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 The main vein trends approximately N50E, dips 75° southeast, and is up to 3 feet wide (White, 1955a; L. Garside, unpublished data).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_3. 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_3 (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 temperatures seem to be located closer to the frontal fault along the east side of the Wassuk Range.

Other water wells

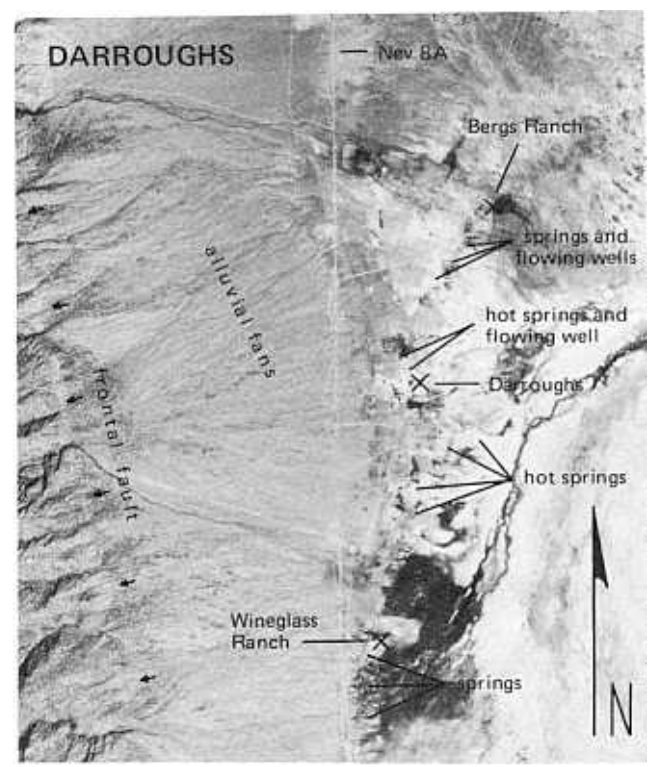
Three other water wells in Mineral County reportedly have anomalous temperatures. Two of these wells are U. S. Bureau of Land Management wells, one in Whiskey Flat (S19,T5N,R31E) and one in Huntoon Valley (S7,T3N, R31E), with reported temperatures of 110° and 78°F, respectively (Everett and Rush, 1967; 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



from several chemical geothermometers are in the 200° to 275°F range. The upper limit of the range was nearly attained in the Magma well. Geophysical data for Darrough's Hot Springs are reported in Kaufmann (1976), Long and others (1976), O'Donnell (1976) and Peterson and Dansereau (1976a).

Other hot springs in Big Smoky Valley [198, 199]

Hot springs at McLeod's Ranch 15 miles north of Darrough's (NE/4 SW/4 S34,T14N,R43E) issue from a large mound in the alluvium and have a relationship to the major Basin and Range fault similar to Darrough's. Big Blue and Charnock Springs are in S16,29,T13N,R44E on the east side of Big Smoky Valley and have temperatures of approximately 80°F. Big Blue Spring is associated with a fault scarp cutting alluvium (Fiero, 1968). Springs reportedly issue from a large mound, and a travertine deposit is reported from an area in the vicinity of S28,T13N,R44E. Thermal waters are also reported from Turk's Ranch (T13N, R43E)? and R. O. Inc. Ranch (T12N,R43E)?.

Springs along Hot Creek Canyon [211]

There are a number of springs along Hot Creek Canyon (T8N,R49–50E), four of which are thermal (fig. 33). The thermal springs have a total discharge of about 850 gpm and temperatures ranging from 72° to 180°F. There are at least nine cold springs interspersed with the thermal springs.

Upper Warm Spring. The westernmost, upstream thermal spring is Upper Warm Spring (SE/4 SW/4 SW/4 S21,T8N, R50E), located just north of the road up the canyon. The spring is used by stock; otherwise it is undeveloped. A flow rate of 32 gpm at 94°F was recorded on March 18, 1967 (Fiero, 1968). It is in an area of Tertiary volcanic rocks underlain by Paleozoic carbonates. There is no evidence of structural control at the surface; however, it is thought to be along a permeable fault zone that allows water to rise from deep circulation within a regional, intrabasin groundwater flow system (Fiero, 1968). Upper Spring, upstream, a quarter of a mile to the southwest, is a cold spring.

Pat Spring. Pat Spring (SE/4 NW/4 SE/4 S21,T8N, R50E) half a mile northeast of Upper Warm Spring had an estimated flow of 50 gpm and a temperature of 72°F on March 19, 1967 (Fiero, 1968). There are two cold springs half a mile downstream from Pat Spring at the Old Page Place; the westernmost, Cress Spring, flows about 10 gpm at 47°F (April 19, 1967; Fiero, 1968); Cold Spring, the easternmost, flows at about the same rate and has a temperature of 43°F (April 19, 1967; Fiero, 1968).

Old Dugan Place Spring. The Old Dugan Place (Warm) Spring (NE/4 NW/4 S25,T8N,R50E) is near the center of the canyon, a quarter of a mile west of the Old Dugan Place (an abandoned ranch) on the north side of the canyon floor. Water issues from several orifices in thin alluvium overlying Paleozoic limestone. It is fenced and ditched to increase the flow into Hot Creek. In September, 1967, a gaging station consisting of a 90° V-notch weir and water-stage recorder was built by the U. S. Geological Survey; preliminary records indicate a steady flow of about 495 gpm. On October 15, 1967, a temperature of 97°F was recorded (Fiero, 1968). A flow rate of 359 gpm at 89°F had previously been measured in 1966(?) (Rush and Everett, 1966). Like other hot springs in this area it is believed to tap water from a deep, regional ground-water flow system. A cold spring between this spring and the Old Dugan Place has a flow of 1½ gpm and a temperature of 66°F on August 14, 1967 (Fiero, 1968).

