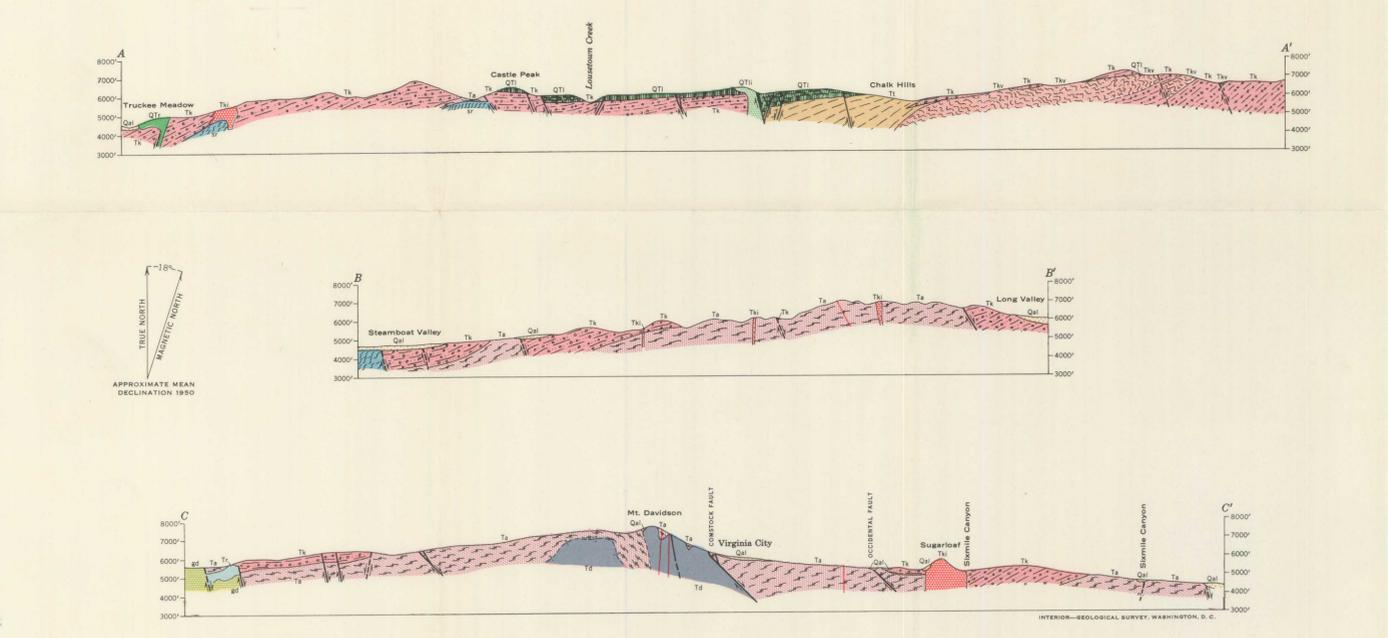


Base from U. S. Geological Survey map of Virginia City quadrangle, Nevada  
Geology by G. A. Thompson, D. E. White, and J. G. Moore, 1948-52; Comstock lode district from detailed map by F. C. Calkins and T. P. Thayer, 1935-39



Scale 1:62,500  
5 Miles  
Contour interval 40 feet  
Datum is mean sea level

### EXPLANATION

**Quaternary**

**Lake Lahontan and post-Lake Lahontan deposits, Q<sub>1</sub> and stream deposits, Q<sub>2</sub>**  
Gravel, sand, and silt; smaller areas shown only where significant; includes some scattered sand deposits near the southeastern corner of the quadrangle and sand and silt of Lake Lahontan proper. Elsewhere the lake deposits were laid down in higher lakes nearly contemporaneous with Lake Lahontan and to post-Lake Lahontan lakes; plays deposits of closed basins are included. The stream deposits, Q<sub>2</sub>, are composed of gravel and sand partly contemporaneous with Lake Lahontan deposits and partly later. Tills, landslides, and mass slumps are included with the stream deposits in the Comstock lode district.

