GEOLOGIC REPORT of BLACK BUTTE

Antelope Valley, California

Submitted by Gilbert Van Dyke

May 30, 1940

GEOLOGIC REPORT of BLACK BUTTE, CALIFORNIA

Abstract

The Black Butte is a distinct hill among other remnant hills in the southern Antelope Valley. Nearly all the other buttes in the vicinity are greyish tan in color and consist of granite cut by numerous aplite and pegmatite dikes. The Black Butte has, besides this granite massif, a cap of diorite which weathers black and hence gives the hill its name.

Introduction

The area was mapped to give the author experience in mapping igneous geology. The mapping was done on an enlargement of a U. S. G. S. Topographic map, largely by location by topography, since the magnetic peculiarities of the hill made work with a brunton compass unreliable.

The area is about one and one-half square miles in extent, and has a rectangular shape trending N.W.-S.E. The butte is located in the east central portion of the Black Butte quadrangle map. The best approach to the hill is by the road between Adelanto and Lancaster. The hill is about 25 miles west of Adelanto.

The relief is nearly 600' above a valley floor of 3000' elevation. The sides of the hill are covered with black diorite boulders giving the hill a smooth topography. It has the shape of a typical desert residual, its sides making a sharp angle with the valley floor.

The vegetation consists of a few sagebrush bushes on the hill, and wild flowers, sage, and Joshua trees in the valley below.

Petrography

Old Metamorphics:

The minerals are quartz, 45%; feldspar, 20%; biotite, 20%; and hornblende, 15%. The quartz and feldspar grains are well rounded, the biotite is in small flakes, and the hornblende is in small cleavage prisms. The grains are fresh, although the rock has good schistose structure. The minerals are fine-grained. The rock occurs as xenoliths in the diorite. It is found throughout the hill as float, and also in place at D_2.

This metamorphic series is probably old paleozoic sandstones only slightly metamorphosed.

Hornblende-diorite:

The minerals of the hornblende-diorite are hornblende, 45%; and feldspar, 55%, with considerable magnetite. All grains are euhedral, and have an average size of 2-3 mm., but there is local variation in size from 0.1 mm. to 6 cm. The rock and its minerals are very fresh, yet there is extensive local epidotization. The epidote occurs in little patches and veinlets and blebs ¼"-2' in diameter, all with sharp boundaries, and all in otherwise fresh diorite. The epidote appears to have been emplaced in the diorite as veins rather than as alteration. The magnetite in the diorite throws a compass needle off by as much as twenty degrees. In some places the magnetite is concentrated enough to produce lodestone. The fresh diorite is blue, but all exposed surfaces have been weathered black. By interpolating from the outcrops and the line of contact around the hill, one recognizes the diorite to be a cap over the adamellite. This cap makes up the upper third of the hill, but the diorite-adamellite contact disappears under the alluvium at the south end of the hill (see geologic structure section).

This hornblende diorite is probably Jurassic.

Adamellite:

The minerals are quartz, 40%; orthoclase, 25%, plagioclase(oligoclase?), 25%; and biotite, 10%. Average grain size is 2-3 mm. The biotite and quartz are fresh, but feldspars are considerably altered to kaolin. The rocks are light grey in color, and weather to a friable material. The rock is found below the diorite cap, on the slopes of the hill, and apparently comprises the lower two-thirds of the butte. Flow structures can be seen at B_1 and B_2. Structure planes, which will be discussed under Structure, are numerous in the northern portions.

The adamellite is probably Jurassic in age,and later than the diorite, because the dikes in the diorite are acidic and very probably came from the adamellite.

Aplite and pegmatite dikes:

The aplites are granitic, light pink in color, and fresh. The pegmatites are composed of orthoclase (dominant), quartz, and albite, with occasional biotite. The dike outcrops usually form conspicuous ridges. The dikes are common, and vary in thickness from a few feet to a few tens ofc feet.

All the dikes were probably intruded coincidentally in Jurassic time, and probably were derived from the adamellite.

