MAP I-427

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEOLOGIC MAP OF THE ORD MOUNTAINS QUADRANGLE SAN BERNARDINO COUNTY, CALIFORNIA

By T. W. Dibblee, Jr.

Prepared in cooperation with the
CALIFORNIA DIVISION OF MINES AND GEOLOGY

GEOLOGIC QUADRANGLE MAP
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DIBBLEE—GEOLOGIC MAP, ORD MOUNTAINS QUAD., SAN BERNARDINO CO., CA 1:62,500 MAP I-427

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TO ACCOMPANY MAP I-427

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DESCRIPTION OF MAP UNITS

PRECAMBRIAN(?) METAMORPHIC ROCKS

Gneissic rocks

Gneissic rocks generally similar to and presumably correlative with Precambrian(?) gneissic rocks of San Bernardino Mountains. Supposedly metamorphosed from metasedimentary rocks. Composed of the following facies units:

Quartz diorite gneiss.--Gray, fine- to medium-grained gneiss composed of quartz, feldspar (mostly sodic plagioclase, minor potassic feldspar), biotite, and (or) hornblende. Rock banded with dark-gray laminae rich in biotite and (or) hornblende alternating with gray-white laminae rich in quartz and feldspar and gray laminae of intermediate composition.

Granite gneiss.--Light-gray, fine- to medium-grained gneiss composed of quartz, potassic feldspar, and sodic plagioclase in nearly equal proportions, but with slight predominance of potassic feldspar, and less than 5 percent of biotite and muscovite. Rock nearly homogeneous, faintly banded with darker laminae containing abundant biotite and muscovite.

Hornblende or biotite schist.--Gray-black foliated fine- to medium-grained schist composed mostly of biotite, hornblende, and plagioclase feldspar.

PALEOZOIC METASEDIMENTARY ROCKS

Metasedimentary rocks

Metamorphosed marine sedimentary rocks exposed as pendants engulfed in plutonic rocks. Greatest exposed thickness about 1,000 feet. Rocks unfossiliferous but lithologically similar to metasedimentary rocks of late Paleozoic age in Oro Grande-Victorville area and in San Bernardino Mountains. Composed of the following rock types:

Marble.--White to gray-white, coarsely crystalline, thickly bedded marble composed of calcite and some dolomite; adjacent to granitic contacts locally silicated to garnet, epidote, and diopside.

Hornfels.--Pinkish to greenish-gray, hard, indistinctly bedded, fine-grained hornfels composed of garnet, epidote, and other calc-silicate minerals.

Schist.--Black, foliated, fine-grained schist composed mostly of biotite, hornblende, quartz, and plagioclase.

MESOZOIC PLUTONIC AND HYPABYSSAL IGNEOUS ROCKS

Hornblende diorite gabbro

Black, massive, medium- to coarse-grained diorite or gabbro, composed mostly of hornblende and plagioclase (labradorite) in variable proportions but with hornblende predominating, and some biotite, epidote, and magnetite; epidote veinlets common. Intrusive into or possibly recrystallized from gneissic and metasedimentary rocks. Age, presumably Mesozoic.

Biotite quartz monzonite

Gray, medium- to coarse-grained, locally porphyritic, massive to slightly gneissic granitic rock composed of quartz, potassic feldspar (orthoclase), and plagioclase (oligoclase or andesine), in about equal proportions or with slight predominance of plagioclase, 5 to 20 percent of biotite, 0 to 5 percent of hornblende, and a total of about 1 percent of magnetite, sphene, apatite, and zircon. Biotite forms numerous minute flakes irregularly distributed as clusters that impart dark color to rock. Porphyritic facies contain scattered to abundant (as much as 20 percent of rock mass) potassic feldspar phenocrysts as long as 2 cm. Rock affected by hydrothermal (or deuteric?) action and by cataclastic shearing, especially in vicinity of Ord and East Ord Mountains, with feldspars partly altered to sericite, biotite largely altered to iron oxides which impregnate fractures throughout rock making it ferruginous and causing it to weather brown; epidote veinlets and coatings common. Intrusive into or possibly in part recrystallized from gneissic rocks; intrusive into metasedimentary rocks east of quadrangle. Age, Mesozoic.

