

Roadlog - Geiger Grade to Virginia City

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<u>Distance</u>	<u>Cumulative mileage</u>	
0.0	0.0	Intersection of U.S. Route 395 and Nev. Route 341. Proceed east on Route 341. Hydrothermally altered rocks of the Geiger Grade altered area are visible as white to pale brown patches on the slopes ahead. Because the pastel colors contrast with the relatively dark colors of the original andesites that have been altered, Thompson (1956) termed these rocks bleached. The exposed area of strongly altered rocks in the Geiger Grade area is about 14 km <sup>2</sup> . Alteration assemblages present include: alunite-quartz, pyrophyllite-quartz-diaspore, kaolinite-quartz, illite-quartz, sericite-quartz, smectite-quartz, metahalloysite-quartz. The alteration distribution is controlled by numerous fracture zones with roughly N-S and E-W orientations. These are commonly manifest by bold exposures of alunite-quartz alteration. Hydrothermal breccias often occur along the fracture zones. Host rocks for the alteration and pyritization are the Miocene Alta Formation and flow and dikes of the Miocene Kate Peak Formation. The alteration is probably about the same age as the Comstock. The Geiger Grade alteration probably overlies a buried porphyry copper system.
0.5	0.5	Quarry for lightweight aggregate located in a dome of rhyolite of Pleistocene (1.2 m.y.) age can be seen on the left (north-east) side of the highway at a distance of about 2 km.
1.2	1.7	Begin climb up Geiger Grade.
1.2	2.9	<u>STOP 1.</u> Clay pit on right (south) side of highway. Material from the pit was used to make bricks during the first half of the century. Most of the pit is in andesite of the Alta Formation, but in the center of the pit is a porphyritic plagioclase-biotite dacite that may be a feeder dike(?) for a flow of the Kate Peak Formation. All rocks exposed in the pit have under gone argillic alteration and

all are oxidized except for several pods of relict unoxidized pyritic rock with illite and montmorillonite 2 to 3 m. above the floor of the central part of the pit. Metahalloysite-rich rocks exposed in the easternmost part of the pit probably originally contained hypogene halloysite. Clay minerals in rocks in the west part of the pit, which are transitional to rocks with propylitic assemblages, are more problematic, and could be largely or entirely of supergene origin. Prominent resistant ledges across the draw approximately 300 m. to the northeast have strong quartz-alunite-pyrite alteration. On both sides of the road about 100 m. to the northeast are excellent exposures of ferricrete.

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| 0.3  | 3.2  | Curve in road. Note adit on right side of road approximately 100 m. to southwest. Dump at the mouth of adit contains fragments of hydrothermal breccia with quartz-kaolinite-pyrite alteration and traces of enargite. Proceeding up the Geiger Grade, note that in many places soil developed on altered areas support only Jeffrey pine ( <u>Pinus jeffreyi</u> ) whereas elsewhere the vegetation is mainly pinyon, juniper, and sage. |
| 0.25 | 3.45 | Unaltered volcanic breccia of the Kate Peak Formation. This rock is typical of the abundant breccias in the Kate Peak. The most common rock type is porphyritic dacite. Fragments and matrix are usually similar in composition. The breccias of the Kate Peak probably include tuff breccias, flow breccias, and lahars.   |
| 0.5  | 3.95 | Return to mostly altered Alta Formation. Unaltered basaltic andesite of the Lousetown Formation caps the hill at 11 o'clock.  |
| 0.25 | 4.2  | <u>STOP 2.</u> The top of the hill ahead is a quartz-alunite ledge. Pyroxene andesite of the Alta Formation forms the road cut on the left (east) side of the road. Unaltered andesite, in part with a glassy matrix, is in contact with oxidized propylitized andesite which contains some patches of partly   |



oxidized pyritic propylitized rock and other patches of pyrite-poor to pyrite-free propylitized rock. The least altered rock is as fresh as can be found in the type area of the Alta. Note the prominent patches of unaltered Alta on the right (west) side of the highway. The lack of alteration in these patches of Alta is probably due to impermeability at the time of alteration.

