

# Lakepoint - Green Ravine Section

Butt. PKs = Erda

962 ft West Canyon = Lakepoint (upper) <sub>LS</sub> <sub>pk43</sub>

$\frac{2}{3}$  unit  
19  
18

? <sup>Fenn</sup> <sub>miss</sub> ?  
566 ft Manning Cyn (Lower part of Lakepoint)

1983 ft

1417 ft Green Ravine of T+R

628' LS

789' LS + shale  
T+R section

Is all of this MCyn  
or could part or all  
be Great Blue?

Contains  
Caninia (coral) zone  
found in upper LS  
mbr of Great Blue  
in Bingham seq.  
Gordon & Duncan  
in T+R, 1970

UGS measured 1540' of MC in Soldier Cyn

Bissell (1967) got late Miss macrofossils  
from core of Kessler anticline

Green Ravine

JK thinks, is all Manning Cyn,  
as <sup>MC</sup> gets thicker to north in Tremonton

Try to get some conodonts from  
Green Ravine to find age range  
of exposed rock



9/3/13

0584





### *The Lake Point Limestone*

^ conformably overlies the late Mississippian Green Ravine Formation and the contact is placed at the first occurrence of brown-weathering, wispy sand lenses in the gray limestones of the Lake Point Limestone. The upper contact is conformable, and is placed at the occurrence of the red brown weathering sandstones of the Erda Formation. / The lower part of the Lake Point Limestone is considered, by Tooker and Roberts (1970), to be equivalent to the upper part of the Manning Canyon Formation elsewhere in the Oquirrh Group outcrop area.

The basal limestone of the Oquirrh Group at Samaria Mountain, Idaho, was referred to as the West Canyon Limestone Member of the Oquirrh Formation by Beus (1968) as a correlative unit to the West Canyon Limestone in northern Utah. In this report, the West Canyon Limestone at Samaria Mountain is referred to as the informal Bannock Peak unit of the Oquirrh Group. It crops out as a continuous band along the eastern side of Samaria Mountain beginning with the first major limestone above the black shales of the Manning Canyon Formation. The Bannock Peak unit is lithically different from the Lake Point and West Canyon limestones. The Bannock Peak unit also crops out along the western margin of the Deep Creek Mountains in Idaho where it conformably overlies the Manning Canyon Formation. Exposures in the southern Deep Creek Mountains are poorly exposed and faulted.



# MEASURED SECTIONS

The Lake Point Limestone was named by Tooker and Roberts (1970) for the small farming community of Lake Point, Utah, immediately south of Great Salt Lake. These limestones and minor quartz arenites crop out in the core of the Kessler anticline, on the north side of Lake Point Ridge, in the upper part of Bates Canyon, on the upper plate of the North Oquirrh thrust fault at Nelson Peak, and in small downfaulted klippen on the lower plates of the thrust near the mouth of Bates Canyon (Tooker and Roberts, 1970, p. A11).

**LAKE POINT LIMESTONE** Type Section. Southwest ridge of hill, from 5,200-ft altitude to about the 6,160-ft altitude in NE 1/4 Sec 6, T. 2 S., R. 3 W., and SW 1/4 Sec 31, T. 1 S., R. 3 W., Garfield quadrangle, Utah. UNIT= unit numbers defined by authors in field; cum= cumulative thickness starting from base of section. Thickness in meters (m). Originally measured by Tooker and Roberts (1970).

Measured by L.E. Davis and G.D. Webster]

## OQUIRRH GROUP:

### RDA FORMATION

Conformable Contact)

