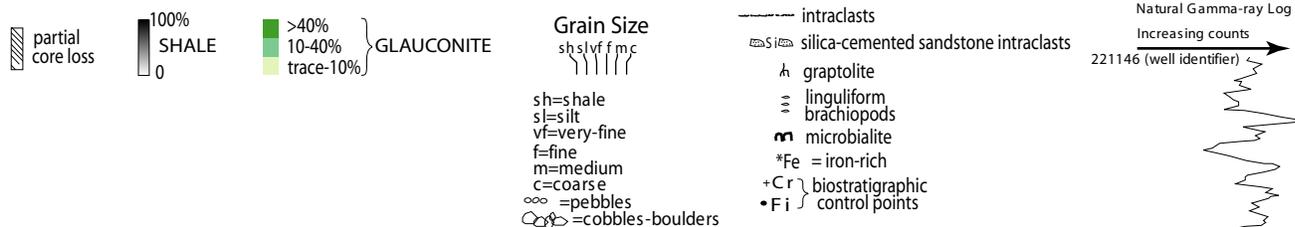


Data repository items for Runkel, A.C., Miller, J.F., McKay, R.M., Palmer, A.R., and Taylor, J.F., High Resolution Sequence Stratigraphy of Lower Paleozoic Sheet Sandstones in Central North America: The Role of "Special Conditions" of Cratonic Interiors in Development of Stratal Architecture

This supplement contains primary data that support the stratigraphic cross-sections in Figures 6 and 7. Included are stratigraphic columns, fossil collection information, borehole natural gamma-ray logs, and associated locality information.

## LEGEND TO STRATIGRAPHIC COLUMNS

FACIES ASSOCIATIONS	FACIES (See Runkel and others, 1998, for more detailed descriptions)
 nearshore nonmarine	6- fine to coarse-grained, cross-stratified sandstone, includes adhesion structures, "pinstripe" laminae;
 nearshore marine	5- fine to coarse-grained sandstone, planar-tabular cross-strata; shale drapes; 4- fine to coarse-grained sandstone, trough to planar cross-strata; common skolithos
 offshore siliciclastic	3- Fine to very fine grained sandstone with amalgamated HCS and SCS 2- Very fine grained sandstone with small to medium scale HCS; siltstone/shale caps 1- Shale, siltstone, very fine grained sandstone with small scale HCS
 "offshore" subtidal carbonate	7- Shale with subordinate dolomudstone to dolograins, HCS, graded beds common; intraclastic. 8- Dolowackestones to grainstones with subordinate shale; HCS, graded beds; intraclastic.
 peritidal to subtidal carbonate	9- intraclastic, oolitic, dolostone with desiccation cracks; variably sandy and with sandstone interbeds



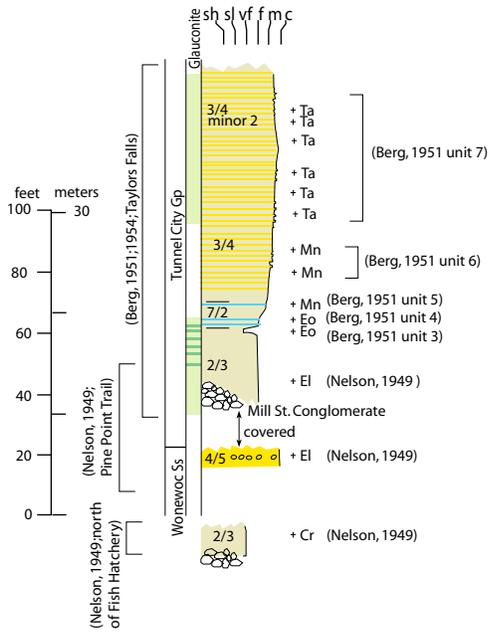
Number above each stratigraphic column refers to control point numbers on location maps (Figs. 1, DR1) and on cross sections (Figs. 6, 7)

CONODONT ZONE/SUBZONE	TRILOBITE (and brachiopod*) ZONE/SUBZONE
• Rm <i>Rossodus manitouensis</i>	+ Sw <i>Symphysurina woosteri</i>
• Ca <i>Cordylodus angulatus</i>	+ Mt <i>Missisquoia typicalis</i>
• la <i>lapetognathus</i>	+ Ea? <i>Eureka apopsis?</i>
• Cl <i>Cordylodus lindstromi</i>	+ Sasz <i>Saukia</i>
• Ch <i>Clavohamulus hintzei</i>	+ Sal " <i>Saukiella</i> "
• Hs <i>Hirsutodontus simplex</i>	+ Ca <i>Calvinella</i>
• Ci <i>Cordylodus intermedius</i>	+ UD Upper <i>Dikelocephalus</i>
• Cp <i>Cordylodus proavus</i>	+ Oo <i>Osceolia osceola</i>
• Ce <i>Clavohamulus elongatus</i>	+ lp <i>Illaenurus priscus</i>
• Fi <i>Fryxellodontus inornatus</i>	+ Pt-Pr <i>Ptychaspis-Prosaukia</i>
• Hh <i>Hirsutodontus hirsutus</i>	+ Pr <i>Prosaukia</i>
• Cm <i>Cambroistodus minutus</i>	+ Pt <i>Ptychaspis</i>
• En <i>Eoconodontus notchpeakensis</i>	+ Ps <i>Ptychaspis striata</i>
• E <i>Eoconodontus</i>	+ Pg <i>Ptychaspis granulosa</i>
• Pm <i>Proconodontus muelleri</i>	+ S-P <i>S. oweni-Psalaspis</i>
• Pp <i>Proconodontus postero-costatus</i>	+ Tae <i>Taenicephalus</i>
• Pt <i>Proconodontus tenuiserratus</i>	+ Ta <i>Taenicephalus altus</i>
	+ Mn <i>Maustonia nasuta</i>
	+ Ppa <i>Parabolinoidea palatus</i>
	+ Eo* <i>Eoorthis*</i> (Brachiopod)
	+ Co <i>Conaspsis</i>
	+ Im <i>Irvingella major</i>
	+ El <i>Elvinia</i>
	+ Du <i>Dunderbergia</i>
	+ Ap <i>Aphelaspis</i>
	+ Cr <i>Crepicephalus</i>
	+ Ce <i>Cedaria</i>

See Figure 5 for relative ages of all biozones

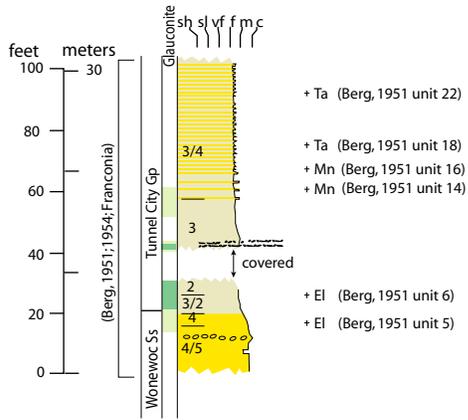
# 1

## (Taylors Falls, Minnesota area)

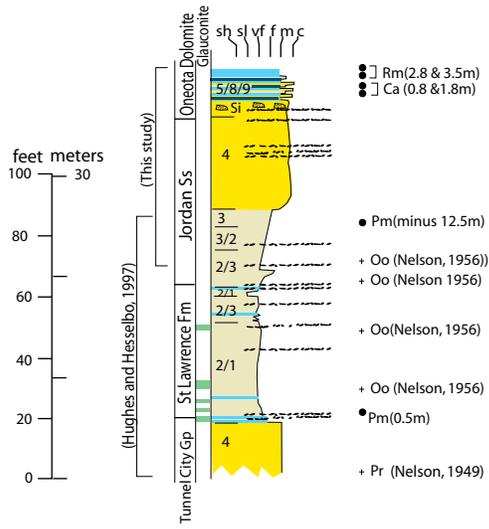


# 2

## (Franconia, Minnesota area)

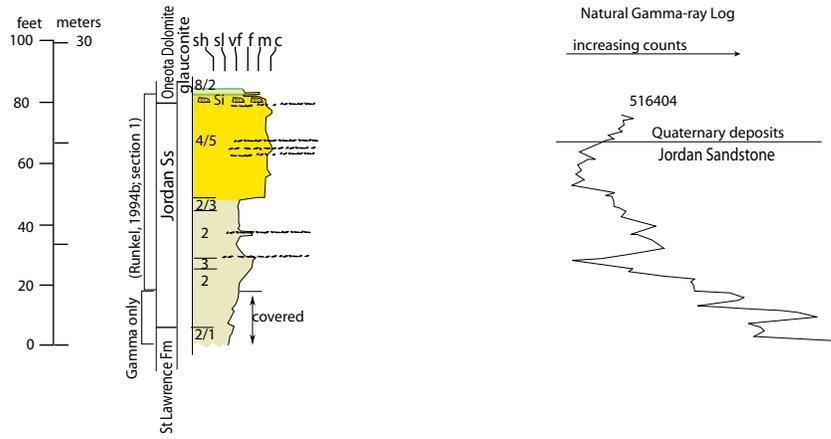


### 3 (Osceola, Wisconsin)



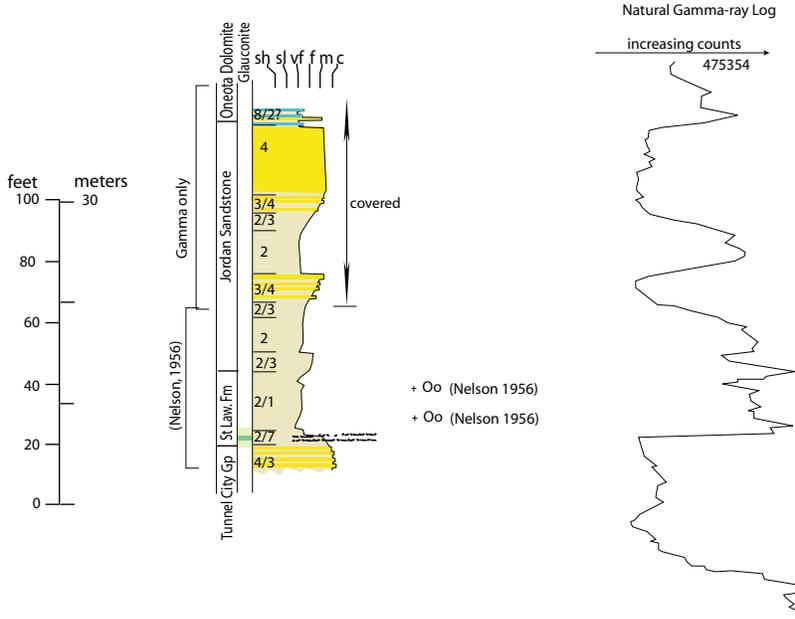
# 4

(Osceola SW, Minnesota)



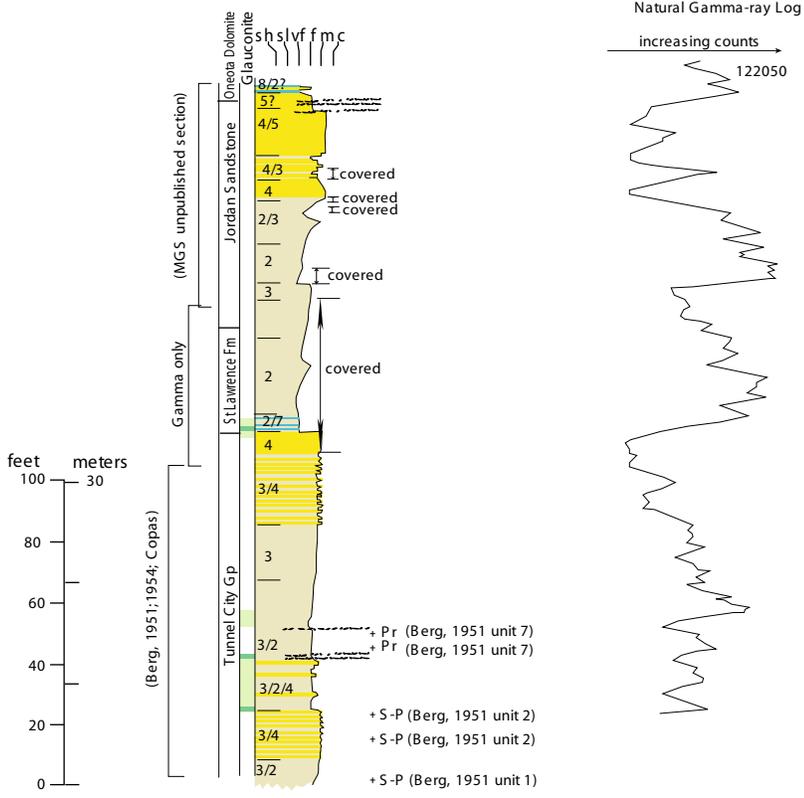
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(Soo Drawbridge, Minnesota)



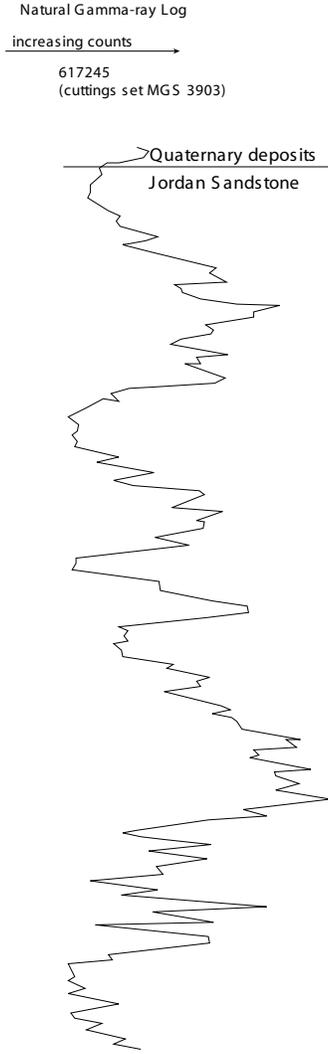
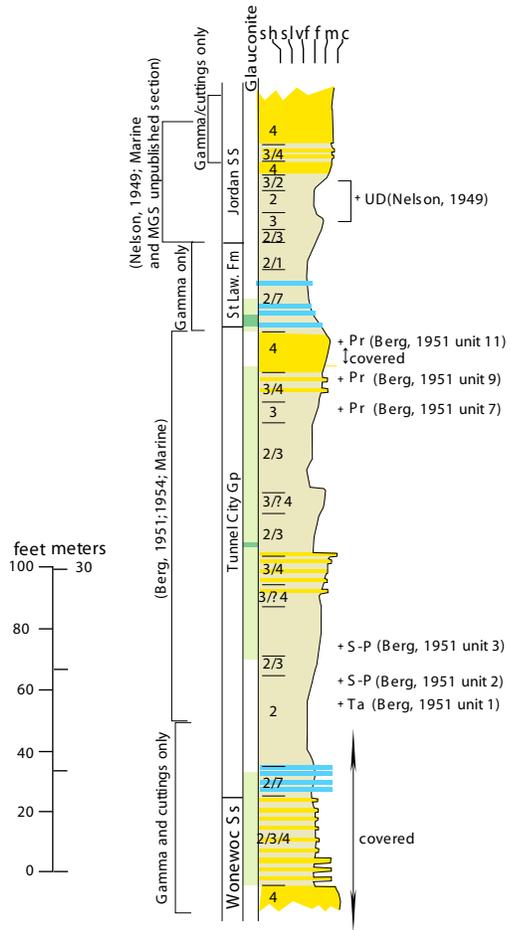
# 6

(Copas, Minnesota)

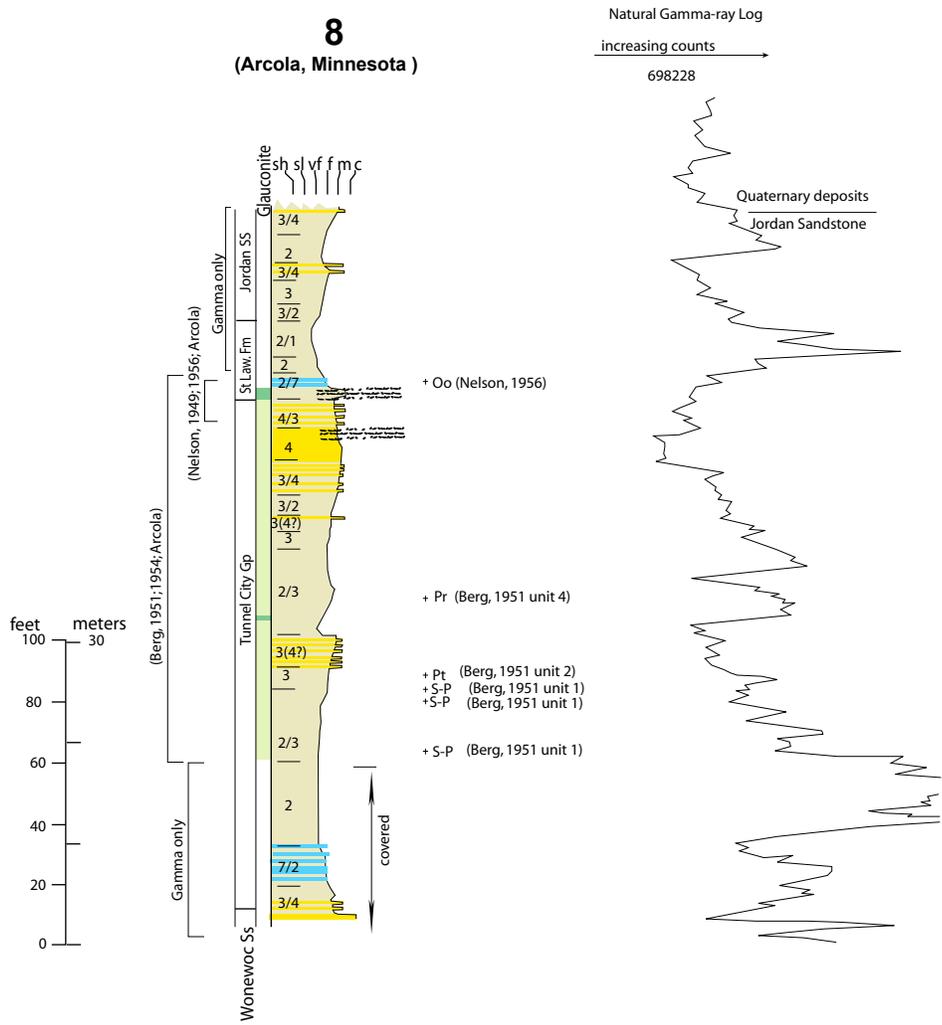


# 7

(Marine, Minnesota)

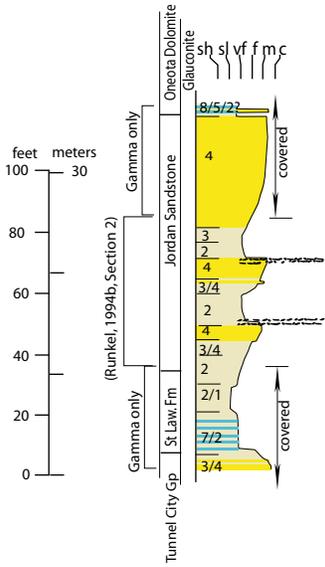


# 8 (Arcola, Minnesota)

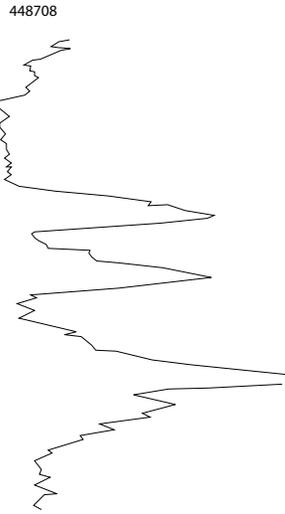


# 9

(Lookout Point, Minnesota)

