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UNITED STATES DEPARTMENT OF THE INTERIOR

LOG FOR FIELD TRIP THROUGH CALDECOTT TUNNEL, BERKELEY HILLS, CALIFORNIA

By

Dorothy H. Radbruch

Open-file report

1964

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.

OPTIONAL FORM NO. 10

UNITED STATES GOVERNMENT

Memorandum

TO : Library, Room 1033, GSA Building, 18th and F Streets, NW, Washington, D. C.

DATE: October 30, 1964

FROM : Area Publications Unit, Geologic Division, USGS, Menlo Park, California

SUBJECT: Open file report by Dorothy H. Radbruch, "Log for Field Trip Through Caldecott Tunnel, Berkeley Hills, California"

Forwarded herewith is a copy of the subject report for your open file depository. We understand the release date is to be November 5, 1964.

Enclosure

LOG FOR FIELD TRIP THROUGH CALDECOTT TUNNEL, BERKELEY HILLS, CALIFORNIA[1/]

By Dorothy H. Radbruch

The third bore of the Caldecott Tunnel will be a vehicular tunnel paralleling the already existing twin bore tunnel on Highway 24, which links suburban communities such as Lafayette and Orinda with the urban centers of Oakland, Berkeley, and others on the shore of San Francisco Bay. The twin bore (formerly known as the Broadway Tunnel) was constructed in 1934-37, and the geology of the tunnel was described by Ben M. Page in an article published in Economic Geology, v. 45, no. 2, 1950. Two disastrous cave-ins, one of which killed three workmen, occurred during the driving of the earlier twin bore tunnel, one at the contact between the "preliminary chert" and the "second sandstone" (see following log) and one in an altered diabase dike. Many soft diabase dikes were encountered in driving the twin bore tunnel; only a few small ones were seen in the present third bore.

The third bore of the Caldecott Tunnel is 3300 feet long; excavation at the west portal began at Station 207+45; the east portal is at Station 140+45 (or 240+45--stationing changes at 125+52). For purposes of convenience, stationing will be given from 207+45 to 240+45.

Two small pilot tunnels were driven (the north and south wall plate drifts) prior to excavating the main part of the bore. At present the steel supports have been placed from the west portal approximately to Station 224+50; the two pilot drifts extend from here to the east portal.

The west portal is in sheared and fractured shale and shaly sandstone of middle Miocene age, which extends to Station 208+54 (steel support No. 48) on the north side of the tunnel, and a little farther east on the south side. This is Page's "first shale." It can be seen at steel support 31 on the south (right) side of the tunnel. Foraminifera of possible Relizian age were collected about 500 feet west of the west portal. This age indicates a probably correlation with the Sobrante Sandstone; this unit and other sandstone, siltstone, and shale beds below the Claremont Shale were mapped as Sobrante Sandstone by Case (1963, U.C. doctor's thesis), although they differ somewhat from the Sobrante Sandstone in surrounding areas.

Sheared and fractured sandstone, which in places contains some shale, extends from the "first shale" to Station 212+00 (set 170). This is Page's "portal sandstone." It could be seen to be dipping northeast where it was exposed in the pilot drifts. It is well exposed at set 49, on the north side, between the concrete pilasters. In some places the sandstone is badly sheared, and zones of very wet fault gouge were encountered. Heavy lagging was required in parts of the pilot tunnels. One shear zone can be seen where steel sets 121 through 128 are on 2-foot centers. The amount of shale increases to the east, and at Station 212+00 the formation is predominantly shale, with some sandstone. Middle Miocene foraminifera were collected from sandstone and shale at Station 212+00 (sets 168-170 on the south side). The contact with the next unit to the east is indefinite.

1/Prepared for Association of Engineering Geologists field trip March 30, 1963.

Badly sheared and fractured shale with some sandstone is exposed from Station 212+00 to Station 212+79 (set 206). This is Page's "shale, sandy shale, and shaly sandstone." The attitude of dark, wet, sheared shale at set 195 (212+56) is N. 80° W., 75° SW. This unit and all those eastward in the tunnel are overturned. This entire unit was very wet. The pilot drifts were heavily lagged, and the steel supports are on 2-foot centers. Survey checks show that there has been some settling and squeezing in this area since the steel supports were placed.