### LAKE POINT LIMESTONE

UNIT #	THICKNESS (m)		LITHOLOGY
		cum.	
109	6.0	465.6 1527'	BRACHIOPOD/TRILOBITE PACKSTONE. Medium light gray; good exposure; thick bedded (40-50 cm); minor silt-sized quartz; very sandy in upper 1.0 m; bioturbated; minor black chert nodules; crinoids, bryozoans, trilobites, and brachiopods.
108	7.0	459.6	ARENACEOUS BRACHIOPOD PACKSTONE. Light gray; poorly exposed; medium bedded (20-30 cm); minor black chert nodules; 40-50% silt-sized quartz; bioturbated; pellets, crinoids, trilobites, bryozoans, and brachiopods.
107	3.0	452.6	BRACHIOPOD/CRINOID PACKSTONE. Medium dark gray; poorly exposed, lower 2.5 m covered; medium bedded (25-30 cm); minor black chert nodules; bioturbated; pellets, bivalves, trilobites, forams, crinoids, and brachiopods.
106	2.0	449.6	ARENACEOUS CRINOID PACKSTONE. Light gray; fair exposure; thick bedded (30-40 cm); 30% silt-sized quartz; 10-15 cm diameter black chert nodules; bioturbated; pellets, echinoderms, trilobites, the forams <u>Bioseriella parva</u> , <u>Eostaffella</u> spp., <u>Pseudoendothyra</u> ? sp., calcareous algae <u>Calcisphaera laevis</u> , and brachiopods.
105	8.5	447.6	CALCAREOUS QUARTZ ARENITE. Moderate brown; poorly exposed, upper 7.0 m covered; massive; trough cross-bedded.



104	1.0	439.1	ARENACEOUS PELLETAL WACKESTONE. Medium light gray; poorly exposed; thick bedded (30-40 cm); 30-40% silt-sized quartz; bioturbated; pellets, crinoids, and brachiopods.
103	4.5	438.1	CALCAREOUS QUARTZ ARENITE. Moderate brown; fair exposure; massive; trough cross-bedded.
102	1.5	433.6	BRACHIOPOD PACKSTONE. Medium gray; good exposure; massive; 10-15 cm diameter black chert nodules; bioturbated; pellets, trilobites, bryozoans, forams, and brachiopods including <u>Spirifer</u> sp.
101	4.5	432.1	CALCAREOUS QUARTZ ARENITE. Light brown; poorly exposed, mostly covered; massive; trough cross-bedded.
100	4.5	427.6	BRACHIOPOD MUDSTONE/WACKESTONE. Medium gray; excellent exposure, resistant ridge former; massive; minor silt-sized quartz; black chert nodules throughout; crinoids, trilobites, and productid brachiopods.
99	4.5	423.5	BRACHIOPOD WACKESTONE/PACKSTONE. Medium light gray; good exposure; thick bedded (40-50 cm); minor silt-sized quartz; crinoids, trilobites, the forams <u>Palaeonubecularia</u> sp., <u>Eostaffella</u> spp., and bryozoans, brachiopods, and the calcareous algae <u>Asphaltina cordillerensis</u> , and <u>Archaeolithophyllum</u> sp.
98	3.5	418.6	CALCAREOUS QUARTZ ARENITE. Light brown; good exposure; massive; trough cross-bedded.
97	6.0	415.1	ARENACEOUS PELLETAL WACKESTONE. Medium dark gray; excellent exposure, resistant ridge former; thick bedded (40-50 cm); 20% fine quartz sand; zones of black chert nodules throughout; bioturbated; pellets, crinoids, trilobites, and brachiopods.
96	4.0	409.1	COVERED INTERVAL. Gray limestone float.
95	2.5	405.1	CALCAREOUS QUARTZ ARENITE. Medium gray; good exposure; medium to thick bedded (30-50 cm); trough cross-bedded; stylitic; bioturbated; pellets, crinoids, and brachiopods.
94	3.0	402.6	BRACHIOPOD WACKESTONE. Medium gray; poorly exposed; medium bedded (20-30 cm); cherty throughout; crinoids, trilobites, bryozoans, and brachiopods.
93	1.5	399.6	COVERED INTERVAL. Gray limestone float.
92	1.5	398.1	BRACHIOPOD WACKESTONE/PACKSTONE. Light gray; fair exposure; medium bedded (20-30 cm); brachiopods.
91	1.5	396.1	BRACHIOPOD WACKESTONE/PACKSTONE. Dark gray; fair



