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Geology along the St. Louis and San Francisco Railroad from Rolla to Newburg

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G E O L O G Y

along the

ST. LOUIS AND SAN FRANCISCO RAILROAD

from

ROLLA TO NEWBURGH.

---xOx---

Approved:

Victor H. Hughes.

1927

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TEXT OF THESIS

-xOx-

The area, the geology of which constitutes the subject of this Thesis, lies between the towns of Rolla and Newburgh, in Phelps Co., Missouri, and is contiguous to the St. Louis & San Francisco Railroad for its entire distance.

TOPOGRAPHY.

The surface of the area may be divided into, (1) alluvial plains and (2) hilly areas.

Alluvial Plains. The alluvial plains include the bottom lands on those portions of the area mapped, which are covered by the waters of Little Piney River and Beaver Creek during period of flood. The total area of these valley tracts constitutes about one-fourth of the area and in general extends from bluff to bluff on either side of the above streams.

Hilly Area. The remainder of the area is hilly. The topography is especially rough towards the west end of the sheet, while in the vicinity of Rolla it becomes less abrupt. East of Newburgh, for a distance of approximately three miles, escarpments varying from twenty-five to eighty-five feet in height occur along the north side of the railroad. Above these escarpments, the hills rise more gently to a height of 125 to 190 feet. In general the hills rise from eighty to two hundred feet above the valley.

The topography of the area may be designated as being of the early mature stage.

GEOLOGICAL FORMATIONS.

The area is underlain with the following formations:-

Recent.

Pennsylvanian (?)

		(Cotton Rock.
	(Jefferson City	(
	((Pitted Dolomite.
Cambrian -	(
	(Roubidoux -(St. Elizabeth).	
	(
	(Gasconade.	

RECENT.

The recent deposits consist of stream gravels and alluvium occurring along the stream beds and flood plains. In the hilly area, they consist of residual soil and clays containing fragments of chert, dolomite and sandstone derived from the disintegration of the overlying beds.

PENNSYLVANIAN.

A formation of possible Pennsylvanian origin occurs on the boundary line between sections 19 and 20, R.8 W., T.37 N. The length of cut on the railroad through this formation is approximately 400 feet. The western 78 feet of this distance shows, by outcrops on either side of the railroad track, the occurrence of a steeply inclined bed of Gasconade Dolomite overlain with a bed of sandstone ten feet in thickness and inclined at an equal angle.

For a distance of 270 feet westward from the

east end of the cut outcrops show the presence of a horizontal bed of Roubidoux sandstone overlain with shale and cherty dolomite.

A mixture of clay, shale, chert fragments and sandstone boulders fills the space between the above mentioned outcrops. On this shaly and fragmental material rests a bed of sandstone ten feet in thickness. The sandstone is hard, compact and composed of fine grains of quartz.

JEFFERSON CITY.

The Jefferson City formation occurs in the extreme eastern portion of the area mapped. It is composed of two members - Cotton Rock member and Pitted Dolomite member. The former is 61 feet in thickness, the latter 65 feet. Following is a complete columnar section of the formation as found in the area:

2 ft. 5 in.	Very thinly bedded Cotton Rock.
1 ft.	Chert.
1 ft.	Cotton Rock.
1 ft. 3 in.	Fine grained sandstone.
6 ft.	Cotton rock in beds of 2 in. to 4 in.
1 ft.	Cherty crystalline Dolomite.
1 ft. 9 in.	Crystalline Dolomite and shale.
1 ft. 6 in.	Shale and Sandstone.
2 ft. 6 in.	Shale, sandstone and chert.
1 ft. 6 in.	Silicious dolomite.
6 in.	Cotton rock.
1 ft.	Yellow, compact, sandy dolomite.
5 ft. 6 in.	Cotton Rock in beds of 6 in. to 8 in.
1 ft. 6 in.	Hard, cherty, crystalline dolomite.

1 ft. 9 in.	Sandstone, shale and dolomite.
2 ft. 3 in.	White cotton rock.
1 ft. 6 in.	Cotton rock - weathers in blocks.
1 ft.	Cherty dolomite.
1 ft.	Arenaceous dolomite.
1 ft.	Sandstone.
4 ft.	Cotton rock.
2 ft.	Hard, gray and cherty dolomite.
5 ft.	Cotton Rock.
3 ft.	Hard, crystalline dolomite.
3 ft. 6 in.	Cotton rock.
5 ft.	Gray, crystalline dolomite - cherty at base.
14 ft. 6 in.	Pitted dolomite.
2 ft.	Cotton Rock.
41 ft.	Pitted dolomite.
1 ft.	Cotton rock.
7 ft.	Pitted dolomite.

