



EXPLANATION

SEDIMENTARY ROCKS

Recent

- Qd** Dune sand and gravel, in part actively drifting. Generally above the saturated zone.
- Qal** Alluvium. Includes sand, gravel, and clay in the eastern and southern parts of Butte Valley; poorly sorted alluvial deposits collected in relatively shallow basins or depressions; local silt deposits; and gravel and sand in major stream channels. Moderately permeable but transmits water to underlying formations.
- Ql** Lake deposits. Semi-consolidated clay, volcanic ash, diatomite, and sand with local stringers of gravelly sand. Locally intertongues with and is overlain by silts, alluvium, and alluvial-fan deposits. In general poorly permeable. Moderately permeable along the east side of Butte Valley, where tapped by irrigation wells.
- Qt** Talus. Wedge-shaped deposits of blocky debris at the base of steep fault scarps. Highly permeable. May serve as ground-water intake areas, storage reservoirs, or drains.

Pleistocene and Recent

- Qf** Fluvio-glacial deposits. Poorly sorted rounded to angular rock fragments, boulders, sand, clay, and silt. Probably poorly permeable; not tapped by wells.
- Qm** Glacial moraines. Unstratified bouldery deposits in a clay matrix. Not tapped by wells; believed to be poorly permeable.

Pliocene

- Td** Diatomite. Massive-appearing gray to white diatomite. Locally contains interbedded sand, cinder tuff-breccia, and volcanic ash. Diatomite essentially not water bearing; some water obtained from the interbedded clastic deposits.

IGNEOUS ROCKS

Pleistocene and Recent

- Qv** "Old" volcanic rocks of the High Cascades. Highly permeable; important chiefly as recharge media. Hypersaline-rich andesitic flows of Deer Mountain, Qv; black vesicular olivine-augite basalt flows from Little Deer Mountain, Qv; black vesicular olivine basalt in Butte Creek Canyon, Qv.
- Qb** Butte Valley basalt. Gray vesicular olivine basalt; highly permeable; yields large supplies of water to wells in the Modoc-Mount Hebron area.
- Qts** Basaltic flows near Sharp Mountain. Dark-colored olivine basalt; highly permeable; important chiefly as an intake area for ground-water recharge.
- Qp** Pyroclastic rocks. Well-consolidated massive to thin-bedded lapilli tuff and tuff-breccia. Moderately permeable; locally yields water to stock wells.

Pliocene

- QTh** Basaltic lava flows. Generally very permeable; important chiefly as intake areas for ground-water recharge. Gray vesicular olivine basalt flows on Big and Little Tablelands and extensive basalt flows south of Lower Klamath Lake, QTh; coarsely vesicular black andesitic basalt near Sheep Mountain, QTh.

Pliocene

- Qv** Older volcanic rocks of the High Cascades. Pale gray olivine basalt and basaltic andesite and discontinuous layers of yellowish tuff and tuff-breccia. Very permeable; important as a ground-water storage reservoir.
- Qtc** Cinder-cone deposits. Red, brown, and black scoria mounds and cinder cones composed chiefly of andesitic and basaltic spines of Pliocene age and younger. Very permeable but largely unsaturated.

Basaltic lava flows

MAJOR UNCONFORMITY

- Tw** Volcanic rocks of the Western Cascades. Chiefly andesitic lava flows and lesser amounts of andesitic tuff-breccia and lapilli tuff. Probably poorly permeable; not tapped by wells.

Inferred contact

Contact of surficial deposits

Fault or fissure

Nonflowing well

Flowing well

Destroyed well

Test well

Spring

N2 Number of well or spring referred to in text

QUATERNARY
 TERTIARY
 QUATERNARY
 TERTIARY

Base from U. S. Geological Survey topographic sheets

Geology by P. R. Wood, 1953-54; geology west of longitude 122° W. modified from Howell Williams, 1949; geologic contacts shown east and southeast of Butte Valley were taken from aerial photographs during a brief reconnaissance

GEOLOGIC MAP OF BUTTE VALLEY REGION, CALIFORNIA, SHOWING LOCATION OF WELLS

