white, crystalline; 30% chert, white, crinoidal; calcite, white, crinoidal	9	126
Limestone, light gray, fine-grained, crystalline, partly dolomitic, pyritiferous; 75% chert, blue-gray and white, porous; shale, dark gray	24	150
Chattanooga shale		
Shale, black, siliceous, pyritiferous, limestone, light gray to green, fine-grained, crystalline, pyritiferous	6	156
Red Mountain formation		
Limestone, white to green, crystalline, partly glauconitic, pyritiferous; 30% calcite, pink to white, crinoidal; sandstone, transparent, rounded quartz grains; less than 5% chert, milky-colored; shale, gray, calcareous	4	160
Test well 33 **Sec. 4, T. 4 S., R. 1 W.**		
Soil, red, residual, and chert gravel	61	61
Fort Payne chert		
Limestone, light gray, crystalline; 70% chert, white, partly weathered and porous, crinoidal	9	70
Limestone, light gray and tan, fine-grained, crystalline, dolomitic; chert, white and tan, partly weathered and porous, crinoidal	5	75
Limestone, gray, fine-grained, crystalline; 75% chert, smoky-colored to white, partly porous	3	78
Limestone, gray, fine-grained, crystalline, dolomitic; 20% chert, milky-colored and light tan, partly porous	6	84
Limestone, light gray, fine-grained, crystalline; 80% chert; smoky-colored and white, partly porous	3	87
Limestone, light gray, fine-grained, crystalline; 30-50% chert, milky-colored and light tan, partly porous	7	94

Names:
Sample Logs of Test Wells

Types:
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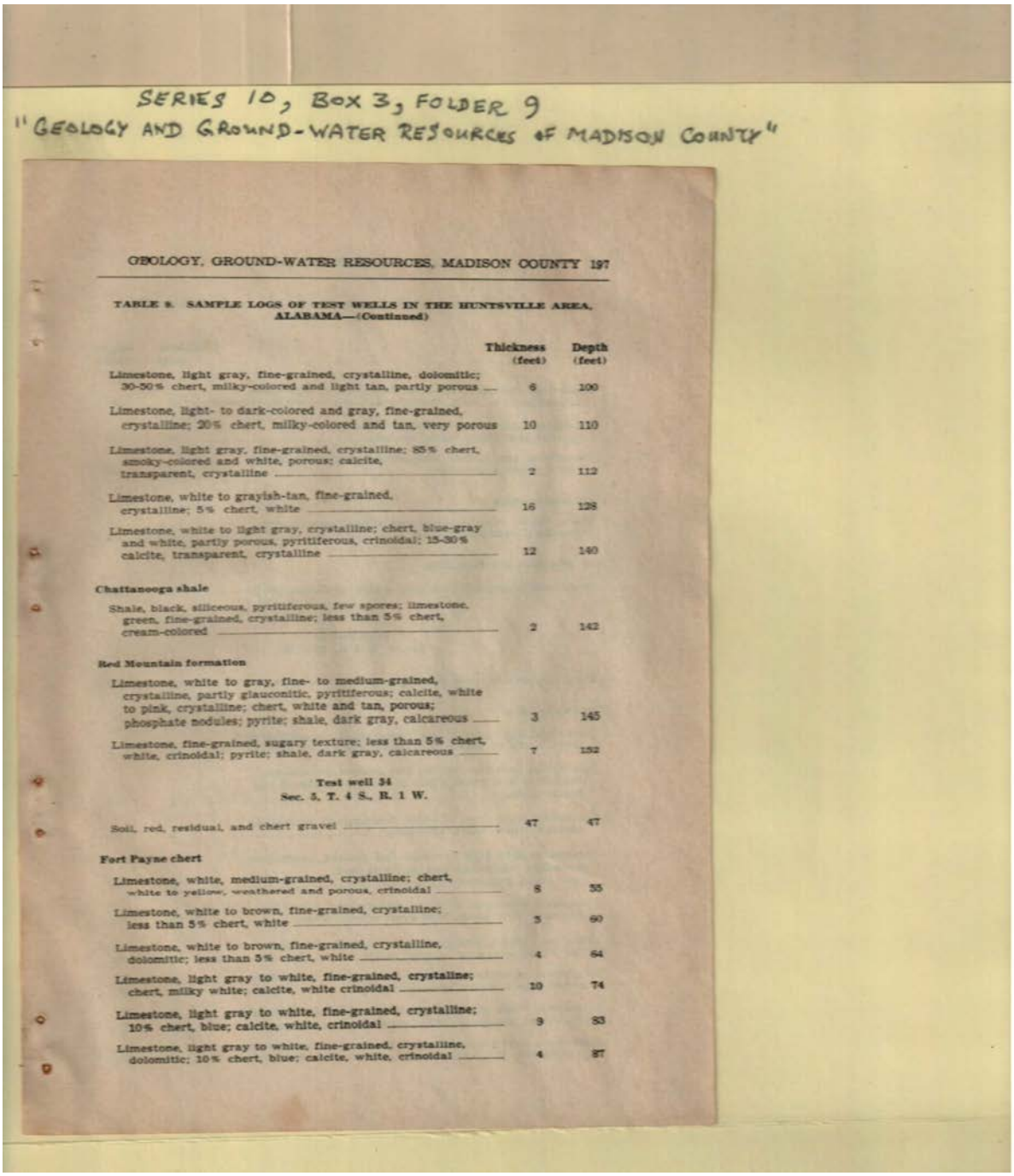

TABLE 8. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray, fine-grained, crystalline, dolomitic; 30-50% chert, milky-colored and light tan, partly porous	6	100
Limestone, light- to dark-colored and gray, fine-grained, crystalline; 20% chert, milky-colored and tan, very porous	10	110
Limestone, light gray, fine-grained, crystalline; 85% chert, smoky-colored and white, porous; calcite, transparent, crystalline	2	112
Limestone, white to grayish-tan, fine-grained, crystalline; 5% chert, white	16	128
Limestone, white to light gray, crystalline; chert, blue-gray and white, partly porous, pyritiferous, crinoidal; 15-30% calcite, transparent, crystalline	12	140
Chattanooga shale		
Shale, black, siliceous, pyritiferous, few spores; limestone, green, fine-grained, crystalline; less than 5% chert, cream-colored	2	142
Red Mountain formation		
Limestone, white to gray, fine- to medium-grained, crystalline, partly glauconitic, pyritiferous; calcite, white to pink, crystalline; chert, white and tan, porous; phosphate nodules; pyrite; shale, dark gray, calcareous	3	145
Limestone, fine-grained, sugary texture; less than 5% chert, white, crinoidal; pyrite; shale, dark gray, calcareous	7	152
Test well 34 **Sec. 5, T. 4 S., R. 1 W.**		
Soil, red, residual, and chert gravel	47	47
Fort Payne chert		
Limestone, white, medium-grained, crystalline; chert, white to yellow, weathered and porous, crinoidal	8	55
Limestone, white to brown, fine-grained, crystalline; less than 5% chert, white	5	60
Limestone, white to brown, fine-grained, crystalline, dolomitic; less than 5% chert, white	4	64
Limestone, light gray to white, fine-grained, crystalline; chert, milky white; calcite, white crinoidal	10	74
Limestone, light gray to white, fine-grained, crystalline; 10% chert, blue; calcite, white, crinoidal	9	83
Limestone, light gray to white, fine-grained, crystalline, dolomitic; 10% chert, blue; calcite, white, crinoidal	4	87

Names:
Sample Logs of Test Wells

Types:
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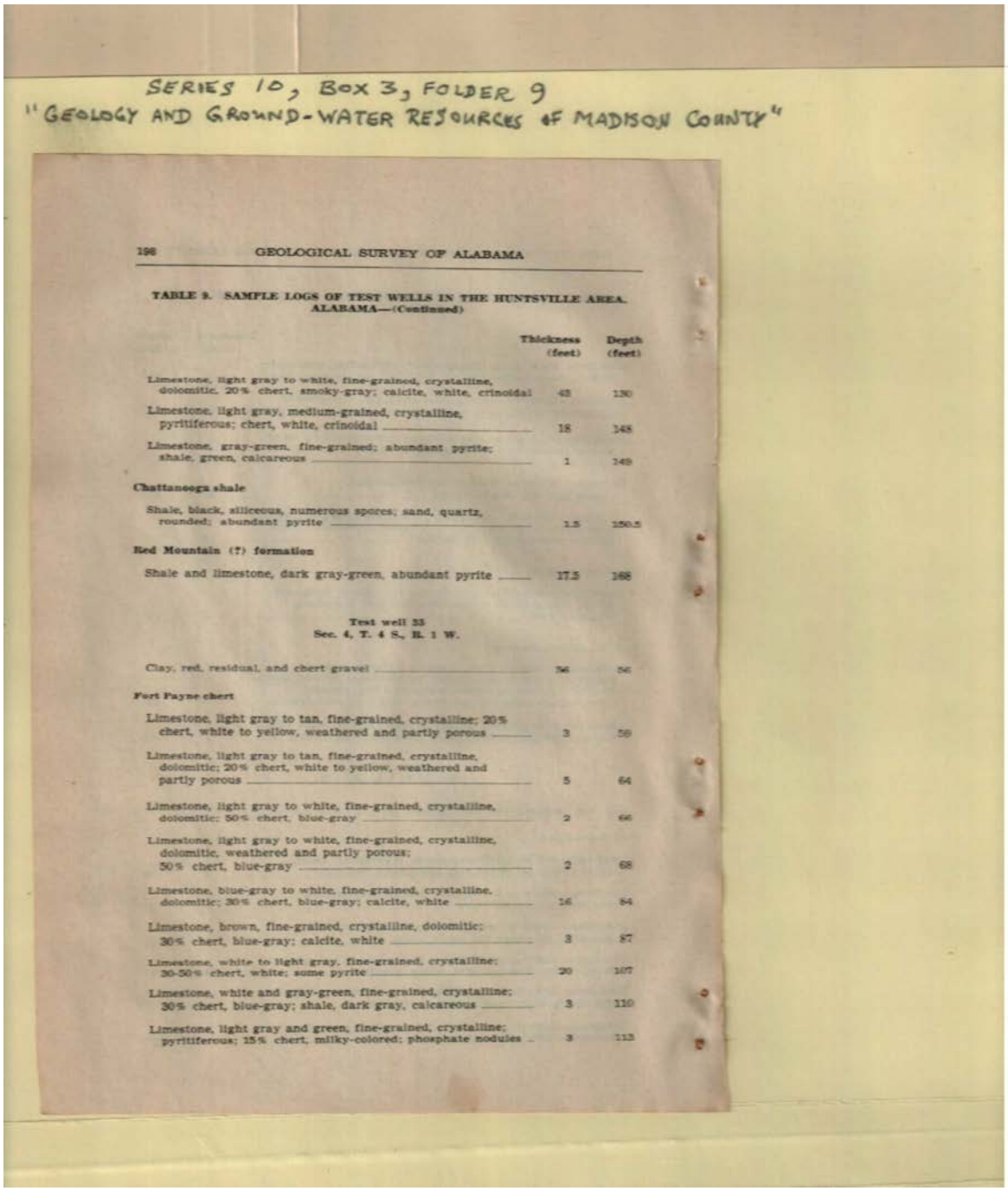

198 GEOLOGICAL SURVEY OF ALABAMA

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray to white, fine-grained, crystalline, dolomitic, 20% chert, smoky-gray; calcite, white, crinoidal	43	130
Limestone, light gray, medium-grained, crystalline, pyritiferous; chert, white, crinoidal	18	148
Limestone, gray-green, fine-grained; abundant pyrite; shale, green, calcareous	1	149
Chattanooga shale		
Shale, black, siliceous, numerous spores; sand, quartz, rounded; abundant pyrite	1.5	150.5
Red Mountain (?) formation		
Shale and limestone, dark gray-green, abundant pyrite	17.5	168
Test well 33 Sec. 4, T. 4 S., R. 1 W.		
Clay, red, residual, and chert gravel	56	56
Fort Payne chert		
Limestone, light gray to tan, fine-grained, crystalline; 20% chert, white to yellow, weathered and partly porous	3	59
Limestone, light gray to tan, fine-grained, crystalline, dolomitic; 20% chert, white to yellow, weathered and partly porous	5	64
Limestone, light gray to white, fine-grained, crystalline, dolomitic; 50% chert, blue-gray	2	66
Limestone, light gray to white, fine-grained, crystalline, dolomitic, weathered and partly porous; 50% chert, blue-gray	2	68
Limestone, blue-gray to white, fine-grained, crystalline, dolomitic; 30% chert, blue-gray; calcite, white	16	84
Limestone, brown, fine-grained, crystalline, dolomitic; 30% chert, blue-gray; calcite, white	3	87
Limestone, white to light gray, fine-grained, crystalline; 30-50% chert, white; some pyrite	20	107
Limestone, white and gray-green, fine-grained, crystalline; 30% chert, blue-gray; shale, dark gray, calcareous	3	110
Limestone, light gray and green, fine-grained, crystalline; pyritiferous; 15% chert, milky-colored; phosphate nodules	3	113

Names:
Sample Logs of Test Wells

Types:
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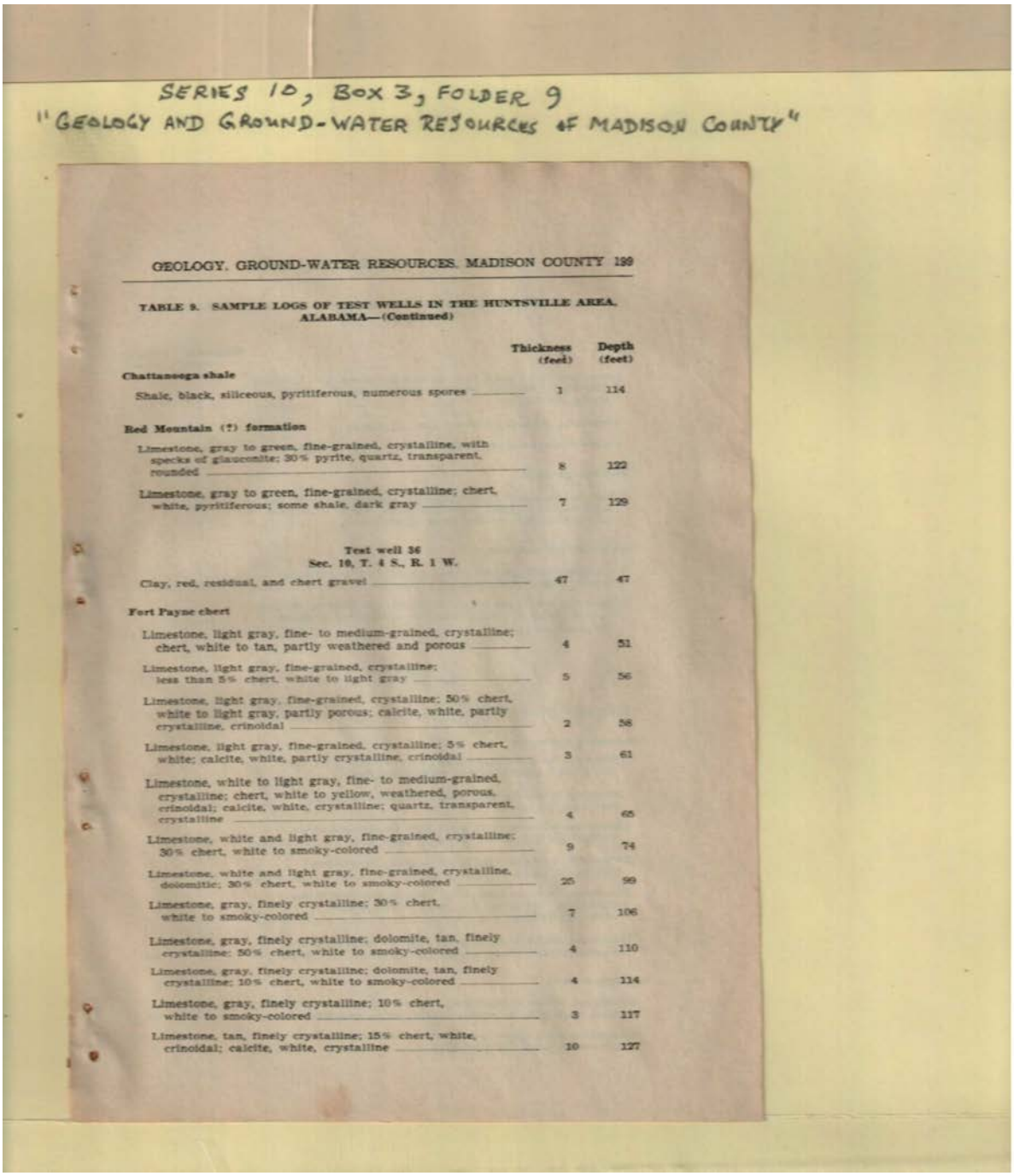

GEOLOGY. GROUND-WATER RESOURCES. MADISON COUNTY 189

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Chattanooga shale		
Shale, black, siliceous, pyritiferous, numerous spores	1	114
Red Mountain (?) formation		
Limestone, gray to green, fine-grained, crystalline, with specks of glauconite; 30% pyrite, quartz, transparent, rounded	8	122
Limestone, gray to green, fine-grained, crystalline; chert, white, pyritiferous; some shale, dark gray	7	129
Test well 36 Sec. 10, T. 4 S., R. 1 W.		
Clay, red, residual, and chert gravel	47	47
Fort Payne chert		
Limestone, light gray, fine- to medium-grained, crystalline; chert, white to tan, partly weathered and porous	4	51
Limestone, light gray, fine-grained, crystalline; less than 5% chert, white to light gray	5	56
Limestone, light gray, fine-grained, crystalline; 50% chert, white to light gray, partly porous; calcite, white, partly crystalline, crinoidal	2	58
Limestone, light gray, fine-grained, crystalline; 5% chert, white; calcite, white, partly crystalline, crinoidal	3	61
Limestone, white to light gray, fine- to medium-grained, crystalline; chert, white to yellow, weathered, porous, crinoidal; calcite, white, crystalline; quartz, transparent, crystalline	4	65
Limestone, white and light gray, fine-grained, crystalline; 30% chert, white to smoky-colored	9	74
Limestone, white and light gray, fine-grained, crystalline, dolomitic; 30% chert, white to smoky-colored	25	99
Limestone, gray, finely crystalline; 30% chert, white to smoky-colored	7	106
Limestone, gray, finely crystalline; dolomite, tan, finely crystalline; 50% chert, white to smoky-colored	4	110
Limestone, gray, finely crystalline; dolomite, tan, finely crystalline; 10% chert, white to smoky-colored	4	114
Limestone, gray, finely crystalline; 10% chert, white to smoky-colored	3	117
Limestone, tan, finely crystalline; 15% chert, white, crinoidal; calcite, white, crystalline	10	127

Names:
Sample Logs of Test Wells

Types:
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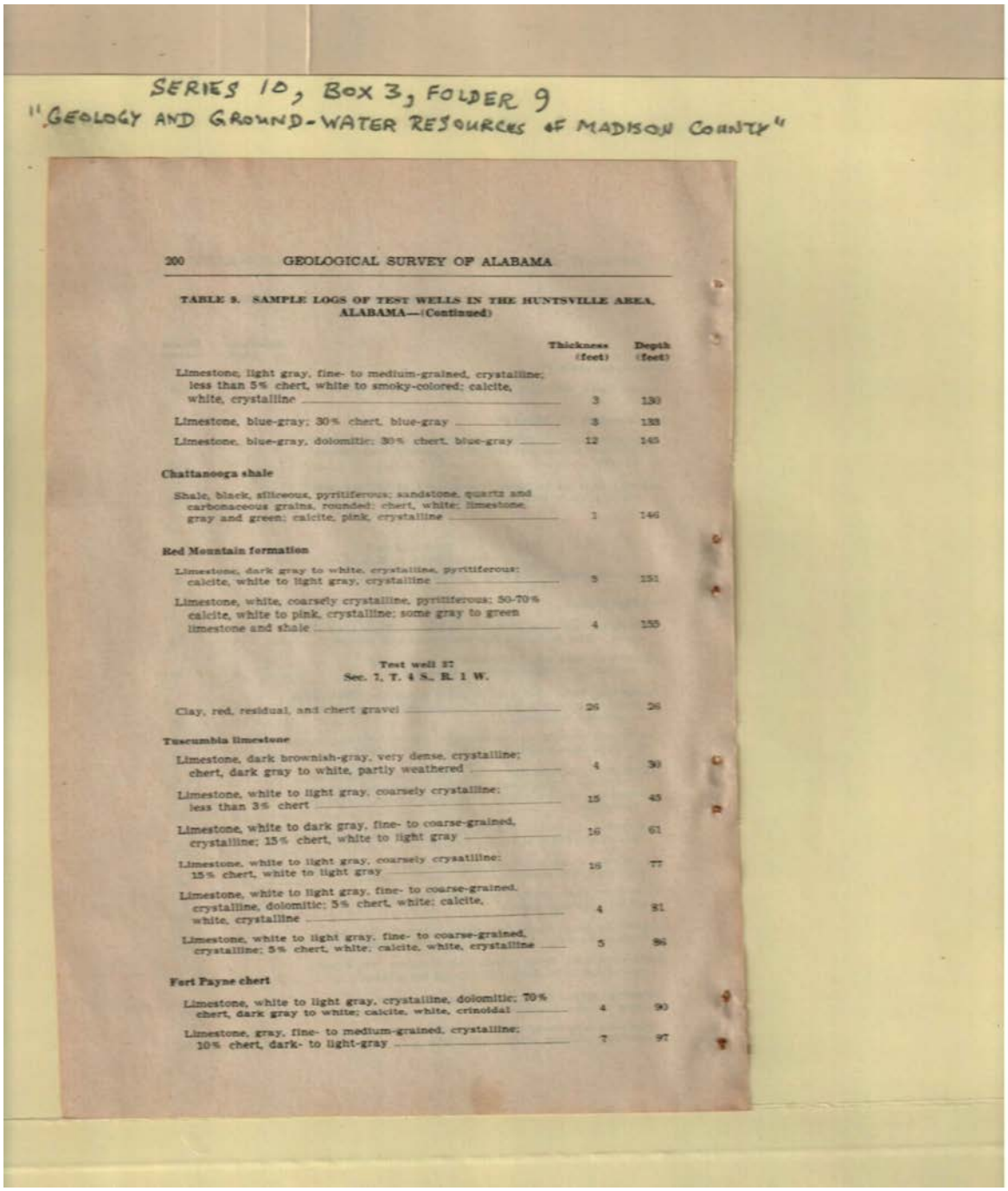