Upper Hot Creek Ranch. The hot spring at the Upper Hot Creek Ranch (NE/4 SE/4 S33,T8N,R50E) is at the east end of the canyon 600 feet southwest of the ranch house. Discharge occurs from several orifices in thin alluvium overlying Cambrian Tybo Shale. The spring is fenced and ditched to take the discharge to Hot Creek; like the other springs, it contributes to irrigation and stock needs. Preliminary U. S. Geological Survey gaging records in 1967 indicate a flow of 280 gpm at 168°F (Fiero, 1968). A flow of 763 gpm at 160°F was recorded in 1966 Rush and Everett, 1966). A spring about 1 mile to the east, on the "Mine" fault, has an estimated flow of 125 gpm at 70°F (Fiero, 1968).

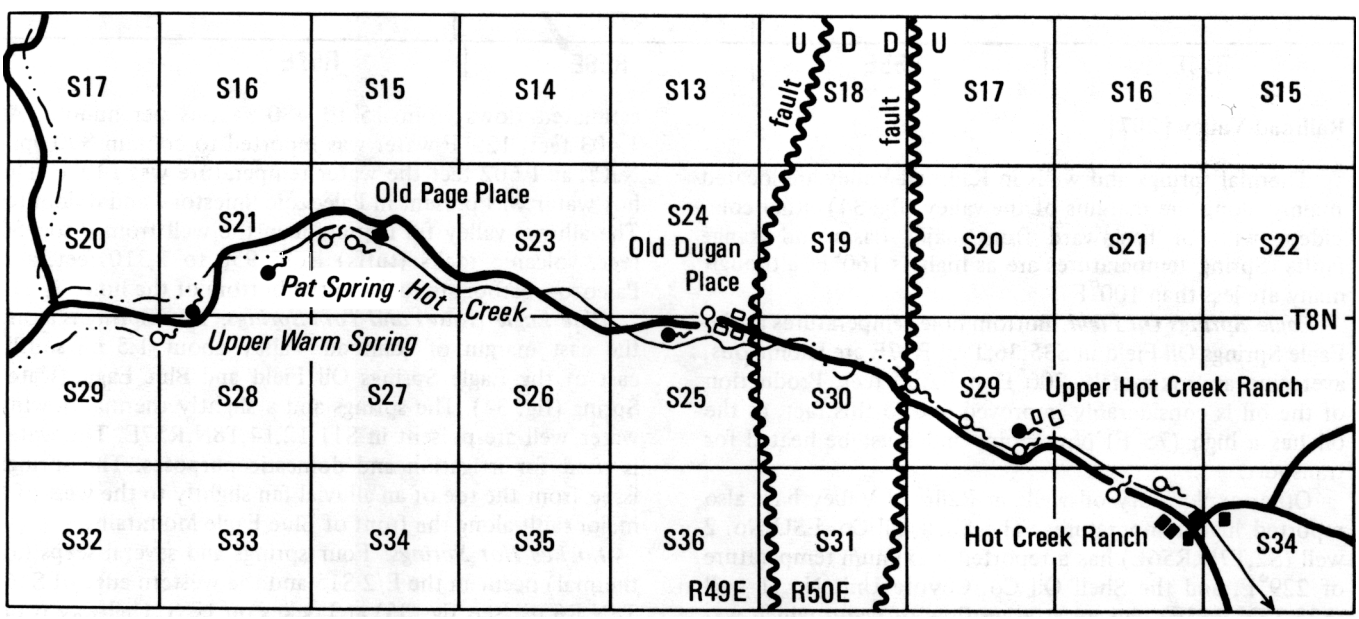
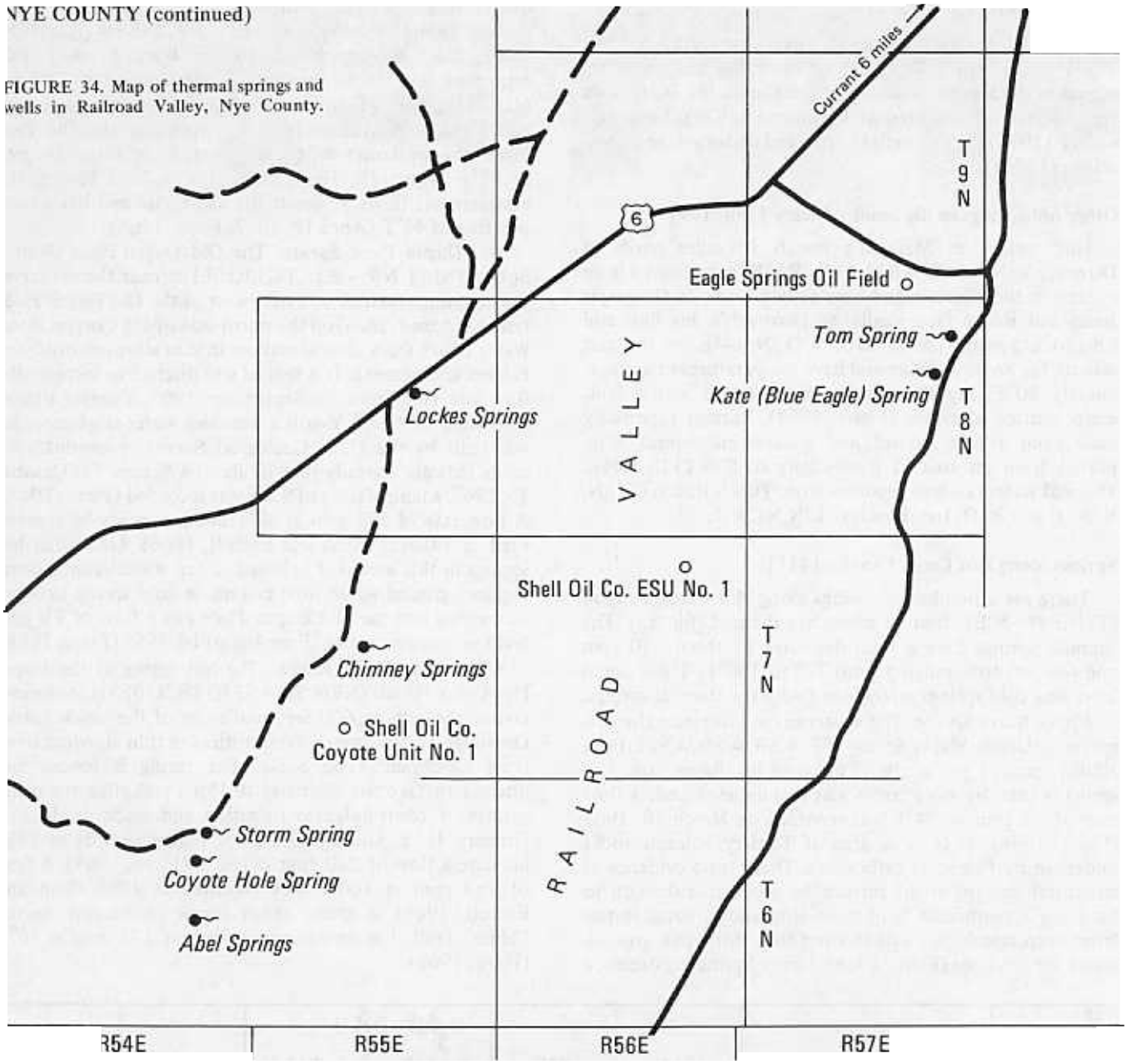


