U. S. DEPARTMENT OF THE INTERIOR

U. S. GEOLOGICAL SURVEY

Preliminary geologic map of the San Fernando 7.5' quadrangle Southern California

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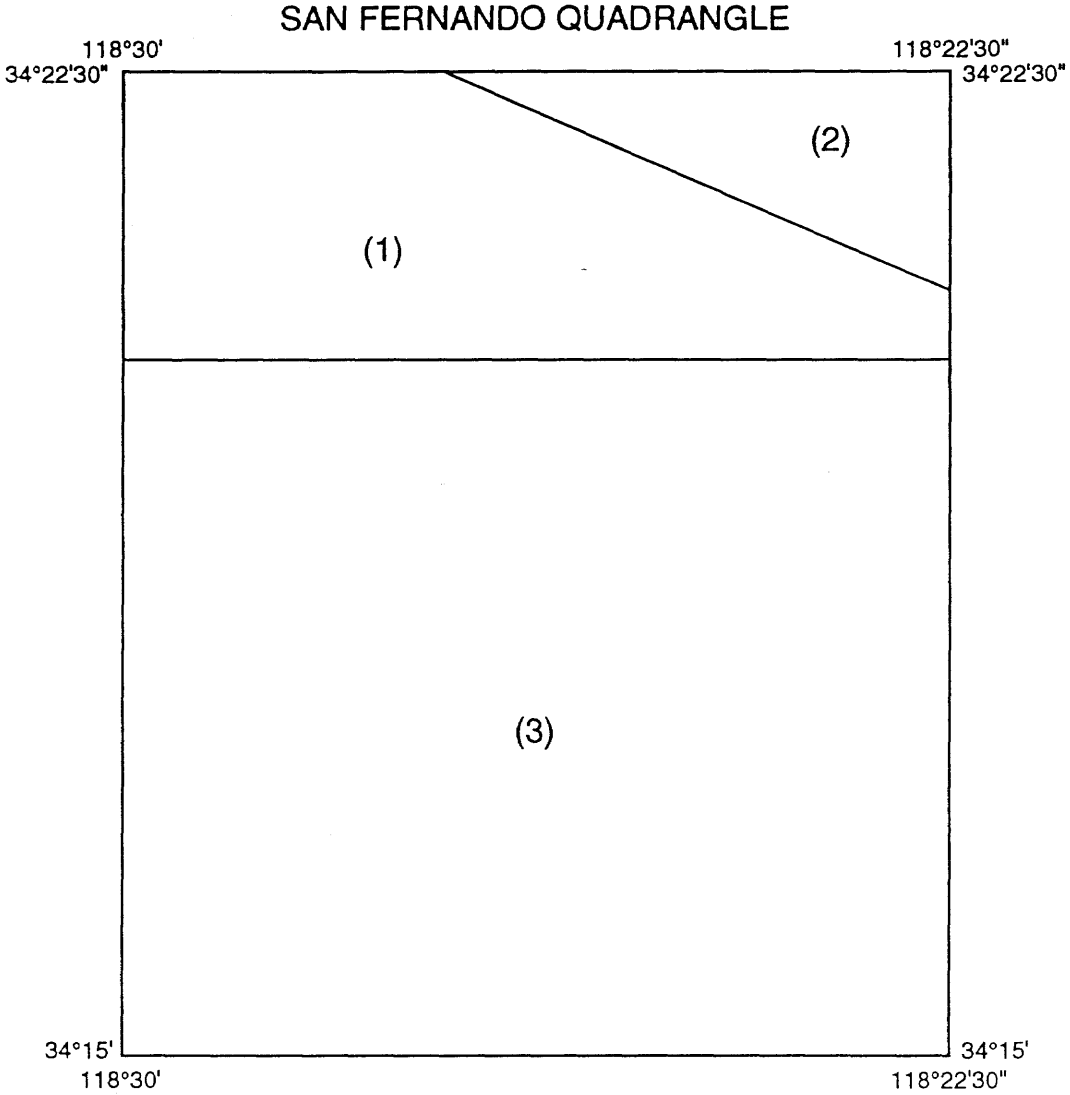
INTRODUCTION

This map is a preliminary product of the Southern California Digital 1:100, 000 Geologic Map Series (Southern California Areal Mapping Project-SCAMP; Morton and Kennedy, 1989). The 1:24,000 manuscript for this map was compiled from original sources, chiefly at 1:24,000, and scanned and processed digitally using the U. S. Geological Survey Alacarte menu-driven interface (Wentworth and Fitzgibbon, 1991) for ARC/INFO, a commercial geographic information system (GIS) avaialable from Environmental Systems Research Institute, Redlands, California.

