

SURFICIAL DEPOSITS

Qal Channel deposits Unconsolidated alluvium in active channels on alluvial fans and within highlands. Composed of poorly sorted sand- to boulder-sized clasts.

Qf Alluvial fan deposits Unconsolidated fluvial and debris-flow deposits in modern alluvial fans. Composed of poorly sorted sand to small cobbles, mostly of tuff of Fairview Peak. Forms continuous fan deposits with smooth, life-scoured, upper surface.

Qc Colluvium Loose debris along the steep eastern flanks of Fairview Peak; composed mostly of tuff of Fairview Peak. Only larger, more continuous deposits mapped.

Qls Landslide deposits Unconsolidated debris composed of coarse blocks of tuff of Fairview Peak. Forms single areas along east face of ridge approximately 4.5 km south of Fairview Peak.

Qol Older alluvial fan deposits Unconsolidated fluvial and debris-flow deposits in older alluvial fans. Composed mostly of poorly sorted sand to small cobbles of tuff of Fairview Peak. Forms discontinuous fan remnants with closely to moderately dissected upper surface. Older alluvial fan deposits on different sides of Fairview Peak are not necessarily contemporaneous.

Qdp Dissected playa Unconsolidated silt and other fine sedimentary deposits in Bell Flat. Area was probably a closed depression on downthrown side of Fairview fault before headward erosion of Bell Canyon allowed drainage westward to Fairview Valley.

Tg Gravel Coarse, poorly to moderately cemented gravel composed of rounded clasts of tuff of Fairview Peak, basal of Bell Canyon, and other volcanic rocks up to 50 cm in diameter. Occurs along west side of the Fairview Range near Bell Canyon, where it was probably deposited by alluvial fans draining the Fairview Range. Dips shallowly to west so involved in some siping. Locally difficult to distinguish from, and probably genetically related to, older alluvial fan deposits (Qol). Probably late Miocene to Pliocene.

Volcanic, Volcaniclastic, and Hypabyssal Intrusive Rocks

LATE MITHRACALDERA DIKES Rhyolitic to dacitic, mostly east-striking dikes that intrude tuff of Fairview Peak and continue eastward into Bell Mountain Quadrangle. May have been formed by areas that formerly overlaid the tuff within the caldera.

Tbq Plagioclase-biotite-quartz phytic dikes Several dikes up to 15 m wide that form partly anastomosing, several kilometers long. Contain 20 to 40% phenocrysts of plagioclase, biotite, quartz, and minor hornblende.

Tbpb Plagioclase-biotite-hornblende phytic dikes A single thick dike that widens into an irregular stock about 500 m across at the eastern edge of the quadrangle. Contains 30 to 25% phenocrysts of plagioclase, biotite, hornblende, and, rarely, sanidine. ⁴⁰Ar/³⁹Ar age on the stock in the Bell Mountain Quadrangle 300 m east of the boundary is 18.82 ± 0.08 Ma (sandrine; H95-91).

RHYOLITIC LAVA DOMES

Td Sparingly porphyritic rhyolite Forms several low ridges of rhyolite. Flow-banded, high-silica rhyolite near the probable buried continuation of the southern margin of the Fairview Peak caldera in Bell Flat. Contains a few percent small (< 1 mm) phenocrysts of plagioclase and sanidine in a strongly oxidized groundmass. Similar rocks, as well as related air-fall tuff, near-source pyroclastic deposits, and level dikes, are extensive along the northern margin of the caldera in the Bell Mountain Quadrangle and may be related. ⁴⁰Ar/³⁹Ar age on rocks in the Bell Mountain Quadrangle range from 18.88 ± 0.04 Ma (sandrine; H95-107) to 18.95 ± 0.06 Ma (sandrine; H95-91).

LAGES OF BELL CANYON Complex assemblage of rhyolitic to andesitic and one basaltic andesite lava, lava domes, dikes and other shallow intrusions, and related pyroclastic and sedimentary deposits that crop out extensively in Bell Canyon along the southern edge of the Fairview Peak caldera. Cumulatively at least 500 m thick. Dikes strike predominantly west-northwest, parallel to caldera margin and to the major reurgent fault. Rocks in the western part of Bell Canyon are extensively hydrothermally altered.

Tba Basaltic andesite lava Single, black, massive to scoriaceous flow containing 10% phenocrysts of plagioclase, idiosyncratic olivine, and magnetite. Approximately 20 m thick.