FIGURE 33. Sketch map of springs along Hot Creek, Nye County (thermal springs shown as solid dots).

FIGURE 34. Map of thermal springs and wells in Railroad Valley, Nye County.



Railroad Valley [207]

Thermal springs and wells in Railroad Valley are located mainly along the margins of the valley (fig. 34) either coincident with or basinward from major Basin and Range faults. Spring temperatures are as high as 160°F, although many are less than 100°F.

Eagle Springs Oil Field. Bottom hole temperatures at the Eagle Springs Oil Field in S35,36,T9N,R57E are anomalous, averaging approximately 200°F at 6,000 feet. Production of the oil is considerably improved due to this fact, as the oil has a high (75°F) pour point and must be heated for transport.

Other exploratory oil wells in Railroad Valley have also reported high temperatures. The Shell Oil Co. ESU No. 2 well (S2,T7N,R56E) has a reported maximum temperature of 229°F, and the Shell Oil Co. Coyote Unit No. 1 well (S28,T7N,R55E) had an artesian flow of water which was hot below 1,400 feet. The well was 1,711 feet deep, with estimated flows from 15 to 480 gallons per minute. At 1,403 feet, 129°F water was reported to contain 890 ppm NaCl; at 1,602 feet the water temperature was 140°F. The hot water was present in Paleozoic limestone and dolomite. The alluvial valley fill is present in the well from 0 to 950 feet, volcanic rocks (tuffs) from 950 to 1,310 feet, and Paleozoic carbonate rocks to the bottom of the hole.

Blue Eagle (Kate) and Tom Springs. Tom Spring is along the east margin of Railroad Valley about 1.5 mi southeast of the Eagle Springs Oil Field and Blue Eagle (Kate) Spring (fig. 34). The springs and a slightly thermal flowing water well are present in S1,1,12,14,T8N,R57E. The water is used for irrigation and domestic purposes. The springs issue from the toe of an alluvial fan slightly to the west of a major fault along the front of Blue Eagle Mountain.

Lockes Hot Springs. Four springs and several seeps (all thermal) occur in the E/2 S15 and the western edge of S16, T8N,R55E (see fig. 35) at Lockes on U. S. Highway 6 on the west side of Railroad Valley. The springs and seeps issue

from a low hill of calcareous tufa over half a mile in diameter. Reported water temperatures range from 93° to 101°F and the combined discharge rate is about 1,500 gpm. Analyses run on water from three of the springs by the Center for Water Resources Research (University of Nevada, DRI) were quite similar (Appendix 1). The water is used for irrigation, stock watering, and as a domestic supply for the Titus Ranch. The remaining water flows to ponds about 2½ miles to the southeast which support abundant waterfowls. The springs are in alluvium (valley fill); the nearest bedrock is Tertiary tuff and Paleozoic limestone in the Pancake Range, two miles to the west. The springs "probably rise due to artesian head along a high permeability zone associated with range front faulting" (Fiero, 1968).

Big Spring (NE/4 SW/4 NE/4 S15,T8N,R55E) is atop the tufa hill a quarter of a mile north of the ranch house (fig. 35). It is used for irrigation and domestic needs. The earliest discharge records, February 7, 1934, showed a flow of 900 gpm at a temperature of 99°F (Eakin and others, 1951). On June 30, 1957, T. C. Frantz of the Nevada Fish and Game Commission measured a discharge of 540 gpm at 101°F, using the float method. On November 12, 1966, a flow of 520 gpm at 99° to 101°F was measured (Mifflin, 1968). Monthly pygmy-meter measurements by the U. S. Geological Survey showed an increase from 471 gpm on August 7, 1967, to 582 gpm on November 22, 1967. Although the period recorded is short, this may indicate response of the spring to seasonal recharge (Fiero, 1968).

