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**GEOLOGIC MAP OF THE NEWBERRY QUADRANGLE
SAN BERNARDINO COUNTY, CALIFORNIA**

By

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MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-461



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DESCRIPTION OF MAP UNITS

SEDIMENTARY AND VOLCANIC ROCKS

Surficial sediments

Unconsolidated valley fill; deposited in valley areas and in Mojave River channel; generally undissected. In much of valley area, sediments gradational into underlying older surficial sediments; elsewhere unconformable on older formations. Age, Recent, probably in part very late Pleistocene. Composed of the following units:

River sand.--Fine- to coarse-grained arkosic sand deposited in channel of Mojave River and its tributaries which are incised through alluvium and older surficial sediments.

River terrace gravel.--Bedded gravel similar to older gravel described below. As thick as 50 feet. Deposited on former meander of Mojave River before present channel was incised.

Windblown sand.--Thin cover and small dunes of fine-grained sand composed mostly of quartz and feldspar, drifted and deposited by prevailing westerly winds on alluvium, clay, and older formations.

Clay.--Light-gray clay or mud; alkaline in Troy Lake (usually dry).

Alluvium.--Cobble-pebble gravel and sand near hills, grading outward into sand and silt in level valley areas; top surface slopes less than 200 feet per mile. Grades downslope into clay.

Alluvial fan gravel.--Coarse gravel of unsorted, subrounded fragments as large as 5 feet in diameter, derived from adjacent mountains and deposited as alluvial fans; top surface slopes from 200 to 350 feet per mile; fragments decrease in size downslope as gravel grades into alluvium.

Basalt of Pisgah flow

Fresh, hard, black vesicular microcrystalline basalt composed of calcic plagioclase (partly as laths), basaltic glass, pyroxene, disseminated magnetite, and small patches of olivine; porous, with minute vugs between grains. Forms at least one single ropy lava flow on alluvium and clay; erupted from Pisgah Crater southeast of quadrangle. Age, Recent, possibly in part Pleistocene.

Manix Lake Beds

Mostly fine-grained sediments named Manix lake beds by Buwalda (1914, p. 444), deposited in a late Pleistocene lake he called Manix Lake. Well exposed 2 1/2 miles east-southeast of Manix; type locality hereby designated from base of lake bed clay exposed on west bank of Mojave River in NW1/4 sec. 15, T. 10 N., R. 4 E., northwesterly to highway in NW1/4 sec. 4, T. 10 N., R. 4 E. Sediments generally flat lying, but much dissected; conformable on older gravel unit. A lacustrine facies of older alluvium. Divided into the following units:

Gravel bar.--Bar of rounded pebbles and coarse sand; deposited by wave action presumably on east shore of Manix Lake.

Sand and silt.--Mostly bedded light-gray to light-buff fine to coarse sand and interbedded light-greenish-gray silt, clay, and some pebble gravel. Maximum total thickness about 40 feet. Grades upward into gravel of older alluvium. Deposited probably in Manix Lake and in part by inflowing streams.

Lake-bed clay.--Light-greenish-gray, faintly bedded, argillaceous to silty clay, and some thin interbeds of fine-grained arkosic sands. About 80 feet in maximum thickness; overlies older gravel; lenses out westward; grades laterally northward and eastward into, and is overlain by, sand and silt. Yielded late Pleistocene bird fossils (Howard, 1955).

Older surficial sediments

Extensive alluvial gravels and sands that fill valley area; total exposed thickness as much as 250 feet; thickness may be greater in valley area where concealed under overlying surficial sediments; eroded and dissected in areas where exposed and elevated. Unconformable on older Pleistocene, Tertiary, and pre-Tertiary rocks. Age, presumably Pleistocene. Divided into the following units:

Older alluvium.--Light-gray, massive to bedded, cobble-pebble gravel and sand derived mostly from adjacent mountains or hills. Maximum exposed thickness about 90 feet.

Older gravel.--Gray, bedded gravel composed of moderately sorted, rounded cobbles and pebbles mostly of Mesozoic metavolcanic and Tertiary andesitic rocks derived from hills to south. Maximum exposed thickness about 160 feet.

Basalt of Malpais flow

Black, hard, vesicular microcrystalline basalt composed of calcic plagioclase laths, pyroxene, olivine, finely disseminated magnetite, and very small phenocrysts of olivine and labradorite; porous, with minute vugs between grains. Forms several flows with total thickness as much as 50 feet, thinning northward; erupted from Malpais Crater 4 miles south of quadrangle in late Pleistocene time.