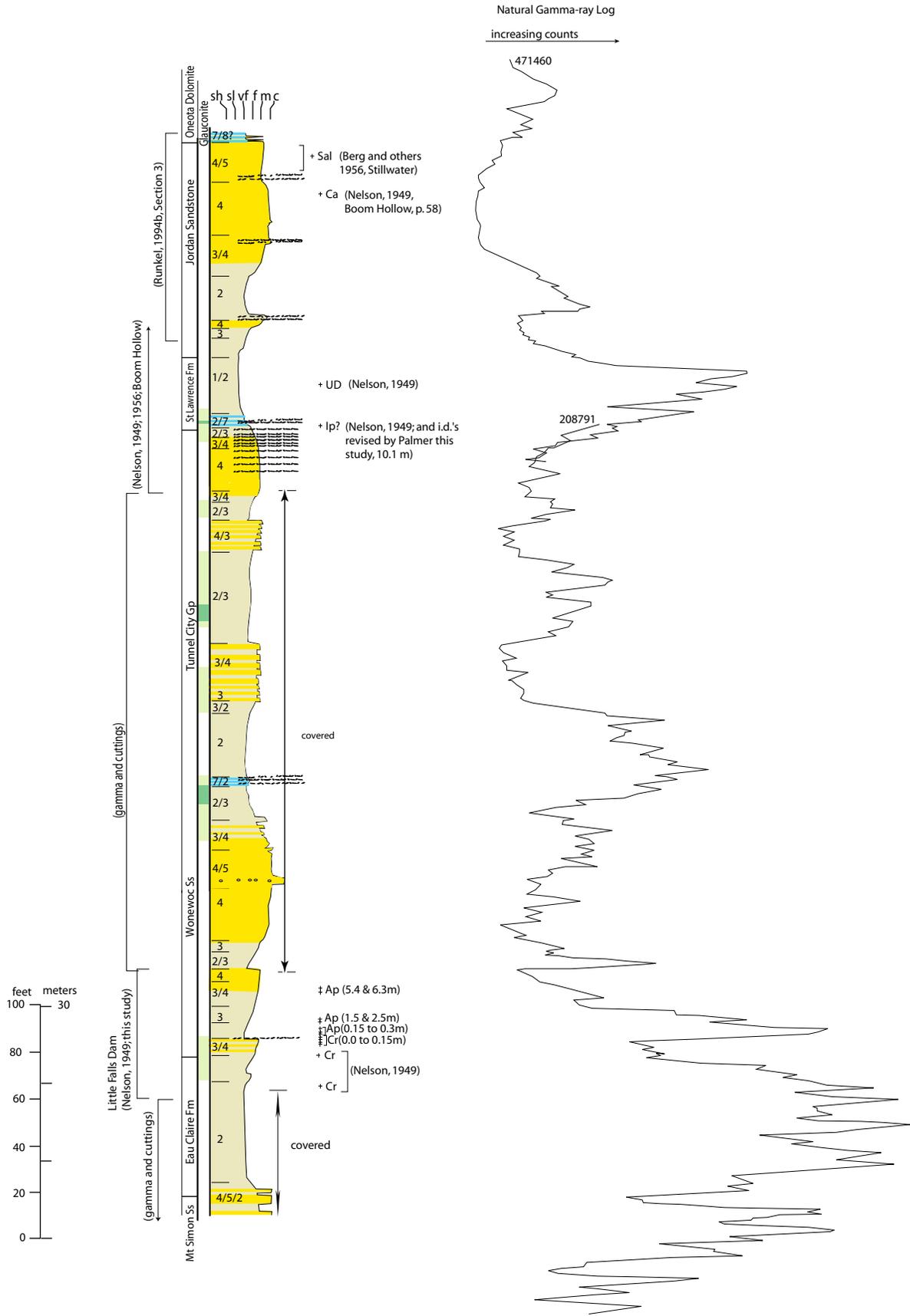


Natural Gamma-ray Log  
increasing counts →



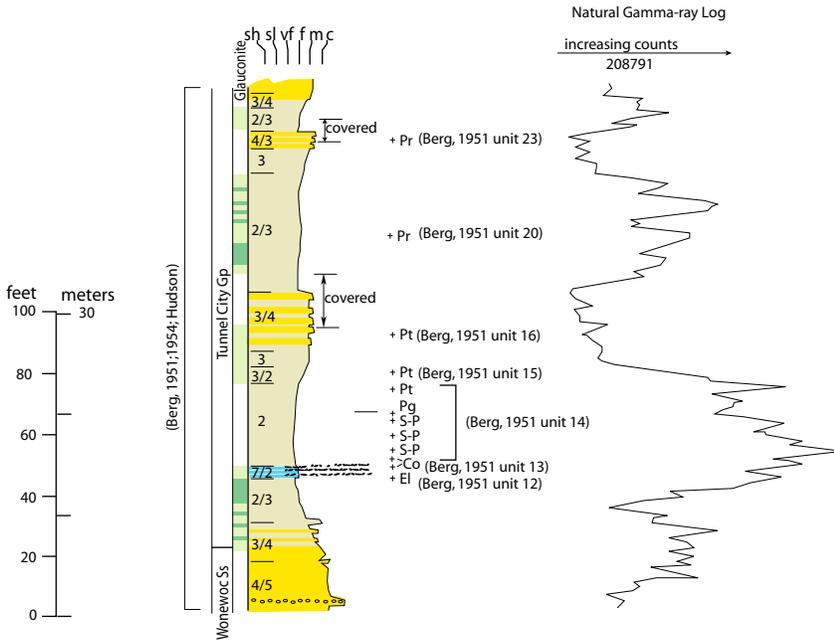
# 10

(Stillwater, Minnesota area)



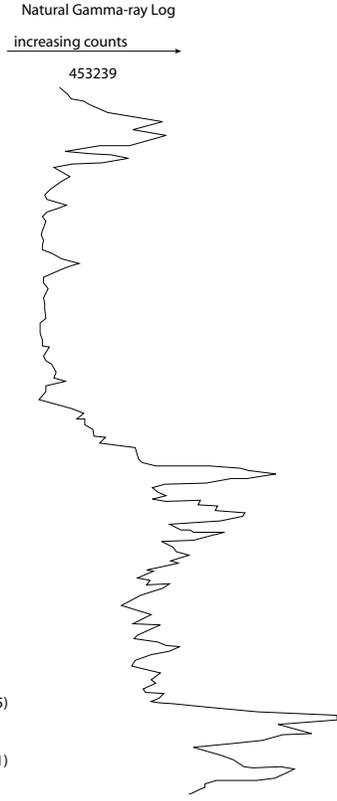
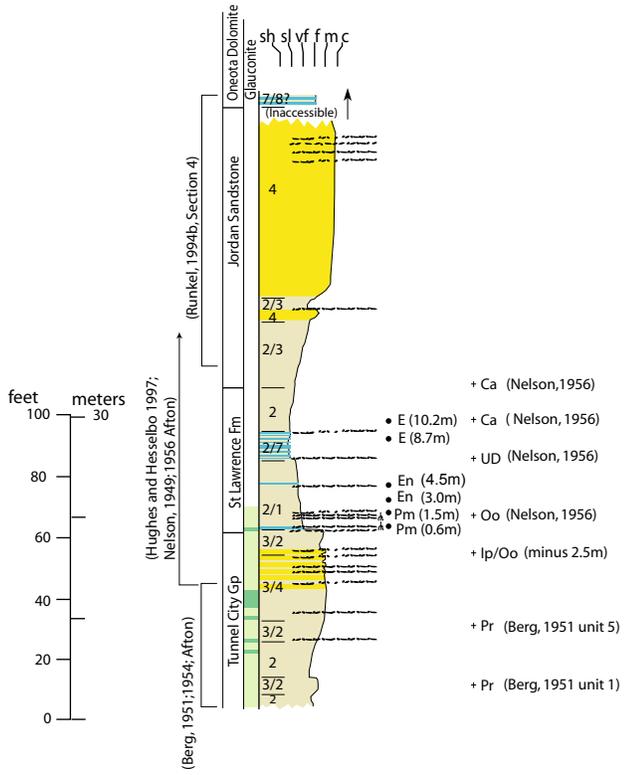
# 11

(Hudson, Wisconsin)

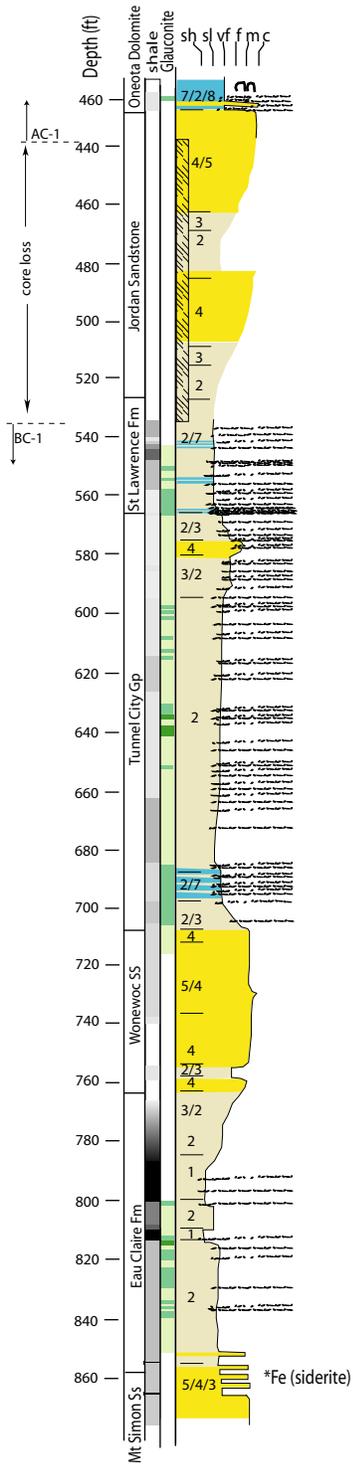


# 12

(Afton, Minnesota)



(BC-1 and AC-1, Minnesota Cores)



↑ Rm (AC-1 445' 8")

- E (541' 3" & 544' 4")
- E (548' 10")
- E (551' 2")
- E (554' 8")
- Pm (564' 10")

+ Pr (AC-1, 660' 6" & 661' 2")

- + Pt (650' 11" & AC-1, 686' 8")
- + Pt (659' 11" & AC-1 691' 0")
- + Pt? (667' 0")

+ Con (684' 6" & 684' 9")

0.0

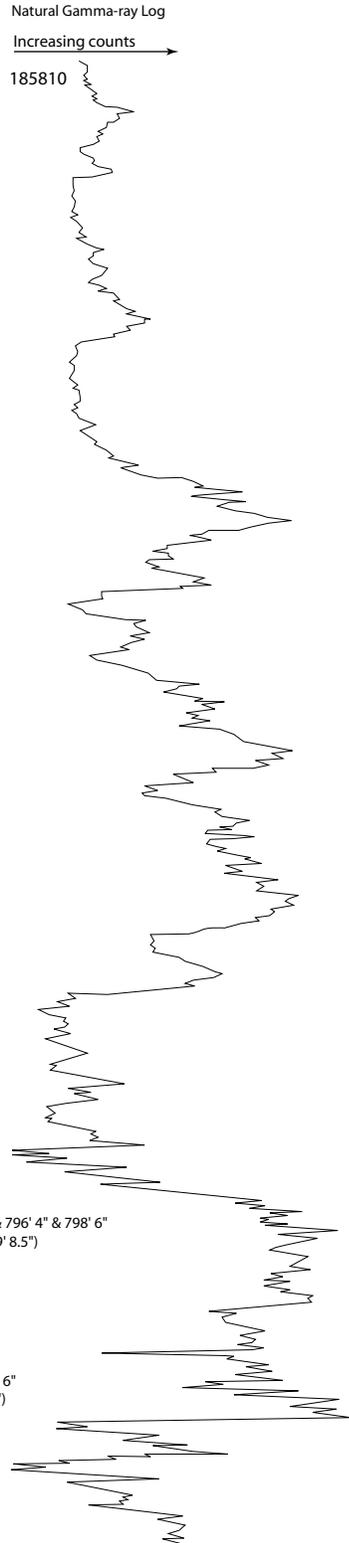
+ Du (AC-1, 788' 3.5")

+ Du (AC-1, 804' 10")

- + Ap/Du (785' 3.5" & 794' 0" & 796' 4" & 798' 6"
- + Ap (785' 3.5" & 794' 0" & 796' 4" & 798' 6"
- + Ap (832' 11.5" & 833' 9")
- + Ap (836' 3.7" & 836' 7" & 839' 6"
- + Cr (799' 0" & AC-1, 830' 2.5")

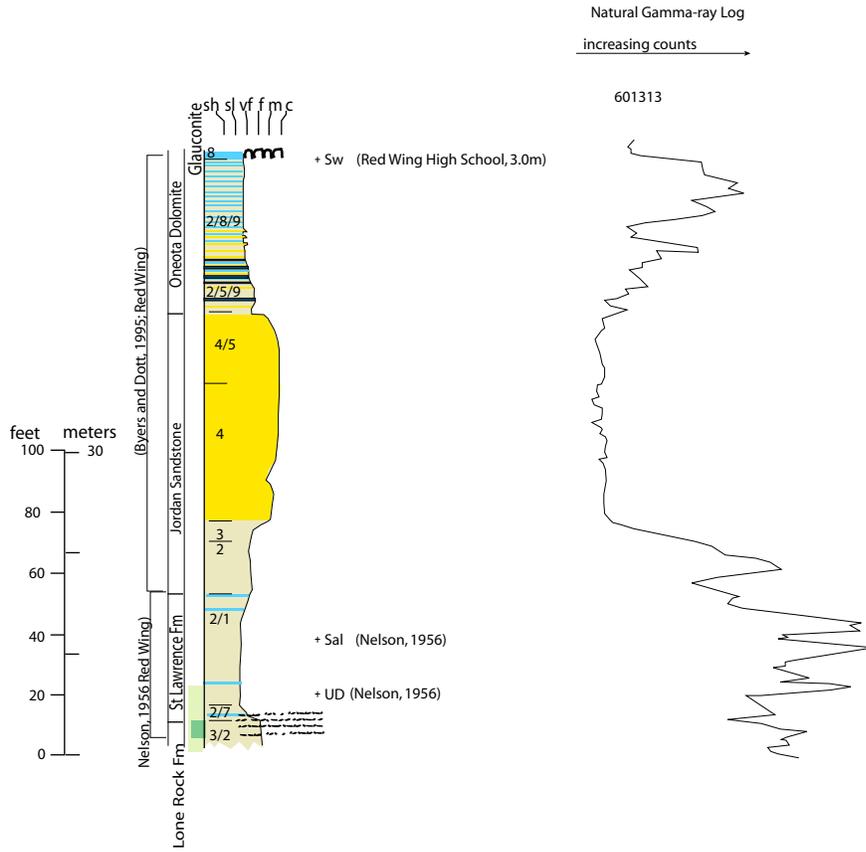
+ Cr (822' 1.5")

- + Cr (832' 11.5" & 833' 9")
- + Ce (836' 3.7" & 836' 7" & 839' 6"
- + Ce (844' 3" & AC-1, 869' 6.5")



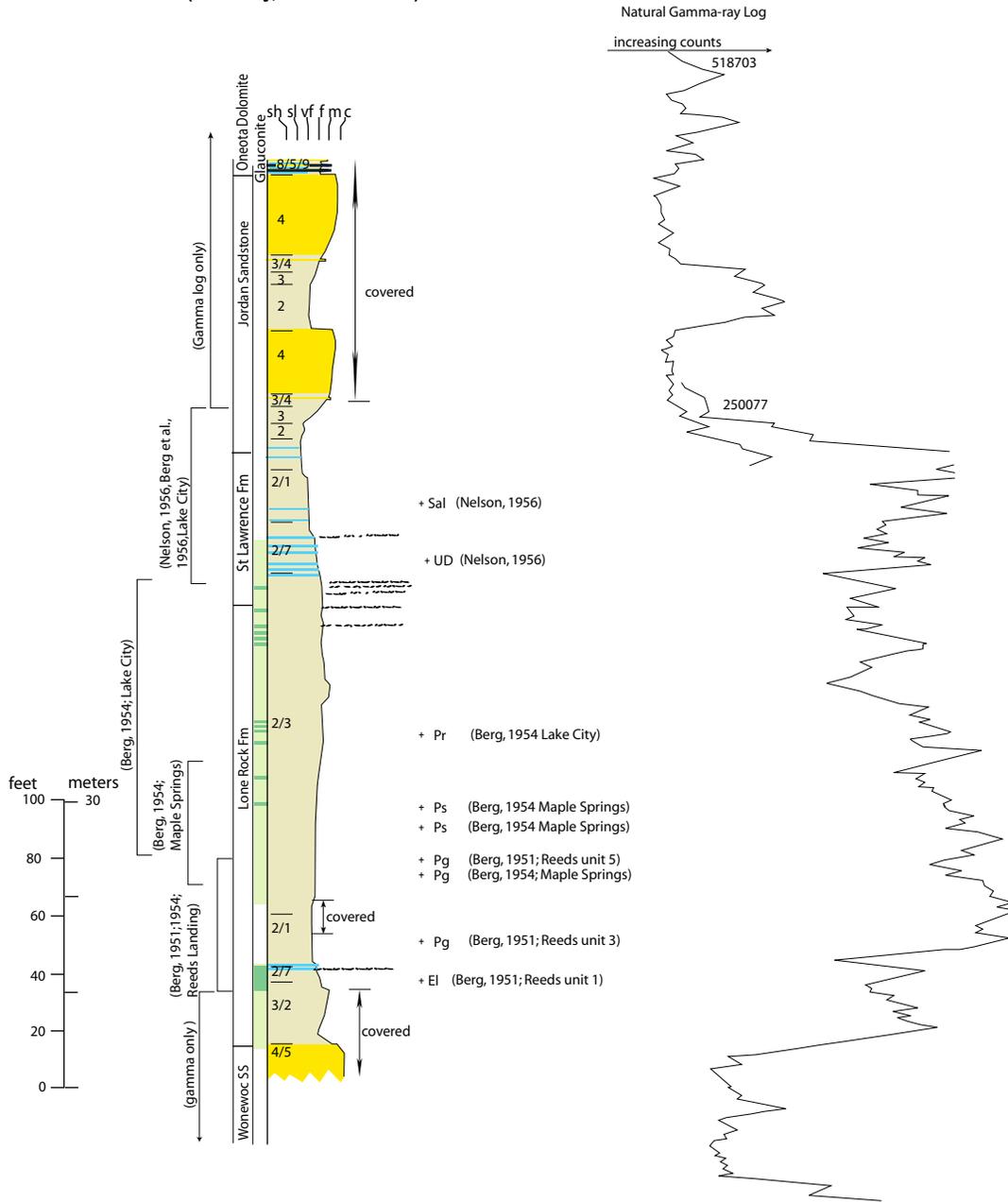
# 14

(Red Wing, Minnesota)