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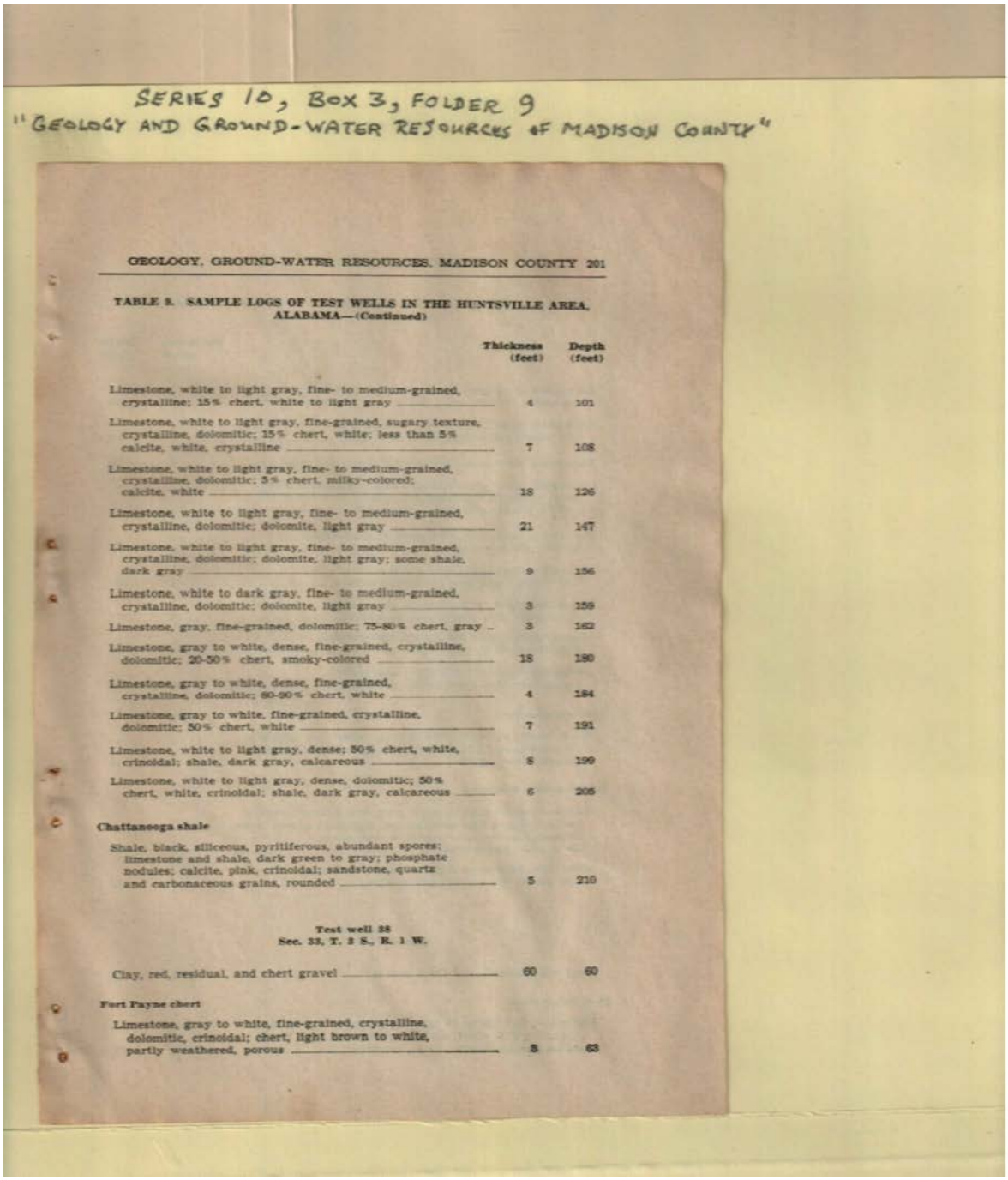
TABLE 8. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray, fine- to medium-grained, crystalline; less than 5% chert, white to smoky-colored; calcite, white, crystalline	3	130
Limestone, blue-gray; 30% chert, blue-gray	8	138
Limestone, blue-gray, dolomitic; 30% chert, blue-gray	12	145
Chattanooga shale		
Shale, black, siliceous, pyritiferous; sandstone, quartz and carbonaceous grains, rounded; chert, white; limestone, gray and green; calcite, pink, crystalline	1	146
Red Mountain formation		
Limestone, dark gray to white, crystalline, pyritiferous; calcite, white to light gray, crystalline	5	151
Limestone, white, coarsely crystalline, pyritiferous; 50-70% calcite, white to pink, crystalline; some gray to green limestone and shale	4	155
Test well 37 **Sec. 7, T. 4 S., R. 1 W.**		
Clay, red, residual, and chert gravel	26	26
Tuscumbia limestone		
Limestone, dark brownish-gray, very dense, crystalline; chert, dark gray to white, partly weathered	4	30
Limestone, white to light gray, coarsely crystalline; less than 3% chert	15	45
Limestone, white to dark gray, fine- to coarse-grained, crystalline; 15% chert, white to light gray	16	61
Limestone, white to light gray, coarsely crystalline; 15% chert, white to light gray	16	77
Limestone, white to light gray, fine- to coarse-grained, crystalline, dolomitic; 5% chert, white; calcite, white, crystalline	4	81
Limestone, white to light gray, fine- to coarse-grained, crystalline; 5% chert, white; calcite, white, crystalline	5	86
Fort Payne chert		
Limestone, white to light gray, crystalline, dolomitic; 70% chert, dark gray to white; calcite, white, crinoidal	4	90
Limestone, gray, fine- to medium-grained, crystalline; 10% chert, dark- to light-gray	7	97

Names:
Sample Logs of Test Wells

Types:
booklet



GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 201

TABLE 8. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, white to light gray, fine- to medium-grained, crystalline; 15% chert, white to light gray	4	101
Limestone, white to light gray, fine-grained, sugary texture, crystalline, dolomitic; 15% chert, white; less than 5% calcite, white, crystalline	7	108
Limestone, white to light gray, fine- to medium-grained, crystalline, dolomitic; 5% chert, milky-colored; calcite, white	18	126
Limestone, white to light gray, fine- to medium-grained, crystalline, dolomitic; dolomite, light gray	21	147
Limestone, white to light gray, fine- to medium-grained, crystalline, dolomitic; dolomite, light gray; some shale, dark gray	9	156
Limestone, white to dark gray, fine- to medium-grained, crystalline, dolomitic; dolomite, light gray	3	159
Limestone, gray, fine-grained, dolomitic; 75-80% chert, gray	3	162
Limestone, gray to white, dense, fine-grained, crystalline, dolomitic; 20-30% chert, smoky-colored	18	180
Limestone, gray to white, dense, fine-grained, crystalline, dolomitic; 80-90% chert, white	4	184
Limestone, gray to white, fine-grained, crystalline, dolomitic; 50% chert, white	7	191
Limestone, white to light gray, dense; 50% chert, white, crinoidal; shale, dark gray, calcareous	8	199
Limestone, white to light gray, dense, dolomitic; 50% chert, white, crinoidal; shale, dark gray, calcareous	6	205
Chattanooga shale		
Shale, black, siliceous, pyritiferous, abundant spores; limestone and shale, dark green to gray; phosphate nodules; calcite, pink, crinoidal; sandstone, quartz and carbonaceous grains, rounded	5	210
Test well 38 **Sec. 33, T. 3 S., R. 1 W.**		
Clay, red, residual, and chert gravel	60	60
Fort Payne chert		
Limestone, gray to white, fine-grained, crystalline, dolomitic, crinoidal; chert, light brown to white, partly weathered, porous	3	63

Names:

Sample Logs of Test Wells

Types:

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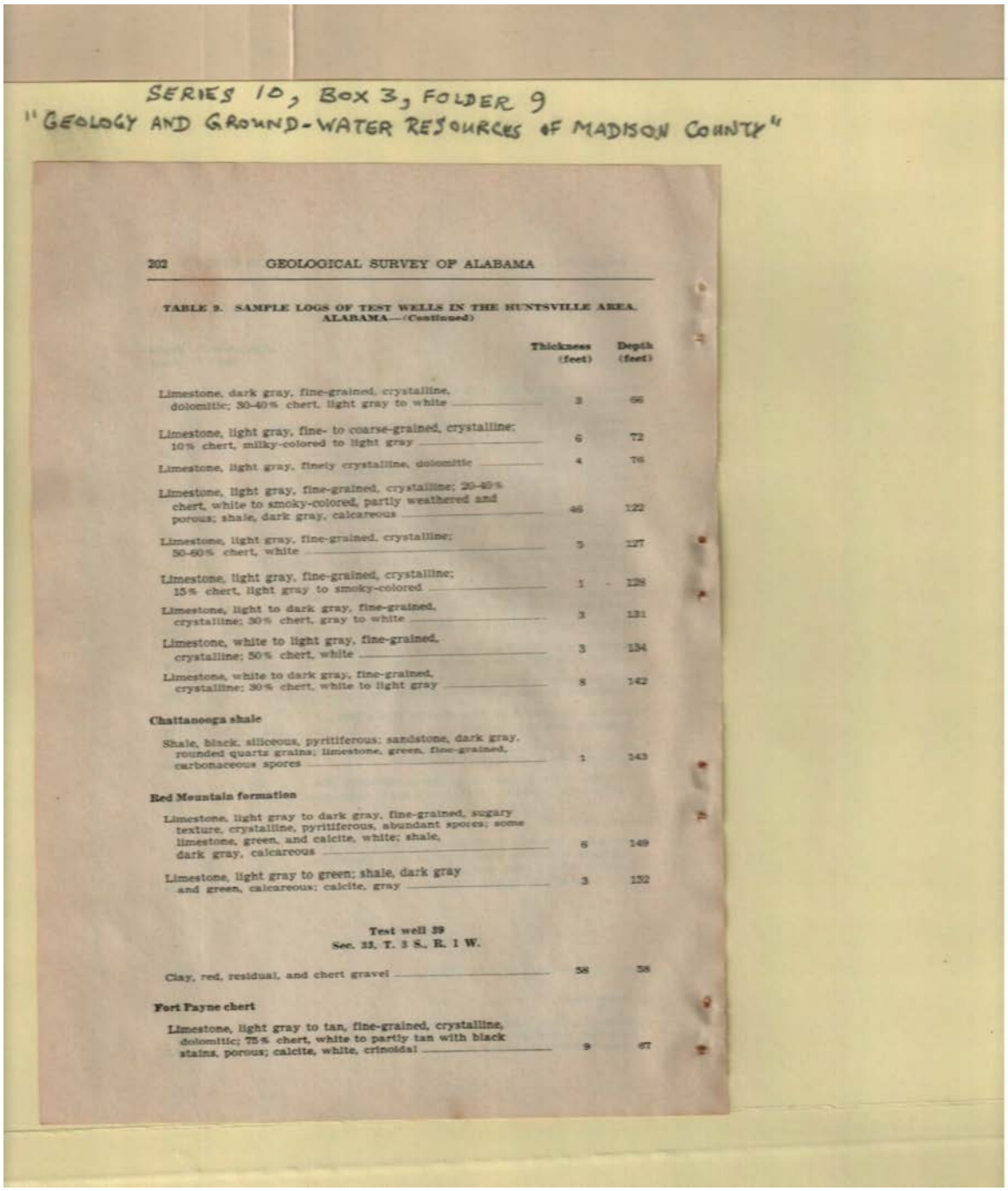

202 GEOLOGICAL SURVEY OF ALABAMA

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, dark gray, fine-grained, crystalline, dolomitic; 30-40% chert, light gray to white	3	66
Limestone, light gray, fine- to coarse-grained, crystalline; 10% chert, milky-colored to light gray	6	72
Limestone, light gray, finely crystalline, dolomitic	4	76
Limestone, light gray, fine-grained, crystalline; 20-40% chert, white to smoky-colored, partly weathered and porous; shale, dark gray, calcareous	46	122
Limestone, light gray, fine-grained, crystalline; 50-60% chert, white	5	127
Limestone, light gray, fine-grained, crystalline; 15% chert, light gray to smoky-colored	1	128
Limestone, light to dark gray, fine-grained, crystalline; 30% chert, gray to white	3	131
Limestone, white to light gray, fine-grained, crystalline; 50% chert, white	3	134
Limestone, white to dark gray, fine-grained, crystalline; 30% chert, white to light gray	8	142
Chattanooga shale		
Shale, black, siliceous, pyritiferous; sandstone, dark gray, rounded quartz grains; limestone, green, fine-grained, carbonaceous spores	1	143
Red Mountain formation		
Limestone, light gray to dark gray, fine-grained, sugary texture, crystalline, pyritiferous, abundant spores; some limestone, green, and calcite, white; shale, dark gray, calcareous	6	149
Limestone, light gray to green; shale, dark gray and green, calcareous; calcite, gray	3	152
Test well 39 Sec. 33, T. 3 S., R. 1 W.		
Clay, red, residual, and chert gravel	58	58
Fort Payne chert		
Limestone, light gray to tan, fine-grained, crystalline, dolomitic; 75% chert, white to partly tan with black stains, porous; calcite, white, crinoidal	9	67

Names:
Sample Logs of Test Wells

Types:
booklet

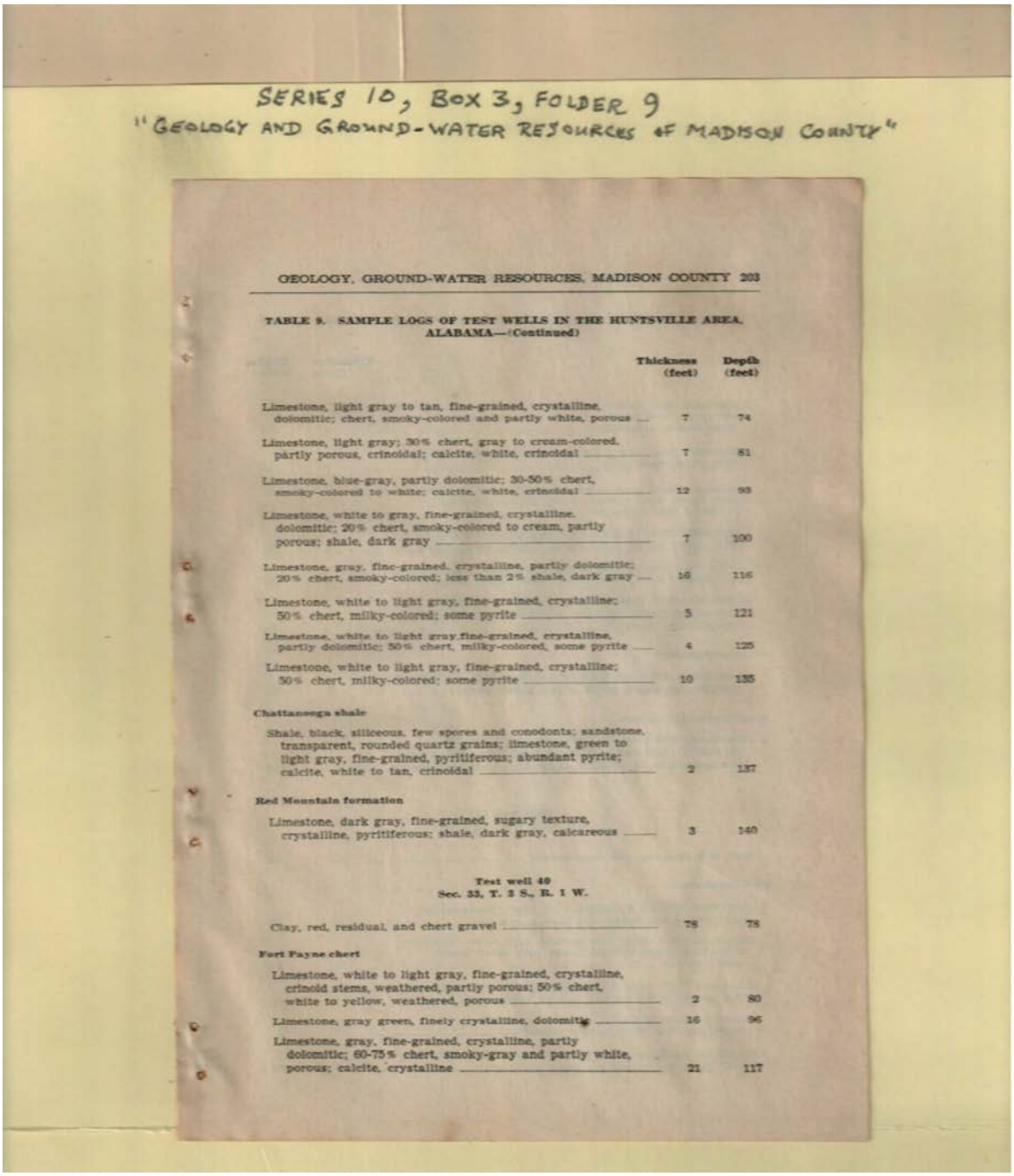

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray to tan, fine-grained, crystalline, dolomitic; chert, smoky-colored and partly white, porous	7	74
Limestone, light gray; 30% chert, gray to cream-colored, partly porous, crinoidal; calcite, white, crinoidal	7	81
Limestone, blue-gray, partly dolomitic; 30-50% chert, smoky-colored to white; calcite, white, crinoidal	12	93
Limestone, white to gray, fine-grained, crystalline, dolomitic; 20% chert, smoky-colored to cream, partly porous; shale, dark gray	7	100
Limestone, gray, fine-grained, crystalline, partly dolomitic; 20% chert, smoky-colored; less than 2% shale, dark gray	16	116
Limestone, white to light gray, fine-grained, crystalline; 50% chert, milky-colored; some pyrite	5	121
Limestone, white to light gray, fine-grained, crystalline, partly dolomitic; 50% chert, milky-colored, some pyrite	4	125
Limestone, white to light gray, fine-grained, crystalline; 50% chert, milky-colored; some pyrite	10	135
Chattanooga shale		
Shale, black, siliceous, few spores and conodonts; sandstone, transparent, rounded quartz grains; limestone, green to light gray, fine-grained, pyritiferous; abundant pyrite; calcite, white to tan, crinoidal	2	137
Red Mountain formation		
Limestone, dark gray, fine-grained, sugary texture, crystalline, pyritiferous; shale, dark gray, calcareous	3	140
Test well 40 **Sec. 33, T. 3 S., R. 1 W.**		
Clay, red, residual, and chert gravel	78	78
Fort Payne chert		
Limestone, white to light gray, fine-grained, crystalline, crinoid stems, weathered, partly porous; 50% chert, white to yellow, weathered, porous	2	80
Limestone, gray green, finely crystalline, dolomitic	16	96
Limestone, gray, fine-grained, crystalline, partly dolomitic; 60-75% chert, smoky-gray and partly white, porous; calcite, crystalline	21	117

