STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY
Horace R. Collins, Chief

Geological Note No. 5

LIMESTONE IN THE TYMOCHTEE DOLOMITE(?) (UPPER SILURIAN), SHAWNEE TOWNSHIP, ALLEN COUNTY, OHIO

by

David A. Stith

Columbus
1977

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Photocopy composer: Donna M. Swartz
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LIMESTONE IN THE TYMOCHTEE DOLOMITE(?) (UPPER SILURIAN), SHAWNEE TOWNSHIP, ALLEN COUNTY, OHIO

by
David A. Stith

ABSTRACT

Sample cuttings and core from four wells in Shawnee Township, Allen County, were examined. Quantitative X-ray diffraction analysis showed significant amounts of limestone in the stratigraphic position of the Tymochtee Dolomite in three of these wells.

INTRODUCTION

To date, the Cayugan rocks (Greenfield and Tymochtee Dolomites and undifferentiated Salina Group) in northwestern Ohio have been described as dolomite (Kahle and Floyd, 1972; Stout, 1941). Recently (Janssens, 1977, p. 26), limestone was reported in the stratigraphic position of the Tymochtee Dolomite in two wells in Shawnee Township, Allen County:

About 90 feet of lithographic partly argillaceous medium-brown to gray limestone overlies the Greenfield Dolomite and is the bedrock in two wells in sec. 11, Shawnee Township, Allen County. By reason of its stratigraphic position, this limestone is assigned to the Tymochtee Dolomite, though its lithology is not representative of the formation.

This note is a report of the laboratory analysis of samples from these wells and of samples and core from two nearby wells.

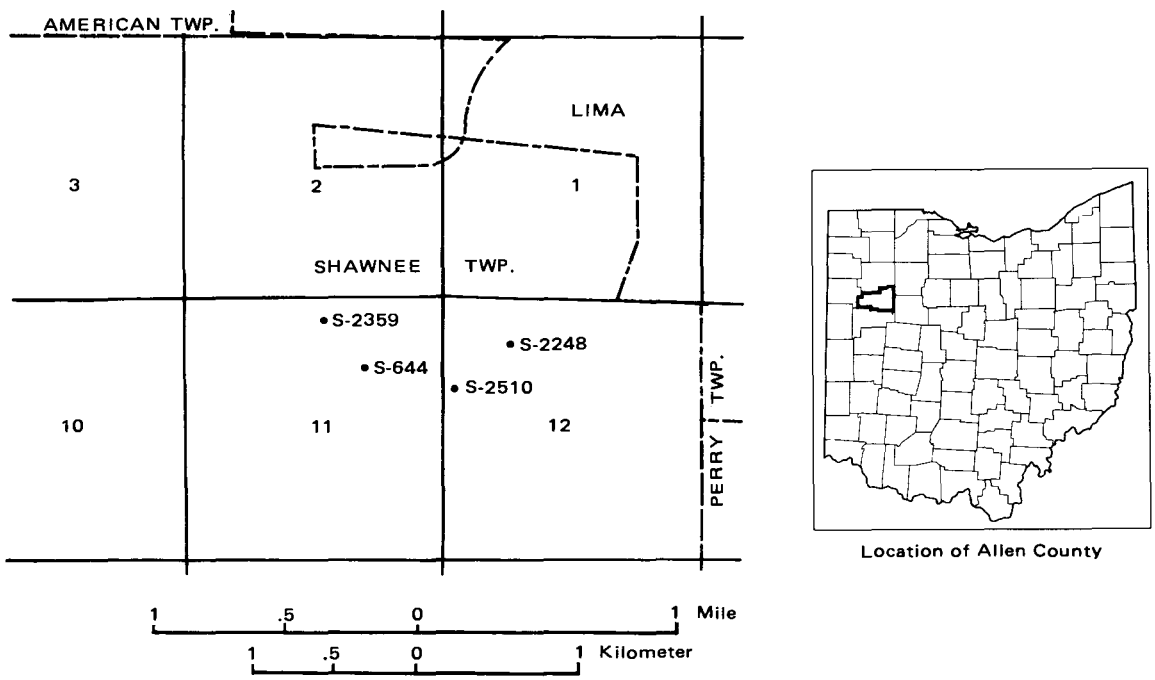

FIGURE 1.–Locations of wells studied in this report.

DISCUSSION

Considerable drilling activity has gone on south and southwest of Lima over the years. Near-surface samples and a core (on file at the Division of Geological Survey) from four of these wells (fig. 1) were examined and described. Cuttings from S-644, S-2359, and S-2248 and a ¼-split of the core from S-2510 were examined from above the calcareous zone down through the top of the Greenfield Dolomite. Samples S-644, S-2359, and S-2510 were analyzed for percentages of calcite, dolomite, and quartz by quantitative X-ray diffraction (Stith, 1972) and for total clay and quartz content by insoluble-residue determination. Sample S-2248 was analyzed in part by qualitative X-ray diffraction.