# 15

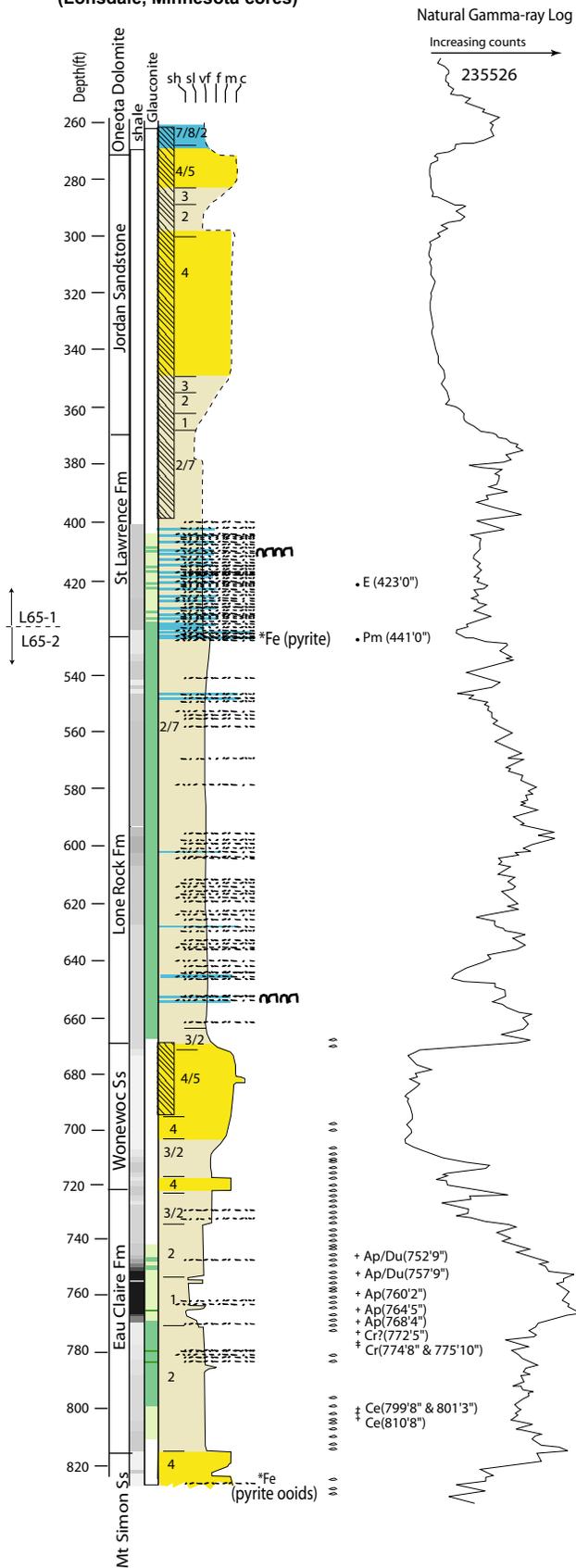
(Lake City, Minnesota area)



# 16

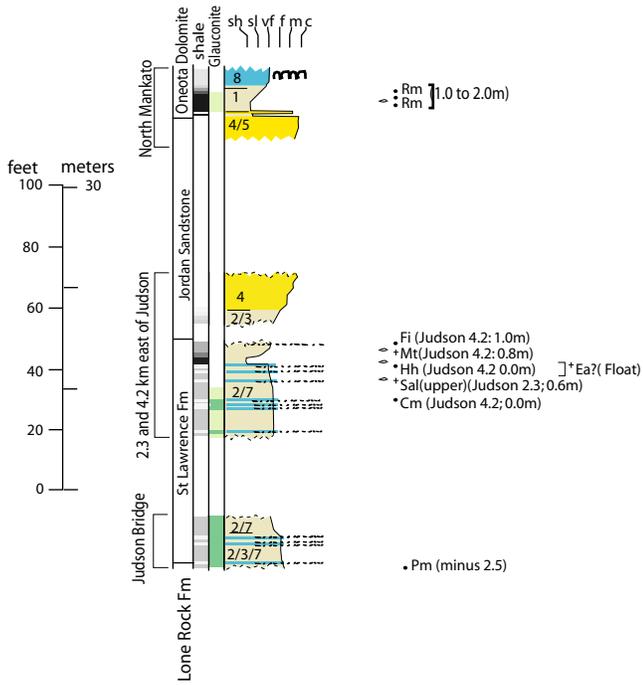
## (Van Oser Creek, Minnesota area)





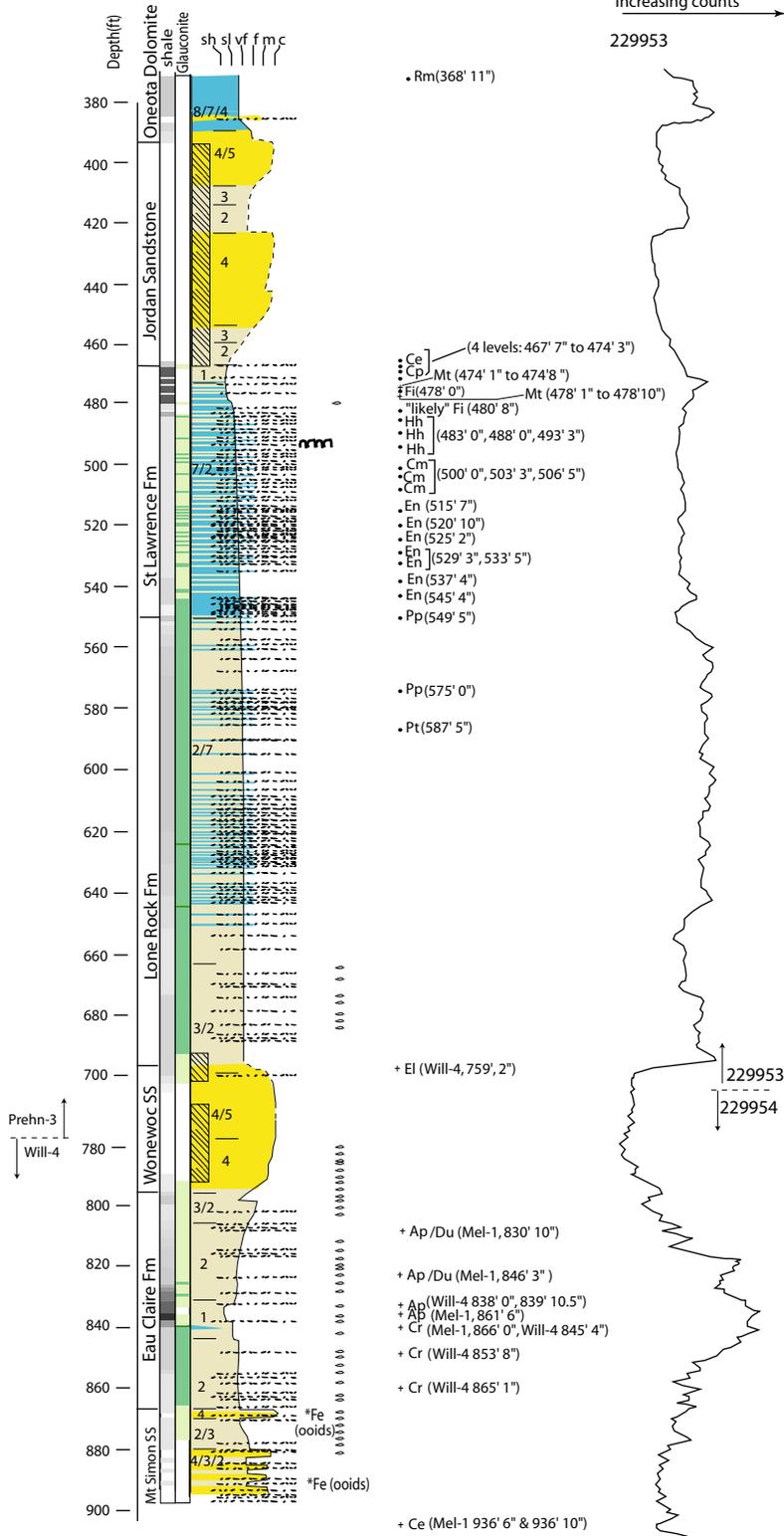
# 18

(Judson-Mankato, Minnesota area)

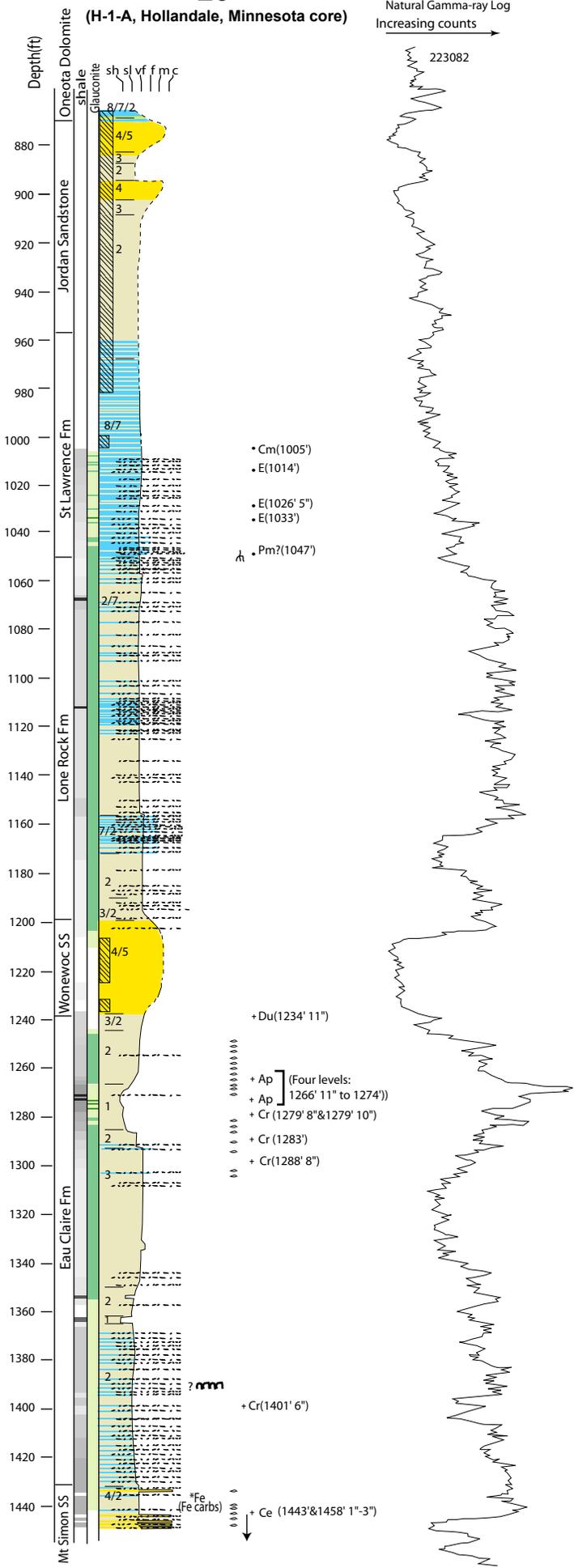


Increasing counts →

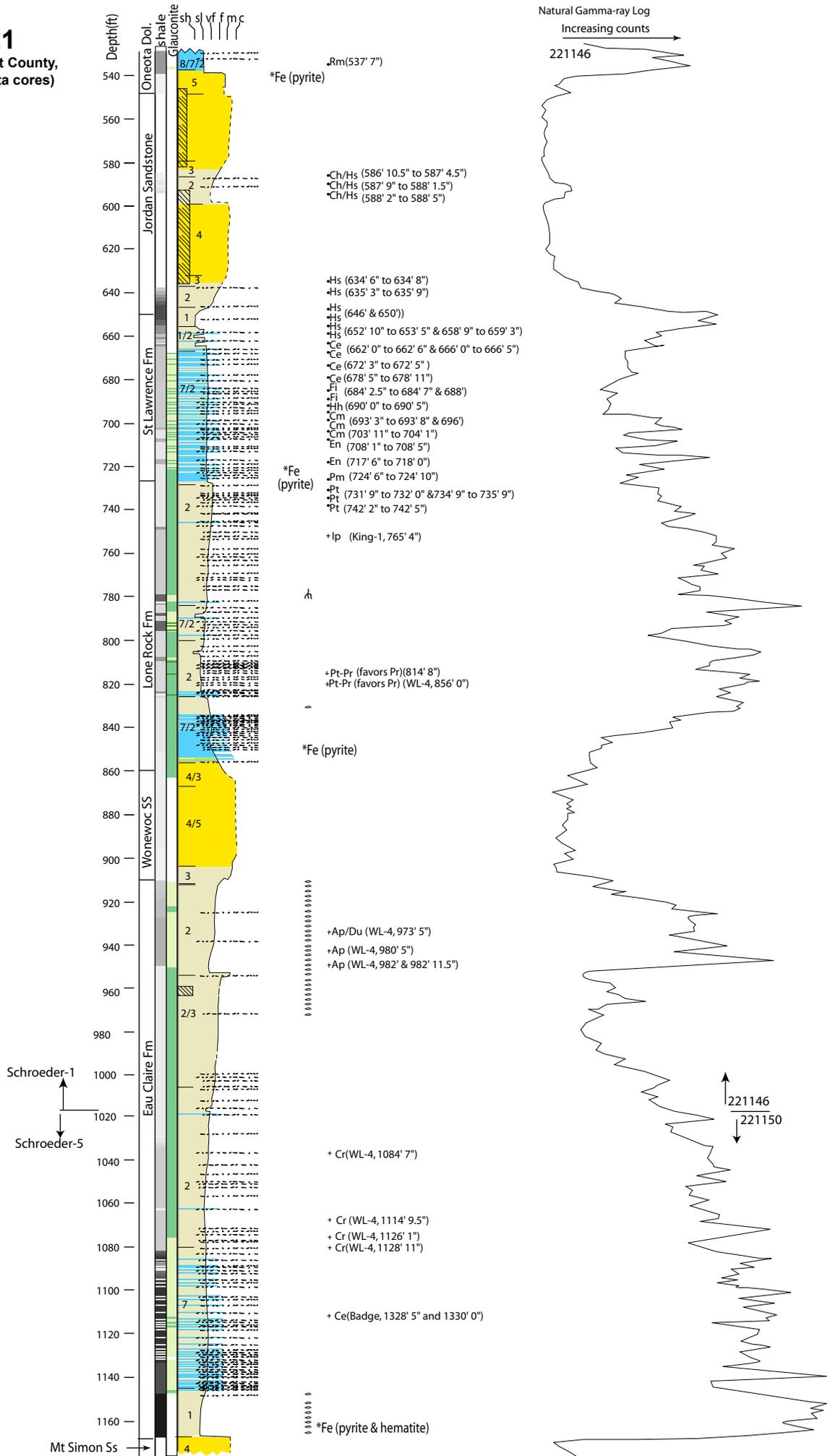
229953



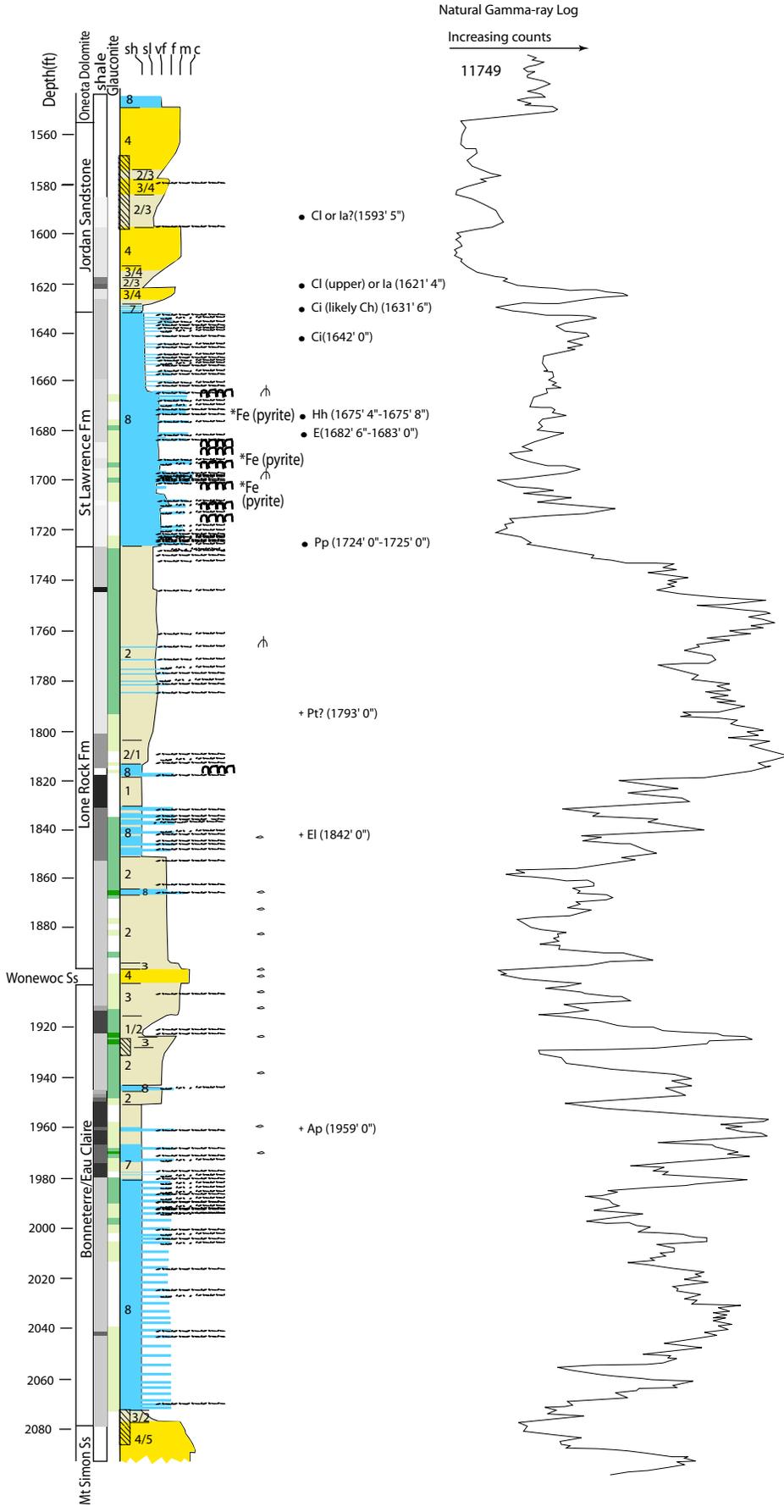
(H-1-A, Hollandale, Minnesota core)



