QUATERNARY GEOLOGIC MAP OF THE SAN JOSE EAST QUADRANGLE, SANTA CLARA COUNTY, CALIFORNIA

by

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INTRODUCTION

The San Jose East Quadrangle is located in the Santa Clara Valley near the south end of San Francisco Bay and covers an area of flat valley of eastern San Jose, California ,and by the western foothills of the Diablo Range. The quadrangle is between 37°22'30" and 37°15' north latitude and 121°52'30" and 121°45' west longitude and is near the northwest corner of the 100,000-scale San Jose Quadrangle (see index to quadrangle map). The Santa Clara Valley is part of a long, northwest-southeast-trending structural depression within the central Coast Ranges of California located between the San Andreas fault to the west and the Hayward and Calaveras faults to the east.

The Hayward fault lies along the southwestern margin of the Diablo Range and enters the study area along the eastern margin of the San Jose East Quadrangle. The rapid increase in topographic relief to the east of the Hayward fault is an effect of a vertical component of displacement on the fault (Dibblee, 1972). Historic movements on the Hayward fault in 1836 and 1868, (Borcherdt and others, 1975) have been right-lateral strike slip (or right slip). Some component of vertical displacement, however, must occur along the fault in view of the contrast in topographic relief across the fault. Dibblee (1972) has mapped several other faults which parallel the Hayward and lie to the southwest. Proceeding southwest from the Hayward fault these are the multistrand Quimby, Evergreen, Silver Creek and Piercy faults. Dibblee's mapping (1972) shows vertical displacement on the Quimby, Evergreen and Piercy faults (up to the east) and unknown slip on the Silver Creek fault. Our mapping tends to support these interpretations; however, some of the apparent vertical displacements on the southwestern part of the Quimby, Evergreen, and southwestern part of the Piercy may be the result of previously unrecognized massive landsliding. Geometry where the Silver Creek fault cuts Pleistocene alluvial fan deposits and undifferentiated bedrock suggest a high angle fault. The surficial deposits in this quadrangle are largely the result of the fluvial system of Coyote Creek, a major source of sediment to the braid-plain, fan-delta (Nemec and Steele, 1988) graded to the present San Francisco Bay estuary.

Mapping Methods

Geologic mapping of urban areas is difficult because much of the land is covered by buildings, pavement and fill. Therefore, alternative mapping techniques are required. We mapped geologic units using black and white aerial photographs (1:20,000-scale) of the Fairchild Collection that were taken in 1939 before much development had taken place in this area. Additionally, the mapping was supplemented with 1:12,000 and 1:24,000-scale color aerial photographs made in 1965 and 1974, respectively. Map units were delineated by: 1) landform morphology 2) relative topographic position, 3) relative degree of preservation of surface morphology, 4) tonal contrast on aerial photographs, 5) relative soil profile development (compiled from U.S. Soil Conservation Service, 1958) and 6) other features such as differences in vegetation density and type.

Landform morphology refers to the shape of a particular landscape element, such as the distinctive conical shape of alluvial fans. Other criteria for delineating geologic units are also used to distinguish one landform from another, and they can be particularly useful in delineating map units within a specific landscape element. A surface on an alluvial fan, for example, might be differentiated from another because of its higher topographic position, greater drainage density, and stronger soil profile development. Attempts were made to check units and contacts in the field. Many geologic units and the contacts between them are presently covered or obscured because of extensive urban cover (buildings, pavement, channeled drainages, quarries and landfill).

The index map shows additional sources of data used to construct this map. The bedrock geology has not been differentiated because new work is in progress. Therefore, the reader is referred to the published work of Crittenden (1951) and Dibblee (1972) for this information, and we will present only a brief summary. The bedrock units in the southern part of the quadrangle are serpentine interbedded with lithologies of the Franciscan Assemblage. Bedrock in the northeastern corner of the quadrangle, east of the Hayward fault, consists of Cretaceous sediments of the Great

Valley sequence along with mid-Tertiary marine and continental sediments. The bedrock faults were taken from the work of Dibblee (1972).

