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NOTES ON THE DEEP WELL DRILLED AT EAST MINNEAPOLIS, MINN., IN 1874—1875.

BY N. H. WINCHELL.

NATURAL SURFACE OF GROUND.				
1	42	Sand.	42	
2	58	Blue.	Limestone.	70
3	104	White.	Sandstone.	294
	109	Red.	Limestone.	338
4	116	Gray.	Limestone.	352
5	110	White.	Sandstone.	403
6	128	Blue	Shale.	508
7	12	White.	Sandstone.	78
8	170	Blue.	Shale.	848
9	12	Sandy.	Limestone.	857
10	110	White.	Sandstone.	967
11	2	Sandy.	Marl.	996
12	70	White.	Sandstone.	1074
13	57	Red	Marl.	1131
14	260	Red.	Sandstone?	1431

The accompanying diagram of the strata passed through, with the designations of the strata, was furnished by Col. J. B. Clough, City Engineer, in whose charge the work was put by the City Council when money was appropriated to aid the enterprise. This occurred at the depth of about 1,000 feet.

No. 1. This sand is the well-known *less loam* of the Mississippi bluffs. Though it is represented here as having a thickness of 42 feet, it shows less than one-half that thickness along the river bluff opposite the site of the well, less than 15 rods distant. It is here underlain by a heavy deposit of boulder-clay drift. It is presumable that this boulder-clay, which is itself rather sandy, was penetrated without the knowledge of the workmen, since it is seen to extend as far from the river as the site of the well along Central Avenue and on other streets, and is struck uniformly over the East Division of the city in digging wells at the depth of ten to twenty feet.

No. 2 is the *Lower Trenton Limestone*, embracing some layers of green shale, and is that which causes, in conjunction with the St. Peter sandstone (No. 3), the Falls of St. Anthony.

No. 3 is known as the *St. Peter Sandstone*. Its thickness, as here developed, is greater than observed at any other point in Minnesota. It is

generally accredited with a thickness of about 152 feet, but here shows 164 feet. It is a purely white sand with very slight cement and very little variation in texture or grain.

No. 4 is known as the *Shakopee Limestone*. It has been placed as the uppermost member of the great Lower Magnesian Formation of Dr. D. D. Owen, but perhaps the St. Peter should be regarded as the uppermost member of that formation. Its color here appears to be nearly the same as seen at Kasota, where it is largely wrought and sold under the name of *Kasota Stone*. Its thickness, 102 feet, is greater than has been observed at any other point.

No. 5 is designated a *gray limestone* with a thickness of sixteen feet. It is a new feature in the lithology of the Lower Magnesian and may belong to the Shakopee.

No. 6. Below the *gray limestone* is a white sandstone similar to the St. Peter above, with a thickness of 116 feet. This can be identified as the *Jordan Sandstone*, so named from Jordan village on the Minnesota river, above Skakopee, where it was first recognized as a distinct portion of the Lower Magnesian.

No. 7. Which is here denominated a *blue shale*, having a thickness of 128 feet, has not before been recognized as a portion of the Lower Magnesian. It occupies the place, in order of stratification, of the St. Lawrence limestone, but is not so thick.

No. 8 is likewise an unknown stratum.

No. 9 in like manner has never before been discovered. It is highly probable that, taken together, Nos. 7, 8, 9 and 10 are the actual equivalents of the St. Lawrence Limestone in point of stratification, modified in character and increased in thickness by proximity to the ancient Laurentian belt that lies but few miles further north. This would indicate the early origin of the Minnesota spur of the old Laurentian belt of the center of North America, as a shore line along which shale and sand were accumulating at the same time that limestone was being formed at points more remote, in deeper water.

No. 10 pertains to the same horizon and bears a stronger resemblance to the St. Lawrence.

Nos. 11, 12 and 13 represent the St. Croix sandstone, but it is of less thickness than where seen in the Mississippi bluffs.

No. 14 may represent the "Lingula flags," or the upper portion of the Potsdam sandstone so-called.

No. 15 was rather clayey to be designated, unqualifiedly, a sandstone. It is undoubtedly the upper portion of the great series of marls and sands that characterize this horizon in Minnesota, as made known by Dr. Owen, and by him and others referred to the

age of the Lower Potsdam Sandstone of New York. It seems to be the same formation in which the salt well, drilled at Belle Plaine, stopped at the depth of 710 feet, though much less compact than where it is exposed at the surface in southwestern Minnesota. It is the same formation as the rock that embraces the well-known "pipestone" or *Catlinite* of Minnesota.

*The University of Minnesota,
Minneapolis, May 25, 1876.*

REPORT OF THE COMMITTEE ON CONCHOLOGY.

BY A. F. ELLIOT.

FAM. VALVATIDÆ.

Gen. Valvata. O. F. Mull.
sp. *V. tricarinata.* Say.

FAM. VIVIPARIDÆ.

Gen. Vivipara. Lam.
sp. *V. subpurpurea.* Say.
Gen. Melantho. Bowditch.
sp. *M. decisa.* Say.
var *rufa* Hald.

FAM. LIMNÆIDÆ.

Sub. Fam. Limnæinæ.
Gen. Limnæa. Lam.
sp. *L. stagnalis.* Say.
Subgenus Limnophysa. Fitz.
sp. *L. reflexa.*
Gen. Physa. Draparnaud.
sp. *P. gyrina.* Say.
sp. *P. heterostropha.* Say

FAM. PLANORBIDÆ.

Gen. Planorbis. Guettard.
Subgenus Planorbella. Hald.
sp. *P. campanulatus.* Say.
Subgenus Helisoma. Swains.
sp. *P. trivolvis.* Say.
sp. *P. bicarinatus.* Say.
Subgenus Gyraulus. Agassiz.
sp. *P. deflectus.* Say.
sp. *P. parvus.* Say.