

EXPLANATION

SEDIMENTARY AND EXTRUSIVE IGNEOUS ROCKS

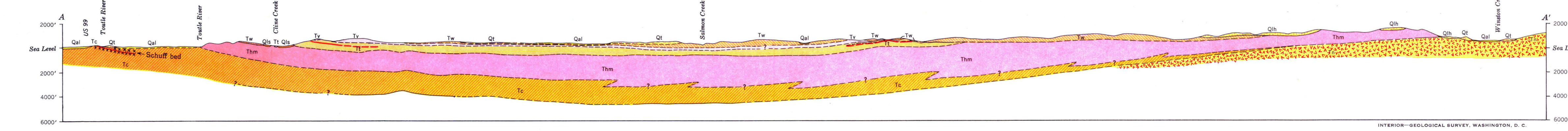
Recent	Aluvium Includes low-level terrace and fluvial deposits	Qal
Pleistocene	Landslide debris Debris of Quaternary and Tertiary rocks	Qls
	Terrace deposits Outwash sand and gravel terrace deposits	Qtt
	Till Alpine till deposits	Qth
	Logan Hill formation Partly weathered gravel and sand, with some till	Qlh
Miocene	Wilkes formation Nonmarine siltstone, sandstone, and conglomerate; contains fossil plants	Tw
	Volcanic rocks Porphyritic andesite and ophanitic basalt flows	Tv
Eocene and Oligocene	Toutle formation Marine and nonmarine massive tuffaceous sandstone and siltstone; contains beds of coal and high-alumina clay. Local interbedded basalt flows (xxx)	Tt
	Hatchet Mountain formation Porphyritic andesite, olivine basalt, basalt, and breccia, with interbedded sedimentary rocks	Thm
Eocene	Cowlitz formation Marine and nonmarine massive sandstone, siltstone, and coal beds, with interbedded basalt flows (xxx)	Tc
	Northeast formation Massive basalt flows and breccia	Tn
	Silver Lake (S)	S

- Dashed where approximately located, dotted where concealed. Name refers to coal bed, number to measured coal sections (pls. 13, 14) and mine or prospect (table 4)
- Contact
Dashed where approximately located
- Fault
Dashed where approximately located, dotted where concealed, arrow shows side of, downthrown side
- Axis of syncline
Dashed where approximately located, dotted where concealed, Arrow shows direction of plunge
- Axis of anticline
Dashed where approximately located, dotted where concealed, Arrow shows direction of plunge
- Strike and dip of beds
- Horizontal beds
- Direction and amount of apparent dip
- Outcrops west of Cowlitz River
- Rock quarry
- Sand and gravel pit
- Strip pit for coal
- Clay pit
- Vertical shaft
- Fossiliferous locality
- F - Foraminifera
- M - Megafossil
- P - Plant
- V - Vertebrate
- M-1
- Fossiliferous locality at point of strike and dip observation
- GS 2
- U. S. Geological Survey drill hole

Base from maps of U.S. Geological Survey
Toultle & Castle Rock quadrangles

Geology by Albert E. Roberts, 1962

NAPAVINE SYNCLINE



**GEOLOGIC MAP AND STRUCTURE SECTION OF THE TOLEDO AND CASTLE ROCK DISTRICT,
LEWIS AND COWLITZ COUNTIES, WASHINGTON**

Scale 1:62,500

0 4 Miles

Contour interval west of 122°45' is 40 feet; contour interval east of 122°45' is 80 feet
Datum is mean sea level