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Geologic map and Structure sections of the Laurel 7-1/2' Quadrangle, Santa Clara and Santa Cruz Counties, California

by

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Open-file Map

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GEOLOGIC MAP AND STRUCTURE SECTIONS OF THE LAUREL 7-1/2' QUADRANGLE, SANTA CLARA AND SANTA CRUZ COUNTIES, CALIFORNIA

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DESCRIPTION OF ROCK UNITS

SURFICIAL DEPOSITS

Qal — ALLUVIUM (HOLOCENE AND UPPER PLEISTOCENE)--Unconsolidated gravel, sand, and silt deposited by streams.

Qls — LANDSLIDE DEPOSITS (HOLOCENE AND PLEISTOCENE)--Debris consisting of a mixture of colluvium and intact masses of rock, displaced down slope by gravity. A large landslide composed of intact blocks of Cretaceous through Eocene rocks is present northeast of the San Andreas fault near northeast corner of Laurel Quadrangle, extending eastward into adjacent Loma Prieta Quadrangle. This landslide block has moved southwestward, locally over-riding the San Andreas fault. Additional landslide information can be found on the map by Cooper-Clark and Associates (1975) and in Wieczorek and others (1988).

Qof — OLDER FLOODPLAIN DEPOSITS (PLEISTOCENE?)--Unconsolidated fluvial gravel, sand, and silt, deposited on older floodplain surfaces, dissected and elevated above present base level.

Qoa

OLDER ALLUVIUM (PLEISTOCENE?)--Unconsolidated fluvial gravel, sand, and silt, dissected, and elevated as terraces above present base level, along mountainous streams having no well-defined floodplains.

Qcu

COASTAL TERRACE DEPOSITS (PLEISTOCENE)--Semiconsolidated moderately-well-sorted, fine-grained marine sand with thin, discontinuous gravel-rich layers.

Qa

AROMAS SAND (PLEISTOCENE)--Eolian sand and fluvial sand, silt, clay, and gravel.

UNITS SOUTHWEST OF SAN ANDREAS FAULT

Tp

PURISIMA FORMATION (PLIOCENE)--Thick-bedded to massive, locally cross-bedded, weakly consolidated, bluish-gray fine- to medium-grained sandstone with abundant andesitic detritus (Lerbekmo, 1961), and very thick-bedded, yellowish-gray, tuffaceous and diatomaceous siltstone. Locally contains scattered cetacean bones and molluscan lenses diagnostic of inner neritic depths and of Pliocene age. As much as 2,700 feet thick along Glenwood syncline.

Tsc

SANTA CRUZ MUDSTONE (UPPER MIOCENE)--Medium-bedded and faintly laminated, pale-yellowish-brown siliceous organic mudstone.

Mudstone thickens southwestward, where benthic foraminifers from upper part of type section near Santa Cruz are diagnostic of neritic depths and of a late Miocene age (*Bolivina obliqua* Zone) of Clark, 1981.

Tsm

SANTA MARGARITA SANDSTONE (UPPER MIOCENE)--Very thick-bedded, yellowish-gray to white, friable medium- to fine-grained arkosic sandstone with granitic conglomerate locally at base. From a pinch-out to the east, sandstone ranges from 7 feet to as much as 80 feet thick in western part of quadrangle and is unconformable on older units. Contains few inarticulate brachiopods, scattered marine mammal bones, and external molds of *Astrodapsis*. In the Felton quadrangle to the west, a diverse mollusk, echinoid, and marine mammal fauna is diagnostic of shallow-marine conditions and of late Miocene age (Phillips, 1983, 1984a, b; Clark, 1981).

Tm

MONTEREY FORMATION (MIDDLE MIOCENE)--Thin- to medium-bedded, brownish-black to pale-yellowish-brown micaceous siltstone and subsiliceous organic mudstone. The Monterey is as much as 380 feet thick along Carbonera Creek in western part of quadrangle. *Anadara obispoana* and benthic foraminifers are diagnostic of neritic depths and of a middle Miocene (Luisian) age.

Tlo LOMPICO SANDSTONE (MIDDLE MIOCENE)--Thick-bedded to massive, yellowish-gray, fine- to medium-grained arkosic sandstone, locally calcareous. Sandstone is as much as 250 feet thick in western part of quadrangle. Along Vinehill Road and Blackburn Gulch area, a thick coquina bed yields fragments of mollusks and *Balanus* together with benthic foraminifers indicative of a near-shore, shallow-marine environment. *Leptopecten andersoni* and *Amusium lompocensis* in the coquina are diagnostic of a middle Miocene age. The Lompico Sandstone is unconformable on older units.