Older fanglomerate and gravel

Gray, crudely bedded fanglomerate and gravel composed of poorly sorted, subrounded fragments as large as 2 feet in diameter of pre-Tertiary porphyry complex or metavolcanic rocks, plutonic rocks, and Tertiary volcanic rocks. Maximum exposed thickness about 250 feet. In areas north of Mojave River, includes fragments of Tertiary chert and limestone. In NW1/4 sec. 17, T. 8 N., R. 3 E., 3 miles south of Newberry, basal 70 feet is buff arkosic sandstone. Unconformable on Tertiary rocks. Age, presumably Pleistocene, possibly in part very late Pliocene.

Sedimentary rocks

Sequence composed mostly of sedimentary rocks; maximum exposed thickness possibly 3,000 feet at south border of quadrangle, less than 2,000 feet elsewhere; unconformable on Tertiary volcanic and sedimentary rocks, especially at south border of quadrangle. Age, Tertiary, presumably late Miocene or younger. Divided into the following rock units as mapped:

Limestone and claystone.--Light-gray to nearly white, hard, poorly bedded to massive limestone, in places partly silicified to gray or black chert, and interbedded soft greenish-gray claystone. Deposited in a lake.

Sandstone and claystone.--Light-gray, friable, locally pebbly, fine- to medium-grained arkosic sandstone, and interbedded light-greenish-gray claystone or micaceous siltstone. At south margin of Cady Mountains contains one or several thin beds of white tuff. In sec. 26, T. 10 N., R. 2 E., north of Toomey, yielded late Miocene horse teeth (T. H. McCulloh, oral communication, 1953).

Volcanic fanglomerate.--Gray, massive fanglomerate composed of unsorted subrounded fragments as large as 3 feet in diameter of Tertiary andesite, felsite, and basalt, in matrix of volcanic debris.

Fanglomerate.--In Harvard Hill, dark-gray massive fanglomerate composed of unsorted fragments, as large as 1 foot in diameter, mostly of blue-black, fine-grained mica schist. Near Newberry Mountains, gray massive to very crudely bedded fanglomerate composed of unsorted, subrounded fragments as large as 5 feet in diameter, mostly of Mesozoic porphyry complex and biotite quartz monzonite, some of other plutonic rocks, including hornblende diorite gabbro, and few of Tertiary volcanic rocks. Deposited by torrential streams as alluvial fans.

Basalt.--Similar to basalt of volcanic and sedimentary rocks in Newberry Mountains; forms two thin flows in lower part of fanglomerate.

Intrusive volcanic rocks

Volcanic rocks forming plugs, pods, and dikes intrusive through pre-Tertiary rocks into Tertiary volcanic and sedimentary rocks; emplaced in vents and fissures through which andesite was extruded; age therefore Tertiary, probably Miocene or older.

Intrusive felsite.--White, tan-pink, lavender, and pale-greenish-gray, massive to flow-laminated felsite of quartz latite composition; rock aphanitic to subvitreous, locally perlitic at margins; composed of potassic feldspar, plagioclase, and quartz; in places contains scattered minute phenocrysts of sodic plagioclase and flakes of mica.

Intrusive andesitic rocks.--Pinkish-, greenish-, to brownish-gray, massive to flow-laminated felsitic rocks, mostly andesite, with minor local variations to latite, dacite, or quartz latite; rocks microcrystalline, composed mostly of sodic plagioclase, locally minor amounts of potassic feldspar, biotite, and finely disseminated iron oxides; commonly contain small phenocrysts of sodic plagioclase and flakes of biotite, rarely of basaltic hornblende, or quartz.

Intrusive basalt.--Black, massive, fine-grained basalt, composed of gray calcic plagioclase, pyroxene(?), and iron oxides; in places contains small phenocrysts of plagioclase and olivine.