Reynolds Springs (SW/4 SE/4 NE/4 S15,T8N,R55E) consists of two small pools about 40 feet apart at the base of the tufa hill about a quarter mile northeast of the ranch house. The water is used for pasture irrigation before flowing into the ponds to the southeast. The combined flow of the springs was 300 gpm on February 7, 1934 (Eakin and others, 1951); 300 gpm on June 30, 1957 (Nevada Fish and Game Commission, unpublished report); 323 gpm on November 12, 1966 (Mifflin, 1968); and 275 gpm and 287 gpm on September 27 and November 22, 1967, respectively (U. S. Geological Survey measurements reported in Fiero, 1968). The easternmost pool had a temperature of 99°F on November 12, 1966 (Mifflin, 1968).

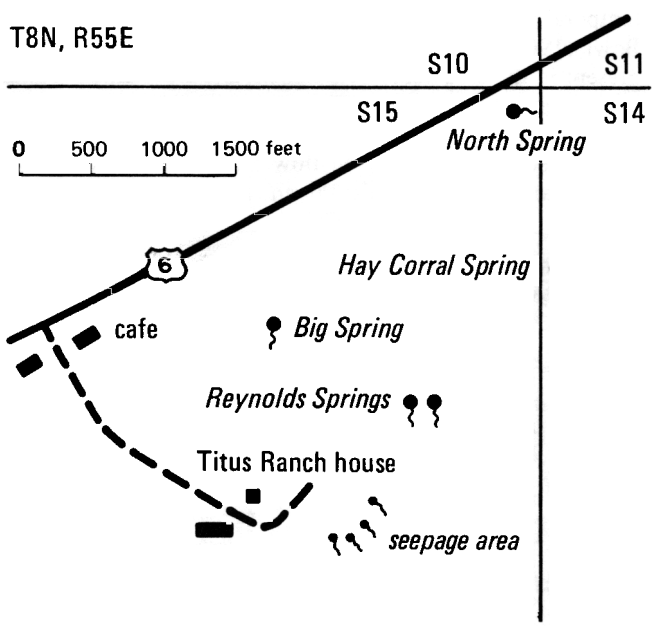
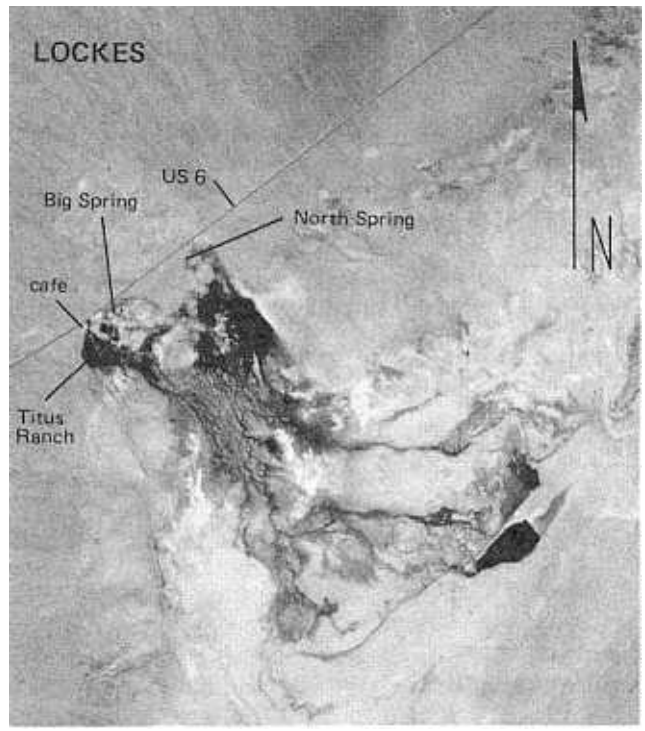


FIGURE 35. Sketch map of Lockes Springs, Nye County (adapted from Nevada Fish and Game unpublished field survey report).



Hay Corral (Stockyard) Spring (SW/4 NW/4 NW/4 S14, T8N,R55E) is about a mile northeast of the ranch house at the base of the tufa hill. The flow is presently held by an earth dam forming a pool 100 feet in diameter. The water is used for stock watering and irrigation. A flow of about 600 gpm at 93°F was recorded on February 7, 1934 (Eakin and others, 1951); the Nevada Fish and Game Commission recorded a temperature of 95°F on June 30, 1957; the Center for Water Resources Research (University of Nevada) estimated the flow rate as 425 gpm on Novenber 12, 1966.

North (Lockes Hot) Spring (NE/4 NE/4 NE/4 S15,T8N, R55E) flows into a ditch just south of the U. S. Highway 6 fence-line about three-quarters of a mile northwest of the ranch house. Its water is used for pasture irrigation. A flow of about 200 gpm at 95°F was recorded on February 7, 1934 (Eakin and others, 1951); the Nevada Fish and Game Commission recorded a discharge of between 170 and 320 gpm at 94°F on June 30, 1957; U. S. Geological measurements indicated flows of 158 and 165 gpm on August 4 and November 22, 1967, respectively.

There are a number of thermal seeps a short distance east of the ranch house; their flow rates and temperatures are not known. Possibly this is "South Spring," although the name has also been applied to Reynolds Springs.

Chimney Hot Springs. Chimney Hot Springs in S16,T7N, R55E have reported temperatures up to 160°F, the highest spring temperatures in Railroad Valley. The water is used for cattle. Three springs issue from an extensive travertine mound, which is nearly half a mile in diameter and approximately 30 feet high (Fiero, 1968). The springs and mound are located at the base of a bajada about 2 miles from the nearest bedrock outcrop. They rise due to artesian pressure

probably along a high permeability zone associated with a range-front fault (Fiero, 1968). The location of Chimney Hot Springs is midway between Lockes Hot Springs to the north and Storm, Coyote, and Abel Springs to the south. All these springs are associated with faulting, and may, in fact lie along the same major fault.