Tla LAMBERT SHALE (LOWER MIOCENE)--Thin- to medium-bedded and faintly laminated olive-gray organic mudstone with pale-yellowish-brown phosphatic laminae and lenses in lower part. Formation grades upward to thin-bedded sandy siltstone with thin to thick interbeds of micaceous fine- to medium-grained arkosic sandstone. Approximately 1,500 feet of Lambert crop out along Mountain Charlie Gulch and as much as 1,800 feet along Hinckley Creek to the southeast. Fish scales and fragments are common, and benthic foraminifers are diagnostic of bathyal depths and of the early Miocene Saucesian Stage (K. McDougall, written commun., 1989; R. L. Pierce, written commun. 1961).

VAQUEROS SANDSTONE AND BASALT (LOWER MIOCENE AND OLIGOCENE)--

Tv

Thick-bedded to massive, yellowish-gray, fine- to coarse-grained arkosic sandstone with thick glauconitic sandstone bed in lower part. The Vaqueros is as much as 2,700 feet thick. Benthic foraminifers from the lower part are diagnostic of bathyal depths and of an early Zemorrian (Oligocene) age. Thick Dosinia and Ostrea biostromes in the upper 300 feet of the Vaqueros along Hinckley Creek indicate shallow-marine conditions.

Tvb

Basalt, vesicular and amygdaloidal, outcrops along Highway 17 and the road to Glenwood Basin in western part of quadrangle. Basalt is tentatively included in the Vaqueros and correlated with flows to the west in the Felton quadrangle, where they are as much as 200 feet thick (Clark, 1981) and have been dated by potassium-argon methods at 23.1 ± 0.7 Ma (Turner, 1970).

Tz

ZAYANTE SANDSTONE (LOWER MIOCENE AND OLIGOCENE)--Thick- to very thick-bedded poorly sorted, reddish muddy sandstone, greenish sandy siltstone, and cobble conglomerate with abundant granitic detritus, probably nonmarine. Locally intertongues with Vaqueros Sandstone.

SAN LORENZO FORMATION (OLIGOCENE AND UPPER EOCENE)--

Tsl — Shale, mudstone and sandstone, undivided

Tsr — Rices Mudstone Member - upper part is light-gray nodular mudstone, which is locally bioturbated and glauconitic and yields fish scales and benthic foraminifers diagnostic of upper middle bathyal depths and an early Zemorrian (Oligocene) age (K. McDougall, written commun., 1989). Along Soquel Creek and to the east in the Loma Prieta quadrangle, lower part is massive fine-grained glauconitic arkosic sandstone with Pitar locally abundant and mollusks characteristic of inner neritic depths and of a Refugian (late Eocene) age (Smith, 1971). The Rices Mudstone Member varies from 1,300 feet to as much as 1,800 feet thick.

Tst — Twobar Shale Member - thin-bedded and laminated olive-gray shale with very thin lenses and laminae of very fine arkosic sandstone, containing bathyal benthic foraminifers assignable to the Narizian Stage of the late Eocene (Smith, 1971). From 200 feet to as much as 450 feet thick along Laurel Creek.

BUTANO SANDSTONE (UPPER, MIDDLE, AND LOWER EOCENE)--

Tb — Yellowish-gray, medium-bedded to massive fine-to medium-grained arkosic sandstone with thin interbeds of olive-gray siltstone and shale. As much as 700 feet of Butano Sandstone crops out along the axis of Laurel anticline in the northern part of quadrangle, but there its base is not exposed. In the northeastern part of quadrangle, about 200 feet of massive Butano Sandstone overlies Butano mudstone (Tbm). In the map area this sandstone yields bathyal benthic foraminifers assignable to the Narizian Stage of the middle to late Eocene (Fairchild and others, 1969; Smith, 1971).

Tbm

Dark-gray, thin-bedded nodular mudstone commonly with fish scales along bedding planes, with interbedded thin to thick, locally graded, arkosic sandstone. Planktic and benthic foraminifers from Soquel Creek are diagnostic of bathyal depths and of a probable late Eocene (Narizian) age (Smith, 1971).

Tbs

Thick-bedded to massive, fine- to coarse-grained arkosic sandstone exposed at base of section along Soquel Creek. Between the San Andreas and Zayante faults, the basement of the Butano is not exposed.