			exposure; medium bedded (20-30 cm); cherty throughout; crinoids, trilobites, bryozoans, and brachiopods.
91	1.5	395.1	CALCAREOUS QUARTZ ARENITE. Moderate brown; fair exposure; medium bedded (20-30 cm); trough cross-bedded.
89	3.0	393.6	BRACHIOPOD WACKESTONE/PACKESTONE. Medium gray; fair exposure; medium bedded (20-30 cm); upper 1.0 m covered; lower 2.0 m cherty; crinoids, trilobites, bryozoans, and brachiopods.
88	3.0	390.6	CRINOID BRACHIOPOD BRYOZOAN PACKSTONE. Medium gray; poorly exposed, mostly covered; bioturbated; crinoids, trilobites, bryozoans, and brachiopods (abundant at base).
86	6.6	387.6	ARENACEOUS CRINOID GRAINSTONE. Medium light gray; poorly exposed, mostly covered; thick bedded (50-60 cm); 25-30% fine sand-sized quartz; crinoids, trilobites, gastropods, bryozoans, and brachiopods.
84	12.0	381.0	BRACHIOPOD WACKESTONE/CORAL FRAMESTONE. Medium gray; excellent exposure, cliff former; massive; minor brownish gray chert; top of cliff forms dip slope; corals including <u>Lophophyllidium</u> sp. (some bioherm development), crinoids and echinoids, bryozoans, and brachiopods.
82	3.0	369.0	BRACHIOPOD MUDSTONE/WACKESTONE. Medium gray; excellent exposure, cliff former; massive; cherty in lower 1 m; crinoids and brachiopods.
84	6.0	366.0	ARENACEOUS CRINOID GRAINSTONE. Light gray; excellent exposure, cliff former; massive; 20-25% quartz; trough cross beds; minor brownish gray chert; bioturbated; crinoids, trilobites, bryozoans, and brachiopods.
83	3.3	360.0	BRACHIOPOD WACKESTONE/PACKSTONE. Dark gray; excellent exposure, cliff former; massive; minor bedded chert, 1-10 cm diameter black chert nodules; crinoids, trilobites, forams, bryozoans, and brachiopods.
82	6.0	356.7	BRACHIOPOD WACKESTONE/PACKSTONE. Grayish black; excellent exposure, cliff former; massive; abundant 1-10 cm diameter black chert nodules; crinoids, ramose bryozoans, and productid brachiopods.
81	3.0	350.7	COVERED INTERVAL. Brownish gray sandstone float.
88	7.5	347.7	MUDSTONE. Grayish black; excellent exposure, cliff former; massive; minor brownish gray chert; abundant vertical burrows; crinoids, trilobites, bryozoans, and brachiopods.



7	4.0	340.2	BRACHIOPOD PACKSTONE. Medium gray; excellent exposure, cliff former; thick bedded (40-80 cm); minor silt-sized quartz; very cherty, two 10 cm black chert layers at top; bioturbated; crinoids, trilobites, ramose and fenestrate bryozoans, and brachiopods.
7	1.5	336.2	MUDSTONE. Black; poorly exposed; thin bedded (1-2 cm).
7	6.4	334.7	BRACHIOPOD PACKSTONE. Dark gray to grayish black; excellent exposure, cliff former; forms dip slope at top; cherty in lower 3.0 m; bioturbated; corals, crinoids, gastropods, trilobites, bryozoans, and brachiopods.
7	1.7	328.3	BRACHIOPOD PACKSTONE. Medium gray; excellent exposure, cliff former; massive; minor chert nodules near center; brachiopods.
7	3.5	326.6	BRACHIOPOD PACKSTONE. Medium dark gray; excellent exposure, cliff former; massive; shaley towards base; crinoids, fenestrate bryozoans, and brachiopods (forms coquina horizons).
7	3.5	323.1	BRACHIOPOD PACKSTONE. Brownish gray; good exposure, cliff former; massive; chert zone 1.8 m above base; fossiliferous above chert zone; bioturbated; crinoids, bivalves, gastropods, trilobites, bryozoans, and brachiopods.
7	2.0	319.6	ARENACEOUS BRACHIOPOD PACKSTONE. Dusky brown; excellent exposure, cliff former; massive; shaley at base; cherty in upper 1.0 m; 20-25% silt-sized quartz; crinoids, trilobites, bryozoans, ostracods, and brachiopods.
7	1.3	317.6	CALCAREOUS QUARTZ ARENITE. Moderate brown; fair exposure, medium bedded (25-35); trough cross-bedded; base of massive cliff.
7	1.5	316.3	ARENACEOUS CRINOID PACKSTONE/GRAINSTONE. Moderate brown; good exposure; massive, 10-15% silt-sized quartz; intraclasts; gastropods, crinoids, and brachiopods.
7	2.3	314.8	ARENACEOUS BRACHIOPOD/CRINOID PACKSTONE/ GRAINSTONE. Medium dark gray; good exposure; massive; 10-15% silt-sized quartz; upper chert layer 10 cm thick; gastropods, corals, crinoids, trilobites, bryozoans, and brachiopods.
6	3.0	312.5	CALCAREOUS QUARTZ ARENITE. Medium light gray; fair exposure; medium bedded (25-35 cm); trough cross-bedded.
6	3.0	309.5	BRACHIOPOD WACKESTONE/MUDSTONE. Dark gray, fair exposure; massive; minor silt-sized quartz; bioturbated;