Volcanic and sedimentary rocks

Sequence of volcanic flows, pyroclastic layers, and coarse torrential fanglomerates; unconformable on

irregular erosion surface of pre-Tertiary rocks; in Newberry Mountains, within quadrangle, only lower 6,000 feet of 12,000-foot-thick onlapping sequence exposed; in Cady Mountains, within quadrangle, maximum thickness possibly 5,000 feet. Unfossiliferous. Age, presumably Miocene or older, on basis of correlation with rocks of that age in Cady Mountains quadrangle. Divided into the following rock units as mapped:

Basalt.--Black, massive, fine-grained to subvitreous, composed of gray calcic plagioclase and minor amounts of ferromagnesian minerals and specks of magnetite; commonly contains some small phenocrysts of plagioclase and olivine. Forms extrusive flows; some flows amygdaloidal. Gradational into andesite. In Newberry Mountains, much of basalt composed of fine-grained mesh of plagioclase laths with interstitial pyroxene, olivine, and magnetite, commonly with scattered small phenocrysts of plagioclase and olivine, as seen in thin section; rock porous, with minute vugs between grains; friable where weathered. In Cady Mountains, much of basalt has subvitreous texture, commonly with abundant phenocrysts of plagioclase and few of olivine.

Basalt breccia and fanglomerate.--Dark-gray to black, massive, in a few places crudely bedded; composed entirely of unsorted angular to subrounded fragments of volcanic rocks as large as 3 feet in diameter; all or most fragments are of black porphyritic subvitreous basalt; in some places are minor admixtures of andesitic fragments.

Andesite.--Dark-reddish-brown to gray, massive porphyritic volcanic rocks, mostly andesite, but ranging to latite; most phenocrysts are plagioclase (andesine?), in a few places some are potassic feldspar (sanidine), rarely biotite or quartz; groundmass microcrystalline, composed of plagioclase, some potassic feldspar, and small amounts of finely divided hematite and magnetite. In Newberry Mountains, some flows in T. 8 N., R. 2 E., approach basalt in composition; in T. 8 N., R. 3 E., and in Cady Mountains, some of andesite may be intrusive.

Andesite breccia.--Gray to greenish-brown, massive to crudely bedded breccia (mostly flow breccia) or porphyritic to felsitic andesite; in places includes some coarse tuff breccia. Gradational into andesite.

Tuff breccia.--Yellowish- to light-greenish-gray, crudely bedded tuff breccia composed of angular andesitic fragments, mostly less than 6 inches in diameter, in matrix of light-colored tuff.

Granitic breccia.--Massive, light-pinkish-gray monolithologic breccia of unsorted angular fragments as large as 6 feet in diameter of hard granitic rock composed of cream-white feldspars and light-brown quartz, in hard matrix of granitic debris. Probably a landslide breccia.

Fanglomerate of Mesozoic rocks.--Gray massive fanglomerate of unsorted subrounded fragments as large as 3 feet in diameter in friable fragmental matrix. Deposited by torrential storms. In Newberry Mountains, detritus composed mostly of Mesozoic porphyry complex and biotite quartz monzonite, and some other plutonic rocks, derived from exposures of these Mesozoic rocks to south. In Harvard Hill, detritus mostly of Mesozoic metavolcanic rocks, fine-grained schist, pink granitic rock, and Tertiary andesitic rocks.

Fanglomerate of andesitic rocks.--Gray massive fanglomerate similar to that described above, but composed entirely of Tertiary volcanic detritus, mostly of porphyritic to felsitic andesite. In places includes some andesite breccia.

PLUTONIC, HYPABYSSAL, AND METAVOLCANIC ROCKS

Aplitic quartz monzonite

Gray-white, weathering buff, fine-grained, composed mainly of quartz, potassic feldspar, and sodic plagioclase, and about 1 percent muscovite. Contains a few small phenocrysts of sodic plagioclase. May be a facies of porphyry complex. Age, presumably Mesozoic.

Porphyry complex

Slightly metamorphosed(?) felsitic to porphyritic hypabyssal(?) rocks, intrusive(?) into granitic rocks. May be metavolcanic rocks. Age, presumably Mesozoic. Divided into the following rock units:

Latite porphyry.--Gray, massive porphyry composed of scattered to abundant feldspar phenocrysts in microcrystalline groundmass; most phenocrysts are plagioclase, few of orthoclase; groundmass is feldspar and minor amount of iron oxides; both phenocrysts and groundmass partly altered to sericite, as seen in thin section.

Silicic felsite.--Buff-white to tan, massive to faintly flow laminated, microcrystalline felsite; composed mainly of sodic plagioclase, quartz, and traces of sericite and iron oxides; locally contains a few very small phenocrysts of sodic plagioclase.