Tbc

Very thick-bedded to massive, light-gray, granular, medium- to coarse-grained arkosic sandstone with thick to very thick interbeds of sandy pebble conglomerate containing granitic boulders as long as 3 feet. As much as 3,600 feet of section crops out south of the Zayante fault in western part of quadrangle, where it rests unconformably on Salinian granitic basement rocks. Superjacent beds in Felton quadrangle to the west yield nannoplankton and benthic and planktic foraminifers diagnostic of bathyal depths and of an early Eocene (P8 Zone) age (Clark, 1981).

SALINIAN BASEMENT ROCKS SOUTH OF ZAYANTE FAULT (CRETACEOUS AND OLDER)

Kgrd/Kgrm — Granitic rocks ranging in composition from granodiorite to quartz diorite, locally divided into quartz diorite (Kgrd) or granodiorite and quartz monzonite (Kgrm) (Ross and Brabb, 1973). Radiometric ages (Rb/Sr and U/Pb), and structural data (Ross, 1978; Compton, 1966; Mattinson and James, 1985) suggest that these rocks were emplaced 95-120 Ma (middle Cretaceous).

sch — Pelitic schist, probably correlative with the Sur Series of Trask (1926).

MAFIC BASEMENT(?) ROCKS BETWEEN ZAYANTE AND SAN ANDREAS FAULT ZONES

db — DIABASE AND GABBRO OF LAUREL CREEK (JURASSIC?)--Fine- to medium-grained intrusive diabase and gabbro, brecciated and sheared, discontinuously exposed for about 300 m along northwest-trending fault which crosses Laurel Creek about 0.1 mi (161 m) downstream from where Old Morrill Road crosses Laurel Creek north of its junction with Old San Jose Road. Diabase is in fault contact with mudstone of the Butano Sandstone, with the

Rices Mudstone Member of the San Lorenzo Formation, and with the Vaqueros Sandstone. Diabase and gabbro have a peculiar "clot-like" cumulate texture, and are lithologically similar to undated diabase and gabbro northeast of the San Andreas fault along Highland Way and Eureka Canyon Roads to the east in Loma Prieta quadrangle (McLaughlin and others, 1988). Rock is locally chloritized, and cut by quartz veinlets. Diabase is undated in Laurel quadrangle, but aeromagnetic and gravity data suggest that it may be coextensive at depth with gabbroic rocks southwest of the San Andreas fault exposed 23 mi (37 km) to the southeast, at Logan (Ross and Brabb, 1973). The mafic rocks at Logan are dated at about 156 Ma (Jurassic) by K-Ar methods (Ross, 1970) and at 161-165 Ma (Jurassic) by Pb-U techniques (Johnson and O'Neil, 1988).

UNITS NORTHEAST OF SAN ANDREAS FAULT

Tme — MARINE SHALE AND SANDSTONE OF HIGHLAND WAY (LOWER MIOCENE OR OLIGOCENE TO LOWER EOCENE)--Hard, dark-brown to black, light-brown weathering, silty to micaceous, locally siliceous carbonaceous shale, and minor quartzo-feldspathic sandstone. Sandstone is rhythmically intercalated within the shale as fine- to medium-grained tabular beds less than 10 cm thick and thick channel-form beds of medium- to coarse-grained sandstone up to 5 m thick. Disseminated grains of glauconite (1 to 3 percent) are common in coarse sandstone and a highly glauconitic sandstone marker bed occurs in upper part of unit. Carbonaceous shales locally are fetid, and in places include thin (3 to 4 cm-thick) carbonate interbeds and thin, laminated black chert beds. Benthic foraminifers and nannofossil assemblages indicate that the lower part of the unit is early Eocene (Penutian, CP-11) and was deposited at middle bathyal depths (K. McDougall and D. Bukry, written commun., 1988). In Loma Prieta quadrangle to the east, shale from the upper part of the section (from along the ridge northwest of Gamecock Canyon) yielded benthic foraminifers, nannofossils, and fish remains indicative of middle to late Eocene, and of Oligocene or early Miocene (Zemorrian or Saucesian) ages and middle to upper bathyal depths (R. L. Pierce, written commun., 1971; K. McDougall and D. Bukry, written commun., 1988). One benthic Miocene fauna from this same area is indicative of an upper-slope setting (R.L. Pierce written commun., 1971; and K. McDougall and D. Bukry, written commun., 1988). The top of this unit is not exposed.

