The springs near Ruby Marsh have a long history, and were first described by Bidwell (1842) as being "boiling hot"; Bidwell's party reportedly used them to cook meat. Audiomagnetotelluric data for the Ruby Valley Known Geothermal Resource Area are reported in Long and Batzle (1976b) and Batzle and others (1976b).

Information on some of Elko County's hot springs is extremely limited, and several are known only from their "warm" designation on topographic maps. Some springs are sources for streams or lakes with "hot" or "warm" in their names, but no temperautre information is available on them. Recent data are available on a few springs in Mariner and others (1974) and Hose and Taylor (1974).

ESMERALDA COUNTY

Nevada Oil and Minerals V.R.S. No. 1 Well [85]

An oil-exploration well drilled in 1970 in Fish Lake Valley encountered hot water during drilling. A temperature log of the well shows a steady temperature increase from 214° at 1,500′ to 253°F at 9,100 feet. However, the bottom hole temperature reported from the electric log was 318°F (Nevada Oil and Gas Conservation Commission, unpublished data). The tops of the major lithologic units are listed below:

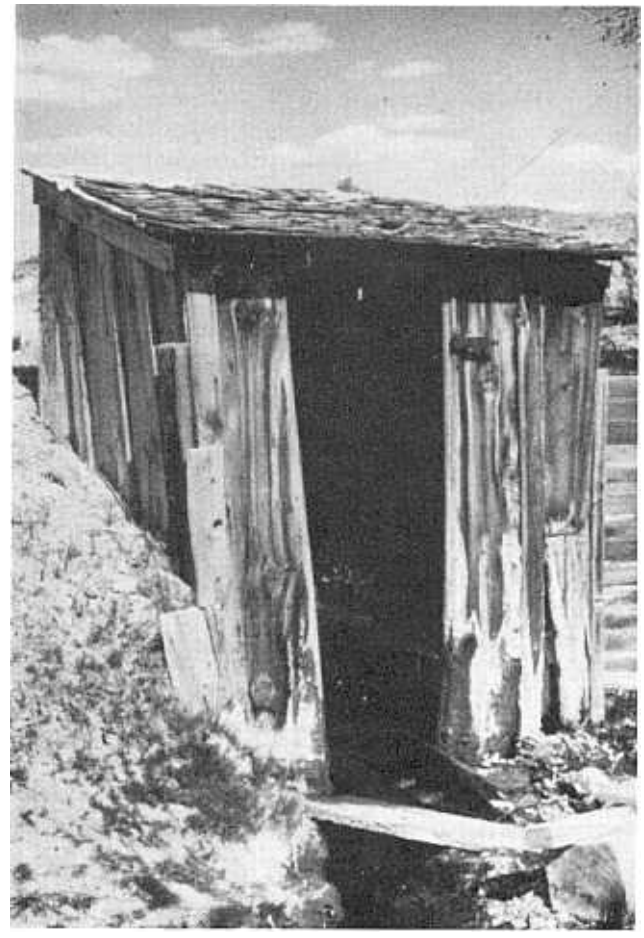
surface	valley fill
5,000′	volcanics
6,175′	limestone
6,350′	shale
6,575′	dolomite
6,610′	metasedimentary? rocks
8,120′	limestone
8,300′	metavolcanic? rocks
8,400′	mudstone
8,600′	metavolcanic rocks

Other springs and wells in Fish Lake Valley [85]

In addition to the Nevada Oil and Minerals well, several other springs and water wells in Fish Lake Valley have higher-than-normal temperatures. Gap Spring, an unnamed spring about 1.5 miles northeast of Gap Spring, Fish Spring, and Sand Spring have temperatures ranging from 73° to 81°F and small discharges. At Gap Spring, a small spot of several square feet at the spring outlet is slightly radioactive. The running water has the highest radioactivity, suggesting that the water may contain radon (Garside, 1973). Four water wells in the northern part of Fish Lake Valley have water temperatures of 74° to 77°F.

Alkali Springs [90]

The waters from Alkali Springs (SW/4 SE/4 NE/4 S26, T1S,R41E) originally rose at a number of small seeps, but in the early 1900's, Combination Mines Co. drove a 40-foot adit into the slope to concentrate the flow into a single channel. The water was pumped to the Combination mill at Goldfield (about 10 miles southeast). The temperature at the face in the adit was 140°F (Ball, 1907, p. 19, 20). A low dome of gray-brown travertine is present 100 yards north of the adit. The spring is reported to contain lithium although Alkali Flat, unlike Clayton Valley (see Silver Peak Hot Springs), does not (Albers and Stewart, 1972). The springs were operated as a spa by the Joe Guisti family during Goldfield's heyday, and a large building and an indoor wooden swimming pool were on the site (Rosevear, 1976).