Tbr Rhyolite lavas Thick, massive, light-gray flows of devitrified to rarely perlitic rhyolite. Individual flows are as much as 120 m thick. Contains 3 to 8% phenocrysts, including subequal amounts of plagioclase and sanidine, lesser biotite, and minor hornblende and oxides. ⁴⁰Ar/³⁹Ar age is 18.88 ± 0.06 Ma (sandrine; H93-20).

Tbd Dacite lavas Thick, massive to brecciated flows of devitrified to perlitic dacite. Contains 20 to 40% phenocrysts, mostly of plagioclase with abundant biotite and hornblende in variable proportions, and Fe-Ti oxides.

Tad Andesite lavas Moderately thick, massive flows and black, vitrophylic flow breccia of abundantly porphyritic andesite. Crystalline andesites typically have coarse, clay, subhorizontal flow bands. Contains 35 to 40% phenocrysts of plagioclase, clinopyroxene, and oxides.

Ti Intermediate intrusion Finely porphyritic to aphyric, highly altered, platy, andesitic intrusion. Contains sparse phenocrysts of plagioclase altered to clay and abundant pyrite. Occurs along north-striking part of reurgent fault through the Gold Coin Mines and locally emplaced into the fault.

Tp Rhyolite dikes Dikes of sparsely porphyritic rhyolite petrographically similar to rhyolite lavas (Tbr) and probably feeders for them. Dikes range from 3 m to rarely as much as 150 m wide. One dike was emplaced having contact with basal of Bell Canyon and pre-Tertiary rocks in the caldera wall. ⁴⁰Ar/³⁹Ar age of this dike is 18.97 ± 0.03 Ma (sandrine; H93-82).

Tdp Dacite intrusions Dikes and larger, irregular intrusions of dacite. Includes a large, irregular intrusion of dacite intruding northward to abundance porphyritic dacite petrographically similar to dacite lavas (Tbd) and probably feeders for them. Dikes range from a few meters to as much as 40 m wide; larger intrusions are as much as 1 km in diameter. Dikes were emplaced along the major reurgent fault in the northern part of Bell Canyon that uplifted tuff of Fairview Peak on north against basal of Bell Canyon on south. ⁴⁰Ar/³⁹Ar age on the dikes is 18.85 ± 0.12 Ma (hornblende; H95-46).

Tda Andesite dikes Dikes of abundantly porphyritic andesite petrographically similar to andesite lavas (Tba) and probably feeders for them. Dikes are a few meters to about 10 m wide and up to 1 km long.

Tt Tuff and volcaniclastic sedimentary rock Heterogeneous assemblage of coarse to fine tuff and volcaniclastic sedimentary rock. Coarse, massive tuff, probably proximal fall deposits, contains blocks of basal of Bell Canyon up to several meters in diameter in a locally pumiceous matrix that is commonly altered to clay in the western part of Bell Canyon. Bedded air-fall tuff is in beds 3 to 20 m thick composed of tuffs of Bell Canyon and white pumice containing phenocryst assemblages similar to those of the lavas. Sedimentary rocks range from coarse, debris-flow deposits similar to those in unit Tpx through coarse conglomerate to massive to finely laminated, tuffaceous sandstone and siltstone. Clasts are mostly of basal of Bell Canyon but debris deposits commonly contain amphibolite and granite.

Tg Granite debris Coarse, unconsolidated debris shed from the southern wall of the Fairview Peak caldera and consisting mainly of blocks of Cretaceous granitic rocks. Similar depositional environment to debris deposits (Tpx) but contemporaneous with lavas of Bell Canyon.

TUFF OF FAIRVIEW PEAK Complex assemblage of densely to poorly welded, rhyolitic ash-flow tuff, megabreccia (large caldera-collapse breccia), and, in upper part, debris-flow deposits that accumulated almost entirely within the Fairview Peak caldera. Caldera collapse occurred during eruption of the tuff of Fairview Peak.

Tps Sedimentary rocks Well-bedded, partly tuffaceous conglomerate, sandstone, and siltstone that overlie the ash-flow tuff (Tf) in low hills southwest of the Bell Mountain mine. Overall sequence appears to fine upward. Probably grades vertically into unit Tbt and, in part, is laterally equivalent. Exposed thickness is approximately 40 m.