Storm, Coyote, and Abel Springs. A group of warm springs are located in S11,12,13,23,24,T6N,R54E along a fault which cuts the alluvium. The springs range from 84° to 113°F and each is reported to be associated with travertine mounds about 300 feet in diameter and 10 to 15 feet high (Fiero, 1968). All springs are fenced, and Abel Springs is additionally improved by a short buried pipeline to a cattle trough (Fiero, 1968).

Gabbs area [201]

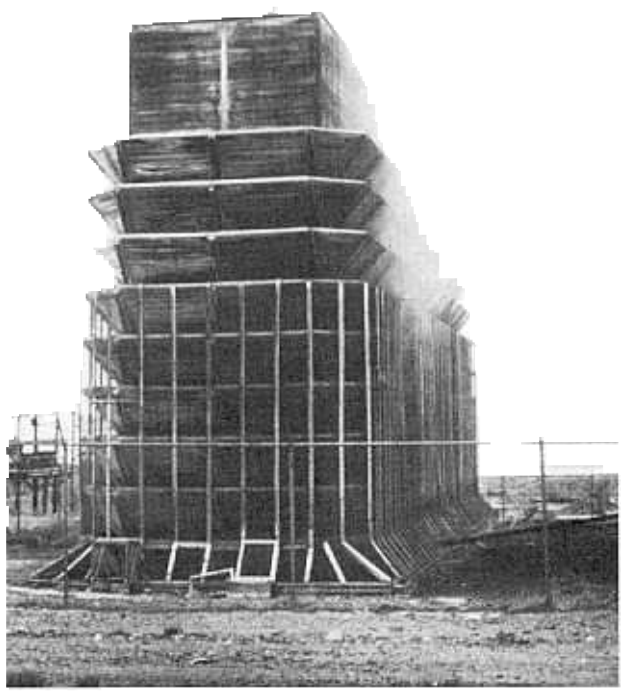
Many water wells drilled for a water supply for the magnesite-brucite mine and mill of Basic, Inc., near the townsite of Gabbs, have abnormally high water temperatures, ranging from 70° to 155°F (Eakin, 1962b). Some must be cooled in cooling towers before use. As the water is reportedly high in fluoride, bottled water is supplied by the local water company for drinking (Nevada State Journal, July 20, 1977). The thermal wells are located in S28,T13N, R36E, and S22,27,28,33,T12N,R36E, in a north-south-trending zone at least 5 miles long. This zone coincides in part with a north-south-trending fault along the west edge of the Paradise Range.

Diana's Punch Bowl–Potts Ranch [200]

Diana's (Dianna's, Devils) Punch Bowl (S22,T14N, R47E) is a cup-shaped depression approximately 50 feet in diameter at the top of a domelike hill of travertine approximately 600 feet in diameter. Warm water in the pool of the bowl is about 30 feet below the rim, while the top of the hill is about 75 feet above the level of Monitor Valley. A small warm spring, approximately 109° to 120°F in temperature, issues from the southwest corner of the travertine dome (Fiero, 1968). Temperatures up to 138°F have been reported, and the estimated minimum reservoir temperature by several chemical geothermometers is 190° to 208°F (Mariner and others, 1974; Hose and Taylor, 1974). Very slightly anomalous radioactivity (16 μR/hr) is reported by Wollenberg (1974b). The thermal area lies on a north-trending, concealed fault in the central part of Monitor Valley (Stewart and Carlson, 1974; Fiero, 1968). Spurr (1905, p. 257) describes a report by J. L. Butler, the discoverer of Tonopah, that the water level had lowered and water became cooler in the years prior to 1905. Also, he reported that more gas was formerly emitted and occasional flames were seen.

Aerial view of Diana's Punch Bowl, Nye County. Depression is approximately 50 feet across (photo by Phillip Hyde).

Hot Springs at Potts Ranch are approximately 4 miles north of Diana's Punch Bowl, in S1,2,T14N,R47E, also in the central part of Monitor Valley. Maximum temperatures here are 113°F, and the estimated minimum reservoir temperatures are nearly identical to those at Diana's Punch Bowl (190° to 208°F). A number of springs and seeps are present in the area near Potts Ranch, and travertine mounds are present in a few areas. The springs lie along a northeast-trending fault which crosses Monitor Valley here (Stewart and Carlson, 1974). The outflow from the hot springs at Potts Ranch and Diana's Punch Bowl contains a small