Names:
Sample Logs of Test Wells

Types:
booklet

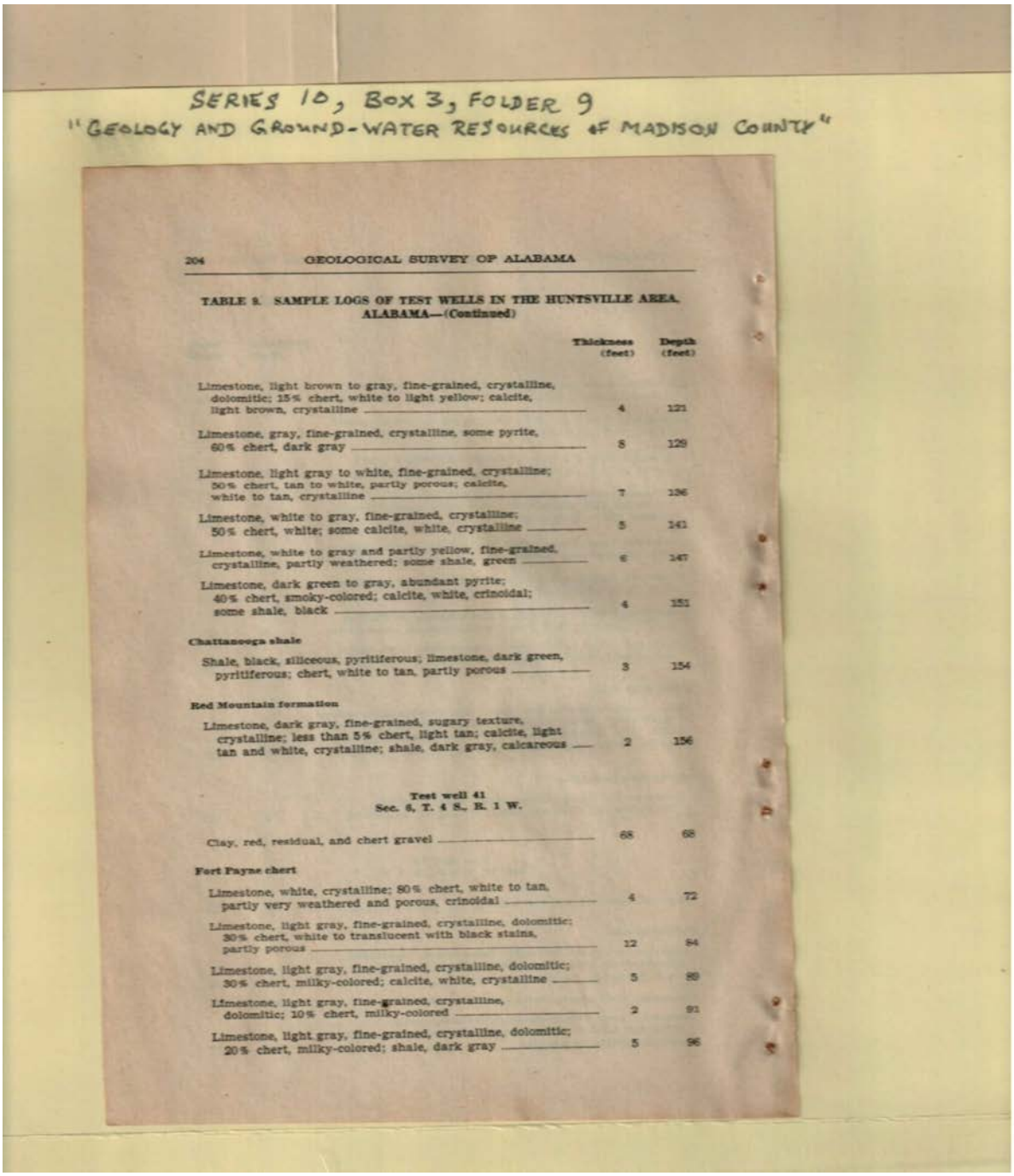

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light brown to gray, fine-grained, crystalline, dolomitic; 15% chert, white to light yellow; calcite, light brown, crystalline	4	121
Limestone, gray, fine-grained, crystalline, some pyrite, 60% chert, dark gray	8	129
Limestone, light gray to white, fine-grained, crystalline; 50% chert, tan to white, partly porous; calcite, white to tan, crystalline	7	136
Limestone, white to gray, fine-grained, crystalline; 50% chert, white; some calcite, white, crystalline	5	141
Limestone, white to gray and partly yellow, fine-grained, crystalline, partly weathered; some shale, green	6	147
Limestone, dark green to gray, abundant pyrite; 40% chert, smoky-colored; calcite, white, crinoidal; some shale, black	4	151
Chattanooga shale		
Shale, black, siliceous, pyritiferous; limestone, dark green, pyritiferous; chert, white to tan, partly porous	3	154
Red Mountain formation		
Limestone, dark gray, fine-grained, sugary texture, crystalline; less than 5% chert, light tan; calcite, light tan and white, crystalline; shale, dark gray, calcareous	2	156
Test well 41 **Sec. 6, T. 4 S., R. 1 W.**		
Clay, red, residual, and chert gravel	68	68
Fort Payne chert		
Limestone, white, crystalline; 80% chert, white to tan, partly very weathered and porous, crinoidal	4	72
Limestone, light gray, fine-grained, crystalline, dolomitic; 30% chert, white to translucent with black stains, partly porous	12	84
Limestone, light gray, fine-grained, crystalline, dolomitic; 30% chert, milky-colored; calcite, white, crystalline	5	89
Limestone, light gray, fine-grained, crystalline, dolomitic; 10% chert, milky-colored	2	91
Limestone, light gray, fine-grained, crystalline, dolomitic; 20% chert, milky-colored; shale, dark gray	5	96

Names:
Sample Logs of Test Wells

Types:
booklet

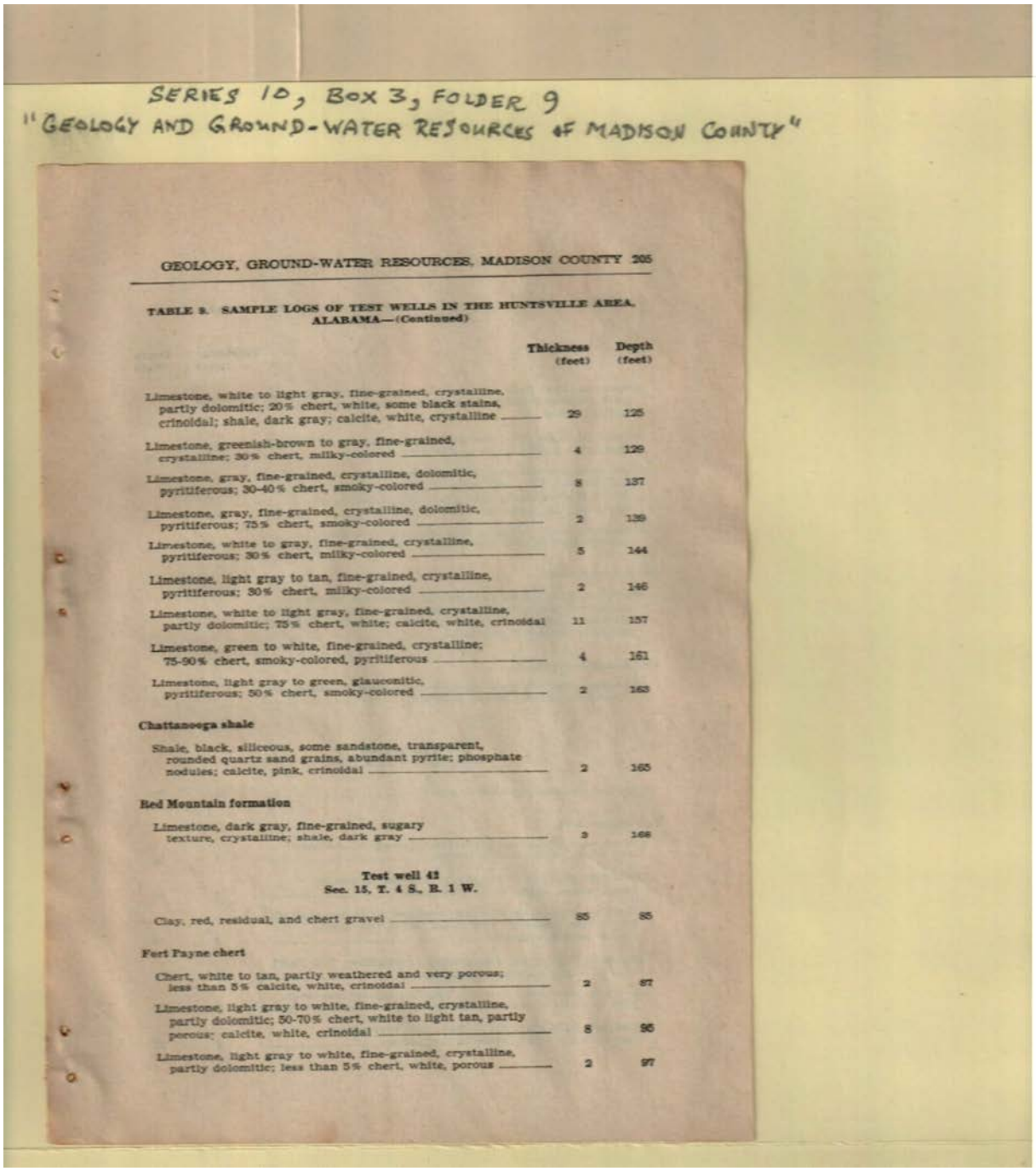

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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, white to light gray, fine-grained, crystalline, partly dolomitic; 20% chert, white, some black stains, crinoidal; shale, dark gray; calcite, white, crystalline	29	125
Limestone, greenish-brown to gray, fine-grained, crystalline; 30% chert, milky-colored	4	129
Limestone, gray, fine-grained, crystalline, dolomitic, pyritiferous; 30-40% chert, smoky-colored	8	137
Limestone, gray, fine-grained, crystalline, dolomitic, pyritiferous; 75% chert, smoky-colored	2	139
Limestone, white to gray, fine-grained, crystalline, pyritiferous; 30% chert, milky-colored	5	144
Limestone, light gray to tan, fine-grained, crystalline, pyritiferous; 30% chert, milky-colored	2	146
Limestone, white to light gray, fine-grained, crystalline, partly dolomitic; 75% chert, white; calcite, white, crinoidal	11	157
Limestone, green to white, fine-grained, crystalline; 75-90% chert, smoky-colored, pyritiferous	4	161
Limestone, light gray to green, glauconitic, pyritiferous; 50% chert, smoky-colored	2	163
Chattanooga shale		
Shale, black, siliceous, some sandstone, transparent, rounded quartz sand grains, abundant pyrite; phosphate nodules; calcite, pink, crinoidal	2	165
Red Mountain formation		
Limestone, dark gray, fine-grained, sugary texture, crystalline; shale, dark gray	3	168
Test well 42 **Sec. 15, T. 4 S., R. 1 W.**		
Clay, red, residual, and chert gravel	85	85
Fort Payne chert		
Chert, white to tan, partly weathered and very porous; less than 5% calcite, white, crinoidal	2	87
Limestone, light gray to white, fine-grained, crystalline, partly dolomitic; 50-70% chert, white to light tan, partly porous; calcite, white, crinoidal	8	95
Limestone, light gray to white, fine-grained, crystalline, partly dolomitic; less than 5% chert, white, porous	2	97

Names:
Sample Logs of Test Wells

Types:
booklet

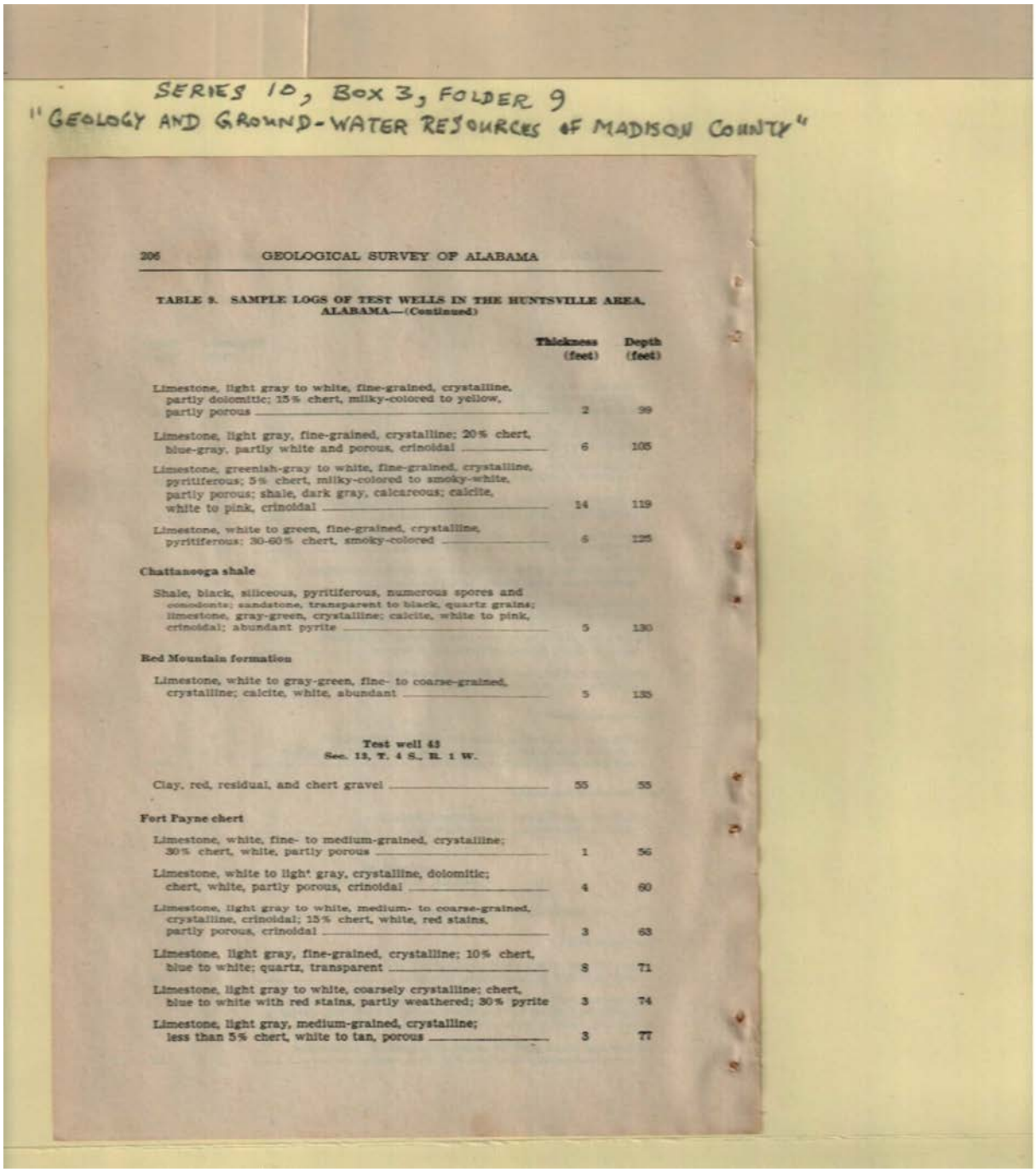

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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray to white, fine-grained, crystalline, partly dolomitic; 15% chert, milky-colored to yellow, partly porous	2	99
Limestone, light gray, fine-grained, crystalline; 20% chert, blue-gray, partly white and porous, crinoidal	6	105
Limestone, greenish-gray to white, fine-grained, crystalline, pyritiferous; 5% chert, milky-colored to smoky-white, partly porous; shale, dark gray, calcareous; calcite, white to pink, crinoidal	14	119
Limestone, white to green, fine-grained, crystalline, pyritiferous; 30-60% chert, smoky-colored	6	125
Chattanooga shale		
Shale, black, siliceous, pyritiferous, numerous spores and conodonts; sandstone, transparent to black, quartz grains; limestone, gray-green, crystalline; calcite, white to pink, crinoidal; abundant pyrite	5	130
Red Mountain formation		
Limestone, white to gray-green, fine- to coarse-grained, crystalline; calcite, white, abundant	5	135
Test well 43 **Sec. 13, T. 4 S., R. 1 W.**		
Clay, red, residual, and chert gravel	55	55
Fort Payne chert		
Limestone, white, fine- to medium-grained, crystalline; 30% chert, white, partly porous	1	56
Limestone, white to light gray, crystalline, dolomitic; chert, white, partly porous, crinoidal	4	60
Limestone, light gray to white, medium- to coarse-grained, crystalline, crinoidal; 15% chert, white, red stains, partly porous, crinoidal	3	63
Limestone, light gray, fine-grained, crystalline; 10% chert, blue to white; quartz, transparent	8	71
Limestone, light gray to white, coarsely crystalline; chert, blue to white with red stains, partly weathered; 30% pyrite	3	74
Limestone, light gray, medium-grained, crystalline; less than 5% chert, white to tan, porous	3	77

Names:
Sample Logs of Test Wells

Types:
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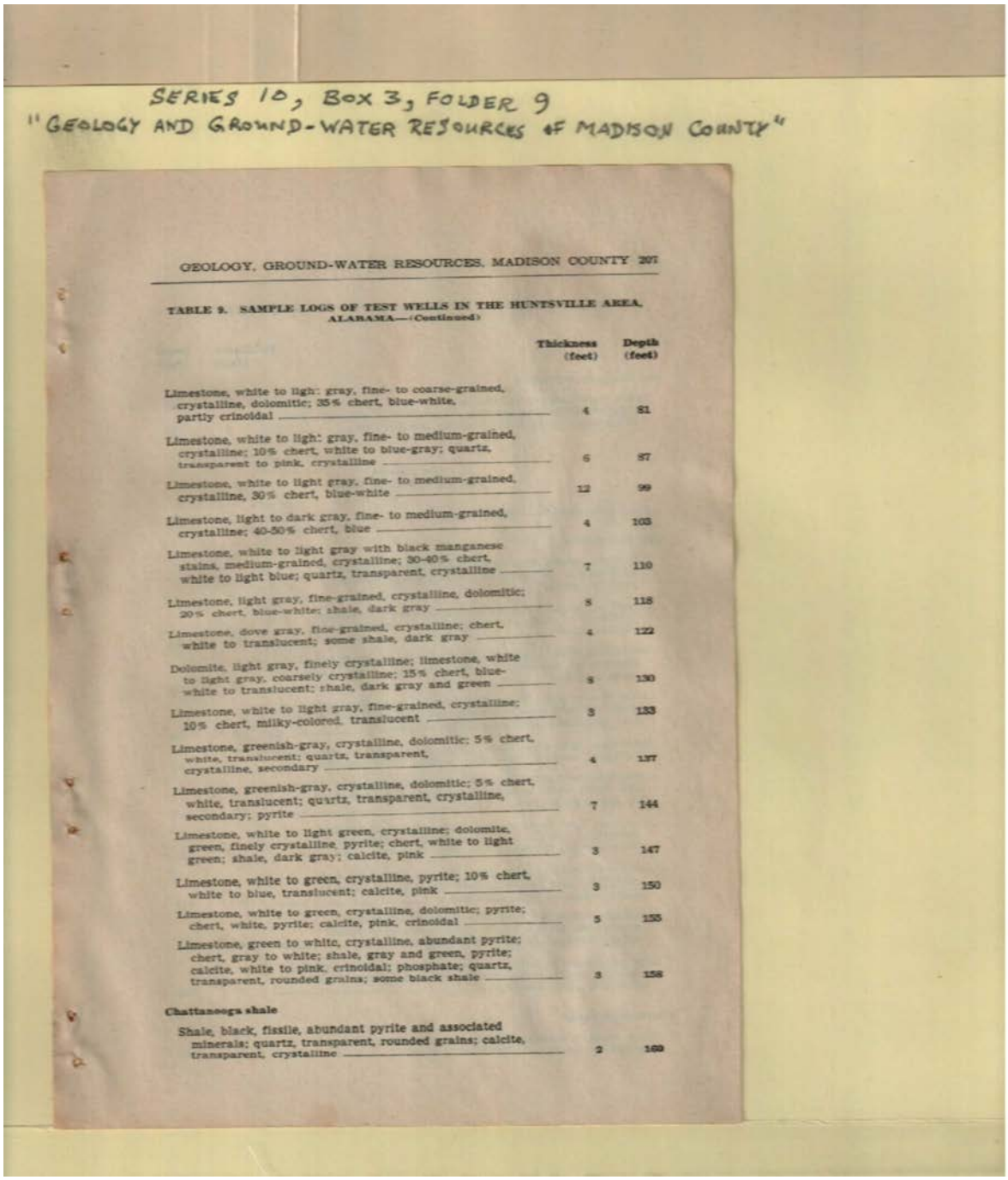