**Pre-Lake Lahontan gravels**  
Older gravels of alluvial fans and pediments. Includes some high terrace gravels that are possibly as old as Pliocene. Distinguished from younger alluvium by relatively mature soil; the leached zone, where preserved, is brown and clayey, and is 2 to 4 feet thick; granitic boulders in this zone are thoroughly rotted, andesitic boulders less so. The underlying zone contains veinlets and beds of calcian carbonate or silica and is about 4 to 10 feet thick; boulders of granodiorite are generally rotted. Areas underlain by the gravel are usually stream with boulders from 6 inches to 16 feet in diameter.

**McClellan Peak olivine basalt**  
Flows, Q<sub>mp</sub>, and cinder cones, Q<sub>mpc</sub>; of gray to black basalt with prominent yellowish-green olivine phenocrysts.

**Muttang andesite**  
Thick flows of gray hornblende andesite. A fine-grained rock containing prominent large hornblende phenocrysts.

**Steamboat Hills rhyolite**  
Domes of extrusive pumiceous rhyolite containing sparse phenocrysts of sanidine, quartz, plagioclase, and biotite.

**Louinstown formation**  
Medium- to dark-gray flows, Q<sub>l</sub>, of basaltic andesite and basalt; intrusions, Q<sub>li</sub>, similar but slightly coarser. Characterized by gray color and well-formed platy parting, with a shon on the parting surfaces resulting from parallel arrangement of the plagioclase laths. Ranges from a fine-grained pyroxene andesite with a basaltic habit and appearance to siliceous basalt. Flows less than 20 feet thick with vesicular tops. Generally lies with marked angular unconformity on the Truckee formation and older rocks. A few feet of underlying stream gravel included in some places. In Steamboat Hills probably contemporaneous with or younger than Steamboat Hills rhyolite; elsewhere older.

**Knickerbocker andesite**  
(Distinguished only in the Comstock lode district)  
Dark pyroxene andesite with a thin buff-colored rind on weathered surfaces. Partly olivine bearing. Intrusive in part.

**Washington Hill rhyolite**  
Domes and possible flows of detritified rhyolitic glass containing sparse phenocrysts of plagioclase and biotite. Some perlitic in smaller mass. Contemporaneous with upper part of Truckee formation.

**Truckee formation**  
Sedimentary rocks deposited in streams and lakes, with intercalated tuff. Includes diatomite, shale, sandstone, conglomerate, and pumiceous tuff-breccia; sediments derived mainly from andesitic and rhyolitic source rocks. Locally intertongues with the upper part of the Kate Peak formation.

**Quartz veins**  
Only large areas of quartz are shown.

**Kate Peak formation, T<sub>k</sub>, with vitrophyre member, T<sub>kv</sub>, and intrusive andesite porphyry, T<sub>ki</sub>**  
Lavas, flow breccias, and agglomerates composed chiefly of hornblende andesite, biotite-hornblende andesite, and pyroxene andesite; includes some interstratified volcanic rocks as well as basalt and as well as rhyolite. The vitrophyre member is made up of flows of partly detritified rhyolite glass containing some phenocrysts of plagioclase, biotite, hornblende, and, rarely, quartz. The intrusive rock is most commonly biotite-hornblende andesite porphyry with a siliceous groundmass and plagioclase phenocrysts as much as half an inch in diameter; a few hornblende andesite dikes that may belong to the Alta formation are included. The Kate Peak formation is distinguished from the Alta formation by its stratigraphic position, reddish-brown color, porous texture, and less intense alteration; the rock is strongly porphyritic, with an ophiolitic to fine-grained groundmass; biotite is present in places and plagioclase phenocrysts are generally larger than in the Alta formation. Most of these criteria, however, may be missing locally.

**Davidson granodiorite**  
Light-gray medium-grained intrusive rock composed of plagioclase, green clusters of altered orthoclase, minerals (pyroxene, hornblende, biotite), orthoclase, and quartz. The orthoclase and quartz are fine grained and inconspicuous. In the smaller intrusions biotite the rock is strongly porphyritic, with an ophiolitic to fine-grained groundmass; orthoclase and quartz are almost entirely in the groundmass.