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| 0.3 | 4.5 | Roadcut on left (west) exposes rocks with variable argillic (montmorillonite, sepiolite, kaolinite) alteration with quartz-alunite ribs.   |
| 0.3 | 4.8 | <u>STOP 3.</u> Geiger Lookout. Roadcut on left (east) exposes hydrothermal breccias. The breccias are matrix supported and irregularly cross cut the Alta andesites. The alteration is alunite-quartz mainly in the breccias and pyrophyllite-quartz with minor diaspore mainly in the unbrecciated wall rocks. The alunite contains subequal amounts of alunite and natroalunite components. Walk down (west) to overlook. The outcrop at the overlook is a fragment supported hydrothermal breccia. The alteration is alunite-quartz. On the south end of the outcrop is a narrow faulted breccia. White cement on the west side of the outcrop is supergene(?) alunite. |
| 1.0 | 5.8 | Note the prominent ledges on the hills on both sides of the road with quartz-alunite alteration.   |
| 0.4 | 6.2 | <u>STOP 4.</u> Most of this road cut consists of quartz-alunite-pyrite altered rocks of the Kate Peak Formation. On the west end of the bend is montmorillonite-quartz altered rock. The east end of the bend exposes rocks containing pyrophyllite-quartz alteration and quartz-alunite alteration with unoxidized pyrite. On the bend are hydrothermal breccias. Some contain fragments of pre-Tertiary plutonic and metamorphic rock. Pre-Tertiary basement crops out at the bottom of the Geiger Grade, suggesting at least 400 m. of vertical transport.  |

1.4	7.6	Old Geiger Grade historical marker on right (south) side of highway. Note Jefferey pine growth on soil derived from altered rock on the slope below the marker. The road cut on the left(north) side of the road is described by Whitebread (1976, fig. 10).
0.65	8.25	Outcrops of intrusive rocks of the Kate Peak Formation, including both unaltered and weakly to moderately altered varieties.
0.15	8.4	Begin outcrops of propylitically altered Alta Formation.
1.1	9.5	Geiger Summit. Outcrops ahead in the distance are unaltered flows of the Kate Peak Formation. Road cuts ahead are mostly unaltered flows of the Alta Formation.
0.8	10.3	Hills in the distance on the left side of the road (east) are underlain by lavas of the Kate Peak Formation. White outcrops are beds of diatomite. To north is the western end of the Geiger Grade altered area.
1.1	11.4	Surface of east-dipping Comstock fault is visible ahead to the south.
0.15	11.55	Beginning at this point, flows of the Alta Formation exposed in road cuts are commonly propylitized.
0.45	12.2	<u>STOP 5.</u> Road cut exposing propylitically altered andesite of the Alta Formation. Rock of this type having the assemblage epidote-albite-chlorite-calcite exposed in the Virginia City area are the type propylite of von Richtofen. The dike of dacite of the Kate Peak Formation cuts the Alta in the northwestern part of the road cut. The dike is somewhat altered and quartz veins can be seen cutting across the contact. Very similar, although more intense, quartz veining can be seen underground in the Comstock district.
0.7	12.9	Sierra Nevada Shaft to the left (east) of the highway.
0.4	13.3	Enter Virginia City.

- 0.2      13.5      Nevada Centennial Marker describing the Comstock Lode district is on the left (east) side of the road. The viewpoint provides an overview of the Virginia City area and the north end of the Lode. Mt. Davidson is on the uphill (west) side of town, to the south. The apex of the Comstock Lode (and the trace of the Comstock Fault) is along the west side of town, at the foot of Mt. Davidson, marked approximately by a line of shafts and cuts that exploit the Lode from the surface to depths of about 700 ft. (215 m.) The major shafts of the "Bonanza Group" including the Ophir and Consolidated Virginia, and the "Central Group" including various shafts on the Gould and Curry, Savage, Hale and Norcross, and Chollar claims, are mostly not visible from this viewpoint, but the large dumps of these mines are visible below the main street of Virginia City. Dumps of the C. & C. and combination shafts are visible to the southeast and the south-southeast. Production from these two shafts at depths greater than 2500 ft. (780 m.) is relatively minor.
- 0.1      13.6      Turn left (east) on to Carson Street.
- 0.1      13.7      Bear left to Masonic Cemetery.
- 0.2      13.9      STOP 6. Masonic Cemetery parking lot. Walking tour of alteration in the hanging wall of the Comstock Lode.
- Many of the boulders bordering the parking lot are stock work from the Comstock. Note the numerous generations of veins. A few have visible adularia (whiter than quartz on margins of vein). Also blocks of unaltered Kate Peak Formation.
- Proceed along northern road to the east about 800 ft. (260 m.) to road cut below Masonic Cemetery.
- STOP 6A. Just below the Masonic Cemetery are several ledges of alunite-quartz alteration (hard material) with selvages of pyrophyllite-kaolinite-quartz-diaspore alteration 30 to 500 cm wide. Zoned outward (east) is montmorillonite-quartz alteration with narrow zones of sericite-quartz alteration.