Mineralization:

There is a narrow band of caliche extending for ten feet into the diorite from the adamellite contact. A fewxstringers of this same material are found in the adamellite.

Associated with quartz veins near the diorite-adamellite contact are chryscolla and other copper salts.

Structure

The time relationships between the schist, diorite, and adamellite seem to be simple. The schist, perhaps of paleozoic age, was intruded by the diorite in the Jurassic. The diorite was in turn intruded by the adamellite and accompanying dikes in the later Jurassic. The evidence for these igneous rocks being Jurassic lies in the fact that the Jurassic was a period of major intrusion in Southern California. Since no contact metamorphism is evident in the diorite, it is reasonable to assume that the adamellite and diorite were emplaced at about the same time.

There is a small fault east of D1, probably of small displacement, since there is no gouge or displacement of the adamellite-diorite contact.

A number of nearly vertical structure planes are found in the northern portion of the adamellite. These planes find expression in high, vertically walled ridges of adamellite at the foot of the hill. Within many of the ridges are found these planes, well shown because of weathering along them. The structures may have been produced during cooling of the adamellite and represent cooling joints. It is also possible that these are fractures or joints caused by dynamic forces after cooling.

Another possible explanation is that they are flow planes. Their most probable origin is as cooling joints.

Geologic History

A. Deposition and cementation of paleozoic sandstone.

B. Intrusion of paleozoic sandstone by diorite in the Jurassic.

C. Intrusion of the diorite by the adamellite, followed by dike emplacement in the Jurassic.

D. Uplift and erosion to present surface.

See Geologic section.

Submitted by:

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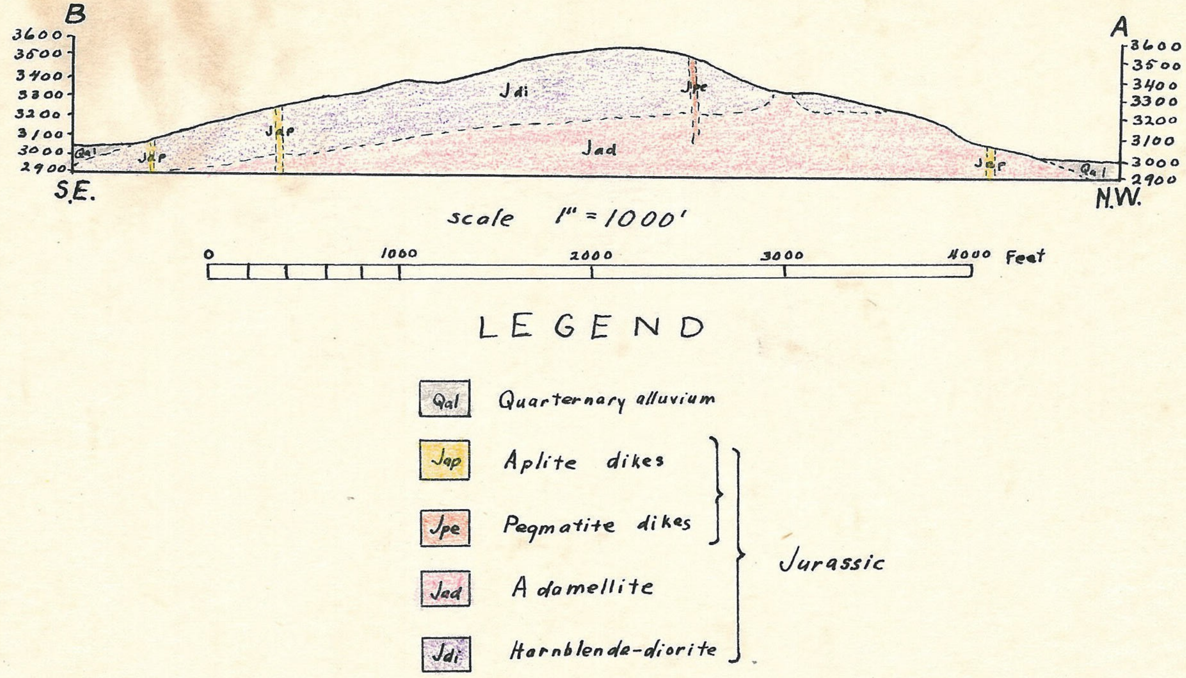
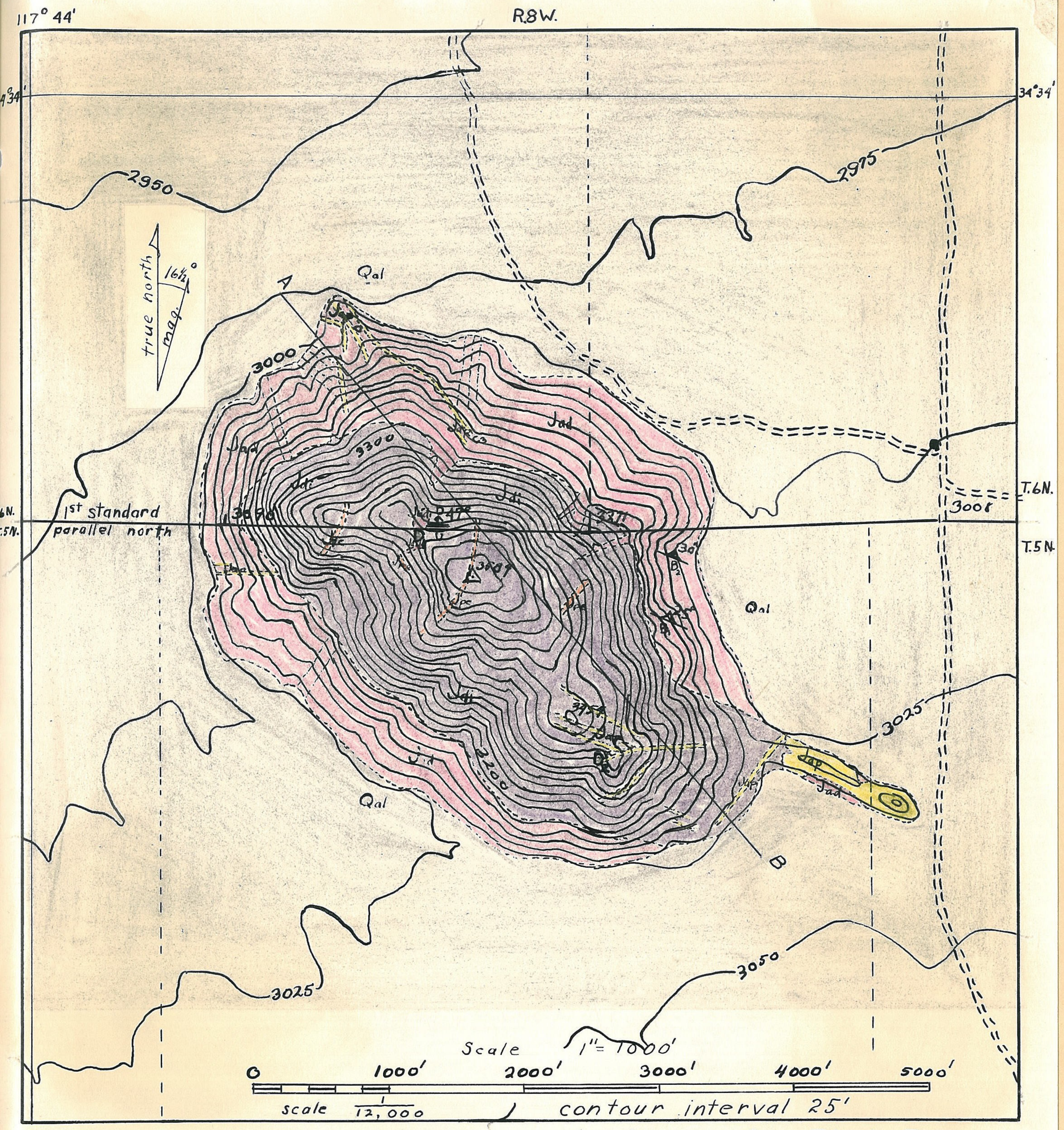
Partner: W. R. Cleveland

May 30, 1940



Geologic Section, Black Butte, Calif.