Landslides are especially abundant in the mountainous areas northeast of the Quimby fault. For additional information on landslides in the map area the reader is referred to Nilsen and Brabb (1972) and Cooper, Clark (1974).

Discussion

The stream channel and overbank deposits of Coyote Creek are the most extensive Quaternary map units in the San Jose East quadrangle. Using 1939 aerial photography, we mapped the original course of Coyote Creek as of 1939. The channel has been straightened and lined with concrete and rip rap since 1939 and the present course is shown on the topographic base. Coyote Creek crosses the quadrangle diagonally from near the southeast corner to near the northwest corner. Almost immediately after leaving its confined bedrock channel near the southeast corner, Coyote Creek begins a meandering course for its entire length through the quadrangle and on to San Francisco Bay (Helley and Wesling, 1989, Wesling and Helley, 1989). There are two terrace levels along the meandering course of Coyote Creek. Terrace deposits are thin (<1 m), but distinct enough to be mapped, and typically contain human artifacts. In several areas, these terraces have been used for landfills. The terraces may be historic cut surfaces related to hydraulic control placed on Coyote Creek with the closure of Coyote Reservoir in 1936 (USGS, 1967, p. 191). The sinuosity of Coyote Creek is likely a response to the rise in sea level during the Late Holocene (Atwater and others, 1976), which reduced the scope of all streams tributary to San Francisco Bay.

Natural levee deposits are easily defined by topographic contours on maps and tonal contrasts on aerial photographs. These deposits are more-or-less symmetrically distributed on either side of the channel of Coyote Creek. Levees grade laterally into fine-grained basin deposits away from the channel. The basin deposits cover a large area northeast of Coyote Creek and probably impeded transport of sediment by the less competent streams which drain the foothills of the Diablo Range in the northeast corner of the quadrangle. In fact, inspection of the 1895 USGS San Jose 15' topographic map indicates standing water or marsh land in the area north of Evergreen covering approximately 2.6 km^2 (1 mi^2). Drainage to this ponded area is from small ephemeral streams issuing from the foothills of the Diablo Range. These streams have built very short steep fans, but because of small drainage basins and, hence, low discharge, cannot transport sediment long distances. Topographic maps of 1895 show small rounded bedrock knobs protruding through alluvial fans. Today, most of these knobs or inselbergs have been planed off for construction sites. Where still exposed we have observed indurated conglomeratic rocks and pebbly sandstones. These we have interpreted as Cretaceous bedrock, namely the Oakland member of the Chico Formation (Crittenden, 1951). The distinguishing criterion is the absence of Miocene chert fragments in the Cretaceous conglomerate. Perhaps these bedrock knobs or inselberg have been brought up by movement on the Evergreen fault.

DESCRIPTION OF MAP UNITS

GP	Gravel Pits--Excavations in stream channels and Holocene alluvium for the purpose of extracting sand and gravel for aggregate in the construction industries.
Qhsc	Stream Channels and Their Deposits (Holocene)--Poorly- to well-sorted sandy silt, silty sand, sand or sandy gravel with minor cobbles.
$Qhfp_1$, $Qhfp_2$	Alluvial Terrace Deposits (Holocene)--$Qhfp_1$, and $Qhfp_2$ are the deposits on the first and second erosional terraces, respectively, cut into levee (Qhl) deposits. Deposits are generally less than 1 meter thick and consist of rounded gravel and historic artifacts in a clayey silt matrix. In several areas, these terraces have been used for landfills.
Qhl	Natural Levee Deposits (Holocene)--Loose, moderate- to well-sorted sandy or clayey silt grading to sandy or silty clay. Levee deposits border the channels of Guadalupe River, Coyote Creek and the lower course of Silver Creek. Textures of Qhl deposits along Coyote Creek tend to be coarser (sandy or clayey silt) than these along the Guadalupe River (sandy or silty clay). Levee deposits are generally well drained. There is little change in grain-size with distance downstream within the San Jose East Quadrangle.
Qhfp	Floodplain Deposits (Holocene)--Medium to dark gray, dense, sandy to silty clay. Lenses of coarser material (silt, sand, and pebbles) may be locally present. Floodplain deposits are found between levee deposits of

Coyote Creek and Guadalupe River. They are exposed only along the west central edge of this San Jose East Quadrangle.

