

**KANSAS GEOLOGICAL SURVEY
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**LIMESTONE DEPOSITS ON KANSAS STATE PENITENTIARY LANDS
A Report to the Warden of the State Penitentiary**

By

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A report to the Warden of the
State Penitentiary - Feb. 1947,

KGS
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47-3

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LIMESTONE DEPOSITS
ON KANSAS STATE PENITENTIARY LANDS

The Kansas State Penitentiary lands at Lansing contain limestone suitable for crushed rock for various purposes, for building stone, and for agricultural limestone in the Plattsburg and Stanton limestone formations. The most favorable quarry sites are along the bluffs of Missouri River and in the hills bordering the river flood plain.

Description of the rocks

Plattsburg limestone.--The Plattsburg is the lowermost outcropping limestone formation occurring at shallow depths on the State lands. It comprises two main limestone ledges. Measurements indicates that the thickness of the lower ledge ranges from 1.6 feet to about 3 feet and of the upper one from 7.4 to 13 or more feet. The two limestones are separated by a shale bed which ranges in thickness from less than 1 foot to more than 4 feet.

Tabulated descriptions of the Plattsburg limestone and adjacent rocks are given in Sections 1 and 2.

Section 1. - An exposure along Nine Mile Creek about 0.5 mile north
Of the Women's Industrial School

	Thickness, feet
Stanton limestone	
Captain Creek limestone member	
Limestone, loose blocks	
Vilas shale (21.0 feet)	
Shale, drab, clayey	19.0
Shale, dark gray to black	3.0
Plattsburg limestone (15.8 feet)	

Spring Hill limestone member (13.0 feet)	
Limestone, dark gray, crystalline, even-bedded;	
partly massive, partly thin-bedded	13.0
Hickory Creek shale member (0.7 foot)	
Shale, black to dark gray	0.7
Merriam limestone member (2.1 feet)	
Limestone, gray, dense	0.9
Shale parting	0.2
Limestone, gray, fossiliferous	0.2
Bonner Springs shale (14.0 feet exposed)	
Shale, gray, carbonaceous	2.0
Clay, maroon	7.0
Shale, gray and green exposed	5.0

Section 2. - An exposure in the Missouri River bluff and along the Missouri Pacific Railroad near the SE cor. sec. 20, T. 9S., R. 23 E., south of water-well field.
 (See Fig. 1).

	Thickness, feet
Stanton limestone	
Captain Creek limestone member	
Limestone, loose blocks	
Vilas shale	
Shale, covered	15.0
Plattsburg limestone (14.4 feet)	
Spring Hill limestone member (7.4 feet)	
Limestone, gray, earthy to slightly crystalline	1.6
Shale, gray	0.2
Limestone, medium dark gray, earthy to	

crystalline, massive	2.2
Limestone, upper part brownish gray and dense, middle and lower middle parts brown and granular (algal), lower part dove gray and dense to crystalline . . .	3.3
Hickory Creek shale member (5.4 feet)	
Shale, upper part yellow, limy, and calcareous; lower part gray	5.4
Merriam limestone member (1.6 feet)	
Limestone, medium gray, fossiliferous . . .	1.6
Bonner Springs shale	
Shale, gray, maroon, and green; contains "rotten" limestone bed about 2 feet from top exposed	6.0

Both the Merriam and Spring Hill limestones appear to be entirely suitable for making crushed rock for road metal and concrete aggregate. Because of its blocky character and durability the Merriam limestone is a potential source of building stone.

According to AAA specifications for agricultural limestone (for Kansas) 90 percent of the crushed material must pass through an 8-mesh screen and 25 percent through a 100-mesh screen; the calcium carbonate equivalent must be not less than 80 percent.

In Figure 1, which is a graphic representation of an outcrop of the Plattsburg limestone (Section 2 of this report), horizons from which 12 samples of limestone were taken and the calcium carbonate equivalent of each sample as determined in the State Geological Survey chemical laboratory, are shown. The average

calcium carbonate equivalent of the 12 samples of the Plattsburg limestone is 90.5 percent.

