MAP I-518

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE CALIFORNIA DIVISION OF MINES AND GEOLOGY

GEOLOGIC MAP OF THE OLD WOMAN SPRINGS QUADRANGLE SAN BERNARDINO COUNTY, CALIFORNIA

By
T. W. Dibblee, Jr.

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-518

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TO ACCOMPANY MAP I-518

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DESCRIPTION OF MAP UNITS*

CENOZOIC SEDIMENTARY AND VOLCANIC ROCKS

Surficial sediments

Undissected, unconsolidated sedimentary fill of valley areas and flood plains of major canyons in mountains. Thickness probably less than 100 feet, in valley areas presumably gradational into the underlying older surficial sediments; elsewhere unconformable on older formations. Age, very late Pleistocene and Recent. Composed of the following facies units:

Sand.—Loose fine sand, deposited on alluvium by prevailing westerly winds.

Alluvial fan gravel.—Coarse fan gravel of boulders, cobbles, pebbles, and sand derived from San Bernardino Mountains; grades downslope into the alluvium.

Alluvium.—Cobble-pebble gravel and arkosic sand.

Clay.—Fine micaceous clay and silt of playa dry lakes. Top surface is level.

Older surficial sediments

Older alluvial fill, generally weakly indurated; dissected where elevated; unconformable on the basalt and pre-Tertiary rocks. Age, presumably Pleistocene. Composed of the following units:

Older alluvium.—In area west of Johnson Valley mostly gray cobble-gravel of detritus similar to that of the fanglomerate described below, but contains abundant fragments of basalt. In areas north and southeast of Johnson Valley, light-gray, medium to coarse arkosic sand and pebble-gravel derived from adjacent highlands of granitic rocks. Maximum exposed thickness about 100 feet; presumably thicker under alluviated valley areas. May be in part younger than the fanglomerate.

Fanglomerate.—Gray, crudely bedded fanglomerate or gravel of poorly sorted boulders, cobbles, and pebbles mostly of granitic rocks, gneissic rocks, quartzite, and marble derived from San Bernardino Mountains. Maximum exposed thickness about 400 feet. Northward under Johnson Valley presumably thickens and grades upward and laterally into the older alluvium. Deposited as alluvial fans by runoff from torrential storms.

Clay and marl.—Lacustrine strata with aggregate thickness of as much as 70 feet. Mostly light-greenish-gray locally nodular sandy clay; several interbeds as thick as 3 feet of hard nodular white calcareous marl, in places silicified to white opal. In part overlain by the fanglomerate.

Basalt

Black, massive, hard, nonvesicular microcrystalline basalt composed of basaltic glass, calcic plagioclase (as minute laths), pyroxene (augite?), and specks of magnetite. In places contains few small phenocrysts of calcic plagioclase and olivine. Maximum thickness about 70 feet. Forms one or several flows extruded from local vents or fissures presumably along or near Old Woman Springs fault. Conformable (?) on Old Woman Sandstone or unconformable on pre-Tertiary rocks. Age, presumably Pliocene or early Pleistocene and correlative with basalt of Nebo Buttes in Lucerne Valley quadrangle (Dibblee, 1964) and basalt of Ruby Mountain area in Emerson Lake quadrangle (Dibblee, 1967).

Old Woman Sandstone

Within the quadrangle formation exposed only near Old Woman Springs, where about 50 feet of sandstone underlies the basalt and base is unexposed. Sandstone weakly consolidated, buff, pebbly, fine to medium grained, arkosic, and contains thin intercalations of reddish sandy siltstone. May be several hundred feet thick under valley area to southwest, where it is presumably unconformable on pre-Tertiary rocks. Age, presumably late Tertiary. Named by Shreve (in Richmond, 1960).

MESOZOIC PLUTONIC AND HYPABYSSAL IGNEOUS ROCKS

Quartz latite dikes

Light-gray, massive porphyry composed of numerous phenocrysts of quartz, potassic feldspar, sodic plagioclase, and biotite in fine-grained to aphanitic groundmass. Phenocrysts as large as 3 mm make up as much as 60 percent of rock mass. Groundmass composed of same minerals as phenocrysts and traces of iron oxides. Forms dikes as thick as 100 feet; porphyry of thick dikes grades outward at margins to few feet of nearly white, massive, brittle, silicic felsite; thin dikes only a few feet thick composed of felsite. Dikes transect the quartz monzonite and older pre-Tertiary rocks. Age, presumably Cretaceous, possibly Tertiary.

