

MS
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#141

SUBSURFACE LIMESTONE RESOURCES IN MACON COUNTY

Abstract

The depth to the Lower Mississippian Limestone in Macon County varies from almost 1700 feet in the southeast part of the county to 740 feet and more in the western part. The well data available are for the most part not detailed but suggest that locally the Fredonia and St. Louis may have units of limestone or dolomite 20 feet or more thick that are possibly of commercially useful character. However, considerable variation in the character of the formations is apparent and a core drilling program is essential to a dependable knowledge of commercial possibilities in any given area.

Introduction

This preliminary investigation was undertaken to obtain a general picture of subsurface limestones suitable for mining in Macon County and also to indicate insofar as possible those areas where additional studies of Survey records and well cuttings might be profitable if such data exist. The limestones considered were the Ste. Genevieve, Fredonia, St. Louis, and Salem as these units afford the best possibilities for comparatively thick workable limestone at minimum depth.

A very large percentage of the well records available are from rotary wells and report only formation tops. The correlations have of necessity been used. Sample studies are relatively infrequent in Macon County. As in adjoining counties, well drillers and oil geologists apply the following terms to the Lower Mississippian sequence: - Ste. Genevieve, Rosiclare, Fredonia, St. Louis, and Salem.

Data on wells are given in Table 1. This is a different method of recording well information than that used in earlier subsurface limestone studies but is much less time consuming and is believed to be equally satisfactory in the case of Macon County. Figure 1 shows the depths to the first limestone below the Pennsylvanian deposits and is a departure from earlier procedures in that specific well locations are not given. However, the data within any section comes from wells drilled in that section.

Depths to Lower Mississippian Limestone

Figure 1 shows that the depth to the Lower Mississippian Limestone is greatest in the southeast corner of Macon County but becomes less to the west, northwest, and north. The shallowest limestone occurs in the western part of the county in the vicinity of Niantic where Lower Mississippian Limestone was found at a minimum depth of 740 feet. Another comparatively shallow area lies about 5 miles north of Blue Mound in the southwest corner of the county where the limestone is around 1,000 feet deep.

Character of the Lower Mississippian Limestones

The Ste. Genevieve is generally thin and it is doubtful from the data at hand that units of limestone more than 15 feet thick and of commercial character are consistently present. Chances appear better in the Fredonia but not outstanding. It includes both limestone and dolomite. The St. Louis in some wells contains limestone or dolomite of such thickness and apparent character that it may have promise but many wells report the presence of gypsum or anhydrite in the St. Louis at frequent horizons which would make the stone unsuitable for commercial use. Whether the presence of gypsum and anhydrite is general or purely local is not known.

The Salem is generally silty or sandy and probably not of wide significance.

Economic Possibilities

The economic possibilities of the Lower Mississippian Limestones in Macon County cannot be evaluated on the basis of available information. A program of core drilling is essential to an adequate knowledge of the depths to potentially workable beds and their commercial character and use possibilities. The significance of the relation of depth to the geographic location of a possible mine involve various geological factors, but Figure 1 should be of use in such considerations.

SUBSURFACE LIMESTONES IN MACON COUNTY

T. 14 N., R. 1 E. Six Rotary Logs. Correlations uncertain but top of Fredonia probably near 1300 - 1400 feet. No sample studies. Thickness of Fredonia uncertain. No Pennsylvanian Limestones above 100 feet deep.

T. 14 N., R. 2 E. Seven Logs, Mostly Rotary. Correlations uncertain but top of Fredonia probably 1400 - 1450 feet. No sample studies. Thickness of Fredonia and underlying beds uncertain but several hundred feet of limestone and/or dolomite reported. No Pennsylvanian Limestones above 100 feet. No sample studies.

T. 14 N., R. 3 E. One Shallow Well.

T. 15 N., R. 1 E. Numerous Wells, Especially in Sections 1 - 12. Top of Fredonia around 1,000 feet. One sample study, J. F. Damery #1 in section 5, by Atherton gives details. Two 20[±] feet units in Fredonia may be OK. Anhydrite beginning at 1,045 feet probably indicates the St. Louis which extends to 1,205 feet. No likely thickness of anhydrite free stone in St. Louis. Salem limestone and dolomite 1,205 - 1,308 feet. Some possible units of combined limestone and dolomite beds. No 100 feet deep Pennsylvanian Limestones.

