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AN EARLY HISTORY OF TABLE ROCK - LOCATION

The community of Table Rock is situated in the central part of Jackson County in Southern Oregon, ten miles north of Medford.

It lies in a small valley surrounded by mountains. Upper Table Rock forms its northern boundary, Lower Table Rock its western boundary and the Rogue River forms the southern and eastern boundary lines. Portions of the Cascade and Siskiyou mountain ranges form an outer rim or background for closer mountains.

Mt. McLaughlin, Roxy Ann, Mt. Wagner and Mt. Ashland are visible from Table Rock farms.

Lower Table Rock forms the dividing line between Sams Valley and Table Rock. For many years they were two distinct communities, having their own schools and social activities.

To reach the community of Table Rock, one travels north on the Table Rock Road until he comes to Bybee Bridge. As soon as he passes over the bridge, he is in Table Rock.

GEOLOGICAL HISTORY OF TABLE ROCK

Between fifty and forty million years ago, most of Oregon was covered by wide, shallow, tropical seas. The area comprising Table Rock was a part of this great ocean floor that spread as far eastward as the Blue Mountains of eastern Oregon.

Then came a period when the entire western part of the continent was subjected to profound earth movements. As a result of these movements the seas were driven westward.

Widespread volcanic activity occurred over most of Oregon. This brought about great changes, one of these being the building up of the Cascade mountain range. This phenomena produced a natural barrier against the Pacific Ocean which had been forced out of this region and was never to return. The departure of the seas took place gradually, leaving many ponds, swamps, brackish waters and low areas. Pre-mazama basalt, flowing from the eruption of a nearby cone 3 or 4 million years ago, filled the depressions in these lowlands.

Subsequent erosion carried away the softer materials, leaving two mesas capped with a hundred or more feet of basalt which now are nearly 800 feet above the surrounding lowlands.

These two mesas are known as Upper and Lower Table Rock. The Upper Table Rock rises 2,068 feet above sea level. The Lower Table Rock has an elevation of 2,044 feet.

From their flat upper surfaces the lavas break off in steep cliffs from all sides. The flat top of Upper Table Rock includes nearly one square mile. That of Lower Table Rock is somewhat less.

Howell Williams in his book "Crater Lake, The Story of its Origin" states some facts about the Medford-Ashland valley, pertinent since Table Rock is just ten miles north of Medford.

Tropical vegetation flourished here, including avocados, cinnamons, figs and persimmons. On the volcanic hills, above the plains, this vegetation was mixed with trees of temperate species including the redwood, alder, tan oak and elm. There were dense swamps where peat accumulated from rotten vegetation. This was later converted into coal. Small graceful horses, not more than a foot high roamed the open spaces.

Dr. E. M. Baldwin in his Geology of Oregon mentions maple, sycamore and ginko trees as being plentiful. Interesting leaf fossils bearing out this information have been found in this vicinity and are on exhibit at the Geological Survey Building in Grants Pass. Also Arnel Butler reports finding fossil beds mixed with fallen lava rocks on the south end of Lower Table Rock. One of these fossils was presented to the Jacksonville museum.

During the next geological period, the climate gradually became cooler. Snow and ice accumulated on the high mountains of the Cascade Range in what is now the Crater Lake area (Crater Lake had not yet been formed). Glaciers choked the canyons to their brims and one of them extended for at least 17 miles down the Rogue River Valley. The tropical vegetation began to disappear and modern forests, similar to those now present, crept in to take their place.

Although the dramatic eruption of Mt. Mazama, that formed Crater Lake, had no direct effect upon the valley in which Table Rock lies, it is credited with the donation of a large quantity of pumice. This pumice is present as a strip approximately a mile long and a half mile wide. It extends on either side of the Table Rock Road from a distance beginning about a half mile from the Table Rock Store, almost to the foot of Lower Table Rock. The formation of this pumice resembles an old lake or river bed. It has the characteristics of a ponded area so the pumice was most likely carried there by a stream. It was probably the ancestral Rogue River whose channel was choked with deposits from the volcano.

The following information was furnished by Norman V. Peterson, State Department of Geology and Mineral Industry, Grants Pass, Oregon:

"Looking at the geologic map of the immediate area (Jacksonville, Medford, Table Rocks) the geologic history to be read from the rocks is briefly as follows:

Hornbrook formation - Upper Cretaceous age - about 70 million years ago - sandstones, shale, conglomerate deposited in a wide shallow sea.