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, white to ligh: gray, fine- to coarse-grained, crystalline, dolomitic; 35% chert, blue-white, partly crinoidal	4	81
Limestone, white to ligh: gray, fine- to medium-grained, crystalline; 10% chert, white to blue-gray; quartz, transparent to pink, crystalline	6	87
Limestone, white to light gray, fine- to medium-grained, crystalline, 30% chert, blue-white	12	99
Limestone, light to dark gray, fine- to medium-grained, crystalline; 40-50% chert, blue	4	103
Limestone, white to light gray with black manganese stains, medium-grained, crystalline; 30-40% chert, white to light blue; quartz, transparent, crystalline	7	110
Limestone, light gray, fine-grained, crystalline, dolomitic; 20% chert, blue-white; shale, dark gray	8	118
Limestone, dove gray, fine-grained, crystalline; chert, white to translucent; some shale, dark gray	4	122
Dolomite, light gray, finely crystalline; limestone, white to light gray, coarsely crystalline; 15% chert, blue-white to translucent; shale, dark gray and green	8	130
Limestone, white to light gray, fine-grained, crystalline; 10% chert, milky-colored, translucent	3	133
Limestone, greenish-gray, crystalline, dolomitic; 5% chert, white, translucent; quartz, transparent, crystalline, secondary	4	137
Limestone, greenish-gray, crystalline, dolomitic; 5% chert, white, translucent; quartz, transparent, crystalline, secondary; pyrite	7	144
Limestone, white to light green, crystalline; dolomite, green, finely crystalline, pyrite; chert, white to light green; shale, dark gray; calcite, pink	3	147
Limestone, white to green, crystalline, pyrite; 10% chert, white to blue, translucent; calcite, pink	3	150
Limestone, white to green, crystalline, dolomitic; pyrite; chert, white, pyrite; calcite, pink, crinoidal	5	155
Limestone, green to white, crystalline, abundant pyrite; chert, gray to white; shale, gray and green, pyrite; calcite, white to pink, crinoidal; phosphate; quartz, transparent, rounded grains; some black shale	3	158
Chattanooga shale		
Shale, black, fissile, abundant pyrite and associated minerals; quartz, transparent, rounded grains; calcite, transparent, crystalline	2	160

Names:
Sample Logs of Test Wells

Types:
booklet

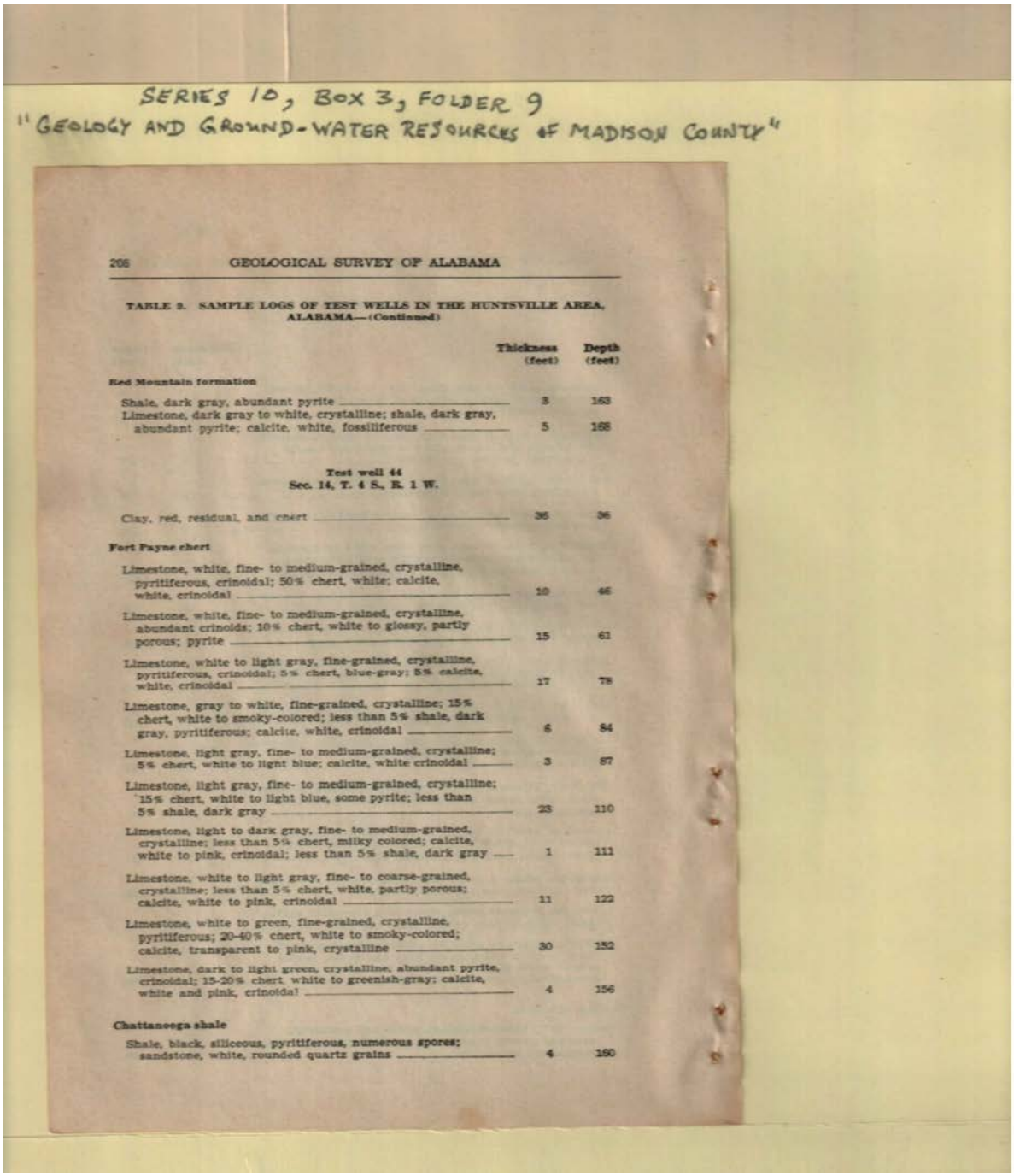

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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Red Mountain formation		
Shale, dark gray, abundant pyrite	3	163
Limestone, dark gray to white, crystalline; shale, dark gray, abundant pyrite; calcite, white, fossiliferous	5	168
Test well 44 Sec. 14, T. 4 S., R. 1 W.		
Clay, red, residual, and chert	36	36
Fort Payne chert		
Limestone, white, fine- to medium-grained, crystalline, pyritiferous, crinoidal; 50% chert, white; calcite, white, crinoidal	10	46
Limestone, white, fine- to medium-grained, crystalline, abundant crinoids; 10% chert, white to glossy, partly porous; pyrite	15	61
Limestone, white to light gray, fine-grained, crystalline, pyritiferous, crinoidal; 5% chert, blue-gray; 5% calcite, white, crinoidal	17	78
Limestone, gray to white, fine-grained, crystalline; 15% chert, white to smoky-colored; less than 5% shale, dark gray, pyritiferous; calcite, white, crinoidal	6	84
Limestone, light gray, fine- to medium-grained, crystalline; 5% chert, white to light blue; calcite, white crinoidal	3	87
Limestone, light gray, fine- to medium-grained, crystalline; 15% chert, white to light blue, some pyrite; less than 5% shale, dark gray	23	110
Limestone, light to dark gray, fine- to medium-grained, crystalline; less than 5% chert, milky colored; calcite, white to pink, crinoidal; less than 5% shale, dark gray	1	111
Limestone, white to light gray, fine- to coarse-grained, crystalline; less than 5% chert, white, partly porous; calcite, white to pink, crinoidal	11	122
Limestone, white to green, fine-grained, crystalline, pyritiferous; 20-40% chert, white to smoky-colored; calcite, transparent to pink, crystalline	30	152
Limestone, dark to light green, crystalline, abundant pyrite, crinoidal; 15-20% chert, white to greenish-gray; calcite, white and pink, crinoidal	4	156
Chattanooga shale		
Shale, black, siliceous, pyritiferous, numerous spores; sandstone, white, rounded quartz grains	4	160

Names:
Sample Logs of Test Wells

Types:
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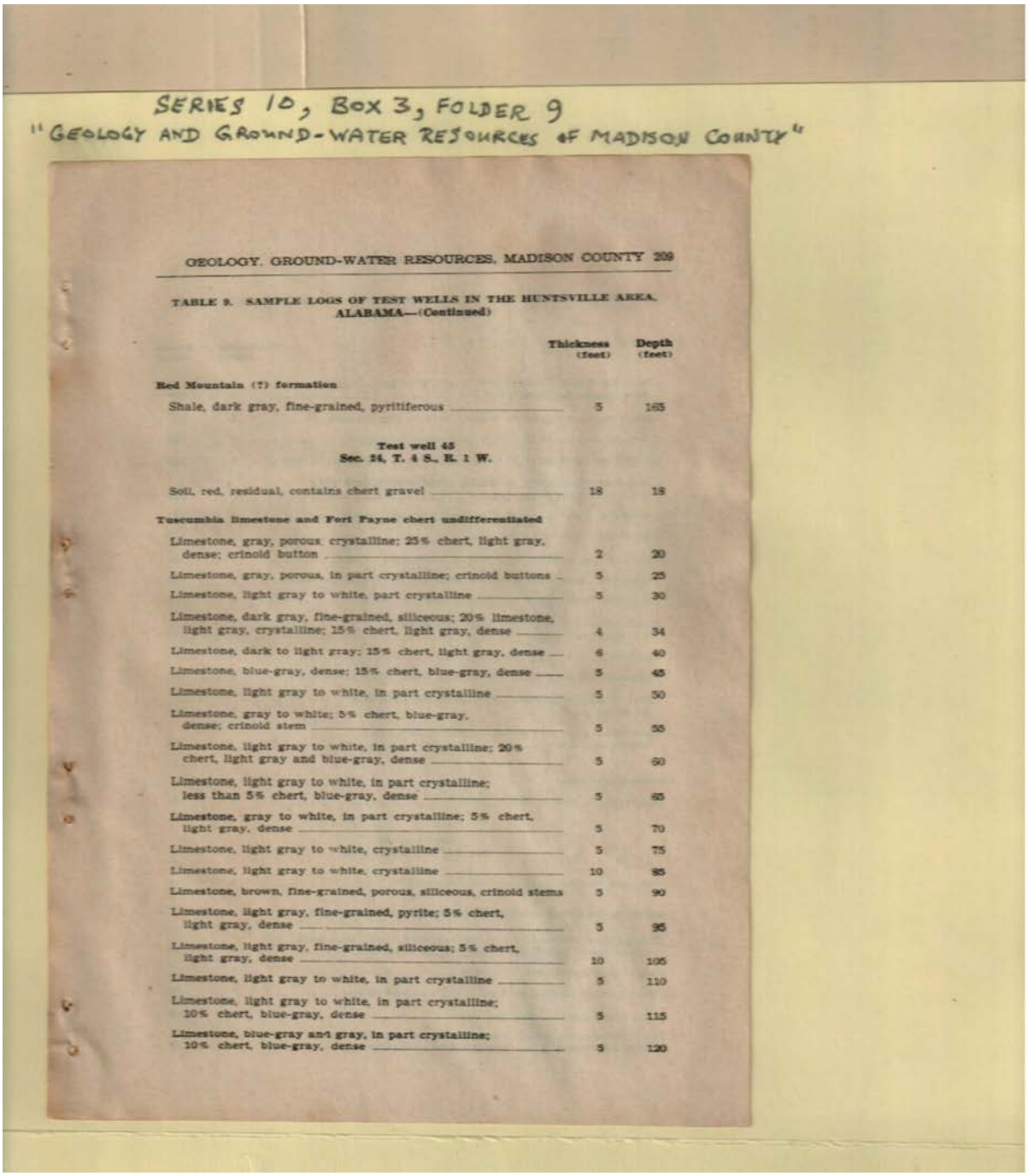

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Red Mountain (?) formation		
Shale, dark gray, fine-grained, pyritiferous	5	165
Test well 45 **Sec. 24, T. 4 S., R. 1 W.**		
Soil, red, residual, contains chert gravel	18	18
Tuscumbia limestone and Fort Payne chert undifferentiated		
Limestone, gray, porous crystalline; 25% chert, light gray, dense; crinoid button	2	20
Limestone, gray, porous, in part crystalline; crinoid buttons	5	25
Limestone, light gray to white, part crystalline	5	30
Limestone, dark gray, fine-grained, siliceous; 20% limestone, light gray, crystalline; 15% chert, light gray, dense	4	34
Limestone, dark to light gray; 15% chert, light gray, dense	6	40
Limestone, blue-gray, dense; 15% chert, blue-gray, dense	5	45
Limestone, light gray to white, in part crystalline	5	50
Limestone, gray to white; 5% chert, blue-gray, dense; crinoid stem	5	55
Limestone, light gray to white, in part crystalline; 20% chert, light gray and blue-gray, dense	5	60
Limestone, light gray to white, in part crystalline; less than 5% chert, blue-gray, dense	5	65
Limestone, gray to white, in part crystalline; 5% chert, light gray, dense	5	70
Limestone, light gray to white, crystalline	5	75
Limestone, light gray to white, crystalline	10	85
Limestone, brown, fine-grained, porous, siliceous, crinoid stems	5	90
Limestone, light gray, fine-grained, pyrite; 5% chert, light gray, dense	5	95
Limestone, light gray, fine-grained, siliceous; 5% chert, light gray, dense	10	105
Limestone, light gray to white, in part crystalline	5	110
Limestone, light gray to white, in part crystalline; 10% chert, blue-gray, dense	5	115
Limestone, blue-gray and gray, in part crystalline; 10% chert, blue-gray, dense	5	120

Names:
Sample Logs of Test Wells

Types:
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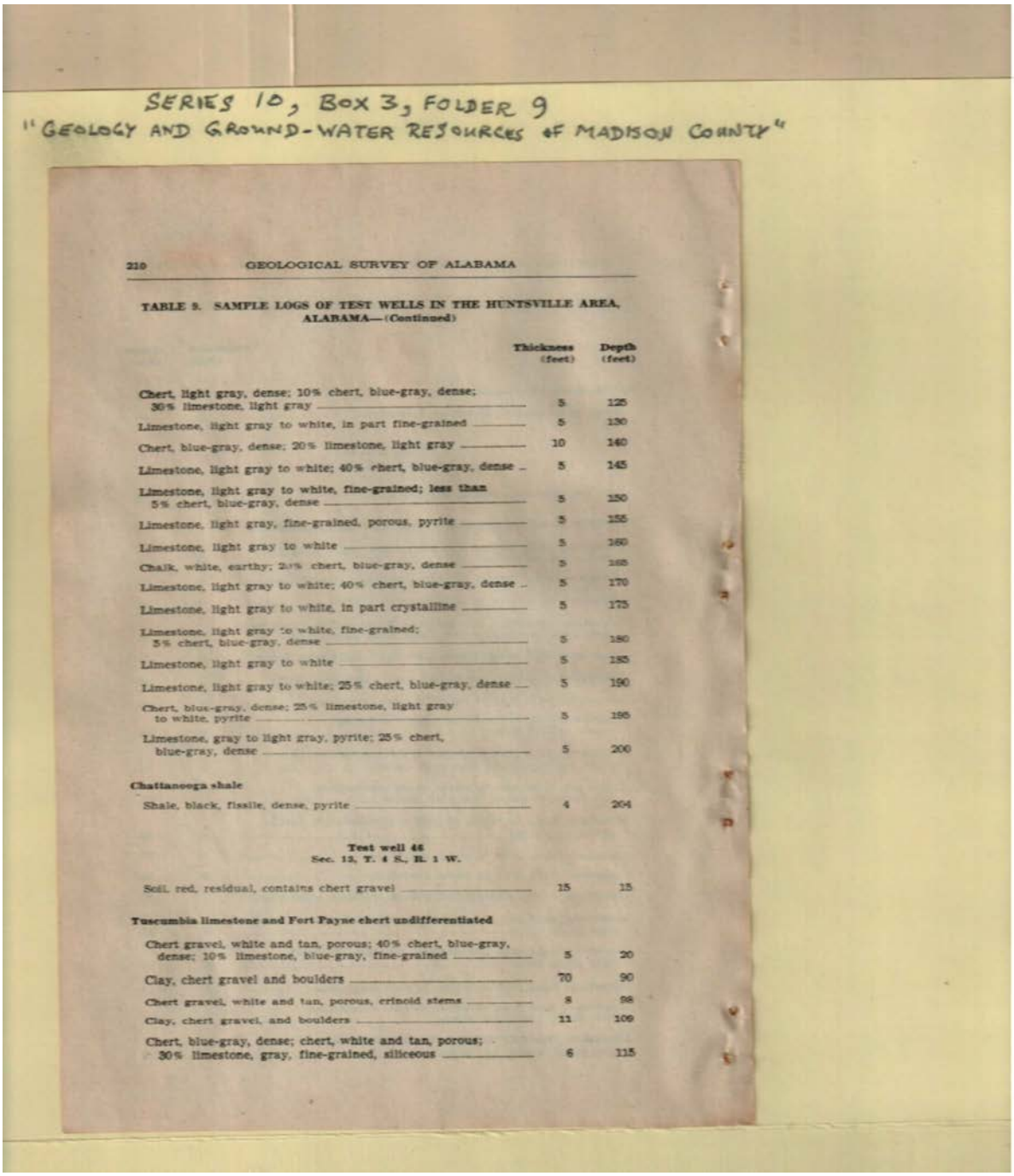

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Chert, light gray, dense; 10% chert, blue-gray, dense; 30% limestone, light gray	5	125
Limestone, light gray to white, in part fine-grained	5	130
Chert, blue-gray, dense; 20% limestone, light gray	10	140
Limestone, light gray to white; 40% chert, blue-gray, dense	5	145
Limestone, light gray to white, fine-grained; less than 5% chert, blue-gray, dense	5	150
Limestone, light gray, fine-grained, porous, pyrite	5	155
Limestone, light gray to white	5	160
Chalk, white, earthy; 20% chert, blue-gray, dense	5	165
Limestone, light gray to white; 40% chert, blue-gray, dense	5	170
Limestone, light gray to white, in part crystalline	5	175
Limestone, light gray to white, fine-grained; 5% chert, blue-gray, dense	5	180
Limestone, light gray to white	5	185
Limestone, light gray to white; 25% chert, blue-gray, dense	5	190
Chert, blue-gray, dense; 25% limestone, light gray to white, pyrite	5	195
Limestone, gray to light gray, pyrite; 25% chert, blue-gray, dense	5	200
Chattanooga shale		
Shale, black, fissile, dense, pyrite	4	204
Test well 46 **Sec. 13, T. 4 S., R. 1 W.**		
Soil, red, residual, contains chert gravel	15	15
Tuscumbia limestone and Fort Payne chert undifferentiated		
Chert gravel, white and tan, porous; 40% chert, blue-gray, dense; 10% limestone, blue-gray, fine-grained	5	20
Clay, chert gravel and boulders	70	90
Chert gravel, white and tan, porous, crinoid stems	8	98
Clay, chert gravel, and boulders	11	109
Chert, blue-gray, dense; chert, white and tan, porous; 30% limestone, gray, fine-grained, siliceous	6	115

Names:
Sample Logs of Test Wells

Types:
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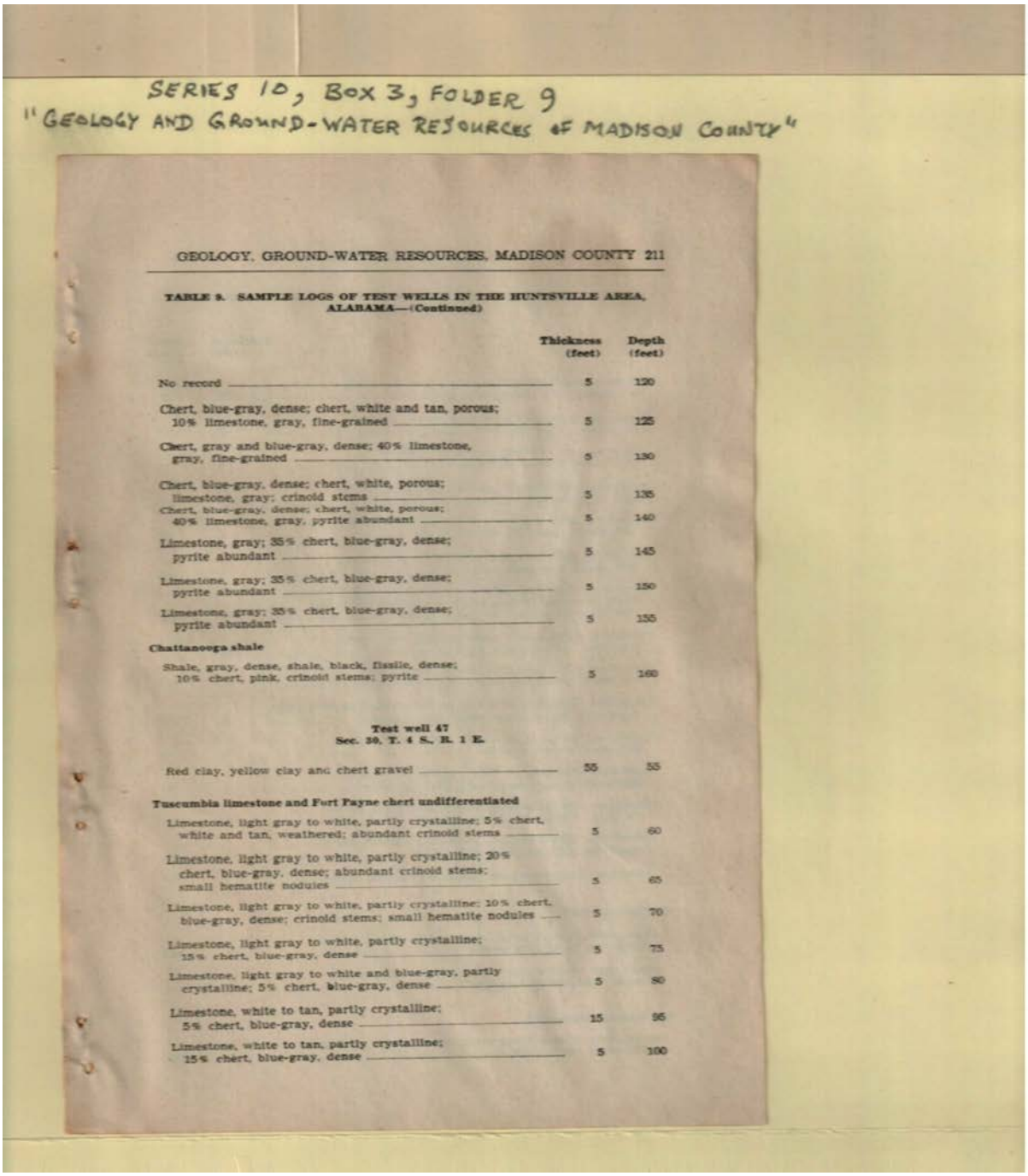