**21**  
 (Faribault County,  
 Minnesota cores)

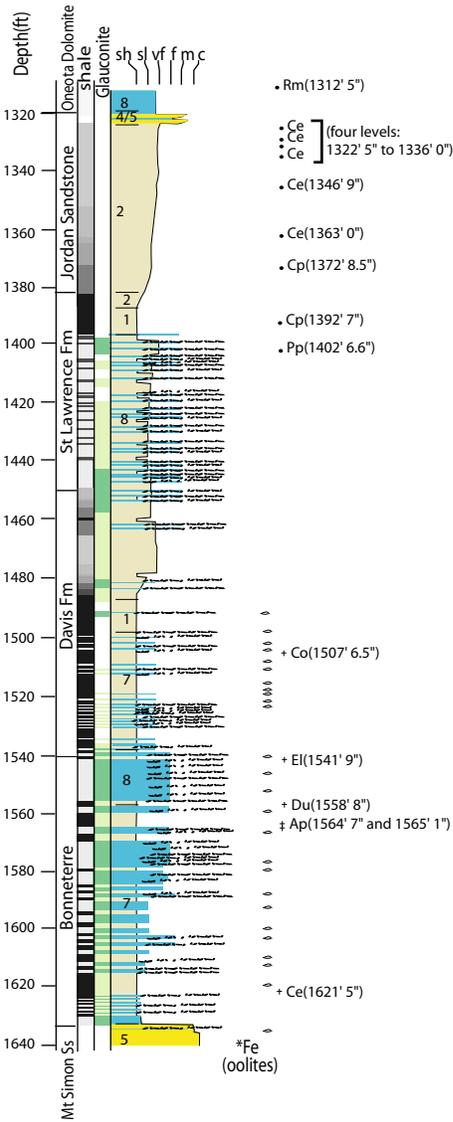


**22**  
**(Peterson Core, Iowa)**



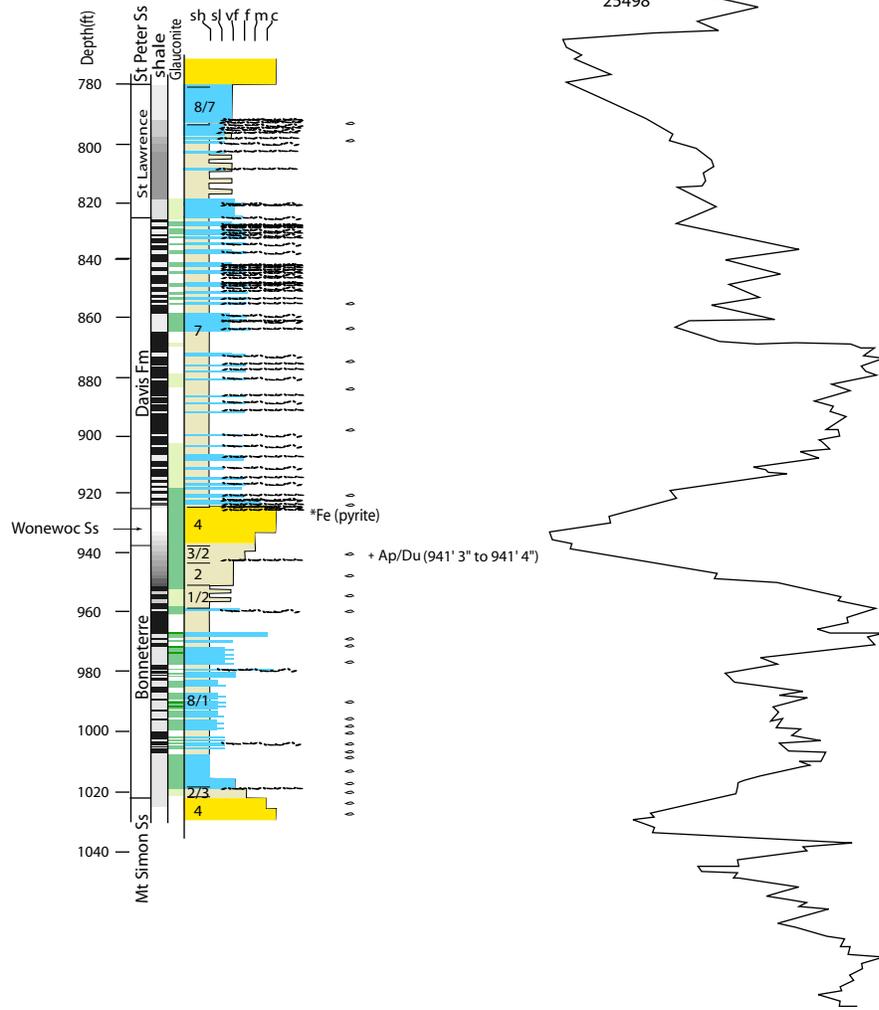
# 23

(Quimby Core, Iowa)



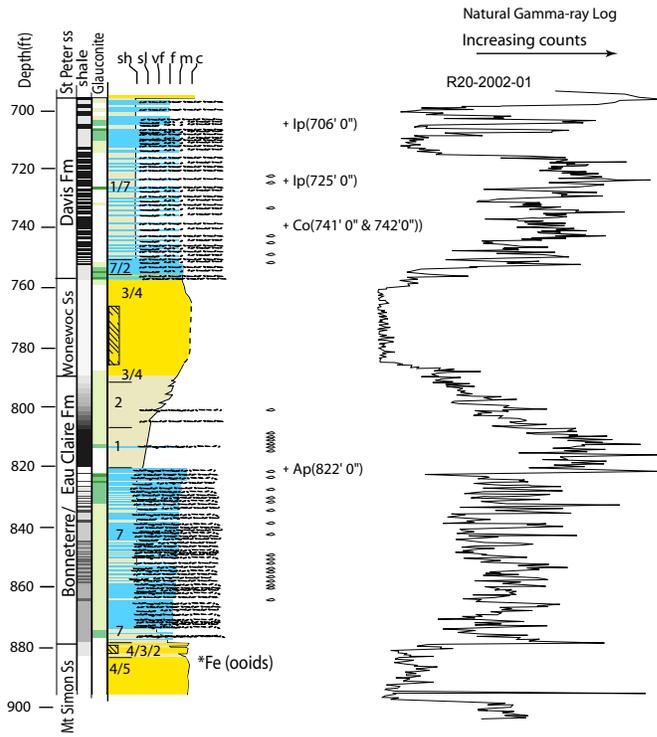
# 24

(Camp Quest Core, Iowa)



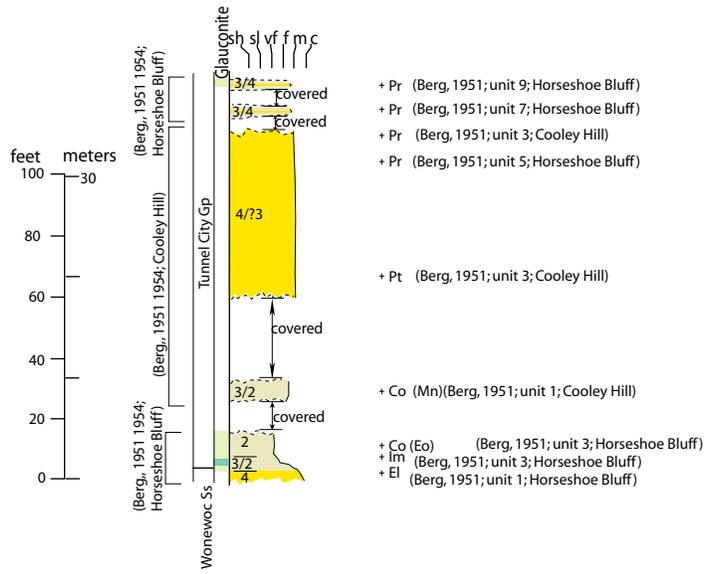
# 25

(R20-2002-01 Core, South Dakota)

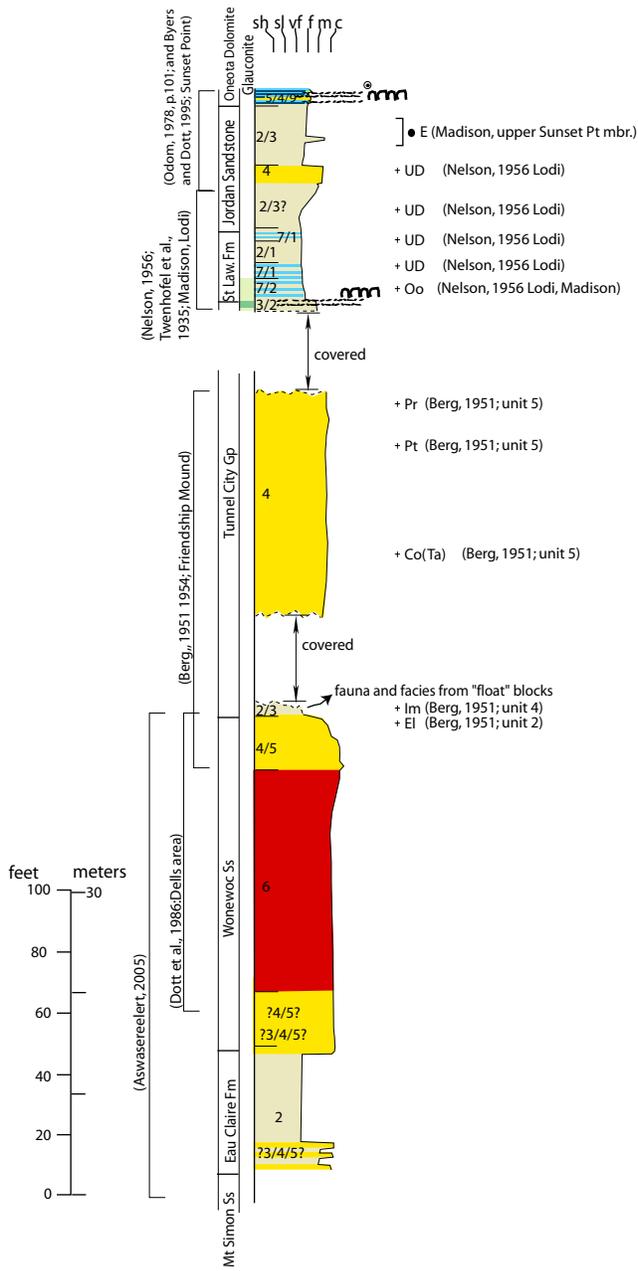


# 26

(Horseshoe Bluff, Cooley Hill, Wisconsin)

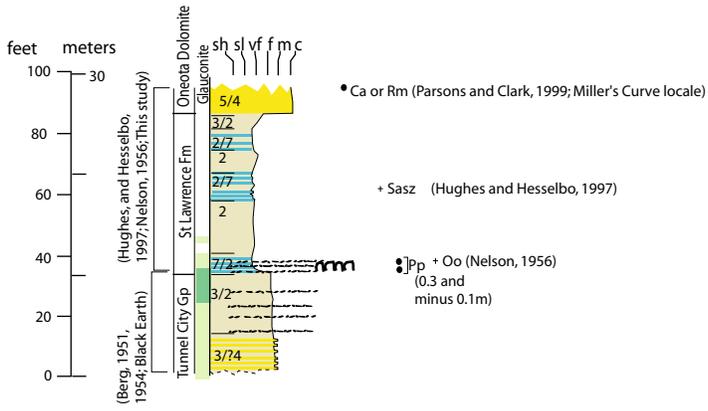


(Friendship Mound, Lodi, Madison, Dells area, Wisconsin)



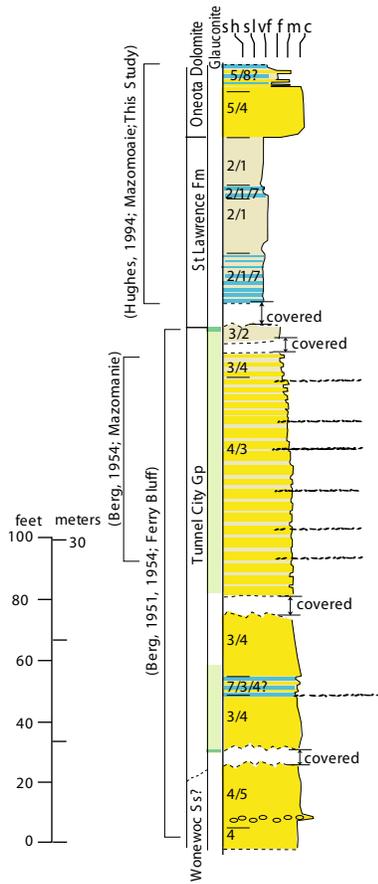
# 28a

## (Black Earth, Wisconsin)



# 28b,c

(Mazomanie, Ferry Bluff, Wisconsin)



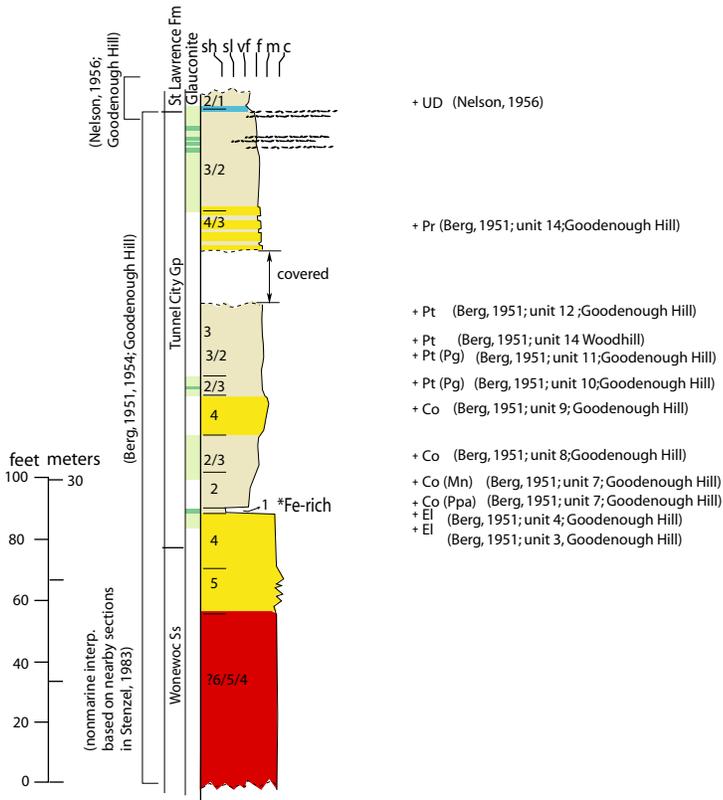
- Ca or Rm (Parsons and Clark, 1999)
- "Ordovician" (3.0m)

- E (n) (minus 0.1m)

- E (n) (minus 9.8m)
- + UD (Nelson, 1956)
- E (n) (minus 12.0m)

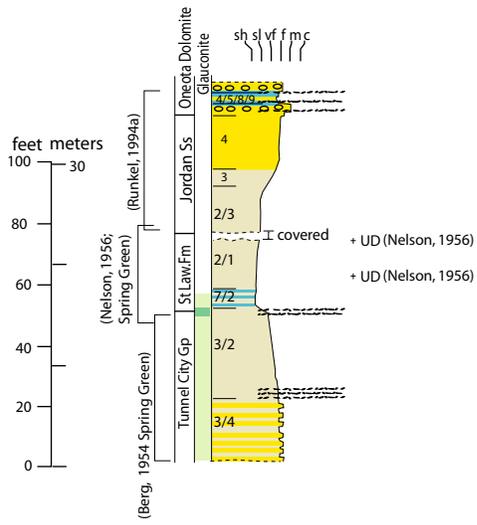
+ Co (Berg, 1951; unit 8)(Eorthis only)

(Hustler, Woodhill, Goodenough Hill, Wisconsin)



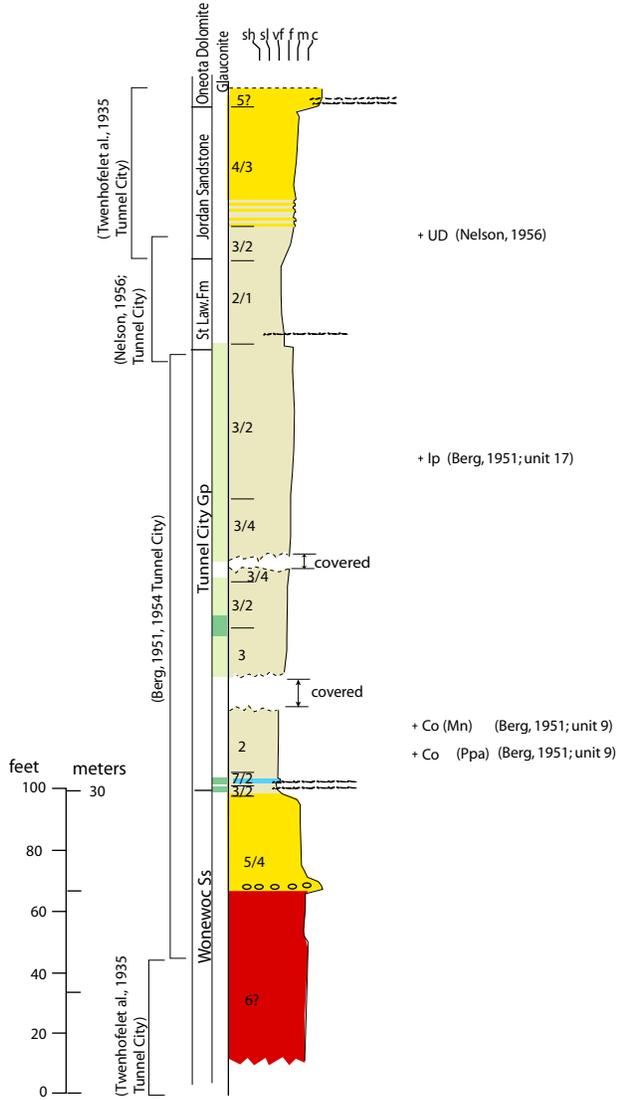
# 30

## (Spring Green, Wisconsin)

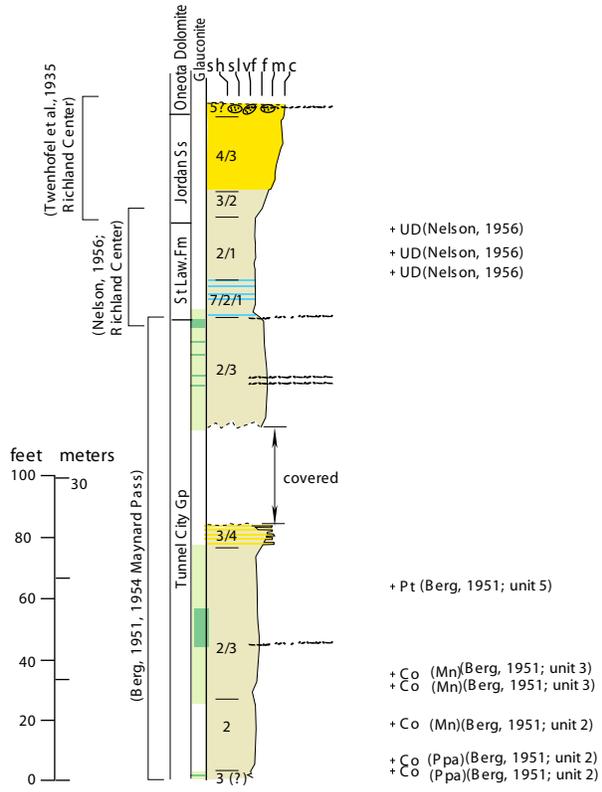


# 31

(Tunnel City, Wisconsin)

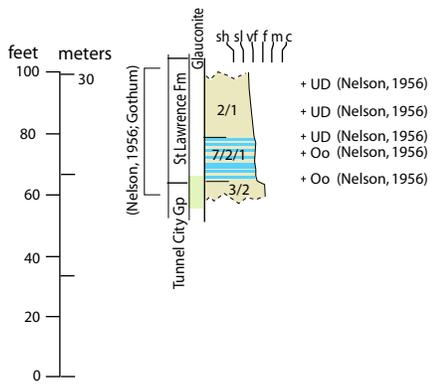


(Maynard Pass, Richland Center, Wisconsin)