**American Ravine andesite porphyry**  
(Distinguished only in the Comstock lode district)  
Most abundant type is fine-grained medium- to light-gray hornblende andesite with a milky tuff, which is a result of parallel orientation of minute plagioclase laths. Includes some coarser andesite porphyry on the southwest side of American Ravine.

**Alta formation, T<sub>a</sub>, with Sutrö member, T<sub>s</sub>**  
Lavas, pyroclastic rocks, and possibly intrusions of hornblende and pyroxene andesite; generally dark colored and extensively altered. The Sutrö member, which is present only in the Comstock lode district, is a sedimentary rock derived in large part from rhyolite and andesitic volcanic rocks; it ranges in texture from shale to conglomerate, with grayish-green shale especially characteristic.

**Hartford Hill rhyolite tuff**  
Light-pink to dull-purple tuff, tuff-breccias, and sandstone. Composed largely of detritified fragments of pumice and glass, with a variable proportion of crystals of quartz, orthoclase, plagioclase, and biotite. Fragments of granitic and metamorphic rocks are abundant in places.

**Granodiorite, g<sub>1</sub>, and foliated granodiorite, g<sub>2</sub>**  
Most abundant type is a light-gray medium-grained plutonic rock that consists of 20 percent quartz, 20 percent plagioclase, 15 percent orthoclase, and 15 percent hornblende and biotite. Includes small areas of quartz monzonite, oligite, and pegmatite. The foliated granitic rock near the southwestern corner of the quadrangle is characterized by aligned biotite and a porphyritic appearance, seemingly caused by movement during consolidation.

**Metavolcanic rocks**  
Mainly dark-grayish-green rocks irregularly stained with iron oxides. Composed of sodic plagioclase and amphibole, with variable amounts of quartz, biotite, chlorite, and epidote. Regionally and thermally metamorphosed basalt and andesite.

**Metamorphosed sedimentary rocks**  
Argillite, slate, hornfels, and contact schist, with some conglomerate and some limestone and marble. The conglomerate is composed mainly of andesite pebbles; the finer grained rocks were originally tuffaceous sediments in large part.

**Bleached rocks**  
(Shown by black dot pattern superimposed on several formations)  
White, yellow, and reddish-brown rocks subjected to near-surface acid attack resulting from oxidation of pyrite contained in the rock from an earlier alteration, which locally affects all rocks older than the Truckee formation, or from oxidation of native hydrogen sulfide (near Steamboat Springs). Basic and intermediate rocks are partly or wholly converted to mixtures of clay, opal, and quartz in variable proportions; quartz-bearing rocks are similarly altered but have residual quartz. Calcite and gypsum abundant locally.

**Hot-spring deposits**  
Siliceous sinter, Q<sub>h</sub>, and travertine, Q<sub>t</sub>, deposited by thermal springs. Age ranges from Pleistocene to Recent.

**Contact, showing dip**  
Dashed where approximately located, short dashed where indefinite or gradational.

**Concealed contact**  
Dashed where approximately located, dotted where concealed. U, upstream side; D, downstream side.

**Fault, showing dip**  
Vertical fault

**Doubtful or probable fault**  
Strike and dip of beds  
Sedimentary rocks, bedded pyroclastic rocks, and lava flows

**Horizontal beds**  
Strike and dip of planar structure  
Platy parting in lava flows and shallow intrusions; foliation in granitic and metamorphic rocks

**Strike of vertical planar structure**  
Strike and dip of joints in granitic rocks

**Anticline, showing trace of axial plane**  
Dashed where approximately located

**Syncline, showing trace of axial plane**  
Dashed where approximately located

INDEX MAP SHOWING LOCATION OF VIRGINIA CITY QUADRANGLE

INDEX MAP SHOWING LOCATION OF COMSTOCK LODE DISTRICT

## GEOLOGIC MAP AND SECTIONS OF THE VIRGINIA CITY QUADRANGLE, NEVADA