DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
LOS ANGELES COUNTY, CALIFORNIA

OPEN-FILE MAP
TOPANGA QUADRANGLE, CALIFORNIA

EXPLANATION

SURFICIAL DEPOSITS

Qaf — Artificial fill

Chiefly fill for roadways; locally includes cut surfaces

Qalc | Qalp | Qf | Qb | Qls | Qdt — Alluvial, fan, beach, landslide, and talus deposits:

Qalc, alluvial deposits in active channels; sand, gravel, and silt; subrounded boulders locally exceed 5 ft (1.5 m), commonly grade downstream to about 1 ft (0.3 m) near mouth of stream, in poorly sorted and poorly bedded, loose, pebbly or silty sand; locally includes colluvium and residual soil

Qalp, alluvial and mudflow deposits underlying flood plains adjoining active channels; incised to depths as great as 25 ft (7.6 m)

Qf, alluvial fan deposits on marine terrace deposits or platforms along coast; crudely sorted and bedded clay, silt, sandy silt, and minor pebbly sand, common clay-rich layers; thickness locally as great as 100 ft, but commonly less than 10 ft (3 m)

Qb, beach deposits; fine- to medium-grained sand, rounded pebble gravel locally at base; loose to moderately cohesive, thickness less than 25 ft (7.6 m)

Qls, landslide deposits; may include both bedrock and surficial materials; mapped boundary may include scarp area; see Map Symbols

Qdt, talus deposits; angular fragments and blocks of rock as large as 6 ft (1.8 m); maximum thickness may exceed 50 ft (15.2 m)

Qst | Qtm — Terrace deposits

Qst, stream terrace deposits; interbedded gravel, sand, and silt, commonly on flanks of valleys; gravel generally subrounded and locally imbricated, boulders as long as 5 ft (1.5 m), sand poorly sorted and crudely bedded; thickness locally as great as 100 ft (30.5 m)

Qtm, marine terrace deposits; sand, silty sand, and gravel; sand, friable, well sorted, fine to medium grained, locally fossiliferous, as thick as 20 ft (6.1 m); overlies three recognized emergent marine platforms between 130 and 318 ft (39.6–97 m) altitude along coastline; commonly overlain by colluvial or fan deposits

Pleistocene and Holocene; Upper Pleistocene and Holocene; Pleistocene; Upper Pleistocene — QUATERNARY

BEDROCK UNITS

Tmo — Modelo Formation

Chiefly thin-bedded, platy to shaly diatomaceous mudstone and siltstone; contains fine- to coarse-grained sandstone interbeds as thick as 3 ft (1 m); pebbly sandstone at base locally as thick as 25 ft (7.6 m). Shale and siltstone locally contain foraminifera and fish scales referred to the Mohnian Stage of Kleinpell (1938), and section along Topanga Canyon Road includes basal part of the type section for the Mohnian Stage

UNCONFORMITY

Ttu — Upper Topanga Formation of Durrell (1954)

Chiefly very thick-bedded to thin-bedded quartz-feldspar wackes (turbidites) and interbedded silty shale; shale may be diatomaceous or phosphatic; locally contains zones of large dolomitic concretions, abundant rust-colored plant fragments, fish scales, and foraminifera questionably referred to the Mohnian Stage of Kleinpell (1938)

Ti — Intrusive sills, dikes, and pods of basalt, commonly with ophitic or diabasic texture; commonly intruded along fault surfaces; thin bodies indicated by line (long dash where location approximate, short dash where inferred, dotted where concealed); x, small exposure, boundaries not determined

UNCONFORMITY

Tcb | Tcs — Conejo Volcanics of Taliaferro (1924)

Tcb, fragmental volcanic rocks, chiefly basaltic breccias; local interbedded sandstone and siltstone

Tcs, nonquartzose volcanic sandstone and siltstone

Ttl — Lower Topanga Formation of Durrell (1954)

Ttl$_3$, upper marine unit; chiefly thin- to medium-bedded fine- to medium-grained sandstone, locally abundant molluscan fauna referred to the "Temblor" stage of Weaver and others (1944); abundant shaly siltstone in northeast part of map area

