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GEOLOGIC MAP OF THE DEADMAN LAKE QUADRANGLE
SAN BERNARDINO COUNTY, CALIFORNIA

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DESCRIPTION OF THE MAP UNITS*

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CENOZOIC SEDIMENTARY AND VOLCANIC ROCKS

Surficial sediments

Unconsolidated sediments of undissected fill of valley areas and flood plains of canyons; sediments derived from adjacent highland areas. In most of large valley areas, fill presumably about 100 feet thick; gradational downward into the older alluvium; elsewhere thinner and unconformable on older formations. Age, very late Pleistocene and Recent. Composed of the following units:

Windblown sand.--Loose fine sand deposited by prevailing westerly winds as a thin cover on the alluvium or on the dissected alluvial fan gravel.

Clay and silt.--Light-grayish-tan, micaceous clay and silt of Deadman dry lake; generally alkaline; mud when wet; top surface is level.

Alluvium.--Detrital sediments ranging from cobble-pebble gravel to fine silty sand; mostly pebbly sand.

Alluvial fan gravel.--Gravel of unsorted boulders, cobbles, and pebbles in coarse sandy matrix, deposited as alluvial fans by runoff from torrential downpours. Grades downslope into the alluvium.

Dissected alluvial fan gravel

Locally dissected gravel and sand deposited as alluvial fans and derived from granitic rocks of Bullion Mountains; similar to, and may be in part equivalent to, the older alluvium, but most is probably younger.

Basalt lava

Basalt erupted from craters in northeastern part of quadrangle; craters and lava flows much dissected; lava unconformable on Tertiary and pre-Tertiary rocks, but north of this quadrangle conformable on the older alluvium. Age, presumably late Pleistocene. Composed of the following units:

Basalt lava.--Black, massive, vitreous to microcrystalline, composed of basaltic glass, calcic plagioclase and pyroxene, and small amounts of olivine and finely divided iron oxides. At and near craters, rock scoriaceous, brecciated, and commonly contains volcanic bombs; away from craters, scoriaceous lava grades outward into several flows and some flow-breccias of vesicular basalt that total 100 feet in thickness.

Basalt, intrusive.--Similar to basalt lava, but non-scoriaceous nonvesicular; forms small plug within crater.

Older valley sediments

Alluvial and lacustrine sedimentary deposits that fill valley and former valley areas; generally weakly

consolidated; slightly to severely dissected where elevated and deformed; west of Bullion Wash, as much as 2,500 feet of sediments exposed, with base buried; elsewhere section is thinner, unconformable on Tertiary and pre-Tertiary rocks. Age, presumably Pleistocene; possibly in part late Tertiary. Composed of the following units, all gradational into each other:

Older alluvium.--Light gray, crudely to moderately bedded gravel and sand, as thick as 500 feet; composed of poorly to moderately sorted cobbles and pebbles in coarse arkosic sand. In western part of quadrangle, cobbles and pebbles are predominantly of granitic rocks, gneiss, quartzite, and few of marble and basalt, probably all derived from San Bernardino Mountains far to southwest. In Bullion Mountains, composed of detritus derived from granitic rocks of these mountains.

Older gravel of volcanic detritus.--Similar to the older alluvium, but dark brown and composed mostly of detritus derived from Tertiary volcanic (andesitic and basaltic) rocks of northern Bullion Mountains. In T. 5 N., R. 7 E., mostly dark cobble-boulder fanglomerate of volcanic detritus. As thick as 400 feet.

Older fanglomerate.--Unconsolidated, unbedded coarse light-gray fanglomerate of unsorted small boulders, cobbles, and pebbles, mostly of the biotite quartz monzonite; some of Tertiary volcanic rocks (andesite and basalt), in matrix of arkosic sand. As thick as 300 feet; deposited as alluvial fans by runoff from torrential downpours. Unconformable on Tertiary and pre-Tertiary rocks.

Older sand and gravel.--Mostly fine to coarse, weakly indurated, buff to light-greenish to reddish-gray arkosic sand and some interbedded friable micaceous siltstone and pebble-cobble gravel. Cobbles and pebbles of same detritus as those of the older alluvium. As thick as 300 feet.

Older gravel of granitic detritus.--Weakly consolidated, unbedded to crudely bedded, coarse dark-gray fanglomerate or gravel composed of unsorted boulders, cobbles, and pebbles mostly of gray porphyritic biotite quartz monzonite, like that exposed in Bullion Mountains to east, and few of quartzite, marble, and Tertiary volcanic rocks, in matrix of coarse arkosic sand; fanglomerate as thick as 300 feet.

Older marl and clay.--White, soft marl and interbedded light-greenish-gray clay. As thick as 150 feet. Base exposed just west of quadrangle. Deposited in a playa lake.

Older clay and sand.--Light-greenish- to pinkish-gray, poorly to well bedded, gypsiferous, argillaceous to silty micaceous clay, lesser amounts of interbedded light-gray arkosic sand. As thick as 300 feet.