Gilbert VanDyke May 30, 1940



G. VanDyke completed 5-11-40 Geology of Black Butte

LEGEND

Qal	Quanternary alluvium		
Jap	Aplite dikes	Jurassic	
Jpc	Pegmatite dikes	Jurassic	
Jad	Adamellite	Jurassic	
Jdi	Hornblenderdiorite	Jurassic	

- - - - - - contacts

— · — · — · — structure-planes

▲ 30° flow-planes

⊥ 40° faults

GEOLOGIC REPORT OF THE PUENTE HILLS, CALIFORNIA

Abstract

A portion of the Puente Hills west of the Pass and Covina Road and east of the town of Puente comprises the area. The structures under the hills are an anticline plunging to the west, a fault running north, and south through the center of the area, and overturning to the north of the eastern portion of the fold. Two rock types, shale and conglomerate, of upper Puente Formation of Upper Miocene time, comprise the area.

Introduction

The area was mapped with brunton compass and by location by topography on an enlargement of a U.S.G.S. topographic map.

The hills are located east of the town of Puente, and cover an area of approximately two square miles. The maximum relief is about 400' above the valley floor of 400' elevation.

Canyons are cut at right angles to the periphery of the hills, and in these canyons are found the outcrops.

Sagebrush, cacti, and grass are plentiful.

Stratigraphy and Petrology

The two types of rock are a tan shale and a brown conglomerate. No unconformities are apparent. Three members occur in the section (see type column), the first composed of two thick shale beds and one thick conglomerate bed; the second of thin shales and conglomerates which vary in thickness laterally; and the third of one thick shale bed. The total thickness of the section is about 3150'.

The shale members are light tan in color, sandy, generally thin layered (½" - 2"), contain considerable mica, and are ironstained. A few members are white and calcareous. No microfossils were found.

In the conglomerate are granite boulders and occasionally pegmatite, schist, and volcanic fragmental material. The average boulder size 1½" - 10", and the boulders are well rounded. The conglomerate is well cemented and considerably iron stained. Some members are very tightly cemented.

The material for both rock types probably came from mountains to the north, and was deposited in a sea, for sorting was good.

According to W. A. English[1] the rocks in this area are Upper Puente of Upper Miocene age.

1. From W. A. English's report on the Puente Hills.

Geologic Structures

In this area is both folding and faulting. Probably the folding was the first to take place.

Folds:

The one major fold, and anticline, lies centered under the hill with its axis trending east-west, and plunges to the west. The fault runs north-south through the center of the area, and divides the fold in two. The west half of the fold is the plunging nose of the anticline. The eastern part of the anticline is overturned to the north.

Faults:

The fault trends north-south through the center of the area, and has no exposure along its entire length. Offset of the beds indicates that it is essentially a vertical fault and that the west block went up 150'.

Geologic History

A. Conformable deposition in the sea of the whole section.

B. Folding of the anticline by a force stronger from the north than from the south.

C. Faulting.

D. Perhaps more folding after the faulting, overturning the eastern portion to the north.

E. Recent uplift and erosion.

Economic Considerations

Dry holes have been drilled along thec fault near the axis of the anticlinev in search of oil. Accurate logging may have disclosed a shifting of the anticline trap to the north since the anticline axis dips to the north.

This region does not lend itself to any economic exploitation.