This 1:24,000 quadrangle is one of sixteen that form the east half of the Los Angeles 1:100,000 quadrangle; the 1:24,000 quadrangles form the basic data supporting the regional-scale quadrangle, and thus include available data on exploratory oil wells and fossil collections.

Stratigraphic nomenclature is largely that of the source materials; it is subject to further modification as compilation progresses. Minor adjustments have been made in geologic boundaries to conform to the metric base, which was enlarged from 1:100,000.

Base-map layers, drainage, roads, and topo contours, were prepared from publicly-avaialable digital line graph (DLG) data for the 1:100,000 Los Angles metric topographic map (1979 edition) by R. H. Campbell, U. S. Geological Survey, Reston, VA.

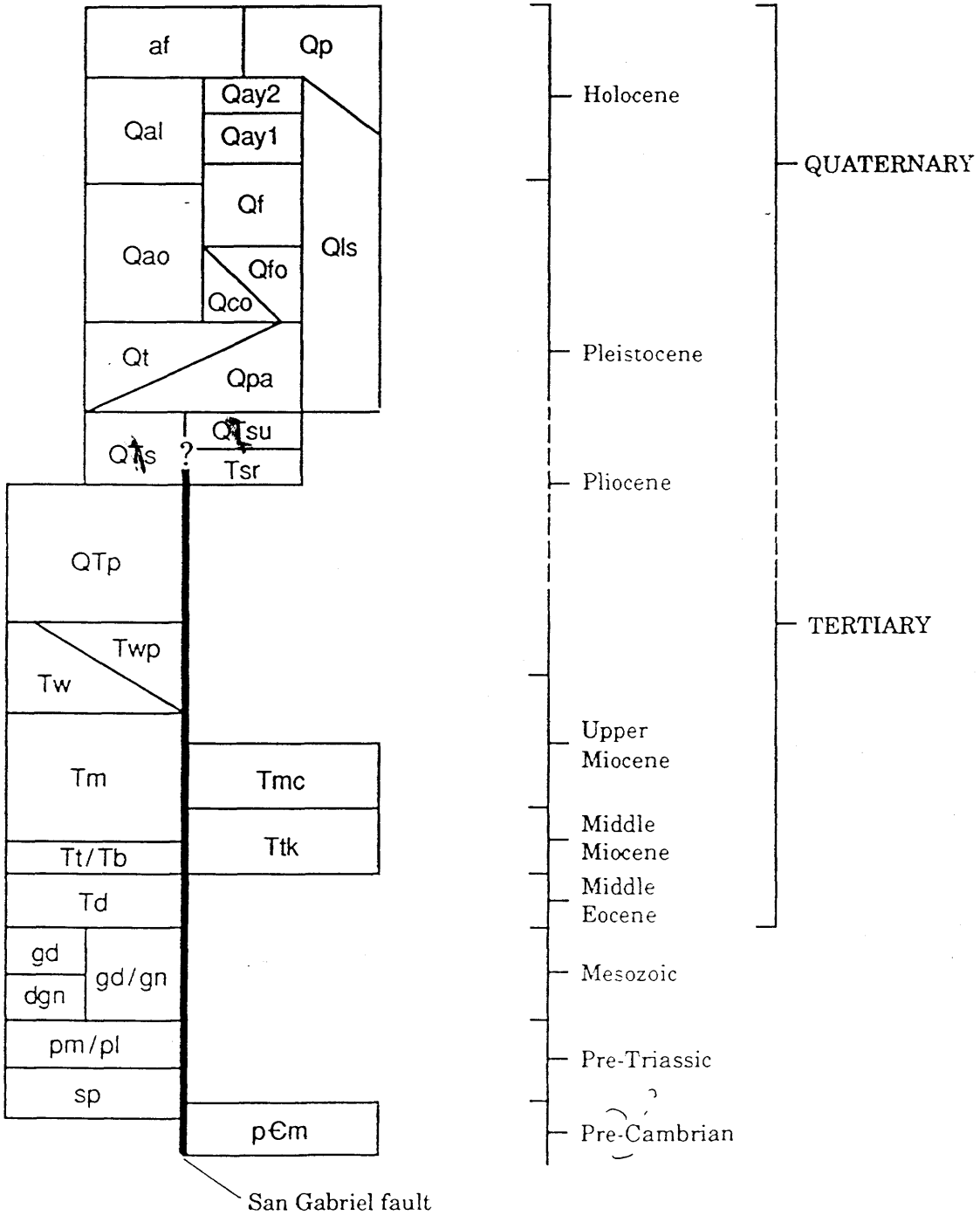


EXPLANATION

1. Oakeshott, 1958b
2. Weber, 1982
3. Barrows and others, 1974;
   Tinsley and others, 1985

Figure 1 - INDEX MAP SHOWING SOURCES OF GEOLOGIC MAPPING

CORRELATION OF MAP UNITS, PRELIMINARY GEOLOGIC MAP OF SAN FERNANDO QUADRANGLE



EXPLANATION, PRELIMINARY GEOLOGIC MAP, SAN FERNANDO QUADRANGLE

DESCRIPTION OF MAP UNITS

af — Artificial fill-Locally faulted or cracked during 1971 San Fernando earthquake; structures built wholly or partly on fill commonly damaged

Qal — **Alluvium** (Holocene)--Deposits in present drainages, alluvial fans, and flood plains: sand and gravel, fine- to coarse-grained, unconsolidated and uncemented, locally includes young colluvium; locally faulted, uplifted, and tilted during 1971 San Fernando earthquake; Qay_2, areas that have flooded historically, thickness 0-3 m, age less than 1,000 yrs; Qay_1, undifferentiated Holocene alluvium, age 1,000-10,000 yrs.