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
No record	5	120
Chert, blue-gray, dense; chert, white and tan, porous; 10% limestone, gray, fine-grained	5	125
Chert, gray and blue-gray, dense; 40% limestone, gray, fine-grained	5	130
Chert, blue-gray, dense; chert, white, porous; limestone, gray; crinoid stems	5	135
Chert, blue-gray, dense; chert, white, porous; 40% limestone, gray, pyrite abundant	5	140
Limestone, gray; 35% chert, blue-gray, dense; pyrite abundant	5	145
Limestone, gray; 35% chert, blue-gray, dense; pyrite abundant	5	150
Limestone, gray; 35% chert, blue-gray, dense; pyrite abundant	5	155
Chattanooga shale		
Shale, gray, dense, shale, black, fissile, dense; 10% chert, pink, crinoid stems; pyrite	5	160
Test well 47 **Sec. 30, T. 4 S., R. 1 E.**		
Red clay, yellow clay and chert gravel	55	55
Tuscumbia limestone and Fort Payne chert undifferentiated		
Limestone, light gray to white, partly crystalline; 5% chert, white and tan, weathered; abundant crinoid stems	5	60
Limestone, light gray to white, partly crystalline; 20% chert, blue-gray, dense; abundant crinoid stems; small hematite nodules	5	65
Limestone, light gray to white, partly crystalline; 10% chert, blue-gray, dense; crinoid stems; small hematite nodules	5	70
Limestone, light gray to white, partly crystalline; 15% chert, blue-gray, dense	5	75
Limestone, light gray to white and blue-gray, partly crystalline; 5% chert, blue-gray, dense	5	80
Limestone, white to tan, partly crystalline; 5% chert, blue-gray, dense	15	95
Limestone, white to tan, partly crystalline; 15% chert, blue-gray, dense	5	100

Names:
Sample Logs of Test Wells

Types:
booklet

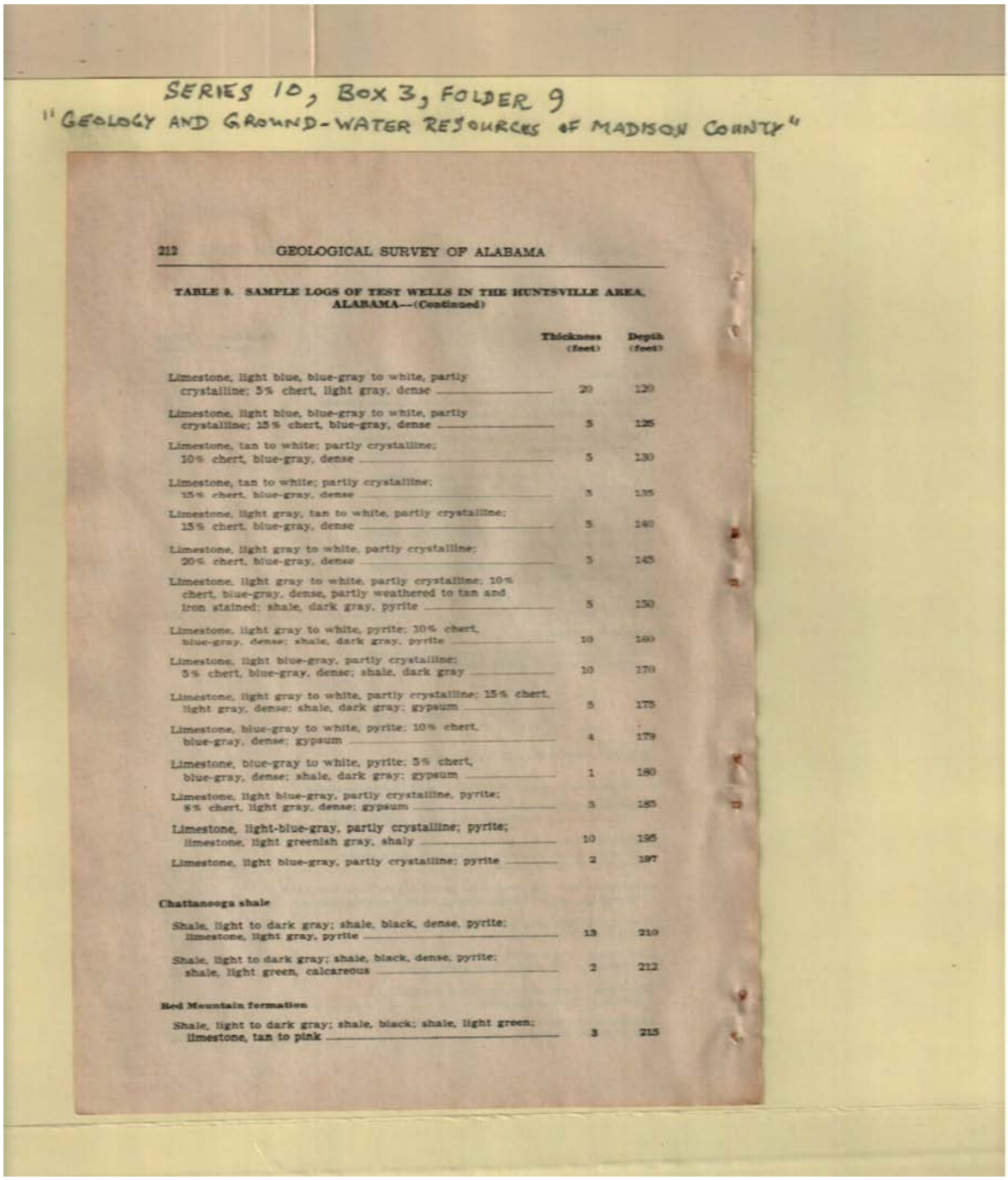

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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light blue, blue-gray to white, partly crystalline; 5% chert, light gray, dense	20	120
Limestone, light blue, blue-gray to white, partly crystalline; 15% chert, blue-gray, dense	5	125
Limestone, tan to white; partly crystalline; 10% chert, blue-gray, dense	5	130
Limestone, tan to white; partly crystalline; 15% chert, blue-gray, dense	5	135
Limestone, light gray, tan to white, partly crystalline; 15% chert, blue-gray, dense	5	140
Limestone, light gray to white, partly crystalline; 20% chert, blue-gray, dense	5	145
Limestone, light gray to white, partly crystalline; 10% chert, blue-gray, dense, partly weathered to tan and iron stained; shale, dark gray, pyrite	5	150
Limestone, light gray to white, pyrite; 10% chert, blue-gray, dense; shale, dark gray, pyrite	10	160
Limestone, light blue-gray, partly crystalline; 5% chert, blue-gray, dense; shale, dark gray	10	170
Limestone, light gray to white, partly crystalline; 15% chert, light gray, dense; shale, dark gray; gypsum	5	175
Limestone, blue-gray to white, pyrite; 10% chert, blue-gray, dense; gypsum	4	179
Limestone, blue-gray to white, pyrite; 5% chert, blue-gray, dense; shale, dark gray; gypsum	1	180
Limestone, light blue-gray, partly crystalline, pyrite; 8% chert, light gray, dense; gypsum	5	185
Limestone, light-blue-gray, partly crystalline; pyrite; limestone, light greenish gray, shaly	10	195
Limestone, light blue-gray, partly crystalline; pyrite	2	197
Chattanooga shale		
Shale, light to dark gray; shale, black, dense, pyrite; limestone, light gray, pyrite	13	210
Shale, light to dark gray; shale, black, dense, pyrite; shale, light green, calcareous	2	212
Red Mountain formation		
Shale, light to dark gray; shale, black; shale, light green; limestone, tan to pink	3	215

Names:
Sample Logs of Test Wells

Types:
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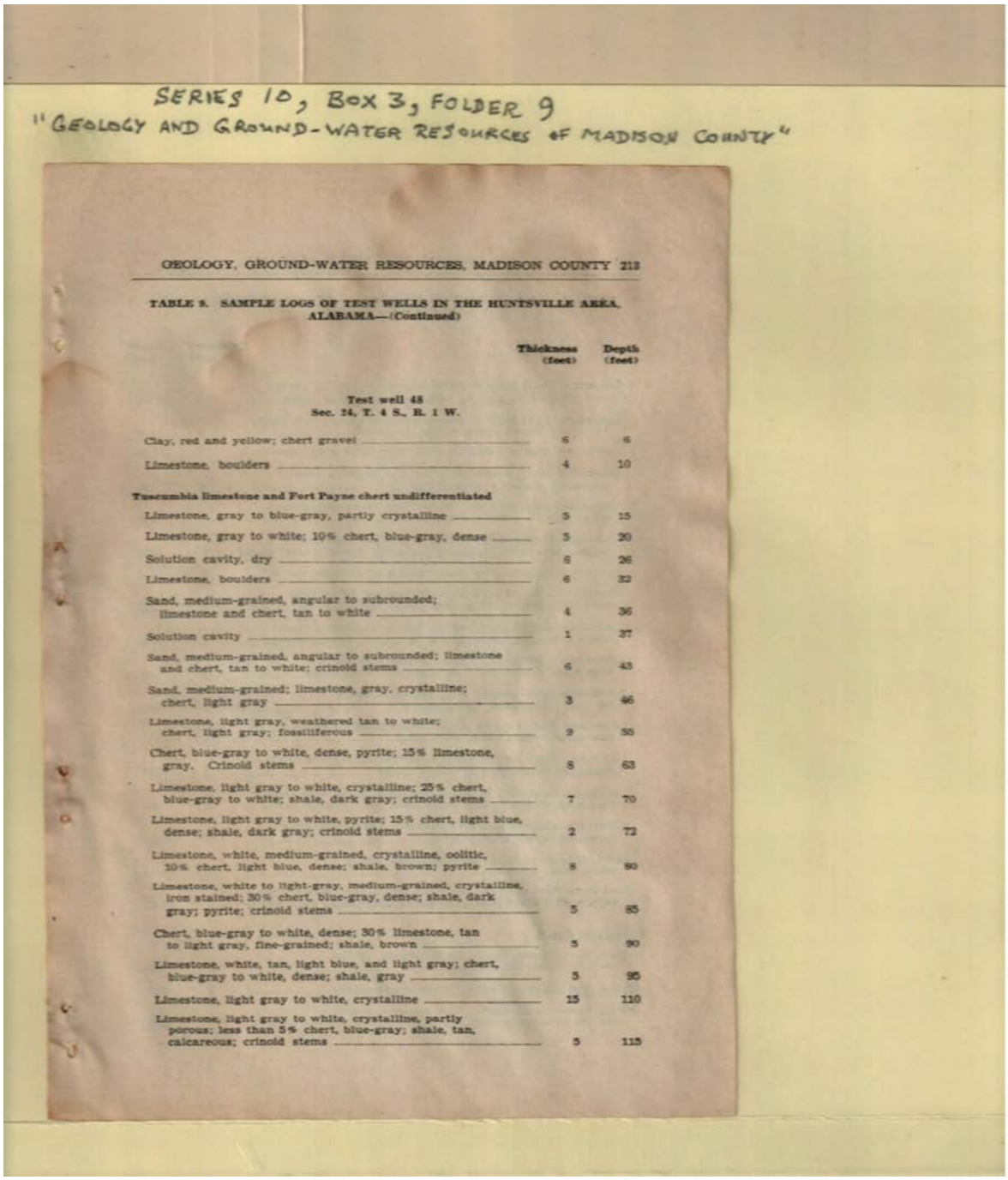

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Test well 48 **Sec. 24, T. 4 S., R. 1 W.**		
Clay, red and yellow; chert gravel	6	6
Limestone, boulders	4	10
Tuscumbia limestone and Fort Payne chert undifferentiated		
Limestone, gray to blue-gray, partly crystalline	5	15
Limestone, gray to white; 10% chert, blue-gray, dense	5	20
Solution cavity, dry	6	26
Limestone, boulders	6	32
Sand, medium-grained, angular to subrounded; limestone and chert, tan to white	4	36
Solution cavity	1	37
Sand, medium-grained, angular to subrounded; limestone and chert, tan to white; crinoid stems	6	43
Sand, medium-grained; limestone, gray, crystalline; chert, light gray	3	46
Limestone, light gray, weathered tan to white; chert, light gray; fossiliferous	9	55
Chert, blue-gray to white, dense, pyrite; 15% limestone, gray. Crinoid stems	8	63
Limestone, light gray to white, crystalline; 25% chert, blue-gray to white; shale, dark gray; crinoid stems	7	70
Limestone, light gray to white, pyrite; 15% chert, light blue, dense; shale, dark gray; crinoid stems	2	72
Limestone, white, medium-grained, crystalline, oolitic, 10% chert, light blue, dense; shale, brown; pyrite	8	80
Limestone, white to light-gray, medium-grained, crystalline, iron stained; 30% chert, blue-gray, dense; shale, dark gray; pyrite; crinoid stems	5	85
Chert, blue-gray to white, dense; 30% limestone, tan to light gray, fine-grained; shale, brown	5	90
Limestone, white, tan, light blue, and light gray; chert, blue-gray to white, dense; shale, gray	5	95
Limestone, light gray to white, crystalline	15	110
Limestone, light gray to white, crystalline, partly porous; less than 5% chert, blue-gray; shale, tan, calcareous; crinoid stems	5	115

Names:
Sample Logs of Test Wells

Types:
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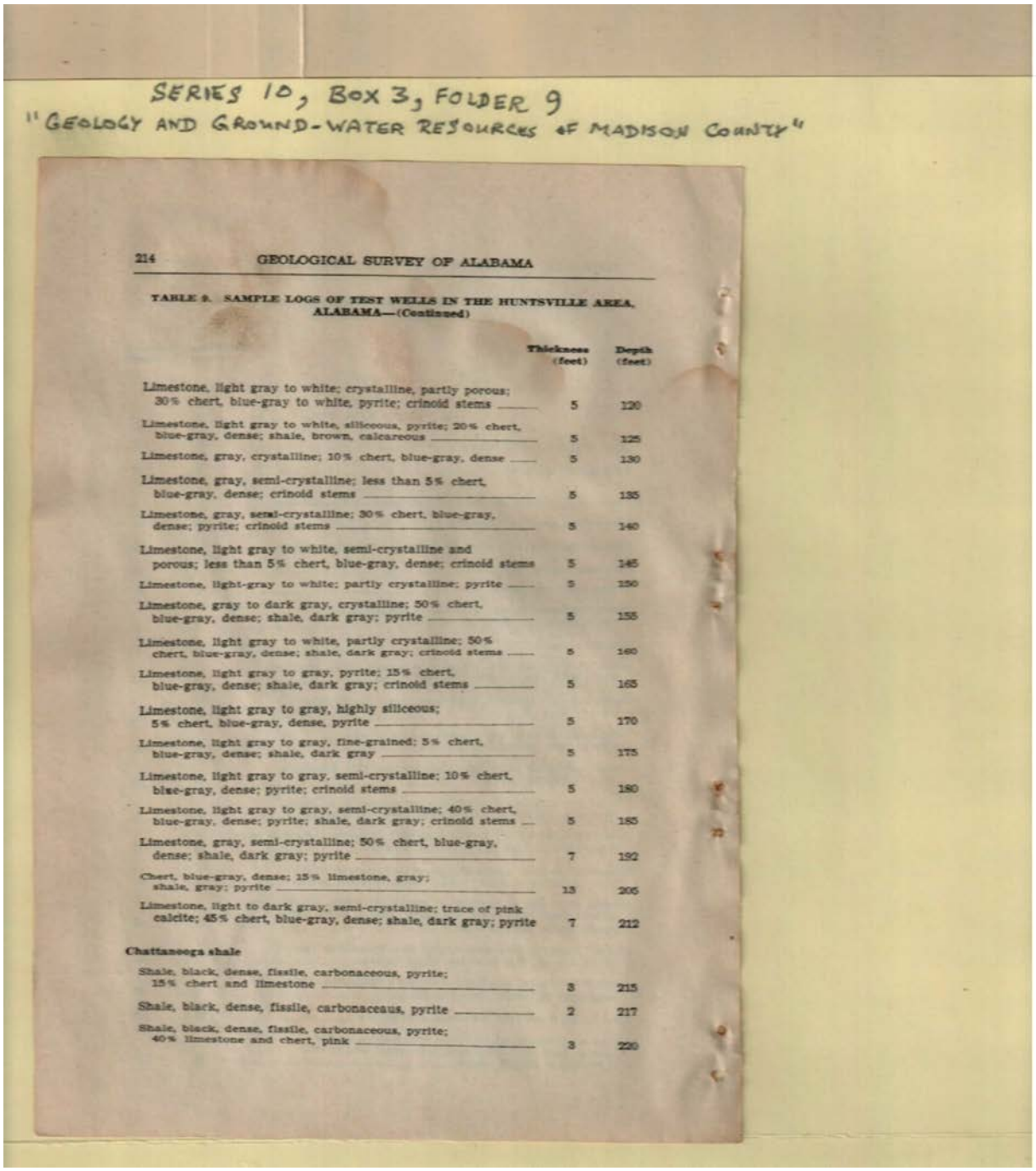

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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray to white; crystalline, partly porous; 30% chert, blue-gray to white, pyrite; crinoid stems	5	120
Limestone, light gray to white, siliceous, pyrite; 20% chert, blue-gray, dense; shale, brown, calcareous	5	125
Limestone, gray, crystalline; 10% chert, blue-gray, dense	5	130
Limestone, gray, semi-crystalline; less than 5% chert, blue-gray, dense; crinoid stems	5	135
Limestone, gray, semi-crystalline; 30% chert, blue-gray, dense; pyrite; crinoid stems	5	140
Limestone, light gray to white, semi-crystalline and porous; less than 5% chert, blue-gray, dense; crinoid stems	5	145
Limestone, light-gray to white; partly crystalline; pyrite	5	150
Limestone, gray to dark gray, crystalline; 50% chert, blue-gray, dense; shale, dark gray; pyrite	5	155
Limestone, light gray to white, partly crystalline; 50% chert, blue-gray, dense; shale, dark gray; crinoid stems	5	160
Limestone, light gray to gray, pyrite; 15% chert, blue-gray, dense; shale, dark gray; crinoid stems	5	165
Limestone, light gray to gray, highly siliceous; 5% chert, blue-gray, dense, pyrite	5	170
Limestone, light gray to gray, fine-grained; 5% chert, blue-gray, dense; shale, dark gray	5	175
Limestone, light gray to gray, semi-crystalline; 10% chert, blue-gray, dense; pyrite; crinoid stems	5	180
Limestone, light gray to gray, semi-crystalline; 40% chert, blue-gray, dense; pyrite; shale, dark gray; crinoid stems	5	185
Limestone, gray, semi-crystalline; 50% chert, blue-gray, dense; shale, dark gray; pyrite	7	192
Chert, blue-gray, dense; 15% limestone, gray; shale, gray; pyrite	13	205
Limestone, light to dark gray, semi-crystalline; trace of pink calcite; 45% chert, blue-gray, dense; shale, dark gray; pyrite	7	212
Chattanooga shale		
Shale, black, dense, fissile, carbonaceous, pyrite; 15% chert and limestone	3	215
Shale, black, dense, fissile, carbonaceous, pyrite	2	217
Shale, black, dense, fissile, carbonaceous, pyrite; 40% limestone and chert, pink	3	220