Stanton limestone. - The Stanton limestone occurs above the Plattsburg and is the uppermost limestone in the Missouri River bluff on the State lands. The Vilas shale between the limestone formations is about 10 feet thick where it has been measured in the river bluffs. It is probable, however, that in the face of the bluff the Stanton limestone is slumped somewhat over the Vilas shale, and the Vilas is actually thicker than 10 feet. The Stanton limestone comprises two main limestone ledges which are separated by about 6 feet of shale. Measured sections show that the upper limestone, the Stoner member, ranges in thickness from 9 to 11 feet, and the lower ledge, the Captain Creek, from 1.8 to 2.3 feet.

Tabulated descriptions of the Stanton limestone and adjacent rocks are given in sections 3 and 4.

Section 3. - An exposure in the old quarry northeast of the Prison near the cen. N $\frac{1}{2}$ sec. 19, T. 9 S., R. 23 E.

	Thickness, feet
Stranger formation (?) (9.0 feet)	
Shale, buff, sandy	6.0
Conglomerate of limestone pebbles . . .	3.0 f
Stanton limestone (14.3 feet)	
Stoner limestone member (9.0 feet)	
Limestone, gray, massive	7.0
Limestone, bluish gray, thin beds and shale partings	2.0

Eudora shale member (3.5 feet)

Shale, drab	0.8
Shale, black	0.2
Shale, drab	0.6
Shale, black	0.4
Shale, gray	1.0
Shale, black, fissile	1.0
Shale, greenish gray	0.5

Captain Creek limestone member (1.8 feet)

Limestone, bluish gray, dense, blocky . . .	1.8
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Vilas shale

Shale, gray, silty and sandy exposed	24.0 ¹ / ₂
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Section 4. - An exposure along Missouri River bluff about 0.5 mile south of pumping station and a short distance south of section 2. (See Fig. 2)

Thickness
feet

Stanton limestone (19.3 feet)

Stoner limestone member (11.0 feet)

Limestone, medium gray, upper part slightly darker gray, lower part brown and gray, wavy-bedded, massive	11.0
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Eudora shale member (6.0 feet)

Shale, partly covered, gray and black .	6.0
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Captain Creek limestone member (2.3 feet)

Limestone, bluish gray and brown, dense to slightly crystalline . . .	2.3
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Vilas shale

Shale, yellow, and gray, partly covered . . . 10.0

Plattsburg limestone

Spring Hill limestone member

Limestone, top of ledge

Both the Captain Creek and Stoner limestones are suitable sources of road metal and concrete aggregate. The Captain Creek limestone is especially suitable for building stone. In the past this rock has been quarried and used as building stone in several eastern Kansas counties. It is quarried easily into blocks of desirable size and is a durable rock.

Figure 2 shows horizons from which samples of the Stanton limestone were taken and the calcium carbonate equivalent of each sample as determined in the State Geological Survey chemical laboratory. The average calcium carbonate equivalent of eight samples of the Stanton limestone is 91.45 percent.

Quarry Sites

From reconnaissance observations it appears that the most favorable quarry sites are along the bluffs bordering the valley of Missouri River and along the valley walls of ravines that enter the river valley from the west. By extending quarrying operations along the contours of the hills, fairly large amounts of rock can be taken without the removal of excessive overburden. Because the Stanton limestone occurs higher in the hills, it in general can perhaps be quarried more economically than can the Plattsburg. However there are bench-like areas under which the Plattsburg limestone lies under a few feet of shale and soil.

One may expect the limestone layers to be found lying in nearly horizontal positions; hence the amount of overburden at any quarry site can be easily estimated.

Although the rock beds are almost horizontal there are slight declinations, probably in most places to the north and west. Better quarry drainage will be had in locations where the slight slope of the rocks is toward stream valleys.

By J. M. Jewett, Geologist, State Geological Survey of Kansas

February 15, 1947

Sec.

 Locality description -
 Measured by - Date -
 Remarks -

Bed No. Description Thickness

Percentages of Calcium Carbonate equivalent.