Intrusive volcanic rocks

Volcanic rocks occurring as plugs, pods, and dikes, intrusive into pre-Tertiary rocks and Tertiary vol-

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

canic and sedimentary rocks; probably fill vents and fissures through which the Tertiary volcanic rocks erupted; age Tertiary, most probably Oligocene or Miocene. Composed of the following units:

Intrusive basalt.--Similar to basalt of the volcanic and sedimentary rocks described below but diabasic in texture, nonvesicular; occurs as dikes, probably feeders of basalt flows.

Andesite porphyry, intrusive.--Greenish-gray, massive porphyry composed of sparse to abundant phenocrysts of plagioclase and some small plates of biotite in subvitreous to microcrystalline groundmass of plagioclase, glass, and scattered specks of iron oxides. Phenocrysts make up from 10 to 30 percent of rock mass. Forms small plug.

Intrusive felsite.--Greenish-white, gray, pink to tan, massive to flow-laminated, vitreous to microcrystalline felsite composed mostly of glass, potassic feldspar, and plagioclase. Forms small pods and plugs.

Volcanic and sedimentary rocks

Assemblage of flows, pyroclastic rocks, and coarse sedimentary deposits; only lowest 3,000 feet of assemblage exposed within quadrangle, remainder exposed north of quadrangle; unconformable on pre-Tertiary rocks. Unfossiliferous. Age, Tertiary, most probably Oligocene or early Miocene, on basis of lithologic similarity to volcanic and sedimentary rocks of probable Oligocene or early Miocene age in Cady Mountains northwest of quadrangle (Dibblee and Bassett, 1966); section in Rainbow Canyon in northwest part of quadrangle described by Bassett and Kupfer (1964, p. 16-17). Composed of the following lithologic units which intertongue with each other:

Basalt.--Black, massive, moderately hard but friable where weathered, finely crystalline, with interstitial vugs; rock composed of basaltic glass, calcic plagioclase (commonly as laths), pyroxene, olivine, and finely divided magnetite; in places contains small phenocrysts of olivine (partly altered to clays), less commonly of plagioclase; some flows contain amygdules of calcite, quartz, chalcedony, opal, or zeolite, and locally veinlets of same minerals except zeolite. Basalt occurs as thick lava flows; some have subplaty fracture parallel to top or base.

Andesite.--Reddish to greenish-brown, hard, massive, microcrystalline to subvitreous, composed mostly of glass, plagioclase, and small amounts of potassic feldspar; commonly contains a few small phenocrysts of plagioclase and minute plates of biotite. Occurs as thick lenticular flows.

Andesite breccia.--Same as andesite described above but highly brecciated, fragmental, unstratified. Deposited as flow breccias. Gradational into fanglomerate of andesitic detritus and into tuff breccia.

Tuff breccia.--Buff to light-greenish-tan, moderately consolidated, massive to bedded tuff with grains of feldspar, flakes of biotite, and small to large (as large as 1 foot in diameter) fragments of pinkish-brown Tertiary andesite and andesite porphyry; locally contains small fragments of devitrified pumice. Deposited as volcanic ash and mud flows.

Fanglomerate of andesitic detritus.--Light-brown, crudely bedded, weakly to moderately consolidated fanglomerate of poorly sorted small boulders, cobbles, and pebbles, mostly of Tertiary andesite and andesite porphyry, in matrix of coarse andesitic and tuffaceous sandstone. Gradational into andesite breccia and tuff breccia.

Fanglomerate of granitic detritus.--Light-gray, unbedded fanglomerate of unsorted boulders, cobbles,

and pebbles of biotite quartz monzonite in matrix of coarse arkosic sand. As thick as 200 feet at base of the volcanic and sedimentary rocks.

MESOZOIC PLUTONIC AND HYPABYSSAL IGNEOUS ROCKS

Quartz monzonite

Gray-white, massive, medium- to coarse-grained granitic rock, moderately hard but friable where weathered; composed of quartz, potassic feldspar, and plagioclase in generally equal proportions, 2 to 5 percent biotite (as euhedral plates), and total of less than 1 percent sphene, zircon, and iron oxides. Rock generally porphyritic, with large euhedral phenocrysts of potassic feldspar from 3/4 inch to 2 inches long. Rock forms small stock intrusive into the biotite quartz monzonite and hornblende diorite. Age, Mesozoic, presumably Cretaceous.

Dike rocks

Dikes as thick as 30 feet, but generally much less, vertical or steeply dipping, generally parallel to each other, intrusive into the biotite quartz monzonite. Composed of massive, hard, fine-grained igneous rocks; similar to dikes in areas west of quadrangle which intrude the biotite quartz monzonite and related rocks but not the quartz monzonite. Age, probably Mesozoic, as indicated by field relationships of similar dike rocks northwest of quadrangle. Composed of the following rock types:

Dioritic to andesitic dikes.--Dikes of dark-gray, very fine grained dioritic to andesitic rock composed mostly of plagioclase (in places as minute laths), hornblende(?) and some biotite and iron oxides.