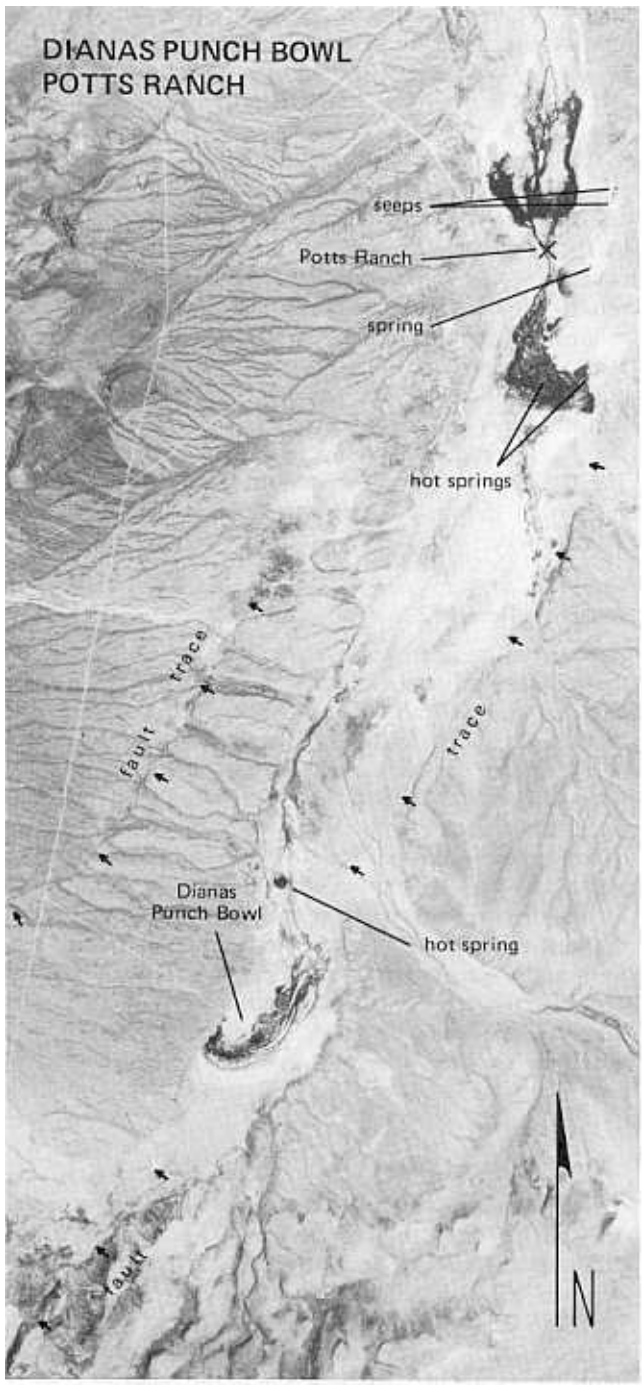
Cooling tower for well water at Gabbs, Nye County.

Warm-water pool in Diana's Punch Bowl, Nye County.

minnow, the speckled dace (Hubbs and others, 1974). The stream courses from some springs have been ditched to improve their flow (fig. 36).

Warm (Nanny Goat) Springs [220]

Warm Springs is a small restaurant and gasoline station at the junction of U. S. Highway 6 and Nevada State Route 25, about 42 miles east of Tonopah. The springs are located about 100 yards west of the restaurant (S20,T14N,R50E) and emerge through alluvium approximately 30 yards east of the bedrock outcrop. They are located along the trace of a major range-front fault along the west side of Hot



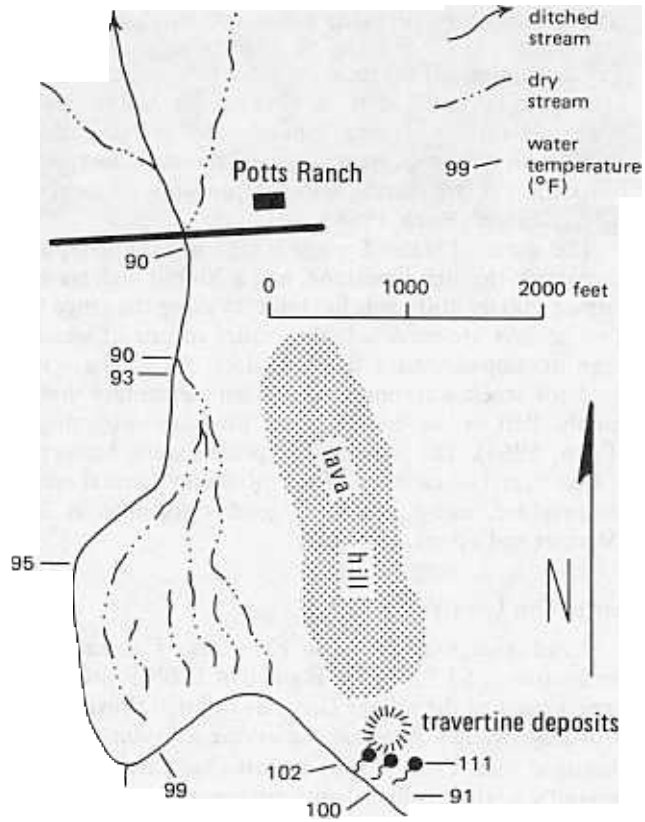
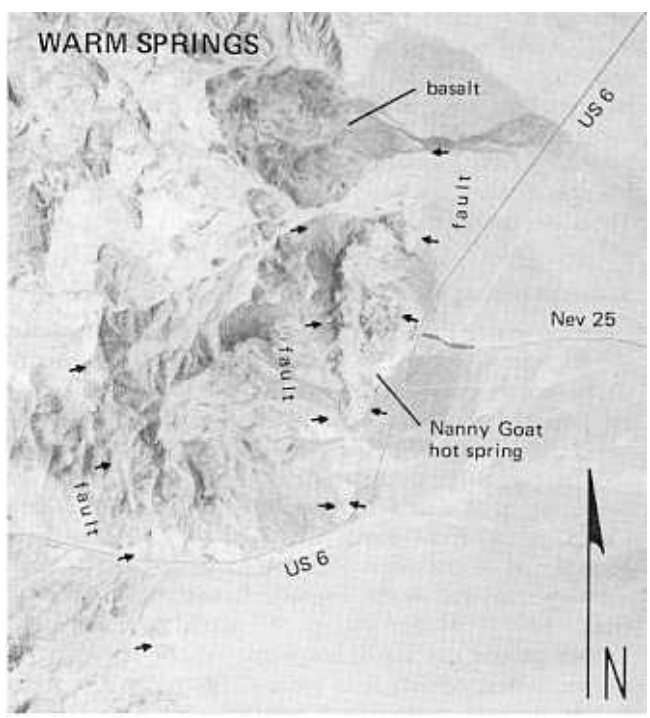


FIGURE 36. Map of warm springs near Potts Ranch, Nye County (after Hubbs and others, 1974).