Qp — **Pond deposits** (Holocene)--Sand,silt, clay, and organic material; unconsolidated

Qf — **Alluvial Fan deposits** (Holocene and Pleistocene)--Sand and gravel, generally coarse-grained, unconsolidated; at mouths of steep drainages, coalesced to form aprons below steep slopes

Qls — **Landslide deposits** (Holocene and Pleistocene)--Fractured and sheared bedrock and surficial materials, commonly slumps; **Qls***, reactivated during 1971 San Fernando earthquake

Qao — **Older alluvium** (Pleistocene)--Fine- to coarse-grained sand and gravel; unconsolidated to moderately consolidated; commonly with reddish clay-bearing soil; prior to 1971 San Fernando earthquake had been faulted, uplifted/tilted and dissected

Qfo — **Older alluvial fan deposits** (Pleistocene)--Sand and gravel, slightly consolidated, dissected

Qco — **Older colluvial and debris flow deposits** (Pleistocene)--Silt, clay, sand, and rock fragments, typically reddish, sbeneath Tujunga segment of 1971 fault rupture (east center of map)

Qt — **Terrace deposits** (Pleistocene)--Gravel with cobbles and boulders, interbedded coarse-grained sand and fine-pebble gravel, thickness up to 200 ft

Qpa — **Pacoima Formation** (Pleistocene)--Pebbly-bouldery fanglomerate of locally-derived basement rocks in a matrix of dark brown-reddish mudstone-soil, poorly sorted, moderately to well-consolidated to poorly cemented, locally strongly folded and faulted

Qs **Saugus Formation** (Pleistocene)--Pebble conglomerate and coarse-grained sandstone, poorly sorted, cross bedded, loosely consolidated to poorly cemented, nonmarine; thickness about 490 m; **Qsu--Upper member** (western area): pebble conglomerate and coarse-grained sandstone, similar to undivided sequence to east, but grades downward into:

Tsr **Sunshine Ranch member**: (Pliocene and Pleistocene?)--Nonmarine fluviatile, brackish-water, and lacustrine gravel, sandstone, sandy mudstone, reddish and greenish mudstone, sandstone, and conglomerate, some thin white freshwater limestone; thickness about 705 m

Tp **Pico Formation** (Pliocene)--Marine, chiefly pale gray resistant coarse-grained sandstone and pebble conglomerate, massive, friable, fossiliferous (table 2), grades downward into:

Twp **Towsley and/or Pico Formations undifferentiated** (upper Miocene and lower Pliocene)--Sandstone and pebble conglomerate, thickness about 910 m

Tw **Towsley Formation** (upper Miocene and lower Pliocene)--Sandstone and conglomerate, commonly massive, local beds of breccia, locally petroliferous, some siltstone and shale, conglomerate commonly contain clasts of anorthosite; thickness about 750 m, abundant molluscan fauna (table 2)

Tm **Modelo Formation** (upper Miocene)--Shale, diatomaceous to cherty, siltstone, sandstone and conglomerate in upper part, landslides common, foraminifera referred to the Mohnian Stage (upper Miocene; table 2), thickness about 910 m

Tmc **Mint Canyon Formation** (middle to upper Miocene. North of San Gabriel fault)--Nonmarine siltstone, sandstone, conglomerate; moderately well consolidated, fluviatile and lacustrine in origin; thickness about 580 m

Ttk **Tick Canyon Formation** (middle Miocene; north of San Gabriel fault)--Chiefly breccia of gabbro-norite, gneiss, and anorthosite clasts, fluviatile/lacustrine sandstone, siltstone, and conglomerate, well stratified and well cemented; sparse vertebrate fauna referred to late-lower or earliest-middle Miocene (Oakeshott, 1958, p. 53)

Tt? **Topanga Formation?** (middle Miocene; southeast corner of map)--Chiefly nonmarine arkose, mudstone, and conglomerate, top of sequence contains coarse-grained sandstone with few poorly-preserved pelecypod casts (Oakeshott, 1958, p. 64); **Tb**, dense vesicular basaltic flows and minor reddish-purple breccia

Td **Domengine Formation** (middle Eocene, Domengine Stage)--Calcareous sandstone, massive, medium grained, compact, well indurated, greenish gray, with well-rounded pebbles and cobbles; definite "Domengine" (middle Eocene) microfauna encountered at 1404 ft in nearby well no. 229B (table 1)

gd **Granodiorite** (Cretaceous?)-Gray, medium- to coarse-grained granitic rocks, varying from quartz diorite to granite, locally gneissic facies near contacts with older rocks

dgn **Diorite gneiss** (Mesozoic)--Generally dark gneisses, but include metadiorites, hornblende diorite, local amphibole schists

pm **Placerita Formation** (pre-Cretaceous)--Schist and feldspathic gneiss as roof pendants; **pl**, marble, crystalline limestone, or dolomite

sp **Serpentinite** (pre-Triassic?)--Serpentinized peridotite, light- to dark-green, highly sheared and slickensided, rounded fragments and boulders; tabular body interlayered with foliated metasedimentary rocks

gb **gabbroic rocks** (preCambrian)--altered rocks bordering a large anorthosite-norite complex

pCm **Mendenhall gneiss** (preCambrian;--North of San Gabriel fault)-blue quartz-plagioclase gneisses, dominantly quartzo-feldspathic granulite; to northeast intruded by pre-Cambrian anorthosite complex (1190 MA; Barth and others, 1995).