Old bathhouse at Alkali Springs, Esmeralda County.

Silver Peak (Waterworks) Hot Springs [91]

Near Silver Peak, hot springs are found near the edge of the playa (Silver Peak Hot Springs), and there is another group of hot springs (Pearl Hot Springs) on the east side of Clayton Valley near the edge of Clayton Ridge. The local residents report that hot waters underlie the upper crust of the whole playa or marsh, especially at certain seasons of the year (Spurr, 1906). Silver Peak Hot Springs (C SE/4 S15,T2S,R39E) has a maximum reported temperature of 118°F, while Pearl Hot Springs to the northeast across Clayton Valley are only 89°F.

The Silver Peak Hot Springs are reportedly quite radioactive (Garside, 1973), but contain very small amounts of uranium. Possibly the radioactivity is due to radon gas. Eleven springs are reported, and the water was once used for the town water supply (Waring, 1965). The springs may be on a major north-northeast-trending fault along the west side of Clayton Valley (Albers and Stewart, 1972). Additional information on the hydrology and salines in Clayton

Valley can be found in Dole (1913) and Meinzer (1917).

One of the world's principal sources of lithium is Clayton Valley. The Foote Mineral Co. has been producing the lithium from brines pumped through about 15 wells from depths of 300 to 700 feet. Lithium values occur at different depths in different wells although the depth to water level remains constant at 30 feet in all wells. Temperatures are constant at 70°F (Albers and Stewart, 1972).

The brines contain about 400 ppm lithium and also contain sodium, potassium, and magnesium, and a little calcium and minor sulfates. The ratio of lithium to potassium is 1:25 and of lithium to magnesium 1:1.5 (Albers and Stewart, 1972). The lithium is concentrated by evaporation.

Geologists employed by Foote Mineral Co. believe that the most likely source of the lithium is hot springs under the valley (Albers and Stewart, 1972).

Pearl Hot Springs [89]

Pearl Hot Springs are located in S25,T1S,R40E and had a reported temperature of 98°F on January 19, 1967 (University of Nevada, DRI, Center for Water Resources Research data). These are probably the springs referred to by Spurr (1906) as issuing from the east side of the playa across Clayton Valley from the Silver Peak Hot Springs. A major north-northeast-trending fault may run through the site of the springs (see Albers and Stewart, 1972, plate 1).

Big Divide Mine [87]