Granite and quartz monzonite

Nearly white, but weathers tan to yellowish-brown, hard, massive, medium-grained granitic rock composed of quartz, potassic feldspar, and plagioclase in nearly equal proportions or with slight predominance of potassic feldspar, 1 to 2 percent of biotite (as very small flakes, partly or wholly leached or altered to brown iron oxides), and a total of 1 percent of sphene, apatite, zircon, and iron oxides. Intrusive into gneissic rocks, metasedimentary rocks, hornblende diorite, biotite quartz monzonite, and possibly into aplitic quartz monzonite and part of porphyry complex.

Aplitic quartz monzonite

Gray-white, tan-weathering, very hard, massive, fine-grained aplitic rock, composed of quartz, potassic feldspar, and sodic plagioclase; contains scattered small phenocrysts of feldspar with poorly defined borders. Relations to adjacent rocks uncertain; apparently gradational into latite porphyry, if so, may be facies of it; probably intrusive into biotite quartz monzonite; near Goat Mountain appears to be intruded by granite and quartz monzonite. Age, presumably Mesozoic.

Porphyry complex

Complex of slightly to moderately metamorphosed, predominantly porphyritic igneous rocks with aphanitic to fine-grained groundmass. Large masses described as Ord Mountain Group of Triassic(?) age, by Gardner (1940, p. 266-270), and west of quadrangle mapped as Sidewinder Volcanic Series, of Triassic(?) age, by Bowen (1954, p. 42-53, pl. 1). On Stoddard Ridge and north of Goat Mountain forms masses either intrusive into or intruded by granite and quartz monzonite; in West Ord Mountain area, dikes intrusive into granite and quartz monzonite, hornblende diorite gabbro, and gneissic rocks; in Ord Mountain area, large masses and dikes intrusive into biotite quartz monzonite. Intruded by quartz monzonite. Apparently emplaced several times during Mesozoic Era. Age probably Jurassic or Cretaceous as indicated by these relationships. Composed of the following rock units:

Latite porphyry.--Mainly gray porphyritic rocks of latite composition but ranging from that of light-gray quartz latite to dark-gray basic andesite. Rocks very hard but closely fractured, generally massive but locally faintly flow laminated and slightly schistose; in places amygdaloidal. Composed of scattered to numerous phenocrysts (as much as 30 percent of rock and as much as 3 mm long) of plagioclase and potassic feldspar in variable proportions, both partly altered to sericite, and black grains of iron oxides and chlorite (after biotite? and hornblende?) in groundmass of intergrown potassic and plagioclase feldspars, sericite, and iron oxides. Some dikes contain no plagioclase, others no potassic feldspar; few contain quartz. Epidote commonly present as fillings in fractures and in vugs (vesicles?) to form amygdules(?). On Ord Mountain some dikes and large main mass of porphyry largely altered to mylonite. Locally on East Ord Mountain rock has contorted flow banding and some spherulitic structure, suggesting metamorphism from obsidian.

Latite porphyry breccia.--Same as latite porphyry, but fragmental; composed of scattered to numerous unsorted angular latite porphyry fragments of various sizes as large as 10 cm, in gray matrix of latite porphyry. Rock devoid of planar structures. Boundaries with latite porphyry gradational, indistinct. Probably a vent breccia.

Basalt porphyry.--Gray-black, massive, hard, composed of scattered relict phenocrysts of plagioclase in fine-grained groundmass of plagioclase and dark minerals.

Diorite.--Gray-black, massive, fine-grained, composed of hornblende and calcic plagioclase and scattered small phenocrysts of hornblende. Forms dikes as wide as 10 feet in biotite quartz monzonite.