Creek Valley. Fiero (1968) reports that this fault has as much as 2,000 feet of geologically recent movement, and the location of earthquake epicenters along the fault indicates that it is still active.

The thermal water is believed to rise along a fault zone, predominantly in limestone. Brecciation along the fault, as



well as solution of the limestone, contributes to a relatively high permeability. Most of the spring water probably originates from a regional ground-water system, after circulation to depths as great as several thousand feet. A small proportion of the spring water is probably of local, non-thermal origin (Fiero, 1968).

The water of Warm Springs is high in carbonate, due to its passage through limestone, and a 20-foot-high travertine terrace 200 by 400 yards has built up along the range front. Two springs are reported, the orifice of one of which has been developed with a five-foot deep ditch. The water is used for stock watering and as a supplementary domestic supply. Part of the flow has been used in a swimming pool (Fiero, 1968). The maximum reported water temperature is 140°F, and an estimate of the minimum thermal reservoir temperature, using the silica geothermometer, is 230°F (Mariner and others, 1974).

Little Fish Lake Valley [206]

Warm springs (104° to 108°F) in Little Fish Lake Valley are located in S7,T11N,R49E and S14,T10N,R49E near the lowest parts of the valley. They rise through alluvium which probably overlies Paleozoic limestone at a depth of a few thousand feet. Fiero (1968) reports that a large number of generally north-trending faults are present in the surrounding mountains as well as within the valley alluvium, and it seems likely that these warm springs rise along a high permeability zone created by faulting. They are undeveloped, but are used by stock.

Duckwater [202]

Two main warm spring areas are located near the small community of Duckwater, which is on the Duckwater Indian Reservation in northeastern Nye County. Big Warm Spring or Duckwater Spring is located in S32,T13N,R56E and has a reported temperature of approximately 90° to 91°F (Van Denburgh and Rush, 1974; Mifflin, 1968; Eakin and others, 1951). Little Warm Spring, in S5,T12N,R54E, is approximately the same temperature. Both springs rise in alluvium a short distance west of a north-trending, range-boundary fault (Stewart and Carlson, 1974). The area may have been called the Burrell Hot Springs District in the past. The water is used locally.

Tonopah mining district [221]

In several mines at Tonopah anomalous underground temperatures have been reported. In the Ohio Tonopah shaft, temperatures up to 78°F were found at 766 feet and temperature gradients reportedly vary from 26 to 54 feet per degree Fahrenheit in dry rocks at depths less than 800 feet (Spurr, 1905, p. 263–265; Darton, 1920). Water temperatures up to 106°F were reported by Bastin and Laney (1918, p. 29) from depths of 1,500 to 2,316 feet in the central part of the mining district. Large flows of hot water were encountered in the Tonopah Extension Mines (Broderick, 1949, p. 9), and during this period approximately 3 million gallons per day of hot water were pumped from the deeper mines. At that time some of the water was utilized in a greenhouse to grow fresh vegetables.

Sarcobatus Flat–Beatty [227]

Warm springs and water wells in the vicinity of Beatty are predominantly near U. S. Highway 95 to the north of the town. Two springs are also reported in Oasis Valley 7 miles north of Beatty, and warm-water wells are found in Sarcobatus Flat as far north as Scotty's Junction. The highest spring temperatures are at Hick's (or Amargosa) Hot Spring (S16,T11S,R47E), where the spring flows from alluvium near outcrops of silicified, opalized, and moderately argillized welded tuff (Malmberg and Eakin, 1962). The hottest of five springs (109°F) supplies bathing pools and related facilities. Burrell Hot Spring (S21,T11S,R47E), located 5 miles north of Beatty on U. S. Highway 95, is approximately 1 mile southwest of Hick's Hot Spring which is in S29?,T11S,R48E, between the Thompson and Silicon Mines. An area of intense silicification, opalization, and moderate argillization has been reported, and is believed to be due to the action of thermal waters which are still present at Hick's Hot Spring (Cornwall and Kleinhampl, 1961).

The municipal water supply for Beatty is obtained from Beatty Springs, a group of six springs that issue from alluvium about 1 mile north of town. The springs are about 80 feet higher in elevation than the town and discharge into concrete collection basins which connect to 8-inch city water mains. Reportedly, the springs discharge 100 to 200 gallons per minute of 75°F water (Malmberg and Eakin, 1962).

