farther east, are the productive Opalite and Bretz mines. Among the nearest productive districts in northern Nevada are the Bottle Creek and National districts. The National contains the Buckskin Peak quicksilver mine (pl. 6).

Late in August 1940 the writer, ably assisted by Herman Zwang, made a trip from Denio, Oreg., through the northwest corner of Nevada to Cedarville, Calif., and thence north and east through Lakeview, Paisley, Bend, and Burns, Oreg., with the object of visiting some of the principal quicksilver properties in that region. (See pl. 6.) The properties visited were those in the Lone Pine district, Nevada, the Silvertown group near Cedarville and the Red Hawk mine near Willow Ranch, Calif., and the Currier property near Paisley and prospects in the Glass Buttes between Bend and Burns, Oreg. Several other prospects said to exist in this region were not visited. These include prospects east of Fairport, Calif, one near Adel, Oreg., and rumored occurrences of quicksilver near Hart Mountain and elsewhere. Although the deposits described are all in Tertiary volcanic rocks, they differ in structure and mineral content.

All the samples collected during this investigation were taken by chipping narrow grooves across the mineralized bodies. It was impracticable to take samples weighing more than a few pounds each, although, as cinnabar is very irregularly distributed in most of the deposits, much larger samples would have been desirable. The tenor of some of the samples, therefore, may be far from representing accurately the grade of the deposits.

All the samples were assayed by J. J. Fahey, of the U. S. Geological Survey.

LONE PINE DISTRICT, WASHOE COUNTY, NEV.

The Lone Pine district is in northwestern Washoe County, Nevada, just south of the Sheldon National Game Refuge (pl. 6).

INVESTIGATIONS, 1941

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SHOE COUNTY, NEV.

northwestern Washoe County,
National Game Refuge (pl. 6).

There are some prospect holes within the refuge also, but that area is now closed to prospectors. The early prospecting for gold disclosed very little of that metal. The more recent discovery of cinnabar led to the locating of a block of 18 claims by Curtis Mathews and W. S. Miller in December 1929.

The claims whose boundaries could be identified are plotted on the map (pl. 7). Antelope No. 1 and No. 2 claims are reported to lie north of No. 5 and No. 6, but no boundary posts for these claims were found by the writer. Antelope No. 12 to No. 18 claims extend eastward from the side line of No. 11 to the streamway beyond the silicified rib near the east border of the area shown on plate 7. Shallow trenches and shafts have been dug at several places on the Antelope group, particularly in the northern part of Antelope No. 10 claim. In the winter of 1939-40 the Colton Log & Lumber Co., of Portland, Oreg., took a bond on the property and made several bulldozer cuts. These are all shallow, most of them being barely deep enough to remove the surface soil.

Some claims that lie just west of the Antelope group and include part of the ground originally explored for gold have recently been staked by Harry Woods, but as yet he has put down only a few small pits. The approximate positions of two of his claims--the Mary Lee and Margaret Dee--are shown on plate 7. Scattered holes and unmarked claim stakes indicate that the ground immediately to the north has been prospected to some extent.

Ralph Roberts and Arthur Granger, of the Geological Survey, paid a brief visit to the district in the fall of 1939 and the writer and Herman Zwang spent 3 days in August 1940 in mapping and studying the area shown on plate 7.

General geology.--The district is underlain by lava flows and associated tuffs that appear to belong to two units, both presumably of Tertiary age. (See pl. 7.) The lower unit

consists of red to nearly black fine-grained andesite lava interbedded with and underlain by light-colored tuff with a few bands of conglomerate. These rocks in general dip gently east, but locally the lava has a platy structure that simulates bedding, and these partings dip northeastward at angles of 45° and more. Along the southern border of the area mapped, the andesitic rocks are overlain unconformably by a basalt flow, 20 to 50 feet thick, which dips gently south. The basalt contains numerous vesicles, in part filled with quartz. Near the middle of the eastern edge of the area mapped there are exposures of a dark-colored rock that is somewhat similar to the basalt, though more pumiceous; this rock is mapped with the basalt, but it may perhaps belong stratigraphically with the andesite.

