The Sally Ann copper area, Ubehebe Peak quadrangle, Inyo County, California

by E. M. MacKevett

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ILLUSTRATIONS

Bx 17)

The Sally Ann copper area, Ubehebe Peak quadrangle, Inyo County, California

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Abstract

The Sally Ann copper area, in the Ubehebe Peak quadrangle, is in a remote part of Inyo County, Calif., within Death Valley National Monument and near the northwest boundary of the Monument. Irregular masses of contact-metamorphic rock containing oxidized copper and iron minerals occur as parts of roof pendants, made up of Paleozoic sedimentary rocks, within quartz monzonite. These rocks are partly covered by talus, alluvial fan material, and playa deposits of Quaternary age. No major faults or folds were observed. There has been no production from the area, and future production seems unlikely.

Introduction

The Sally Ann copper area is on the western slope of the unnamed range east of the Racetrack Playa, near the northwest boundary of Death Valley National Monument, Inyo County, Calif./ The history of the district

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/ Plate 1. Index map showing the location of the Ubehebe Peak quadrangle and the Sally Ann area.

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is little known. That its copper-stained outcrops were noticed by the early prospectors is shown by claim notices dated 1905. At present the Sally Ann claims are owned by Orval Huffman and J. R. Arnold of Compton, Calif., and their associates, who were engaged in developing the property from December 1947 to June 1948. They drove a prospect adit 117 feet, in an endeavor to crosscut the downward extension of the richest-appearing surface deposit. As only this recent prospect adit and a few small prospect pits are present, it is assumed that there has been no production to date.

Two roads provide access to the area by automobile. One route is over the main road through Death Valley northward to the Ubehebe Craters and from there approximately 25 miles over a dirt road to the Racetrack Playa. A second route extends from State Highway 190 northward from a junction about 16 miles southeast of Keeler, over a very poor dirt road past Lee Flats, through the southern part of Saline Valley, past the Lippincott lead mines, and to the Racetrack Playa. In places this road is practically impassable and it is recommended only for a vehicle with four-wheel drive and a driver acquainted with desert conditions. Both roads are subject to washouts. Except for brief periods after rain, which is rare, the Racetrack Playa affords a good landing field for airplanes.

The writer studied the Sally Ann area while assisting J. F. McAllister in mapping the Ubehebe Peak quadrangle, and is indebted to McAllister for suggestions and some of the information incorporated herein. The field work was done intermittently during July and August, 1948, and consisted of making a detailed geologic and topographic map with a plane table and alidade, and of collecting specimens and samples.

The datum for plate 2/ is approximate mean sea level. Elevations

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/ Plate 2. Geologic map of the Sally Ann copper area, Inyo County, California.

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shown on the map were computed with reference to a bench mark established by a preliminary survey of a levelling party of the Geological Survey in the spring of 1948. The bench mark is on the western border of the playa, but the elevation of the playa adjacent to the Sally Ann area was assumed to be the same because a few inches of water will completely cover the playa.

Geology

The region is underlain by quartz monzonite and syenite which locally contain roof pendants of metamorphosed Paleozoic sediments. Superficially deposited over these rocks are talus, alluvial fan, and playa deposits. No major faults or folds were recognized in the area.

Metamorphic rocks

The beds of Paleozoic metamorphic rocks in the roof pendants dip steeply and, in general, strike north approximately parallel to the range front. The metamorphic rocks in the largest pendant are about 375 feet thick and include metamorphosed dolomite and limestone, skarn, and hornfels; metadolomite and metalimestone are the most abundant kinds of rock. The metadolomite is of two varieties: (1) an impure medium- to fine-grained sandy dolomite which is light brown on a fresh surface and slightly darker brown where weathered, and (2) a coarse-grained, white to light-gray, dolomitic marble which weathers buff. Most of the metalimestone is impure sandy light-gray to buff limestone that weathers light brown, but the pendant joining the southern border of the map area contains light-gray limestone that weathers bluish gray.

Skarn comprises masses as much as 10 feet thick along the eastern (higher) contacts of the roof pendants in the southern third of the area. The skarn is made up mainly of two varieties of garnet, and the characteristic brown color and greasy luster of this mineral is the predominant feature of the rock. The skarn also contains oxidized copper minerals and magnetite. While using a fluorescent lamp at night, the writer observed small amounts of scheelite in the skarn and in the border zones of the adjacent igneous rocks. Hornfels, which is dark gray and weathers brown to black, forms masses 6 to 10 feet thick next to the eastern contact of the roof pendant in the central part of the area. Chloritized dolomite is common in zones within 10 to 12 feet of igneous contacts and is particularly conspicuous contiguous to dikes and igneous salients. The chlorite is in green flakes, the largest a centimeter in diameter. Small bodies of epidotized and silicified rocks are found in a few places along the contacts of igneous and metamorphic rocks. Chrysotile and antigorite were also observed within the metamorphic rock near the igneous contact. No fossils were found in the rocks of the area.