MAP SYMBOLS

Contact or mapped horizon—Long-dashed where approximately located, short-dashed where inferred

Fault— Long-dashed where approximately located, short-dashed where inferred, dotted where concealed, queried where doubtful

Surface ruptures of 2/9/71—Shown in red

Thrust fault—Dashed where approximately located, dotted where concealed; sawteeth on upper plate

Photolineament—Approximately located

Anticline— Approximately located, dotted where concealed; showing crestline

Syncline— Approximately located, dotted where concealed; showing troughline

70 **Strike and dip of inclined beds**—Approximately located

70 **Strike and dip of folaition**—Approximately located

211 **Exploratory well**—Number refers to table 1, below

FM1 **Fossil locality**—Number refers to table 2, below

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Table 1 - DATA ON EXPLORATORY WELLS, SAN FERNANDO QUADRANGLE[1]

MAP NO.	T	RW	Sec.	OPERATOR	NAME/NUMBER	ELEV-ATION (ft)	TOTAL DEPTH (ft)	BOT-TOM[2]
213	3N	14	30	Nadot Oil Co.	Nadot 1	2287	3575	Pl
218	3N	15	2	Sandee Oil Co.	Brooks 1	2190	4350	Mm
221	3N	15	3	C.C. Townsend	Townsend-Allen 1	1926	1601	Q
222	3N	15	3	Puccio-Doshay	Puccio-Doshay 1	2000	1200	Gr
223	3N	15	3	Pioneer	White Oil Co. 1	2100	1270	BC
226	3N	15	4	H. E. & J. D. Wilhoit	Wilhoit 1	2200	1778	Mm
229	3N	15	5	W. Y. Lee	Gov't. 1	1504	2602	BC
229A	3N	15	6	Occidental Petroleum Corp.	501	1600	994	?
229B	3N	15	6	Conoco, Inc.	Phillips 1	1646	8253	Gn
230	3N	15	6	H.H. Herrman	Albert-Trinity 1	1650	1040	?
231	3N	15	6	Atlantic Oil Co.	Albert 1	1600	1012	C
232	3N	15	7	Chevron USA, Inc.	Elsmere 23	1450	2821	C
233	3N	15	7	Chevron USA, Inc.	Elsmere 1	1800	1376	E?
235	3N	15	8	H. C. Hicks	Lillie 1	1850	1000	Pl
236	3N	15	17	Graves Oil Co.	1	2200	1500	BC
237	3N	15	18	Chevron USA, Inc.	Elsmere 24	2050	1624	Mm
238	3N	15	18	Buick Oil Co.	2	2140	1485	Pl
239	3N	15	18	M.R. Peck & Sons	Brown 1	2100	796	Gr
240	3N	15	19	Chevron USA, Inc.	Newhall 1	2000	700	Pl
241	3N	15	19	ARCO	T I & T 1	1321	8207	QT
242	3N	15	19	Tesoro Pet. Corp.	T I & T 1	1343	3180	Pl
243	3N	15	20	Ajax O & D Co.	McCloskey-Hansen USL 1	1625	2600	Gr
244	3N	15	21	Sun Oil Co.	Stetson-Sombrero 1	1435	12027	QT
245	3N	15	30	Sun Oil Co.-DX Div.	T I & T 1	1527	8035	Pl
246	3N	15	30	Active Oil Co.	1	1300	2102	Q
247	3N	15	32	San Fernando O & G Co.	1	1150	1953	Mu
248	3N	15	35	H. C. Long	Verda 1-35	1297	6210	Pl
249	3N	15	36	D.W. Griffith Oil Co.	1	1450	1647	Pl
250	3N	15	36	Terminal Drlg. Co.	Lloyd 1	1301	3470	Mu
379	2N	14	6	Bell Pet. Co.	Bartholomaus Canyon-Bush Bar 1	1660	2988	Mu
380	2N	14	6	Bell Pet. Co.	Bartholomaus 74-6	1290	5347	Gr
381	2N	14	6	Oceanic Oil Co.	Oceanic-Dubois 1	1268	3582	Gr
382	2N	14	6	G.C. Parry	Moynier-Parry 1	1220	4216	Mu
383	2N	14	7	W.L. Alexander	1	1125	1239	Mu
387	2N	15	1	Casa Grande Oil Co.	Lopez-Lundy 1	1255	3782	M
388	2N	15	1	E.L. Doheny	E.L.D.-Reeves 1	1650	4568	Mu
389	2N	15	1	Tesoro, Inc.	Toon 1	1250	4553	Mm
390	2N	15	1	K.V. & P.J. Lopez	1	1300	2880	Mu
391	2N	15	2	Pacoima Petroleum & Helium Gas Corp.	1	1000	2700	Mu
392	2N	15	4	Gulf Oil Corp.	Carey 1	1240	10136	Mu
393	2N	15	4	Shell CPI	Mission 1	1173	4953	Mu