Porphyritic felsite.--Gray-white to tan felsite with few phenocrysts (less than 10 percent of rock mass) of feldspar and quartz. Very hard, siliceous, massive to rarely flow laminated. Forms dikes as wide as 50 feet, or dike group as wide as 200 feet, intrusive into gneissic rocks, hornblende diorite gabbro, biotite quartz monzonite, granite and quartz monzonite, and possibly into latite porphyry.

Siliceous felsite.--White to gray-white, massive to locally flow-banded, very hard siliceous aphanitic to aplitic felsite. Composed mostly of quartz and plagioclase (albite-oligoclase?). Contains few small phenocrysts of plagioclase (albite) with indistinct boundaries (partly resorbed?). In places contains fine-grained streaks of dark minerals. Forms dikes and pods as wide as 150 feet in latite porphyry and biotite quartz monzonite.

Quartz diorite

Gray, massive, medium-grained granitic rock, weakly coherent where weathered, breaks down by separation of grains, about 50 percent composed of plagioclase (oligoclase-andesine), remainder composed of quartz, potassic feldspar, biotite, and hornblende in variable proportions, and a total of less than 2 percent of sphene, apatite, zircon, and magnetite. Rock unaltered. Possibly a mafic facies of quartz monzonite but presumably older.

Quartz monzonite

Gray-white, massive, medium-grained equigranular granitic rock, weakly coherent where weathered, breaks down by separation of grains; composed of quartz, potassic feldspar, and plagioclase (oligoclase), in generally equal proportions, 2 to 5 percent biotite (as scattered euhedral tablets from 1 to 3 mm in diameter), and a total of less than 2 percent of sphene, apatite, zircon, and magnetite. Rock unaltered. Intrusive into all other pre-Tertiary rocks except quartz. Age, possibly Late Jurassic, presumably Cretaceous.

Bleached quartz monzonite

Zone of quartz monzonite in sec. 19, T. 6 N., R. 2 E., bleached white by hydrothermal action, with feldspars kaolinized and biotite leached out.

Aplite

Nearly white, homogeneous fine-grained aplite composed mainly of quartz and feldspar; forms dike as wide as 6 feet in latite porphyry breccia. Age, presumably Mesozoic.

Pegmatite

Nearly white, medium- to very coarse grained pegmatite composed of quartz, potassic feldspar and some sodic plagioclase, small amounts of biotite and muscovite. Forms dikes from less than 1 inch to 20 feet thick; small dikes medium grained or even aplitic, larger dikes coarse grained. Age, Mesozoic, may be offshoots from quartz monzonite or may be slightly younger.

Quartz

Massive milky-white quartz, in places brecciated and recemented by iron oxides; forms veins or pods as thick as 50 feet. Age, presumably Mesozoic.

CENOZOIC SEDIMENTARY AND VOLCANIC ROCKS

Intrusive(?) felsite

Pink, light-gray to tan felsite of rhyolite or quartz latite composition; hard, massive to flow laminated, with fracture parting parallel to flow laminae; some laminae porous with minute angular vugs; aphanitic to very fine grained, composed mostly of potassic and plagioclase feldspars; contains a few small phenocrysts (as long as 1 mm) of plagioclase. Intrusive(?) into and probably extrusive onto biotite quartz biotite; overlain by associated tuff breccia. Age, Tertiary, presumably early Miocene or older.

Volcanic and sedimentary rocks

Extrusive volcanic flows and torrential fanglomerates exposed north of Kane Wash; maximum exposed thickness within quadrangle about 2,000 feet. Unconformity at base. Age, presumably Tertiary, early Miocene or older on basis of stratigraphic position northwest of quadrangle. Composed of the following rock units:

Tuff breccia.--Crudely bedded pink breccia of scattered to numerous angular fragments as large as 1 foot across of light-gray to pink felsite in matrix of white tuff; includes some lenses of gray perlite breccia; grades northward into bedded white tuff. Felsite fragments derived from associated intrusive felsite. Where present, forms basal part of this volcanic and sedimentary sequence.