Tpb Debris deposits Lenses and irregular masses of breccia, coarse, massive to crudely bedded debris-flow deposits, and minor bedded tuff composed of material collapsed from caldera walls. Breccia consists of angular clasts, generally of a single rock type, up to several meters in diameter in a matrix of more finely ground material of the same type. Debris-flow deposits consist of angular to moderately rounded clasts locally disarticulated, and lithologically diverse fragments also up to several meters in diameter in a granular, mostly non-tuffaceous matrix. Clasts include amphibolite, granite, and various volcanic rocks, rock types that make up the adjacent caldera wall. Interbedded with and overlying uppermost part of unit Tf.

Megabreccia Large blocks, consisting mostly of andesite and flow-banded rhyolite, slumped from the caldera wall and incorporated within units Ttp and Tpx. Commonly up to about 70 m in diameter, with one composite block nearly 2 km long. Mapped only where greater than about 3 m in diameter.

Tp Ash-flow tuff Compound cooling unit of light red-brown, devitrified, densely to poorly welded, rhyolitic ash-flow tuff. Widely deposited within the Fairview Peak caldera except for outflow deposits in the northern part of the quadrangle. Minimum intercalars thickness of 700 m estimated from outcrop in the east face of Fairview Peak. Contains 7 to 10% and, rarely up to 15%, phenocrysts of plagioclase, sanidine, biotite, and quartz. Contains mostly small, sparse, lentic fragments of Cretaceous granitic rock up to 40 cm in diameter occur throughout the caldera. Petrographically altered throughout most of the caldera. ⁴⁰Ar/³⁹Ar ages of 19.25 ± 0.03 Ma and 19.22 ± 0.03 Ma were determined on sanidine from samples from the Bell Mountain Quadrangle.

Rocks of the Fairview Mining District

Heterogeneous assemblage of intermediate to silicic volcanic and shallow intrusive rocks. The rhyolite intrusions (Tr), rhyolite tuff (Ttr), and tuff of the Pyramid (Tf) are probably related to the Fairview Peak caldera whereas the tuff of Elevenmile Canyon (Tte) and older andesite (Tba) may be from distal or much older sources. Most rocks are porphyrolytically altered and contain abundant epidote, sericite, chlorite, calcite, and pyrite. They are also commonly silicified, especially along the prominent east-northeast-trending veins that hosted ore in the Fairview district.

Tr Rhyolite intrusions Numerous, mostly bleached white, flow-banded dikes and small intrusions. Aphyric to moderately porphyritic; contain phenocrysts of sanidine, plagioclase, quartz, and biotite. ⁴⁰Ar/³⁹Ar age is 19.31 ± 0.06 Ma (sandrine; H95-5).

Ttr Rhyolite tuff Apex of coarse debris to bedded tuff adjacent to and probably aneuphotic equivalent of rhyolite dome (Ttr) in the center of the Fairview district. Coarsest deposits contain angular, matrix-supported blocks of sparsely porphyritic rhyolite, lithologically similar to adjacent dome, in a matrix of pumice and finer clasts. Bedded tuff is clay to finely sandstone.

Tte Tuff of the Pyramid Coarse, lentic, densely to poorly welded ash-flow tuff that rests depositional upon andesite intrusion (Tba) in the eastern part of the district. Contains 15 to 20% phenocrysts, mostly of plagioclase with quartz, sanidine, and biotite. Lithic fragments include spherulitic rhyolite, porphyritic intermediate volcanic rock, and Cretaceous granitic rock up to 40 cm in diameter. Also includes an area of coarse, crudely bedded tuff containing blocks up to 2 m in diameter that crops out along the ridge approximately 1.5 km north of Fairview Peak.

Tty Younger dacite Medium- to dark-gray, massive, porphyritic dacite or andesite that is probably mostly intrusive, including one dike, and possibly some lava. Contains 20 to 25% phenocrysts of plagioclase, prominent hornblende, and Fe-Ti oxides. Dike is mostly altered to chlorite + epidote. ⁴⁰Ar/³⁹Ar age is 20.02 ± 0.10 Ma (hornblende; H95-16).

Ttl Andesite intrusion Medium-gray, massive to commonly intrusively banded, porphyritic andesite makes a large, probably intrusive body at least 2 km across in the eastern part of the Fairview district to northeast of Fairview Peak, makes up much of the northern part of the caldera wall, and is a common dike in the tuff of Fairview Peak. Contains 30 to 40% phenocrysts, mostly of tracyitic plagioclase and clinopyroxene, with minor biotite, possible quartz, orthopyroxene, and Fe-Ti oxides.