Ttl$_2$, chiefly fluvial to brackish water sandstone in thick, lenticular, ledge-forming beds, mudstone, minor limestone and tuff
Sandstone medium- to coarse-grained, very poorly sorted, friable, arkosic, in beds as thick as 20 ft (6 m); commonly contains subangular to subrounded pebbles of granitic and metamorphic rocks as long as 8 in (20 cm), scattered or in lenses as thick as 5 ft (1.5 m), locally filling channels. Thicker beds show complex cross-beds and channelling, locally parallel laminations; thinner beds are finer grained, better sorted, and laminated, and contain thin interbeds of fine-grained blottitic sandstone or mudstone; sandstone locally contains ellipsoidal concretions as long as 2 ft (0.6 m), scattered fragments of bone, and locally abundant closely-spaced filled tubes or borings normal to bedding and as long as 2 ft (0.6 m); one bed of medium-grained calcareous sandstone on ridge west of Fernwood (lower part of unit) locally contains the middle Miocene guide fossil Melongena, a shallow-brackish water gastropod
Mudstone, forms abundant interbeds as thick as 3 ft (1 m) in lower part of sandstone sequences, grayish-red or olive gray in color, locally sandy; locally contains scattered limestone nodules as long as 6 in (15 cm)
Limestone, 3 beds in lower part of unit; dense, fine to micro-crystalline, in beds locally as thick as 2 ft (0.6 m); brownish gray, light gray, or white, conchoidal fracture, locally sandy; upper bed has sparse, small, pinkish, silicified algal(?) structures
Tuff, at least 2 beds as thick as 6 ft (1.8 m) in lower part of unit; compact, altered vitric(?) tuff, pale gray to light orange in color, contains scattered angular crystals and fragments of altered biotite; beds commonly eroded and channelled by overlying sandstones

Ttl$_1$, lower marine unit; chiefly sandstone and pebbly sandstone and minor siltstone, locally contains abundant molluscan fauna referred to the "Vaqueros" and "Temblor" Stages of Weaver and others (1944) and dominated by Vertipecten nevadanus; sandstone is dominantly subangular; medium-grained, feldspathic, contains up to 7 percent biotite and thin lenses of subrounded to well-rounded pebbles as long as 4 in (10 cm); local conglomeratic beds contain up to 50 percent cobbles, as long as 8 in (20 cm), of meta-igneous and volcanic rocks; coarser-grained beds are as thick as 10 ft (3 m) and are parallel or cross laminated; finer-grained beds are commonly well-sorted, parallel-laminated, or structureless, carbonized plant fragments locally abundant. Siltstone interbeds are clayey and biotitic, characteristically closely jointed and fracture into angular splinters; contains locally abundant fish scales

Ttl, undivided marine sandstone, siltstone, and pebbly sandstone; commonly contains molluscan fauna referred to the "Temblor" and "Vaqueros" Stages of Weaver and others (1944), but locally contains the middle Miocene guide Cerithium topangensis

Tv — Vaqueros Formation

Chiefly thick-bedded sandstone that contains a molluscan fauna dominated by the early Miocene guide Turritella inezana referred to the "Vaqueros" Stage of Weaver and others (1944), minor interbedded fluvial or deltaic reddish brown or grayish green micaceous mudstone and siltstone; present in southwest corner of map only; sandstone is dominantly medium-grained, poorly to well sorted, has sharp, persistent bedding surfaces but is otherwise structureless, commonly closely jointed.

Ts — Sespe Formation

Nonmarine sequence of thick bedded to massive, cliff-forming sandstone and pebbly sandstone; sandstone is grayish red to reddish brown, grayish yellow, pale greenish white, or medium gray; medium- to coarse-grained, commonly pebbly or conglomeratic and contains disseminated greenish gray or hematite-coated biotite in a sparse clayey matrix; well indurated, very poorly sorted but local beds 1 to 10 ft (0.3–3m) thick become finer-grained upward, are cross-laminated, or flat-laminated; contains lenses as thick as 6 in (15 cm) of subangular to subrounded pebbles and cobbles, as long as 6 in (15 cm), of hard volcanic porphyries and quartzite, as well as local thin layers of siltstone chips; commonly has partings and thin interbeds of greenish gray or grayish red biotitic mudstone or siltstone

Upper Miocene; Middle Miocene; Lower Miocene; Upper Eocene, Oligocene, and lower Miocene; Eocene, Oligocene, and Miocene — TERTIARY

BEDROCK UNITS (Cont.)