Te2

MARINE SANDSTONE AND SHALE (EOCENE)--Massive to thin-bedded, coarse- to fine-grained, yellowish-orange to white weathering, quartzo-feldspathic sandstone, silty sandstone, and silty dark-brown to greenish-brown, brown to gray weathering mudstone. Unit is extensively hydrothermally altered and quartz veined within Laurel quadrangle. Basal beds consist of thick-bedded quartzo-feldspathic sandstone (0.5 to 3 m thick) locally with calcareous cement, disseminated glauconite pellets, rounded pebbles of black chert, quartz, mafic igneous rocks, and sparse angular clasts of sheared serpentinite. The basal sandstone is overlain by thick-bedded quartzo-feldspathic, biotite-bearing sandstone (beds 1/2 to 2 m thick), which is rhythmically interbedded with brown, silty, buff-weathering mudstone. The upper part of the unit consists of thick-bedded to massive, medium- to coarse-grained, yellow to white-weathering, friable to moderately lithified, quartzo-feldspathic sandstone. Locally, the upper part of this unit also includes minor brown, platy, silty, semi-siliceous mudstone. Where thick-bedded to massive, the upper sandstone exhibits cavernous and spheroidal weathering and traction-related sedimentary structures. The age of this unit is probably middle to late Eocene, based on the early Eocene age of underlying mottled mudstone and sandstone of Mount Chual and on the occurrence of *Parvamussium* c.f. *P. stanfordensis* in silty siliceous mudstone partings near the top of the unit at one locality in Loma Prieta quadrangle (C.L. Powell, written commun., 1988). Contacts with the underlying rocks and with the overlying shale and sandstone of Highland Way are faulted. Unit is here correlated with similar cavernous weathering quartzo-feldspathic sandstone north of the map area in Santa Teresa Hills. The correlative rocks in Santa Teresa Hills were originally assigned a Late Cretaceous age (Bailey and Everhart, 1964), but were recently re-assigned to the Eocene (Short, 1986; Blondeau and Brabb, 1983). The unit may also correlate, in part, with rocks near Searsville Lake and along Westridge Road in Palo Alto 15' quadrangle mapped as Eocene Butano(?) Sandstone by Dibblee (1966); and Page and Tabor (1967) and assigned to the middle Eocene Discoaster bifax subzone by Bukry and others (1977).

Tel

MOTTLED MARINE MUDSTONE AND SANDSTONE OF MOUNT CHUAL (LOWER EOCENE)--Thin-bedded olive-green to greenish-gray, or mottled reddish-brown and green mudstone; brown to white, thin- to thick-bedded, quartzo-feldspathic, locally glauconitic sandstone; and minor conglomerate. Basal conglomerate exposed only locally, consists of up to 8 m of unsorted subrounded to subangular clasts of red radiolarian chert, quartz-veined green and brown metachert, graphitic quartzite, mafic igneous rocks, serpentinite, quartz-veined metasandstone, foraminifer-bearing limestone and rare clasts of quartz-lawsonite schist. In the Loma Prieta quadrangle, some limestone clasts in conglomerate contain calcareous algae and planktic and large foraminifers of Eocene age (planktic foraminifer zones P7-P8) (W.V. Sliter, written commun., 1988). Conglomerate bed is correlated with shallow-water limestone containing Discocyclina sp. of early Eocene age in Santa Teresa Hills north of the map area (McLaughlin and others 1988; Blondeau and Brabb, 1983). A laminated glauconite sandstone and glauconitic quartz-grit as much as 2 m thick overlie, or occur locally in place of the conglomerate. Also, a breccia composed of angular chips of mottled red and green mudstone locally occurs above, or in place of the glauconitic sandstone and the conglomerate. As much as 210 m of olive-green to red and green-mottled chloritic mudstone and minor thin-bedded biotitic feldspathic sandstone overlie the conglomerate, glauconitic sandstone and (or) the mudstone-chip breccia. This mudstone unit characteristically contains abundant benthic and planktic foraminifers, nannofossils, echinoid spines, and fish debris indicative of an early Eocene (Penutian, CP-11) age, and of a lower bathyal to abyssal (2000 m or greater) depositional setting (K. McDougall and D. Bukry, written commun., 1988). In addition, species transported from higher slope and shelf settings are included. This mottled mudstone is correlative with lithologically identical units of the same age in Santa Teresa Hills (Blondeau and Brabb, 1983; Bukry and others, 1977; Short, 1986), possibly with rocks of similar age near Stanford University (Graham and Classen, 1955; Page and Tabor, 1967), with rocks exposed southeast of the Calaveras fault along the west side of the Diablo Range near Paicines (Bolado Park Formation of Karr, 1962), with the Lucia Mudstone of the Santa Lucia Range west of King City, and with the basal Juncal Formation of the San Rafael Mountains north of Santa Barbara (Bukry and others, 1977). The upper part of the mudstone unit locally includes thick-bedded to massive channel-shaped deposits of medium- to coarse-grained quartzo-feldspathic sandstone with disseminated glauconite and locally, rounded pebbles of quartz and dark chert.

