UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Geologic Map of the Northwest quarter of the Mountain City quadrangle, Elko county, Nevada and Owyhee County, Idaho

by

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This map is preliminary and has not been reviewed for conformity with U. S. Geological Survey editorial standards and stratigraphic nomenclature.

Menlo Park, California

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DESCRIPTION OF MAP UNITS

Qc COLLUVIUM, TALUS AND LANDSLIDE DEPOSITS (QUATERNARY)--Unsorted surficial material ranging from boulders through sand and gravel to silt and clay. Development of colluvium is strongly controlled by direction of exposure as the greater amount of vegetation on north-facing slopes favors accumulation. Coarse material at the upper end of mapped bodies forms talus and finer material is washed downslope and becomes colluvium. Poorly resistant formations such as airfall tuffs and non-welded igmimbrites commonly blanketed by colluvium over much of their extent. Landslides common on steeper slopes

Qa ALLUVIUM (QUATERNARY)--Consists of sand, silt, and gravel along present stream courses. Maybe 2 m thick above normal stream in summer time, thicker alluvium may be present in some small valleys where rate of supply exceeds the transporting power of the stream.

Qtg TERRACE GRAVEL AND DISSECTED ALLUVIAL FANS (QUATERNARY)--Gravel accumulated on stream terraces higher than the present flood level. In the valley of the Owyhee River, as much as 30 m above the river, and of boulders as much as .7 m in diameter, subangular to well-rounded. Thickness as much as 3 m

QTls LANDSLIDES, ROCKSLIDES, AND EARTHFLOWS (QUATERNARY AND TERTIARY)--Unsorted boulders and finer material. Younger bodies have characteristic hummocky topography

QTs* UNCONSOLIDATED SEDIMENTARY ROCKS (QUATERNARY AND TERTIARY)--Includes material as alluvium, colluvium, talus, landslides

Tb BIG ISLAND FORMATION (MIOCENE)--Tholeiitic olivine basalt, with overlying and underlying gravel. Minor amounts of rhyolite tuff are present directly beneath basalt in many places.

Tcp COUGAR POINT WELDED TUFF (MIOCENE)--Upper part of formation is phenorhyolitic to phenodacitic ignimbrite, purplish gray to dark brown, or black where glassy, and ranging from compact vitrophyres to friable devitrified welded tuff. The tuff contains abundant phenocrysts of sanidine or anorthoclase, plagioclase and, in most quartz. Apatite, zircon and magnetite are common accessories. In some of the compact vitrophyres, fayalite and ferroaugite are present, the latter may be accompanied or proxied by ferropigeonite, very rarely by hypersthene and hornblende. In less compact welded tuff, fayalite is iddingsitized and pyroxene argillized. The groundmass ranges from wholly glassy to cryptocrystalline. A potassium-argon age determined (DKA-1068) on a sample of sanidine from near the base of the welded tuff section at Yellow Rock in the Owyhee 15' quadrangle, by John Obradovich (oral commun,; 1965) gave a date of 12.2±0.8 m.y.

Tcpg COUGAR POINT WELDED TUFF, BASAL GRAVEL (MIOCENE)--Gravel, locally separately mapped

Tjt JENNY CREEK TUFF (MIOCENE)--Rhyolitic air fall tuff and lapilli tuff, cream to buff, and dark carbonaceous tuff, locally with fossil leaves. Locally combined with Cougar Point Welded Tuff

Twt WELDED LAPILLI TUFF OF WALL CREEK (MIOCENE)--Medium- to dark-gray welded tuff and welded lapilli tuffs, phenorhyodacite to phenorhyolite. Phenocrysts include plagioclase and sanidine, commonly with quartz and ferroaugite, and rarely ferropigeonite. Contains coarse glassy lapilli, flow structure common. A few widely scattered small bodies. K-Ar age determinations on plagioclase-sanidine composite grains from five different localitites, four by John Obradovich (oral commun., 1966) and one by Richard Marvin (oral commu., 1967) gave ages ranging from 15±0.8 to 16±0.8 m.y.