gastropods and brachiopods..

- 67 2.5 306.5 BRACHIOPOD/CRINOID PACKSTONE. Dark gray; excellent exposure, ridge former; massive; minor silt-size quartz; chert beds; bioturbated; bivalves, gastropods, crinoids, trilobites, and brachiopods.
- 66 1.0 304.0 BRACHIOPOD PACKSTONE. Medium gray, poorly exposed; massive; corals, crinoids, bryozoans, and brachiopods.
- 65 1.5 303.0 COVERED INTERVAL. Gray limestone float.
- 64 1.8 301.5 CRINOID PACKSTONE. Light gray, good exposure; massive; bioturbated; gastropods, corals, crinoids, echinoids, and brachiopods.
- 63 3.0 299.7 COVERED INTERVAL. Gray limestone float.
- 62 3.0 296.7 BRACHIOPOD PACKSTONE. Medium light gray; excellent exposure; very thick bedded (50-60 cm); chert stringers and nodules throughout; bioturbated; gastropods, corals (upper 30 cm), crinoids, bryozoans, and brachiopods including Derbyia sp. and Linoproductus sp.
- 61 1.2 293.7 BRACHIOPOD WACKESTONE/PACKSTONE. Light gray; good exposure; massive; black chert layer at top of unit; corals, crinoids, bryozoans, and brachiopods.
- 60 4.5 292.5 COVERED INTERVAL. Gray limestone float.
- 59 5.2 288.0 ARENACEOUS WACKESTONE. Dusky brown; excellent exposure; massive; sandy in lower 3.0 m; cherty in upper 1.0 m; brachiopods (occur in distinct horizons).
- 58 8.5 282.8 ARENACEOUS MUDSTONE. Medium light gray to moderate brown; good exposure; massive; silty; trough cross-bedded; shaley partings in lower 4.0 m; cherty in upper 4.0 m; bioturbated.
- 57 3.6 274.3 BRYOZOAN WACKESTONE. Dark gray; poorly exposed, thick bedded (30-40 cm); bioturbated in upper 1 m; crinoids, ramose bryozoans and brachiopods including Derbyia sp. and Linoproductus sp.
- 56 2.0 270.7 ARENACEOUS BRACHIOPOD PACKSTONE/GRAINSTONE. Dark gray; fair exposure; thick bedded (35-45 cm); cherty in upper 1.0 m; 15-20% silt-sized quartz; intraclasts, crinoids, ramose bryozoans, pellets, and brachiopods Derbyia sp. and Linoproductus sp.
- 55 1.5 268.7 BRACHIOPOD WACKESTONE/PACKSTONE. Medium dark gray; fair exposure; thick bedded (35-45 cm); cherty in upper 0.5 m; oxidized chert layer at top of unit; bioturbated; pellets, corals, crinoids, echinoids, bryozoans,



brachiopods Derbyia sp. and Linoproductus sp.