SANDSTONE, SHALE, AND CONGLOMERATE OF SIERRA AZUL (UPPER CRETACEOUS)--

Kus

Feldspathic to arkosic lithic wacke and dark-green to black, hard, silty, locally concretionary argillite. Sandstone is orange-brown weathering, gray to green, biotitic, thin to thick bedded, fine- to medium-grained and locally conglomeratic. Sandstone and argillite are mostly rhythmically interbedded, exhibiting thinning upward bedding cycles, load features, plane-laminations at tops of beds, and rare graded beds. Upper part of section is largely massive, medium- to fine-grained sandstone and dark-green to black, hard, silty to micaceous argillite, locally with spheroidal sandy to shaly carbonate concretions and lenses. These rocks in places contain ammonites, gastropods, *Dentalium* sp., *Penticrinus* sp., fish parts, and rare crabs (*Archaepus* sp.) of probable late Campanian age, and also probably transported in part, from a near-shore depositional setting (W. Elder, written commun., 1988). The uppermost beds of the unit include a progradational(?) thickening-upward cycle of 25 cm- to 1 m-thick beds of feldspathic sandstone that locally exhibit trough-shaped cross-bedding. In many places formation is veined extensively with quartz ± calcite ± laumontite.

Kuc

Conglomerate, unsorted, polymict, rounded, pebbly to bouldery, and up to 1,100 m thick in lower and middle parts of formation, thinning southeastward to less than 150 m in Loma

Prieta quadrangle. Conglomerate also crops out locally in less extensive thinner lenses. Clast counts (Simoni, 1974) show that the conglomerate consists predominently of clasts of intermediate to silicic, porphyritic volcanic extrusive and hypabyssal intrusive rocks (andesite, dacite, rhyolite) most of which are recycled (55 percent). These volcanic clasts are followed in order of abundance by clasts of granitic rocks, including aplite (16 percent), mafic igneous rocks, including basalt and diabase (13 percent), and minor slate or phyllite (6 percent), sandstone (5 percent), vein quartz (3 percent), and quartzite (1 percent). Locally, the conglomerate is a calcite-cemented intraformational breccia mixed with abundant fragments of bivalves, Dentalium sp., and Membranipora sp., of late Campanian to early Maastrichtian age (W. Elder, written commun., 1988). Brecciation probably occurred during transport from a near-shore depositional setting (W. Elder, written commun., 1988).

KJs

SHALE AND SANDSTONE (LOWER CRETACEOUS(?) AND UPPER JURASSIC)--Thin-bedded, dark-green to black shale and minor interbedded cherty, locally pebbly, arkosic and lithic wacke. Unit is not exposed at surface in Laurel quadrangle because of offset along Sargent fault, but crops out in Loma Prieta quadrangle to the southeast and in Los Gatos quadrangle to the north. Unit is presumed to occur in subsurface of Laurel quadrangle. In Loma Prieta quadrangle a thin quartz-veined greenish-gray, tan-weathering radiolarian-bearing tuff interbed occurs in the lower part of shale. Tabular to nodular, dark-gray to brown, calcareous concretions also occur locally. Calcareous interbeds and shales locally contain rare ammonites and pelecypods (mostly Buchia), which indicate a Tithonian age for this unit within Loma Prieta quadrangle (W. Elder, written commun., 1988). Buchia species of Tithonian to Valanginian age occur in same unit to southeast near Mount Madonna (McLaughlin, 1973; McLaughlin and others, 1971).

COAST RANGE OPHIOLITE (MIDDLE TO UPPER JURASSIC)--

| Jo | Undivided ophiolitic rocks in structure sections.

| Jodi | Diorite dikes and sills south of, and within the Sargent fault zone, faulted below shale and sandstone of Late Jurassic age, and above undated diabase; exhibit saussuritic alteration to epidote group assemblages.

| Jodb | Diabase sills, fine- to coarse-grained and saussuritic. In Laurel quadrangle diabase is south of and within the Sargent fault zone; it underlies dioritic rocks and overlies cumulate gabbro. In Loma Prieta quadrangle, diabase also crops out on north side of Sargent fault, where it is faulted beneath basaltic flow rocks.

