

## LYON COUNTY (continued)

ride in this area are associated with the thermal water found along the south and west sides of Smith Valley, presumably along fault planes (Loeltz and Eakin, 1953). An estimate of the reservoir temperature of Hinds' Hot Springs, using the Na-K-Ca geothermometer, is 187°F, and deposits of travertine are reported (Mariner and others, 1974).

In the early 1960's, U. S. Steel Corp. drilled three geothermal exploration wells at Hinds' Hot Springs (Appendix 1). The temperatures encountered in these wells were reportedly lower than the maximum temperatures from nearby springs. Today the water from Hinds' Hot Springs is used to irrigate pasture and other salt-tolerant grasses, and in a swimming pool near the site of two of the geothermal wells. The third geothermal well is a short distance to the south of the pool.

Hinds' Hot Springs are only one of several thermal water areas along the eastern edge of the Pine Nut Mountains. The contact between alluvium and bedrock along the mountain front is a series of faults (Moore, 1969). Recent faulting is indicated in this area by discordant breaks in slope on some alluvial fans, such as on the small fan just south of Hinds' Hot Springs (Loeltz and Eakin, 1953). The other thermal areas are the Wellington area, 10 miles to the south, and the Artesia Lake area, 2 to 4 miles north of Hinds' Hot Springs.

### Wellington area [ 187 ]

At least seven water wells near the town of Wellington have encountered warm to hot water at depths of 65 to 200 feet. The wells are located in S2,11,12,T10N,R23E. The deepest well (200 feet) has a reported temperature of 117°F, and there are indications that it may become hotter with increased pumping (Loeltz and Eakin, 1953). The water chemistry of this well is very similar to Hinds' Hot Springs 10 miles to the north, suggesting a common source for the thermal water. Water from the 117°F well is used for a public swimming pool.

### Artesia Lake area [ 183 ]

The Artesia Lake area is 2 to 4 miles north and northeast of Hinds' Hot Springs and is a continuation of the thermal anomalies along the Pine Nut Mountains from Wellington to Artesia Lake. Warm-water wells and springs are reported

from S25,27,34,T13N,R23E and S10,T12N,R23E. Well temperatures are up to 82°F for the Ambassador well; no temperature data are available for the springs, except that they are warm (Moore, 1969, pl. 1). The Ambassador well is 540 feet deep and artesian. Measurements of uranium and radium in water from this well indicate that it may penetrate volcanic rocks at depth (Scott and Barker, 1962).

### Other springs and wells

Four other hot springs are reported in Lyon County. Two of these are in southern Mason Valley along the east edge of the Singatse Range. Wilson Hot Spring (S34,T11N,R25E) was reportedly dry in 1969 (Alvin McLane, personal communication, 1973), and no information is available on the other Mason Valley hot spring in S34,T12N,R25E. Unnamed springs in the SW/4 SE/4 S4,T7N,R27E along the East Walker River in southern Lyon County are approximately 110°F and are reportedly slightly radioactive (possibly due to radon in the water). The spring is in the vicinity of several uranium occurrences (Davis, 1954). Stearns and others (1937) reported two springs and a public bathing area.

Two water wells in Dayton Valley have temperatures of 80° and 95°F. They are located in S7,T16N,R21E and S12,T16N,R22E. Also, the water flowing from the portal of the Sutro Tunnel is 81° to 83°F (Glancy and Katzer, 1975). The Sutro Tunnel was built to drain the mines of the Comstock Lode. The abnormal temperatures in this mining district are described in the Storey County section.

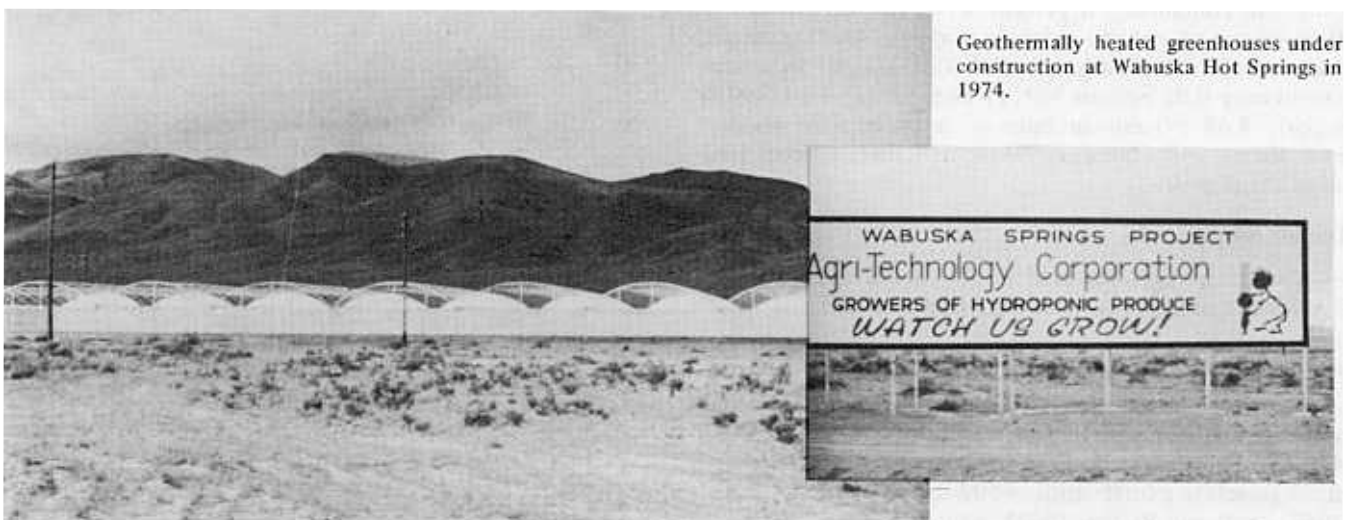
### Eldorado Canyon travertine deposit [ 180 ]

A travertine terrace has been built up from hot springs, now inactive. The deposit is in the NW/4 SE/4 S36,T16N,R21E about 2.5 miles southeast of Dayton. During active mining on the Comstock Lode, the travertine was burned for lime in several stone kilns (Archbold, N. L., in Moore, 1969, p. 39).