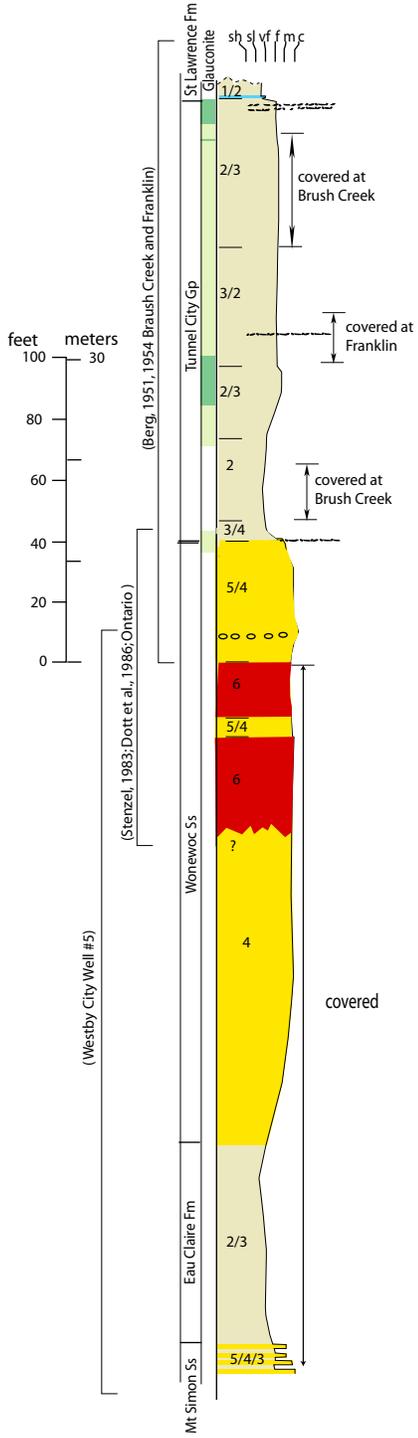


# 32b

(Gothum, Wisconsin)



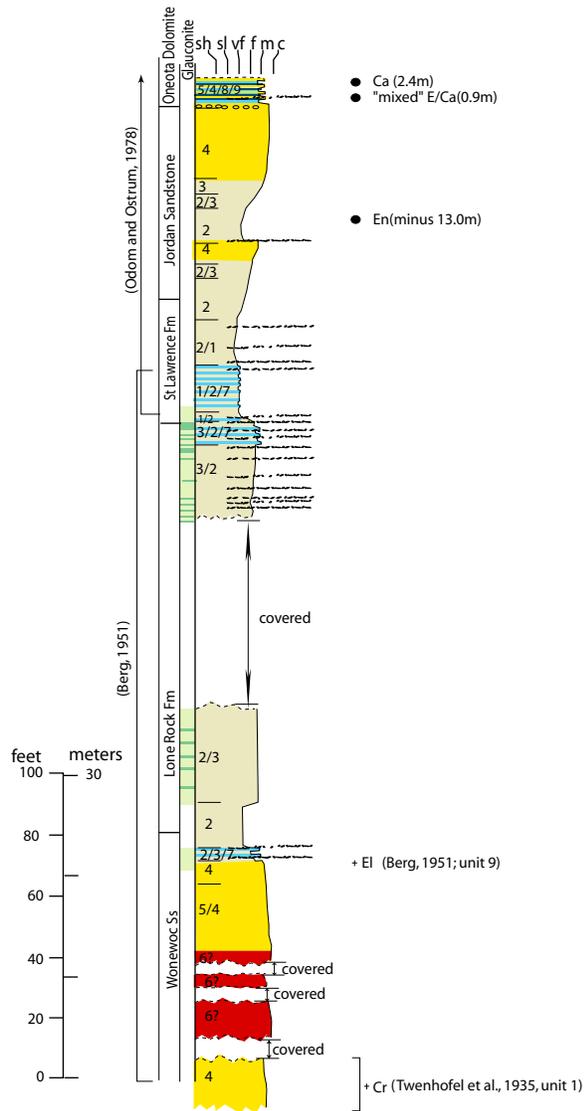
(Westby, Brush Creek, Franklin, Ontario, Wisconsin)



- + Co (Ta) (Berg, 1951; Franklin unit 10)
- + Co (Berg, 1951; Brush Creek unit 8)
- + Co (Mn) (Berg, 1951; Franklin unit 8)
- + Co (Mn) (Berg, 1951; Franklin unit 8)
- + Co (Ppa) (Berg, 1951; Franklin unit 8)
- + Co (Berg, 1951; Brush Creek unit 6)
- + Co (Berg, 1951; Brush Creek unit 4)
- + Co (Berg, 1951; Franklin unit 4)

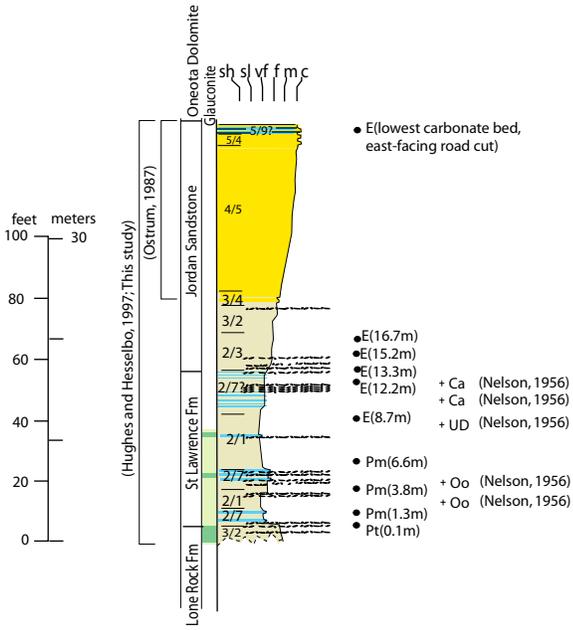
# 34

(Coon Valley, Wisconsin)

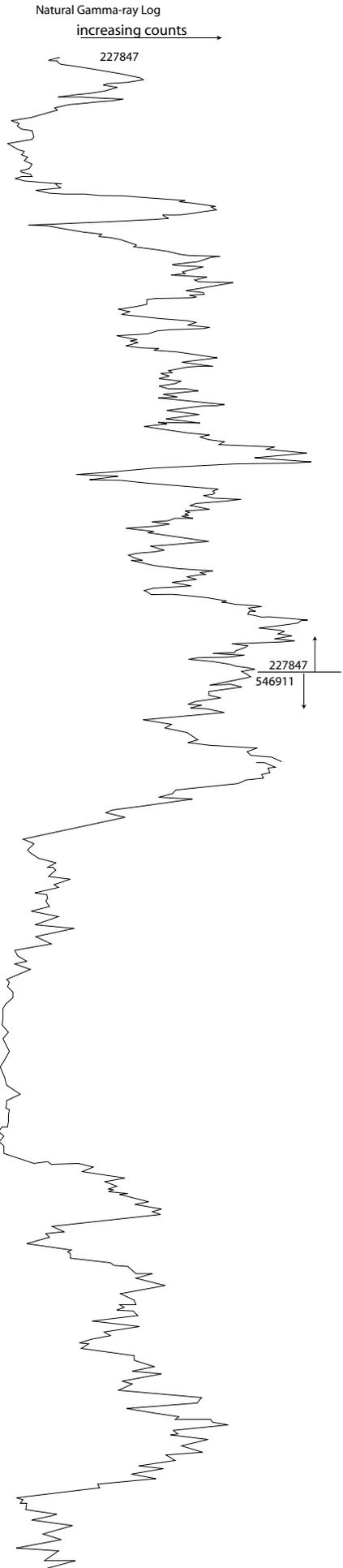
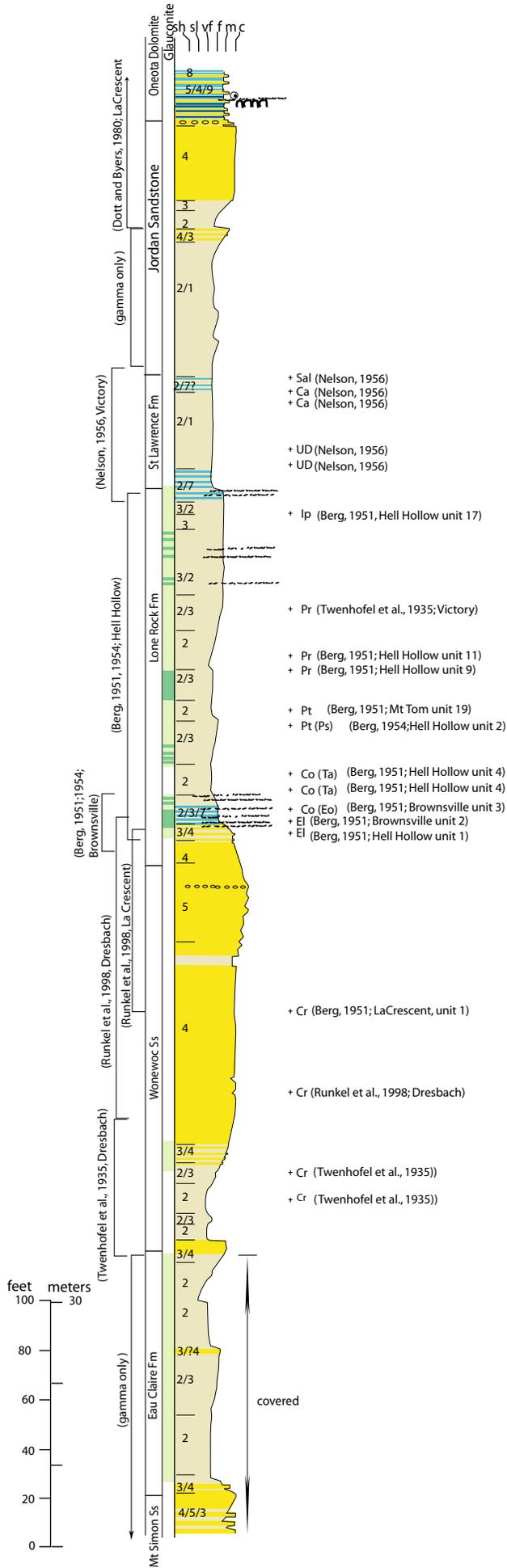


# 35

(Arcadia, Wisconsin)

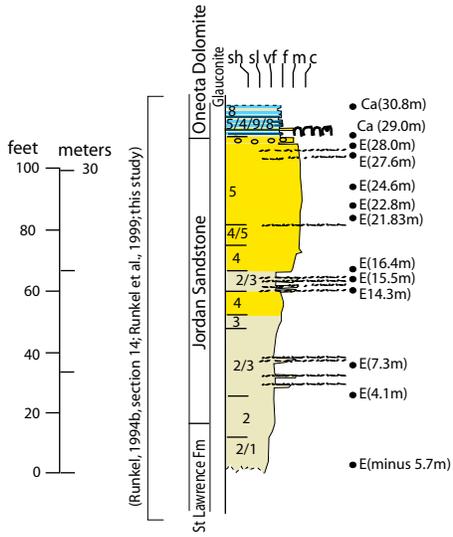


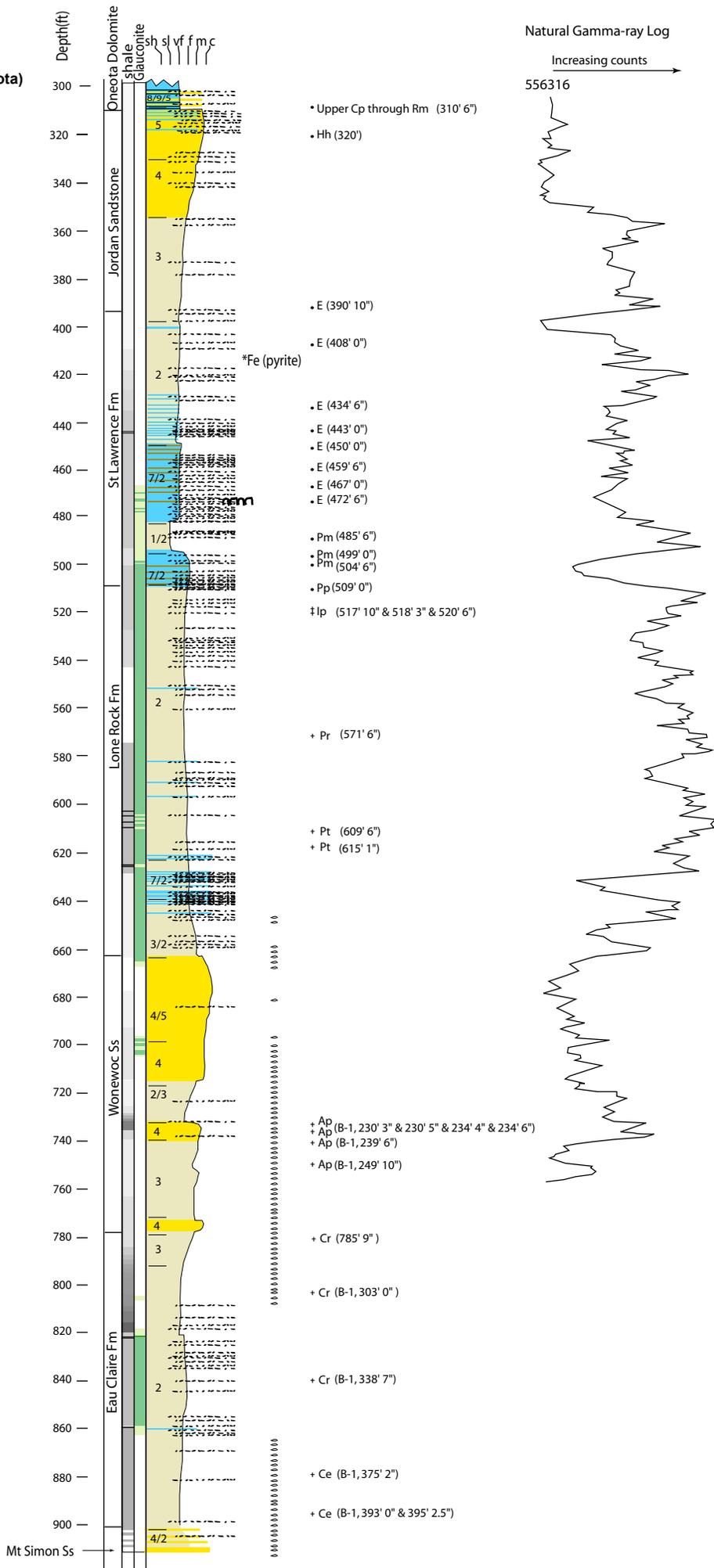
(LaCrescent, Minnesota, area)

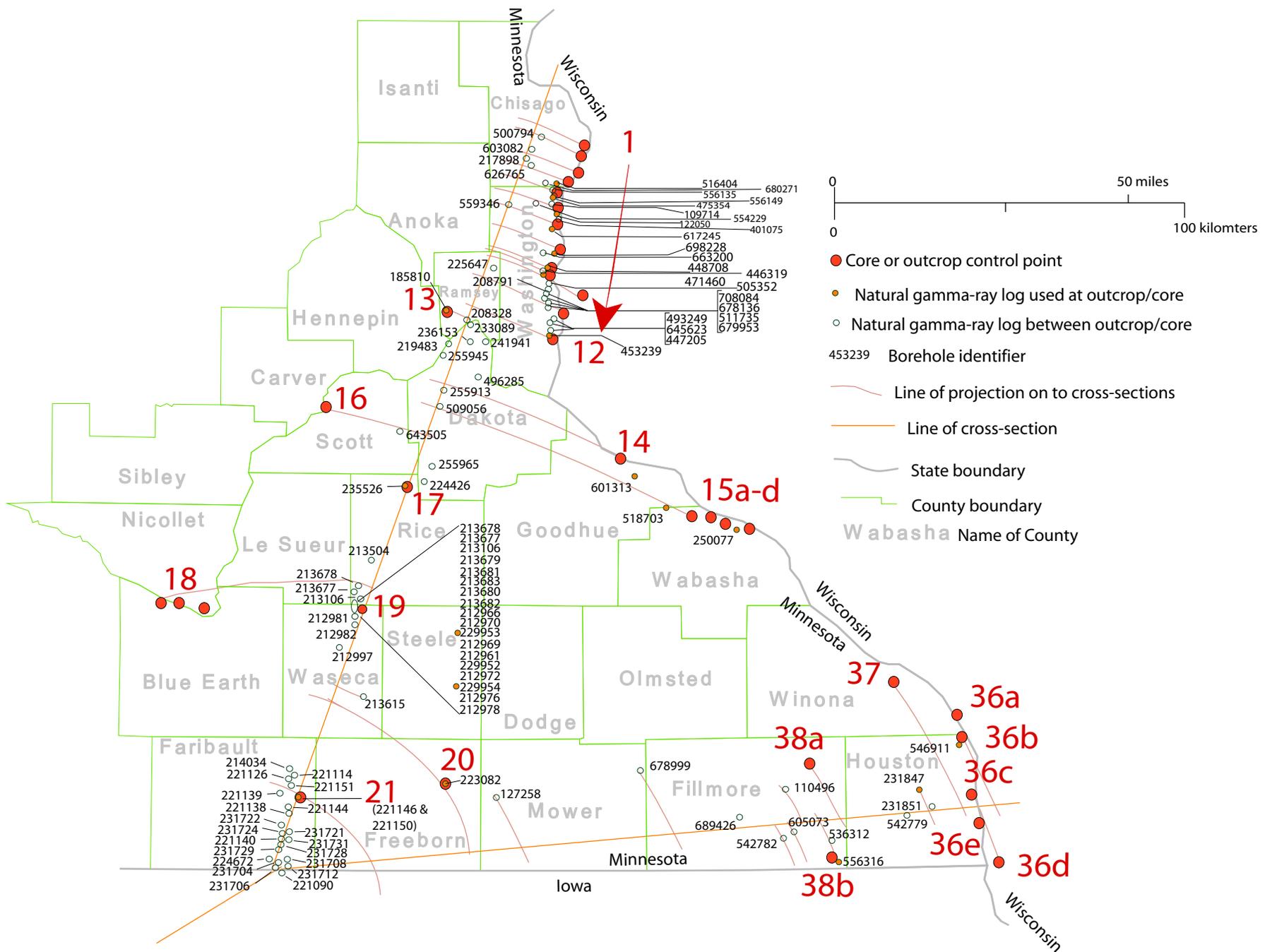


# 37

(Homer, Minnesota)







Runkel et al **Figure DR1** Location map providing location and identification number for boreholes with natural gamma-ray logs used in the construction of cross-sections in Figures 6 and 7. Precise locality information for gamma-ray logs is available in the County Well Index maintained by the Minnesota Geological Survey. See Figure 1 for regional location.

Locality information for control points that support cross sections in Figures 6 and 7. Includes name, location, and principal sources of stratigraphic information from previous workers. “Gamma-ray unique number” is an identifier used by the Minnesota Geological Survey for borehole natural gamma-ray log used to augment sections where core is incomplete or outcrops partly covered, shown as dashed lines below control points in Figures 6 and 7.

**1 Taylors Falls:** Outcrops near Taylors Falls, Chisago County, Minnesota. Lone Rock and Mazomanie Formations in road cut on north side of U.S. Highway 8, extending between 2.3 and 2.7 km east of intersection with Minnesota State Highway 95 (about 2.4 km southwest of downtown Taylors Falls). NE1/4, SE1/4, SE1/4 sec. 35, T34N, R19W. Eau Claire through lower Lone Rock Formations along Pine Point Trail, about 1.3 km southwest of downtown Taylors Falls, in Interstate Park, north of U.S. Highway 8. NE1/4, NW1/4, NW1/4 sec. 36, T34N, R19W. Nelson (1949), Berg (1951, 1954). Mill Street conglomerate exposed in an approximately 400 meter SW-NE trending, narrow belt of outcrops paralleling Mill Street, about 20-50 m north of street, Taylors Falls, adjacent to northern boundary of Interstate Park. SE1/4, SW1/4, SE1/4 sec. 25, T34N, R19W. Berkey (1897), Berg (1954).