Tmz — "Martinez Formation" of Weaver and others (1944)

Lower part is chiefly thick-bedded, cliff-forming pebble-cobble conglomerate and sandstone (probably marine turbidite) in Topanga Canyon; sandstone in southwest corner of area locally contains molluscan fauna characterized by the Paleocene guide Turritella pacheocoensis, referred to the "Martinez" Stage of Weaver and others (1944); pebble-cobble conglomerate overlain by thin bedded siltstone and minor algal limestone
Conglomerate is typically cobble conglomerate in beds as thick as 25 ft (7.6 m) with scattered pebbles and boulders and interbeds as thick as 4 ft (1.2 m) of medium- to coarse-grained sandstone; more than 50 percent of rock consists of subrounded to well-rounded cobbles and boulders of light-colored granitic and gneissic rock, brown and gray quartzites, and distinctive brick-red or lavender quartz-bearing porphyries (not present in Cretaceous conglomerates); conglomerate beds locally contain mudstone or siltstone chips and slabs as long as 3 ft (1 m)
Sandstone is medium- to coarse-grained, poorly to well sorted, of subangular to subrounded quartz and feldspar in sparse clayey matrix with locally abundant biotite, hard and well indurated, commonly thick bedded with sharp bedding surfaces, tops of many beds are graded
Siltstone in upper part of sequence varies from sandy siltstone to silty claystone, contains abundant biotite, weathered surfaces characterized by bluish-black manganiferous(?) coating; bedding defined by partings of fine-grained micaceous sandstone at intervals of 6 to 18 in (15–46 cm) and local beds of silty biotitic sandstone; closely fractured and jointed normal to bedding; fractures into ellipsoidal blocks as thick as 6 in (15 cm) and as long as 2 ft (0.7mm); local calcareous siltstone beds are as thick as 5 in (13 cm) and contain hard concretions as long as 3 ft (1 m); locally contains molluscan or foraminiferal fauna questionably referred to the Eocene
Limestone is very light gray to yellowish gray, hard and resistant, in massive beds as thick as 15 ft (4.6 m), contains calcareous algal structures, granular calcite, sparse mollusks, foraminifera, and scattered sand grains
Basal conglomerate in Tuna Canyon contains up to 50 percent fractured, well-rounded large cobbles and boulders of light-colored granitic and gneissic rocks and well-rounded cobbles as long as 6 in (15 cm) of quartzite, but lacks red and lavender porphyries; matrix is poorly-sorted, angular, arkosic sandstone that contains abundant lithic fragments

Paleocene and Eocene(?); Lower Paleocene and middle Eocene(?) — TERTIARY

K — Sedimentary rocks in Peña, Tuna, and Topanga Canyons (Equivalent in part to Chico Formation of Hoots, 1930)

Chiefly thick-bedded marine sandstone containing fragments of slate or siltstone (turbidite), siltstone, and local conglomerate
Sandstone is micaceous, arkosic, and contains locally abundant subangular to subrounded grains and chips of dark-colored slate or siltstone; beds commonly very thick (up to 30 ft or 9 m); texture varies from moderately sorted medium grained to very poorly sorted and coarse grained, tops of beds structureless, graded, or laminated; some sections have interbeds as thick as 3 ft (1 m) of darker-colored fine-grained sandstone, mudstone, or shale; some beds show lamination due to concentration of carbonized plant fragments and mica, convolute lamination, load casting, or low-angle cross lamination; lenses as thick as 2 ft (0.6 m) of well-rounded pebbles and cobbles as long as 6 in (5 cm) are present locally; locally contains molluscan or foraminiferal faunas referred to the Campanian or Maestrichtian Stages (Late Cretaceous). The steeply-dipping section near the mouths of Tuna and Topanga Canyons consists of regularly interbedded, thin-bedded medium-grained sandstone, and dark gray platy siltstone
Siltstone, commonly dark gray, in interbeds as thick as 5 ft (1.5 m) in sandstone sections, but locally makes up to 70 percent of the rock; commonly micaceous, with platy or hackly fracture
Conglomerate, well exposed near mouth of Tuna Canyon and in highway cut east of mouth of Topanga Canyon, chiefly cobble conglomerate having interbeds as thick as 3 ft (1 m) of fine- to coarse-grained arkosic sandstone with abundant grains and chips of dark-colored slate or siltstone; conglomerate consists of 25 to 50 percent well-rounded cobbles and boulders as long as 2 ft (0.6 m) of gray or greenish porphyries and quartzites, including a distinctive greenish porphyry that contains chips of dark-colored slate as long as 2 in (5 cm); fragments are poorly sorted into beds of pebbles, cobbles, and boulders; matrix is medium- to coarse-grained arkosic sandstone containing abundant lithic fragments; rock is closely fractured and shattered