## MINERAL COUNTY

### Wedell Springs [ 191 ]

The highest spring temperatures in Mineral County are found at Wedell Springs in the SW/4 S7,T12N,R34E. They



## MINERAL COUNTY (continued)

consist of two main springs which range in temperature from 129° to 144°F (Eakin, 1962c). Schrader (1947, p. 146) reports that excellent water for domestic and other purposes was hauled to the mining camp of Rawhide, about 14 miles west of these springs.

### Dead Horse Wells [190]

Water from Dead Horse Wells in S21,T12N,R32E is reported to be hot (Miller and others, 1953). This area is about 10 miles west of Wedell Springs and about 4.5 miles southwest of Rawhide. Dead Horse Wells lies on the west margin of a closed basin while Wedell Springs lies on the east margin of this basin.

### Sodaville (Soda) Spring [193]

A pair of spring clusters in the NE/4 NE/4 SW/4 and the SW/4 SW/4 SE/4 S29,T6N,R35E near Sodaville (3.5 miles south of Mina) have temperatures up to 101°F. The total flow is 75 gallons per minute, and is unused at present (Van Denburgh and Glancy, 1970; Stearns and others, 1937). White (1955a) reports that the springs emerge from marshy ground and travertine, and have a maximum temperature of 100°F. Mariner and others (1974) have estimated the reservoir temperature at 208°F from a silica geothermometer.

In the 1880's the readily available water supply at Sodaville prompted construction of an ore smelter. A hotel and bathhouses, owned by Martin Brazzanovich, also occupied the site during this period (Myrick, 1962, p. 175).

A hot-springs-type tungsten-manganese deposit (the Black Jack Mine) occurs in pre-Tertiary chert in the NW/4 SE/4 SW/4 S29,T6N,R35E. This locality is about a third of a mile northeast of Sodaville. The deposits consist of veins of bluish-colored chalcedonic quartz, calcite, gypsum (often selenite), iron oxides, and tungsten-bearing psilomelane. The main vein trends approximately N50E, dips 75° southeast, and is up to 3 feet wide (White, 1955a; L. Garside, unpublished data). At one time, travertine probably capped the veins but has since been removed by slight erosion. The veins are believed to be the "roots" of former Pliocene hot springs (R. Roberts, *in* White, 1955a; Kerr, 1946).

Where manganese is high, tungsten also appears to be high. A sample with 40.3 percent manganese and 7.2 percent iron contained 3.0 percent WO<sub>3</sub>. Ore that is high in iron, on the other hand, is low in tungsten. Another sample with 1.2 percent manganese and 35.4 percent iron contained only 0.05 percent WO<sub>3</sub> (White, 1955a). Kerr (1946) reports 4.88 percent tungsten in a psilomelane sample, and Warner and others (1959) report 0.0075 percent BeO from the deposit.

### Double Spring [189]

A warm spring is reported from S23,T13N,R29E about 7 miles east of Schurz (Stearns and others, 1937).

### Hawthorne area [192]

Several water wells in the Hawthorne area have reported water temperatures of 75° to 124°F. The wells are from 400 to 600 feet deep, and the deepest well penetrated sandstone gravels to a total depth of 602 feet (Everett and Rush, 1967; Scott and Barker, 1962). Wells with the higher tem-

peratures seem to be located closer to the frontal fault along the east side of the Wassuk Range.

### Other water wells

Three other water wells in Mineral County reportedly have anomalous temperatures. Two of these wells are U. S. Bureau of Land Management wells, one in Whiskey Flat (S19,T5N,R31E) and one in Huntoon Valley (S7,T3N,R31E), with reported temperatures of 110° and 78°F, respectively (Everett and Rush, 1967; Van Denburgh and Glancy, 1970). A third well in S32,T2N,R33E has a reported temperature of 113°F (CWRR, 1973).

## NYE COUNTY

### Darrough's Hot Springs [204]

Darrough's Hot Springs are located in S7,8,T11N,R43E in Big Smoky Valley about 60 miles north of Tonopah. The hot springs discharge several hundred gallons per minute of water that is near the boiling point for that elevation. An 812-foot-deep well drilled in 1962 (and redrilled in 1963) by Magma Power Co. and associates encountered temperatures up to 265°F with a very large flow of water and minor steam (Koenig, 1971). Ranch wells have also hit boiling water at shallow depths. Anomalous radioactivity (75 μR/hr) is reported from near the edge of a fenced pool (Wollenberg, 1974b). Travertine and a trace of siliceous sinter are reported (Mariner and others, 1974).

The springs issue from valley fill on an alluvial fan. The mountain front, about 1.5 miles to the west, is a fault scarp of a major Basin-and-Range fault along the east side of the Toiyabe Range. The amount of displacement on this fault is unknown. Fiero (1968) has suggested that the hot springs are along a fault parallel to this major fault. Best estimates for thermal aquifer temperatures at Darrough's Hot Springs