Qhb Floodbasin Deposits (Holocene)--Organic-rich dark clay to very fine silty-clay deposits occupying the lowest topographic positions either between the Holocene levee deposits (Qhl) or Holocene floodplain deposits (Qhfp). In contrast the floodbasin deposits grade smoothly into the Holocene alluvial fans and stream sediments. In the central part of the San Jose East Quadrangle the floodbasin deposits overlap and bury the toes of Pleistocene Alluvial fans.

$Qhaf_1$ Alluvial Fan Deposits (Holocene)--Brown, poorly-sorted, dense, sandy or gravelly clay. $Qhaf_1$ deposits may have a debris flow origin possibly representing the most recent deposition of Qhaf deposits. $Qhaf_1$ deposits are found both incised into older deposits as well as on top of older units.

Qhaf Alluvial Fan Deposits (Holocene)--Brown medium dense, gravelly sand and clayey gravel that grades upward to sandy or silty clay. Sediments near the heads of these fans are typically brown or tan, medium dense to dense, gravelly sand or sandy gravel that grades upward to sandy or silty clay. The Qhaf deposits grade to and merge with Holocene Basin deposits on distal fan edges. In the southeast corner of the quadrangle these sediments cover Holocene terrace surfaces which also merge with the Holocene Basin deposits.

Qls Landslide Deposits --(Pleistocene and/or Holocene)--Landslide materials consist of poorly-sorted mixtures of clay, silt, sand, gravel and boulders (direction of movement shown by arrow). Landslide deposits were mapped only in the upland (bedrock) areas, and most were taken from Dibblee (1972). Additional landslides were added to supplement Dibblee's mapping. .

$Qpaf_1$ Alluvial Fan Deposits (Pleistocene)--Crudely-bedded, clast supported tan to reddish brown clayey gravels and cobbles with a sandy matrix. Qpaf deposits are the most widespread of the Quaternary alluvial fan deposits covering most of the northeast corner of the quadrangle. These strata typically are spatially related to the modern drainages that deposited them . The distal edges of these fans are overlapped by Holocene basin deposits (Qhb). The heads of these fans are both overlapped and partially incised by Holocene alluvial fan deposits (Qhaf and $Qhaf_1$).

Qpaf Alluvial Fan Deposits (Pleistocene)--Tan to reddish brown, dense, gravelly and clayey sand or clayey gravel that grades upward to a sandy clay. Qpaf deposits are restricted to a few small exposures along the mountain front in the northeast corner of the quadrangle and a few small patches along Thompson Creek in the southeast corner of the quadrangle. Qpaf deposits have only vague relations to modern drainages .

QTsc Santa Clara Formation (Pliocene and Pleistocene)--The unconsolidated sediments of the Santa Clara Formation crop out almost continuously along the northeast corner of the Santa Clara Valley. However, in the San Jose East Quadrangle the Santa Clara is conspicuously absent along the valley's eastern edge except for one small exposure along the east central edge of the quadrangle. The Santa Clara also underlies the long narrow low rolling topography adjacent to the east bank of Silver Creek. Along the creek it may be in fault contact with bedrock. Several outcrops of bedrock poke through the Santa Clara just a few meters east of the Silver Creek fault, suggesting that this formation is a thin veneer of sediment covering bedrock. Where exposed, the Santa Clara consists of poorly-sorted gravel, pebbly sandstone, siltstone and clay. A diagnostic component is angular clasts of Monterey Formation. It is moderately deformed with a relatively constant northwest strike and northeast dip.

Undifferentiated Bedrock--Rocks older than the Santa Clara have not been differentiated. The reader is referred to Crittenden, 1951, and Dibblee, 1972, for descriptions of these older units.

