Radium Deposits

Carnotite was discovered several miles west of Sutor Siding in 1931 by J. Isachsen, formerly of Jean, Nev. Following Isachsen's discovery, other deposits were located in the vicinity.

The carnotite, associated with manganese oxide, occurs as a coating in fractures in sandstone and limestone. Although prospecting has been carried on by a number of shallow shafts, trenches, and open-cuts, the amount of carnotite found was too small to be of commercial importance.

Limestone Deposit

A limestone quarry about 1 mile southeast of Jean, Nev., on Sheep Mountain, was opened by the Blue Diamond Gypsum Co. about 10 years ago. After 850 tons of lime rock had been shipped, the quarry was abandoned.

LAS VEGAS DISTRICT

(Manganese)

The Las Vegas district is 16 miles southeast of Las Vegas, Nev. Manganese was discovered here in September 1917 by R. N. Edwards, B. R. Jefferson, and J. F. Marrs of Las Vegas, who located the Three Kids group of claims. Shortly after, a local group formed the Manganese Association, and production was begun in November 1917. In 1918 the Three Kids mine and the adjoining Las Vegas group were purchased by Thomas Thorkildson of Los Angeles, Calif., but the name of the company was retained. The Manganese Association worked the property until March 1919. The property remained idle until 1936, when it was acquired by Los Angeles interests, who formed the Boulder Dam Manganese Co. Production during the war was about 16,000 tons of shipping ore that averaged 40 percent manganese.

Interest in these manganese deposits was revived in 1936 because of the research work carried on by the U. S. Bureau of Mines on the electrodeposition of metallic manganese from an electrolyte obtained by leaching manganese ore[19].

Boulder Dam Manganese Co.

The Boulder Dam Manganese Co., H. R. Golenor of Los Angeles, president, and G. R. Boggs, of Los Angeles, vice president and consulting engineer, controls the principal properties in the Las Vegas manganese district, comprising 11 claims, two of which are patented.

Development work comprises a number of shallow shafts and inclines, none over 100 feet deep, and several short tunnels. There is no equipment on the property. In February 1937 the property was idle.

19/ Koster, J., and Shelton, S. M., Electrolytic Manganese: Eng. and Min. Jour., vol. 137, October 1936, pp. 510-513.

During the World War mining was done by either open-cuts or the room-and-pillar system. Where the overburden was comparatively thin it was broken up and removed by horse-drawn scrapers and the ore was mined by open-pit methods; where the overburden became too thick to be handled economically, the room-and-pillar system of mining was employed. According to Hale[20], the first 31 carloads of ore shipped from the Three Kids property averaged as follows:

	Percent
Mn	41
SiO_2	11
P	0.03
Fe	1
Moisture	11.62

In 1936 the Boulder Dam Manganese Co. explored its holdings by diamond drilling. As a result of this work, ore was blocked out as follows:

	Tons ore (2,000 lb.)	Mn content, percent	Ave. thickness, feet
Block A	83,000	35.33	34
Block B	228,000	30.5	37
Block C	65,000	18.5	20
Three Kids	100,000	31.0	20
Total	476,000	29.81	

The metal content of the ore blocked out is 141,889 tons of metallic manganese.

The geology of the Las Vegas manganese deposit has been described by Pardee and Jones[21] and Hewett and Webber[22].

According to Hewett and Webber, the Las Vegas manganese deposits are of sedimentary origin. The formation in the vicinity consists of numerous volcanic flows, breccias, and tuffs. The overlying stratified materials that contain the beds of manganese oxides are largely reddish-brown tuffs, with conglomerate of volcanic material and gypsum beds. Drill records show the average thickness of the overburden to be about 26 feet.

The manganese oxides, chiefly wad and psilomelane, occur as soft porous material weighing about 80 pounds per cubic foot. The thickness of the bed varies from a few feet to a maximum of 60 feet. The bed has been disturbed by faulting. The ore is homogeneous, and a high-grade product cannot be

20/ Hale, Fred A., Jr., Manganese Deposits of Clark County, Nev.: Eng. and Min. Jour., vol. 105, 1918, p. 776.

21/ Pardee, J. T., and Jones, E. L., Jr., Deposits of Manganese Ore in Nevada: U. S. Geol. Survey Bull. 710, 1920, pp. 209-242.

22/ Hewett, D. F., and Webber, B. N., Bedded Deposits of Manganese Oxides Near Las Vegas, Nev.: Nevada University Bull., vol. 25, 1931, 17 pp.

obtained by sorting or selective mining. Lenses of sandy material and seams of fibrous gypsum ranging in thickness from a few inches to 2 feet occur in the manganese bed. This material is easily separated from the ore in mining.