T. 15 N., R. 2 E. Numerous Wells, One Sample Study. Top of Fredonia at 1,350 - 1,425 feet; 1,405 feet in sample study, Cook #1, section 21. Ste. Genevieve (Fredonia) 25 feet thick and no good because sandy. Forty-seven feet of seemingly useful limestone and dolomite in upper St. Louis. Gypsum and anhydrite present from 1,500 - 1,625 feet. The Salem contains only 25 feet of limestone and it is impure. Most of the formation is sandstone and shale.

T. 15 N., R. 3 E. A Few Rotary Wells. Correlations not clear. Best guess at top of Fredonia about 1,603 feet in A. Henneberry #1 in section 21.

T. 15 N., R. 4 E. One Rotary Well. Ste. Genevieve top given at 1,668 feet. No details.

T. 16 N., R. 1 E. There are numerous wells in this township, most of them rotary wells. Those on which correlations appeared are summarized in Table 1. There are no Survey sample studies nor detailed descriptions of the limestones. The subdivision Ste. Genevieve, Rosiclare, Fredonia, used elsewhere in central Illinois by drillers, appears frequently.

The thickness of the formations in the Kraft #1 well in section 32, which is based on a sample study by a "Company" geologist, are as follows: - Ste. Genevieve - 9 feet, Rosiclare - 22 feet, Fredonia - 46 feet, St. Louis - 136 feet, Salem - 66 feet, and Warsaw - 26 feet.

The depth to the Ste. Genevieve or Fredonia, Table 1, Figure 1, apparently varies in short distances but the most consistently shallowest occurrences are in sections 32 and 33 where readings between 950 and 1,000 feet are common. Apparently the depth is 100 - 150 feet greater in the northeast part of the township.

T. 16 N., R. 2 E. There are only a few logs in this township that go to the Mississippi^{Basin} and these are listed in Table 1. In some of the records it is not possible to identify the uppermost Lower Mississippian formation. However, in three wells the formation was called the St. Louis on the basis of mostly limited number of samples.

The depth to the St. Louis or Lower Mississippian apparently is somewhat more in some places than others but there are insufficient wells to establish any trends.

According to a sample study by Atherton of the Dipper #1 well in section 17 the St. Louis is 215 feet thick. Much of it is impure, cherty, or

contains gypsum or anhydrite but at 1,270 - 1,320 feet there is 50 feet of limestone and dolomite that might be commercial. The Salem is 275 feet thick but only the upper 70 feet is limestone and it is all silty except for 10 feet of oolitic stone at 1,350 feet.

T. 16 N., R. 3 E. Only a few records reach the Lower Mississippian which is generally between 1,300 and 1,400 feet deep. There is one sample study by Tippie, Beach #1 in section 11. Ste. Genevieve Limestone 25 feet thick is indicated at 1,390 and may be commercially usable. In the St. Louis apparently usable units are as follows: - 10 feet dolomite about 1,415, 15 feet dolomitic limestone about 1,455, 10 feet dolomitic limestone about 1,520, 20 feet dolomitic limestone about 1,540, 10 feet dolomite about 1,570, and 20 feet dolomite about 1,605. Intervening strata are cherty or gypsiferous. Gypsum is reported at intervals from 1,470 - 1,570 feet. All the Salem Limestones are silty.

T. 16 N., R. 4 E. There is little data in this township. No sample studies. Electric logs only. Depth to Ste. Genevieve or Fredonia is around 1,500 feet.

T. 16 N., R. 1 W. Only one deep well and correlations are not clear. Possibly the top of the Lower Mississippian is at 870 or 1,002 feet. No descriptions of formations.

T. 17 N., R. 1 E. Only Six Deep Wells. Three I could not correlate, the other 3 give a little data. Depth to Fredonia probably between 1,050 and 1,100 feet. No descriptions of formations.

T. 17 N., R. 2 E. Depths to the top of the Lower Mississippian vary roughly from about 1,050 - 1,200 feet with around 1,100 feet being the most common. There are 3 records (sections 19, 29, and 31) for which sample studies have been

made but they are not very detailed and the set from section 31 has many portions missing. Possibly the Ste. Genevieve may have some favorable units but the reporting of gypsum or anhydrite in the St. Louis in two of the wells suggests that it could offer problems. The nature of the Salem is not clear but much of it may be sandy or argillaceous or interbedded with sandstone or shale.