Trt AIR FALL TUFF (MIOCENE)--White to cream colored poorly stratified, fine-grained, unconsolidated; a single occurrence at west boundary of map area, underlies welded lapilli tuff of Wall Creek

Tdp DANGER POINT TUFF (MIOCENE)--Ranging from andesitic to rhyolitic in composition, largely montmorillonitized, with substantial admixture of boulders picked up by surface flow. Locally, most boulders are Prospect Mountain quartzite. Elsewhere, sedimentary admixture is finer, and most is granitic material of local derivation. Locally interbeded with tuff unit of Seventy Six Basalt

Tsb SEVENTY SIX BASALT (MIOCENE)--Present in central and east parts of map area. Flows of porphyritic olivine basalt, with conspicuous clear phenocrysts of labradorite, commonly to 5 cm and locally to 15 cm in size, in a subophitic groundmass with plates of purplish augite including grains of olivine, labradorite, magnetite, ilmentite, and apatite. Local patches of mesostasis made up of biotite and sanidine. Locally interbedded with tuff, Tsbt

Tsbt SEVENTY-SIX BASALT, TUFF UNIT (MIOCENE)--Dull greenish-gray, now nontronitic, with plagioclase crystals like those in flows, Tsb. Crystals of plagioclase from the tuff on Rough Mountain gave an age of 22.9±3 m.y. (J. C. von Essen, Menlo Park, Potassium-Argon age report 51, October 15, 1969). Tuffaceous sandstone made up of this basaltic material furnished horse remains of Barstovian age (C. A., Repenning, oral commun., 1965). Possibly some of the tuff was reworked in Barstovian time; the earlier age given by the K-Ar determination is used here for the age of the volcanic rocks

Ts* SEVENTY SIX BASALT WITH TUFF UNIT, UNDIVIDED (MIOCENE)--Shown in cross sections

Tmb MUSTANG BUTTE GRAVEL (OLIGOCENE)--Chiefly coarse, poorly sorted boulder gravel, with angular fragments of granodiorite and of

rocks derived from the Reservation Hill, Nelson, and Banner Formations. Oligocene age established by K-Ar date on an interlayered hornblende-biotite phenorhyolite welded tuff. Locally, the unit may include some masses of younger, possibly Miocene tuff and gravel

Tsd PHENODACITE AND PHENOANDESITE IGNIMBRITE OF SALMON SPRINGS (EOCENE)--Crystal-rich ignimbrite, generally devitrified, and relatively fine grained, part contains phenocrysts of quartz, plagioclase (mostly oligoclase), and biotite with local sanidine; another cooling unit includes phenocrysts of plagioclase, biotite, green hornblende, augite, and hypersthene. Rests on ignimbrite of Reed Creek, locally overlain by gravel of Mustang Butte

Tar ANDESITE OF RUSSEL GULCH (EOCENE)--Black, mostly vitrophyric, andesitic welded tuff, with phenocrysts of andesine, augite, hypersthene, apatite, magnetite, and rare zircon, biotite, and green hornblende. Where devitrified, black to brown felsophyre. At base, locally small amounts of rhyolitic airfall tuff

Trc PHENORHYODACITE IGNIMBRITE OF REED CREEK (EOCENE)--Welded tuff with abundant phenocrysts, principally quartz, plagioclase, and biotite; locally with hornblende. Magnetite, apatite, and zircon common accessories. One sanidine and one biotite from separate localities gave an age of 39.6±2.0 m.y. (Eocene or Oligocene) by K-Ar analyses (John Obradovich, written commun., 1965, Lab nos. DKA-1073 and DKA-1070). Locally opalized, bleached, and iron stained

Tjc VOLCANIC AND SEDIMENTARY ROCKS OF JONES CREEK (EOCENE)--Flows and tuff breccias of pyroxene andesite, hornblende-pyroxene andesite, hornblende-augite andesite and hornblende andesite, dark gray to medium gray and commonly porphyritic. Gray air-fall tuffs are locally present. Total thickness may be several thousand feet