Names:
Sample Logs of Test Wells

Types:
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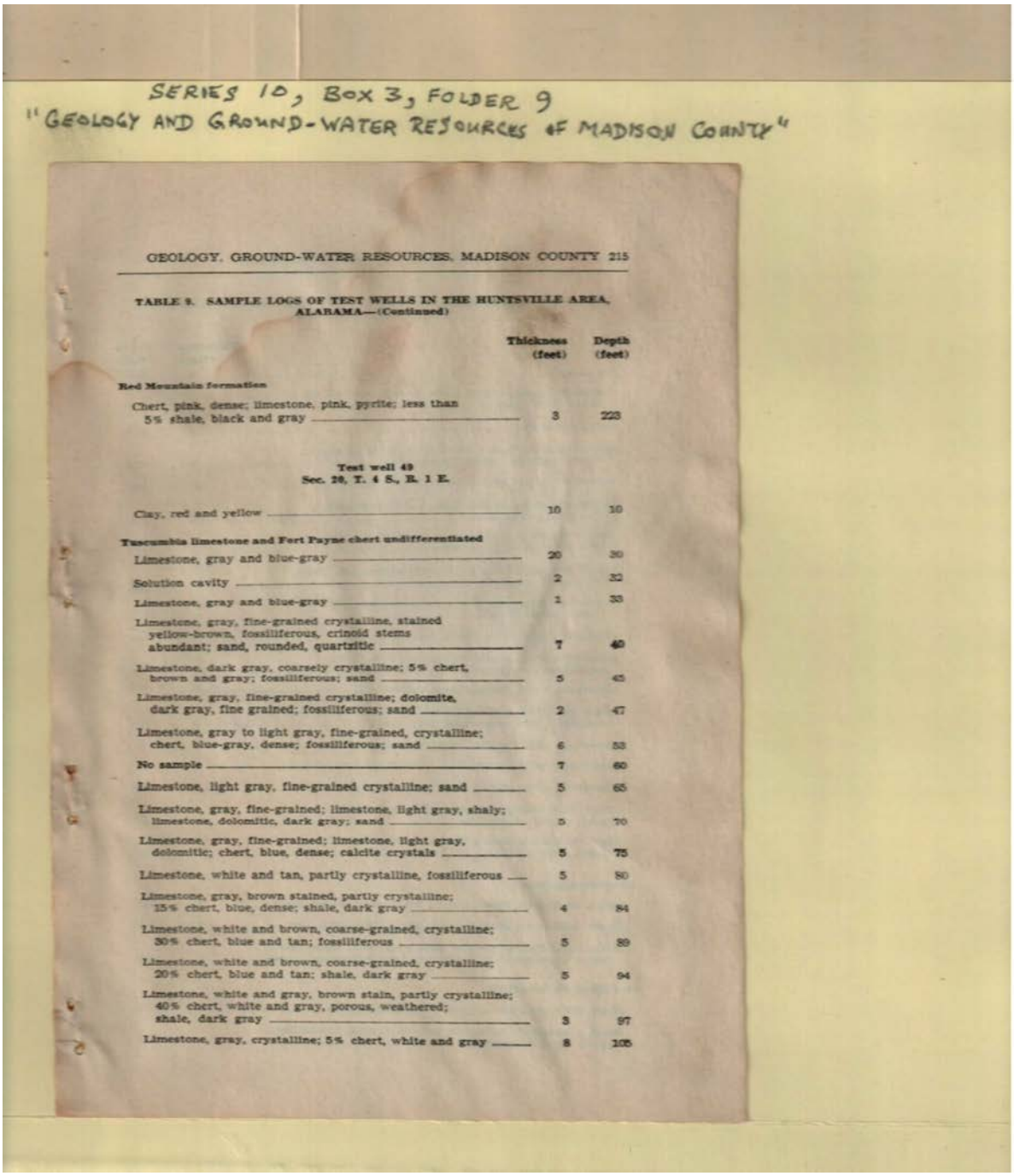

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 215

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Red Mountain formation		
Chert, pink, dense; limestone, pink, pyrite; less than 5% shale, black and gray	3	223
Test well 49 Sec. 20, T. 4 S., R. 1 E.		
Clay, red and yellow	10	10
Tuscumbia limestone and Fort Payne chert undifferentiated		
Limestone, gray and blue-gray	20	30
Solution cavity	2	32
Limestone, gray and blue-gray	1	33
Limestone, gray, fine-grained crystalline, stained yellow-brown, fossiliferous, crinoid stems abundant; sand, rounded, quartzitic	7	40
Limestone, dark gray, coarsely crystalline; 5% chert, brown and gray; fossiliferous; sand	5	45
Limestone, gray, fine-grained crystalline; dolomite, dark gray, fine grained; fossiliferous; sand	2	47
Limestone, gray to light gray, fine-grained, crystalline; chert, blue-gray, dense; fossiliferous; sand	6	53
No sample	7	60
Limestone, light gray, fine-grained crystalline; sand	5	65
Limestone, gray, fine-grained; limestone, light gray, shaly; limestone, dolomitic, dark gray; sand	5	70
Limestone, gray, fine-grained; limestone, light gray, dolomitic; chert, blue, dense; calcite crystals	5	75
Limestone, white and tan, partly crystalline, fossiliferous	5	80
Limestone, gray, brown stained, partly crystalline; 15% chert, blue, dense; shale, dark gray	4	84
Limestone, white and brown, coarse-grained, crystalline; 30% chert, blue and tan; fossiliferous	5	89
Limestone, white and brown, coarse-grained, crystalline; 20% chert, blue and tan; shale, dark gray	5	94
Limestone, white and gray, brown stain, partly crystalline; 40% chert, white and gray, porous, weathered; shale, dark gray	3	97
Limestone, gray, crystalline; 5% chert, white and gray	8	105

Names:
Sample Logs of Test Wells

Types:
booklet

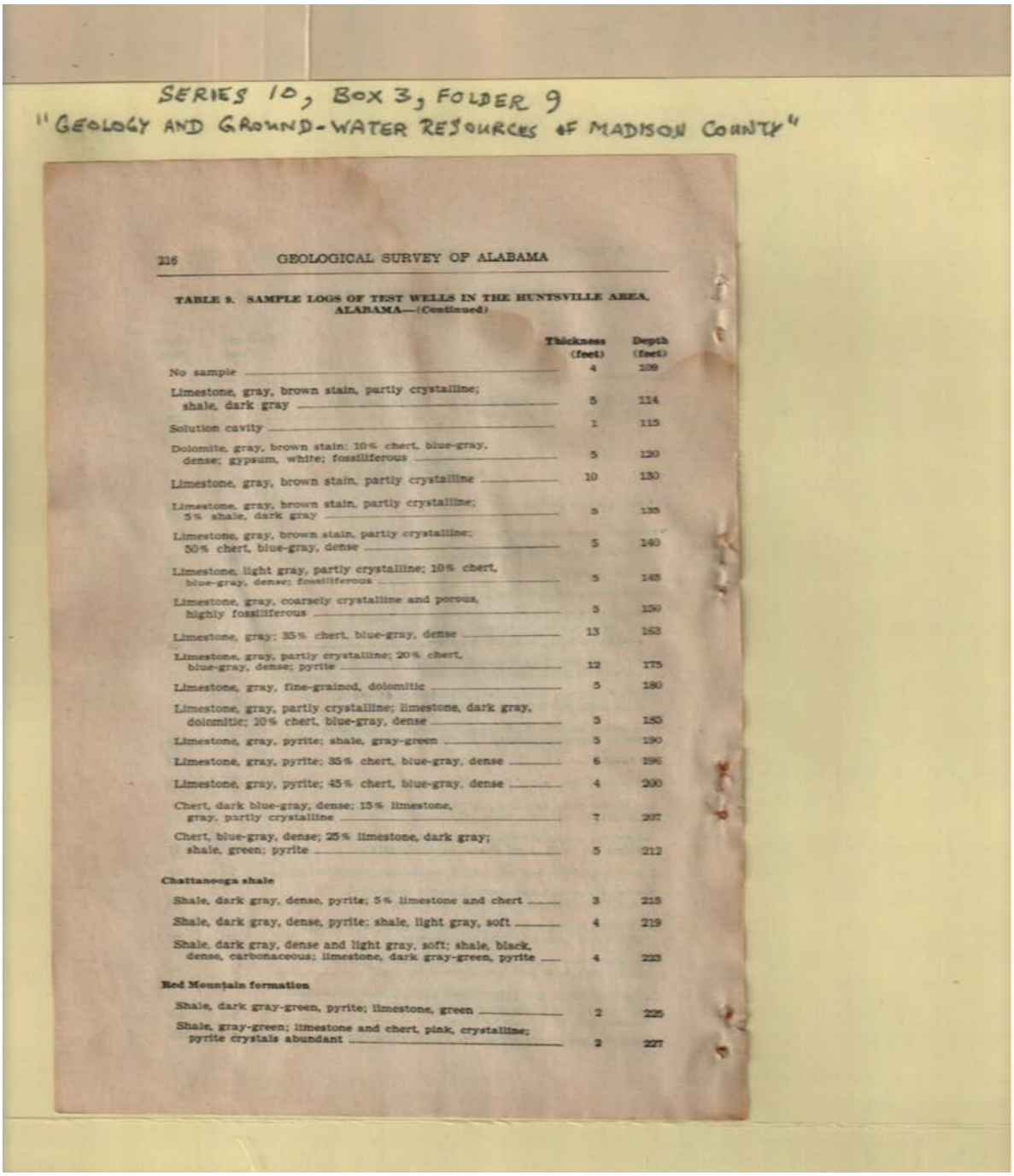

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TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
No sample	4	109
Limestone, gray, brown stain, partly crystalline; shale, dark gray	5	114
Solution cavity	1	115
Dolomite, gray, brown stain; 10% chert, blue-gray, dense; gypsum, white; fossiliferous	5	120
Limestone, gray, brown stain, partly crystalline	10	130
Limestone, gray, brown stain, partly crystalline; 5% shale, dark gray	5	135
Limestone, gray, brown stain, partly crystalline; 50% chert, blue-gray, dense	5	140
Limestone, light gray, partly crystalline; 10% chert, blue-gray, dense; fossiliferous	5	145
Limestone, gray, coarsely crystalline and porous, highly fossiliferous	5	150
Limestone, gray; 35% chert, blue-gray, dense	13	163
Limestone, gray, partly crystalline; 20% chert, blue-gray, dense; pyrite	12	175
Limestone, gray, fine-grained, dolomitic	5	180
Limestone, gray, partly crystalline; limestone, dark gray, dolomitic; 10% chert, blue-gray, dense	3	183
Limestone, gray, pyrite; shale, gray-green	5	190
Limestone, gray, pyrite; 35% chert, blue-gray, dense	6	196
Limestone, gray, pyrite; 45% chert, blue-gray, dense	4	200
Chert, dark blue-gray, dense; 15% limestone, gray, partly crystalline	7	207
Chert, blue-gray, dense; 25% limestone, dark gray; shale, green; pyrite	5	212
Chattanooga shale		
Shale, dark gray, dense, pyrite; 5% limestone and chert	3	215
Shale, dark gray, dense, pyrite; shale, light gray, soft	4	219
Shale, dark gray, dense and light gray, soft; shale, black, dense, carbonaceous; limestone, dark gray-green, pyrite	4	223
Red Mountain formation		
Shale, dark gray-green, pyrite; limestone, green	2	225
Shale, gray-green; limestone and chert, pink, crystalline; pyrite crystals abundant	2	227

Names:
Sample Logs of Test Wells

Types:
booklet

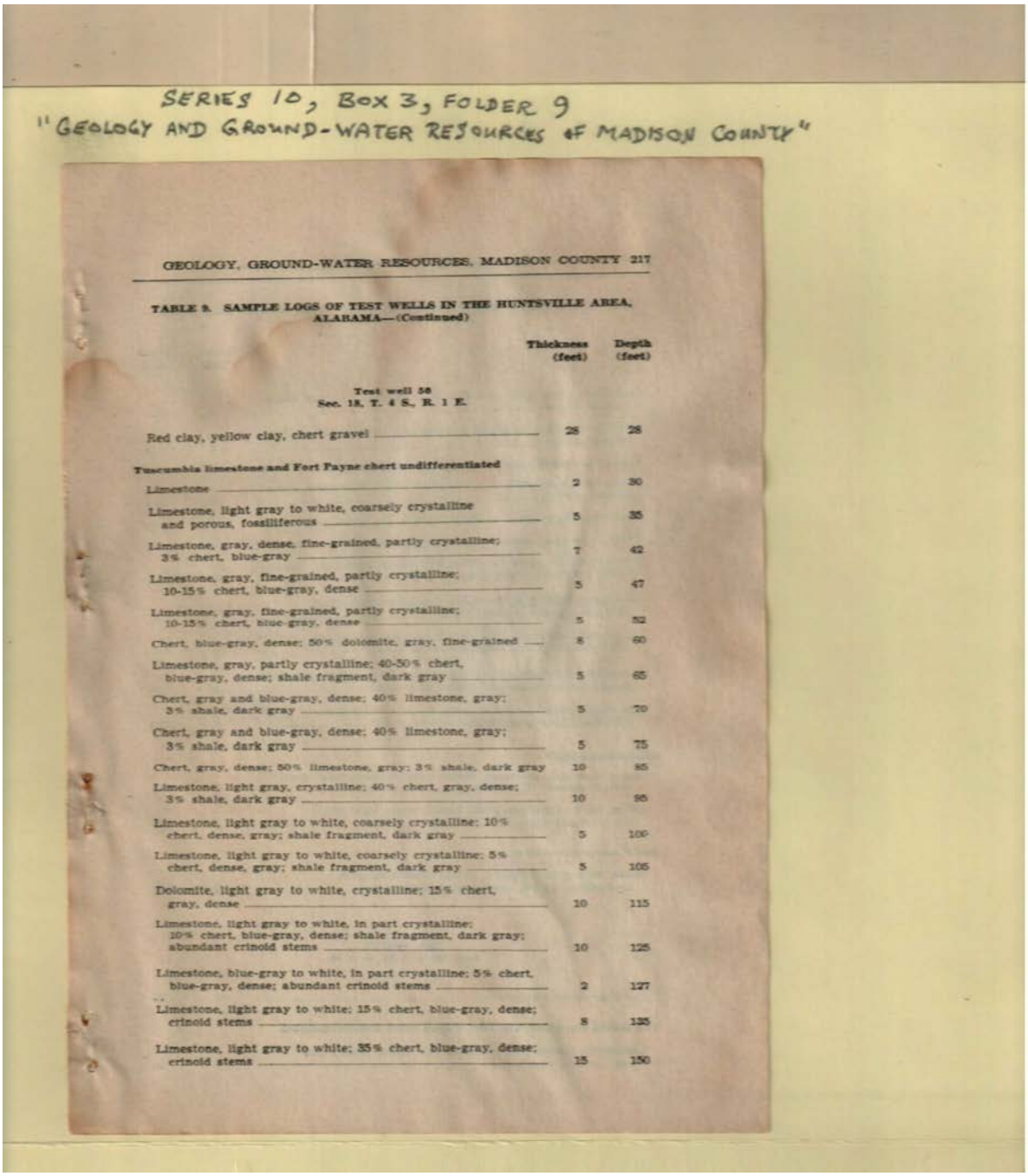

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Test well 56 **Sec. 18, T. 4 S., R. 1 E.**		
Red clay, yellow clay, chert gravel	28	28
Tuscumbia limestone and Fort Payne chert undifferentiated		
Limestone	2	30
Limestone, light gray to white, coarsely crystalline and porous, fossiliferous	5	35
Limestone, gray, dense, fine-grained, partly crystalline; 3% chert, blue-gray	7	42
Limestone, gray, fine-grained, partly crystalline; 10-15% chert, blue-gray, dense	5	47
Limestone, gray, fine-grained, partly crystalline; 10-15% chert, blue-gray, dense	5	52
Chert, blue-gray, dense; 50% dolomite, gray, fine-grained	8	60
Limestone, gray, partly crystalline; 40-50% chert, blue-gray, dense; shale fragment, dark gray	5	65
Chert, gray and blue-gray, dense; 40% limestone, gray; 3% shale, dark gray	5	70
Chert, gray and blue-gray, dense; 40% limestone, gray; 3% shale, dark gray	5	75
Chert, gray, dense; 50% limestone, gray; 3% shale, dark gray	10	85
Limestone, light gray, crystalline; 40% chert, gray, dense; 3% shale, dark gray	10	95
Limestone, light gray to white, coarsely crystalline; 10% chert, dense, gray; shale fragment, dark gray	5	100
Limestone, light gray to white, coarsely crystalline; 5% chert, dense, gray; shale fragment, dark gray	5	105
Dolomite, light gray to white, crystalline; 15% chert, gray, dense	10	115
Limestone, light gray to white, in part crystalline; 10% chert, blue-gray, dense; shale fragment, dark gray; abundant crinoid stems	10	125
Limestone, blue-gray to white, in part crystalline; 5% chert, blue-gray, dense; abundant crinoid stems	2	127
Limestone, light gray to white; 15% chert, blue-gray, dense; crinoid stems	8	135
Limestone, light gray to white; 35% chert, blue-gray, dense; crinoid stems	15	150

Names:
Sample Logs of Test Wells

Types:
booklet

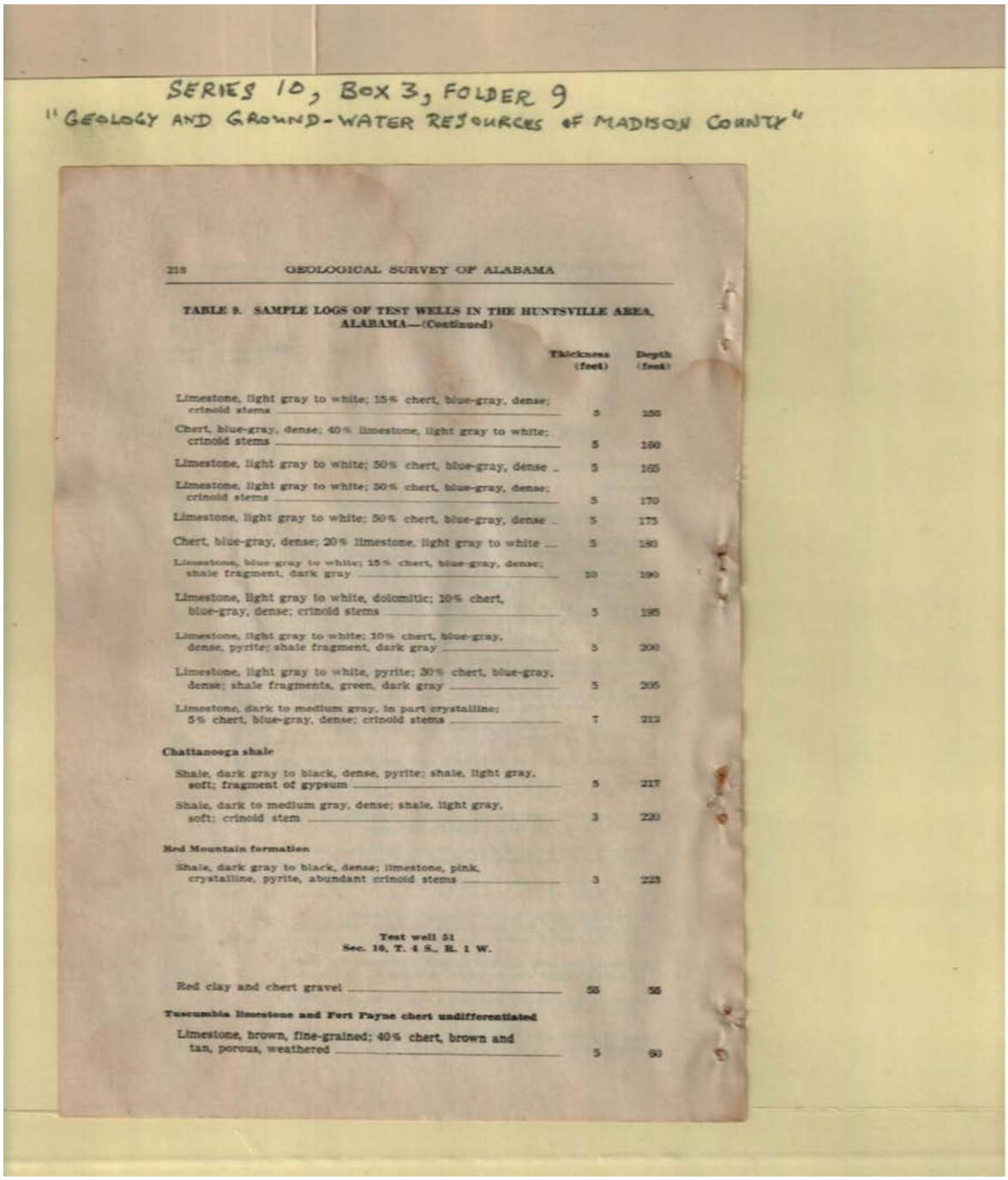

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, light gray to white; 15% chert, blue-gray, dense; crinoid stems	5	155
Chert, blue-gray, dense; 40% limestone, light gray to white; crinoid stems	5	160
Limestone, light gray to white; 50% chert, blue-gray, dense	5	165
Limestone, light gray to white; 50% chert, blue-gray, dense; crinoid stems	5	170
Limestone, light gray to white; 50% chert, blue-gray, dense	5	175
Chert, blue-gray, dense; 20% limestone, light gray to white	5	180
Limestone, blue-gray to white; 15% chert, blue-gray, dense; shale fragment, dark gray	10	190
Limestone, light gray to white, dolomitic; 10% chert, blue-gray, dense; crinoid stems	5	195
Limestone, light gray to white; 10% chert, blue-gray, dense, pyrite; shale fragment, dark gray	5	200
Limestone, light gray to white, pyrite; 30% chert, blue-gray, dense; shale fragments, green, dark gray	5	205
Limestone, dark to medium gray, in part crystalline; 5% chert, blue-gray, dense; crinoid stems	7	212
Chattanooga shale		
Shale, dark gray to black, dense, pyrite; shale, light gray, soft; fragment of gypsum	5	217
Shale, dark to medium gray, dense; shale, light gray, soft; crinoid stem	3	220
Red Mountain formation		
Shale, dark gray to black, dense; limestone, pink, crystalline, pyrite, abundant crinoid stems	3	223
Test well 51 **Sec. 10, T. 4 S., R. 1 W.**		
Red clay and chert gravel	55	55
Tuscumbia limestone and Fort Payne chert undifferentiated		
Limestone, brown, fine-grained; 40% chert, brown and tan, porous, weathered	5	60