Uncomformity indicating a cessation of marine deposition with some folding followed by uplift and erosion.

Umpqua formation - 50 million years - buff sandstones, shales, and conglomerates mainly of fresh water environment with several thin layers of coal. Subtropical swamps and river were the sites and depositional agents.

Unconformity - uplift and volcanic eruptions commencing on a grand scale to begin the building of the Cascades. Volcanism continuing through Oligocene & Miocene to build a trememdously thick pile of volcanic rocks northeast of Bear Creek Valley. At the close of the Miocene uplift and stresses resulted in tilting of the Western Cascades & Umpqua formation and the streams cut deep channels as they flowed westward to the sea.

Pliocene - Intrusive and extrusive basaltic lava flows that locally filled existing basins and stream channels are present from the Rogue River Valley (Table Rocks) to the High Cascades. Table Rocks are an erosional remnant of these and considered to be uppermost Pliocene age - 1-1/2 to 2 million years.

Erosion by normal geologic processes of erosion and mass wasting have left remnants of the Table Rock lava flow or flows that locally filled a broad shallow depression or a broad stream valley. The source of the lava is probably nearby."

FLORA AND FAUNA

TREES ON TABLE ROCK

Among the trees found on the tops and slopes of the Table Rocks are: Ponderosa Pine, Douglas Fir, Madrone, White and Black Oaks, Mountain Mahogany, Cedar and an occasional willow.

The shrubs are: Two kinds of ceanothus - one locally known as Wild Lilac and the other by the general terms of Chaparral, Oregon Grape, Manzanita, Choke-Cherry, Snowberry Bush, Bitter Bush or Quinine Bush (Garrya) and Mountain Balm.

An abundance of Poison Oak grows on the slopes of both mountains.

Of the native trees growing in the valley and along Rogue River as it borders the Table Rock community are: Big Leaf Maple, Black Cottonwood, Black Oak, Ponderosa Pine, Alder, Oregon Ash and an occasional Douglas Fir and Cedar. Wild Grape vines climb and twine their tendrils around tree trunks in the bottomland.

FLOWERS ON TOP AND ON SLOPES OF TABLE ROCK

Due to the thin soil and hot dry summers the flowers on the mountain are of short duration. They start blooming about the middle of March and continue to near the first of May. They are usually at their best about the first of April. At this time the slopes of both mountains have an abundance of their most showy flowers. These are known locally as Purple Lambtongues (Erythronium). Also at about this time the Shooting Stars or Birdbills (Dodecatheon) are blooming on the slopes near the Lambtongues, as are Yellow Buttercups (Ranunculus).

Other flowers are:

Grass Widows (Sisyrinchium)

Western Hound's Tongue (Cynoglossum)

Gold Star (Crocidium)

Potentilla or Cinquefoil

Stork's Bill or Filaree

Plectritus (Valerian Family)

Pearly Everlasting (Anaphalis)

Bleeding Heart (Dicentra)

Chinese Houses (Collinsia)

Larkspur (Delphinium)

Popcorn Flower or Wild For-Get-Me-Not (Plagiobothrys)

Saxifrage - Several varieties

Fiddle-Neck (Amsinckia)

Alum Root (Heuchera)

Yellow Monkey Flower (Mimulus)

Arnica - Composite Family

Arliene's Delight (Hesperochiron Pumulis)

Spring Beauties (Dentaria) Mustard Family

Cat's Ear (Calochortus)

Dogbane (Apocyhum)

Field Chickweed

Gaillardia (Composite Family)

Wild Honeysuckle

Bedstraw (Galium)

Yellow Violet (Shelton's)

Yellow Bells (Fritillaria Pudica)

Red Bells (Fritillaria Recurva)

Mottled Bells (Fritillaria Lanceolata)

False Soloman's Seal (Vagnera)

Miners Lettuce - Purslane Family

Wild Onions (Allium)

Parsley Family

Mint Family

Yarrow (Achillea Millefolium)

California Poppy

Lupine - 2 varieties including dwarf

Lace Pod (Thysanocarpus)

Many tiny annual flowers too small to identify satisfactorily make a living carpet on Lower Table Rock for a few weeks in early spring. White Lambtongues (Erythronium) are found in fields at the base of Lower Table Rock.