- |    |     |       |  |
|----|-----|-------|--|
| 54 | 3.0 | 267.2 | COVERED INTERVAL. Gray limestone float.  |
| 53 | 3.5 | 264.2 | BRACHIOPOD/BRYOZOAN PACKSTONE/GRAINSTONE. Medium gray; good exposure; thick bedded (30-45 cm); cherty throughout; bioturbated; corals, crinoids, echinoids, pellets, fenestrate and ramose bryozoans, brachiopods (form coquina horizons). |
| 52 | 2.0 | 260.7 | BRACHIOPOD WACKESTONE/PACKSTONE. Medium gray; good exposure; thick bedded (30-40 cm); cherty in upper 50 cm; minor silt-sized quartz; crinoids, trilobites, bryozoans, and brachiopods (form coquina horizons).                            |
| 51 | 1.8 | 258.7 | BRACHIOPOD/BRYOZOAN WACKESTONE. Dark gray; fair exposure; thin to medium bedded (5-25 cm); cherty and shaley layers; bioturbated; crinoids, brachiopods (abundant in minor layers), ramose bryozoans, and pellets.                         |
| 50 | 6.0 | 256.9 | COVERED INTERVAL. Gray limestone float.  |
| 49 | 1.8 | 250.9 | CRINOID GRAINSTONE. Medium light gray; fair exposure, bottom mostly covered; medium bedded (20-35 cm); bioturbated; pellets, crinoids, trilobites, intraclasts, brachiopods, and bryozoans.  |
| 48 | 1.5 | 249.1 | CRINOID GRAINSTONE. Medium light gray; fair exposure; medium bedded (25-40 cm); red brown oxidized layer at top of unit; bioturbated; pellets, echinoids, crinoids, forams, brachiopods, and bryozoans.                                    |
| 47 | 1.5 | 247.6 | COVERED INTERVAL. Gray limestone float.  |
| 46 | 3.3 | 246.1 | PELLETAL PACKSTONE. Medium gray; good exposure; thick bedded (40-60 cm); cherty in upper part; bioturbated; pellets, crinoids, brachiopods, and bryozoans (very fossiliferous in upper 1.0 m).   |
| 45 | 1.5 | 242.8 | CRINOID PACKSTONE. Medium gray, good exposure; massive; cherty layers; bioturbated; pellets, solitary corals, brachiopods, and crinoids.   |
| 44 | 2.1 | 241.3 | CRINOID PACKSTONE/GRAINSTONE. Medium dark gray; good exposure; massive; minor silt-sized quartz; bioturbated; pellets, corals, brachiopods, and crinoids.  |
| 43 | 1.7 | 239.2 | ARENACEOUS MUDSTONE. Medium gray, good exposure; medium bedded (25-40 cm); 5-10% silt-sized quartz.  |
| 42 | 1.2 | 237.5 | BRACHIOPOD WACKESTONE. Medium dark gray; good exposure; thick bedded (40-50 cm); minor silt-sized quartz; bryozoans, trilobites including <u>Paladin?</u> sp., and   |



brachiopods (coquina of Spirifer sp. at top of unit).