Basalt.--Black, massive, commonly vesicular basalt, hard but friable where weathered; fine-grained, composed mostly of lathy plagioclase (labradorite), pyroxene (augite?), and magnetite; contains scattered to numerous (as much as 20 percent of rock) subhedral phenocrysts of olivine (largely altered to iddingsite), and in places few small ones of plagioclase. Vesicles sparse to abundant, as large as 2 cm in diameter, commonly filled with calcite or quartz. Forms several flows, as thick as 50 feet.

Fanglomerate.--Gray, massive to crudely bedded fanglomerate composed of unsorted, subrounded boulders, cobbles, and pebbles, derived mostly from porphyry complex and biotite quartz monzonite, some from other plutonic rocks, including hornblende diorite gabbro, very few from metasedimentary rocks. Deposited by torrential downpours as alluvial fans presumably derived from area to south.

Sedimentary rocks

Coarse fanglomerate, and local basal breccia and tuff; maximum exposed thickness within quadrangle about 1,000 feet; probable unconformity at base. Age, Tertiary, most probably late Miocene as based on stratigraphic position northwest of quadrangle. Composed of the following rock units:

Tuff.--Creamy-white, massive, fine- to medium-grained tuff, composed almost entirely of glass shards and scattered flakes of biotite; contains small angular fragments, up to 4 inches across, of andesite or dacite. As thick as 40 feet; forms basal unit of sequence where present.

Granitic breccia.--Dark-red breccia composed of unsorted angular fragments as large as 3 feet across of biotite quartz monzonite in matrix of hard red ferruginous gritty arkosic sandstone. Forms basal lens as thick as 100 feet where present.

Fanglomerate.--Similar to that of underlying volcanic and sedimentary rocks described above, but locally contains some clasts of Tertiary basalt and andesite. Nearly devoid of bedding. Forms bulk of sequence. Deposited by torrential downpours as alluvial fans presumably derived from area to south.

Travertine vein

Calcite travertine vein as wide as 15 feet, with banding parallel to walls of vein, mostly white, some bands iron-stained yellow, brown, and red. Probably a hot-spring deposit. Age, presumably Tertiary, or possibly Quaternary.

Basalt

Black, massive, hard, nonvesicular basalt composed of scattered small euhedral phenocrysts of plagioclase and subhedral olivine in dark microcrystalline groundmass. Forms local flow as thick as 20 feet in quadrangle; more extensive in Fry Mountains to east. Age, possibly Pliocene but probably early Pleistocene.

Older surficial sediments

Unbedded alluvial gravel, dissected where elevated, in places to erosional remnants; presumably underlies modern surficial sediments in larger valleys; unconformity at base. Deposited as alluvial fans. Age, presumably mostly or all Pleistocene. Composed of the following units:

Older fanglomerate.--Gray fanglomerate of unsorted boulders and cobbles derived from porphyry complex of Stoddard Ridge; maximum exposed thickness about 350 feet. Possibly in part of Tertiary age.

Older gravel.--Gray gravel of rounded cobbles derived mostly from porphyry complex of Ord and East Ord Mountains; maximum exposed thickness about 230 feet.

Older alluvium.--Gray gravel of unsorted detritus derived from adjacent Tertiary and pre-Tertiary rocks; maximum exposed thickness about 150 feet.

Surficial sediments

Unconsolidated sediments of undissected fill in valley areas. In larger valleys presumably gradational downward into older surficial sediments; elsewhere unconformable on various older rocks. Age, Recent, possibly in part very late Pleistocene. Composed of the following facies:

Alluvium.--Coarse gravel of unsorted boulders and cobbles in alluvial fans sloping from bordering mountains, grading downslope through cobble-pebble gravel into pebble gravel and sand in valley areas.