Jog

Gabbro cumulates, with pyroxene-feldspar segregation layering, and prominent uralitic and saussuritic alteration. Unit is locally gradational into ultramafic cumulates, but commonly it is faulted above and below. In other parts of the California Coast Ranges, Pb-U dates from zircon indicate that these rocks crystallized 163 to 169 Ma (Hopson and others, 1986).

Jou

Ultramafic cumulates, exhibiting residual interstitial plagioclase and segregation layering. Ultramafic rocks range from peridotite to norite. Rocks are locally cut by mafic dikes altered to rodingite, or enclose sheared dikes or segregations of gabbro or diabase. Ultramafic cumulates are partially serpentinized, faulted along upper and lower contacts, and locally hydrothermally altered to silica carbonate rock (sc).

Jos

Partially to completely serpentinized, sheared ultramafic rocks, locally enclosing minor sheared intrusives or segregations of cumulate clinopyroxene and hornblende gabbro, and commonly altered to rodingite assemblages. Serpentinite locally is hydrothermally altered to silica carbonate rock (sc).

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CREDITS FOR PALEONTOLOGIC DATA

Mesozoic invertebrate fossils	- W. Elder,[1/] D. L. Jones[2/]
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Benthic -	- K. McDougall[1/] and R. L. Pierce (deceased)[1/]
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Tertiary fish scales	- R. L. Pierce (deceased)[1/]

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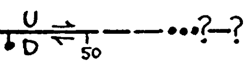
MAP SYMBOLS

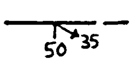
Contact, dashed where approximate, dotted where concealed



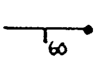
Fault, dashed where approximate, dotted where concealed, queried where uncertain. Ball and bar denote down-thrown block, or U and D denote up and down-thrown blocks. Direction and amount of dip of fault plane shown locally. Horizontal arrows denote relative horizontal movement


Fault at low-angle to bedding, interpreted as low-angle normal fault, double-bars on down-dropped side


Thrust fault, barbs on upper plate

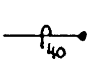


Direction and amount of dip of fault, and plunge of lineation on fault plane

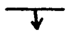


Bedding, ball denotes that facing direction is known from sedimentary structures


Vertical bedding, ball denotes facing direction, as determined from sedimentary structures



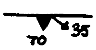
Overturned bedding, ball denotes that facing direction is known from sedimentary structures



Bedding, strike and dip direction approximated from air photos, from long distance sighting, or averaged in area where strike or dip highly variable.

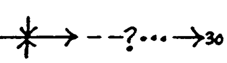
Shear foliation

Vertical shear foliation

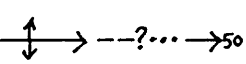


Shear foliation, showing plunge of lineation on shear surface

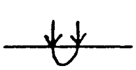
Folds



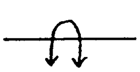
Synclinal axis, showing direction and amount of plunge, dashed where approximate, dotted where concealed, queried where uncertain



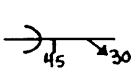
Anticlinal axis, showing direction and amount of plunge, dashed where approximate, dotted where concealed, queried where uncertain



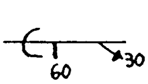
Overturned syncline



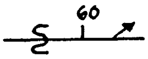
Overturned anticline



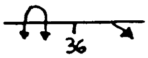
Outcrop-scale anticlinal fold, showing dip of axial plane, and amount and direction of plunge



Outcrop-scale synclinal fold, showing dip of axial plane, and amount and direction of plunge



Isoclinal folds showing dip of axial planes and plunge direction



Outcrop-scale overturned anticline, showing dip of axial plane and plunge direction