BIRDS

Resident bird life on the Table Rocks consists of Golden-Crowned, White-Crowned and Lark Sparrows, Bewick's Wrens, Titmice,Oregon Juncos, Rock Wrens, Brown Towhees, Rufous-Sided Towhees, Western Bluebirds and Ruffled Grouse.

During the wet season you might see the water pipit, constantly bobbing its tail and walking instead of hopping.

During the dry season Savannah Sparrows and Horned Larks may be found.

During spring and fall migration, Say's Phoebes have been seen on the slopes of Table Rock.

Other residents, Red-Shafted Flickers, Acorn and Down Woodpeckers feed on grubs and insects from the various trees that grow on the mountains. Most every locality has its Jay and the one found here is the Scrub Jay (California).

In the Rim Area one is very apt to see a Red-Tailed Hawk sailing over the cliffs and out into the blue. Other predators are Cooper's Hawks, Sparrow Hawks and the Golden Eagle "the poets bird of broad and sweeping wing."*

(Bird list furnished by General J. H. Hicks, 40 S. Modoc Ave., Medford, Oregon)

ANIMALS

Animal life known to be on Table Rock consists of deer, coyotes, squirrels and wood rats. It is generally believed that rattlesnakes have their homes beneath the rocks on the mountains. The early settlers wouldn't climb the Table Rocks after the month of May as summer was supposedly the time when the snakes would be about. These early settlers also told stories of bears and cougars having been seen in this region.

Raccoons are still seen in the woods along the river; occasionally a beaver is seen working in the river, and muskrats swim in the irrigation ditches.

Table Rock, like many other places in the valley, has always had its share of our little friends, the black and white skunks.

Any of the three models we have discussed might explain the configuration of the basalt flows. Model 1 assumes a much larger flow over relatively flat or a rolling topography. A flow came out of the western cascades and spread out over a deeply eroded Eocene Payne Cliff Formation. All of the Oligocene and Miocene are missing from the valley floor.

Issues:

A. There should be some evidence of this large flow as residual boulders somewhere in Sams Valley since there is bedrock exposed over a large area. There is no evidence of basalt boulders in the Rogue River.

B. Could it really just be coincidence that the last remnants of the flow would have the same "U" shape when most buttes are symmetrically round.

C. If the river would have carved the large flow into this shape you would expect substantial terrace gravel around the Table Rocks. But these are not found.

Model 2 assumes a deep canyon existed in the Upper Eocene Payne Cliff Formation and the basalt flow filled the deep canyon meanders. Subsequent erosion was far more extensive than what was previously thought(by 120 feet).

Issues:

A. One would expect to find river gravel at the base of the flow. The base of the flow is not well exposed, but we might find the gravel in the caves of upper Table Rocks.

B. The large number of remnant blocks of basalt lying between the arms of lower Table Rocks do not conform to the theory that the basalt was confined to a meander channel.

C. The location of the large remnant blocks in the gravel pit below the east arm of lower Table Rock supports model 2 because the few remnant boulders found at a distance from Table Rocks appear to be extensions of the meander channel.

Model 3 assumes a localized basalt flow from a nearby vent such as Castle Rock which has an elevation of 150 feet higher than the west arm of lower Table Rock.

I have decided to leave the decision as to what model best explains the method of deposition of the basalt to the participants of this hike. Please vote by checking the appropriate box