Clay.--Micaceous silt and clay of dry lake or playa.

Sand.--Loose sand composed of well-sorted fine- to medium-sized subrounded grains of quartz and feldspar; deposited by prevailing west winds as small elongate dunes on alluvium and clay.

MINES AND QUARRIES

Gold, silver, copper, molybdenum, and iron

A. New Deal mine. NW¼ sec. 12, T. 7 N., R. 1 W. Small quartz vein in aplitic quartz monzonite, prospected by 60-foot shaft, presumably for gold. Long idle.

B. Gold Belt mine. SW¼SW¼ sec. 30, T. 7 N., R. 1 E. Free gold associated with pyrite and chalcopyrite in quartz-calcite vein 2 to 7 feet wide, striking N. 40° E., dipping 45° SE. in hornblende diorite, and granitic gneiss. Mined from 275-foot vertical shaft with level workings at 50, 100, and 240 feet, with drifts in both directions on vein from each level, including 700-foot drift to northeast on 240-foot level; from mill tunnel driven northeast 820 feet to bottom of shaft, with raises to two lower levels; in 1930 40-stamp mill installed, operated until 1932; mine idle since. (Tucker and Sampson, 1940, p. 235-236)

C. Martha mine. SE¼SW¼ sec. 11, T. 7 N., R. 1 E. Small quartz vein and shear zone, striking about N. 70° W. in biotite quartz monzonite. Prospected by shallow shaft. No production recorded.

D. Greenback (Sunshine) mine. NE¼NE¼ sec. 12, T. 7 N., R. 1 E. Copper carbonates and minor chrysocolla in narrow quartz vein in somewhat gneissic biotite quartz monzonite, along or near contact with dike of latite porphyry that trends N. 20° W. Explored by two shafts 50 feet apart, 65 and 85 feet deep. First opened in 1898, reopened in 1939, active in 1952; no production recorded. (Wright and others, 1953, tab. list p. 11, no. 30)

E. Gold Banner mine. SE¼ sec. 12, T. 7 N., R. 1 E. Copper carbonates, and chalcopyrite in quartz vein 4 to 10 feet wide, nearly vertical, striking N. 10° W., in somewhat schistose, mylonitic biotite quartz monzonite, in places associated with dikes of latite porphyry of similar trend. Explored by adit driven S. 20° E. 200 feet, intersected 80 feet from portal by 40-foot shaft from surface; two other shallow shafts within 1,200 feet southeast of adit portal. Several hundred tons shipped in 1917, one carload shipped in 1941; idle since. (Wright and others, 1953, tab. list p. 10, no. 26, in part)

Ord Mountain group (25 claims).--SE¼ sec. 12, E½ sec. 13, E½ sec. 24, T. 7 N., R. 1 E. Iron oxides, copper carbonates and free gold near surface, primary pyrite, chalcopyrite, and bornite with gold values at depth, unevenly distributed in small discontinous veins of quartz, calcite, and barite. Veins trend generally north, dip steeply east, mostly within shear zone of similar attitude, as wide as 250 feet and about 2 miles long, along or near contact of ferruginous biotite quartz monzonite on west and mylonitic latite porphyry on east. Several minor veins in latite porphyry just east of main shear zone. Ore bodies mined from numerous workings for more than 40 years prior to 1942, idle since. (Tucker and Sampson, 1940, p. 239; Wright and others, 1953, p. 66-67) Most important workings of group composed of following mines (F to M) from north to south:

F. Brilliant mine. NW¼SE¼ sec. 12. Shaft 200 feet deep, sunk on narrow vein on footwall of latite porphyry dike that dips 75° E., strikes N. 10° W., in somewhat schistose, altered biotite quartz monzonite, with several hundred feet of drifts at 100- and 180-foot levels; also 50-foot shaft and open cuts south along vein and dike; in 1942 yielded 80 tons of ore averaging 2 to 3 percent copper and $7.75 in gold per ton.

