System	Series Name	Formation Name	Columnar Section	Thickness	Character of Rock
QUATERNARY	Pleistocene	Recent Champlain Wisconsin and earlier drift sheets		1110 — 0	Sand, gravel, boulder clay. Lake Superior pink clay. Till= boulder clay, sometimes very sandy, again clayey and dark. A gray and red till may in some places be distinguished, an older and a younger.
POSSIBLY LATER	Conemaugh	Woodville		110 — 0	Light reddish sandstone and sandy shales.
CARBONIFEROUS	Pennsylvanian (Upper Pottsville)	Saginaw		400	White sandstone, coal seams, black and white shales; then bands of limestone and of siderite rare, rarely broken up and found in fragments of the sandstone.
		Parma		170—0	White sandstone and conglomerates, of small white quartz pebbles; brine and sulphates.
	Mississippian	Bayport or Maxville Upper Grand Rapids Upper St. Louis		235—50	Limestones: light and bluish, cherty; also calcareous sandstones.
		Michigan Lower Gd. Rapids Lower St. Louis Osage or Augusta		300—0	Dark or bluish limestones and dolomites with gypsum and blue or black shales: rarely reddish or greenish shales and dark or red sandstones.
		Napoleon Upper Marshall		560 — to	White sandstone: often pyritic, brine or fresh water, sulphates low.
		Lower Marshall		260	White and red sandstones: peanut conglomerates, sandy shales, whetstones, and blur shales, muck carbonate of iron, and mica in the formation; generally a red shale at the top and bottom.
		Coldwater Buena Vista		1000—800	Blue shale: with nodules of carbonate of iron especially at the top; sandstone; very subordinate streaks of fine grained limestone, especially on the west side; black shales at the base.
		Sunbury or Berea			
		Berea			White sandstone; brine and salt even near the surface.
DEVONIAN	Neo-Devonian	Bedford Antrim (Senecan)		480 — 140+	Shale: mainly black and always at the base, with huge round balls of calcite; towards the top, blue and black shales.
	Meso-Devonian	Naples goniatite fauna Traverse Petosky limestone Hamilton (Erian) Acervularia beds Bell and (Marcellus shale)		660 to 50 60	Bluish limestones, dolomites and shales: base a blue or black shale; top generally limestone and rarely reddish.
		Dundee (Ulsterian)		255 to 65—	Limestone: buff and light brown, fiercely effervescent, somewhat cherty.
	Latest Ontarian possibly Eo-Devonian	MONROE: Upper Monroe or Detroit River (Lucas, Amherstburg, Anderdon, Flat Rock); Middle Monroe, Sylvania		275 to 0	a 200, b 20, c 50, d 47. Dolomites; mainly; the Anderdon formation is limestone; gypsum or anhydrite also occurs, with celestite and sulphur.
				410 ? to 30	White sandstone: very pure, passing towards the north into calcareous sand-limestone.
UPPER SILURIAN OR ONTARIAN	Upper Ontarian	Lower Monroe or Bass Island (Raisin River, Put-in-Bay, Tymochtee, Greenfield)		200 ? 100 + 100 — 100 —	Dolomites: at some levels sandy, at others oölitic, often cherty. At the Tymochtee and other levels shaly; anhydrite abundant in the lower parts of the salt basin; Celestite.
	Middle Ontarian	SALINA ? 3, 2, 1		960 to 0	Salt, anhydrite, dolomites, calcareous marls: red and green, more rarely blue and black, shales.
	Lower Ontarian (Niagaran or Manitoulin)	Guelph and Niagara		600 to 270	White dolomites: peculiar whiteness characteristic, often cherty, and with a little quartz sand which sometimes occurs in beds; pure limestone rare.
		Rochester Shale		85 to 0	Blue shale.
		Clinton		150 to 0	Reddish limestones and shales or iron ore.
		Medina and		100 to 0	Red shales; sometimes sandy or green shales.
LOWER SILURIAN OR ORDOVICIAN	Upper Ordovician (Cincinnatian) (Hudson River)	Richmond		150 to 0 ?	Shales; red and blue and sandy; gradual transition at base.
		Lorraine		345 t 215	Shales: blue, sometimes in streaks black, especially towards base.
		Utica		80 to 50	Black shales.
	Middle Ordovician	Gelena Trenton Platteville ?		271 to 100 ?	Limestone and dolomite; blue and shaly, or solid shale at base.
OZARKIAN ?	Lower Ordovician	St. Peter Calciferous		18 to 0	White friable sandstone; or represented by red clay, residual top of underlying formation.