MAP NO.	T	RW	Sec.	OPERATOR	NAME/NUMBER	ELEV-ATION (ft)	TOTAL DEPTH (ft)	BOT-TOM[2]
394	2N	15	4	Shell CPI	Mission 2	1130	5687	Mu
395	2N	15	4	Chevron USA, Inc.	Rinaldi C.H. 1	1031	4725	Mu
396	2N	15	5	Mission Hills Oil Co.	1	1100	1421	Mu
397	2N	15	6	Gulf Oil Corp.	Panorama 1	1180	9614	M
398	2N	15	6	Exeter Oil Co.	Exeter-Elerath 1	1042	5347	Pl
399	2N	15	6	J.P. Getty	Foothill Orchards 1	1050	3559	Pl
400	2N	15	9	UNOCAL	San Fernado 1-9	1020	8925	C
401	2N	15	10	Occidental Pet. Corp.	Pacoima E.H. 1	999	9291	Mm
402	2N	15	11	Chevron USA, Inc.	Century Props. 1	1050	8055	M
403	2N	15	11	Chevron USA, Inc.	Pacoima 1	1010	9995	Ku
404	2N	15	15	Chevron USA, Inc.	Pacoima 8	955	11294	M?
405	2N	15	15	Chevron USA, Inc.	University 1	945	5938	M
406	2N	15	16	Chevron USA, Inc.	Burnet C.H. 1	927	10227	Ku
407	2N	15	18	Chevron USA, Inc.	Coffman 1	932	6608	Mu

[1] Data from Yerkes and Showalter, 1990.
[2] BC, basement complex; C, confidential; E, Eocene; Gr, granite; Gn, gneiss; K, Cretaceous; M, Miocene;Pl, Pliocene; Q, Quaternary; QT, Pliocene or Pleistocene; m, middle,; u, upper.

Table 2 - DATA ON FOSSIL LOCALITIES, SAN FERNANDO QUADRANGLE

MAP NO[1]	TN	RW	Sec	COLL-ECTOR	AGE	MAP UNIT	SOURCE
FR3	3	14	31	BFH	P	Tp	Oak.
FR4	3	15	21	CDMG	P	Tw	do.
FR5	3	15	21	do.	P	Tw	do.
FR6	3	15	20	do.	P	Tw	do.
FR7	3	15	19	do.	P/Mu	Tw	do.
FR8	3	15	17	USGS	P	Tw	Eng.
FR9	3	15	17	G & G	P	Tw	Oak.
FR10	3	15	8	do.	P	Tw	do.
FM11	3	15	2	UCLA	Mu	Tm	do.
FR11A	3	15	8	G & G	P	Tw	do.
FR12	3	15	8	do.	P	Tw	do.
FR13	3	15	8	do.	P	Tw	do.
FR14	3	15	8	do.	P	Tw	do.
FR15	3	15	18	UCLA	P	Tw	do.
FR16	3	15	18	do.	P	Tw	do.
FR17	3	15	7	do.	P	Tw	do.
FP1	3	15	7	G & G	P	Tp	do.
FP2	2	15	5	CDMG	P	Tp	do.
fM4	2	15	12	CDMG	Mu?	Tm	do.
fM5	2	15	5	CDMG	Mu	Tm	do.
fM7	3	15	2	UCLA	Mu	Tm	do.

[1] F, macrofossil collection; f, microfossil collection; number same as collector's number.
[2] BFH, B. F. Howell, 1949; CDMG, Calif. Div. Mines and Geology; G & G, Grant and Gale, 1931; UCLA, Univ. Calif. Los Angeles; USGS, U. S. Geol. Survey.
[3] M, Miocene; P, Pliocene; u, upper.
[4] Eng., English, 1914; Oak., Oakeshott, 1958.