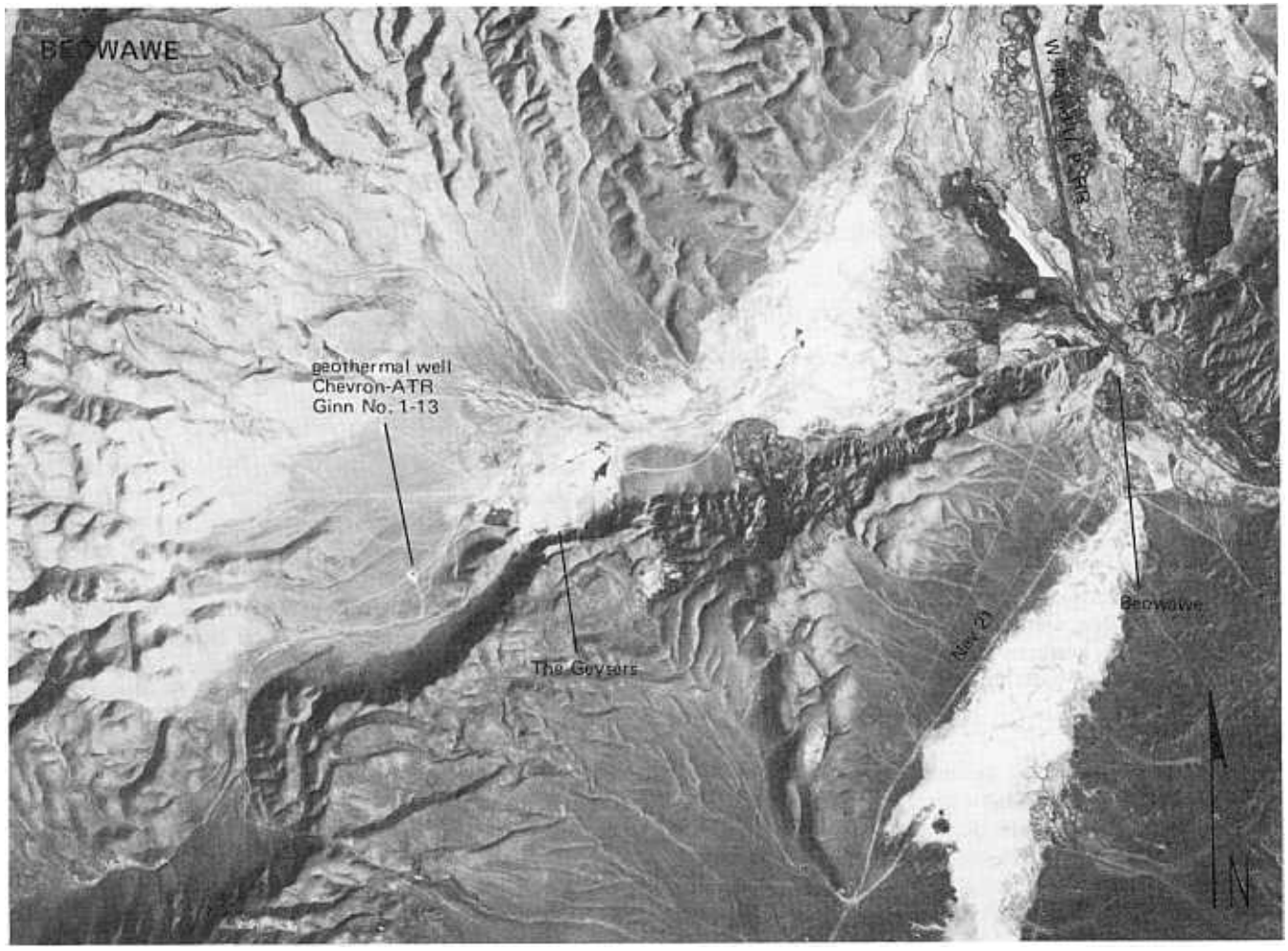
Hot water was reportedly hit below the 1,000 foot-level in the Big Divide Mine (NW/4 SW/4 S26,T2N,R42E) during the 1920's. Approximately 42,000 gallons per day were pumped during this time (Engineering and Mining Journal Press, 1923). Two miners were reportedly scalded in the shaft sump, and the shaft steamed at the surface in cold weather until the ventilation system was changed (Norman Coombs, personal communication, 1972).

Water wells in southern Big Smoky Valley [86]

Three wells in the southern part of Big Smoky Valley have anomalous water temperatures. These wells (Emigrant well, Fishlake Livestock Co. well, and an unnamed well) are 300 to 500 feet deep, and one, the Fishlake Livestock Co. well, hit hot water at 165 feet.

Unnamed spring, southern Esmeralda County [92]

A spring is reported from S6,T11S,R43E, just inside Death Valley National Monument. The temperature is 77°F (University of Nevada, DRI, Center for Water Resources Research).



ESMERALDA COUNTY (continued)

Travertine deposit [88]

A mound of calcareous spring travertine occurs in C NW/4 S5,T1N,R43E, near the south end of the Klondyke Hills. There are no known hot springs in the vicinity. The mound is about 600 feet in diameter, and occurs in an area of Tertiary welded tuffs and Paleozoic limestones.