Figure 7. Geologic column of Michigan from the St. Peter sandstone to the Pleistocene. (After A. C. Lane).

LEGEND

PENNSYLVANIAN

- Ccm — Coal measures including Parma sandstone

MISSISSIPPIAN

- Mgr — Grand Rapids group
- Mbl — Bayport limestone or Upper Grand Rapids
- Mms — Michigan series or Lower Grand Rapids
- Mm — Marshall formation
- Mum — Upper Marshall sandstone
- Mlm — Lower Marshall
- Mcs — Coldwater shale including Berea grit

DEVONIAN

- Das — Antrim shale
- Dt — Traverse formation
- Dut — Upper Traverse or Thunder Bay series
- Dal — Alpena limestone
- Dlb — Long Lake series
- Dbs — Bell shale
- Ddl — Dundee limestone

SILURIAN

- Sm — Monroe formation including the Salina
- Sum — Upper Monroe or Detroit River series
- Sss — Sylvania sandstone or Middle Monroe
- Slm — Lower Monroe or Bass Island series

"Niagara" formation

PENNSYLVANIAN

Ccm — Coal measures including Parma sandstone

MISSISSIPPIAN

Mgr — Grand Rapids group

Mbl — Bayport limestone or Upper Grand Rapids

Mms — Michigan series or Lower Grand Rapids

Mm — Marshall formation

Mum — Upper Marshall sandstone

Mlm — Lower Marshall

Mcs — Coldwater shale including Berea grit

DEVONIAN

Das — Antrim shale

Dt — Traverse formation

Dut — Upper Traverse or Thunder Bay series

Dal — Alpena limestone

Dlb — Long Lake series

Dbs — Bell shale

Ddl — Dundee limestone

SILURIAN

Sm — Monroe formation including the Salina

Sum — Upper Monroe or Detroit River series

Sss — Sylvania sandstone or Middle Monroe

Slm — Lower Monroe or Bass Island series

"Niagara" formation

Sed — Engadine dolomite or Upper "Niagara"

Sms — Manistique series

Sfl — Fiborn limestone

Shs — Hendricks series or Lower "Niagara"

ORDOVICIAN

Oc — Cincinnatti group

Ot — Trenton limestone

Ob — Beekmantown formation including Hermansville limestone and St. Peter Sandstone

CAMBRIAN

Cls — Lake Superior sandstone

▲ — Limestone Quarries

LAKE MICHIGAN

LAKE HURON

LAKE ST. CLAIR

LAKE ERIE

CANADA

INDIANA

OHIO

GEOLOGIC MAP OF THE PALEOZOIC FORMATIONS OF MICHIGAN AND LOCATION OF LIMESTONE QUARRIES

1. Alpena Q's.
2. Bayport Q.
3. Bayshore Q.
4. Bichler Q.
5. Black Lake Q.*
6. Brest Q's.*
7. Bullock Q.*
8. Burt Pt. Cement Co. Q.
9. Campbells Stone Co. Q.
10. Dundee Q.*
11. Drummond Q.
12. Fiborn Q.
13. Gibraltar Q.*
14. Griffin M.J. Q.*
15. Griffin Q.*
16. Harmon City Q.*
17. Hendricks Q.
18. Ida Q's.*
19. Legrand Q.*
20. Lime Island Q.*
21. Lulu Q's.*
22. Mc.Donnell Q.
23. Manistique Q's.
24. Marblehead Q.
25. Marion Stone Q.*
26. Maybee Q.*
27. Menominee Q.
28. Middle Bluff Q.*
29. Mill Creek Q
30. Monroe Q's.

Abandoned or idle ×

31. Newport Q.*
32. Norwood Q.*
33. Ottawa Lake Q.
34. Ozark Stone Co. Q.
35. Parma Q.*
36. Petoskey Q's
37. Petoskey Crushed Stone Q.
38. Pigeon Q.
39. Portage River Q's.*
40. Rockport Q.
41. Seaman Q.*
42. Sibley Q.
43. Superior Q.
44. Blaney Q.
45. Charlevoix Q's
46. Days River Q'. 47 Calcited Q.

FIGURE 9.