Dolomite/Dolostone July 31, 2020 WDHanson

The information and chemical analyses for dolomite, the mineral, and dolostone, the rock, both published and unpublished data, is found in the Geological Survey Library.

Chemically dolomite/dolostone is $CaMg(CO_3)_2$. Pure dolomite contains 54.28% calcium carbonate and 45.72% magnesium carbonate. Dolostone is commonly referred to as dolomite. The vast majority of the dolomite/dolostone in the state is Ordovician age and makes up a large part of the surface rock of the Salem Plateau of the Ozark Plateaus of northern Arkansas, Fig 1. The area includes portions of Carroll, Benton, Boone, Marion, Baxter, Fulton, Izard, Sharp, Randolph and Lawrence Counties. In recent publications dolomite/dolostone is grouped with limestone, ex: AGC Bulletin 24 and US Bureau of Mines Bulletin 645. Dolomite/dolostone primarily occurs in four formations, the Jefferson City, Cotter, Powell and Everton are mid to lower Ordovician age. The Jefferson City, the oldest formation, is mapped only in Fulton County. This formation contains the most impurities which include chert, thin sandstone intervals, shale and oolite all of which occur intermittently throughout the unit. Exposures of this unit are found along drainages in Fulton and Marion Counties. The base of this unit is not exposed in Arkansas, so the thickness is unknown. The Cotter Formation stratigraphically above the Jefferson City Fm. outcrops in Randolph, Sharp, Fulton, Baxter and Marion Counties. Impurities in the unit are minor and consist of chert, shale and sandstone. Rocks in this unit are sometimes referred to as 'Cotton Rock' because of its' appearance when weathered. Due to the many exposures and the magnesia (MgO) content, 17-20%, this formation has the potential to be a source for magnesium metal. Thickness of the unit ranges from a few feet in the east to about 500 feet. The Powell overlies the Cotter Fm. and is most extensively exposed in Boone, Benton, Newton, Izard, Sharp and Lawrence Counties. Impurities include green shale, drusy quartz beds and a thin conglomerate at the base of the unit. The formation thickness is up to about 215 feet and has slightly lower magnesia content than the Cotter. The Everton Fm. overlies the Powell and is exposed in Carroll, Boone, Marion, Baxter, Izard, Sharp, Lawrence and Newton Counties and is up to 615 thick. The unit has traces of sandstone, chert, dolomitic shale, shale and conglomerate. This unit generally has a higher sand and shale content than the older units. A disconformable contact exists between the Jefferson City, Cotter and Powell while an unconformable surface exists between the Powell and the Everton.

Current uses of dolomite/dolostone in Arkansas include crushed aggregate, building and dimension stone and agricultural lime. Rock high in silica content has been used in the manufacture of rock wool for insulation.

Places to look for additional information about dolomite/dolostone in Arkansas include AGC Bulletin 24, Limestone and Dolostone, pages 60-62, AGC Miscellaneous Publication 18-C, Geochemistry of the Lower Ordovician Dolomite of Northern Arkansas, page 51-64 and US Bureau of Mines Bulletin 645, pages 123-124. Current commodity and market information can be found in Industrial Minerals and Rocks; Commodities, Markets and Uses, 2006, edited by J. E. Kogel, N. C. Trivedi, J. M. Baker and S. T. Krukowski, 7th edition, Society for Mining, Metallurgy, and Exploration, Inc., 1548p., Limestone and Dolomite, pages 581-598 and Magnesium Minerals and Compounds, p. 615-630.