Names:
Sample Logs of Test Wells

Types:
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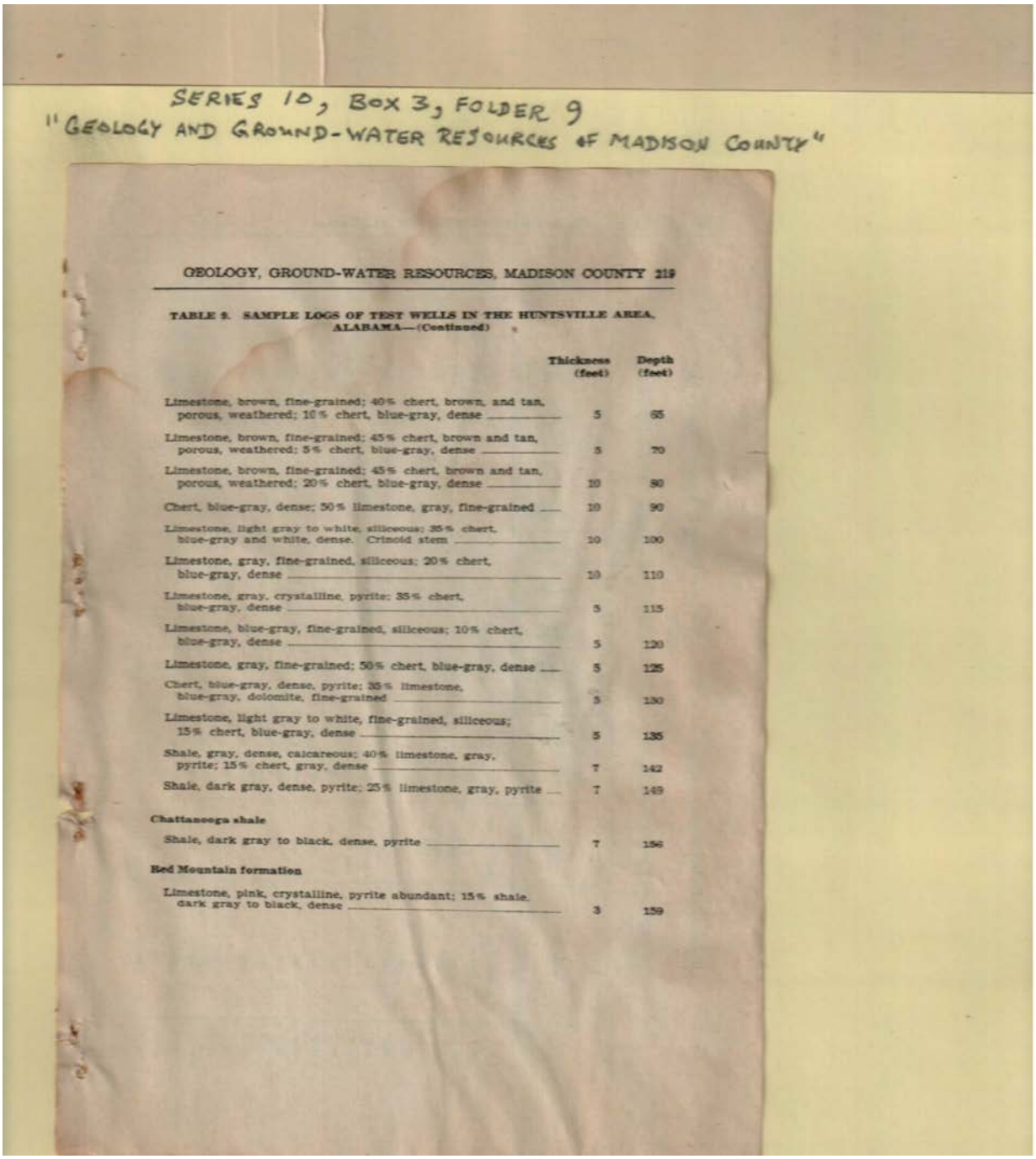


GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 219

TABLE 9. SAMPLE LOGS OF TEST WELLS IN THE HUNTSVILLE AREA, ALABAMA—(Continued)

	Thickness (feet)	Depth (feet)
Limestone, brown, fine-grained; 40% chert, brown, and tan, porous, weathered; 10% chert, blue-gray, dense	5	65
Limestone, brown, fine-grained; 45% chert, brown and tan, porous, weathered; 5% chert, blue-gray, dense	5	70
Limestone, brown, fine-grained; 45% chert, brown and tan, porous, weathered; 20% chert, blue-gray, dense	10	80
Chert, blue-gray, dense; 50% limestone, gray, fine-grained	10	90
Limestone, light gray to white, siliceous; 35% chert, blue-gray and white, dense. Crinoid stem	10	100
Limestone, gray, fine-grained, siliceous; 20% chert, blue-gray, dense	10	110
Limestone, gray, crystalline, pyrite; 35% chert, blue-gray, dense	5	115
Limestone, blue-gray, fine-grained, siliceous; 10% chert, blue-gray, dense	5	120
Limestone, gray, fine-grained; 50% chert, blue-gray, dense	5	125
Chert, blue-gray, dense, pyrite; 35% limestone, blue-gray, dolomite, fine-grained	5	130
Limestone, light gray to white, fine-grained, siliceous; 15% chert, blue-gray, dense	5	135
Shale, gray, dense, calcareous; 40% limestone, gray, pyrite; 15% chert, gray, dense	7	142
Shale, dark gray, dense, pyrite; 25% limestone, gray, pyrite	7	149
Chattanooga shale		
Shale, dark gray to black, dense, pyrite	7	156
Red Mountain formation		
Limestone, pink, crystalline, pyrite abundant; 15% shale, dark gray to black, dense	3	159

Names:
Sample Logs of Test Wells

Types:
booklet

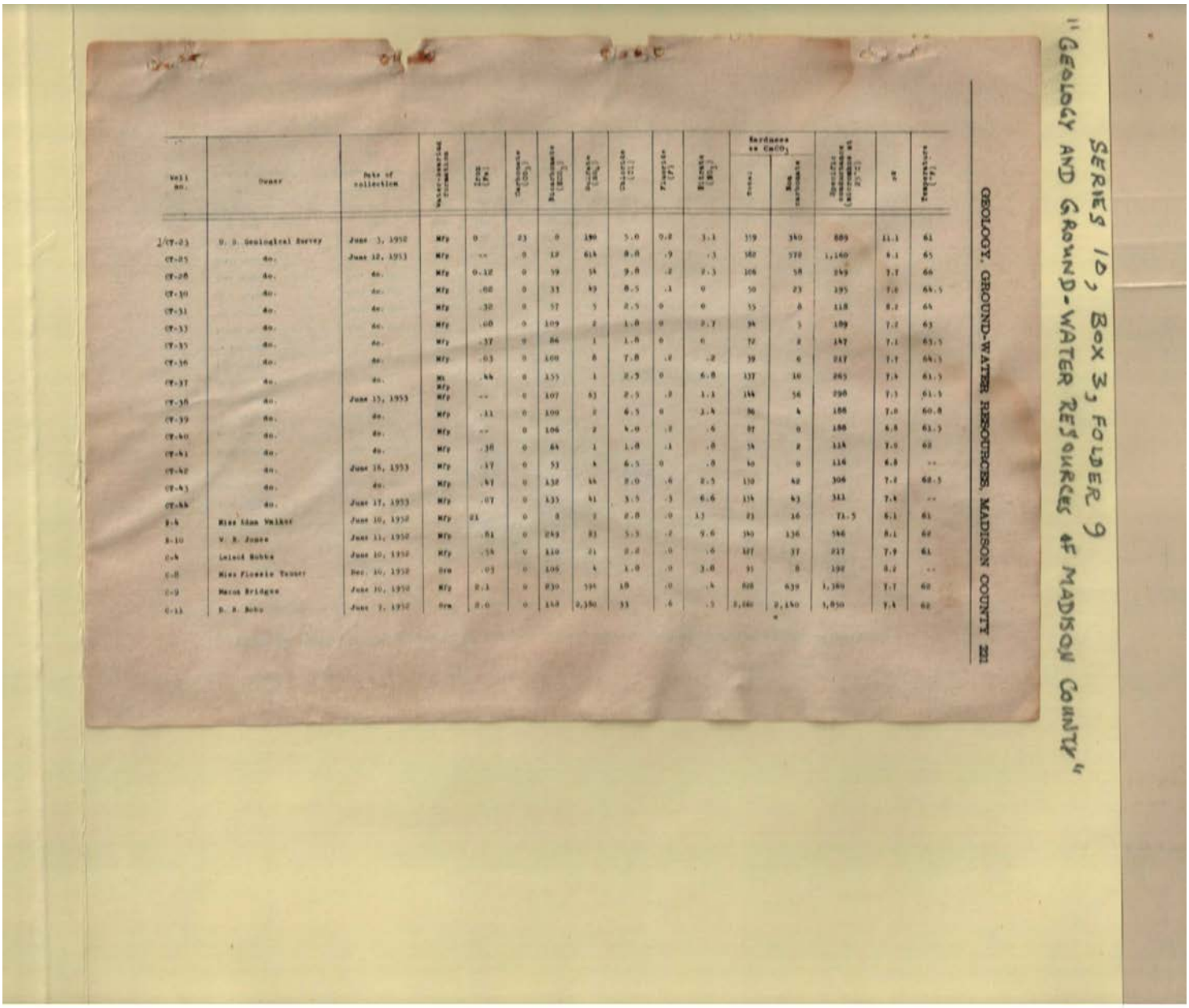
Table 10.–Partial chemical analyses of water from wells and springs in Madison County, Ala.
(parts per million)

Water-bearing formations: Cc, Chickamauga limestone; Srm, Red Mountain formation; Dc, Chattanooga shale; Mfp, Fort Payne chert; Mt, Tuscumbia limestone; Ms, Ste. Genevieve limestone; Mg, Gasper formation; Mb, Bangor limestone; Ppv, Pottsville formation; R, soil zone.

(Well numbers in table correspond with those in plates 7 and 9 and tables 7 and 8.)

Well no.	Owner	Date of collection	Water-bearing formation	Iron (Fe)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Hardness as $CaCO_3$ Total	Non carbonate	Specific conductance (micromhos at 25°C)	pH	Temperature (°F)
CT-1	U. S. Geological Survey	June 3, 1952	Mfp	0.08	0	93	34	8.2	0.2	1.2	116	38	247	7.9	61
CT-2	do.	do.	Mfp	0	0	252	38	10	.0	19	288	81	497	8.0	61
CT-3	do.	do.	Mfp	0	0	131	5	5.0	.2	8.0	150	43	283	7.5	61
CT-5	do.	do.	Mfp	.56	0	42	90	5.0	.2	4.3	111	77	222	8.0	61
CT-6	do.	do.	Mfp	0	0	160	341	3.0	.2	4.8	426	295	706	8.1	61
CT-7	do.	do.	Mfp	0	3	89	13	5.2	.2	1.3	108	30	199	8.4	61
CT-8	do.	do.	Mfp	.64	0	56	1	9.8	.2	.2	59	13	180	7.8	61
CT-9	do.	do.	Mfp	0	0	52	1	3.0	.2	.7	48	5	85.7	8.2	61
CT-10	do.	June 16, 1953	Mfp	.03	5	83	7	2.0	.1	0	84	0	74.6	9.1	62.5
CT-11	do.	June 3, 1952	Mfp	0	5	13	165	9.0	.2	13	214	194	487	8.9	61
1/ CT-12	do.	do.	Mfp	.44	36	0	347	9.8	.4	1.2	1,540	1,510	4,600	12.0	61
CT-13	do.	do.	Mfp	0	0	47	17	2.8	.4	2.8	48	9	116	8.1	61
CT-14	do.	do.	Mfp	0	0	35	8	2.5	.2	3.1	34	5	70.8	7.7	61
CT-15	do.	do.	Mfp	0	0	21	19	2.2	.2	.5	49	32	181	7.1	61
CT-16	do.	do.	Mfp	0	--	41	12	4.0	.2	6.3	56	22	137	7.6	61
CT-17	do.	do.	Mfp	0	0	29	4	2.0	.2	5.0	37	13	67.1	8.0	61
CT-18	do.	do.	Mfp	.4	0	39	9	2.2	.2	1.0	47	15	106	8.0	61
2/ CT-19	do.	do.	Mfp	0	27	0	17	4.0	.2	2.0	313	291	1,090	11.5	61
CT-20	do.	do.	Mfp	0	0	278	22	3.0	.0	.4	283	55	441	8.8	61
CT-21	do.	do.	Mfp	.4	0	61	3	2.0	.0	1.8	58	8	108	8.1	61
CT-22	do.	do.	Mfp	0	1	53	4	3.5	.4	.3	42	0	111	8.4	61

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"



Names:

Chemical Analysis of Water

Types:

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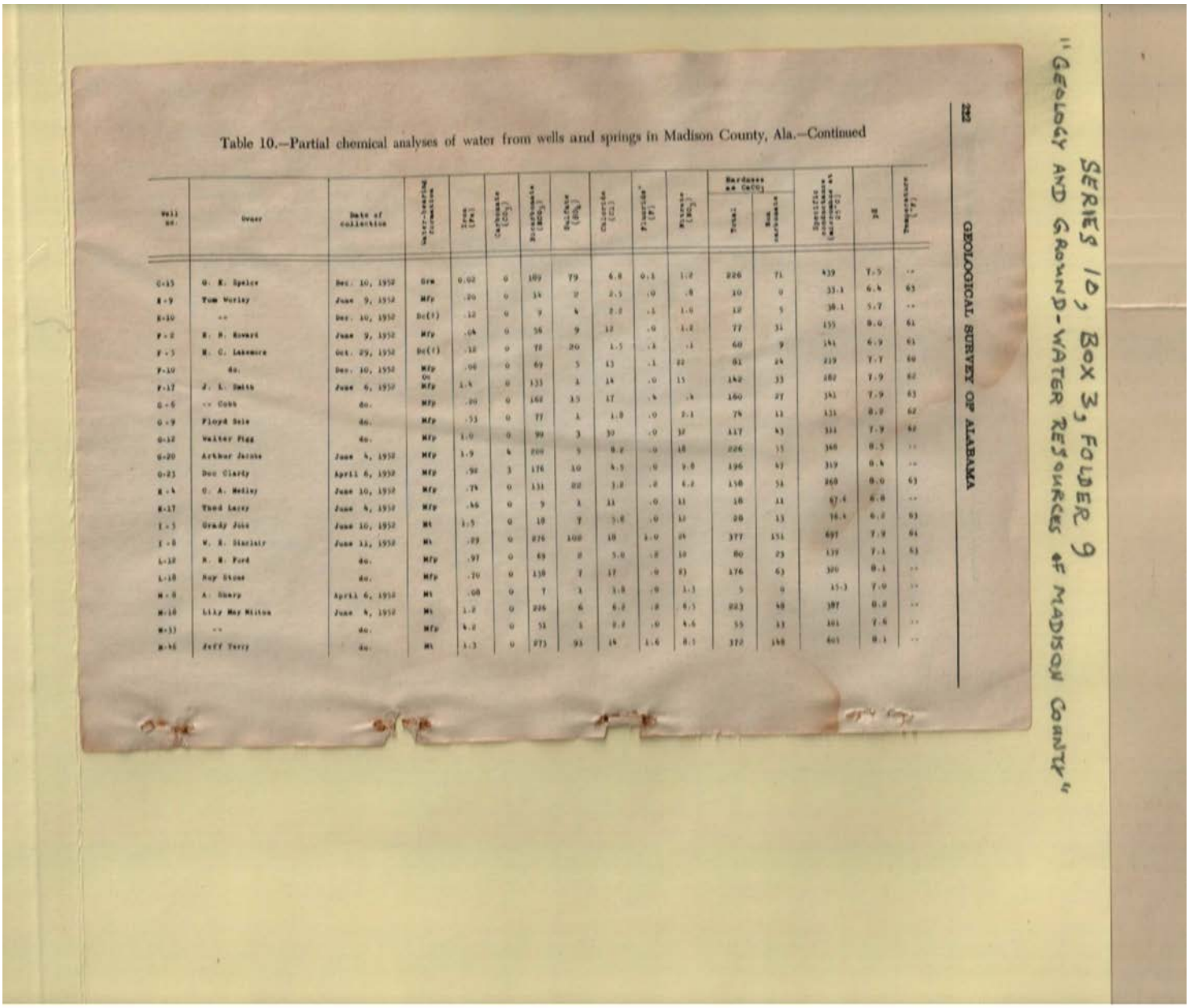
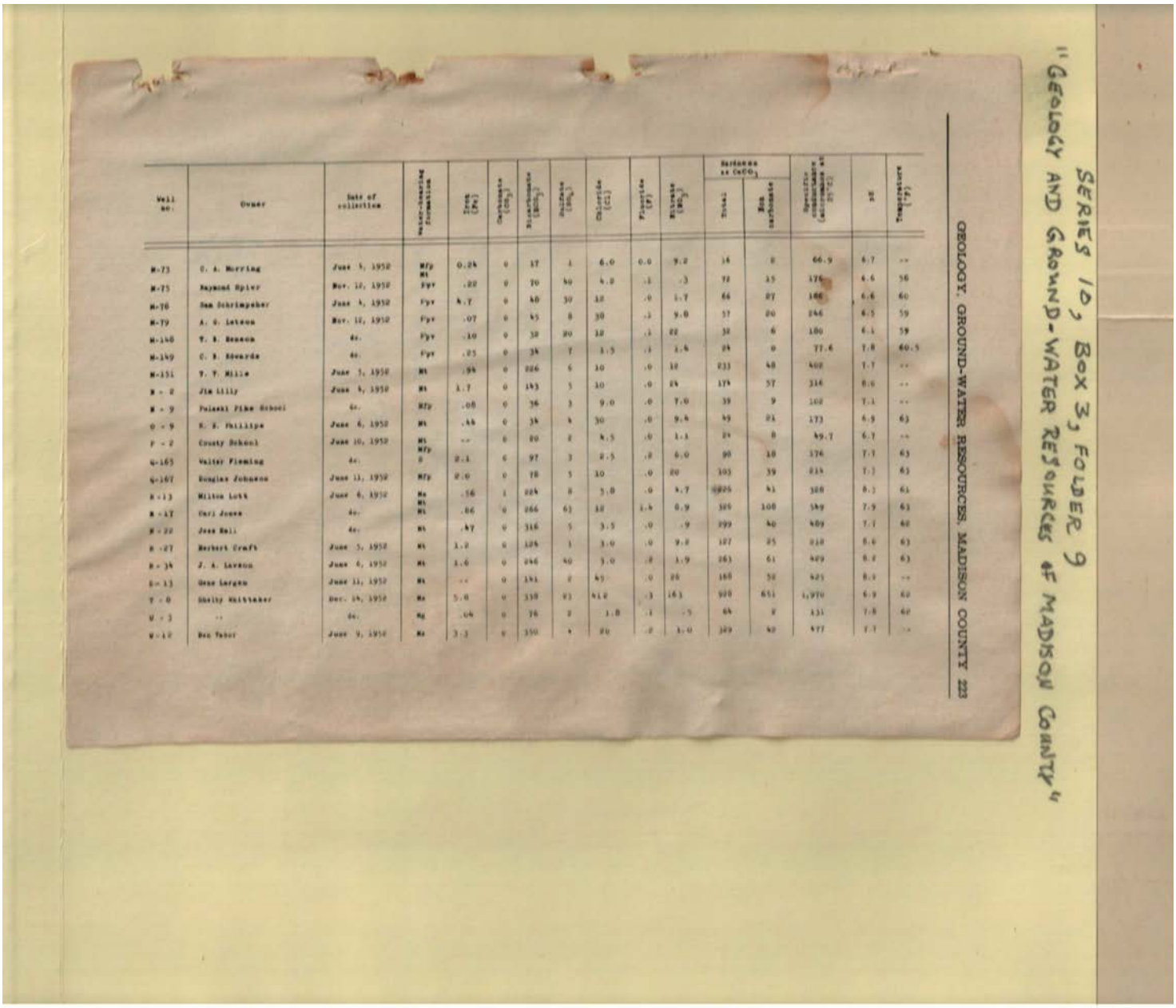