Tyb IGNIMBRITES OF YANKEE BILL SUMMIT (EOCENE)--Welded phenoandesite and phenodacite tuff, ranging from light-brown to black dosemic to semihyaline, glassy constituents now partly crystallized with pectinate structures. Phenocrysts plagioclase, hypersthene, commonly augite, rare hornblende, and sparse biotite. Magnetite and apatite nearly ubiquitous. Present in south part of map area

Tsa ANDESITE OF SUMMIT CREEK (EOCENE)--Mostly pyroxene andesite and pyroxene-hornblende-biotite andesite; also contains biotite pyroxene dacite vitrophyre

Tsl PHENOANDESITE IGNIMBRITE OF SALMON CREEK (EOCENE)--Light-gray to light-brownish-red ignimbrite, sparse phenocryst include biotite, plagioclase, and local hornblende with accessory magnetite, apatite, and zircon. Mostly devitrified

Kg GRANITE (IN THE BROAD SENSE ACCORDING TO STRECKEISEN, 1967) (CRETACEOUS)--Includes granodiorite and quartz monzonite of

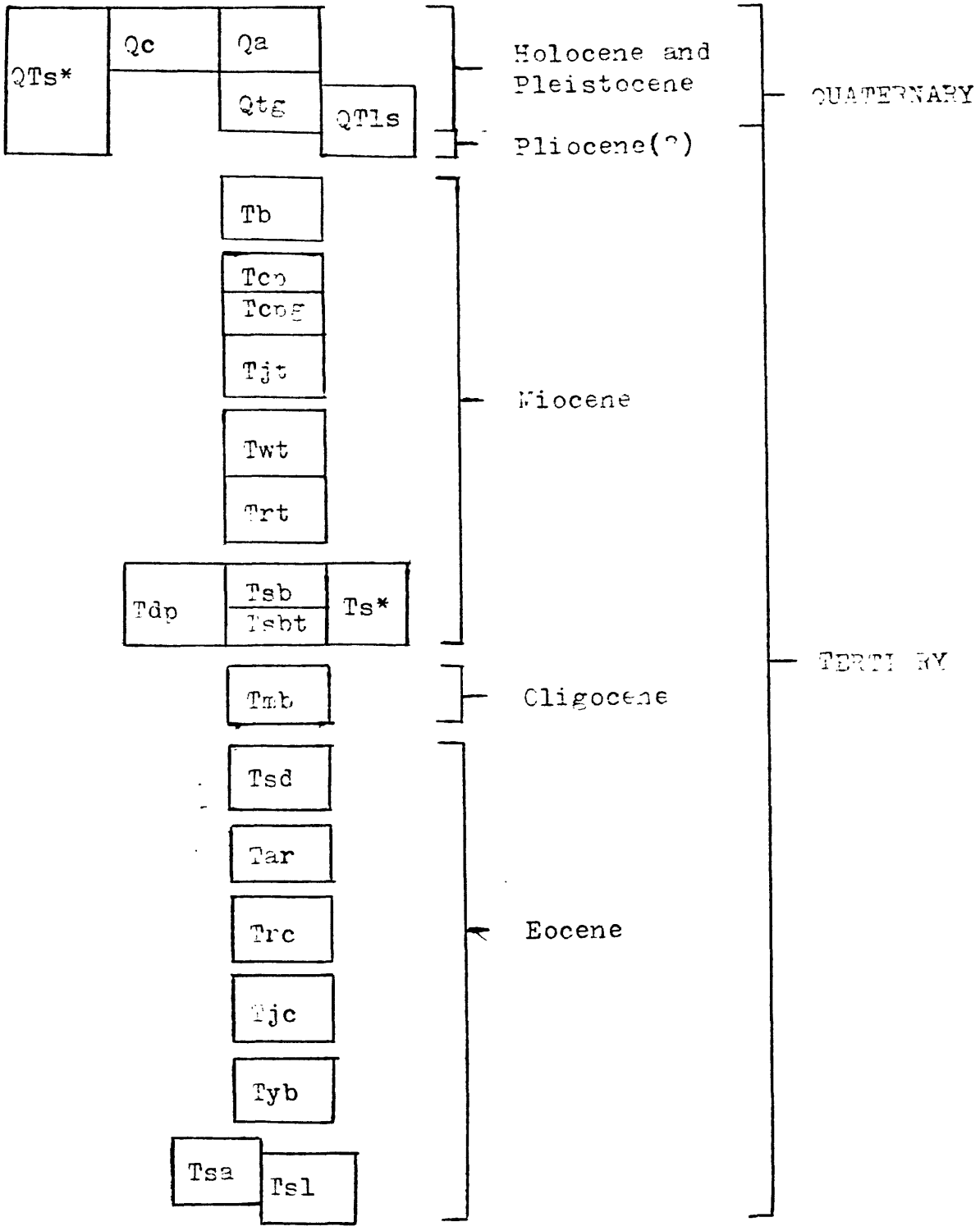
previous usage; includes marginal microcline microperthite aplite, pegmatite, and migmatitic zones adjacent to country rock. Generally contains both biotite and hornblende, locally contains perthitic orthoclase megacrysts