Model 1 _____

Model 2 _____

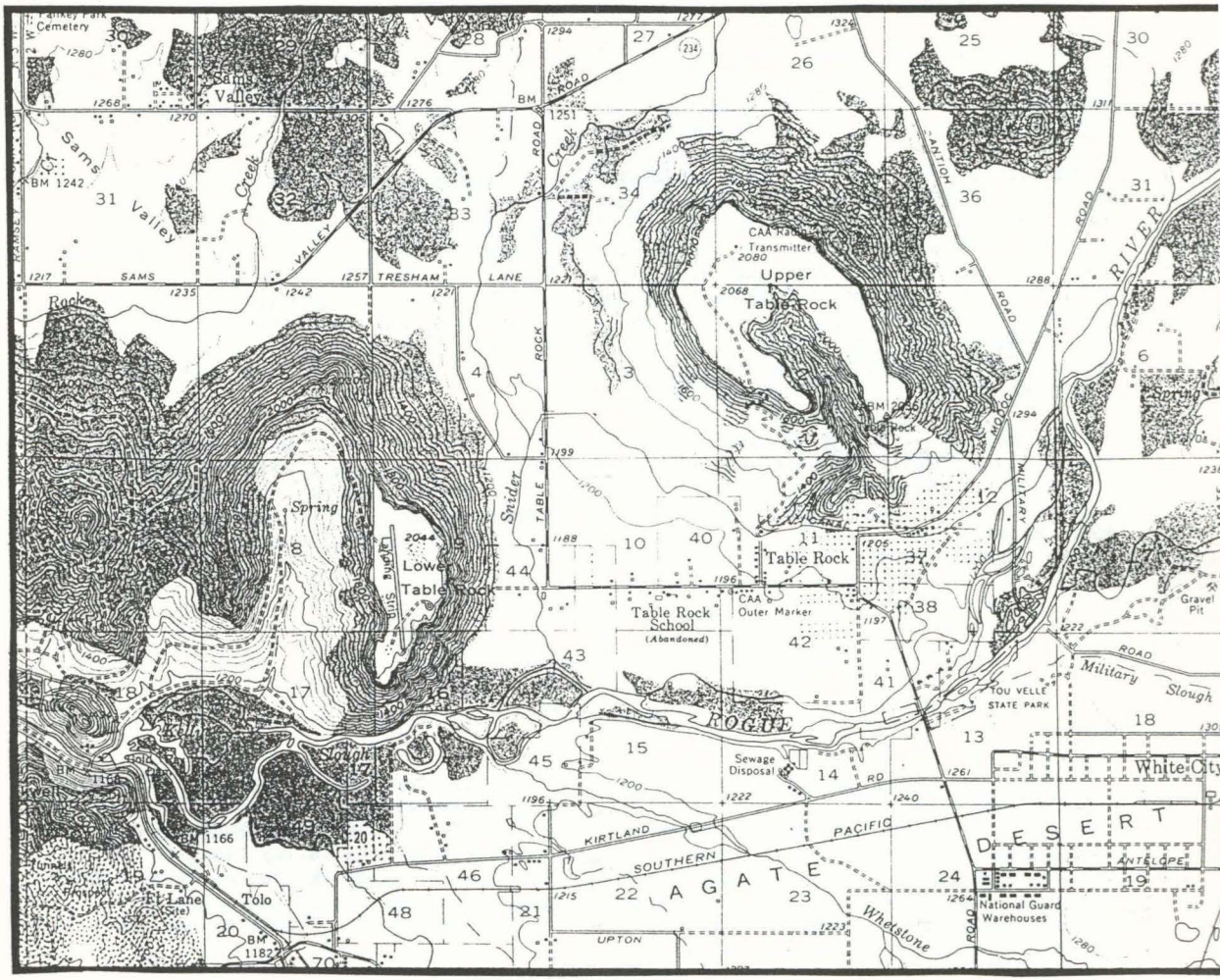
Model 3 _____

Other_____
_____
_____

Geologic History and Significance of Table Rocks

Monty Elliott
April 4, 1990

Table Rock Environmental Education Program
Nature Conservancy



Mesa-Buttes

Lower and Upper Table Rocks represent one of the many interesting geologic features in the Rogue Valley region. Both of these horseshoe-shaped buttes stand about 600 to 700 feet above the adjacent valley floor. The name "Table" is derived from the nearly horizontal surface of the buttes and "Rock" from the cliff-forming cap of basaltic lava. The terms "Upper" and "Lower" refer to the relative position of each feature in respect to the Rogue River, i.e., upstream or downstream. The average elevation of Upper Table Rock is approximately 30 feet higher than Lower Table Rock.

Lava

The caprock forming the flat surface of the buttes is a 125 foot thick layer of grayish-black dense basalt. Within the dense lava numerous crystals of light colored plagioclase and equant, darker augite occur. The mineral olivine is also present and is weathering to a dark red, submetallic alteration product named iddingsite.

Lava refers to molten rock which issues from a volcano. Lava and magma both belong to the igneous rock group. These rocks differ from the other two major rock groups, sedimentary and metamorphic, in that the parent material is a molten fluid. Lava differs from magma in two important ways. First, magma is found below the earth's surface whereas lava is found on the earth's surface. Secondly, when magma reaches the surface and erupts as lava, the confining pressure holding vast quantities of gas in solution is suddenly released with explosive violence. The presence of spherical voids or vesicles indicates the incomplete separation of gas from the lava due to rapid crystallization of the molten fluid.