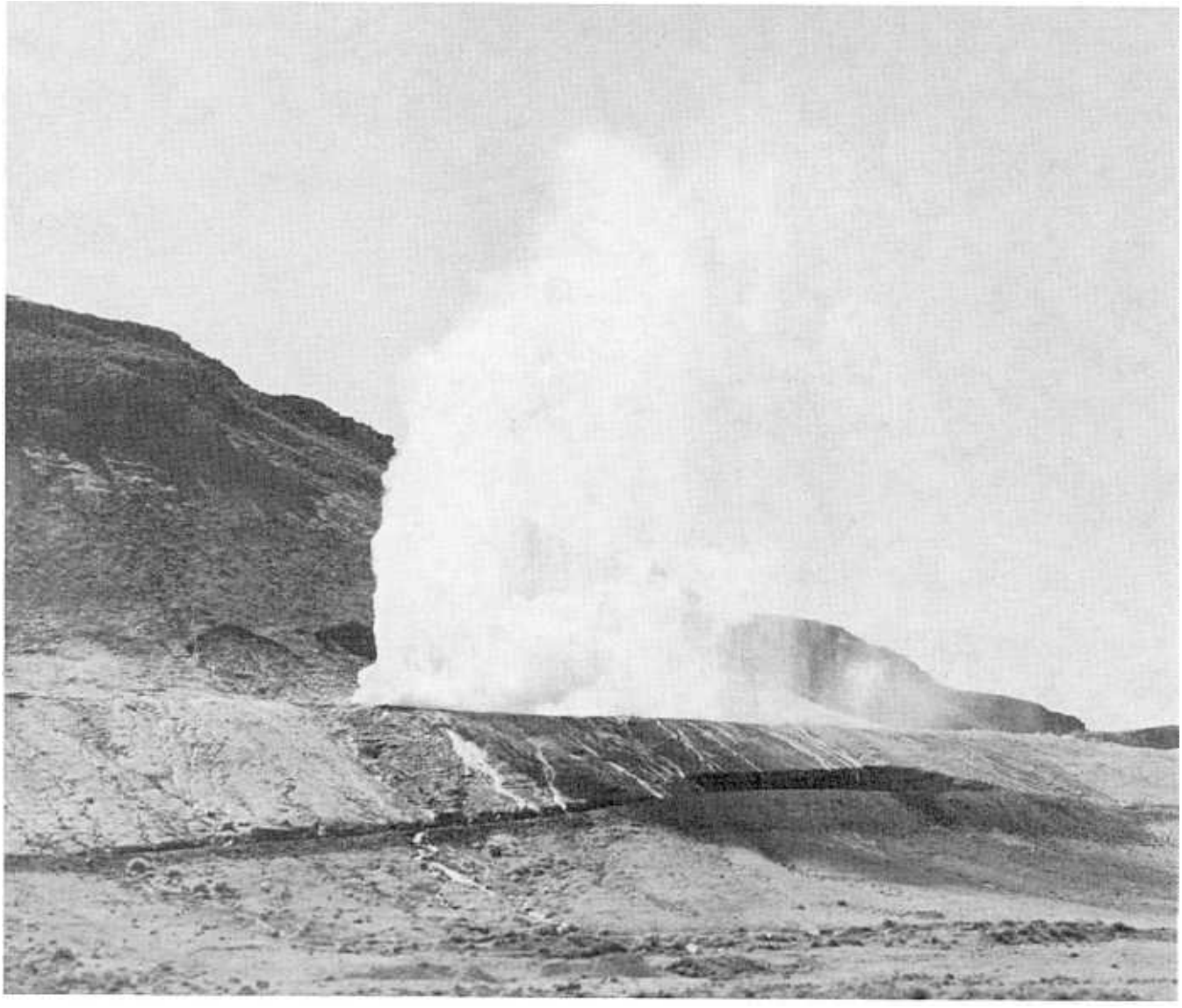
EUREKA COUNTY

Beowawe Geysers [94]

The geothermal area at Beowawe Geysers has the highest reported subsurface temperatures in Eureka County, and, with the Brady's Hot Spring area in Churchill County, has the highest steam-well temperatures in Nevada. It is one of the most drilled geothermal areas in the State, and has been actively investigated by several energy companies over the past 15 years.

The surface geothermal activity at the Beowawe Geysers area is mainly confined to S8,17,18,T31N,R48E. This area is mainly in Eureka County, although S18 is in Lander County. For simplicity, this description is included in Eureka County. The Geysers is in southwestern Whirlwind Valley, about 6 miles west of the small community of Beowawe.

The hot springs, geysers, and fumaroles have temperatures up to 202° to 204°F, and in 1932 several geysers were reported to erupt to heights of several feet (Nolan and Anderson, 1934). One geyser reportedly played to a height of 3 feet and another to 12 feet. Drilling of geothermal exploration wells on the main sinter terrace in the early 1960's resulted in the disruption of natural geyser activity there, but geysers on the valley floor to the west of the terrace were considerably more thermally active in 1968 than in 1932 (Rinehart, 1968). These geysers erupted to heights of 3 to 6 feet. Vandals blew the caps from four steam wells on the main terrace sometime prior to 1972, and one of these released steam and water in rather large volumes. One of the notable effects of this release of fluid and possibly the original drilling was the cessation of geyser activity (Hose and Taylor, 1974). The "best guess"



Steam wells on the sinter terrace at Beowawe Geysers in 1977 (photo by Dennis Trexler).