Results of the quantitative analyses are shown in table 1. Three distinct lithologies are recognizable. A faintly laminated medium-gray clayey carbonate is overlain by a lithographic to sublithographic brown dolomitic limestone and underlain by a dense very argillaceous dark dolomitic limestone. The lithographic zone is a dolomitic limestone in all three wells (S-644, S-2359, and S-2510). The laminated clayey carbonate is a calcareous dolomite in the two well-strings (S-644 and S-2359), but is almost totally dolomite in the core (S-2510) farther to the east. The dark very argillaceous limestone also shows decreased calcite content in the core, being subequal in calcite and dolomite.

Examination of cuttings from the fourth well, S-2248, still farther to the east, shows that the limestone facies is of very local extent. Sample examination and qualitative X-ray diffraction show a significant amount of limestone only in the interval from 115 feet to 120 feet in this well. This limestone is a sublithographic carbonate, subequal in calcite and dolomite. The dark argillaceous zone, although almost totally dolomite, also is present. The middle laminated unit is not recognizable in this well. Table 2 shows the correlation of the three lithologies in the wells studied. Many of the differences in elevation and thickness shown in table 2 are probably due to the fact that three of the wells were sampled from cuttings and only one sample was core.

TABLE 1.—*Analytical results*

OGS sample number	Sample interval (ft)	Method of sampling[1]	X-ray analysis				Insoluble residue (%)	Total carbonate + insoluble residue (%)
			Calcite (%)	Dolomite (%)	Quartz (%)	Total carbonate (%)		
S-644	100-107	B	61.5	33.5	1.8	95.0	4.7	99.7
	107-115	D	65.0	30.0	1.8	95.0	5.8	100.8
	115-120	D	49.5	43.0	4.0	92.5	8.3	100.8
	120-125	A	32.5	59.0	1.1	91.5	6.8	98.3
	125-130	B	20.3	68.7	1.7	89.0	10.7	99.7
	130-135	D	30.5	56.5	1.7	87.0	11.3	98.3
	135-140	D	58.0	22.7	3.3	80.7	17.2	97.9
	140-145	D	14.7	47.8	6.3	62.5	29.2	91.7
S-2359	85- 90	A	37.7	60.3	2.1	98.0	4.2	102.2
	90- 95	A	69.3	29.0	0.9	98.3	2.7	101.0
	95-100	C	57.5	33.0	3.8	90.5	7.7	98.2
	100-105	C	63.0	29.0	2.7	92.0	7.0	99.0
	105-110	C	55.8	34.9	3.4	90.7	9.4	100.1
	110-115	A	36.2	54.0	1.1	90.2	7.1	97.3
	115-120	C	35.6	54.0	1.5	89.6	9.3	98.9
	120-125	C	33.2	56.0	1.3	89.2	10.1	99.3
	125-130	C	55.3	28.0	3.8	83.3	17.2	100.5
	130-135	C	57.5	38.2	2.9	95.7	7.0	102.7
	135-140	C	33.6	58.2	1.2	91.8	6.3	98.1
	140-145	C	37.2	54.0	1.4	91.2	8.6	99.8
	145-150	C	4.1	88.7	1.3	92.8	5.5	98.3
S-2510	91.7- 96.7	E	1.7	90.5	2.3	92.2	9.7	101.9
	96.7-101.7	E	10.0	73.0	6.6	83.0	16.3	99.3
	101.7-107.0	E	57.0	37.7	1.6	94.7	5.2	99.9
	107.0-112.9	E	45.7	46.7	0.7	92.4	6.2	98.6
	112.9-117.9	E	1.5	90.0	1.3	91.5	7.1	98.6
	117.9-123.9	E	3.5	85.2	0.7	88.7	7.9	96.6
	123.9-129.9	E	5.5	84.5	1.4	90.0	9.9	99.9
	129.9-134.8	E	16.0	69.0	2.2	85.0	12.4	97.4
	134.8-139.0	E	39.2	34.7	4.6	73.9	23.5	97.4
	139.0-143.2	E	39.0	40.5	3.5	79.5	18.0	97.5
	143.2-149.2	E	12.9	50.7	6.7	63.6	29.0	92.6
	149.2-153.0	E	0.5	98.5	1.7	99.0	4.5	103.5

[1] A, handpicked from gross drill sample; B, handpicked from coarse sieve (+35-mesh) split of drill sample; C, gross drill sample minus handpicked contaminants; D, coarse sieve split of drill sample minus handpicked contaminants; E, ¼-split of whole core.