The chemical analyses below are housed in the AGS Library:

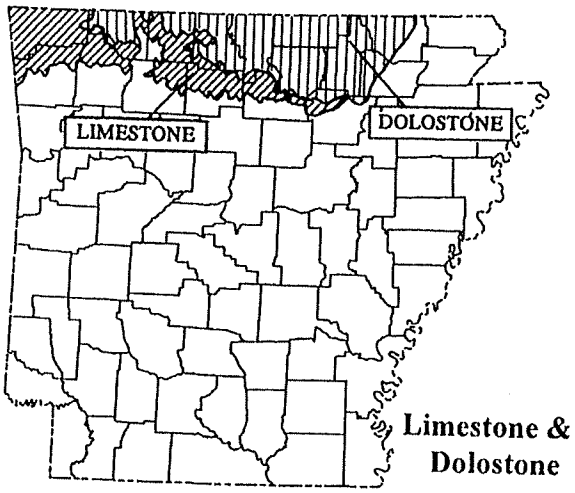


FIGURE 1. — COPIED FROM AGC BULLETIN 24.

Report of Chemical Analysis

ARKANSAS RESOURCES AND DEVELOPMENT COMMISSION

DIVISION OF GEOLOGY

Room 446 State Capitol Building — Little Rock, Arkansas

Sample No. 1157

Date 4-16-51

Location: Williford, Sharp County

Kind of material: Dolomite (Marquette Quarry - Jeff. City; Henderson Quarry - Cotter Dol.

Test recommended for: Ca, $MgCO_3$, SiO_2, R_2O_3, Fe_2O_3

ANALYSIS

	A Marquette Quarry Random Sample	B Marquette Quarry Random sample from stockpile	C Henderson Quarry along C - D	D Henderson Quarry Random Sample*
SiO_2	16.04	16.80	18.87	11.77
$CaCO_3$	45.7	46.4	45.3	48.3
$MgCO_3$	33.6	33.2	31.4	35.6
Al_2O_3	2.01	1.79	2.16	1.05
Fe_2O_3	0.57	0.36	0.39	0.40
Equivalent $CaCO_3$	85.7	85.8	82.5	90.6

* Blocks fallen from E. Face

Date analysis completed: 4-26-51

By Troy W. Carney
Chief Chemist

Form RD-2—1M—3-49—102332—C.-McB.

Lower Ordovician Series.

Cotter Dolomite.

. . . . . .

Character.-- The formation consists mainly of two kinds of dolomite--a fine-grained argillaceous, earthy-textured, relatively soft, white to buff or gray variety, known as "cotton rock", and a more massive medium-grained gray variety that weathers hackly on the surface and becomes dark on exposure. These two sorts occur in beds ranging from a few inches to 4 feet in thickness and are interbedded with each other and with thinner layers of sandstone, shale, and some chert. The lime and magnesia constituting the greater part of the dolomite occur in almost the exact proportion in which they are found in true dolomite, as is shown by analyses of the rock at and near Eureka Springs, published by the Geological Survey of Arkansas.*

Partial analyses of Cotter dolomite.

(R. N. Brackett, analyst)

	A	B	C
Silica and silicates.	8.65	(a)	14.71
Iron and alumina.	4.72	(a)	(a)
Magnesia.	18.68	19.05	17.03
Lime.	26.83	27.74	26.57

a Present but not determined.

A, Leatherwood switch (south side); B, Leatherwood switch (north side); C, depot at Eureka Springs.

DOLOMITE ANALYSES

From Arkansas Geological Survey Annual Report for 1890, Vol. IV, "Marbles and Other Limestones," by T. C. Hopkins, 1893.

County	Locality	Lime carbonate ($CaCO_3$)	Magnesium carbonate ($MgCO_3$)
Baxter	Sec. 26-18N-13W, White River	48.23	38.36
Marion	Sec. 35-20N-18W	-	36.75
	Sec. 17-19N-17W	49.89	37.21
	Sec. 7-19N-17W	32.25	24.02
	Sec. 11-19N-18W	48.22	37.89
	3 mi SE of Yellville	48.53	37.91
Carroll	Eureka Springs at depot	47.43	35.76

(Extract from "Mineral Fertilizers in Arkansas," by Dr. N.F. Drake, published in 1924, by Arkansas State Bureau of Mines, Manufactures and Agriculture, p. 25.)