*Potassic and sodic-calcic (plagioclase) feldspar content of igneous rocks determined by chemical staining of sawed surface of samples by M. B. Norman; and from thin sections of plutonic and gneissic rocks.

Quartz veins

Massive white milky quartz; commonly much fractured, in places iron-stained. Forms veins or pods as wide as 15 feet in the quartz monzonite and older granitic rocks. Age, presumably Cretaceous.

Pegmatite and aplite dikes

White to gray-white, fine-grained aplitic to very coarse grained pegmatitic rocks composed almost entirely of quartz, potassic feldspar, and plagioclase (albite-oligoclase) in nearly equal proportions; less than 2 percent accessories (mostly biotite, muscovite, locally sphene, zircon, epidote, garnet). Forms generally parallel dikes, in places as wide as 20 feet, but generally less than 2 feet wide, within the quartz monzonite and older pre-Tertiary rocks. Age, Mesozoic, presumably Cretaceous; see under Radioactive minerals.

Quartz monzonite

Mapped as Cactus Granite by Vaughan (1922, p. 344, 364-365). Gray-white to white, massive (nongneissoid), generally medium-grained, equigranular granitic rock; not as hard or firm as other granitic rocks; weathers by separation of grains to generally low relief. Rock composed of quartz, potassic feldspar (orthoclase), and plagioclase (oligoclase or andesine), in generally equal proportions, 3-7 percent biotite (generally as scattered euhedral plates 1-3 mm in diameter), and a total of less than 2 percent sphene, zircon, and magnetite, rarely hornblende. Intrusive into older plutonic and all metamorphic rocks. Age, Mesozoic, presumably Early Cretaceous, possibly Late Jurassic. Age of zircon sample from Pomona tile quarry (see under Prospects and quarries) by the lead-alpha method 89+10 m.y. (T. W. Stern, written communication to D. F. Hewett and W. C. Smith, Oct. 2, 1957).

Dike rocks

Hard or firm, massive, finely crystalline rocks intrusive into the dioritic and the older granitic rocks in northeast part of quadrangle. Age, Mesozoic, as indicated by field relation of similar dikes in the Lucerne-Ord Mountain area northwest of quadrangle (Dibblee, 1964b). Composed of the following types:

Felsitic dikes.—White to gray-white, silicic, composed mainly of sodic plagioclase and small amounts of potassic feldspar and quartz; contains few very small phenocrysts of sodic plagioclase and minute flakes of biotite. Forms dikes as wide as 60 feet.

Mafic (andesitic to dioritic) dikes.—Dikes that range from dark-gray microcrystalline latite or andesite composed mainly of plagioclase, some potassic feldspar, and small amounts of biotite and iron oxides, to black very fine grained diorite composed mainly of plagioclase and hornblende; both commonly contain a few very small phenocrysts of plagioclase and hornblende(?). Dikes as wide as 50 feet.

Older granitic rocks

Mainly quartz monzonite, but range from granite to granodiorite. Age, Mesozoic, presumably Late Jurassic or Early Cretaceous. Composed of the following mapped units:

Granite to quartz monzonite.—Nearly white, buff-weathering, hard, massive (nongneissoid), fine- to medium-grained granitic rock composed of quartz, potassic feldspar (orthoclase) and plagioclase (oligoclase) in nearly equal proportions or with predominance of potassic feldspar, 1-2 percent biotite (as minute flakes), 0-1 percent hornblende (locally partly altered to brown iron oxides by weathering), and a total of about 1 percent sphene, zircon, and iron oxides. Intrusive into the biotite quartz monzonite and dioritic rocks.

Quartz monzonite of Emerson Lake area.—Similar to the granite to quartz monzonite unit described above, and probably of same age, but white to pale gray, and composed of quartz, potassic feldspar (orthoclase), and plagioclase (oligoclase) in nearly equal proportions or with local predominance of plagioclase; intrusive into the biotite quartz monzonite and dioritic rocks. Exposed extensively in Emerson Lake area east of quadrangle (Dibblee, 1967).