Hornblende diorite or gabbro

Dark-gray to black, massive, medium- to coarsely crystalline diorite or gabbro, composed mainly of hornblende and plagioclase (labradorite) and some biotite and magnetite. Age, presumably Mesozoic, as indicated by field relations outside quadrangle.

Granitic rocks

Massive granitic rocks mostly of quartz monzonite composition in this quadrangle. Probably intruded by, or possibly intrusive into, porphyry complex; intrusive(?) into metavolcanic rocks east of quadrangle. Age, presumably Mesozoic, either Late Jurassic or Early Cretaceous, as indicated by field relations outside of quadrangle. Composed of following types:

Granite to quartz monzonite.--Light-gray, medium- to coarse-grained, composed of quartz, white to pinkish-white potassic feldspar, and light-gray sodic plagioclase in variable proportions, about 1 percent biotite, and a total of less than 1 percent sphene, zircon, apatite, and magnetite.

Biotite quartz monzonite.--Light-gray, composed of quartz, potassic feldspar, and sodic plagioclase in nearly equal proportions, from 3 to 10 percent biotite (as clusters of minute flakes), and less than 1 percent sphene and iron oxides. In places rock sparsely porphyritic with a few large phenocrysts of orthoclase.

Pink granite.--Pale-pink, medium-grained, equigranular, composed mainly of quartz, gray-white sodic plagioclase, and pale-pink potassic feldspar with moderate predominance of potassic feldspar, from 1 to 3 percent biotite, and a total of less than 1 percent sphene, zircon, and magnetite.

Metavolcanic rocks

Gray, hard, massive to foliated felsitic to porphyritic rocks of andesite to quartz latite composition exposed in northwestern Cady Mountains. In northwestern part of exposure, rock is mostly pyroclastic (or cataclastic?) breccia of small angular fragments in faintly to prominently flow-banded matrix; fragments are usually less than half an inch long, elongated parallel to flow banding, light-gray massive to flow-banded, silicic, rhyolitic to latitic felsite,

commonly with a few small phenocrysts of feldspar; matrix is microcrystalline, in places porphyritic, faintly to prominently flow banded, with flow banding curved around fragments; rock commonly is foliated parallel to flow banding. In southeastern part of exposure (mostly in and southwest of secs. 26 and 35, T. 10 N., R. 4 E.), most of rock is porphyry, with little or no flow banding, but locally foliated, and with few or no fragments; most phenocrysts are of plagioclase, some of potassic feldspar, and in places, some of quartz; groundmass microcrystalline, of plagioclase and potassic feldspar. Probably metamorphosed tuff breccias, flow breccias, flows(?), and intrusions(?). Age, presumably Mesozoic, possibly older.

METAMORPHIC ROCKS

Marble

White, thick-bedded, coarsely crystalline dolomitic marble; overlies gneiss. Age, presumably Paleozoic or older.

Gneiss

Dark-gray, medium-grained porphyroblastic gneiss or gneissoid quartz diorite composed mainly of quartz, plagioclase, biotite, and minor amounts of potassic feldspar and hornblende; contains few to abundant porphyroblasts of potassic feldspar as long as 3 mm. Age, Paleozoic or older.

NOTE: Potassic and sodic-calcic feldspar content of igneous rocks determined by chemical staining of sawed surface of sample, by M. B. Norman.

QUARRIES

Clay

A. Staccite mine. SW1/4SE1/4 sec. 20, T. 10 N., R. 4 E. Massive, soft, pinkish-gray-white bentonitic clay. Contains some coarsely crystalline calcite veins. Clay may have formed by hydrothermal alteration of Tertiary andesitic tuff breccia. Several hundred tons of clay quarried in 1950's and early 1960's from pit about 300 feet long, 80 feet wide, and 20 to 60 feet deep, driven southeastward into hill.

B. "Talc mine." NE1/4 sec. 1, T. 8 N., R. 4 E. Somewhat bentonitic greenish-gray clay, soft, massive, at base of Pleistocene fanglomerate and gravel. Quarried years ago from several small shallow pits by California Talc Co.

C. Tuff quarries (National Lead Co.). S1/2 sec. 31, T. 9 N., R. 5 E., sec. 6, T. 8 N., R. 5 E. Bed of white fine-grained tuff containing the zeolites clinoptilolite and erionite (Sheppard and Gude, 1964), as thick as 4 feet, in Tertiary sandstone and claystone. Several tons quarried for absorptive clay from shallow trenches in 1950's.