T. 17 N., R. 3 E. The data in this township are scattered but suggest the top of the Lower Mississippian at about 1,300 - 1,350 feet. One good sample study, William Rhodes, #1, section 28, reports only 10 feet of Ste. Genevieve and it is mostly shale. Much of the St. Louis is silty or cherty. Anhydrite is present. The most likely unit is 40 feet of brown, very fine grained dolomite at 1,430 feet. The Salem is silty or argillaceous.

T. 17 N., R. 4 E. Minor amount of data.

T. 17 N., R. 1 W. Minor data but shallow Lower Mississippian.

T. 18 N., R. 1 and 2 E. No data. Ditto R. 3 E.

T. 18 N., R. 4 E. Two records. No details.

~~End of Data on Macon County~~

JEL
12/64

Macow Co. - Table 1
 Depth to ^{Lower} Mississippian Ls

T14N, R1E

T15N, R1E (cont)

T15N, R1E (cont)

T15N, R2E (cont)

Sec.	Depth	Sec.	Depth	Sec.	Depth	Sec.	Depth
3	988 LM	5	950G,	6	954G,	30	1333LM?
	or 1342		987F		982F	32	1365LM
3	960 LM	5	944G,	6	952G		1327G,
	or 1262		978F		972F		1365F
3	1297?	5	948 G,	7	966 G	T15N, R2E	
3	1225 LM		978F		994F	25	1603 LM
10	1252G	5	960G	7	875 LM	T15N, R4E	
14			987F	7	970G,	8	1668G
<hr/>		5	952G		1011F	<hr/>	

T14N R2E

Sec.	Depth
7	1319G
9	1378G
15	1402G,
	1497F

5	980F	8	952G,
5	963G,		982F
	992F	8	957G,
5	956G,		982F
	984F	8	1000G
5	944G		1054F
5	950G	18	1010G,
	972F		1030F

T15N. R1E

1	1206 LM
4	994G,
	1026 F
4	978G,
	1010 F
5	946G,
	978F

5	960G	26	1206G
	982F	T15N, R2E	
5	1062G	9	1319 LM
	1091 F	17	1339 L
6	972G,	20	1312G
	1006F	21	1405G
6	1024 LM		

Macon Co
T. 16N, R. 1E.