Biotite quartz monzonite.—Gray, massive to faintly gneissoid, generally hard or firm, medium-grained, subporphyritic granitic rock composed mainly of quartz, potassic feldspar (orthoclase) and plagioclase (oligoclase-andesine) in nearly equal proportions or with slight predominance of plagioclase, 5-20 percent biotite (mostly as clusters of minute flakes that form dark patches), 0-10 percent hornblende, and a total of about 2 percent pyroxene, magnetite, sphene, apatite, and zircon. Phenocrysts of potassic feldspar as long as 1 cm common; in areas northeast of Melville Lake, rock locally highly porphyritic, with abundant phenocrysts of gray to white potassic feldspar (orthoclase, as determined by thin sections) as long as 3 cm which make up as much as 25 percent of rock mass. Rock much affected by regional alteration, of which feldspars are partly altered to sericite, and biotite clusters partly altered to iron oxides, imparting brown iron-staining to weathered rocks. Rock may be in large part recrystallized from gneissic rocks. Some small pendant masses east of Rock Corral contain black biotite-rich inclusions as large as 15 feet across.

Granodiorite.—Light-gray, massive to faintly gneissoid, medium-grained equigranular granitic rock composed of about 30 percent quartz, 10-20 percent potassic feldspar, 40-50 percent plagioclase (andesine), 10 percent biotite and (or) hornblende, and less than 1 percent iron oxides. Rock somewhat incoherent where weathered. Commonly contains scattered migmatites of gneissic rock; also few to abundant xenoliths of dark-gray fine-grained diorite elongate parallel to gneissoid structure.

Dioritic rocks

Dark mafic rocks, intrusive into the gneissic rocks and the Saragossa Quartzite; intruded by the older granitic rocks and the quartz monzonite. Age, presumably Mesozoic. Composed of the following units:

Hornblende diorite or gabbro.—Dark-gray to black, massive, medium- to coarse-grained mafic rocks composed mainly of calcic plagioclase (labradorite?) and hornblende in variable proportions but generally with predominance of hornblende (in places partly altered to biotite, chlorite, and epidote) and small amounts of magnetite, sphene, and quartz. Epidote veinlets common.

Biotite diorite.—Dark-gray, massive to somewhat foliated, fine- to medium-grained mafic rock composed predominantly of calcic plagioclase (labradorite?) and biotite; small amounts of hornblende, magnetite, and epidote.

PALEOZOIC METASEDIMENTARY ROCKS

Furnace Limestone

Light-blue-gray to white, thick-bedded, carbonate rocks that range from limestone to dolomite (distinguishable only by acid test) crystallized to medium- to coarse-grained marble. In places marble contains calc-silicate minerals such as tremolite, epidote, diopside, garnet, and forsterite. Maximum exposed thickness within quadrangle about 3,000 feet. Overlies Saragossa Quartzite, intruded by the quartz monzonite. Unfossiliferous within quadrangle, but west of quadrangle contains Paleozoic (Mississippian and Pennsylvanian?) fossils (Richmond, 1960, p. 17).

Tactite

Greenish- to reddish-gray, fine- to coarse-grained tactite composed mainly of diopside, epidote, garnet, quartz, and iron oxides. Forms small irregular masses, silicated from marble, within the biotite quartz monzonite in northeastern part of quadrangle.

Saragossa Quartzite

Near southwest corner of quadrangle, about 1,000 feet of quartzite exposed, overturned northeastward, overlain by Furnace Limestone to northeast and overridden on fault to southwest by the underlying gneissic rocks (see cross sections B-B' and C-C'); quartzite section there and northwestward mapped as Saragossa Quartzite by Vaughan (1922, pl. 1) and Dibblee (1964a). In the mountains westward from lower Rattlesnake Creek area, about 3,000 feet of gneissic quartzite and some schist exposed; section there mapped as Arrastre Quartzite by Vaughan (1922, pl. 1), but these rocks probably are the same unit as Saragossa Quartzite; they lie unconformably(?) on the gneissic rocks, and are intruded by the quartz monzonite. Unfossiliferous. Age, presumably Paleozoic. The following units were mapped:

Quartzite.—Gray-white to tan, massive to bedded, hard, brittle quartzite composed mainly of quartz and minor amounts of muscovite, biotite, alkali feldspars, and iron oxides. In places rock crosslaminated or ripplemarked. Brown iron stains on fracture surfaces. Contains intercalations of gray micaceous quartzitic phyllite.