Ttd Dacite Massive, dark-gray, moderately porphyritic dacite that forms most outcrops in the central part of the Fairview district. It is intensely porphyrolytically altered and commonly kaolinized. The unit is probably mostly intrusive but includes a tuff of Elevenmile Canyon (Tte) and includes some lava. Contains 20 to 25% phenocrysts, mostly of plagioclase with minor quartz and altered biotite, hornblende, and sanidine(?). Unit is the dominant host of precious-metal-bearing quartz veins of the district. Equivalent to late andesite of Schrader (1947).

Tti Porphyritic intrusions Numerous east-striking dikes and irregular bodies of porphyritic dacite that grades into more andesitic intrusions. Contains 20 to 25% phenocrysts, mostly of plagioclase with minor quartz and altered biotite, hornblende, and sanidine(?). Unit is the dominant host of precious-metal-bearing quartz veins of the district. Equivalent to late andesite of Schrader (1947).

Ttj Tuff of Elevenmile Canyon (?) Green, abundantly porphyritic, coarsely lentic, rhyolite to dacitic(?) ash-flow tuff. Contains about 50% phenocrysts, mostly of plagioclase, with quartz, sanidine, and altered biotite and hornblende. Lithic fragments up to 50 cm in diameter include Cretaceous granodiorite and various Tertiary porphyritic granitic rocks. Crops out extensively in the Fairview district and to the north in the southern part of the Drum Summit Quadrangle. Approximately 150 m thick. Texturally correlated with Tuff of Elevenmile Canyon (John, 1992b, 1993a, b; D. A. John, personal communication, 1994), which erupted at about 25 Ma from a caldera in the Silver Star Range 20 km to the north. However, blocky nature of coarse lithic fragments suggests a source in the Fairview area.

Tto Older andesite lavas Dark gray, abundantly porphyritic andesite lava flows. Contains 60% phenocrysts, mostly of the plagioclase type, with lesser clinopyroxene and altered hornblende(?). Forms several flows that rest upon pre-Tertiary granitic and metamorphic rocks in the tuff of Elevenmile Canyon(?) southwest of the Fairview district. Approximately 150 m thick.

Miscellaneous Intrusion

Tb Basalt intrusion Single body of porphyritic basalt or basaltic andesite that intrudes Cretaceous granodiorite near the southwestern corner of the quadrangle. Phenocrysts are abundant plagioclase laths up to 1.5 cm long, mostly altered olivine and clinopyroxene. Petrographically similar to, and probably related to, a sequence of Cretaceous basaltic andesite lavas that are extensive in the northern part of the State Mountain Quadrangle to the south.

CRETACEOUS

Tg Granite intrusion Medium- to coarse-grained, equigranular to coarsely porphyritic biotite hornblende granodiorite, up to 1 mm long is a ubiquitous accessory. Granodiorite at State Mountain contains common megacrysts of potassium feldspar up to 5 cm long. Pegmatite and apatite form numerous, mostly east-striking dikes in the northern end of State Mountain. Intrusion there may be a laccolite because the contact with rhyolite and numerous sills occur in adjacent metamorphic rock. John (1992a) reported a Rb-Sr age of 82-81 Ma for intrusion at State Mountain.

METAMORPHIC ROCKS JURASSIC-TRIASSIC(?)

All metamorphic rocks in the Bell Canyon Quadrangle were included in the Triassic-Jurassic volcaniclastic rocks and limestone unit of Wilken and Speed (1974) within the Sand Springs terrane by Greene and others (1991) and Oldow and others (1995). A minimum age for these rocks is indicated by a U-Pb age on zircon of 237.5 Ma (early Middle Triassic) for a quartz porphyry intrusion that cuts metamorphic rocks in the Sand Springs Range west of the Bell Canyon Quadrangle (Satterfield and Oldow, 1999). In contrast, Greene and others (1991) reported sparse Late Triassic and Early Jurassic fossils from similar rocks elsewhere in the Reno 11' x 2' Quadrangle. Rocks at State Mountain are lithologically distinct, and have higher metamorphic grade (amphibolite facies), than rocks in the Fairview district (greenschist).