Mineralized bodies.--The mineralized bodies in this area consist of lava and tuff that are fractured, kaolinized, locally silicified, and somewhat iron-stained. They contain some cinnabar and a little pyrite that is largely oxidized. The deposits have not been sufficiently explored to determine their size and shape. In most places the fractures are discontinuous and strike in various directions; but the more prominent fracture zones found so far, including the prominent silicified rib that crosses the northeast corner of Antelope No. 18 claim, the minor seam in a shallow shaft on Antelope No. 16, and the more conspicuous of the fracture zones revealed by the workings on Antelope No. 10, all trend northwestward. The first two are nearly vertical and the last dips 55° NE.

The silicified rib is 2 to 5 feet wide and is easily traceable for more than 800 feet. The intensely silicified fault breccia of which it is composed is reliably reported to contain a little cinnabar, but a sample chipped from it at one spot yielded no quicksilver on assay. The seam on Antelope No. 16 is said to contain a little gold. The workings on Antelope No. 10 claim show considerable cinnabar along some fractures, much of

it in coatings of the pulverulent cinnabar commonly called "paint." Samples from the two shallow shafts or pits in the southeast part of the main group of workings, taken from channels cut across seams 48, 36, and 15 inches wide, yielded 0.29, 0.07, and 0.18 percent of quicksilver, respectively. A sample chipped across an especially promising 10-inch seam was found to contain 0.70 percent (14 pounds to the ton) of quicksilver. This sample contained 0.12 percent of mercuric chloride, which was not looked for in the other samples. The possibility that chloride may be present in the ore represented by other samples should be taken into account in treating material from this district. Four samples cut by Walter Bentley, of the Colton Log & Lumber Co., from a trench somewhat farther north contained 0.35, 0.33, 0.075, and 0.075 percent of quicksilver. The workings west of the Antelope group, particularly on the Margaret Dee claim, are in partly opalized tuff with a little pyrite and cinnabar. No samples were cut there, because the rock now exposed obviously contains very little quicksilver. It is reported, however, that better material was found in one of the pits now caved.

Outlook.--Even though the district has not been thoroughly explored, some altered rocks that occur in it have been shown to contain fair percentages of quicksilver. The deposits have been sampled by several people, and some of the samples have yielded higher percentages than any of the samples collected for the Geological Survey. But the chance of mining quicksilver profitably depends on finding larger bodies of ore than were visible in 1940. In order to learn whether such bodies exist at readily accessible depths, it would be necessary to sink shafts or to drill. The first exploration should be undertaken in Antelope No. 10 claim, where the best showings now are, and should be guided by the fact that the principal fractures trend northwest.

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The lava in this vicinity is underlain by tuff, and parts of the tuff may possibly have been replaced, like that exposed farther west, by opaline material containing cinnabar in minable quantities. None of this material is exposed here, and the search for it would necessarily be somewhat blind; but it seems most likely to be found in the vicinity of outcrops of fractured and mineralized lava. Such prospecting, however, would scarcely be justified unless prices became exceptionally high.

SILVERTOWN GROUP NEAR CEDARVILLE, CALIF.

The Silvertown group, in the north-central part of T. 42 N., R. 15 E., in the Warner Mountains, Modoc County, Calif. (pl. 6), consists of 5 claims held by Roy Stanley, of Cedarville, Calif. The claims extend across the mountains from a point near North Deep Creek to South Deep Creek, a distance of nearly a mile, and the lode is said to have been explored, in places, even farther south.

The country rock of the prospects is thick-bedded agglomerate, conglomerate, lava, and tuffaceous sandstone that belong to what has been called the Lower Cedarville formation, of Miocene age.[1/] This unit is reported to comprise "from 2,000 to 3,500 feet of andesitic agglomerates, tuffs, conglomerates, intercalated flows, and sediments." The great mass of Tertiary strata that make up the Warner Mountains is reported to have a maximum aggregate thickness of about 5,000 feet. In the vicinity of the Silvertown group the beds trend east of north and dip 10° W.