G. Belgian and Copper Junction mines. Center NE¼ sec. 13. Belgian adit driven S. 15° W. along vein in altered biotite quartz monzonite, with winze 480 feet deep and 140 feet from portal; Copper Junction adit driven south 200 feet on vein along contact with latite porphyry with crosscut driven west 65 feet to Belgian adit.

H. Josephine mine. SW¼NE¼ sec. 13. Adit driven S. 20° W. 500 feet along or near small vein in latite porphyry about 500 feet east of main shear zone.

J. Last chance mine. N½SE¼ sec. 13. Crosscut adit driven S. 70° W. about 200 feet to intersect several minor veins striking N. 10° W. in latite porphyry about 500 feet east of main shear zone.

K. Coupon mine. S½SE¼ sec. 13. Crosscut adit driven southwest about 200 feet to vein in main shear zone, and several shallow shafts and pits to north and south on vein.

L. Rio Vista mine. S½NE¼ sec. 24. Two crosscut tunnels driven east to vein on main shear zone; lower adit 650 feet long, with about 150 feet of drifts on vein; upper adit about 100 feet higher and 300 feet south of lower adit, about 200 feet long, with about 300 feet of drifts on zone and one raise; mine yielded more than 1,000 tons of ore averaging 2 percent copper and $5.51 in gold per ton.

M. Painsville mine. N½SE¼ sec. 24. Shaft 90 feet deep on vein in shear zone and several open cuts to south on vein; worked in 1890, probably oldest mine of zone; long idle.

T. K. T. Mining Company prospects (38 claims).--SW¼ sec. 19, secs. 30, 31, T. 7 N., R. 2 E.; sec. 6, T. 6 N., R. 2 E. Includes prospects N to Q as follows, developed since 1954 (visited in 1963 with Mr. J. A. Theide, owner).

N. Moly No. 1 mine. SW¼NW¼ sec. 30, altitude 5,000 feet. Hematite, pyrite, chalcopyrite, said to carry values in gold, silver, traces of molybdenite, in shear zones in altered, ferruginous biotite quartz monzonite at and near contact with mylonitized latite porphyry to east. Mineralized zone strikes about N. 17° W., nearly vertical, contains some rich ore shoots. Developed from adit driven north 150 feet, ore encountered about 100 feet from portal; about 90 feet from portal winze sunk vertically 50 feet, with level at bottom driven north about 15 feet to ore shoot.

O. T.K.T. iron prospect. SW¼SW¼ sec. 30. Pod striking east, as long as 50 feet, as thick as 15 feet, of flaky hematite, as much as 95 percent pure, in altered ferruginous biotite quartz monzonite and dike of latite porphyry. Prospected by shallow pit.

P. T.K.T. Powellite prospect. NW¼NE¼ sec. 31, T. 7 N., R. 2 E. Powellite ($CaMoO_4$) and silver said to be finely disseminated in vertical north-striking shear zone as wide as 5 feet in north-striking dike of latite porphyry. Prospected by small pit.

Q. T.K.T. south prospects. NW¼NW¼ sec. 6, T. 6 N., R. 2 E. Quartz vein, as thick as 5 feet, strikes N. 70° E., dips about 75° S., in altered biotite quartz monzonite, and crossing dikes of latite porphyry. Vein made up mostly of quartz stringers, in places carries chalcopyrite, pyrite, flaky hematite; said to carry values in gold and silver. On east side of ridge prospected by adit driven west along vein about 50 feet, now only 20 feet because of road graded over outer 30 feet. On west side of ridge and about 100 feet north of vein vertical shaft sunk 62 feet on north-striking 35-foot-wide dike of dark-gray latite porphyry. Owner states that porphyry contains finely disseminated values in flaky gold and silver, and traces of platinum, according to assays. In 1963, 35- to 50-ton per day pilot mill erected to process gold and silver ore from shaft; plans to deepen shaft to 80 feet and run levels north and south in porphyry. Six men employed.