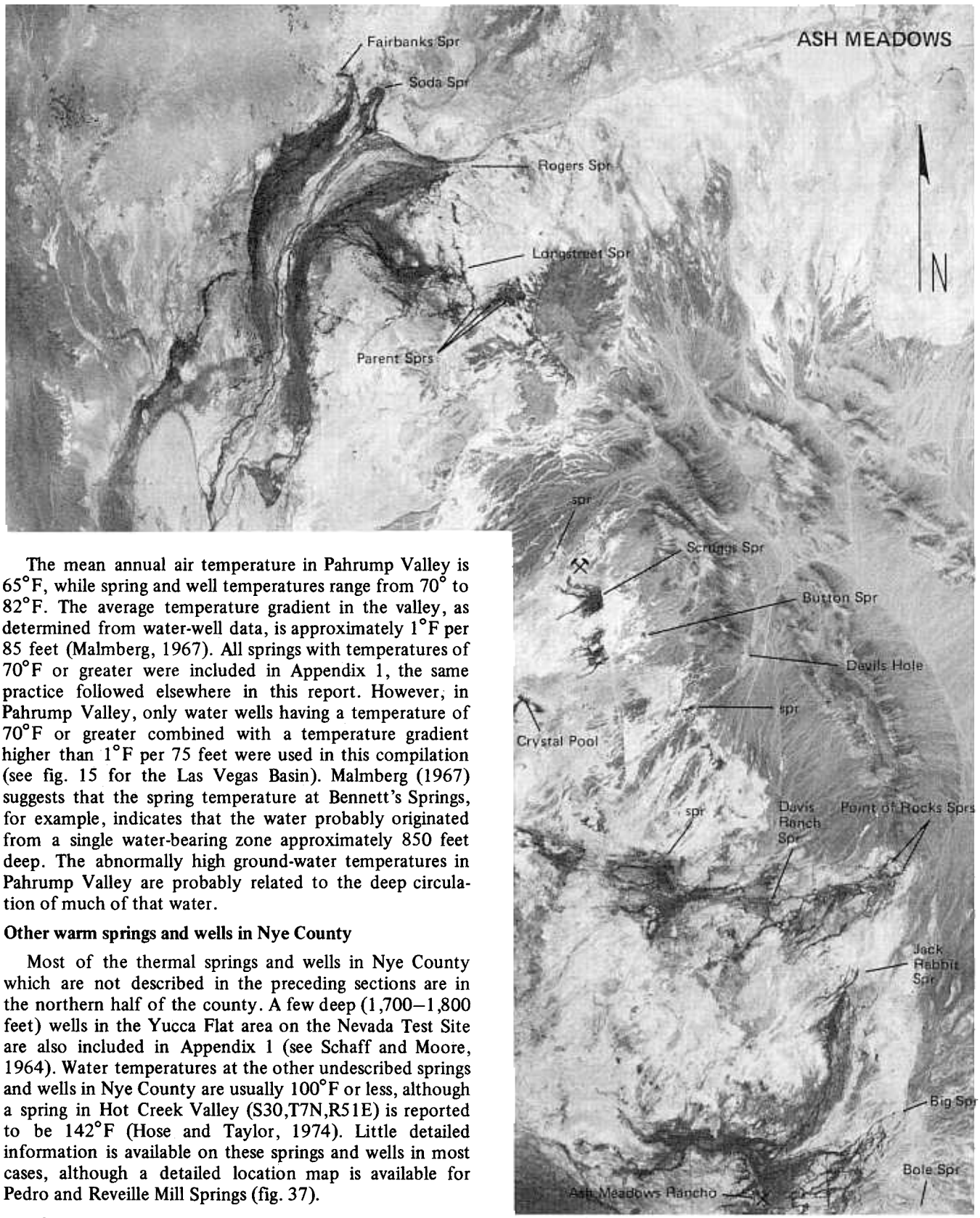
The ground water in Sarcobatus Flat has a relatively uniform temperature of 72°F, which is 16°F higher than the average annual air temperature (Malmberg and Eakin, 1962). This anomalous temperature may be due to the deep circulation that most of the ground water in this area has undergone.

Amargosa Desert [229]

Warm springs and warm water wells are distributed over the southern third of the Amargosa Desert (a few wells are included under this heading in Appendix 1 that are located to the east of the Amargosa Desert). The temperatures reported are mostly less than 90°F, and many wells have temperatures no more than 10 to 15 degrees above the mean annual air temperature. The thermal springs are concentrated in the vicinity of Ash Meadows and the Death Valley National Monument and are almost certainly related to one or more north- and northwest-trending faults along the east side of Ash Meadows. Spring temperatures range from approximately 75° to 93°F, and extensive travertine deposits are present at some springs (Naff, 1973). The source of the spring waters is apparently carbonate aquifers which are exposed in an area to the northeast (Dudley and Larson, 1976).

Pahrump Valley [230]

Several warm springs and a number of warm-water wells are located in Pahrump Valley. The springs include Pahrump (Bennett's) Springs in S14,T20S,R53E; Manse Ranch Springs in S3,T21S,R54E; and Brown's Spring in S15,T22S,R54E, Clark County. Many of the warmer water wells are in the immediate vicinity of these springs, although a few are located elsewhere in the valley.



The mean annual air temperature in Pahrump Valley is 65°F, while spring and well temperatures range from 70° to 82°F. The average temperature gradient in the valley, as determined from water-well data, is approximately 1°F per 85 feet (Malmberg, 1967). All springs with temperatures of 70°F or greater were included in Appendix 1, the same practice followed elsewhere in this report. However, in Pahrump Valley, only water wells having a temperature of 70°F or greater combined with a temperature gradient higher than 1°F per 75 feet were used in this compilation (see fig. 15 for the Las Vegas Basin). Malmberg (1967) suggests that the spring temperature at Bennett's Springs, for example, indicates that the water probably originated from a single water-bearing zone approximately 850 feet deep. The abnormally high ground-water temperatures in Pahrump Valley are probably related to the deep circulation of much of that water.

Other warm springs and wells in Nye County

Most of the thermal springs and wells in Nye County which are not described in the preceding sections are in the northern half of the county. A few deep (1,700–1,800 feet) wells in the Yucca Flat area on the Nevada Test Site are also included in Appendix 1 (see Schaff and Moore, 1964). Water temperatures at the other undescribed springs and wells in Nye County are usually 100°F or less, although a spring in Hot Creek Valley (S30,T7N,R51E) is reported to be 142°F (Hose and Taylor, 1974). Little detailed information is available on these springs and wells in most cases, although a detailed location map is available for Pedro and Reveille Mill Springs (fig. 37).

PERSHING COUNTY

Leach (Pleasant Valley, Nelson's, Guthrie) Hot Springs [235]

Leach Hot Springs are located near the south end of Grass Valley in S36,T32N,R38E, slightly more than 1 mile west of the major frontal fault on the west side of the Sonoma Range. The springs have several other names, including Pleasant Valley, Nelson's, and Guthrie Hot Springs. The spring temperatures reported at Leach are up to boiling, which would be 204°F at that elevation. Tempera-