Continue along road about 900 ft. (300 m.) to Union Shaft.

STOP 6B. The dump of the Union Shaft contains all of the major rock types exposed at depth. Included are the Davidson Granodiorite (phaneritic), Triassic(?) meta-andesite (weakly schistose), Alta Formation (fine-grained porphyritic andesite) and intrusives of the Kate Peak Formation (large phenocrysts). Many of the rocks contain quartz veins, some of which are as stock works. Some veins contain visible sphalerite and pyrite with minor galena and chalcopyrite.

Continue northeast to ridge about 1100 ft. (260 m.)

STOP 6C. Most of the ridge is quartz-alunite alteration forming the bold outcrops. Isolated blocks contain unoxidized pyrite. Softer material is pyrophyllite-kaolinite-quartz-diaspore and sericite-quartz alteration. The prominent across the canyon to the northeast have similar types of alteration.

Return to Masonic Cemetary parking lot. along the way to the Union Shaft are exposures of altered rocks containing variously pyrophyllite, sericite, illite, kaolinite and quartz.

0.3	14.2	Intersection of Carson Street and C Street (Route 341). Turn left (south) on to C Street.
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0.85	15.05	Intersection of Routes 341 (straight) and 340 (left) and B Street (right). Turn right on to B Street. Loring Cut across street.
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STOP 7. Loring Cut. Quartz vein is boldly exposed on the floor of the cut to the west as well as on the benches on the south (far) end of the cut. Locally good stock work veining is exposed. The quartz contains very low gold values. The gouge near an exposed underground working on the road in the southeast central part of the cut contains higher gold values. Alteration in the cut is kaolinite-quartz and sericitic-quartz around the quartz veins and propylitic alteration distal to the veins.