Table 10.—Partial chemical analyses of water from wells and springs in Madison County, Ala.—Continued

Well no.	Owner	Date of collection	Water-bearing formation	Iron (Fe)	Carbonate (CO3)	Bicarbonate (HCO3)	Sulfate (SO4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO3)	Hardness as CaCO3: Total	Hardness as CaCO3: Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Temperature (°F)
G-15	G. E. Spiker	Dec. 10, 1952	Ore	0.02	0	189	79	6.8	0.1	1.2	226	71	439	7.5	--
E-9	Tom Worley	June 9, 1952	Mfp	.20	0	14	2	2.5	.0	.8	10	0	33.1	6.4	63
E-10	--	Dec. 10, 1952	Dc(?)	.12	0	7	4	2.2	.1	1.0	12	5	38.1	5.7	--
F-2	E. P. Howard	June 9, 1952	Mfp	.04	0	56	9	12	.0	1.2	77	31	155	8.0	61
F-5	E. C. Lakemore	Oct. 29, 1952	Dc(?)	.12	0	78	20	1.5	.1	.1	60	9	191	6.9	63
F-10	do.	Dec. 10, 1952	Mfp or Ore	.06	0	69	5	13	.1	22	81	24	219	7.7	60
F-17	J. L. Smith	June 6, 1952	Mfp	1.5	0	133	1	14	.0	15	142	33	282	7.9	62
G-6	-- Cobb	do.	Mfp	.00	0	162	15	17	.4	.4	160	27	341	7.9	63
G-9	Floyd Sole	do.	Mfp	.53	0	77	1	1.8	.0	2.1	74	11	131	8.2	62
G-12	Walter Pigg	do.	Mfp	1.0	0	99	3	10	.0	12	117	43	211	7.9	62
G-20	Arthur Jacobs	June 4, 1952	Mfp	1.9	4	200	5	8.2	.0	18	226	15	368	8.5	--
G-21	Doc Clardy	April 6, 1952	Mfp	.92	3	176	10	4.5	.0	2.8	196	47	319	8.4	--
E-4	O. A. Bailey	June 10, 1952	Mfp	.74	0	131	22	3.8	.2	6.2	158	51	260	8.0	63
E-17	Thad Lacey	June 4, 1952	Mfp	.46	0	9	1	11	.0	11	18	11	67.4	6.8	--
I-3	Grady Jobe	June 10, 1952	Mt	1.5	0	10	7	3.8	.0	12	28	13	76.4	6.2	63
I-8	W. E. Starnes	June 11, 1952	Mt	.09	0	276	108	18	1.0	25	377	151	697	7.9	64
L-12	R. E. Ford	do.	Mfp	.97	0	69	2	5.0	.2	10	80	23	139	7.1	63
L-18	Ray Stone	do.	Mfp	.70	0	138	7	17	.0	23	176	63	300	8.1	--
M-8	A. Sharp	April 6, 1952	Mt	.08	0	7	1	1.8	.0	1.1	5	0	15.3	7.0	--
M-10	Lily May Hilton	June 4, 1952	Mt	1.2	0	226	6	6.2	.2	6.5	223	48	387	8.2	--
M-33	--	do.	Mfp	4.2	0	51	1	2.2	.0	4.6	55	13	101	7.6	--
M-36	Jeff Terry	do.	Mt	1.3	0	273	93	19	1.6	8.1	272	158	601	8.1	--

Names:
Chemical Analysis of Water

Types:
booklet



SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 223

Names:
Chemical Analysis of Water

Types:
booklet

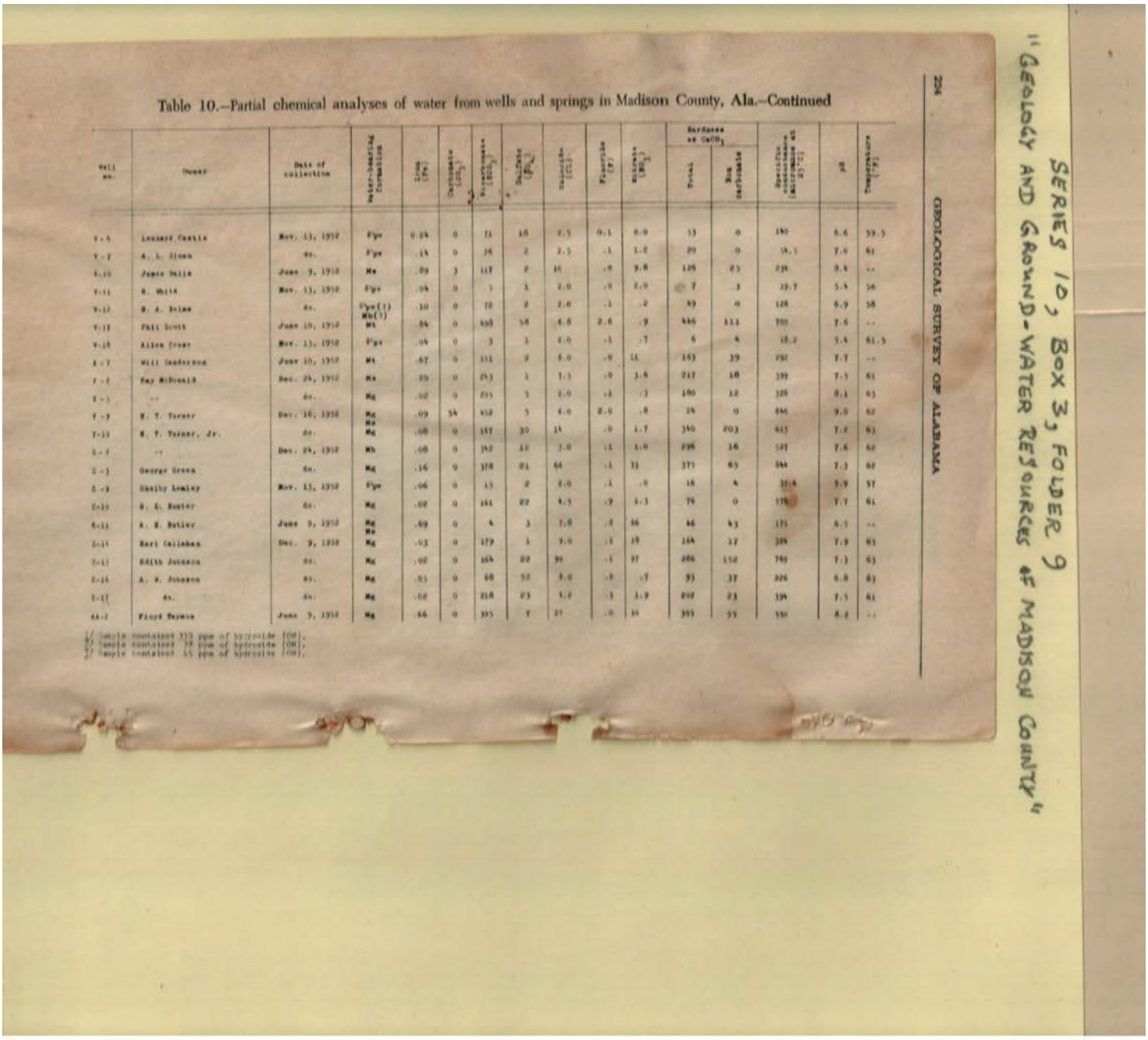


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Table 10.—Partial chemical analyses of water from wells and springs in Madison County, Ala.—Continued

Well no.	Owner	Date of collection	Water-bearing formation	Iron (Fe)	Carbonate (CO3)	Bicarbonate (HCO3)	Sulfate (SO4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO3)	Hardness as CaCO3: Total	Hardness as CaCO3: Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Temperature (°F)
Y-6	Leonard Castle	Nov. 13, 1952	Pyr	0.04	0	71	16	2.5	0.1	0.0	53	0	140	6.6	59.5
Y-7	A. L. Dixon	do.	Pyr	.14	0	76	2	2.5	.1	1.2	70	0	134	7.0	61
Y-10	James Mills	June 9, 1953	Ms	.09	3	117	2	16	.0	9.8	126	23	238	8.4	--
Y-11	H. White	Nov. 13, 1952	Pyr	.04	0	5	1	2.0	.0	2.0	7	3	19.7	5.4	56
Y-12	H. A. Brice	do.	Pyr(?) Mb(?)	.10	0	72	2	2.0	.1	.2	59	0	128	6.9	58
Y-13	Phil Scott	June 10, 1953	Ms	.84	0	498	58	6.8	2.6	.9	446	111	700	7.6	--
Y-15	Allen Cruse	Nov. 13, 1952	Pyr	.04	0	3	1	2.0	.1	.7	6	4	18.2	5.4	61.5
Z-7	Will Anderson	June 10, 1953	Ms	.67	0	151	2	8.0	.0	11	143	39	292	7.7	--
Y-2	Ray McDonald	Dec. 24, 1952	Ms	.20	0	243	1	7.5	.0	3.6	217	18	399	7.5	61
Y-5	--	do.	Mg	.02	0	235	3	2.0	.1	.3	180	12	328	8.1	63
Y-9	H. T. Turner	Dec. 16, 1952	Mg Ms	.09	54	452	5	6.0	2.0	.8	24	0	846	9.0	62
Y-10	H. T. Turner, Jr.	do.	Mg Ms	.08	0	157	30	14	.0	1.7	340	203	613	7.8	63
Z-1	--	Dec. 24, 1952	Mb	.08	0	342	12	3.0	.1	1.0	296	16	527	7.6	62
Z-3	George Green	do.	Mg	.16	0	378	81	64	.1	31	371	65	844	7.3	62
Z-9	Shelby Lemley	Nov. 13, 1952	Pyr	.06	0	13	2	2.0	.1	.0	16	4	31.6	5.9	57
Z-10	H. E. Butler	do.	Mg	.02	0	161	22	4.5	.9	1.3	76	0	378	7.7	61
Z-11	A. E. Butler	June 9, 1953	Mg Ms	.69	0	4	3	7.8	.2	66	46	43	171	6.5	--
Z-14	Earl Callahan	Dec. 9, 1952	Mg	.03	0	179	1	9.0	.1	18	164	17	384	7.9	63
Z-15	Edith Johnson	do.	Mg	.02	0	164	22	99	.1	37	286	152	769	7.3	63
Z-16	A. W. Johnson	do.	Mg	.03	0	68	32	8.0	.2	.7	93	37	226	6.8	63
Z-17	do.	do.	Mg	.02	0	218	23	5.2	.3	1.9	202	23	394	7.5	61
AA-2	Floyd Bynum	June 9, 1953	Mg	.66	0	395	7	27	.0	10	393	55	550	8.2	--

1/ Sample contained 313 ppm of hydroxide (OH).
2/ Sample contained 78 ppm of hydroxide (OH).
3/ Sample contained 15 ppm of hydroxide (OH).

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
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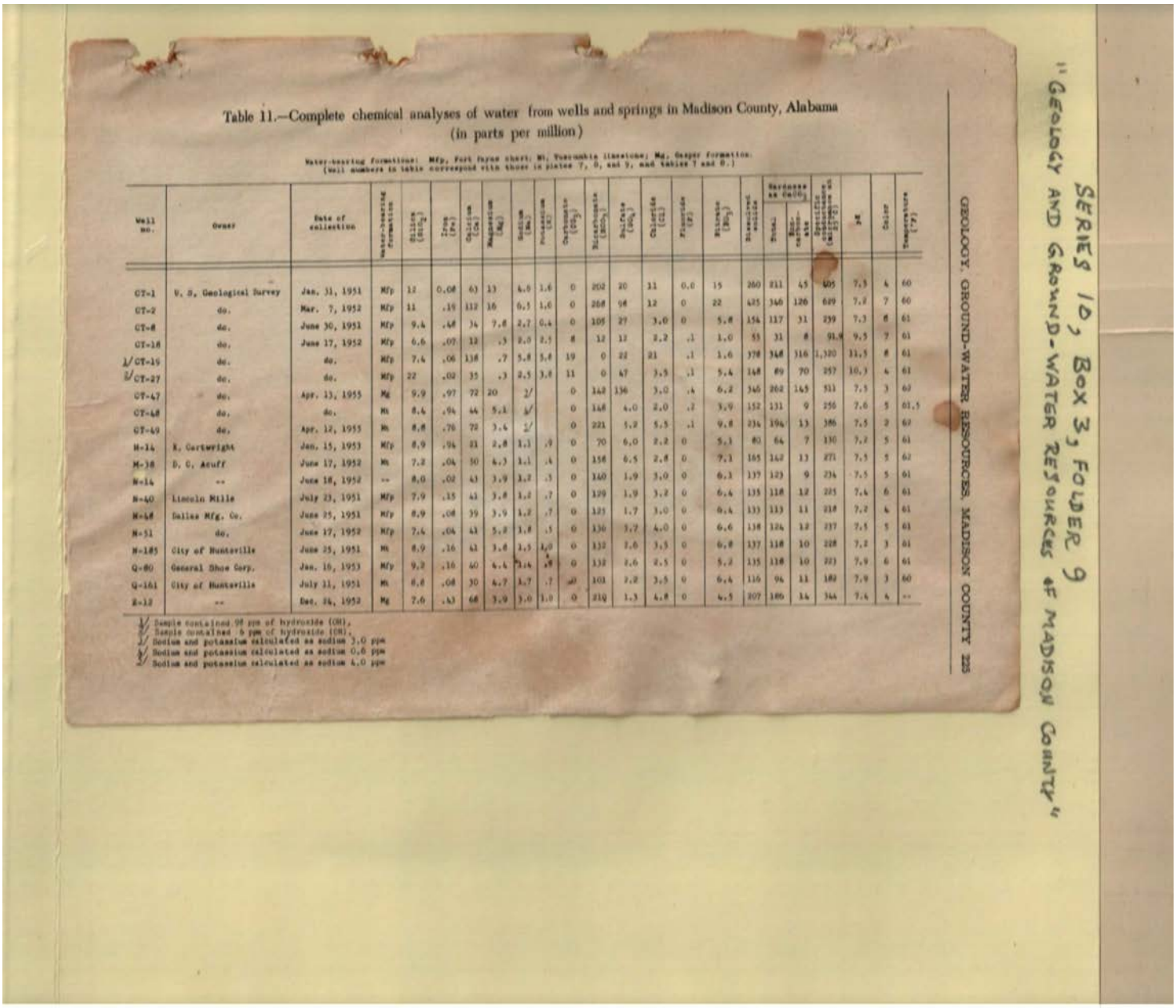

Table 11.—Complete chemical analyses of water from wells and springs in Madison County, Alabama
(in parts per million)

Water-bearing formations: Mfp, Fort Payne chert; Mt, Tuscumbia limestone; Mg, Gasper formation.
(Well numbers in table correspond with those in plates 7, 8, and 9, and tables 7 and 8.)

Well no.	Owner	Date of collection	Water-bearing formation	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as CaCO3: Total	Hardness as CaCO3: Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Color	Temperature (°F)
CT-1	U. S. Geological Survey	Jan. 31, 1951	Mfp	12	0.08	63	13	4.0	1.6	0	202	20	11	0.0	15	260	211	45	405	7.5	4	60
CT-2	do.	Mar. 7, 1952	Mfp	11	.19	112	16	6.1	1.6	0	268	98	12	0	22	425	340	126	699	7.2	7	60
CT-8	do.	June 30, 1951	Mfp	9.4	.48	34	7.8	2.7	0.4	0	105	27	3.0	0	5.8	154	117	31	239	7.3	6	61
CT-18	do.	June 17, 1952	Mfp	6.6	.07	12	.3	2.0	2.1	8	12	12	2.2	.1	1.0	53	31	8	91.9	9.5	7	61
1/CT-19	do.	do.	Mfp	7.4	.06	138	.7	5.8	5.6	19	0	22	21	.1	1.6	378	348	316	1,320	11.5	8	61
2/CT-27	do.	do.	Mfp	22	.02	35	.3	2.5	3.8	11	0	47	3.5	.1	5.4	148	89	70	257	10.3	4	61
CT-47	do.	Apr. 13, 1955	Mg	9.9	.97	72	20	3/		0	142	136	3.0	.4	6.2	346	262	145	511	7.5	3	62
CT-48	do.	do.	Mt	8.4	.94	44	5.1	3/		0	148	4.0	2.0	.2	3.9	152	131	9	256	7.6	5	61.5
CT-49	do.	Apr. 12, 1955	Mt	8.8	.76	72	3.4	3/		0	221	5.2	5.5	.1	9.8	234	194	13	386	7.5	2	62
H-14	E. Cartwright	Jan. 15, 1953	Mfp	8.9	.94	21	2.8	1.1	.9	0	70	6.0	2.2	0	5.1	80	64	7	130	7.2	5	61
M-38	D. C. Acuff	June 17, 1952	Mt	7.2	.04	50	4.3	1.1	.4	0	156	6.5	2.8	0	7.1	165	142	13	271	7.5	5	62
N-14	--	June 18, 1952	--	8.0	.02	43	3.9	1.2	.3	0	140	1.9	3.0	0	6.1	137	123	9	234	7.5	5	61
N-40	Lincoln Mills	July 23, 1951	Mfp	7.9	.15	43	3.8	1.2	.7	0	139	1.9	3.2	0	6.4	135	118	12	225	7.4	6	61
N-48	Dallas Mfg. Co.	June 25, 1951	Mfp	8.9	.08	39	3.9	1.2	.7	0	125	1.7	3.0	0	6.4	133	113	11	218	7.2	4	61
N-51	do.	June 17, 1952	Mfp	7.4	.04	43	5.2	1.8	.5	0	136	3.7	4.0	0	6.6	138	124	12	237	7.5	5	61
N-185	City of Huntsville	June 25, 1951	Mt	8.9	.16	41	3.8	1.5	1.0	0	132	2.6	3.5	0	6.8	137	118	10	228	7.2	3	61
Q-80	General Shoe Corp.	Jan. 16, 1953	Mfp	9.2	.16	40	4.4	1.4	.8	0	132	2.6	2.5	0	5.2	135	118	10	223	7.9	6	61
Q-161	City of Huntsville	July 31, 1951	Mt	8.8	.08	30	4.7	1.7	.7	40	101	7.2	3.5	0	6.4	116	94	11	182	7.9	3	60
Z-12	--	Dec. 24, 1952	Mg	7.6	.43	68	3.9	3.0	1.0	0	219	1.3	4.8	0	4.5	207	186	14	344	7.4	4	--

1/ Sample contained 98 ppm of hydroxide (OH).
2/ Sample contained 6 ppm of hydroxide (OH).
3/ Sodium and potassium calculated as sodium 3.0 ppm
4/ Sodium and potassium calculated as sodium 0.6 ppm
5/ Sodium and potassium calculated as sodium 4.0 ppm

GEOLOGY, GROUND-WATER RESOURCES, MADISON COUNTY 225

SERIES 10, BOX 3, FOLDER 9
"GEOLOGY AND GROUND-WATER RESOURCES OF MADISON COUNTY"

Names:
Chemical Analysis of Water

Types:
booklet

Frances Cabaniss Roberts Collection: Series 10, Box 3, Folder 9
Malmberg, Glenn T. and Downing, D.T., "Geology and Ground - Water Resources of Madison County" Report, 1957

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Name & Place Index

Frances Cabaniss Roberts Collection

Preferred Citation: Frances Cabaniss Roberts Collection, Archives and Special Collections, M. Louis Salmon Library, University of Alabama in Huntsville, Huntsville, AL.

Collection Scope and Content: The Collection of 114 Linear ft. includes a total of 156 Archival Boxes. The Frances Cabaniss Roberts collection covers the historical records of the Cabaniss Roberts family. This collection contains extensive correspondence records of the Cabaniss Roberts family circa 1830 to 1930.

Archives/Special Collections Access Restrictions: None

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