Overturned isoclinal folds, showing dip of axial planes and plunge direction

Drill hole

Mine adit

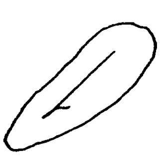
Mineral prospect

0000000 Conglomeratic marker bed

g•••g•••g•••g Glauconitic marker bed

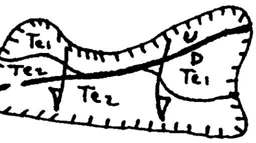
Travertine Spring

Closed depression



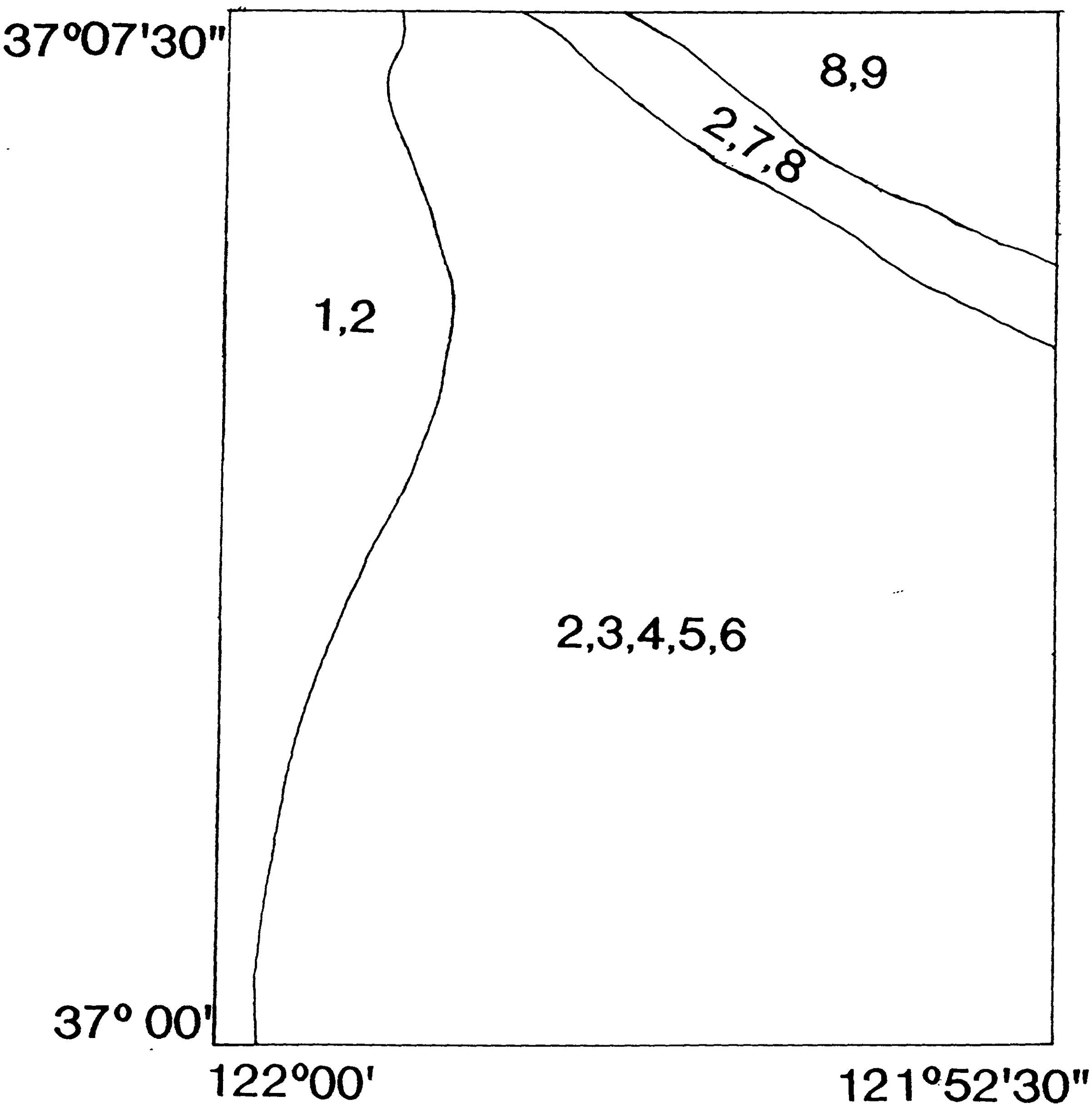
Landslide, arrows indicate direction of movement