DOLOMITE

Some Local Occurrences

The accompanying map shows the general distribution of the dolomites and magnesian bearing limestone, and several references have already been made about some local occurrences. The analyses of dolomites show the general character of the rocks at different localities. At Williford, Sharp County, over 150 feet of dolomite strata outcrop without any other intervening beds. Analyses Nos. 33 and 34 represent the dolomites of this locality. At Mammoth Spring, Fulton County, in the south edge of town, about 20 feet of yellowish-gray, fine-textured dolomite is exposed.

At Sloan, Lawrence County, the dolomite strata that are being quarried show a thickness of about 60 feet. Most of the rock is a light cream color, but probably five per cent of the strata are dark gray in color. A very few nodules occur in some of the strata. Analysis No. 35B was made from fragments from many different strata exposed here.

About one-half mile south of Ash Flat, Sharp County, along the banks of Big Creek, about 10 feet of dolomite outcrops. Some of the central portion of the bed appears to be rather siliceous. Analysis No. 109 represents the whole 10-foot bed. A better grade of dolomite occurs along the road one to two miles south of Ash Flat.

In and about Evening Shade, Sharp County, is an abundance of good dolomite.

About one-half mile north of Cave City, Sharp County, rather massive beds of dove-colored dolomite occur. Analysis No. 110 represents 10 to 12 feet of the top of this dolomite bed, and that is the best part of the bed.

At Morriston Post Office, Fulton County, is exposed a dolomite bed about 25 feet in thickness. The basal five feet is the best. Most of the rest of the bed appears to be rather siliceous. Analysis No. 108 represents the best of the lower five feet of the bed.

About one-half mile north of Mountain Home, Baxter County a bed of dolomite six to seven feet in thickness outcrops. Analysis No. 106 was made from samples of this bed.

Along the road from Viola to Salem, Fulton County, the outcropping rock is all sandstone until within about one-quarter mile of Salem. At the southeast side of Salem, about 25 feet of dove-colored, dense, even-grained dolomite is exposed in outcrops around the base of hills. Analysis No. 107 was made of samples taken from this 25-foot bed.

About three miles west of Flippin, Marion County, along the Yellville-Cotter road, a bed of dolomite about 25 feet in thickness outcrops. Analysis No. 104 was made from samples of this bed.

About two and one-half miles N. NE. Berryville, the basal part of the hills show about 100 feet in thickness of Powell limestone, near the top of which is a two-foot bed of even-textured buff rock that has been quarried some for building purposes. Below this stratum the beds are gray in color and nodular in weathering. Analysis No. 101 was made from samples of the nodular weathering part of the formation.

Analysis No. 100 was made from sample three miles north of Berryville, Carroll County.

Analyses of Dolomites

By Dr. William F. Manglesdorf

No.	Moisture	Silica and insolubles	Oxide of iron and alumina	Lime carbonate	Magnesium carbonate	P_2O_5
33	-	6.15	3.04	54.97	36.24	-
34	-	10.58	1.42	51.40	36.43	-
35B	-	10.60	1.56	55.75	32.24	-
100	0.24	8.42	0.66	52.50	39.38	-
101	0.18	7.91	0.54	55.51	36.54	-
104	0.19	13.41	0.96	47.85	36.65	-
106	0.18	10.88	0.85	48.92	39.30	-
107	0.09	5.81	0.82	53.11	39.07	-
108	0.25	13.61	0.93	47.67	37.33	Trace
109	0.18	4.25	0.72	53.05	41.42	Trace
110	0.13	4.71	0.63	56.31	38.16	-

(From "Mineral Fertilizers in Arkansas," by Dr. N. F. Drake, published in 1924, by Arkansas State Bureau of Mines, Manufactures and Agriculture.)

FULTON COUNTY

Dolomite

Along the road from Viola to Salem, Fulton County, the outcropping rock is all sandstone until within about one-quarter mile of Salem. At the southeast side of Salem, about 25 feet of dove-colored, dense, even-grained dolomite is exposed in outcrops around the base of hills. Analysis No. 107 was made of samples taken from this 25 foot bed.