- 41 3.0 236.3 COVERED INTERVAL. Gray limestone float.
- 40 3.0 233.3 CRINOID/BRACHIOPOD PACKSTONE/GRAINSTONE. Medium light gray; fair exposure, lower 1.5 m poorly exposed; thick bedded (40-50 cm); bryozoans, crinoids, and brachiopods (abundant in upper 1.0 m).
- 39 4.5 230.3 ECHINOD/CRINOID PACKSTONE/GRAINSTONE. Medium gray; good exposure; medium to thick bedded (30-50 cm); bioturbated; bivalves, ramose bryozoans, ostracods, trilobites, brachiopods (locally abundant near top of unit); crinoids, and echinoids.
- 38 3.3 225.8 BRACHIOPOD/PELLETAL WACKESTONE. Medium dark gray; excellent exposure, cliff former; thick bedded (50-60 cm); bioturbated; corals, trilobites, pellets, productid brachiopods including Dictyoclostus sp. Hustedia sp. Composite sp. Cleiothyridina sp.
- 37 4.5 222.5 BRACHIOPOD/PELLETAL WACKESTONE/PACKSTONE. Medium light gray; excellent exposure, cliff former; massive; cherty and sandy in places; red brown oxidized zone at top; crinoids, pellets, and brachiopods (locally abundant).
- 36 2.5 218.0 CALCAREOUS SILTSTONE. Dark gray, poorly exposed; thin bedded.
- 35 2.5 215.5 BRACHIOPOD WACKESTONE/PACKSTONE. Medium dark gray, poorly exposed; medium bedded (20-30 cm); corals, ramose bryozoans, and productid brachiopods.
- 34 3.4 213 BRYOZOAN WACKESTONE. Dark gray; poorly exposed, mostly covered; medium bedded (25-35 cm); ramose bryozoans and brachiopods including Spirifer sp. Dictyoclostus sp., and Punctospirifer sp.
- 33 3.0 209.6 BRYOZOAN WACKESTONE. Dark gray; poorly exposed, mostly covered; medium bedded (20-30 cm); cherty in upper part; crinoids, brachiopods, and ramose bryozoans.
- 32 3.5 206.6 ARENACEOUS WACKESTONE. Medium gray; excellent exposure, cliff former; thick bedded (40-60 cm); (unit 6 of Tooker and Roberts, 1970); crinoids, trilobites, brachiopods, and bryozoans.
- 31 3.0 203.1 BRACHIOPOD WACKESTONE. Medium dark gray; fair exposure; medium bedded (15-30 cm); chert throughout; crinoids, fenestrate bryozoans; and brachiopods including Derbyia sp., Spirifer sp., Buxtonia sp., and Dictyoclostus sp.
- 30 2.0 200.1 BRYOZOAN PACKSTONE/GRAINSTONE. Medium light gray; good exposure; medium bedded (10-30 cm); brown chert zone in

upper 30 cm; minor silt-sized quartz; bioturbated; ramose bryozoans, crinoids, brachiopods, and trilobites.

- 29 2.0 199.1 CRINOID/BRACHIOPOD PACKSTONE/GRAINSTONE. Medium dark gray; good exposure; thick bedded (50-70 cm); cherty in upper 20 cm; bioturbated; solitary corals, crinoids, brachiopods, ramose bryozoans, and trilobites.
- 28 3.0 197.1 COVERED INTERVAL. Gray limestone float.
- 27 2.3 194.1 BRACHIOPOD/BRYOZOAN WACKESTONE. Medium gray; good exposure; thick bedded (70-100 cm); minor silt-sized quartz; cherty in upper 80 cm; crinoids, ramose bryozoans, and brachiopods including Derbyia sp., Spirifer sp., and Punctospirifer sp.
- 26 4.5 191.8 ARENACEOUS BRACHIOPOD WACKESTONE. Medium gray; excellent exposure, cliff former; massive; 5-10% silt-sized quartz sand; abundant black chert nodule zones (10-40 cm) in lower 2.0 m; crinoids, trilobites, bryozoans, and brachiopods including Derbia sp., Spirifer sp., and Punctospirifer sp.
- 25 1.5 187.3 CRINOID WACKESTONE. Dark gray, excellent exposure, cliff former; massive; minor silt-sized quartz; shaley in upper part; black cherty layers in upper portion; bioturbated; crinoids, brachiopods, and bryozoans.
- 24 1.5 185.8 CRINOID/BRACHIOPOD PACKSTONE. Medium gray; fair exposure; thick bedded (40-60 cm); minor silt-sized quartz sand; crinoids, brachiopods, ramose bryozoans, forams including Neoarchaediscus incertus, Eostaffella spp., and Pseudoendothyra sp., the calcareous algae Calcisphaera laevis and ostracods including Polytylites? sp. and Amphissites? sp.
- 23 2.0 184.3 BRACHIOPOD WACKESTONE. Medium dark gray; excellent exposure, cliff former; massive; minor black chert nodules in lower portion; brachiopods including Spirifer sp., Buxonia sp., and Composita sp. and corals.
- 22 3.0 182.3 BRACHIOPOD PACKSTONE. Medium dark gray; excellent exposure, cliff former; thick bedded (40-60 cm); brachiopods including Punctospirifer sp. and Composita sp., crinoids; brachiopods aligned and stacked.
- 21 3.0 179.3 BRACHIOPOD PACKSTONE. Medium dark gray to grayish orange; poorly exposed; massive; productid brachiopods, crinoids, corals, ostracods, and ramose bryozoans.
- 20 2.2 176.3 BRACHIOPOD WACKESTONE/PACKSTONE. Dark gray; good exposure, resistant ridge former; massive; shaley partings; brachiopods including Linoproductus sp. and Buxtonia? sp., forams, ramose bryozoans, ostracods,



crinoids, corals, and trilobites.