Rock

D. Rock quarry, Newberry, SW1/4NW1/4 sec. 32, T. 9 N., R. 3 E. Intrusive andesite, several hundred tons quarried for road fill in 1940's.

E. Rock quarry, SW1/4 sec. 6, T. 8 N., R. 3 E. Intrusive rhyolitic felsite, several hundred tons quarried for road fill in 1950's.

TEST WELLS DRILLED FOR OIL OR GAS

Logs for wells 1 through 4 obtained in 1954 by D. F. Hewett from Mr. Ken Rhinehold of Manix.

1. Manix well No. 1 NW1/4 sec. 4, T. 10 N., R. 4 E. Drilled with cable tools in 1922. Summary driller's log reported as follows:

0 to 98 feet clay
98 to 240 feet sand
240 to 950 feet clay

950 to 1,030 feet conglomerate
1,030 to 1,600 feet clay
1,600 to 1,615 feet sand (oil reported)
1,615 to 2,510 feet shale and limestone

2. Manix well No. 2. NW 1/4 sec. 4, T. 10 N., R. 4 E. 400 feet southeast of Manix well No. 1. Drilled with rotary tools in 1925. Summary driller's log reported as follows:

0 to 92 feet clay
92 to 290 feet sand
290 to 960 feet clay
960 to 1,010 feet conglomerate
1,010 to 1,640 feet clay
1,640 to 2,380 feet conglomerate
2,380 to 3,200 feet shale and limestone
3,200 to 3,497 feet conglomerate

3. Manix well No. 3. NW 1/4 sec. 3, T. 10 N., R. 4 E. Drilled in 1952. Total depth, 3,370 feet; reported in sedimentary rocks at bottom.

4. Sierra Oil and Gas Co., Wilhelm well No. 1. SW1/4 sec. 5, T. 10 N., R. 4 E. Drilled in 1959. Total depth 5,243 feet; reported in pre-Tertiary rocks at bottom.

5. Allan Weiss and Associates. Hosterman well No. 1., 2,552 feet west, 265 feet south of NE cor. sec. 17, T. 8 N., R. 4 E. Drilled in 1955. No cores taken. Log from California Division of Oil and Gas. Summary driller's log reported as follows:

0 to 105 feet sand and gravel (alluvium)
105 to 719 feet blue clay, sand, and boulders (older alluvium?)
719 to 752 feet hard sand (Tertiary?)
752 to 1,153 feet hard red conglomerate (Tertiary?)
1,153 to 1,353 feet hard red and brown shale, with streaks of limestone (Tertiary?)

Larger rig moved in

1,353 to 1,799 feet dark-red and brown shale, with streaks of limestone and sandstone; hard at bottom (Tertiary?)

TEST HOLE DRILLED FOR MINERALS

6. Congdon and Carey, Hector well No. 1. SE1/4 sec. 24, T. 8 N., R. 4 E. Summary log (cored intervals 300 to 306, 501 to 505, 859 to 869, and 1,102 to 1,221 feet). Log published with permission of Thomas E. Congdon, Denver, Colo.

0 to 950 feet sand, light-brownish-gray, massive, weakly indurated, medium- to mostly coarse grained, arkosic, in places contains pebbles and cobbles of Tertiary andesite porphyry and Mesozoic granitic rocks. Probably Pleistocene older alluvium
950 to 1,500 feet sand, same as above, but light-greenish-gray; contains some pebbles and cobbles as above; also a few thin layers of gray clay showing dip of nearly 0°. Probably Pleistocene older alluvium; possibly Tertiary

REFERENCES

- Buwalda, J. P., 1914, Pleistocene beds at Manix in the eastern Mojave Desert region: California Univ., Dept. Geology Bull., v. 7, no. 24, p. 443-464, pls. 22-25.
Howard, Hildegard, 1955, Fossil birds from Manix Lake, California: U.S. Geol. Survey Prof. Paper 264-J, p. 199-205, pl. 50.
Sheppard, R. A., and Gude, A. J., 3d, 1964, Reconnaissance of zeolite deposits in tuffaceous rocks in the western Mojave Desert and vicinity, California: U.S. Geol. Survey Prof. Paper 501-C, p. C114-C116.