FAIRVIEW DISTRICT

Tm Metasedimentary rocks Dark-gray quartzite grading to phyllitic sandstone and shale. Sandstone and shale form fine up to 1 mm long is a ubiquitous accessory. Granodiorite at State Mountain contains common megacrysts of potassium feldspar up to 5 cm long. Pegmatite and apatite form numerous, mostly east-striking dikes in the northern end of State Mountain. Intrusion there may be a laccolite because the contact with rhyolite and numerous sills occur in adjacent metamorphic rock. John (1992a) reported a Rb-Sr age of 82-81 Ma for intrusion at State Mountain.

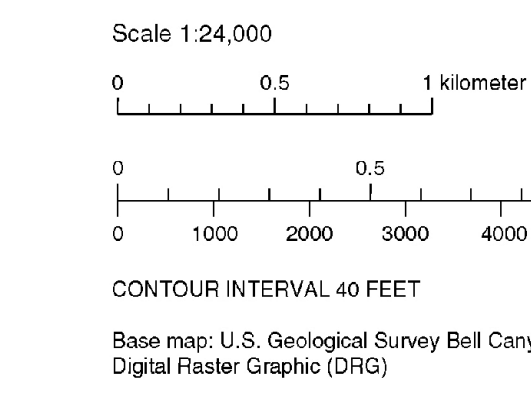
SLATE MOUNTAIN

Tsh Metarhyolite Two 3- to 4-m-thick, massive porphyritic lenses that parallel bedding and probable bedding in amphibolite. Thickness of lenses and lack of breccia or pyroclastic features such as lithic fragments suggest that the rhyolites are sills. Phenocrysts consist of quartz, now mostly polycrystalline aggregates (5%), plagioclase partly altered to muscovite (5%), and probable biotite altered to aggregates of Fe-Ti oxides (1%). These intrusions may be the same age as the 237.5-Ma quartz porphyry reported by Satterfield and Oldow (1999).

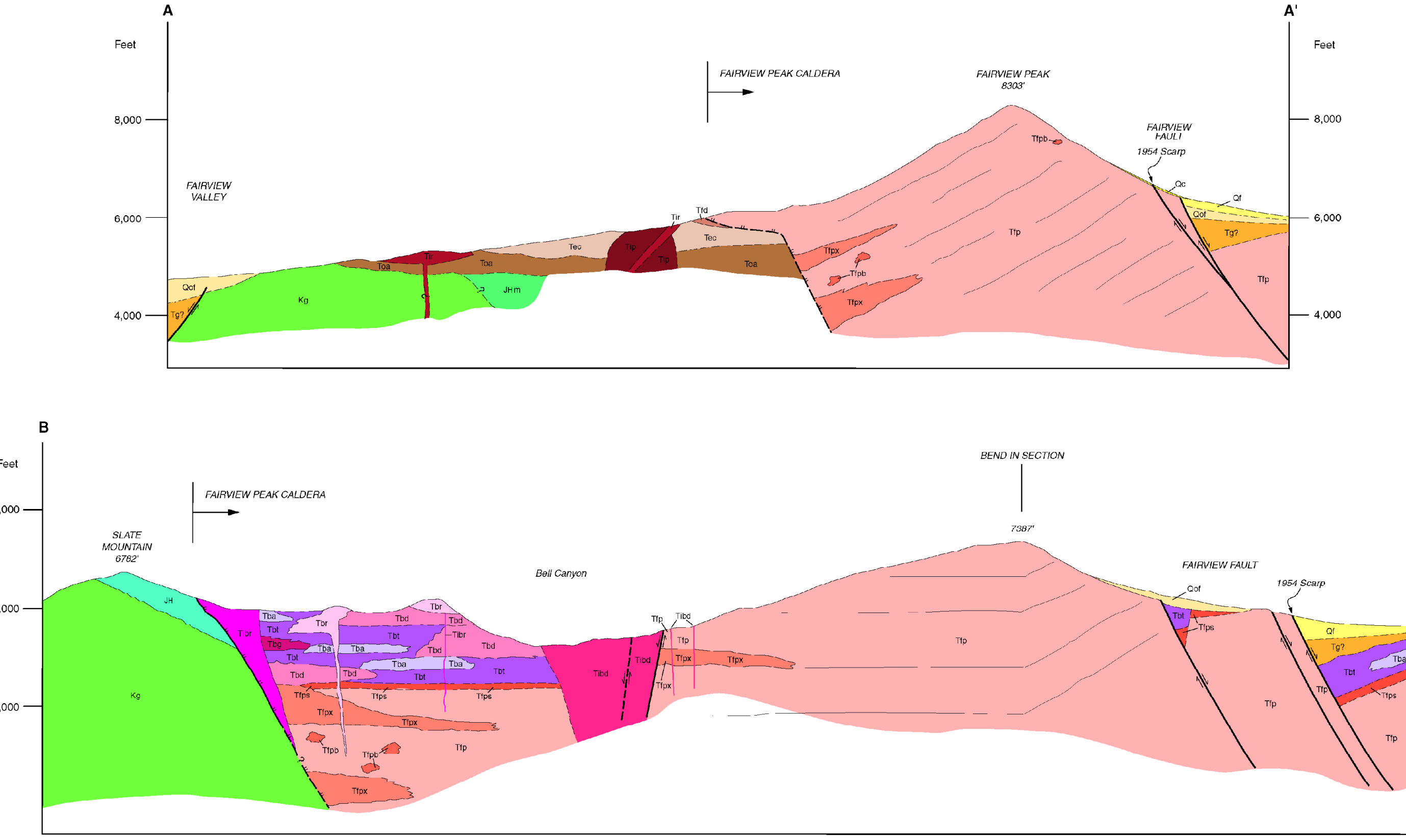
Tj Amphibolite and biotite schist Mostly strongly banded amphibolite containing hornblende and minor quartz, epidote, plagioclase, and biotite; potassium feldspar forms rare porphyroblasts. Quartz commonly forms elongate mosaics that may have been quartz pebbles. Amphibolite locally is massive and contains plagioclase porphyroblasts or relic phenocrysts to 2 mm long. Schist contains biotite, quartz, plagioclase, muscovite, and hornblende. Schist layers show suggestions of relic rock beds. Compositional layering and metamorphic foliation are parallel and strike north and dip 40° to 60° to the east. Profoliation of most rocks were probably volcanic sediments. Massive amphibolites may have been basaltic lavas or sills. Exposed thickness is nearly 1,000 m, but rocks may be repeated by folding and faulting.

