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Geology of the Steens Area

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Geology of Steens Area

lying in the arid sage-clad region of southern Oregon, Steens Mountain forms by far the largest topographic feature in the north-western part of the Great Basin. The major central mass of the mountain consists of a great fault block, which rises gently from the west with an even slope about 25 miles in length. The block, which is slightly dissected by erosion, is truncated on the east by a scarp which drops abruptly to Alvord Desert, 5,500 feet below. This scarp has been rendered extremely precipitous by valley glaciation. The summit, with an elevation of 9760 feet, lies in the south-central portion of Harney County, a little less than 50 miles north of the Nevada line at a point approximately midway between the California and the Idaho boundaries.

Steens Mountain is composed of two igneous flows, both more than 4000 feet thick. The older flow is known as the Steens Mountain series and consists of ~~reddish~~ gray to black volcanic rock and poorly-layered flows. The younger flow, which lies atop the Steens series, is basalt. This basalt, which extends over the entire length of the mountain, differs from most of the basalt seen in Oregon and Washington. In it are elongated, flat crystals about an inch in length with numerous openings between them.

The highest part of the Steens has been more thoroughly dissected by erosion, much of it glacial, than other scarps in south-eastern Oregon, probably owing to the greater precipitation that often accompanies altitude and because of steeper gradient. Nearly all of the east-flowing streams have minor cirques at their heads. However, the much longer streams on the west slope, such as the upper Blitzen, Indian Creek, and Kiger Creek flow in well-glaciated U-shaped canyons. Fish Lake occupies a shallow glacially-formed depression at the head of Fish Creek.

The Alvord Desert is a major depression caused by the differential movement of the fault block, that formed the Steens. The depression is a relatively flat-floored owing to the accumulation of sediments in the vast system of lakes from which it was once a part. The many partially eroded beach terraces on the scarp testify to a previous depth of water of about 300 feet above the lake deposits, which in itself is probably many hundred feet in depth.

Minerals found in the area of the Steens Mountains.

Chalcopyrite (CuFeS_2)	Cinnabar (HgS)
Gold Ore	Manganite (Mn(OH))
Pellomelane (MnO_2)	Agate
Calcite	Gypsum
Amphibole	Feldspar
Mica	Clivine ($(\text{CaPo})_2\text{SiO}_4$)
Pyroxene	Quartz (SiO_2)
Tourmaline	