U.S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

AREAL GEOLOGY

CALIFORNIA
CONCORD QUADRANGLE

LEGEND

SEDIMENTARY ROCKS
(continued)

UNCONFORMITY

Ttj — Tejon formation *(hard, ferruginous and calcareous sandstones, with beds of shale and lenses of conglomerate at base)* — Eocene — TERTIARY

UNCONFORMITY

Tmz — Martinez formation *(sandstone in part glauconitic, shale, and some conglomerate)* — Eocene — TERTIARY

UNCONFORMITY

Kc / Ko — Chico formation with Oakland conglomerate member at base *(massive yellowish sandstone and clay shale with conglomerate member, Ko, at base)* — Upper Cretaceous — CRETACEOUS

Kk — Knoxville shale *(carbonaceous and arenaceous)* — Lower Cretaceous — CRETACEOUS

UNCONFORMITY

Jfm — Metamorphic schist *(sedimentary and igneous rocks altered by contact metamorphism, chiefly to glaucophane schist)*

Jf — Undifferentiated sandstones of Franciscan group, with radiolarian chert lentils of undetermined horizons, Jfc — Franciscan group — JURASSIC ? (pre-Knoxville)

IGNEOUS ROCKS CHIEFLY INTRUSIVE
(Areas of igneous rocks are shown by patterns of triangles and rhombs)

Tln — Leona rhyolite *(lava flows of undetermined age)* — Post-Cretaceous (Pliocene?) — TERTIARY

Jsp — Serpentinized peridotite with associated gabbro and pyroxenite *(serpentine in part altered to an aggregate of silica and various carbonates)*

Jb — Basalt and diabase *(commonly show spheroidal or ellipsoidal structures)* — Intrusive into Franciscan group — JURASSIC ? (pre-Knoxville)

Faults

Concealed faults *(covered by younger deposits)*

T Indicates overthrust side of thrust faults
Strike and dip of stratified rocks
Strike of vertical strata

Crushed-stone quarries
Limestone quarry
Pyrite Mine
Gravel pit

Economic note: *Crushed stone can be obtained from sandstone, chert, and schist of Franciscan group, cherty shale of Monterey group, Leona rhyolite, andesite and basalts of Berkeley group, and intrusive diabase and basalt; sandstone from Chico formation; brick clay from Orinda, Siesta, Knoxville, and Temescal formations and the regolith from sandstones of Franciscan group; lime from travertine and limestone lentils in Moraga, Orinda, and Siesta formations; abrasives from Pinole tuff; greensand for fertilizer from Martinez formation; pyrite for sulphuric acid from Leona rhyolite; water from sandstones of Chico formation, loose-textured rocks of Berkeley group and Campus formation, gravels of Alameda formation, Merritt sand, and gravelly portions of Temescal formation.*

LEGEND

SEDIMENTARY ROCKS
(Areas of subaqueous deposits are shown by patterns of parallel lines; subaerial deposits by patterns of dots and circles)

Qs — Salt marsh deposits *(clay and silt)* — Recent — QUATERNARY

Qt — Travertine *(calcareous spring deposits)* — Recent — QUATERNARY

Qtc — Temescal formation *(alluvium)* — Recent — QUATERNARY

UNCONFORMITY

Qm — Merritt sand *(marine sand)* — Pleistocene — QUATERNARY

UNCONFORMITY

Qsac / Qsa — San Antonio formation with chert-gravel member, Qsac *(coarse alluvial fans; the later part of deposits, Qsac, contains angular chert fragments)* — Pleistocene — QUATERNARY

Qa — Alameda formation *(yellow marine clay with some intercalated fluviatile gravel)* — Pleistocene — QUATERNARY

UNCONFORMITY

Qc — Campus formation *(fresh-water clay, limestone, conglomerate, tuff, agglomerate, and andesite and basalt flows)* — Pleistocene — QUATERNARY

UNCONFORMITY

Tbp — Bald Peak basalt *(lava flows with lentils of fresh-water limestone; some dikes are included in mapping)* — Berkeley group — Pliocene — TERTIARY

Tst — Siesta formation *(fresh-water conglomerate, clay, sandstone, chert, limestone, lignite, and tuff)* — Berkeley group — Pliocene — TERTIARY

UNCONFORMITY

Tm / Tmc — Moraga formation *(andesite and basalt flows, with rhyolitic and basic tuffs, lentils of gravel, clay, and limestone, and thick beds of conglomerate, Tmc, near base)* — Berkeley group — Pliocene — TERTIARY

Tml — Fresh-water limestone lentils at various horizons in the Moraga and Siesta formations *(only the larger bodies shown)* — Berkeley group — Pliocene — TERTIARY

UNCONFORMITY ?

Tor — Orinda formation *(fresh-water conglomerate, sandstone, clay, limestone, and thin layers of tuff)* — Berkeley group — Miocene — TERTIARY

Tp — Pinole tuff *(pumiceous tuff, probably andesitic, deposited in fresh water)* — Berkeley group — Miocene — TERTIARY

UNCONFORMITY

Tsp — San Pablo formation *(coarse gray to blue sandstone with admixtures of trachytic material)* — Berkeley group — Miocene — TERTIARY

UNCONFORMITY

Thl / Tb — Briones sandstone with Hercules shale member, Thl *(light-colored coarse to pebbly quartzose sandstone with chalky bituminous shale member, Thl)* — Monterey group — Miocene — TERTIARY

Tr — Rodeo shale *(chiefly chalky bituminous shale, stained by iron, with some cherty beds)* — Monterey group — Miocene — TERTIARY

Th — Hambre sandstone *(medium-textured, slightly ferruginous sandstone, with some sandy shale)* — Monterey group — Miocene — TERTIARY

Tr — Tice shale *(white to pink bituminous shale, prevailingly chalky)* — Monterey group — Miocene — TERTIARY

To — Oursan sandstone *(fine-grained, light-colored, soft sandstone)* — Monterey group — Miocene — TERTIARY

Tc — Claremont shale *(white chalky bituminous shale and yellowish chert rhythmically interbedded with thin shales; thin hard sandstones and lentils of ferruginous limestone)* — Monterey group — Miocene — TERTIARY

Ts / Tss — Sobrante sandstone *(light-colored soft sandstone with darker-ferruginous beds; includes layers of white pumiceous tuff, Tss, near base)* — Monterey group — Miocene — TERTIARY

Legend is continued on the left margin.

Henry Gannett, Chief Topographer.
R.U. Goode, Geographer in charge.
Triangulation by U.S. Coast and Geodetic Survey.
Topography by W.D. Johnson and W.H. Otis.
Surveyed in 1893-94.

Geology by Andrew C. Lawson and John C. Merriam, assisted at various times by students of the University of California.
Surveyed in 1894, 1896, 1905, and 1911.

Scale 1/62500

1 0 1 2 3 4 Miles
1 0 1 2 3 4 5 Kilometers

Contour interval 25 feet.
Datum is mean sea level.
Edition of Oct. 1913.

APPROXIMATE MEAN DECLINATION 1913.