TABLE 2.—*Correlation of equivalent lithologies*

Lithology	S-2359		S-644		S-2510		S-2248	
	Interval (ft)[1]	Elevation (ft above sea level)	Interval (ft)[1]	Elevation (ft above sea level)	Interval (ft)[1]	Elevation (ft above sea level)	Interval (ft)[1]	Elevation (ft above sea level)
lithographic and sublithographic limestone	88-110	766-744	100-115	760-745	101.7-112.9	761-750	115-120	758-753
laminated clayey carbonate	110-125	744-729	120-135	740-725	112.9-134.8	750-728	?	?
dense very argillaceous limestone(dolomite)	125-132	729-722	135-140	725-720	134.8-143.2	728-719	153-163	720-710
top of Greenfield Dolomite	145	709	155?	705?	149.2	713	165	708

[1] See Appendix for intervals and descriptions. Intervals may differ from sample intervals because of author's interpretations.

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APPENDIX–SAMPLE DESCRIPTIONS

Allen County
Shawnee Township
Section 11 (NE¼)

Layne #2 Sohio
Water well
Sample No. 644
Elevation (T) 860 feet

Depth (ft)	
	Samples start at 100 feet in TYMOCHTEE DOLOMITE(?)
100 - 107	Limestone, medium-brown, lithographic to sublithographic. Dolomite, medium- to dark-brownish-gray, very fine-grained
107 - 115	Limestone, light- to medium-brown, light- to medium-gray, lithographic to sublithographic; minor amount very fine-grained. Dolomite, medium-brown and medium- to dark-brownish-gray, sublithographic to very fine-grained; minor amount. Chert, very light-gray to white; trace
115 - 120	Limestone and dolomite as in samples from 100 feet to 115 feet. Limestone, light- to medium-gray, very fine- to fine-grained, argillaceous. Chert, white; trace
120 - 135	Limestone, light- to medium-gray, very fine-grained, argillaceous; dolomitic in part, laminated in part
135 - 140	Limestone, slightly dolomitic, medium- to dark-gray, sublithographic to dense, argillaceous. Limestone as above, trace. Dolomite, medium-brown and medium-grayish-brown, very fine-grained; trace. Pyrite, trace
140 - 145	Dolomite, calcareous, light- to dark-gray, dense to very fine-grained, laminated, argillaceous. Pyrite, trace
145 - 155	Cavings
155 - 160	Dolomite, light- to medium-brown, very finely crystalline. GREENFIELD DOLOMITE at 155? feet
160 - 165	Dolomite as above

Allen County
Shawnee Township
Section 11 (NE¼)

Vistron #2 Sohio
Permit No. 71
Sample No. 2359
Elevation (KB) 854 feet

Depth (ft)	
	Samples start at 30 feet in TYMOCHTEE DOLOMITE(?)
30 - 85	Poor samples but apparently dolomite
85 - 90	Limestone, medium-brown, lithographic to sublithographic. Limestone, medium-gray, very fine-grained. Dolomite, dark-gray, very fine-grained, argillaceous
90 - 95	Limestone, medium-brown, lithographic. Limestone, medium-gray, fine-grained; minor amount
95 - 100	Limestone, medium-gray, sublithographic to very fine-grained. Limestone, light- to medium-brown, very fine-grained, sucrosic; trace
100 - 105	Limestone, medium-gray, sublithographic to very fine-grained
105 - 110	Limestone as in samples from 95 feet to 100 feet
110 - 125	Limestone, light- to medium-gray, very fine-grained, laminated in small part; abundant dolomite rhombs
125 - 130	Limestone, medium- to dark-gray, sublithographic to dense, argillaceous
130 - 135	Limestone as above. Limestone, medium-brown, lithographic to sublithographic
135 - 145	Limestone, light- to medium-gray, very fine- to fine-grained, laminated in part; abundant dolomite rhombs
145 - 150	Dolomite, medium- to dark-brown, very fine-grained (crystalline), black argillaceous partings. Limestone as above, trace. GREENFIELD DOLOMITE at 145 feet
150 - 155	Dolomite as above

Allen County
Shawnee Township
Section 12 (NW¼)