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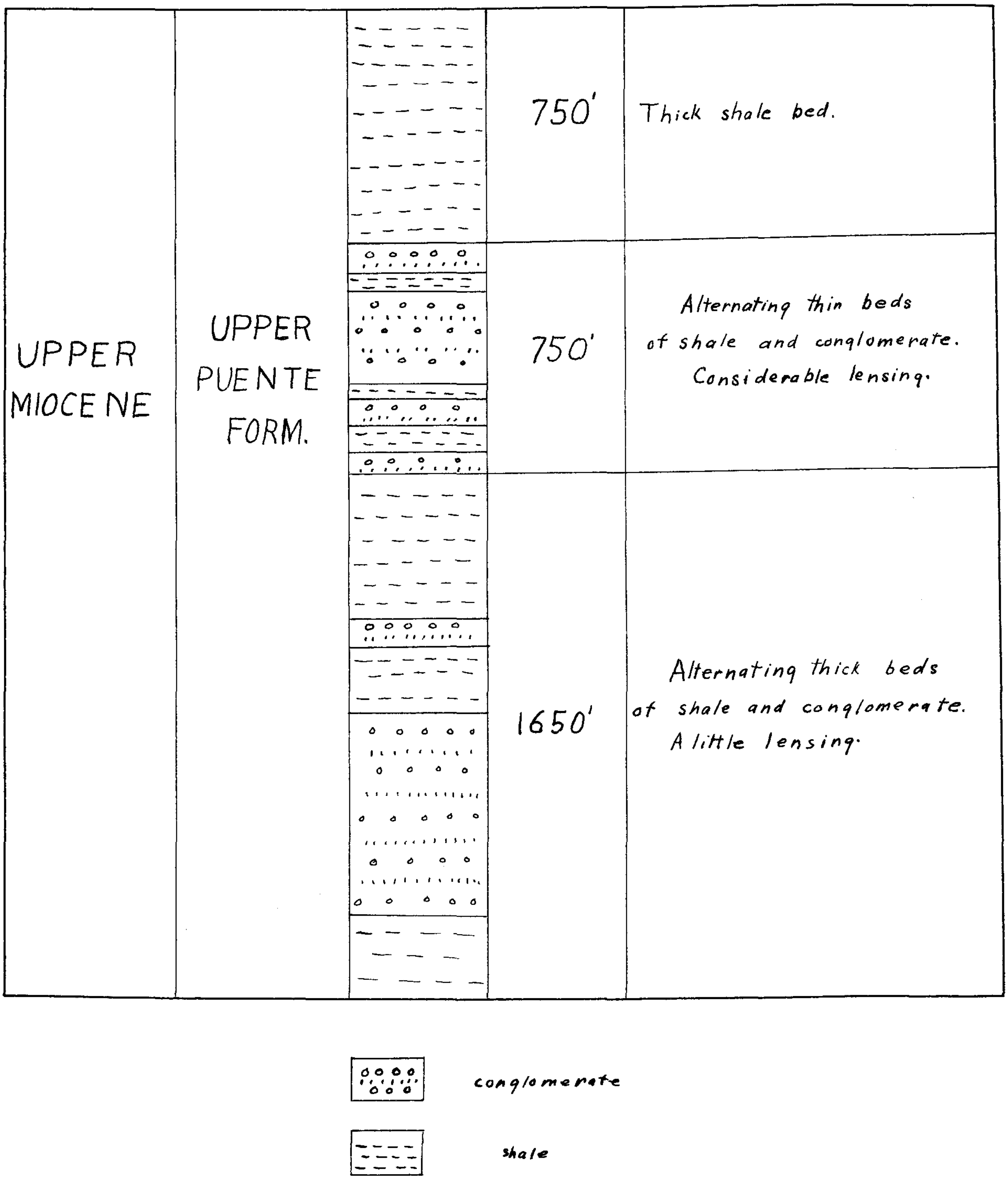
Type column for Puente Hills   Vert. Scale 1" = 500'