Ebony Queen Claim

Manganese occurs 2 miles northwest of Boulder City, Nev., near Hemmingway Pass on the Ebony Queen unpatented claim relocated by J. R. Sailor and G. H. Miller of Las Vegas, Nev., in January 1937. This deposit was explored about 1925 by several open-cuts totaling about 50 feet of work. Nothing has ever been produced.

The deposit striking northwest and southeast and dipping 75° outcrops for several hundred feet along the side of a small hill. Material consists of a mixture of iron and manganese oxide ranging from 4 to 10 feet in width. No information on the manganese content is available.

MOAPA DISTRICT

(Gypsum, Volcanic Ash)

The Moapa district is in the vicinity of Moapa, Nev., a station on the Union Pacific R.R. that connects Los Angeles, Calif., and Salt Lake City, Utah. Gypsum and volcanic ash occur in this area but the only production has been gypsum.

Gypsum Deposits

From 1919 to 1923 the White Star Plaster Co. exploited a gypsum deposit 3 1/2 miles east of Moapa. The White Star mill originally contained two 10-foot, oil-fired, calcining kettles, but the plant was enlarged to be a 3-kettle mill in 1922. During 1922 shipments of plaster to Los Angeles, Calif., averaged about 3,000 tons per month[23].

In 1923 the company ceased operations, and no work has been done on the deposits since.

Two beds of gypsum occur in limestone, but only the lower bed was exploited. This bed is from 30 to 40 feet thick, dips about 30°, and is exposed for several thousand feet.

In the Muddy River Valley, about 5 miles south of Moapa, lies the Anderson gypsum deposit. Strata of gypsum interbedded with shale outcrop for a distance of 3 miles. Within a gypsiferous zone several hundred feet thick are strata of rock gypsum apparently containing no anhydrite. The principal gypsum bed is from 10 to 60 feet thick, and it could be mined at low cost.

23/ Lincoln, Francis Church, Mining Districts and Mineral Resources of Nevada: Mackay Sch. Mines Bull., 1923, pp. 22-23.

The nearest railroad point is Jackson Siding, 4 miles east of the deposit, on the St. Thomas branch of the Union Pacific R.R. About 20 years ago the Rex Plaster Co. shipped a small amount of gypsum from this deposit to a plant in Los Angeles.

Volcanic Ash Deposit

A deposit of volcanic ash owned by the Dotson Bros., Mart and Henry, of Logandale, Nev., occurs 13.6 miles northwest of Moapa. The deposit is covered by four unpatented lode claims.

The volcanic ash occurs as a horizontal bed about 30 inches thick, exposed on a side of a bluff for a distance of about 1 mile. The material is uncemented, fine-grained, and gray in color. No effort has been made to work the deposit.

Tin Deposit

In 1936 tin was reported to have been found about 13 miles southeast of Moapa, Nev. The Cosmo Mining Co. acquired a large group of claims and some stock was sold. Pieces of sandstone stained with manganese, said to contain tin, were taken by the writer. A composite sample of the material was analysed by the Mackay School of Mines laboratory at Reno, Nev., but no tin was found.

MUDDY MOUNTAINS DISTRICT

(Borates, Gypsum, Silica Sand, Bentonite, Sodium Sulphate)

Deposits of borates, gypsum, silica sand, bentonite, and sodium sulphate occur in the southern part of the Muddy Mountains in eastern Clark County north of Lake Mead. The only production of any consequence has been from the borate deposits. The non-metallic deposits that occur in the northern part of the Muddy Mountains are described in this paper under the Moapa and St. Thomas districts.

The borate deposits, which occur chiefly as colemanite ($Ca_2B_6O_{11}.13H_2O$), are of interest in that they constitute the only commercial occurrences of this mineral in the United States outside of California. These deposits were discovered in 1920 and 1921 and were exploited from 1922 to 1928. In the latter year operations ceased, due to the discovery of a new boron mineral, kernite ($Na_2B_4O_7.4H_2O$), near Kramer, San Bernardino County, Calif. Because of the different types of borate deposits that have been worked successively in the United States, the borax industry has been very unstable, and at every stage of development different processes of exploitation were devised.

In the United States the industry began with the discovery of borax ($Na_2B_4O_7.10H_2O$) by John A. Veatch in the waters of Tuscan Springs, Tahama County, Calif. Doctor Veatch extended his search, and other deposits were found in the same year on the east side of Clear Lake, Calif. The borax