**2 Franconia:** Bluffs along east and west side of Lawrence Creek, near village of Franconia, Chisago County, Minnesota. NE1/4, SE1/4 sec. 3, and NW1/4, SW1/4, SW1/4 sec. 2, T33N, R19W. Nelson (1949), Berg (1951, 1954).

**3 Osceola:** Cascade Falls section on Mill Creek and Eagle Point Bluff in southern part of Osceola, Polk County Wisconsin. Mazomanie Formation up to base of Jordan Sandstone is in ravine north of Wisconsin Highway 243; Jordan Sandstone through lower Oneota Dolomite is in road cuts and bluff on south side of Wisconsin Highway 243. NW1/4, SW1/4, SW1/4 sec. 27, T33N, R19W. Nelson (1949, 1956), Hughes and Hesselbo (1997).

**4 Osceola Southwest:** Outcrop along west bank of St. Croix River, Chisago County, Minnesota. About 3.2 km south of Osceola, Wisconsin. SW1/4, NE1/4, NE1/4 sec. 32, T33N, R19W. Runkel (1994b). Gamma-ray unique number 516404.

**5 Soo Drawbridge:** At falls in tributary to St. Croix River west of railroad drawbridge. Washington County, Minnesota. SW1/4, SE1/4, NW1/4 sec. 7, T32N, R19W. Nelson (1956). Gamma-ray unique number 475354.

**6 Copas:** Near town of Copas, Washington County, Minnesota. Lone Rock and Mazomanie Formations in ravine leading to St. Croix River, W1/2, SE1/4 sec. 19, T32N, R19W. Nelson (1949), Berg (1951, 1954). Jordan Sandstone in ravine in SE1/4, NW1/4, SW1/4 sec. 19, T32N, R19W (unpublished Minnesota Geological Survey (MGS) measured section, 1981). Gamma-ray unique number 122050.

**7 Marine:** Near and within town of Marine, Washington County, Minnesota. Lone Rock and Mazomanie Formations along west bank of St. Croix River, and along Ferry and Mill Creeks, W1/2 sec. 6, T31N, R19W. Berg (1951, 1954). Jordan Sandstone along County Road 7 southwest of town, NE1/4, SE1/4, SE1/4 sec. 12, T31N, R20W (Nelson, 1949). Gamma-ray unique number 617245.

**8 Arcola:** Near Arcola, Washington County, Minnesota. In ravine east of Minnesota Highway 95, S1/2, SE1/4, NE1/4 and NW1/4, NE1/4, SE1/4 sec. 30, T31N, R19W.

Nelson (1949, 1956), Berg (1951, 1954). Gamma-ray unique number 698228.

**9 Lookout Point:** Outcrop along east side of Minnesota Highway 95, 2.3 km north of junction with Minnesota Highway 96, Washington County, Minnesota. NW1/4, SW1/4, NW1/4 sec. 14, T30N, R20W. Runkel (1994b). Gamma-ray unique number 448708.

**10a Stillwater:** In city of Stillwater, Washington County, Minnesota. Jordan Sandstone and lower Oneota Dolomite at NW corner of intersection of Minnesota Highway 95 and Elm Street, Washington County. NW1/4, NE1/4, NE1/4 sec. 28, T30N, R20W. Runkel (1994b). Lone Rock, Mazomanie, and St. Lawrence Formations at “Boom Hollow,” along west bank of St. Croix River and on bluffs on west side of Minnesota Highway 95, SE1/4, NW1/4, SE1/4 sec. 15, T30N, R20W. Nelson (1949), Berg et al. (1956). Gamma-ray unique number 471460.

**10b Little Falls Dam:** Eau Claire and lower Wonewoc Formations below outlet for Little Falls Dam on north bank of Willow River, St. Croix County, Wisconsin, NE1/4, SW1/4, NE1/4 sec. 8, T29N, R 19W. Nelson (1949), Runkel et al. (1998).

**11 Hudson:** Outcrops and road cuts in south part of city of Hudson, St. Croix County, Wisconsin. Cuts exposing upper Wonewoc and lower Lone Rock Formations along east side of Wisconsin Highway 35, and natural exposures of Lone Rock and Mazomanie on bluffs above. SE1/4, SE1/4, NW1/4 and NE1/4, SW1/4 sec. 25, T29N, R 20W. Nelson (1949), Berg (1951, 1954).

**12 Afton, Minnesota:** Outcrops and small road cuts about 0.8 to 1.6 km south of city of Afton on east and west sides of Douglass Road, Washington County, Minnesota.

NW1/4, NE1/4, NE1/4 sec. 27, and SW1/4, SE1/4, SE1/4 sec. 22, T28N, R20W. Berg (1951, 1954), Hughes (1993), Hughes and Hesselbo (1997), Runkel, (1994b).

Gamma-ray unique number 453239.

**13 BC-1 and AC-1:** Cores, Ramsey County, Minnesota, SW1/4, NE1/4, SW1/4 sec. 21, T29N, R23W. Mossler (1992); Runkel et al. (1998). Gamma-ray unique number 185810.

**14 Red Wing:** West side of Barns Bluff, near south end of Mississippi River bridge in city of Red Wing, Goodhue County, Minnesota. SE1/4, NE1/4, NE1/4 sec. 30, and SW1/4, NW1/4, NW1/4 sec. 29, T113N, R14W. Oneota Dolomite trilobite collection from road cut on south side of Goodhue County Road 21, across from City of Red Wing High School, NW1/4, NW1/4, SE1/4, sec. 5, T112N, R14W. Nelson (1956), Byers and Dott (1995). Gamma-ray unique number 601313.

**15a Lake City:** Upper Lone Rock, St. Lawrence and lower Jordan Sandstone in quarry and natural outcrop on bluff about 1.6 km west of Lake City, Wabasha County, Minnesota. NE1/4 sec. 7, T111N, R12W. Nelson (1956), Stauffer and Theil (1941). Gamma-ray unique number 518703.

**15b Lake City:** Middle part of Lone Rock Formation in outcrops on bluff and road cuts on south side of US Highway 61 about 1.6 to 2.4 km east of Lake City, Wabasha County, Minnesota. N1/2, SW1/4 sec. 13, N1/2, NW1/4 sec. 14, T111N, R12W. Berg (1954), Berg et al. (1956), Grant (1962). Gamma-ray unique number 518703.

**15c Maple Springs:** Lower part of Lone Rock Formation in outcrops on bluff, ravine and road cuts on south side of US Highway 61 at Maple Springs, Wabasha County, Minnesota. SW1/4, SE1/4 sec. 17, and S1/2, SW1/4 sec. 16, T111N, R11W. Berg (1954), Grant (1962), (Mossler, 2001). Gamma-ray unique number 518703.

**15d Reads Landing:** Lower part of Lone Rock Formation in ravine and road cuts on south side of US Highway 61 at Reads Landing, Wabasha County, Minnesota. SE1/4, SE1/4, NW1/4 sec. 24, T111N, R 11 W Berg (1951, 1954), Berg et al. (1956). Gamma-ray unique number 518703.

**16 Van Oser Creek:** Quarry and scattered outcrops along “Van Oser” (now “Sand”) Creek. SE1/4, SW1/4, SW1/4 sec. 33, T115N, R23W, and N1/2, NW1/4 sec. 4, T114N, R23W. Stauffer (1940), Stauffer and Theil (1941).

**17 Lon (Lonsdale) 65-2 and 65-1:** Cores, Rice County, Minnesota. Lon 65-1, NW1/4, SW1/4, SW1/4 sec. 14, T112N, R21W. Lon 65-2, NW1/4, NW1/4, NW1/4 sec. 14, T112N, R21W. Mossler (1992), Runkel et al. (1998). Gamma-ray unique number 235526.

**18 Judson-Mankato:** Outcrops between the cities of Judson and North Mankato, Nicollet County, Minnesota. Upper Lone Rock and lower St. Lawrence Formations beneath and along west side of bridge on north bank of Minnesota River SW1/4, NE1/4, SE1/4 sec. 33, T109N, R28W. St. Lawrence Formation and lower Jordan Sandstone in shallow ravines that cross County Road 41 2.3 km east of Judson (SE1/4, SW1/4, SW1/4 sec. 35, T109N, R28W, and NE1/4, NW1/4, NW1/4 sec. 2, T108N, R28W) and 4.2 km east of Judson (NE1/4, NW1/4 sec. 1, T108N, R28W).

Upper Jordan and lower Oneota Formations in North Mankato on bluffs along north side of County Road 41, NE1/4, NW1/4, NE1/4 sec. 14, T 108N, R27W.

**19 Prehn-3 and Will-4:** Cores, Waseca County, Minnesota, Prehn-3, SE1/4, NE1/4, SW1/4 sec. 6, T108N, R22W. Will-4 (L. Williams-4), NW1/4, SW1/4, NE1/4 sec. 7, T108N, R22W. Additional trilobite and collections from nearby core Mel-1, Rice County, Minnesota, SW1/4, SE1/4, SW1/4, sec. 28, T109N, R22W. Mossler (1992), Runkel et al. (1998). Gamma-ray unique numbers 229954 and 229953.

**20 H-1-A (“Hollandale”):** Core, Freeborn County, Minnesota, SE1/4, SE1/4, SW1/4 sec. 7, T103N, R19W. Mossler (1992), Runkel et al. (1998). Gamma-ray unique number 223082.

**21 Sch-1 (Schroeder), Sch-5 (Schroeder):** Cores, Faribault County, Minnesota. Sch-1, SW1/4, SE1/4, SW1/4 sec. 28, T103N, R24W. Sch-5, SW1/4, SE1/4, SW1/4 sec. 28, T103N, R24W. Additional trilobite and conodont collections from nearby cores: W1-4, NE1/4, NW1/4, SW1/4 sec. 36, T103N, R25W; Gerber-1, SW1/4, SW1/4, NE1/4 sec. 8, T102N, R24W; Flo-1, SE1/4, SW1/4, SW1/4 sec. 11, T101N, R25W; and Kingstrom-1, NE1/4, NW1/4, NW1/4 sec. 6, T101N, R24W. Mossler (1992), Runkel et al. (1998). Gamma-ray unique numbers 221146 and 221150.

**22 Peterson-1:** Core, Webster County, Iowa. NE1/4, NE1/4, NW1/4 sec. 10, T90N, R27W. Runkel et al. (1998). Gamma-ray unique number 11749.

**23 Quimby:** Core, Cherokee County, Iowa. NW1/4, NW1/4, NE1/4 sec. 34, T90N, R41W. Runkel et al. (1998).

**24 Camp Quest:** Core, Plymouth County, Iowa. SW1/4, NW1/4, SW1/4 sec. 2, T92N, R45W. Runkel et al. (1998). Gamma-ray unique number 25498.

- 25 Elk Point:** Core, Union County, South Dakota. NW1/4, NW1/4, NE1/4 sec. 13, T90N, R50W. McCormick (2005). Gamma-ray unique number R20-2002-01.
- 26a Horseshoe Bluff:** Upper Wonewoc Sandstone and lower Lone Rock Formation in shale pit and bluff exposures along County Road G, Adams County, Wisconsin. SW1/4, NE1/4 sec. 11, T17N, R7E. Berg (1951, 1954).
- 26b Cooley Hill:** Lone Rock and Mazomanie Formations in quarry and road cuts on County Road B, Adams County, Wisconsin. NW1/4, SW1/4, NW1/4 sec. 31, T16N, R7E. Berg (1951, 1954).
- 27a Friendship Mound:** Wonewoc Sandstone, Lone Rock and Mazomanie Formations on the south end of bluff "Friendship Mound", Adams County, Wisconsin. NE1/4 sec. 6, and NW1/4 sec. 5 T17N, R6E. Berg (1951, 1954).
- 27b Lodi:** St. Lawrence Formation and lower Jordan Sandstone in ravine on south face of Gibraltar Bluff, Columbia County, Wisconsin. SW1/4, SE1/4 sec. 18, T10N, R8E. Raasch (1939), Nelson (1956).
- 27c Madison:** Outcrops and core within and near city of Madison, Dane County, Wisconsin. Upper Mazomanie and St. Lawrence Formations exposed at Farwell Point, on north shore of Lake Mendota NE1/4 sec. 34, T8N, R9E. Twenhofel et al. (1935), Nelson (1956). Upper Jordan Sandstone and Oneota Dolomite exposures along Bluff Street and in abandoned quarry to south of street in Hoyt Park, SE1/4, SE1/4, NE1/4 sec. 20, T7N, R9E. Byers and Dott (1995), Odom (1978). Eau Claire Formation through lower Lone Rock from core, Nine Springs area near Madison, SW1/4 sec. 30, T7N, R10E (Aswasereelert, 2005).

- 27d Wisconsin Dells:** Wonewoc Sandstone and lower Lone Rock Formation along Wisconsin River and tributaries at Wisconsin Dells, southeast Juneau and northeast Sauk counties, Wisconsin. From composite measured sections in Dott et al. (1986).
- 28a Black Earth:** Upper Mazomanie Formation through Oneota Dolomite along road cut and in bluff on north side of US Highway 14, about 1.6 km southeast of Black Earth, Dane County, Wisconsin. NW1/4, SE1/4, SW1/4 sec. 25, T8N, R6E. Berg (1951, 1954), Nelson (1956), Hughes and Hesselbo (1997).
- 28b Mazomanie:** Upper Mazomanie Formation through Oneota Dolomite along road cut and in bluff on south side of US Highway 14, in east end of Mazomanie, Dane County, Wisconsin. NE1/4, SE1/4, NW1/4 sec. 16, T8N, R6E. Berg (1954), Nelson (1956), Odom (1978), Runkel (1994a), Hughes and Hesselbo (1997), Parsons and Clark (1999).
- 28c Ferry Bluff:** Bluff and river bank exposures of Wonewoc Sandstone through upper Mazomanie and Lone Rock Formations along north side of Wisconsin River, Sauk County, Wisconsin. NW1/4, NW1/4 sec. 29, and E1/2, SW1/4 sec. 20, T9N, R6E. Berg (1951, 1954).
- 29a Goodenough Hill:** Wonewoc Sandstone through lower St. Lawrence Formation along road cuts on old Wisconsin Highway 71 at Goodenough Hill, Juneau County, Wisconsin. E1/2 sec. 13, T15N, R2E. Berg (1951, 1954), Nelson (1956).
- 29b Woodhill:** Wonewoc Sandstone through middle Mazomanie/Lone Rock Formations along road cuts on Wisconsin Highway 80 at Woodhill, Juneau County, Wisconsin. E1/2 sec. 3, T15N, R2E. Berg (1951, 1954).

**29c Hustler:** Wonewoc Sandstone through lower Mazomanie/Lone Rock Formations along road cuts and in shale pit along County Road H, Juneau County, Wisconsin. E1/2, NE1/4 sec. 31, T16N, R2E. Berg (1951, 1954).

**30 Spring Green:** Mazomanie/Lone Rock and St. Lawrence Formations in quarry and in road cuts along Wisconsin Highway 23 about 2.6 km north of Spring Green, Sauk County, Wisconsin. NE1/4 sec. 36, T9N, R3E. Berg (1954), Nelson (1956). Jordan Sandstone and lower Oneota Dolomite on east side of Wisconsin Highway 23 about 4 km north of Spring Green NW1/4, SW1/4, SW1/4 sec. 30, T9N, R4E. Odom (1978), Runkel (1994a).

**31 Tunnel City:** Quarry, road and railroad cuts in and around Tunnel City, Monroe County, Wisconsin. Wonewoc Sandstone in cuts along railroad tracks east and west of town secs. 25 and 26, T18N, R2W. Twenhofel et al. (1935). Upper Wonewoc Sandstone and Lone Rock Formation in road cuts along Wisconsin Highway 21 west of town, SW1/4, NW1/4 sec. 25, and NE1/4 sec. 26, T18N, R2W. Berg (1951, 1954). Upper Lone Rock Formation through lower Oneota Dolomite in quarry and bluff exposures about 2.4 km north of town, near Elder Road, NE1/4 sec. 23, T18N, R2W. Twenhofel et al. (1935).

**32a Maynard Pass:** Mazomanie/Lone Rock through lower St. Lawrence Formations in road cuts along Interstate 90 about 9.7 km west of Tomah, Monroe County, Wisconsin. NW1/4 sec. 22, T17N, R2W. Berg (1951, 1954).

**32b Gotham:** Composite upper Lone Rock and St. Lawrence Formation sections from outcrops 3.2 to 6.4 km east of Gotham, Richland County, Wisconsin. Sections 25-28, and 34, T9N, R2E. Raasch (1939), Nelson (1956).

**32c Richland Center:** Upper Lone Rock through lower Oneota Dolomite in quarry and bluff exposures in south end of Richland Center, Richland County, Wisconsin.

NW1/4, SE1/4 sec. 21, T10N, R1E. Twenhofel et al. (1935), Nelson (1956).

**33a Ontario:** Wonewoc Sandstone and lower Lone Rock Formation in bluff exposures and road cuts near Ontario, Wisconsin. Road cut on Highway 131 north of town, NW1/4, NW1/4 sec. 35, T15N, R2W, Monroe County. Road cut and bluff exposures above Kickapoo River east of town on Vernon County Road P, NE1/4, NW1/4 sec. 2, T14N, R2W. Stenzel (1983), Dott et al. (1986).

**33b Franklin:** Wonewoc Sandstone through lower St. Lawrence Formation in road cuts and shale pit along County Road C, Jackson County, Wisconsin. NE1/4 sec. 2, T20N, R6W. Berg (1951, 1954).

**33c Brush Creek:** Wonewoc Sandstone through lower St. Lawrence Formation in road cuts along Wisconsin Highway 23 between Ontario and Cashton, Monroe County, Wisconsin. NW1/4, SE1/4 sec. 31, NW1/4, SE1/4 and NE1/4, SW1/4 sec. 36, SE1/4, NW1/4 sec. 35, NW1/4 SE1/4 sec. 34, T15N, R2W and 3W. Berg (1951, 1954).

**33d Westby:** Upper Mt Simon through Wonewoc Sandstones from water well drilling record for Westby City Well #5, Vernon County, Wisconsin. S1/2 sec. 28 or N1/2 sec. 33 T14N, R4W. (Roger Peters, Wisconsin Geological and Natural History Survey oral communication).

**34 Coon Valley:** Road cuts and natural exposures in and around Coon Valley, Vernon County, Wisconsin. Wonewoc Sandstone through lower St. Lawrence Formation in cliff on northwest side of town on east side of State highway 162, NW1/4, NE1/4 sec. 7, T14N, R5W and in road cuts along US Highway 14/61, 2.4 km west of town,

NW1/4, NW1/4 sec. 12 and NE1/4, NE1/4 sec. 11, T14N, R6W. Berg (1951). St. Lawrence Formation through lower Oneota Dolomite in road cut and quarry farther west on US Highway 14/61, NW1/4, NE1/4 sec. 11, T14N, R6W. Odom and Ostrom (1978).

**35 Arcadia:** Upper Lone Rock Formation through lower Jordan Sandstone in west-facing road cut along Wisconsin Highway 93, 1.9 km south of its intersection with Wisconsin Highway 95 in Arcadia, Trempealeau County, Wisconsin. SE1/4, NE1/4, SE1/4 sec. 5, and upper Jordan Sandstone through lower Oneota Dolomite in east-facing road cut about 8 km to south, W1/2 NW1/4 sec. 9, T20N, R9W. Hughes and Hesselbo (1997), Ostrom (1987).