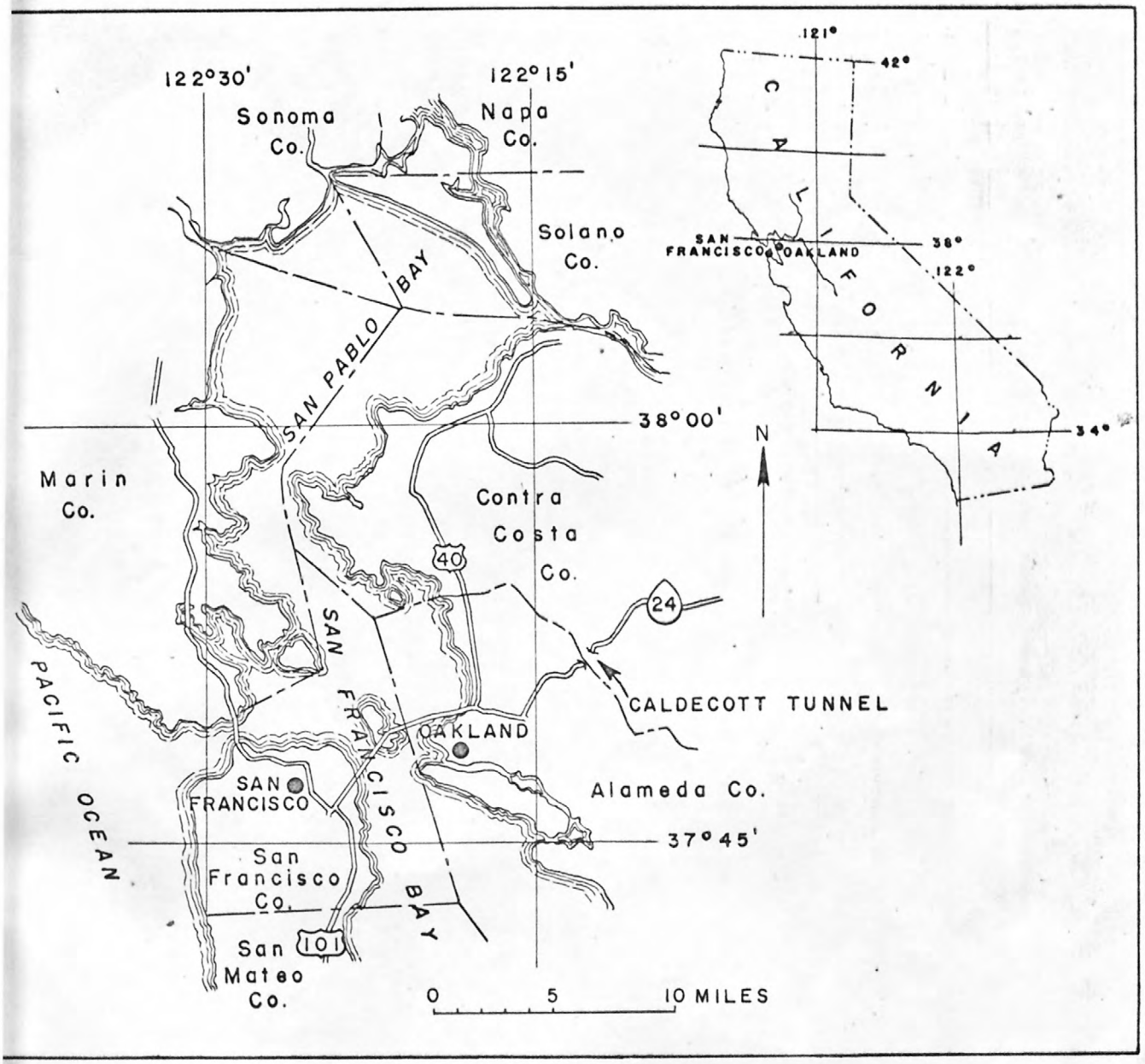
Highly fractured and contorted chert and shale extend from Station 212+79 (set 206) to 214+07 (set 254). This is Page's "preliminary chert." Parts of this unit are sheared and wet. A sandstone dike in the chert is poorly exposed from set 224 to set 229. The chert is well exposed from set 236 to set 254.

Dense, obscurely bedded sandstone is exposed from Station 214+07 (set 254) to Station 217+05 (set 358)--Page's "second sandstone." It is fractured in places, but was firm enough to stand without lagging in parts of the pilot tunnels. On the north side of the tunnel sheared, wet sandstone with an inclusion of chert and some bituminous material was exposed in the north wall plate drift, but this exposure is now obscured by the steel sets. The sandstone can be seen throughout its length between the steel sets on the south side of the tunnel. Faint bedding can be seen striking N. 25°-30° W., dipping 50° SW. between sets 310 and 311.

Claremont chert and shale of middle Miocene age extends from Station 212+05 (steel set 358) to Station 228+60 (timber set 233, south wall plate drift). Sandstone dikes and bodies of sandstone that may be either dikes or sandstone lenses within the chert are exposed from steel set 371 eastward. At set 528 the chert can be seen dipping southwest. Chert and shale are well exposed in the south wall plate drift east of the jumbo. The chert is badly sheared in places, and the timbering in these spots is heavier--note particularly the spiling in the roof of the drift. A diabase dike in chert can be seen in no. 3 car pass at Station 227+25; this is the largest diabase dike exposed in the tunnel.

The contact between the Claremont Shale and the Orinda Formation is at Station 228+60 (timber set 233). There is some shearing at the contact, which dips to the southwest. The formations are overturned, with the younger Orinda Formation underlying the Claremont chert. The Orinda Formation, consisting predominantly of sandstone, shale, and conglomerate extends from here to the east portal of the tunnel. Note bituminous material a few feet east of the Claremont Shale - Orinda Formation contact, on the north wall of the south wall plate drift. Bedding is indistinct; the formation dips to the southwest from the contact to the east portal of the tunnel; the dip reverses just east of the east portal. Pliocene vertebrate fossils were found in the crown drift near the east portal at Station 139+40.

The Wildcat fault is shown on two maps of this area--Lawson's (1914, SF folio) and Untermann's (1935, U.C. master's thesis). It was not shown by Page or Case (1963, U.C. doctor's thesis). Untermann showed it at the boundary between the Claremont Shale and an underlying sandstone; Lawson showed it within the Clarement Shale. There is much shearing of most of the formations exposed in the tunnel, and it has not been possible to identify a specific shear zone as the Wildcat fault.



Index map showing location of Caldecott Tunnel

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