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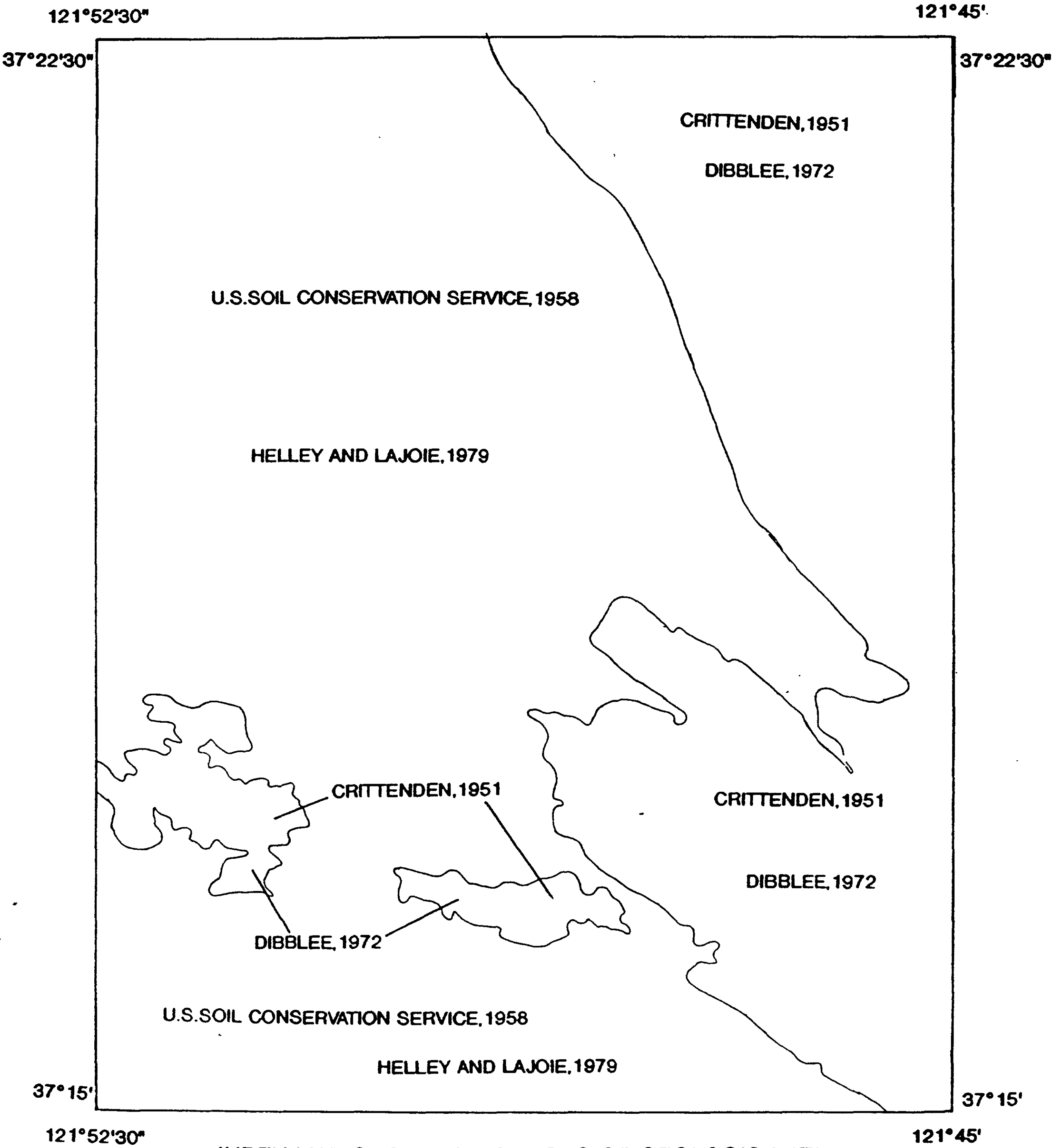
122° 37°30' — 121°

MILPITAS	CALAVERAS RES.	MT. DAY	EYLAR MTN.	MT. BOARDMAN	COPPER MTN.	PATTERSON	CROWS LANDING
SAN JOSE WEST	SAN JOSE EAST	LICK OBSERVATORY	ISABEL VALLEY	MT. STAKES	WILCOX RIDGE	ORESTIMBA PEAK	NEWMAN
LOS GATOS	SANTA TERESA HILLS	MORGAN HILL	MT. SIZER	MISSISSIPPI CREEK	MUSTANG PEAK	CREVISON PEAK	HOWARD RANCH
LAUREL	LOMA PRIETA	MT. MADONNA	GILROY	GILROY HOT SPRINGS	PACHECO PEAK	PACHECO PASS	SAN LUIS DAM