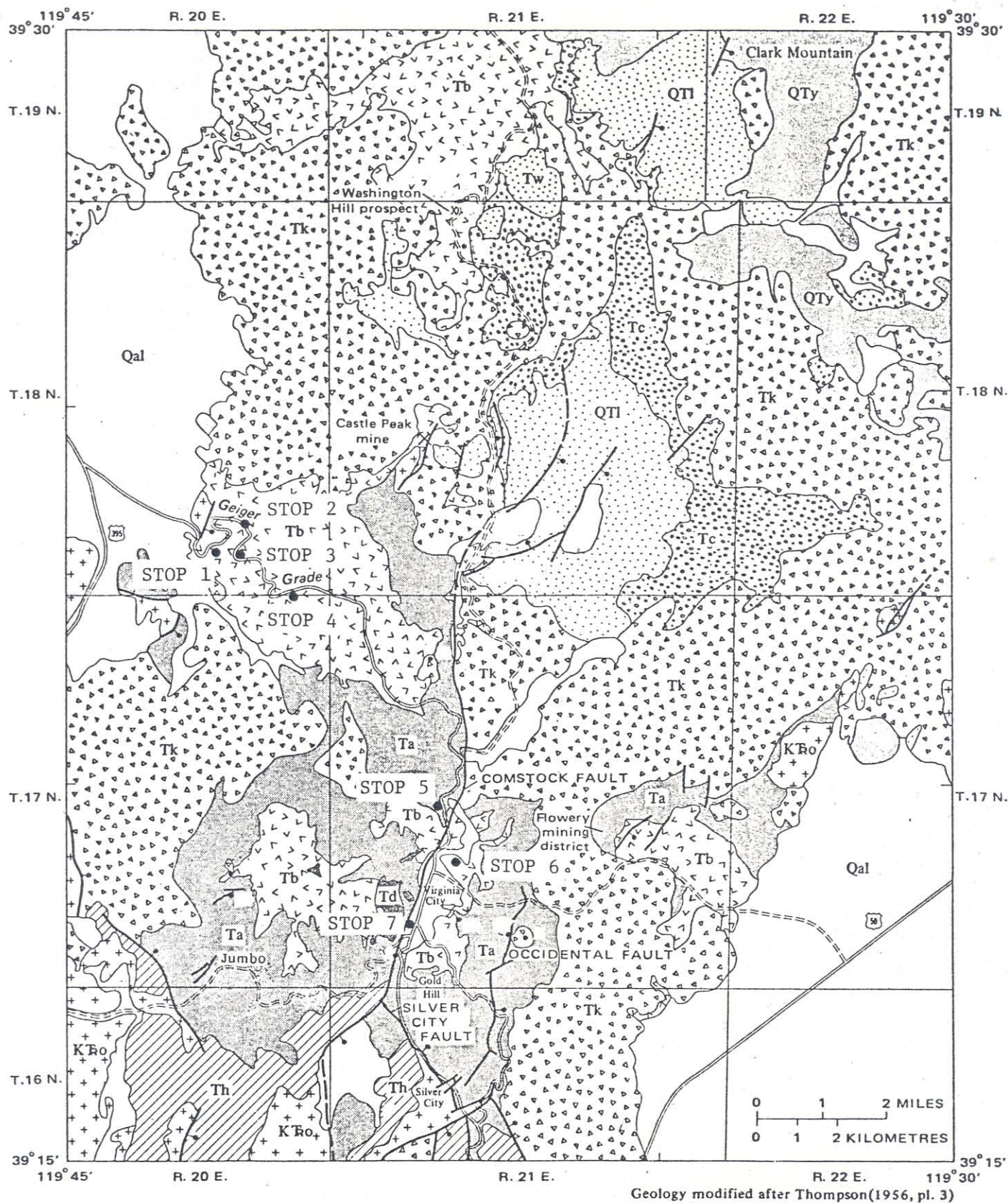


FIG. 1. Geologic map of part of the Virginia Range, Nevada, showing the location of field trip stops.. Modified from Whitebread (1976, p. 4).

# EXPLANATION

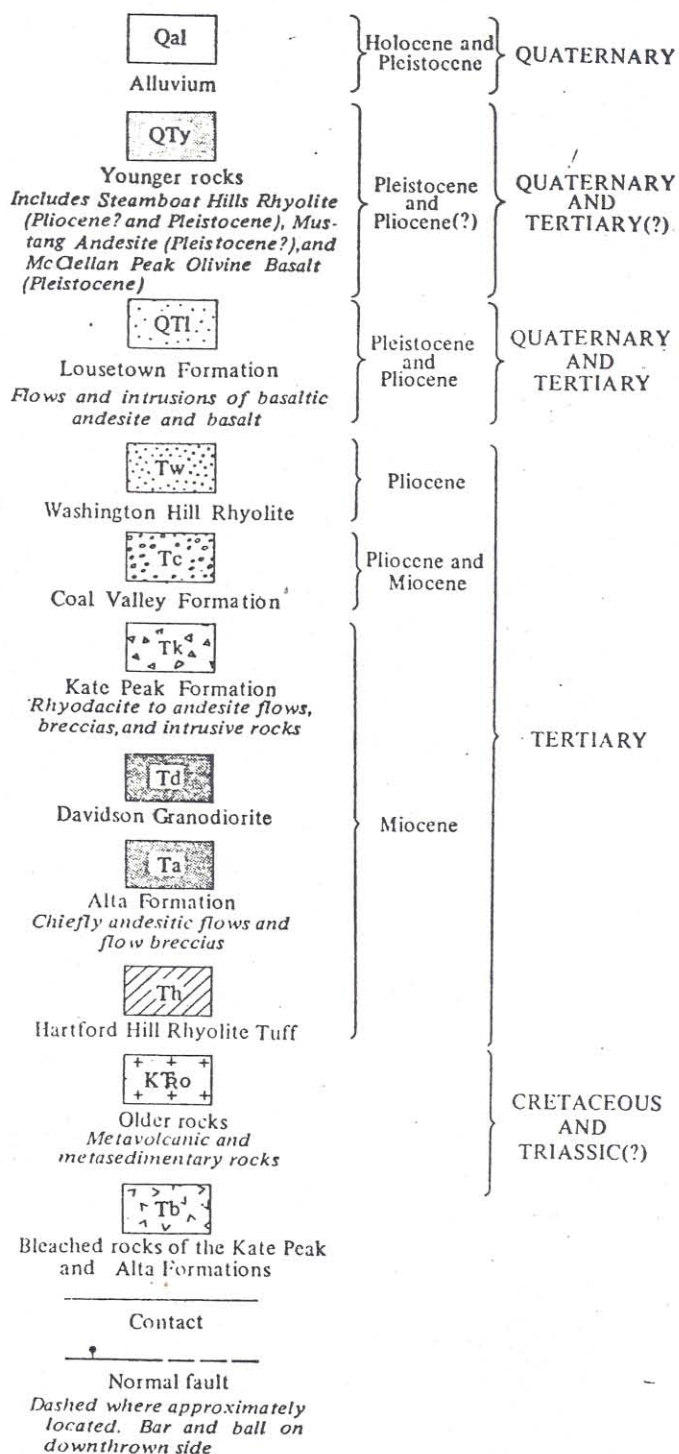


Figure 1 continued.