**36a Dresbach:** outcrops along Mississippi River between cities of Dresbach and Winona, Winona County, Minnesota. Wonevoc Sandstone and lower Lone Rock Formation SE1/4, SE1/4, SE1/4 sec. 1, T106N, R 6W and SE1/4. NW1/4, SW1/4 sec. 20, T105N, R 4W. Runkel et al. (1998), Twenhofel et al. (1935).

**36b LaCrescent:** Outcrops and road cuts in and near city of LaCrescent, Houston County, Minnesota. Wonevoc Sandstone and lower Lone Rock Formation along west side of U.S. Highway 61, N1/2, SE1/4sec. 3, T104N, R 4W. Runkel et al. (1998), Berg (1951). Jordan Sandstone and lower Oneota Dolomite on northwest side of County Road 29, NE1/4, NE1/4, NE1/4 sec. 4, T104N, R4W and S1/2, SE1/4, SW1/4 sec. 33, T105N, R4W. Dott and Byers (1980). Gamma-ray unique numbers 227847 and 546911.

**36c Brownsville:** Upper Wonevoc Sandstone and Lower Lone Rock Formation in road cuts along Minnesota Highway 26, Houston County, Minnesota, 2.7 to 4.3 km south

of Brownsville and at north edge of town. NW1/4, NW1/4, SW1/4 sec. 26 and E1/2 sec. 35, T103N, R4W, and E1/2 sec. 2, T102N, R4W. Berg (1951, 1954).

**36d Victory:** Upper Lone Rock and St. Lawrence Formations in ravine in bluff along the east bank of the Mississippi River, Vernon County, Wisconsin. SW1/4, NE1/4 sec. 21, T12N, R7W. Twenhofel et al. (1935), Nelson (1956).

**36e Hell Hollow:** Upper Wonevoc Sandstone through lower St. Lawrence Formation along tributary to Mississippi River about 2.1 km north of Reno, Houston County, Minnesota. SE1/4 sec. 23, T102N, R4W. Berg (1951, 1954).

**37 Homer:** Outcrop along east side of County Road 15 about 3.2 km south of the town of Homer, Winona County, Minnesota, NE1/4, NW1/4, NE1/4 sec. 2, T106N, R6W. Runkel (1994b); Runkel et al. (1999).

**38a B-1:** Core, Fillmore County, Minnesota. SE1/4, NW1/4, SW1/4 sec. 25, T104N, R9W. Mossler (1992), Runkel et al. (1998).

**38b BO-1:** Core, Fillmore County, Minnesota, NW1/4, SW1/4, SE1/4 sec. 22, T101N, R8W. Mossler (1992), Runkel et al. (1998). Gamma-ray unique number 556316.

**Runkel et al Table DR1** Compilation of fossil collections and identifications made during the course of this study.

Locality names, numbers, and collection levels are tied to the same information shown on the stratigraphic columns in this data repository.

Locality name	Strat. position	Key taxa identified	Zone	Comments on stratigraphic position
<b>3 OSCEOLA</b>				
				stratigraphic position for samples below is distance in meters above (positive values) or below (negative values) contact between Jordan Sandstone and overlying Coon Valley Member, marked by breccia with silica-cemented sandstone clasts
Osceola	3.5	Moderate fauna including <i>Cordylodus angulatus</i> , <i>Acanthodus</i> , <i>Polycostatus oneotensis</i>	Rm	
Osceola	2.8	Large fauna including <i>Loxodus bransoni</i>	Rm	
Osceola	1.8	<i>Aloxoconus</i> , <i>Cordylodus linstromi</i> , <i>Polycostatus oneotensis</i> , <i>Acanthodus</i> , <i>Cordylodus</i> n. sp.	Ca	
Osceola	0.8	<i>Acanthodus uncinatus</i> , <i>Polycostatus</i> n. sp., <i>?Utahconus</i> n. sp., robust <i>Teridontus</i> sp.	likely Ca	
Osceola	minus 12.5	<i>Proconodontus muelleri</i>	Pm	
				stratigraphic position for sample below is distance in meters above contact between Mazomonie Formation and overlying St Lawrence formation, marked by intraclastic conglomerate at top of water fall
Osceola	0.5	<i>Proconodontus muelleri</i> , <i>Teridontus</i> sp.	Pm	
<b>10a STILLWATER (Boom Hollow)</b>				
				stratigraphic position is distance in meters above base of Boom Hollow outcrop, as reported by Nelson (1949)
Stillwater	10.1	<i>Prosaukia?</i> sp., <i>Briscoia?</i> , <i>Dikelocephalus</i>	Ip?	
<b>10b LITTLE FALLS DAM (LFD)</b>				
				stratigraphic position for samples below is distance in meters above, or below (negative value) prominent 3cm thick, iron- and brachiopod-rich coarse sandstone lag separating medium grained swaley cross-stratified sandstone from overlying fine to very fine grained hummocky cross-stratified sandstone and shale. Sandstone lag is about 7 m above base of outcrop (level of river)
LFD	6.3		Ap	
LFD	5.4	<i>Aphelaspis</i> sp.	Ap	
LFD	2.5	<i>Aphelaspis</i> sp.	Ap	
LFD	1.5	<i>Aphelaspis</i> sp.	Ap	

LFD	0.2 through 0.3	<i>Aphelaspis</i> sp.	Ap	
LFD	0.15 through 0.2	<i>Glaphyraspis</i> sp.	Ap ("crisis")	
LFD	0 through 0.15	<i>Lonchocephalus</i> , <i>Crepicephalus</i> ?, <i>Densonella</i> , <i>Crepicephalus</i> , another <i>Crepicephalid</i> (genus indet.)	Cr	
LFD	minus 0.81	<i>Lonchocephalus</i> , <i>Densonella</i> ?	Cr	
<b>12 AFTON</b>				
				stratigraphic position for samples below is distance in meters above, or below (negative value) contact between Lone Rock Formation and overlying St Lawrence Formation, marked by an intraclastic conglomerate
Afton	10.2	<i>Proconodontus muelleri</i> , <i>P. serratus</i> , <i>Eoconodontus notchpeakensis</i>	E	
Afton	8.7	<i>Eoconodontus notchpeakensis</i>	E	
Afton	4.5	<i>Proconodontus muelleri</i> , <i>Cambroistodus cambricus</i> , <i>Eoconodontus notchpeakensis</i>	En	
Afton	3	<i>Proconodontus muelleri</i> , very primitive <i>Eoconodontus notchpeakensis</i>	En	
Afton	1.5	<i>Prooneotodus gallatini</i> , <i>P. rotundatus</i> , <i>Proconodontus muelleri</i>	Pm	
Afton	0.6	<i>Proconodontus muelleri</i> , <i>Prooneotodus rotundus</i> , <i>Prooneotodus gallatini</i>	Pm	
Afton	minus 2.5	<i>Croixana</i> ??, <i>Iliaenurus</i> ?, <i>Tellerina leucosia</i> , <i>Saukiella pyrene</i> , <i>Rasettia</i> sp., <i>Dikelocephalus</i> sp., three other species of uncertain identification	Ip/Oo	
<b>13 BC-1 (and AC-1)</b>				
				Position of sample is depth below land surface in feet
AC-1	445' 8"	16 species (R. Ethington, written com.)	typical of Rm	
BC-1	541' 3"	<i>Eoconodontus notchpeakensis</i>	E	
BC-1	544' 4"	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
BC-1	548' 10"	<i>Eoconodontus notchpeakensis</i>	E	
BC-1	551' 2'	<i>Eoconodontus notchpeakensis</i>	E	
BC-1	554' 8"	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
BC-1	564' 10"	<i>Teridotus</i> sp.	possibly Pm	
AC-1	660' 6"	<i>Ptychaspis</i> cf. <i>P. meniscaensis</i> or <i>P. striata</i> , <i>Dartonaspid</i>	Pr	
AC-1	661' 2"	<i>Dartonaspid</i>	Pr	
BC-1	650' 11"	<i>Idahoia</i> , <i>Monocheilus</i> , <i>Ptychaspis</i>	Pt	

AC-1	686' 8"	<i>Idahoia, Monocheilus, Ptychaspsis, Wilbernia pero</i> (Walcott)	Pt	
AC-1	691' 0"	<i>Idahoia, Monocheilus, Ptychaspsis, Wilbernia pero</i> (Walcott)	Pt	
BC-1	659' 11"	<i>Ptychaspsis, Idahoia, Monocheilus</i>	Pt	
BC-1	667' 0"	<i>Litagnostus parilis</i> (Hall)	Pt	
BC-1	684' 6"	cf. <i>Taenicephalus</i>	Co	
BC-1	684' 9"	cf. <i>Taenicephalus</i>	Co	
AC-1	788' 3.5"	<i>Apsotreta</i>	Du	
AC-1	804' 10"	<i>Dytremacephalus</i>	Du	
BC-1	785' 3.5"	<i>Aphelaspsis, Apsotreta?</i>	Ap/Du	
BC-1	794' 0"	early <i>Apsotreta</i>	Ap	
BC-1	796' 4"	<i>Aphelaspsis</i>	Ap	
AC-1	828' 7"	<i>Aphelaspsis</i>	Ap	
BC-1	798' 6"	<i>Aphelaspsis</i>	Ap	
AC-1	829' 8.5"	<i>Aphelaspsis</i>	Ap	
BC-1	799' 0"	<i>Crepicephalus, Coosia, Dicellomus</i>	Cr	
AC-1	830' 2.5"	crepicephalid	Cr	
BC-1	822' 1.5"	<i>Komaspidella?, Dicellomus</i>	Cr	
BC-1	832' 11.5"	<i>Dresbachia, Coosia?, Crepicephalus?, Komaspidella</i>	Cr	
BC-1	833' 9"	<i>Dresbachia, Coosella?</i>	Cr	
BC-1	836' 3.7"	" <i>Cedaria</i> "	Ce	
BC-1	836' 7"	" <i>Cedaria</i> "	Ce	
AC-1	869' 6.5"	" <i>Cedaria</i> "	Ce	
BC-1	839' 6'	" <i>Cedaria</i> "	Ce	
BC-1	844' 3"	" <i>Cedaria</i> "	Ce	
<b>14 RED WING (High School locale)</b>				
				stratigraphic position for sample below is distance in meters above base of outcrop for bed of siliceous nodules that yield sampled trilobites
Red Wing	3	<i>Praepatokephalus</i> sp., <i>Symphysurina woosteri</i> , <i>Hystricurus</i> sp.	Sw	
<b>16 VAN OSER CREEK</b>				
				Stratigraphic position for sample refers to upper 10.0 m of Jordan Sandstone. Based on descriptions of locale in Stauffer (1940) and subsequent MGS mapping in area
Van Oser Cr.	Upper 10.0 m	Includes <i>Euptychaspsis kirki</i>	Sal (upper)	
<b>17 LON 65-1, LON 65-2</b>				

				Position of sample is depth below land surface in feet
LON 65-1	423' 0"	<i>Eoconodontus notchpeakensis</i>	E	
LON 65-1	441' 0"	<i>Proconodontus muelleri</i> , <i>Prooneotodus rotundatus</i>	Pm	
LON 65-2	752' 9"	<i>Aphelaspis</i> sp.	Ap/Du	
LON 65-2	757' 9"	<i>Apsotreta</i> ?	Ap/Du	
LON 65-2	760' 2"	<i>Angulotreta</i> ?	Ap	
LON 65-2	764' 5"	<i>Aphelaspis</i> sp.	Ap	
LON 65-2	768' 4"	<i>Aphelaspis</i> sp.	Ap	
LON 65-2	772' 5"	<i>Cheilocephalus</i> ?	Cr	
LON 65-2	774' 8"	<i>Crepicephalus</i> ? sp.	Cr	
LON 65-2	775' 10"	<i>Crepicephalus</i> ? sp.	Cr	
LON 65-2	799' 8"	" <i>Cedaria</i> ", norwoodiid	Ce	
LON 65-2	801' 3"	" <i>Cedaria</i> "	Ce	
LON 65-2	810' 8"	" <i>Cedaria</i> "	Ce	
<b>18 JUDSON</b>				
<b>North Mankato</b>				
	1 through 2.0	Many species typical of Rm zone	Rm	Stratigraphic position for samples is distance in meters above the base of the "Blue Earth Siltstone" of the lowermost Oneota Dolomite
<b>4.2 km east of Judson</b>				
				stratigraphic position for two samples below is distance in meters above the highest of three small waterfalls in creek. Each falls is capped by hard, pink, intraclastic dolostone
JUDSON (4.2)	1	<i>Fryxellodontus inornatus</i> , <i>Fryxellodontus</i> n. sp.	Fi	
JUDSON (4.2)	0.8	<i>Apoplanias</i> cf. <i>A. rejectus</i>	Mt	
JUDSON (4.2)	0	<i>Cordylodus proavus</i> , <i>Hirsutodontus hirsutus</i> , new genus referred to in Utah as cf. <i>Semiacontiodus</i> , <i>Teridontus nakamurai</i>	Hh	sample is from intraclastic dolostone capping second-highest of three small waterfalls in creek. Each falls is capped by hard, pink, intraclastic dolostone
JUDSON (4.2)	0	<i>Eoconodontus notchpeakensis</i> , <i>Cambrooistodus minutus</i> , <i>Cambrooistodus cambricus</i>	Cm	sample is from intraclastic dolostone capping lowest of three small waterfalls in creek. Each falls is capped by hard, pink, intraclastic dolostone
JUDSON (4.2)		Eurekiid, likely <i>Eureka</i> or <i>Bayfieldia</i>	Ea?	Samples found as float, precise strat position uncertain
<b>2.3 km east of Judson</b>				
JUDSON (2.3)	0.6	<i>Macronoda</i> , <i>Briscoia</i>	Sal (upper)	stratigraphic position for sample is distance in meters above base of outcrop
<b>Judson Bridge</b>				
JUDSON (Br)	minus 2.5	<i>Proconodontus muelleri</i> , <i>Teridontus</i> sp.	Pm	stratigraphic position for sample is distance in meters below prominent, cliff-forming intraclastic conglomerate

19 Prehn-3 (and Will-4, Mel-1)				
				Position of sample is depth below land surface in feet
Prehn-3	368' 11"	"Fauna typical of Rm zone" (Ethington, written communication)	Rm	
Prehn-3	467' 7"	<i>Eoconodontus notchpeakensis</i> , <i>Cordylodus proavus</i> , <i>Teridontus nakamurai</i> , <i>Semiacontiodus nogamii</i>	Ce	
Prehn-3	468' 0"	<i>Eoconodontus notchpeakensis</i> , <i>Cordylodus proavus</i> , <i>Teridontus nakamurai</i> , <i>Semiacontiodus nogamii</i>	Ce	
Prehn-3	468' 4"- 468' 9"	<i>Cordylodus</i> sp., <i>Teridontus nakamurai</i> , <i>Semiacontiodus nogamii</i> , <i>Clavohamulus bulbosus</i>	Ce	
Prehn-3	474' 3"	<i>Eoconodontus notchpeakensis</i> , <i>Cordylodus proavus</i> , <i>Teridontus nakamurai</i>	Cp	
Prehn-3	474' 1"- 474' 8"	<i>Apoplanias rejectus</i>	Mt	
Prehn-3	478' 0"	<i>Fryxellodontus inornatus</i>	lower Fi	
Prehn-3	478' 1"-478' 10"	<i>Apoplanias rejectus</i>	Mt	
Prehn-3	480' 8"	<i>Fryxellodontus inornatus</i>	Likely Fi	
Prehn-3	483' 0"	<i>Cordylodus proavus</i> , <i>Hirsutodontus hirsutus</i>	Hh	
Prehn-3	488' 0"	<i>Cordylodus proavus</i> , <i>Teridontus nakamurai</i>	Hh	
Prehn-3	493' 3"	<i>Cordylodus andresi</i> , <i>Cordylodus proavus</i> , <i>Teridontus nakamurai</i>	Hh	
Prehn-3	500' 0"	<i>Cambrooistodus minutus</i> , <i>Proconodontus muelleri</i> , <i>Eoconodontus notchpeakensis</i>	Cm	
Prehn-3	503' 3"	<i>Cambrooistodus minutus</i> , <i>Eoconodontus notchpeakensis</i>	Cm	
Prehn-3	506' 5"	<i>Cambrooistodus minutus</i> , <i>Eoconodontus notchpeakensis</i>	Cm	
Prehn-3	515' 7"	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	En	
Prehn-3	520' 10"	<i>Eoconodontus notchpeakensis</i>	En	
Prehn-3	525' 2'	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i> , <i>cambrooistodus cambricus</i>	En	
Prehn-3	529' 3"	<i>Eoconodontus notchpeakensis</i> , <i>Cambrooistodus cambricus</i>	En	
Prehn-3	533' 5"	<i>Eoconodontus notchpeakensis</i>	En	
Prehn-3	537' 4"	<i>Eoconodontus notchpeakensis</i>	En	
Prehn-3	545' 4"	very primitive <i>Eoconodontus notchpeakensis</i> , <i>Palaeobotryellus taylori</i>	En	
Prehn-3	549' 5"	<i>Proconodontus posterocostatus</i> , <i>Teridontus</i>	Pp	
Prehn-3	575' 0"	<i>Proconodontus posterocostatus</i> , <i>Teridontus</i>	Pp	
Prehn-3	587' 5"	<i>Proconodontus tenuiserratus</i>	Pt	

Will-4	759' 2"	<i>Linnarssonella</i>	EI	
Mel-1	830' 10"	<i>Aphelaspis</i>	Ap/Du	
Mel-1	846' 3'	<i>Aphelaspis</i>	Ap/Du	
Will-4	838' 0"	<i>Aphelaspis</i>	Ap	
Will-4	839' 10.5"	<i>Apsotreta?</i>	Ap	
Mel-1	861' 6"	<i>Aphelaspis</i>	Ap	
Mel-1	866' 0"	<i>Coosia</i> sp.	Cr	
Will-4	845' 4"	<i>Dicellomus</i> and trilobite with wide doublures	Cr	
Will-4	853' 8"	crepicephalid	Cr	
Will-4	865' 1"	<i>Crepicephalus</i>	Cr	
Mel-1	936' 6"	<i>Norwoodella</i>	Ce	
Mel-1	936' 10"	menomoniid?	Ce	
<b>20 H-1-A</b>				
				Position of sample is depth below land surface in feet
H-1-A	1005' 0"	<i>Eoconodontus notchpeakensis</i> , <i>Cambroistodus cambricus</i> , <i>C. minutus</i>	Cm	
H-1-A	1014' 0"	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
H-1-A	1026' 5"	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i> , <i>Prooneotodus</i>	E	
H-1-A	1033' 0"	<i>Eoconodontus notchpeakensis</i>	E	
H-1-A	1047' 0"	<i>Teridontus</i>	Pm?	
H-1-A	1234' 11"	<i>Dytremacephalus</i> , <i>Apsotreta?</i>	Du	
H-1-A	1266' 11"	<i>Aphelaspis</i>	Ap	
H-1-A	1267' 0"	<i>Aphelaspis</i>	Ap	
H-1-A	1268' 0"	<i>Aphelaspis</i>	Ap	
H-1-A	1274' 0"	<i>Aphelaspis</i>	Ap	
H-1-A	1279' 8"	lonchocephalid, <i>Dicellomus?</i>	Cr (or "basal" Ap)	
H-1-A	1279' 10"	lonchocephalid	Cr (or "basal" Ap)	
H-1-A	1283' 0"	<i>Coosella?</i> , <i>Dicellomus</i>	Cr	
H-1-A	1288' 8"	<i>Crepicephalus</i> , <i>Coosia?</i>	Cr	
H-1-A	1401' 6"	crepicephalid	Cr	
H-1-A	1443' 0"	norwoodiid	Ce	
H-1-A	1458' 1"-3"	norwoodiid	Ce	
<b>21 SCH-1 (and King-1, WL-4, Badge)</b>				
				Position of sample is depth below land surface in feet
Sch-1	537' 7"	<i>Loxodus bransoni</i> , <i>Aloxoconus propinquus</i>	Rm	