Gneissic quartzite.—Generally similar in color and composition to quartzite described above, but has aplitic fine-grained texture and contains grains of feldspar and laminae rich in biotite that may be relict bedding. In places rock is lineated.

Schist.—Dark-gray, fine- to medium-grained mica schist, commonly banded with nearly black laminae rich in biotite and lighter gray to white laminae rich in quartz and feldspar; in places laminae contorted; schistosity parallel to banding; in places lineated; in part gneissic. In places contains some interbedded gray quartzite.

PRECAMBRIAN(?) METAMORPHIC ROCKS

Gneissic rocks

Banded or laminated gneissic rocks, with laminae generally undulating; in places contorted or with some lineation. Age, probably Precambrian (Dibblee, 1964a, b). Gneiss probably in large part recrystallized in Precambrian time, or possibly in Paleozoic or Mesozoic time, from sedimentary(?) rocks of Precambrian(?) age; or may be in part of magmatic origin. The following general types were mapped:

Quartz diorite gneiss.—Medium- to dark-gray, mostly medium-grained gneiss composed mainly of quartz, plagioclase (andesine), biotite, hornblende, potassic feldspar, muscovite, and iron oxides in that general order of decreasing abundance. In places contains augen of potassic feldspar as long as 3 cm. Generally prominently banded with black laminae, rich in biotite and hornblende, alternating with white laminae, rich in quartz and feldspar, and gray laminae of intermediate composition.

Granitic gneiss.—Light-gray, buff-weathering, medium- to fine-grained granitic gneiss composed mainly of quartz, plagioclase (oligoclase-andesine), potassic feldspar, biotite, and a little muscovite. Rock nearly homogeneous but faintly to moderately banded with thin biotite-rich laminae.

Gneiss and schist.—Similar to quartz diorite gneiss, but includes some laminae and lenses of gray-black foliated schist rich in biotite and hornblende and light-gray schist rich in fine-grained muscovite or sericite, quartz, and feldspar.

PROSPECTS AND QUARRIES

Gold

A. Jeffrey prospect. SW¼ sec. 11, T. 2 N., R. 2 E. Iron sulfides that reportedly carry gold sparsely distributed in fracture zones in Saragossa Quartzite at and near contact with Furnace Limestone, both formations overturned, dip steeply southwest. Prospected by shallow shaft and shallow cut.

B. Hideout prospect. NE¼NE¼ projected sec. 34, T. 3 N., R. 3 E. Iron and copper sulfides, may carry gold, in shear zone as wide as 3 feet, strikes east, dips 80° S., in quartz monzonite. Prospected by two shafts about 200 feet apart, each about 100 feet deep, sunk on shear zone, and adit driven east about 80 feet in shear zone.

C. Stewart (Jackass) prospect. NE¼ sec. 17, T. 2 N., R. 3 E. Gold reported in granitic dike and in contact shear zone between quartz monzonite and mica schist. Explored by adit driven south 150 feet. Long idle (Wright and others, 1953, tab. list p. 58, no. 187).

D. McLure-Bess placers. E½ sec. 16, T. 2 N., R. 3 E. Placer gold in gravel of older alluvium. Reported $1,000 in gold recovered since 1941 by dry placer methods (Wright and others, 1953, tab. list p. 48, no. 145).

E. Vaughan placers. NW¼ sec. 15, T. 2 N., R. 3 E. Placer gold in gravel of the older alluvium. Small

production by dry placer methods reported by Wright and others (1953, tab. list p. 60, no. 197).

F. Parker Group placers. Secs. 14, 15, T. 2 N., R. 3 E. Placer gold in gravel of the older alluvium, $1 in gold per ton average value by dry placer methods test reported (Wright and others, 1953, tab. list p. 53, no. 165).

G. Alpha prospects. NW¼ sec. 9, T. 2 N., R. 4 E. Vertical quartz vein as thick as 10 feet that strikes east, in quartz monzonite; vein much fractured. Prospected by several pits and trenches, presumably for gold, prior to 1941. Biotite-rich gneiss half a mile south (in SW¼ sec. 9) prospected in late 1950's by shallow pits, presumably for radioactive minerals.