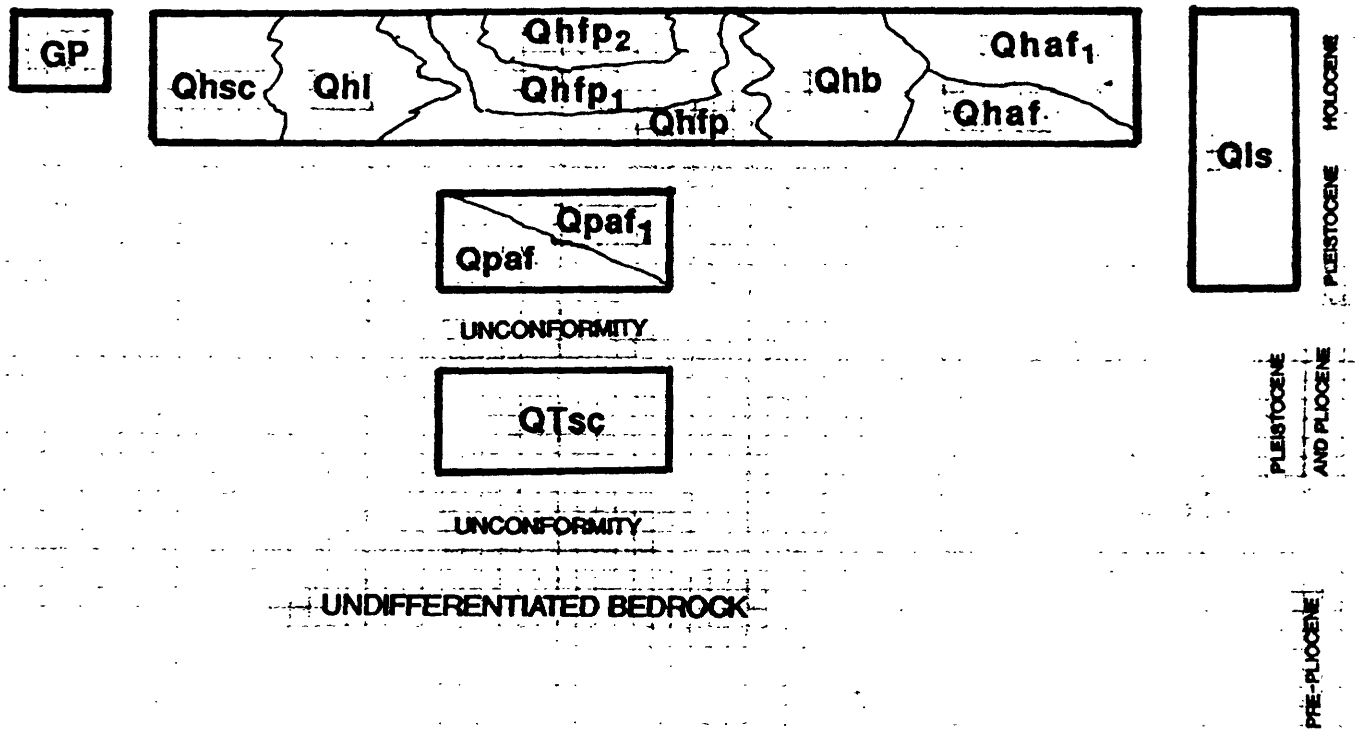
37°

INDEX MAP OF 7.5' QUADRANGLES IN THE 1:100,000 SAN JOSE QUADRANGLE



INDEX MAP SHOWING SOURCES OF GEOLOGIC DATA

CORRELATION OF MAP UNITS



EXPLANATION OF MAP SYMBOLS

GEOLOGIC CONTACT

DASHED WHERE APPROXIMATELY LOCATED

FAULT CONTACT

DASHED WHERE APPROXIMATELY LOCATED