- 89.78
- 92.09
- 90.45
- 73.67
- 92.16
- 94.02
- 96.45
- 96.00
- 96.18
- 96.25
- 92.66
- 76.29

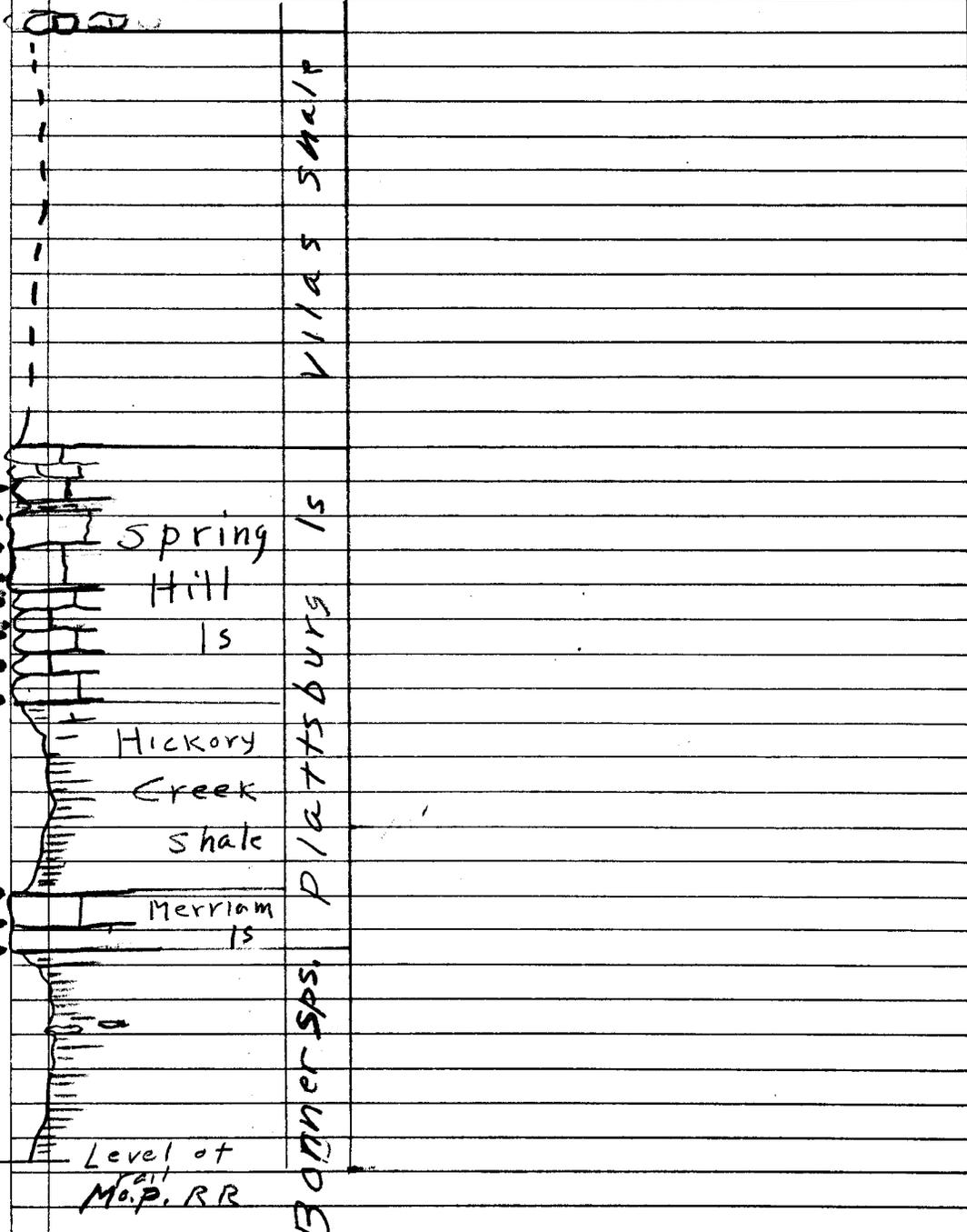


Figure 1. Graphic representation of outcrop of Plattsburg limestone in Missouri River Bluff - sec 2 of this report

T. S. R.