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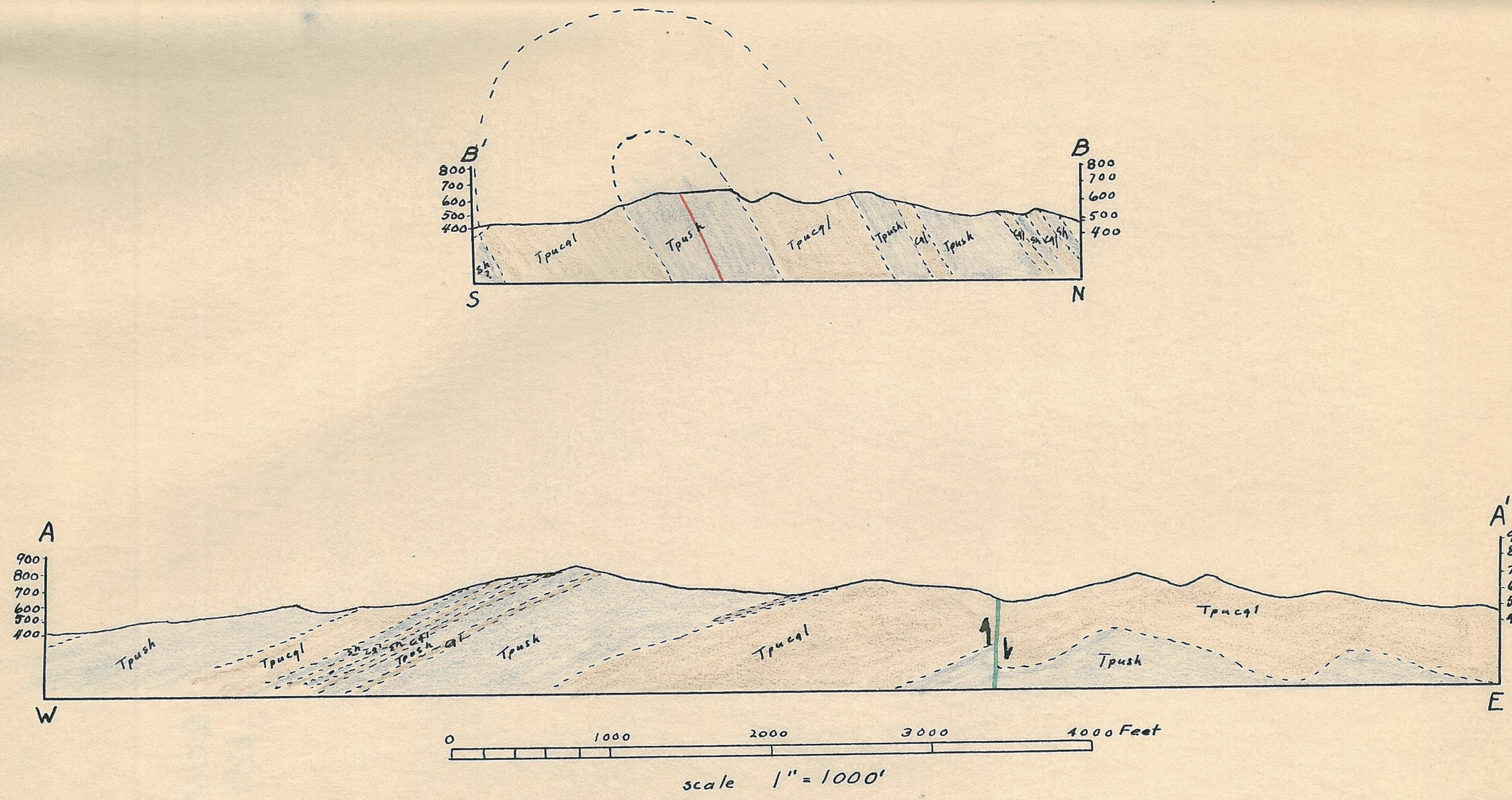

Legend

Tpush	Puente uppershale	(green line)	fault
Tpucgl	Puente upper conglomerate	- - - - -	contact
		(red line)	anticlinal axis

Geologic Sections, Puente Hills

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