Felsitic dikes.--Dikes of light-gray to tan, very hard, very fine grained felsitic rock composed mostly of quartz, potassic feldspar, and plagioclase, and traces of mica.

Granite porphyry dikes.--Dikes as thick as 30 feet of light- to medium-gray porphyritic rocks composed of fine-grained quartz, potassic feldspar, and a little plagioclase with scattered to abundant phenocrysts up to one-fourth of an inch long of potassic feldspar and, rarely, of quartz.

Hornblende diorite or gabbro

Dark-gray to black, massive, hard, medium- to coarse-grained dioritic rock composed mostly of hornblende and plagioclase feldspar; small amounts of biotite, chlorite, and iron oxides. Occurs as masses within the biotite quartz monzonite and between it and the quartz monzonite. Age, presumably Mesozoic.

Older granitic rocks

Hard granitic rocks; somewhat affected by regional alteration; forms major part of pre-Tertiary complex within quadrangle. Age, probably Mesozoic. Composed of the following units:

Biotite quartz monzonite.--Light- to medium-gray, massive, hard granitic rock composed essentially of quartz, potassic feldspar, and plagioclase (oligoclase-andesine) in proportions from nearly equal to slight predominance of plagioclase; from 2 to 20 percent biotite, and a total of less than 2 percent hornblende, sphene, zircon, and iron oxides. In most places the rock is gray, the quartz and feldspars being gray, and is porphyritic, with subhedral phenocrysts of gray orthoclase from 1/2 to 1 inch long, and with abundant biotite as clusters or clots of minute flakes. In other places the rock is nonporphyritic and contains very little biotite. In many places both types of rock are bleached light gray to white, commonly along irregular streaks or zones. These bleached rocks are

severely affected by alteration in which feldspars are commonly in part altered to sericite, with plagioclase zoned or rimmed by albite; in most places potassic feldspar (including phenocrysts) is partly to completely replaced by albite, and biotite and hornblende are partly altered to iron oxides and chlorite, which are commonly leached out. Veinlets of epidote are common.

Iron-stained biotite quartz monzonite.--Same as biotite quartz monzonite, but stained dark brown from iron oxides, presumably from hydrothermal action; iron oxides probably derived from biotite content of rock.

PALEOZOIC(?) METAMORPHIC ROCKS

Metasedimentary rocks

Metasedimentary rocks occurring as small pendants engulfed in the biotite quartz monzonite. Lithologically similar to metasedimentary rocks of Paleozoic age in areas west of quadrangle. Age, therefore, considered Paleozoic(?). Composed of the following units:

Quartzite.--Light- to medium-gray, fine-grained, massive to locally bedded, severely shattered, iron-stained, locally brecciated; composed mostly of quartz, with small percentages of mica, feldspar, and iron oxides, and in places epidote. Lithologically similar to Saragossa Quartzite (Paleozoic) in San Bernardino Mountains (Dibblee, 1964).

Limestone or dolomite marble.--White to light-bluish-gray, massive to crudely bedded, fine to coarsely crystalline, composed of calcite and dolomite; commonly contains lenses of garnet, epidote, and hematite near quartz monzonite contacts. Occurs as very small pendants. Recrystallized from limestone or dolomite; lithologically similar to Furnace Limestone (Paleozoic) of San Bernardino Mountains (Dibblee, 1964).

Tactite.--Dark-greenish-brown, massive, finely to coarsely crystalline; composed mostly of garnet and some quartz, epidote, and iron oxides. Forms very small masses engulfed in the biotite quartz monzonite; probably silicated from marble.

PROSPECTS

Gold - Copper(?)

A. Prospect in E 1/2 sec. 32, T. 5 N., R. 8 E. Quartz in shear zone that strikes northwest, in quartzite near contact with the biotite quartz monzonite. Prospected prior to 1952 presumably for gold or copper, by adit driven northwest.

B. Prospects N 1/2 sec. 20, T. 3 N., R. 8 E. Quartz and quartz-feldspar veins and stringers in the hornblende diorite or gabbro, near contact with the quartz monzonite. Prospected in many places by shallow pits and short adits, presumably for gold or copper, prior to 1952.

Iron

C. Le Coitrane iron prospect. NW 1/4 sec. 18, T. 4 N., R. 9 E. Iron ore, mostly hematite, forms several veins in pendant of dolomitic marble; largest vein as thick as 7 feet, as long as 100 feet, strikes N. 30° E., nearly vertical, in marble 50 to 100 feet west of contact with the biotite quartz monzonite. Other smaller veins and stringers of hematite lie parallel to main vein and extend in several directions from it. Prospected prior to 1952 by adit driven northwest about 100 feet to main vein, and by several shallow pits.

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