At Morriston Post Office, Fulton County, is exposed a dolomite bed about 25 feet in thickness. The basal five feet is the best. Most of the rest of the bed appears to be rather siliceous. Analysis No. 108 represents the best of the lower five feet of the bed.

Analyses of Dolomite

By Dr. William F. Manglesdorf

No.	Moisture	Silica and insolubles	Oxide of iron and alumina	Lime carbonate	Magnesium carbonate	P 205
107	0.09	5.81	0.82	53.11	39.07	
108	0.25	13.61	0.93	47.67	37.33	Trace

(From "Mineral Fertilizers in Arkansas," by Dr. N. F. Drake, published in 1924, by Arkansas State Bureau of Mines, Manufactures and Agriculture.)

LAWRENCE COUNTY

Dolomite

At Sloan, Lawrence County, the dolomite strata that are being quarried show a thickness of about 60 feet. Most of the rock is a light cream color, but probably five per cent of the strata are dark gray in color. A very few nodules occur in some of the strata. Analysis No. 35B was made from fragments from many different strata exposed here.

Analysis of Dolomite

By Dr. William F. Manglesdorf

No.	Moisture	Silica and insolubles	Oxide of iron and alumina	Lime carbonate	Magnesium carbonate	P205
35B		10.60	1.56	55.75	32.24	

(From "Mineral Fertilizers in Arkansas, " by Dr. N. F. Drake, published in 1924, by Arkansas State Bureau of Mines, Manufactures and Agriculture.)

MARION COUNTY

Dolomite

About three miles west of Flippin, Marion County, along the Yellville-Cotter road, a bed of dolomite about 25 feet in thickness outcrops. Analysis No. 104 was made from samples of this bed.

Analysis of Dolomite

By Dr. William F. Manglesdorf

No.	Moisture	Silica and insolubles	Oxide of iron and alumina	Lime carbonate	Magnesium carbonate	P_2O_5
104	0.19	13.41	0.96	47.85	36.65	-

(From "Mineral Fertilizers in Arkansas," by Dr. N. F. Drake, published in 1924, by Arkansas State Bureau of Mines, Manufactures and Agriculture.)

SHARP COUNTY

Dolomite

The accompanying map shows the general distribution of the dolomites and magnesian bearing limestone, and several references have already been made about some local occurences. The analyses of dolomites show the general character of the rocks at different localities. At Williford, Sharp County, over 150 feet of dolomite strata outcrop without any other intervening beds. Analyses Nos. 33 and 34 represent the dolomites of this locality. At Mamoth Spring, Fulton County, in the south edge of town, about 20 feet of yellowish-gray, fine-textured dolomite is exposed.

About one-half mile south of Ash Flat, Sharp County, along the banks of Big Creek, about 10 feet of dolomite outcrops. Some of the central portion of the bed appears to be rather siliceous. Analysis No. 109 represents the whole 10-foot bed. A better grade of dolomite occurs along the road one to two miles south of Ash Flat.

In and about Evening Shade, Sharp County, is an abundance of good dolomite.

About one half mile north of Cave City, Sharp County, rather massive beds of dove-colored dolomite occur. Analysis No. 110 represents 10 to 12 feet of the top of this dolomite bed, and that is the best part of the bed.

Analses of Dolomite

By Dr. William F. Manglesdorf

No.	Moisture	Silica and insolubles	Oxide of iron and alumina	Lime carbonate	Magnesium carbonate	P205
33		6.15	3.04	54.97	36.24	
34		10.58	1.42	51.40	36.43	
109	0.18	4.25	0.72	53.05	41.42	Trace
110	0.13	4.71	0.63	56.31	38.16	

(From "Mineral Fertilizers in Arkansas, " by Dr. N. F. Drake, published in 1924, by Arkansas State Bureau of Mines, Manufactures and Agriculture.)

CARROLL COUNTY

Dolomite

About two and one-half miles N. NE. Berryville, the basal part of the hills show about 100 feet in thickness of Powell limestone, near the top of which is a two foot bed of even-textured buff rock that has been quarried some for building purposes. Below this stratum the beds are gray in color and nodular in weathering. Analysis No. 101 was made from samples of the nodular weathering part of the formation.