The term lava is derived from the old Italian verb *lavare* meaning "to wash", hence lavatory. In early Italian usage it was also applied to a "running stream" and was used to describe lava streams from Vesuvius. From that the term has derived its modern English meaning. Magma is Greek and means dough-like.

Basalt lava differs from other types of lava in important ways . Mineral composition of basalt is dominated by calcic plagioclase, pyroxene, and sometimes olivine. Other lavas such as rhyolite, and andesite are dominated by quartz, amphibole, and sodic to potassic feldspar minerals. The typical chemical composition of basalt shows 49 percent SiO_2, 16 percent Al_2O_3, 12 percent iron oxides, 9 percent CaO, 6 percent MgO, and relatively small amounts (<3 percent) of the oxides of sodium and potassium. Basalt, compared to rhyolite and andesite, is low in SiO_2 and Al_2O_3 and comparatively high in Fe, Ca, and Mg oxides. The chemistry accounts for basalt's dark color and the lava's relatively low viscosity when erupted, type of eruption, the rate of flow, and other characteristics.

The mobility of basalt is much greater than other types of lava. Being more fluid, basalt flows readily from its vent and consequently builds volcanoes with low slope angles called "shield volcanoes". The thickness of a basalt flow may be hundreds of feet or a few inches. Individual flows may travel hundreds of miles at velocities of 10-25 mph. Basalt is erupted with a temperature around 1,100° C and may require several years before complete crystallization has occurred:

3 feet thick . . . . . 12 days

30 feet thick . . . . . 3 years

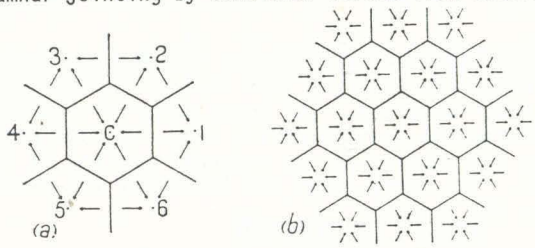
300 feet thick . . . . . 30 years

Caprock

The capping lava exhibits prominent vertical cliffs. These cliffs have been formed by the differential erosion of the soft underlying sandstone and the resistant basalt. The lava rests unconformably on a sandstone pedestal formed from the Eocene-aged Payne Cliffs Formation, the sedimentary rock unit which underlies much of the valley floor in this area. The easily eroding sandstone gradually undercuts the caprock causing large blocks of basalt to periodically fall downslope thus renewing the fringe of vertical cliffs. Slump blocks form the prominent benches seen in places around the flanks of the Table Rocks.

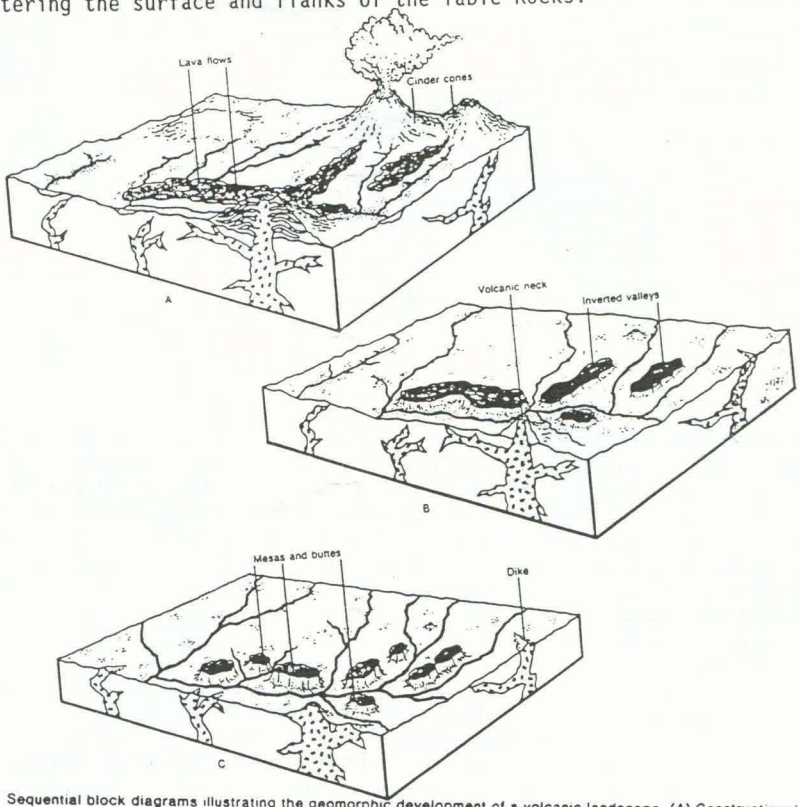
Columnar jointing

The cliffs are formed of small, crudely developed vertical columns. These columns are produced by sets of intersecting fractures called "joints." Basalt lava typically develops this columnar jointing by tensional stress from contraction in the cooling lava.