Lead

H. Silver Dream mine. SW¼ sec. 17, T. 2 N., R. 3 E. Galena-rich gossan veins, average width less than 5 inches, as long as several tens of feet, in irregular fracture zone as wide as 60 feet and at least 250 feet long, striking west-northwest, dipping 45°-60° N. along contact between limestone marble to south and layer of soft micaceous schist to north in Furnace Limestone. Prospected by two old shafts less than 30 feet deep and by several trenches cut in 1951 (Wright and others, 1953, p. 112-113).

Aggregate

J. Parton-Quarles epidote quarry. E½ projected sec. 25, T. 5 N., R. 2 E. Mass of green, very fine grained epidote tactite, as wide as 50 feet across, between the biotite quartz monzonite to southwest and felsitic dike to northeast. Quarried from large pit since 1953; crushed at small mill nearby for use as green roofing granules. Gravel of the older alluvium to south quarried in 1950's for use as aggregate.

Feldspar and quartz

K. Pomona Tile quarry. SW¼SE¼ sec. 23, NW¼NE¼ sec. 26, T. 3 N., R. 4 E. Ridge capped by tabular lens of pegmatite as thick as 15 feet, as long as 150 feet, strikes about N. 70° E., dips 5°-10° NW., on the quartz monzonite. Pegmatite composed of large masses of quartz and of pale-pink potassic feldspar (orthoclase and microcline). Explored by six open cuts and trenches; loading chute installed; several hundred tons of feldspar and quartz quarried in late 1940's by Pomona Tile Co.

Radioactive minerals

L. Blankenship-Sykes uranium prospect. SE¼NW¼ projected sec. 22, T. 3 N., R. 3 E. Nodules of brannerite (oxide of titanium, uranium, thorium, and rare earth elements) and rutile from half an inch to 1 inch in diameter, some euxenite, in gray granite gneiss that strikes north, dips about 70° E., and is in part altered to sericite and chlorite. Explored in small open pit; about 25 pounds of nodules recovered in 1950 by owners (Hewett, Stone, and Levine, 1957, p. 30-38).

M. Martin prospect. Near center sec. 6, T. 2 N., R. 4 E. Small amounts of monazite irregularly distributed in nearly black biotite-rich gneiss with large orthoclase porphyroblasts. Prospected in 1950's by open pit.

N. Black Dog prospect. N½ sec. 4, T. 2 N., R. 4 E. Allanite, monazite, and possibly other radioactive minerals in vein as much as 5 or 6 inches wide in biotite-rich gneiss (Hewett, D. F., oral communication, 1963; Walker, Lovering, and Stephens, 1956, p. 24). Prospected in early 1950's by shaft about 50 feet deep. Nearby to southwest are three small plugs of iron-stained quartz that contain pyrite, possibly some monazite, in granodiorite; largest, most westerly, prospected by 50-foot shaft; other two by shallow pits, in 1950's; may have been prospected earlier for gold.

Q. Radioactive biotite-rich inclusions. NW¼NE¼ sec. 26, T. 3 N., R. 4 E. Cordierite and small amounts of radioactive zircon, monazite, allanite, and possibly other radioactive minerals present in some black masses of fine- to medium-grained biotite rock, similar to those described by Moxham, Walker, and Baumgardner (1955, p. 116-117); largest mass as much as 20 feet across, all in biotite quartz monzonite near quartz monzonite contact. Prospected by shallow pits. Similar masses in SE¼ sec. 23, SW¼ sec. 24, T. 3 N., R. 4 E., and NW¼ sec. 30, T. 3 N., R. 5 E., also prospected by shallow pits.

Alpha claims (see G above). S½ sec. 9, SW¼ sec. 10, T. 2 N., R. 4 E. Small pendants of black biotite-rich gneiss on quartz monzonite. Pendants locally radioactive but no radioactive minerals positively identified. Prospected by trenches and shallow pits (Walker, Lovering, and Stephens, 1956, p. 24, in part).

Pomona Tile quarry (see K above). At one place large mass of quartz in pegmatite contains very small amounts of ilmenite, allanite, epidote, hematite, magnetite, monazite, rutile, sphene, euxenite, and an unidentified uranium mineral; occurrence of scientific interest only; age determination based on percentages of lead, uranium, and thorium indicated to be about 149.7 m.y. (Hewett and Glass, 1953, p. 1024-1049); however, age determination of quartz monzonite host rock indicated to be about 89± m.y. (see quartz monzonite; T. W. Stern, written communication to D. F. Hewett and W. C. Smith, Oct. 2, 1957).

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