Table 1. Data
on T16N, R1E

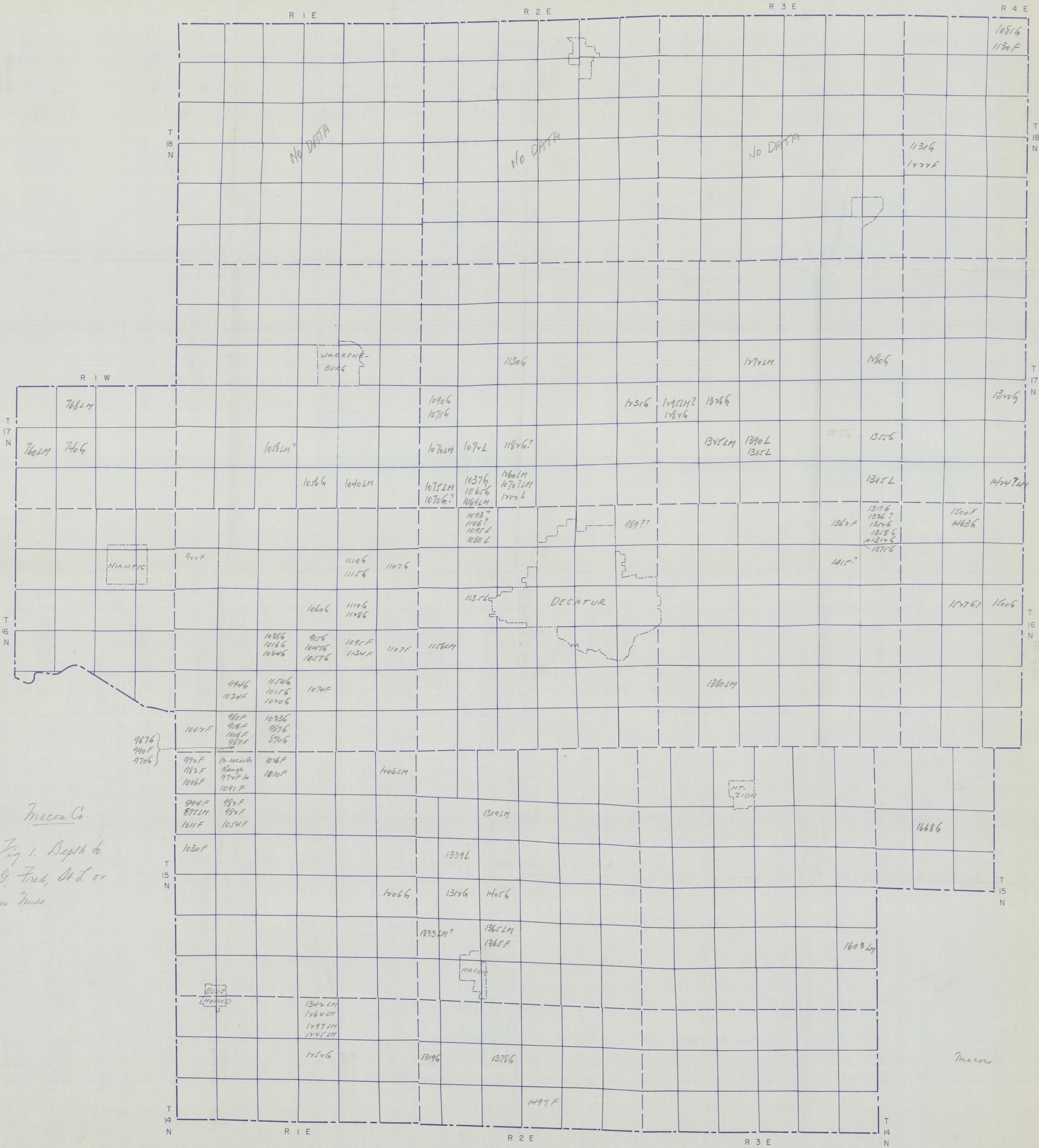
Sec	Depth to Fredonia or Str. G. in.	Sec.	Depth
7	922 F		
11	1119 G	32	987 F
11	1115 G	32	1006 F
17	1107 G	32	967 G
14	1110 G	32	970 G
14	1128 G	32	980 F
15	1060 G	32	990 F
21	1038 G	33	1033 G
21	1016 G	33	987 G
21	1024 G	33	870 G
	915 G		
22	1047 G		
22	1057 G		
23	1095 F		
23	1134 F		
24	1107 F		
27	1074 F		
28	1154 G		
28	1015 G		
28	1020 G		
28	Additional logs showed about the same data		
29	994 G		
	1024 F		
31	1002 F		
32	956 G		

These are all wells that were already Correlated. The Str. G. Reculture, Fredonia classification is employed rather commonly

Macon Co. - Table 1
Depth to Miss. Limestone
Lower

T16N, R2E		T16N, R3E		T16N, R4E		T17N, R1E	
Sec.	Depth	Sec.	Depth	Sec.	Depth	Sec.	Depth
1	989 ??	1	1317 G	5	1500 F	28	1058? LM
5	1093 ??	1	1336 ?	5	1463 G?	34	1056 G,
5	1106 ??	1	1317 G	16	1500 G		1081 F
5	1095 St.L. (top LM)	1	1358 G	17	1527? G?	35	1040 LM
5	1080 St.L. (top LM)	1	1317 G	~~~~~			
		1	1375 G	T17N	R3E	T18N	R4E
		2	1367 F	(Cont.)		4	1081 G,
17	1135 St.L. (top LM)	11	1415 ?	25	1355 G		1130 F
		29	1380 LM	28	1390 L	31	1131 G
19	1158 LM	~~~~~		29	1375 LM		1227 F
		T17N	R2E	36	1366 LM		
T17N	R2E	(Continued)		28	1315 L		
16	1130 G	32	1064 LM	~~~~~			
19	1090 G	33	1160 LM	T17N	R4E		
19	1071 G	33	1070? LM	21	1370 G		
24	1231 G	33	1200 L	33	1424? LM		
28	1182 G?	~~~~~		~~~~~			
29	1072 L	T17N	R3E	T17N	R1W		
30	1070 LM	13	1280 G	22	768 LM		
31	1075 LM	16	1272 LM	27	740 G		
31	1070 G?	20	1295? LM	28	760 LM		
32	1037 G	20	1282 G				
32	1065 G ↑	22	1326 G ↑				

F - Fredonia, G - St. Gen, St.L - St. Louis, LM - G.F. St.L etc. uni-differentiated



Macon Co.
 Fig. 1. Depth to
 St. G, Fred, St. L or
 Lower Miss