Cretaceous; Upper Cretaceous — CRETACEOUS

MAP SYMBOLS

Bedding: 65 — Contact or mapped horizon showing dip. Long dash where approximately located, short dash where inferred, dotted where concealed

30 — Strike and dip of bed. Ball on strike line indicates top determined from sedimentary structures

65 — Overturned beds

90 — Vertical beds. Number on up-section side where top determined from sedimentary structures

Horizontal beds

35 — Approximate strike and dip of beds determined from indirect evidence

65 — Strike and dip of indistinct layering in volcanic rocks

Original base of marine terrace deposits (Qtm) on Parker Mesa, now removed by grading operations; mapped by J. T. McGill, June 1961

Folds: 15 — Minor anticline; 10 — Minor fold. Showing direction and plunge of axis

Landslide features: Most landslides are complex, ancient, and dissected; symbol may include more than one type and stage of movement; may include both bedrock and surficial materials

Landslide deposits. Arrows show general direction of movement; queried where identification or origin of feature doubtful; date indicates that feature was active at that time

Fresh scarp at head of landslide

Other symbols: A — A' — A'' — A''' Line of structure section

Ferguson Francisco 1 1185' Exploratory well, showing name and depth

Faults

Fault symbols: long dash where approximately located, short dash where inferred, dotted where concealed, queried where doubtful; x, igneous rock intruded along fault

75 — High-angle fault, showing dip; p

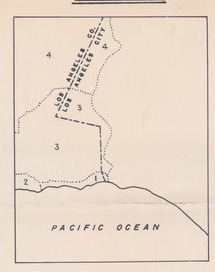
35 — Low-angle reverse fault, sawteeth on upper plate

30 — Low-angle fault, sawteeth on upper plate; relative displacement not determined

FOSSIL LOCALITIES (F-Mem, f-Mi)

F, macrofossil collection; f, microfossil collection; Q, late Pleistocene; M, Miocene; E, middle Eocene ("Domengine" Stage of Weaver and others, 1944); P, early Paleocene ("Martinez" Stage of Weaver and others, 1944); K, Late Cretaceous (Campanian or Maestrichtian Stage); e, early; m, middle; l, late; (?), assignment not certain. For example, F-Mem, macrofossil collection of early or middle Miocene age; f-Ml, microfossil collection of late Miocene age. Fossils identified by W. O. Addicott, D. L. Jones, E. J. Moore, R. L. Pierce, P. B. Smith, and J. G. Vedder, U.S. Geological Survey.

INDEX TO MAPPING



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   McGill, J. T., unpublished mapping of surficial deposits and geomorphic features of Parker Mesa area, June 1961.
2. Mapped by J. E. Schoellhamer (Yerkes and others, 1964).
3. Mapped by R. H. Campbell and R. F. Yerkes (Yerkes and others, 1964).
4. Previously unpublished mapping by R. F. Yerkes.