R. L. Shouse (Red Hill) mines. SW¼SE¼ sec. 31, T. 7 N., R. 2 E. Chalcopyrite, pyrite, hematite, molybdenite, disseminated mostly in brecciated quartz veins and brecciated zones, some in adjacent north-trending dikes of porphyry and felsite that transect biotite quartz monzonite; brown iron stains and blue copper stains on surface. Chalcopyrite and pyrite reportedly carry values in gold and silver. Prospected as early as 1896 from shaft (old Mary Etta shaft) about 150 feet deep on copper-stained zone on east edge of porphyry dike at east edge of hill. Prospected later from adit on another dike about 500 feet southwest of old shaft, adit driven northeast about 100 feet. Prospected in 1961-62 by numerous trenches cut east across several dikes near tunnel, and about 100 drill holes as deep as 100 feet, one at south end of hill reportedly drilled to 600 feet, and shallow pit on another dike near center of south boundary of sec. 31.

S. Galena claim. NW¼ sec. 4, T. 6 N., R. 2 E. Chalcopyrite, pyrite, iron oxides, in porphyry intruded by tongue of quartz monzonite striking southeast. Prospected as late as 1962 by adit driven east about 50 feet along contact and by several shallow pits and trenches.

T. Maumee mine. NE¼NE¼ sec. 34, T. 7 N., R. 2 E. Iron-stained shear zone in ferruginous biotite quartz monzonite. Prospected by shallow shaft and small adit driven west, presumably for gold. Long idle.

U. Grand View, Ord Belt, Hoover, and Ford mines. Sec. 10, T. 6 N., R. 2 E. Gold irregularly disseminated in many veins of brecciated or sheared iron-stained zones, some containing quartz, from few inches to several feet wide, dip steeply, with various trends, in aplitic quartz monzonite, in places along contact with latite porphyry. Explored or mined from several shafts, deepest 150 feet, drifts, and several adits, longest 500 feet. Active mostly prior to 1928; last active 1934. (Tucker and Sampson, 1940, p. 235-238)

V. Prospects in NW¼SW¼ sec. 19, T. 6 N., R. 2 E. Small quartz veins in pendants of schist and in quartz monzonite; prospected presumably for gold in many shallow pits. Long idle.

W. Prospects in SE¼NE¼ sec. 20, T. 5 N., R. 2 E. Copper stains in quartz veins in very small pendant of gneissic biotite quartz monzonite within quartz monzonite; prospected by shaft about 50 feet deep.

Tungsten

Z. White Dollar mine. SE¼ sec. 7, T. 7 N., R. 2 E. Scheelite irregularly disseminated in small masses of friable, brecciated garnet-epidote tactite in biotite quartz monzonite, cut by north-trending latite porphyry dikes. Explored by several open cuts and two shallow shafts. Few hundred tons of tungsten ore mined and milled in 1951-52. (Wright and others, 1953, p. 153)

AA. Pure Quill mine. SW¼ sec. 33, T. 7 N., R. 1 E. NW¼ sec. 4, T. 6 N., R. 1 E. Scheelite irregularly disseminated in thin zones of quartz within 5- to 20-foot-wide sill of hornblende diorite in granitic gneiss. Explored in 1951-52 by small cuts, and 200-foot adit driven southwest, scheelite zone struck at 170 feet from portal and drifted northwest 138 feet and southeast 87 feet. (Wright and others, 1953, p. 150-151)

BB. Star Dust group. SW¼ sec. 12, T. 5 N., R. 1 W. Scheelite sparsely disseminated in small masses of garnet-epidote tactite or marble, intruded by hornblende diorite. Prospected by shallow cuts. No known production. (Wright and others, 1953, tab. list p. 126, no. 382, in part)

Uranium

CC. Uranium prospect. NW¼ sec. 12, T. 6 N., R. 1 W. Vein 2 to 4 feet wide of quartz with oxides of iron and copper, strikes N. 70° E., dips steeply south, also parallel stringers of quartz and of pegmatite, in hornblende diorite gabbro. Vein and stringers contain small amounts of autunite and yellow-green oxides of uranium, altered probably from uranothorite (found as traces) and possibly from pitchblende (D. F. Hewett, oral communication, 1962). Prospected in late 1950's by several drill holes (as deep as 200 feet), numerous trenches, and open pits; by shaft about 80 feet deep sunk on main vein with drifts on bottom along vein. No recorded production.