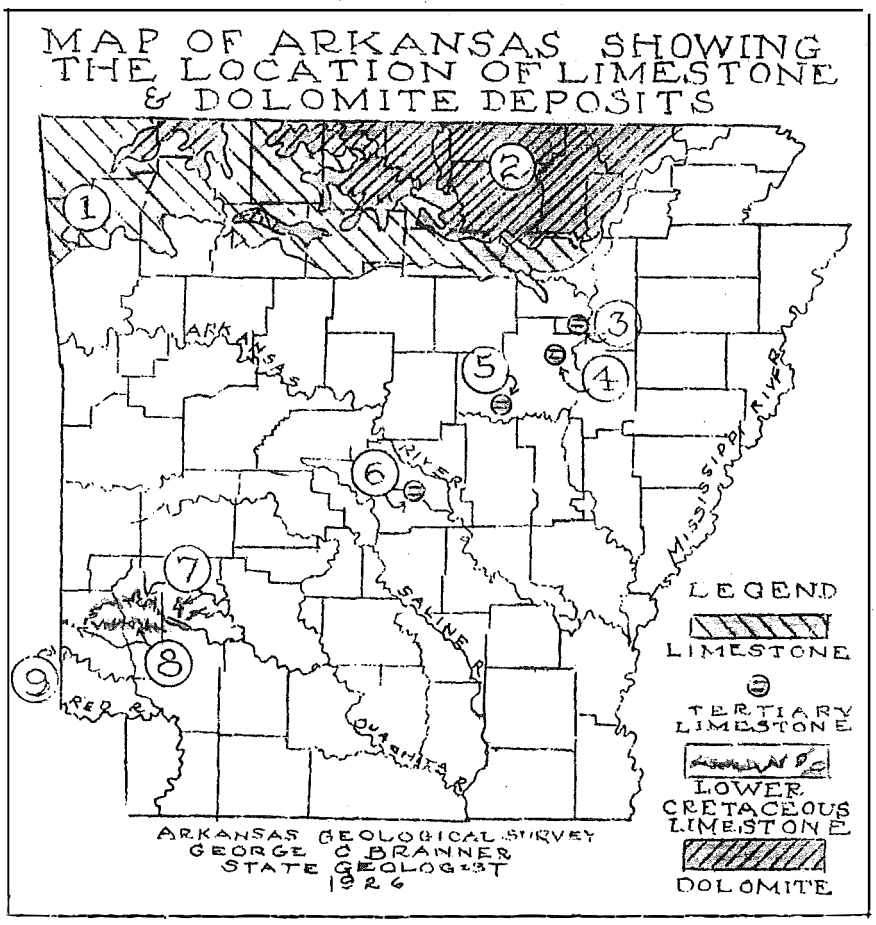
Analysis No. 100 was made from sample three miles north of Berryville, Carroll County.

Analyses of Dolomite

By Dr. William F. Manglesdorf

No.	Moisture	Silica and insolubles	Oxide of iron and alumina	Lime carbonate	Magnesium carbonate	P205
100	0.24	8.42	0.66	52.50	39.38	
101	0.18	7.91	0.54	55.51	36.54	

Outlines of Arkansas' Mineral Resources, 1927
AGS



Key to Above Map Showing Location of Limestone and Dolomite Deposits

1. Paleozoic limestones of north Arkansas.
2. Paleozoic dolomites of north Arkansas.
3. Tertiary limestone - Grand Glaise, Jackson County.
4. Tertiary limestone - Bradford, White County.
5. Tertiary limestone - Russell Station, White County.
6. Tertiary limestone - on Fourche Creek, Section 8, Township 1 south, Range 13 west, Pulaski County.
7. Lower Cretaceous limestone - Dierks limestone lentil in southwest Arkansas.
8. Lower Cretaceous limestone - De Queen limestone member in southwest Arkansas.
9. Lower Cretaceous limestone - Goodland limestone member in southwest Arkansas.