LITHOLOGIC SYMBOLS

	Geologic map	Structure sections
Conglomerate	cgl	
Limestone	ls	
Sandstone	sd	
Silty sandstone	sty sd	
Pebbly sandstone	pbly sd	
Shale	sh	
Siltstone	st	
Intrusive basalt		
Tuff	t	
Volcanic breccia		
Unconformity		

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Hoots, H. W., 1930, Geology of the eastern part of the Santa Monica Mountains, Los Angeles County, California: U.S. Geol. Survey Professional Paper 165, p. 83–180, geologic map of area east of Topanga Canyon at scale of 1:24,000.

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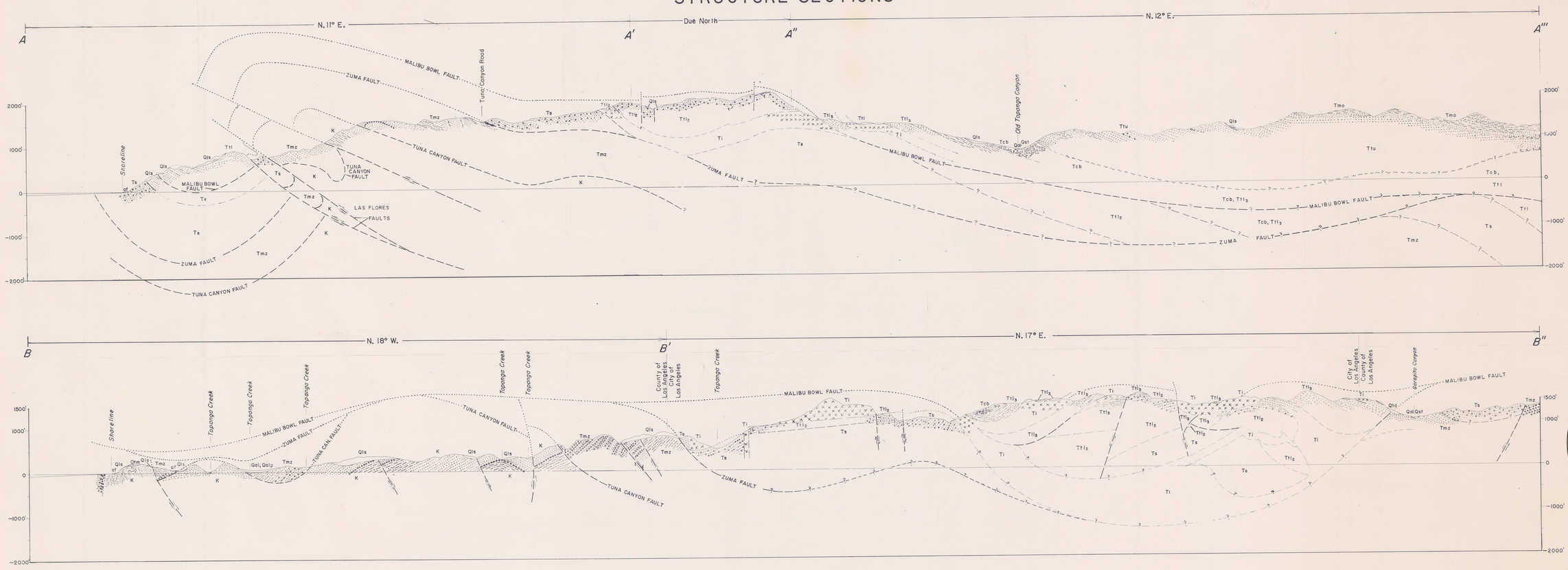
STRUCTURE SECTIONS



Base by U.S. Geological Survey, 1952; photorevised 1967

APPROXIMATE MEAN DECLINATION, 1967

SCALE 1:12,000
1/2 0 1 MILE
.5 0 1 KILOMETER

SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE AVERAGE RANGE OF TIDE IS APPROXIMATELY 4 FEET

CONTOUR INTERVAL 25 FEET
DATUM IS MEAN SEA LEVEL

This map is preliminary and has not been reviewed for conformity with U. S. Geological Survey standards and nomenclature

PRELIMINARY GEOLOGIC MAP OF THE UNINCORPORATED PART OF THE TOPANGA QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA

By

R. F. Yerkes, R. H. Campbell, J. E. Schoellhamer, and P. W. Birkeland

1973