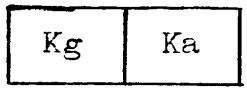
Ka APLITE (CRETACEOUS)--Marginal to granite.

PIPrh RESERVATION HILL FORMATION (PERMIAN? AND PENSYLVANIAN?)--Mostly fine grained dolomitic metasandstone and siltstone; pale gray, weathering white or pale reddish brown, in beds 2 cm to 5 cm thick, interbedded regularly with thinner beds of graphitic phyllite. The dolomitic metasandstone is composed of various combinations of quartz, calcite, tremolite, diopside, and wolastonite, the last locally coarsely prismatic. Also present are metagraywacke, micaceous and tremolitic quartzite, rare metachert, actinolite-epidote-plagioclase schist derived from andesite and hornblende plagioclase schist. A few lenses of gray, siliceous dolomitic limestone, locally with coarse calcitic "eyes" suggesting former presence of crinoids

Mn NELSON FORMATION (MISSISSIPPIAN)--Greenschist composed of tremolite-actinolite, chlorite, epidote, calcite, ilmenite, and relict andesine, in part altered to albite. Derived from flows, tuff breccias, and minor sills of andesitic and basaltic composition. Includes one lens of rhyolitic tuff. At the base, locally an extrusive breccia, possibly a pépérite, with limy matrix, locally fossiliferous.

CORRELATION OF MAP UNITS

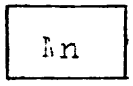




CRETACEOUS

ALLOCHTHONOUS UNITS

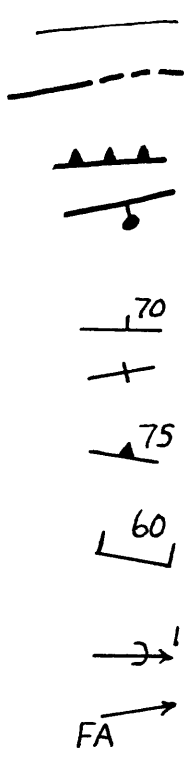
PERMIAN(?) AND PENNSYLVANIAN(?)



MISSISSIPPIAN

Space between boxes indicates unconformity
* indicates shown in cross-section only

SYMBOLS



CONTACT

FAULTS--Dashed where inferred; dotted where concealed; querried where doubtful

Thrust fault

High angle fault--Bar and ball on downthrown side

STRIKE AND DIP OF BEDS

Inclined

Vertical

STRIKE AND DIP OF FOLIATION

Inclined

STRIKE AND DIP OF CLEAVAGE

Inclined

MINOR FOLD AXES

Anticline--showing plunge

Fold axis--showing plunge