GEOLOGIC MAP OF THE BELL CANYON QUADRANGLE, WESTERN NEVADA

Christopher D. Henry
1996



See accompanying text for references and a discussion of the geology of the quadrangle and the volcanic and tectonic development of the Fairview Peak caldera.



Geological Symbols:

- Long dashes: Long dashes where approximately located, short dashes between different flows or fans within the same unit.
- Normal fault: Showing sense of displacement and dip; dashed where approximately located, dotted where concealed, quanted where uncertain; arrow shows plunge of linear features. On cross sections only, arrow shows sense of displacement.
- 1954 fault scarp: Fractures on downthrown side.
- Caldera: Topographic or buried structural margin of Fairview Peak caldera, dashed where approximately located, dotted where concealed, quanted where uncertain.
- Strike and dip of beds or compaction foliation in ash-flow tuff: Inclined Horizontal, Inclined Vertical.
- Strike and dip of flow bands in lava or intrusion: Inclined Horizontal, Inclined Vertical.
- Strike and dip of metamorphic foliation: Inclined.
- Vein: Showing dip, dashed where approximately located.
- Vein coincident with normal fault: Showing dip, dashed where approximately located, arrow shows plunge of linear features.
- Area of silicified rock: H95-16.
- Sample location for ⁴⁰Ar/³⁹Ar date or chemical analysis.

Stratigraphic Column:

- Quaternary: Holocene (Qal, Qf, Qc, Qls, Qol, Qdp), Pleistocene (Tg).
- Miocene/Pliocene: Tps, Tpb, Tbd, Tbr, Tba, Tt, Ttr, Tte, Ttd, Tti, Ttj, Tto.
- Cretaceous: Tg.
- Jurassic-Triassic: Tm, Tsh, Tj, Tb, Tt.

Geological Legend:

- Surficial Deposits: Qal, Qf, Qc, Qls, Qol, Qdp.
- Volcanic, Volcaniclastic, and Hypabyssal Intrusive Rocks: Tps, Tpb, Tbd, Tbr, Tba, Tt, Ttr, Tte, Ttd, Tti, Ttj, Tto.
- Local domes and intrusions: Tba, Ttr, Tte, Ttd, Tti, Ttj, Tto.
- Metamorphic Rocks: Tm, Tsh, Tj, Tb, Tt.
- Granite Intrusion: Tg.
- Metasedimentary Rocks: Tm.
- Metarhyolite: Tsh.
- Amphibolite and biotite schist: Tj.
- Basalt intrusion: Tb.

Field work done in 1993 and 1995.

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