The formation of an ideal hexagonal pattern of joints by uniform contraction towards evenly spaced centres

Most commonly the lava cools progressively from the base and the surface of the flow. Thus two sets of columns form and meet in the middle of the flow. The lower set, the colonnade, is larger and better developed than the smaller, more irregular upper group, the entablature. On the Table Rocks the upper zone of columnar jointing represents most of the cliffs and the colonnade is rarely exposed above the surrounding apron of rubble slopes. The fine blocky jointing of the entablature has aided the erosional production of rubble seen littering the surface and flanks of the Table Rocks.



Sequential block diagrams illustrating the geomorphic development of a volcanic landscape. (A) Constructional stage. (B) Post-constructional stage. (C) Terminal stage.

Inverted topography

The erosional development of lava-capped buttes from what was once a lava-floored valley is an example of "inverted topography". Even today young lava flows have also inundated the upper Rogue River drainage and the stream is just beginning the long erosional process of reconstructing its former channel. Perhaps in millions of years there will be similar landforms like the Table Rocks seen along the upstream reaches.

Patterned ground

The surfaces of the nearly flat buttes have developed an interesting feature called "patterned ground". Coarse rocky rubble is arranged into stripes and polygonal rings with intervening areas of mounded finer material. The loose material overlying the dense basalt has been size sorted by differential heaving during expansion and contraction cycles produced by Ice Age freezing and thawing or the seasonal wetting of the expandable type soil developed from the basalt. The stony rings are typically low enough to locally form small vernal pools of water on the surface.

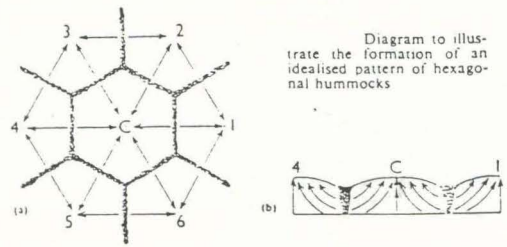


Diagram to illustrate the formation of an idealised pattern of hexagonal hummocks

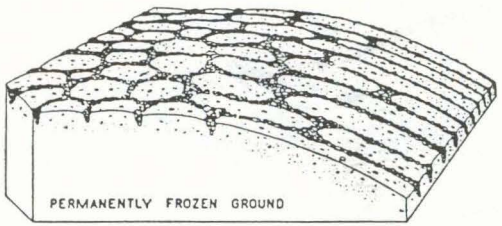


Diagram illustrating the merging of stone-rings on a flat surface into stone-stripes on a slope

Intracanyon flow

The Table Rocks represent small erosional remnants of a very thick and areally extensive basalt lava flow. Estimating the original extent of the flow is highly conjectural since these are the only known outcrops. The source of the flow is thought to lie eastward in the volcanic Cascade Mountains. One 7.5 million year date has been radiometrically determined by the United States Geological Survey. But this age is suspect due to the weathered character of the dated sample. An actual age of around 4 to 4.5 million years is probable. This age and the horizontal attitude of the lava indicate the source must lie hidden within the young, horizontal High Cascade volcanic belt found east of and parallel to the Western Cascade. The rocks of the Western Cascade subprovince are considerably older and have a marked northeastern tilt in this region. The huge volume of Table Rocks basalt must have crossed the Western Cascades via the valley of the ancient Rogue River. This intracanyon flow inundated and displaced the river from its valley. Stream-rounded gravel on the surface of the Table Rocks provides evidence of the ancient displaced river. Gradually the Rogue River reestablished its channel by cutting into and along the margins of the flow until today no evidence remains of this event except for the Table Rocks. No volcanic rocks older than 4.5 million years have been located in the southern High Cascades which makes the Table Rock flow one of the oldest if not the oldest known volcanic unit of this geologic subprovince.