Quartz monzonite and related rocks

Quartz monzonite is the dominant granitic rock of the area, although small bodies of syenite are locally present near the borders of the pendants. The quartz monzomite is a medium-grained rock which is light gray on fresh surfaces and weathers light to dark brown, the darker brown being a desert lacquer. As observed in a hand specimen the quartz monzonite consists essentially of plagioclase and orthoclase in approximately equal amounts, with some quartz, and usually with minor amounts of augite, biotite, sphene, and magnetite.

The syenite is mottled gray but weathers brown. It is composed mainly of coarse-grained, euhedral to subhedral perthite, with black garnet, probably melanite, as an accessory. One thin section of the syenite consisted of small amounts of euhedral plagioclase enclosed in subhedral orthoclase, and biotite, hornblende, magnetite, sphene, and apatite.

Chloritization, tourmalinization, and, to a lesser extent, epidotization have altered the intrusive rocks near contacts. Most of the tourmaline occurs along fractures in the igneous rock as fine black needlelike crystals with radial and divergent habits.

The igneous rocks form a stock. Local field evidence has failed to provide any data concerning the age of the intrusion, but probably the intrusion was concurrent with the emplacement of the batholithic rocks of the Sierra Nevada, which took place during late Jurassic time.

Recent surficial deposits

Quaternary alluvial-fan material flanks the western slope of the range and extends westward to the Racetrack Playa. The maximum thickness of the fan is uncertain. The fan consists of angular to subangular rock fragments ranging from large boulders to fine sand. Boulders between 4 and 5 feet in diameter constitute the bulk of the fan aggregate, especially in an apron-like zone that borders the range front. The largest boulder observed was in the form of a crude parallelepiped and measured approximately 30 feet by 10 feet by 10 feet. Almost all of the large boulders are of quartz monzonite.

Quaternary talus and slope rubble consisting of angular fragments occur on slopes of less than the angle of repose and commonly below steep cliffs which provide a source of accumulation. This material is made up almost entirely of igneous rock and attains a thickness of not more than 10 or 15 feet. Only the large deposits of talus and slope rubble were mapped, and minor deposits of slope rubble and slope wash which do not completely conceal the underlying bed rock are not shown on plate 2. In places it was difficult to establish the contact between the talus and fan material because of the gradational nature of the contact and the similarity of the units.

The Quaternary playa deposits of the Racetrack Playa consist of light-gray silt and mud which have solidified, giving the playa a hard, smooth surface. The thickness of the playa deposits is not known.

Structure

The Paleozoic metamorphic rocks dip steeply and, in general, strike north approximately parallel to the range front. The dips of the beds range from steeply east, through vertical, to steeply west. Major faults appear to be lacking, although a few minor faults were found, having a general eastward trend. The fault which is exposed at the portal of the main adit (pl. 2) dips 30° N. It is a dip-slip, probably normal, type of fault. Discontinuous faults are indicated at several places by narrow gouge and breccia zones along the contact of igneous and metamorphic rocks. These faults are steep and are probably related to the emplacement of the intrusive. A few small bedding-plane faults, not mapped, are within the metamorphic bodies. The variations in attitudes of the beds probably represent minor warps developed in response to the intrusive forces. No major folds are believed to exist within the roof pendants.

Copper-iron mineralized areas

Chrysocolla, malachite, and other secondary copper minerals, and magnetite are irregularly distributed along the eastern (higher) contacts of the roof pendants. These minerals are associated with garnet, chlorite, antigorite, and a small amount of quartz. The latter minerals are characteristic of the contact-metamorphic deposits found elsewhere in the quadrangle. The largest continuous mineralized body, which also is the most prospected, is 148 feet long and ranges in width from 2 to 10 feet. The average width is about 3 feet. The composition of the metamorphic beds seems to have had no bearing on the localization of the copper and iron minerals, although these minerals are most abundant in the southern part of the area where skarn is the host rock. The contact between the metamorphic and igneous rocks is generally nearly vertical, and small steep faults, which are marked by gouge and breccia zones as much as a foot thick, are associated with some of the deposits. The western contacts of the roof pendants are barren of any potential ore. The ore bodies were sampled by the writer, but the assay results are not available at present.