19	1.5	174.1	ARENACEOUS BRACHIOPOD PACKSTONE. Grayish black, good exposure; thick bedded (40-60 cm); shaley layer (30cm) near top of unit; minor dark brown sandy layers; corals, ostracods, productid brachiopods, and ramose bryozoans.
18	7.5	172.6 (567')	COVERED INTERVAL. Gray limestone float with abundant brachiopods.
17	1.4	165.1 542'	CORAL FRAMESTONE. Dark gray; good exposure; thick bedded (40-60 cm); minor silt-sized quartz; thick coral zone of <u>Orygmophyllum</u> (unit 4 of Tooker and Roberts, 1970), crinoids, trilobites, brachiopods, ostracods, and oncolites.
16	0.6	163.7 537'	MUDSTONE. Tan; good exposure; thick bedded; shaley in lower 10 cm.
15	3.5	163.1 535'	BRACHIOPOD WACKESTONE. Medium dark gray; poorly exposed; massive; ostracods, spirifer, productid, and pseudopunctate brachiopods and ramose bryozoans.
14	6.0	159.6 523'	COVERED INTERVAL. Gray limestone float.
13	0.8	153.6 504'	ARENACEOUS BRACHIOPOD/PELLETAL PACKSTONE. Dark gray; good exposure; thick bedded (50+ cm); minor silt-sized quartz; brachiopods and crinoids.
12	1.3	152.8 501'	PELLETAL WACKESTONE. Dark gray to grayish orange; good exposure; thick bedded (60+ cm); green chert zone 60 cm above base; bioturbated; brachiopods.
11	3.0	151.5 497'	BRACHIOPOD PACKSTONE. Light gray; good exposure; medium to thick bedded (20-50 cm); brachiopods.
10	3.0	148.5 487'	COVERED INTERVAL. Light gray limestone float.
9	12.5	145.5 477'	ARENACEOUS BRACHIOPOD PACKSTONE. Dark gray to grayish orange; excellent exposure; <u>cliff former</u> ; massive; minor silt-sized quartz; brachiopods including <u>Rhipidomella nevadensis</u> , and crinoids.
8	10.0	132.0 433'	BRACHIOPOD WACKESTONE. Dark gray, excellent exposure; <u>cliff former</u> ; massive; sandy (in part); brachiopods and crinoids.
7	21.0	122.0 400'	CRINOID PACKSTONE. Dark gray; poorly exposed, <u>mostly covered</u> ; thick bedded (40-50 cm); conglomeratic bed (channeled?) near base; crinoids, brachiopods, and bryozoans.
6	12.0	101.0 331'	ARENACEOUS MUDSTONE. Medium dark gray; excellent exposure; thick bedded (40-50 cm); minor brown sandy

Penn

Miss

1050'

WC

MC

477'

Double

Cliff

layers; brachiopods, solitary corals, crinoids, and bryozoans.

- |   |      |      |  |
|---|------|------|--|
| 5 | 15.0 | 89.0 | CRINOID GRAINSTONE. Medium dark gray; fair exposure; medium to thick bedded (25-60 cm); tan sandy layers.  |
|   | 49'  | 292' |  |
| 4 | 19.0 | 74.0 | CRINOID PACKSTONE. Medium light gray; good exposure; resistant ledge-former; medium to thick bedded (20-50 cm); minor sandy layers; crinoids, brachiopods, trilobites, gastropods, and bryozoans.                                  |
|   | 62'  | 243' |  |
| 3 | 15.0 | 55.0 | ARENACEOUS BRACHIOPOD/CRINOID PACKSTONE/GRAINSTONE. Medium light gray; good exposure; resistant ledge-former; medium to thick bedded (20-50 cm); minor sandy layers; crinoids, brachiopods, trilobites, gastropods, and bryozoans. |
|   | 49'  | 190' |  |
| 2 | 20.0 | 40.0 | ARENACEOUS MUDSTONE. Dark gray; poorly exposed; minor silt-sized quartz, rare brachiopods.   |
|   | 66'  | 131' |  |
| 1 | 20.0 | 20.0 | ARENACEOUS BRACHIOPOD MUDSTONE. Grayish black, good exposure; resistant ridge; massive; shaley partings in lower 10 m; silty, trough cross-bedding; brachiopods present in thin layers.  |
|   | 66'  | 66'  |  |