The lode is a silicified fracture zone that trends N. 20° W. and has a steep northeast dip. The rock is more or less silicified over a width of fully 100 feet, but the more intensely

1/ Russell, R. J., Basin range structure and stratigraphy of the Warner Range, northeastern California: California Univ., Dept. Geol. Sci., Bull., vol. 17, No. 11, pp. 402-406, 1928. LaMotte, R. S., The Upper Cedarville flora of northwestern Nevada and adjacent California: Carnegie Inst. Washington Pub. 455, p. 61, 1936.

mineralized material appears
to 20 feet. The workings in
distributed along the length
valley of South Deep Creek

The lode contains films
nated grains of pyrite, mala
that is in places almost co
cite. As the mineralized f
liquely, its country rock i
of the zone is in agglomera
lava. The more thoroughly
contain 0.55 pound of quick
The two samples cut by the
of quicksilver, but these s
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would yield ore of higher t
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amount of cinnabar-bearing
necessary in order to obtai
cial possibilities of the a

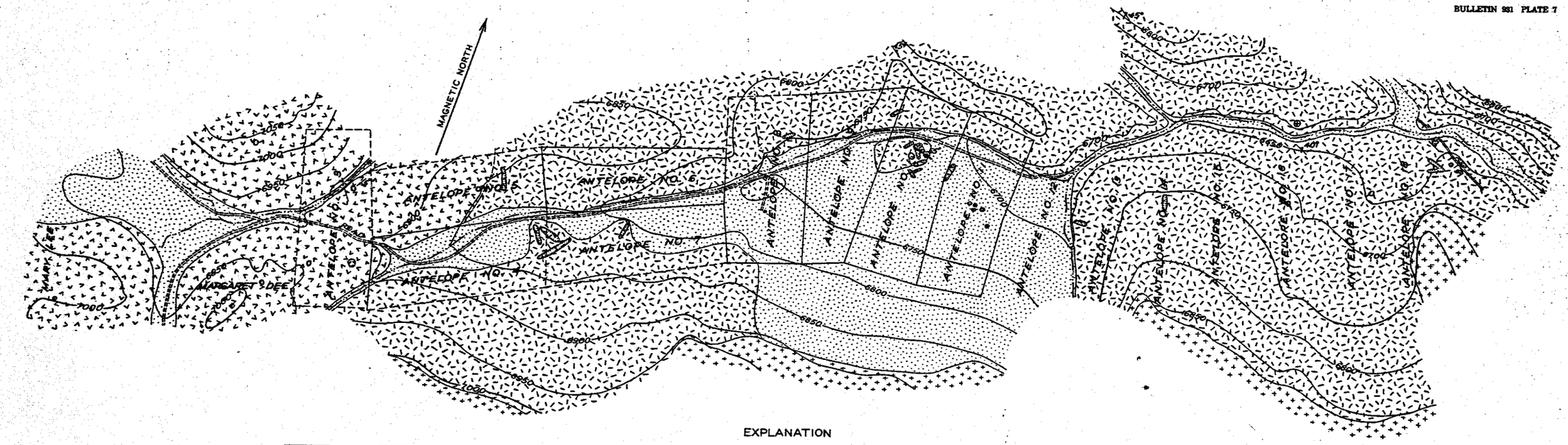
RED HAWK MINE NE

The Red Hawk quicksilve
Modoc,[2/] is in T. 4 N., R. 1
office of Willow Ranch, Cal
ern part of the High Grade
mined.[3/] The property compr
done at the Red Hawk mine i
Charles Kirkpatrick, of Lak
the property but no record

2/ Bradley, W. W., Quicksilv
State Min. Bur. Bull. 78, p. 72,
3/ Hill, J. M., Some mining
northwestern Nevada: U. S. Geol

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

BULLETIN 931 PLATE 7



GEOLOGIC AND TOPOGRAPHIC MAP OF THE PRINCIPAL PART OF THE LONE PINE DISTRICT, WASHOE COUNTY, NEVADA

AUGUST 1940