The shales of the Cotton Rock member contain a large amount of chert, occurring on nodules. These nodules are of concentric structure and lie with their axes in the same general direction, indicating growth within the shale beds as an origin.

ROUBIDOUX (ST. ELIZABETH).

Outcrops of the Roubidoux formation occur in approximately the central portion of the area mapped. The formation consists of two dolomite members and two sandstone members. The sandstone members constitute the lower and second from the top portions of

the formation. A columnar section of the Roubidoux formation is as follows:

3 ft.	Shelly dolomite - sand at top.
10 ft.	Thin bedded gray cotton rock.
5 ft.	Irregular bedded Arenaceous dolomite containing some crystals of Calcite.
2 ft.	Thin bedded, cherty, dolomite.
1 ft. 6 in.	Sandstone and sandy dolomite.
2 ft.	Banded dolomite - Bands due to layers of sandstone.
2 ft. 6 in.	Gray, cherty, crystalline dolomite.
2 ft. 6 in.	Crystalline dolomite with cherty base.
25 ft.	Sandstone.
2 ft. 6 in.	Thin bedded, crystalline dolomite - Cherty in places.
2 ft. 6 in.	Dense, yellow-grey dolomite.
2 ft.	Chert.
2 ft.	Sandstone.
1 ft. 6 in.	Thinly bedded sandstone.
2 ft.	Heavy bedded, coarsely crystalline dolomite.
2 ft.	Cherty dolomite.
3 ft.	Decomposed chert.
4 ft.	Hard, crystalline dolomite. Very cherty
1 ft.	Sandstone.
3 ft. 6 in.	Gray, crystalline dolomite. Sandy at top - cherty at bottom.
16 ft.	Sandstone in two beds.

Exposures of the upper sandstone member shows the presence of sun cracks in the top bed of the sandstone. This sandstone possesses well developed systems of jointing. The major system extends in a general east-west direction, the minor in a general north-south direction.

Exposures of the upper portion of the lower sandstone member shows a well ripple marked surface. This member also possesses two jointing systems. The joints are at such an angle with each other as to form -shaped blocks of the sandstone.

GASCONADE.

Outcrops of this formation are found in the western portion of the area. The formation consists of massive, cherty dolomite. Following is a columnar section of the formation:

4 ft.	Coarsely, crystalline dolomite.
1 ft.	Arenaceous dolomite.
4 ft.	Gray, coarsely, crystalline dolomite.
2 ft.	Chert. Contains long, narrow openings.
4 ft.	Chert in form of nodules.
2 ft. 6 in.	Crystalline dolomite. Contains some decomposed chert.
3 ft.	Thinly bedded, cherty dolomite.
7 ft.	Heavy bedded, coarsely crystalline dolomite.
3 ft.	Yellow, crystalline dolomite. Cherty in places.
30 ft.	Pink to gray, crystalline dolomite. Is cellular in places.
6 in.	Calcareous sandstone.
2 ft.	Coarsely crystalline dolomite.

2 ft.	Banded, coarsely crystalline dolomite.
5 ft.	Cherty, coarsely crystalline dolomite.
3 ft.	Fragmental chert.
8 ft. 6 in.	Hard, finely crystalline Dolomite. Banded with sandstone.
20 ft.	Very cherty dolomite. Dolomite varies from gray, finely crystalline to yellow, coarsely crystalline.
5 ft. 6 in.	Heavy bedded dolomite.
10 ft.	Chert.
3 ft.	Very cherty dolomite.
4 ft.	Decomposed chert.
4 ft.	Chert nodules with some gray crystal- line dolomite.
4 ft.	Heavy bedded, crystalline dolomite.
5 ft. 6 in.	Very cherty, crystalline dolomite.
4 ft.	Arenaceous dolomite.
1 ft.	Chert nodules with some dolomite.
2 ft. 6 in.	Chert.
3 ft. 6 in.	Very cherty, gray, crystalline dolomite.
3 ft.	Very cherty, yellow, crystalline dolomite
2 ft. 6 in.	Gray, crystalline dolomite, containing some decomposed chert.

The lower beds of the Gasconade formation are very susceptible to solution and numerous cavities and small caves are found in their outcrops.