Sch-1	586' 10.5"-587' 4.5"	<i>Utahconus</i> sp., <i>Acanthodus</i> sp.	"probably" Ch/Hs	
Sch-1	587' 9"-588' 1.5"	<i>Monocostodus sevierensis</i> , <i>Utahconus utahensis</i>	Ch/Hs	
Sch-1	588' 2"-588' 5"	<i>Monocostodus sevierensis</i>	Ch/Hs	
Sch-1	634' 6"-634' 8"	<i>Monocostodus sevierensis</i> , <i>Utahconus utahensis</i>	Hs	
Sch-1	635' 3"-635' 9"	<i>Monocostodus sevierensis</i> , <i>Utahconus utahensis</i>	Hs	
Sch-1	646' 0"	<i>Monocostodus sevierensis</i> , <i>Utahconus utahensis</i> , <i>Hirsutodontus simplex</i>	Hs	
Sch-1	650' 0"	<i>Cordylodus proavus</i> , <i>C. intermedius</i> , <i>Monocostodus sevierensis</i> , <i>Utahconus utahensis</i> , <i>Semiacontiodus nogamii</i>	Hs	
Sch-1	652' 10"-653' 5"	<i>Hirsutodontus simplex</i> , <i>Monocostodus sevierensis</i> , <i>Utahconus utahensis</i> , <i>Semiacontiodus lavadamensis</i>	Hs	
Sch-1	658' 9"-659' 3"	<i>Hirsutodontus simplex</i> , <i>Monocostodus sevierensis</i> , <i>Utahconus utahensis</i>	Hs	
Sch-1	662' 0"-662' 5"	<i>Cordylodus proavus</i> , <i>Cordylodus hastatus</i> , <i>Hirsutodontus hirsutus</i>	Ce	
Sch-1	666' 0"-666' 5"	<i>Cordylodus proavus</i> , <i>Cordylodus hastatus</i> , <i>Semiacontiodus nogamii</i> , <i>Teridontus nakamurai</i>	Ce	
Sch-1	672' 5"-672' 3"	<i>Cordylodus hastatus</i> , <i>Semiacontiodus nogamii</i>	Ce	
Sch-1	678' 5"-678' 11"	<i>Clavohamulus elongatus</i> , <i>Fryxellodontus</i> n. sp.	Ce	
Sch-1	684' 2.5"-684' 7"	<i>Fryxellodontus inornatus</i> , <i>Cordylodus proavus</i> , <i>Teridontus nakamurai</i>	Fi	
Sch-1	688' 0"	<i>Fryxellodontus inornatus</i>	Fi	
Sch-1	690' 0"-690' 5"	<i>Cordylodus andresi</i> , <i>Hirsutodontus hirsutus</i> , <i>Teridontus nakamurai</i>	Hh	
Sch-1	693' 3"-693' 8"	<i>Proconodontus muelleri</i> , <i>Eoconodontus notchpeakensis</i> , <i>Cambrooistodus minutus</i>	Cm	
Sch-1	696' 0"	<i>Eoconodontus notchpeakensis</i> , <i>Cambrooistodus minutus</i>	Cm	
Sch-1	703' 11"-704' 1"	<i>Eoconodontus notchpeakensis</i> , <i>Cambrooistodus minutus</i>	Cm	
Sch-1	708' 1"-708' 5"	<i>Proconodontus muelleri</i> , <i>P. serratus</i> , <i>Eoconodontus notchpeakensis</i>	En	
Sch-1	717' 6"-718' 0"	<i>Proconodontus muelleri</i> , <i>Eoconodontus notchpeakensis</i>	En	
Sch-1	724' 6"-724' 10"	<i>Proconodontus muelleri</i> , <i>Teridontus</i> sp.	Pm	
Sch-1	731' 9"-732' 0"	<i>Teridontus</i> sp.	Pt	
Sch-1	734' 9"-735' 9"	<i>Teridontus</i> sp.	Pt	
Sch-1	742' 2"-742' 5"	<i>Teridontus</i> sp.	Pt	

King-1	765' 4"	<i>Iliaenurus</i> and small sauikiid	Ip	
Sch-1	814' 8"	<i>Dartonaspis</i> or <i>Irvingella</i>	Pt/Pr (favors Pr)	
WI-4	856' 0"	<i>Idahoia</i> sp., <i>Ellipsocephaloides</i> n. sp.	Pt/Pr (favors Pr)	
WI-4	973' 5"	<i>Aphelaspis</i> sp.	Ap/Du	
WI-4	980' 5"	<i>Aphelaspis</i> sp.	Ap	
WI-4	982' 0"	<i>Aphelaspis</i> sp.	Ap	
WI-4	982' 11.5"	<i>Aphelaspis</i> sp.	Ap	
WI-4	1084' 7"	<i>Crepicephalus</i>	Cr	
WI-4	1114' 9.5"	menomoniid	Cr	
WI-4	1126' 1"	<i>Blountia</i>	Cr	
WI-4	1128' 11"	<i>crepicephalid</i>	Cr	
Badge	1328' 5"	<i>Norwoodella</i>	Ce	
Badge	1330' 0"	<i>Kormagnostus</i>	Ce	
<b>22 PETERSON</b>				
				Position of sample is depth below land surface in feet
Peterson	1593' 5"	juveniles? of <i>Utahconus</i> sp., <i>Acanthodus</i> sp.	? Cl or ?la	
Peterson	1621' 4"	<i>Cordylodus linstromi</i> , <i>Utahconus</i> n. sp. , <i>Paltodus</i> n. sp., <i>Acanthodus uncinatus</i> , <i>Aloxoconus</i> n. sp., <i>Teridontus</i> n. sp.(robust)	upper Cl or la	
Peterson	1631' 6"	<i>Hirsutodontus simplex</i> , <i>Utahconus utahensis</i> , <i>Monocostodus severiensis</i> , <i>Semiacontiodus nogamii</i> , <i>Acanthodus</i> n. sp., ? <i>Rossodus tenuis</i>	Ci (likely Ch)	
Peterson	1642' 0"	<i>Hirsutodontus simplex</i> , <i>Utahconus utahensis</i> , <i>Cordylodus</i> sp.	Ci	
Peterson	1675' 4" to 1675' 8"	<i>Teridontus nakamurai</i> , <i>Eoconodontus notchpeakensis</i> , <i>Cordylodus proavus</i>	Hh	
Peterson	1682' 6" to 1683' 0"	fauna from top of Millardan Series	E	
Peterson	1793' 0"	<i>Ptychaspsis</i> ??	Pt??	
Peterson	1842' 0"	<i>Linnarssonella</i>	EI	
Peterson	1959' 0"	<i>Aphelaspis</i> , <i>Apsotreta</i>	Ap	
<b>23 QUIMBY</b>				
				Position of sample is depth below land surface in feet
Quimby	1312' 6"	<i>Teridontus</i> sp., <i>Utahconus</i> n. sp., <i>Acanthodus</i> sp., <i>Aloxoconus iowensis</i> , <i>Polycostatus</i> sp.	la/ Ca/Rm	
Quimby	1322' 5"	<i>Cordylodus</i> sp., <i>Teridontus nakamurai</i>	Ce	

Quimby	1326' 5"	<i>Cordylodus</i> sp., <i>Teridontus nakamurai</i> , <i>Semiacontiodus nogamii</i> , <i>Clavohamulus elongatus</i>	Ce	
Quimby	1330' 0"	<i>Clavohamulus elongatus</i>	Ce	
Quimby	1335' 0"	<i>Cordylodus</i> sp., <i>Teridontus nakamurai</i> , <i>Semiacontiodus nogamii</i> , ? <i>Utahconus utahensis</i>	Ce	
Quimby	1336' 0"	<i>Eoconodontus notchpeakensis</i> , <i>Cordylodus</i> <i>hastatus</i> , <i>Cordylodus proavus</i> , <i>Teridontus</i> <i>nakamurai</i> , <i>Semiacontiodus nogamii</i> , <i>Clavohamulus elongatus</i>	Ce	
Quimby	1346' 9"	<i>Teridontus nakamurai</i> , <i>Clavohamulus elongatus</i> , <i>Clavohamulus bulbosus</i>	Ce	
Quimby	1363' 0"	<i>Eoconodontus notchpeakensis</i> , <i>Teridontus</i> <i>nakamurai</i> , <i>Clavohamulus elongatus</i> , <i>Clavohamulus bulbosus</i>	Ce	
Quimby	1372' 8.5"	<i>Teridontus nakamurai</i>	Cp	
Quimby	1392' 7"	<i>Cordylodus proavus</i> , <i>Teridontus nakamurai</i> , <i>Hirsutodontus hirsutus</i>	Cp (likely Hh)	
Quimby	1402' 6.6"	<i>Proconodontus posterocostatus</i>	Pp	
Quimby	1507' 6.5"	<i>Taenicephalus</i>	Co	
Quimby	1541' 9"	<i>Housia</i>	EI	
Quimby	~1558' 8"	<i>Apsotreta</i> , <i>Dunderbergia</i> ?	Du	
Quimby	1564' 7"	<i>Prehousia</i> ?	Ap	
Quimby	1565' 1"	<i>Aphelaspis</i> , <i>Apsotreta</i>	Ap	
Quimby	1621' 5"	norwoodiid	Ce	
<b>24 CAMP QUEST</b>				
				Position of sample is depth below land surface in feet
Camp Quest	941.3 to 941.4	<i>Apsotreta</i> ?	Ap/Du	
<b>25 R20-2002-01</b>				
				Position of sample is depth below land surface in feet
R20-2002-01	706' 0"	<i>Dikelocephalus</i> cf <i>D. minnesotensis</i> (Owen)	Ip	
R20-2002-02	725' 0"	dikelocephalid	Ip	
R20-2002-03	741' 0"	<i>Wilbernia</i> cf. <i>W. Pero</i> (Walcott)	Co	
R20-2002-04	742' 0"	<i>Wilbernia</i> sp.	Co	
R20-2002-05	822' 0"	<i>Aphelaspis</i>	Ap	
<b>27c MADISON</b>				

				Precise stratigraphic position is uncertain. The stratigraphically highest of five samples collected from the type section of the Sunset Point Member of the Jordan Sandstone
MADISON	Upper Sunset Pt. Mbr	<i>Eoconodontus notchpeakensis</i>	E	
<b>28a BLACK EARTH (BE)</b>				
				stratigraphic position is distance in meters above (positive values) or below (negative values) base of strombolite bed in lowermost St Lawrence Fm.
BE	0.3	<i>Proconodontus posterocostatus</i>	Pp	
BE	minus 0.1	<i>Proconodontus posterocostatus</i>	Pp	
<b>28b MAZOMONIE</b>				
				stratigraphic position is distance in meters above (positive values) or below (negative values) contact between St Lawrence Fm. and overlying white sandstone of Coon Valley Member
Mazomonie	3	<i>Teridontus nakamurai</i>	"Ibexian"	
Mazomonie	minus 0.1	<i>Eoconodontus notchpeakensis</i>	En	
Mazomonie	minus 9.8	<i>Proconodontus muelleri, Prooneotodus sp.</i>	En	
Mazomonie	minus 12.0	<i>Proconodontus muelleri, Eoconodontus notchpeakensis</i>	En	
<b>34 COON VALLEY</b>				
				stratigraphic position is distance in meters above (positive values) or below (negative values) contact between Jordan Sandstone and overlying Coon Valley Member (marked by intraclastic sandstone with pebbles of vein quartz)
Coon Valley	2.4	<i>Teridontus sp., Acanthodus uncinatus</i>	likely Ca or Rm	
Coon Valley	0.9	<i>Proconodontus muelleri, Teridontus nakamurai, Eoconodontus notchpeakensis</i>	mixed E+Ca	
Coon Valley	minus 13	<i>Eoconodontus notchpeakensis</i>	En	
<b>35 ARCADIA</b>				

Arcadia	see note on position	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	from lowest sandy carbonate bed in east-facing road cut
				stratigraphic position for samples below is distance in meters above contact between Lone Rock Formation and overlying St Lawrence Formation, marked by an intraclastic conglomerate near the base of the outcrop
Arcadia	16.7	<i>Eoconodontus notchpeakensis</i> , possible <i>Proconodontus muelleri</i>	E	
Arcadia	15.2	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
Arcadia	13.3	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
Arcadia	12.2	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i> , <i>Prooneotodus</i>	E	
Arcadia	8.7	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
Arcadia	6.6	<i>Proconodontus muelleri</i>	Pm	
Arcadia	3.8	<i>Proconodontus muelleri</i> or <i>Eoconodontus notchpeakensis</i> , and <i>Prooneotodus</i>	Pm	
Arcadia	1.3	<i>Proconodontus muelleri</i> , <i>Prooneotodus</i>	Pm (lower)	
Arcadia	0.1	<i>Proconodontus muelleri</i> , <i>Prooneotodus</i> , <i>Proconodontus posterocostatus</i> , <i>Terodontus</i> sp.	Pt	
<b>37 HOMER</b>				
				stratigraphic position is distance in meters above (positive values) or below (negative values) base of Jordan Sandstone
HOMER	30.8	<i>Oneotodus simplex</i> , <i>Terodontus gracilis</i> , <i>Cordylodus intermedius</i> , <i>Aloxoconus</i> sp., <i>Aloxoconus propinquus</i>	Ca	
HOMER	29	<i>Oneotodus simplex</i> , ? <i>Aloxoconus</i> sp., <i>Acanthodus uncinatus</i> ?	"likely" Ca	
HOMER	28	<i>Eoconodontus notchpeakensis</i>	E	
HOMER	27.6	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
HOMER	24.6	<i>Eoconodontus notchpeakensis</i>	E	
HOMER	22.8	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
HOMER	21.83	<i>Eoconodontus notchpeakensis</i>	E	
HOMER	16.4	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
HOMER	15.5	<i>Eoconodontus notchpeakensis</i>	E	
HOMER	14.3	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	

HOMER	7.3	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
HOMER	4.1	<i>Eoconodontus notchpeakensis</i>	E	
HOMER	minus 5.7	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i> , <i>Prooneotodus rotundatus</i>	E	
<b>38 BO-1 (and B-1)</b>				
				Position of sample is depth below land surface in feet
BO-1	310' 6"	<i>Terodontus nakamurai</i> , <i>Acanthodus uncinatus</i>	upper Cl through Rm	
BO-1	320' 0"	<i>Terodontus nakamurai</i> , <i>Cordylodus proavus</i> , <i>Hirsutodontus hirsutus</i>	Hh	
BO-1	390' 10"	<i>Eoconodontus notchpeakensis</i>	E	
BO-1	408' 0"	<i>Proconodontus muelleri</i>	E	
BO-1	434' 6"	<i>Eoconodontus notchpeakensis</i>	E	
BO-1	443' 0"	<i>Eoconodontus notchpeakensis</i>	E	
BO-1	450' 0"	<i>Eoconodontus notchpeakensis</i>	E	
BO-1	459' 6"	<i>Cambroistodus cambricus</i>	E	
BO-1	467' 0"	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
BO-1	472' 6"	<i>Eoconodontus notchpeakensis</i> , <i>Proconodontus muelleri</i>	E	
BO-1	485' 6"	<i>Proconodontus muelleri</i>	Pm	
BO-1	499' 0"	<i>Proconodontus muelleri</i>	Pm	
BO-1	504' 6"	<i>Proconodontus muelleri</i> , <i>Terodontus nakamurai</i>	Pm	
BO-1	509' 0"	<i>Proconodontus posterocostatus</i> , <i>Terodontus</i> sp.	Pp	
BO-1	517' 10"	<i>Clelandia</i> sp.	lp	
BO-1	518' 3"	<i>Prosaukia</i> or <i>Saukiella</i>	lp	
BO-1	520' 6"	cf. <i>Symphysurina</i> or cf. <i>Iliaenurus</i>	lp	
BO-1	571' 6"	<i>Chariocephalus whitfield</i> (Hall), <i>Prosaukia</i> sp., <i>Pseudagnostus josepha</i> (Hall), <i>Litagnostus?</i> sp., <i>Iliaenurus</i> sp., <i>Ellipsocephaloides</i> sp., <i>Idiomesus?</i> sp.	Pr	
BO-1	609' 6"	<i>Litagnostus</i> sp., <i>Pseudagnostus</i> sp., <i>Monocheilus</i> , sp.	Pt	
BO-1	615' 1"	<i>Monocheilus</i> sp.	Pt	
B-1	230' 3"	<i>Aphelaspis</i> sp.	Ap	
B-1	230' 5"	<i>Aphelaspis?</i> sp.	Ap	
B-1	234' 4"	<i>Aphelaspis</i> sp.	Ap	
B-1	234' 6"	<i>Aphelaspis</i> sp.	Ap	
B-1	239' 6"	<i>Aphelaspis?</i> sp.	Ap	



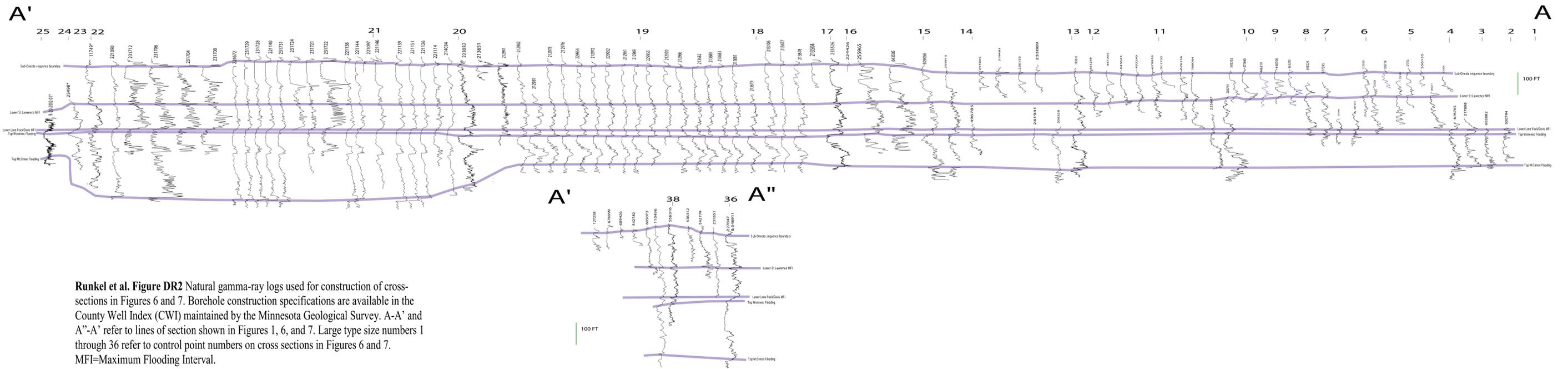
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Runkel et al. Figure DR2 Natural gamma-ray logs used for construction of cross-sections in Figures 6 and 7. Borehole construction specifications are available in the County Well Index (CWI) maintained by the Minnesota Geological Survey. A-A' and A''-A' refer to lines of section shown in Figures 1, 6, and 7. Large type size numbers 1 through 36 refer to control point numbers on cross sections in Figures 6 and 7. MFI=Maximum Flooding Interval.