*meters*

Conformable Contact)  
GREEN RAVINE FORMATION



**LEGEND**

### MAP UNITS

The map displays the Keweenaw Peninsula with various geological units labeled in boxes and their stratigraphic relationships indicated by arrows and numbers. The units and their relationships are as follows:

- Qal** (ALLUVIUM (Quaternary)) is at the top, with an arrow pointing down to **Tt** labeled with the number 49.
- Tt** (IGNEOUS FIRES (Tertiary)) has an arrow pointing down to **Pk-dc** labeled with the number 17.
- Pk-dc** (KIRKMAN-DIAMOND CREEK FORMATION? (Lower Permian)) has an arrow pointing down to **Po1p** labeled with the number 10.
- Po1p** (FREEMAN PEAK FORMATION (Lower Permian)) has an arrow pointing down to **Po2** labeled with the number 65.
- Po2** (ERDA FORMATION (Middle Pennsylvanian)) has an arrow pointing down to **Po1p** labeled with the number 37, and another arrow pointing down to **Po1p** labeled with the number 35.
- Po1p** (LAKE POINT LIMESTONE (Lower Pennsylvanian)) is at the bottom.

Other features on the map include a north arrow, a scale bar (0 to 1 mile), and a legend for symbols: a box for 'Geological Unit', a line for 'Geological Contact', and a line for 'Geological Boundary'.

## MAP SYMBOLS

Bedding traces.

Boundary between two structural domains of study area.

Fault, approximate where dashed, possible where queried.




Thrust fault, approximate where dashed, possible where queried; altitude of fault surface indicated by arrow and number.

**Shear zone.**

CONTACT, APPROXIMATE WHERE  
DUSTED, POSSIBLE WHERE QUERIED.

Topographic map showing a mountainous region with contour lines. A river flows from the top left towards the bottom center. A road is shown on the right side. A specific location is marked with a crosshair and labeled '90'. Another point is marked with a circle containing a crosshair and labeled '59'.

of beds. beds. beds. 65

Strike and dip of overturned  Strike and dip in undulatory  Approximate strike and dip 

Antiform, approximate where

50 73 28 Pfp

Overlain antiform, approximate  
where dashed, possible where  
outlined

Minor, plunging antiform.

30 ← ———— Synform, approximate where dashed, possible where queried; plunge indicated by arrow

40 and number.

37 ✓ 4 where dashed, possible where queried.

Minor, plunging synform.

to map individually.

where dashed, possible where queried.

This image shows a close-up of a page from an old, weathered book. The paper is heavily discolored, appearing yellowed and stained. A prominent horizontal line runs across the middle of the frame. To the right of this line, there are some faint, handwritten markings that appear to be '30' and '35'. The overall texture of the paper is rough and aged.

Pfp 3 1114 01857 8833 35

A topographic map segment showing contour lines. The contour lines are labeled with elevations of 8400 and 8200. A spot elevation of 20 is marked with a small cross symbol.

A topographic map segment showing contour lines. A dashed line runs diagonally from the top right towards the center. To the left of this line, a contour line is labeled '33' with a small 'V' mark below it. To the right of the dashed line, a contour line is labeled '25' with a small 'Y' mark below it. The map uses brown contour lines on a light green background.

A topographic map segment showing contour lines. On the left, a yellow-shaded area contains a contour line labeled '5' and a point labeled '10'. To the right, a blue-shaded area contains a contour line labeled '22' and a point labeled '22'.

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