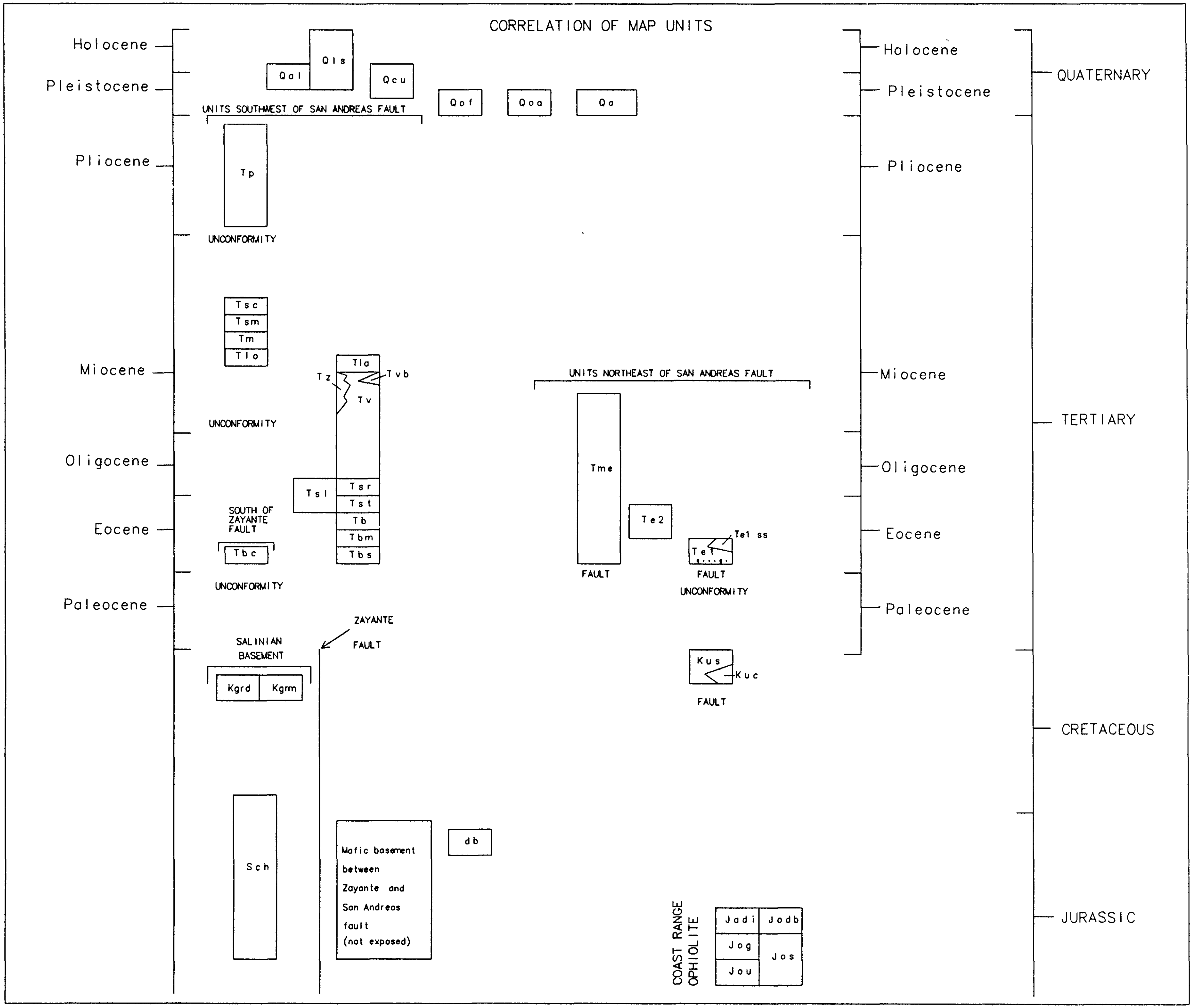
Topographic escarpment, line above barbs denotes top of escarpment



Large landslide, consisting of one or more blocks of intact rock rotationally displaced downslope from a prominent headwall scarp. Arrows indicate direction of movement; stratigraphy and structure of intact blocks delineated where mapped.

FIGURE 1. INDEX TO SOURCES OF DATA USED IN COMPILATION




CORRELATION OF MAP UNITS
Holocene
Pleistocene
Pliocene
Miocene
Oligocene
Eocene
Paleocene
QUATERNARY
TERTIARY
CRETACEOUS
JURASSIC
UNITS SOUTHWEST OF SAN ANDREAS FAULT
Qal
Qls
Qcu
Qof
Qoa
Qa
Tp
UNCONFORMITY
Tsc
Tsm
Tm
Tlo
Tla
Tz
Tvb
Tv
UNCONFORMITY
Tsl
Tsr
Tst
Tb
Tbm
Tbs
SOUTH OF ZAYANTE FAULT
Tbc
UNCONFORMITY
ZAYANTE FAULT
SALINIAN BASEMENT
Kgrd
Kgrm
Sch
Mafic basement between Zayante and San Andreas fault (not exposed)
db
UNITS NORTHEAST OF SAN ANDREAS FAULT
Tme
FAULT
Te2
Te1 ss
Te1
FAULT
UNCONFORMITY
Kus
Kuc
FAULT
COAST RANGE OPHIOLITE
Jodi
Jodb
Jog
Jos
Jou