Fluorite

DD. McKinney mine. S½ sec. 1, T. 6 N., R. 1 W. Minor amounts of fluorite in two quartz veins in granite gneiss and hornblende diorite. Largest vein vertical, strikes west, as wide as 10 feet; explored by three shafts, deepest 50 feet, with 110 feet of drifts. No production recorded. (Wright and others, 1953, tab. list p. 147)

EE. Green Hornet mine. SE¼? sec. 7, SW¼ sec. 8, T. 6 N., R. 1 E. Small irregular masses of fluorite in five parallel quartz veins 4 to 6 feet wide, which strike west, dip 80° S. in hornblende diorite. One vein

explored by 80-foot shaft, joined at bottom by 125-foot easterly drift. Ten tons of ore said to average 85 percent CaF_2, 12 percent SiO_2. (Wright and others, 1953, tab. list p. 146, no. 427)

Barite

FF. T.K.T. barite prospect. SW¼SE¼ sec. 25, T. 7 N., R. 1 E. Barite vein strikes about N. 17° W., in ferruginous biotite quartz monzonite. Vein about 2 feet wide at surface; owner (J. A. Theide) states vein as much as 6 feet wide, contains disseminated values of gold and silver. Prospected in 1950's by 6-foot adit and several drill holes.

GG. Prospect in NW¼ sec. 9, T. 6 N., R. 2 E. Barite vein 1 foot wide, 100 feet long at surface, vertical, strikes N. 20° W., in dike of latite porphyry of same attitude within latite porphyry. Barite contains some pyrite and iron oxides. Prospected in late 1950's by open pit.

Marble

HH. Richter quarry. SW¼ sec. 15, T. 5 N., R. 1 W. Small low hill of white dolomitic marble containing some magnesite, intruded by granite and quartz monzonite. Small tonnage quarried briefly in 1940's and 1950's. (Wright and others, 1953, tab. list p. 155, no. 455)

JJ. Peterson quarry. NW¼ sec. 12, T. 5 N., R. 1 W. White calcite marble in places partly silicated to tactite, overlies schist, intruded by hornblende diorite gabbro to south. Small tonnage quarried in mid-1940's, 1950's. (Wright and others, 1953, tab. list p. 155)

KK. Travertine deposit. NW¼SE¼ sec. 3, T. 7 N., R. 1 E. Vein of travertine as wide as 15 feet, vertical, strikes northwest along or near contact of granite gneiss to west and fanglomerate to east. Suitable for ornamental stone. Prospected by small pits and trenches.

REFERENCES

Bowen, O. E., Jr., 1954, Geology and mineral deposits of Barstow quadrangle, San Bernardino County, California: California Div. Mines Bull. 165, p. 7-185.

Gardner, D. L., 1940, Geology of the Newberry and Ord Mountains, San Bernardino County, California: California Jour. Mines and Geology, v. 36, no. 3, p. 257-292.

Tucker, W. B., and Sampson, R. J., 1940, Economic mineral deposits of the Newberry and Ord Mountains, San Bernardino County [California]: California Jour. Mines and Geology, v. 36, no. 3, p. 232-254.

Wright, L. A., Stewart, R. M., Gay, T. E., Jr., and Hazenbush, G. C., 1953, Mines and mineral deposits of San Bernardino County, California: California Jour. Mines and Geology, v. 49, nos. 1 and 2, p. 49-257, and tabulated list p. 1-192.