Outlook

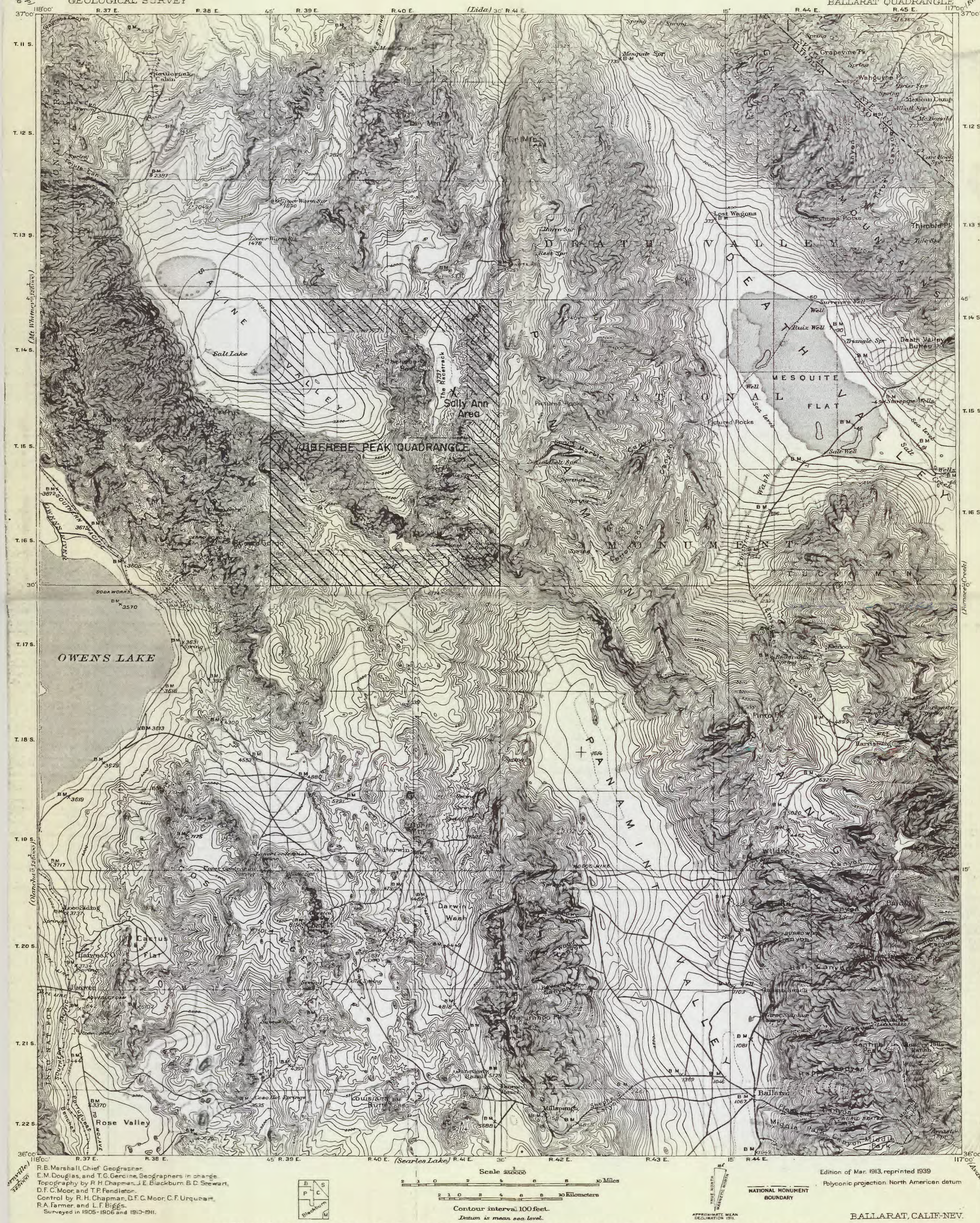
The small size and low grade of the mineralized bodies do not favor the economic production of copper from this area in the near future. The scattered distribution and irregular shape of the mineralized bodies, as well as the long haul are also unfavorable factors.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

49-37

PLATE I

CALIFORNIA - NEVADA
BALLARAT QUADRANGLE



R.B. Marshall, Chief Geographer.
E.M. Douglas, and T.G. Gerdine, Geographers in charge.
Topography by R.H. Chapman, J.E. Blackburn, B.D. Stewart, D.F.C. Moor, and T.P. Pendleton.
Control by R.H. Chapman, D.F.C. Moor, C.F. Urquhart, R.A. Farmer, and L.F. Biggs.
Surveyed in 1905-1906 and 1910-1911.

Scale $\frac{1}{250000}$

Contour interval 100 feet.
Datum is mean sea level.

APPROXIMATE MEAN DECLINATION 1911.

NATIONAL MONUMENT BOUNDARY

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Polyconic projection. North American datum

BALLARAT, CALIF.-NEV.

INDEX MAP SHOWING THE LOCATION OF THE UBEHEBE PEAK QUADRANGLE AND THE SALLY ANN AREA

49-37
PLATE 2

EXPLANATION

QUATERNARY

Qpl — Playa deposits

Qt — Talus and slope rubble

Qal — Fan deposits

JURASSIC(?)

qm — Quartz monzonite and related rocks

PALEOZOIC

Pm (h: hornfels; sk: skarn) — Undifferentiated metamorphic rocks; h-hornfels; sk-skarn

70 — Contact, showing dip (Dashed where approximate)

Concealed contact

Vertical contact

35 — Fault, showing dip

Probable fault

Concealed fault

35 — Strike and dip of beds

90 — Strike of vertical beds

Cu, Fe — Mineralized zones (Irregular contact—metamorphic deposits)

Adit

Open cut

Dump

×—US-1 — Sample

▲NW2 — Corner of claim

Primary triangulation station △ el. 3709

THE RACETRACK

16° — True North / Magnetic North

Topography by J. F. Mc Allister and E. M. Mac Kevett

Geology by E. M. Mac Kevett
July 1948

GEOLOGIC MAP OF SALLY ANN COPPER AREA, INYO COUNTY, CALIFORNIA

200 100 0 200 400 600 Feet

Contour interval 50 feet

Datum is approximate mean sea level