Fenix and Scisson #2 Sohio
Permit No. 69
Sample No. 2248
Elevation (G) 873 feet

Depth (ft)	
	Samples start at 45 feet in TYMOCHTEE DOLOMITE(?)
45 - 75	Dolomite, light- to dark-gray, very fine-grained; minor amount of brown mottling
75 - 85	Dolomite as above. Dolomite, brown, very fine- to fine-grained
85 - 105	Dolomite as in samples from 45 feet to 75 feet
105 - ?	Dolomite as above
115 - 120	Limestone, dolomitic, light- to medium-gray and medium-brown, sublithographic to very fine-grained
120 - 125	Dolomite, light- to medium-gray, very fine-grained. Limestone as above, trace
125 - 150	Dolomite as above
150 - 155	Dolomite as above. Dolomite, medium- to dark-gray, very fine-grained and dense, argillaceous; moderate amount
155 - 160	Poor samples, contaminated
160 - 165	Dolomite, brown and grayish-brown, fine-grained. Dolomite, dark-gray, very fine-grained and dense, argillaceous
165 - 175	Dolomite, light- to medium-brown, very fine- to fine-grained (crystalline); dark-gray carbonaceous partings. GREENFIELD DOLOMITE at 165 feet

Allen County
Shawnee Township
Section 12 (NW¼)

Fenix and Scisson #1 Sohio
Permit No. 68
Sample No. 2510
Elevation (G) 862.4 feet

Depth (ft)	
	Core description. Core starts at 33 feet in TYMOCHTEE DOLOMITE(?)
33.0 - 70.5	Dolomite, medium- to dark-gray, very fine-grained, crystalline; beds ½ inch to 4 inches thick. Bitumen staining, trace. Sparse to moderate number of black shale and black shaly dolomite partings and interbeds (to ¼ inch thick), straight to wavy interbedding
70.5 - 74.3	Dolomite, medium-gray and medium- to dark-brownish-gray, very fine-grained, crystalline; sparse carbonaceous partings. Samples from 73.8 feet to 74.0 feet slightly calcareous
74.3 - 83.5	Dolomite, dark-gray, very fine-grained; minor amount medium gray; very abundant black shale partings and interbeds (to ¾ inch thick)
83.5 - 87.0	Dolomite, dark-gray, very fine-grained, sparse carbonaceous partings
87.0 - 101.7	Dolomite, medium- to dark-gray, laminated medium-brownish-gray, very fine- to fine-grained. Moderate number of black shale partings and interbeds (to $\frac{1}{16}$ inch thick). Moderate number of calcareous laminae from 91.4 feet to 94.9 feet; laminae generally fine grained and medium brownish gray. Lowest 4.5 feet becoming browner with more calcareous laminae
101.7 - 107.0	Limestone, dolomitic, medium- to dark-brown, lithographic and sublithographic to very fine-grained; moderate number of black shale partings and interbeds (to $\frac{1}{16}$ inch thick); pelletal and brecciated in part; sparse algal laminations, cross bedding, desiccation and syneresis cracks
107.0 - 112.9	Limestone, dolomitic, medium- to dark-brownish-

gray, sublithographic to very fine-grained; small number of black shale partings; lowest 1.5 feet becoming more dolomitic and predominantly very fine grained

112.9 - 134.8 Dolomite, medium-brownish-gray, faintly laminated, dark-brownish-gray, very fine-grained, argillaceous; calcareous in part; sparse areas of "luster-mottled" calcareous dark-brownish-gray sublithographic to very fine-grained dolomite; becoming darker gray and more calcareous in bottom 3 feet

134.8 - 143.2 Limestone, dolomitic, medium- to dark-gray and black, dense and very fine-grained. Moderate number of black shale interbeds and partings; argillaceous, silty

143.2 - 146.1 Interbedded black shale and medium- to dark-gray limestone and dolomite, dense to fine-grained; wavy to straight interbedding

146.1 - 146.4 Interbedded black shale and medium- to dark-brown limestone, very fine-grained; wavy interbedding

146.4 - 146.9 Dolomite, medium-brown and medium-brownish-gray, very fine-grained, laminated; calcareous in part

146.9 - 147.3 Limestone, medium- to dark-brown, lithographic to sublithographic; interbedded with black shale

147.3 - 148.4 Dolomite, slightly calcareous, medium-brown, laminated medium- to dark-brownish-gray, very fine-grained; faint indications of porosity

148.4 - 149.2 Dolomite, medium-gray, very fine-grained, argillaceous, burrowed(?); numerous nodules (¼-inch diameter) of light-gray dolomite. ½ inch of greenish-gray very argillaceous punky dolomite and interbedded black shale at base; nodular and contorted bedding (contact?)

149.2 - 153.0 Dolomite, light- to medium-gray, banded and laminated, very fine-grained, crystalline, stylolitic; microvugular porosity. Bitumen staining. GREENFIELD DOLOMITE at 149.2 feet

153.0 - 155.1 Dolomite, medium-brown, very fine-grained, crystalline