(8.4,4.9)
148°51'
65°16'

Fbnks Prec
Tolovana Dist

TERRITORY OF ALASKA

DEPARTMENT OF MINES

COLLEGE, ALASKA

[redacted]

PE-049-08

TOLOVANA HOT SPRINGS, ALASKA

KA49-116

(Tolovana Recording District)

1948

By
Bruce D. Thomas
Associate Mining Engineer.

[redacted]

B. D. [redacted]

INDEX

TERRITORY OF ALASKA
DEPARTMENT OF MINES
COLLEGE, ALASKA
1948

SUMMARY

The Tolovana Hot Springs should be particularly attractive to people who frequent mineral springs, because of their high temperature, slight saline taste and no noticeable odor. The thermal waters of these mineral springs has a temperature comparable to theManley (Baker) Hot Springs and the Circle Hot Springs. The water has a slight saline taste and no noticeable odor. The chemical analysis does not indicate the presence of any chemical compound particularly foreign to thermal waters.

INTRODUCTION

Hot springs are widely distributed in interior Alaska (Figure 1). At several accessible hot springs bathing establishments have been constructed and are much used by local residents as health resorts. With the gradual expansion of the road systems in interior Alaska and the demand for centers of tourist attraction the hot springs that are more difficult of access, but still on the general routes of travel have attracted local attention. This local attention has led to a demand for more accurate information about the qualities of the thermal waters than has been heretofore available.

The mineral waters from several unappropriated hot springs in the Yukon-Tanana region are potentially valuable natural resources. The mineral springs in this region have a medicinal value and where springs are located at sites favorable for outdoor sports they could be developed into favorable resorts.

The Territorial Department of Mines in conjunction with its function

to promote the development and expansion of the mineral resources of Alaska has examined the Tolovana Hot Springs. These springs have been visited by prospectors and miners alike for several years but no information has been made available to the general public relative to the analysis, temperature or quantity of the thermal waters. The expansion and development of centers of tourist attraction has led to the demand for more accurate information about the quality of these hot spring waters. The springs were examined and sampled in April 1948, by Arthur E. Glover and Bruce I. Thomas, both of the Territorial Department of Mines. The water analysis was made by the Civil Aeronautics Administration soil testing laboratory at Anchorage, Alaska. This work was done at the request of Mr. Lloyd A. Morley, District Sanitarian, Territorial Department of Health.

This report is not concerned with the medicinal qualities of the hot spring waters. The exact interpretation of the healthful effect of these thermal waters is left entirely to the various members of the medical profession.

LOCATION AND ACCESSIBILITY

The Tolovana Hot Springs are located approximately twenty air-line miles south twenty-seven degrees west of the town of Livengood, at approximate longitude 148° 51'30" west and latitude 65° 16' 20" north. The springs are situated at an elevation of about 1,200 feet above sea level on the south east slope of a prominent hill which is bounded by Brooks Creek on the north and west, the Tolovana River on the east and south, and Idaho Creek on the southwest. (Figure 2).

The springs may be reached from Livengood during the summer by following the old Livengood-Dunbar trail south to Log Jam; thence west across

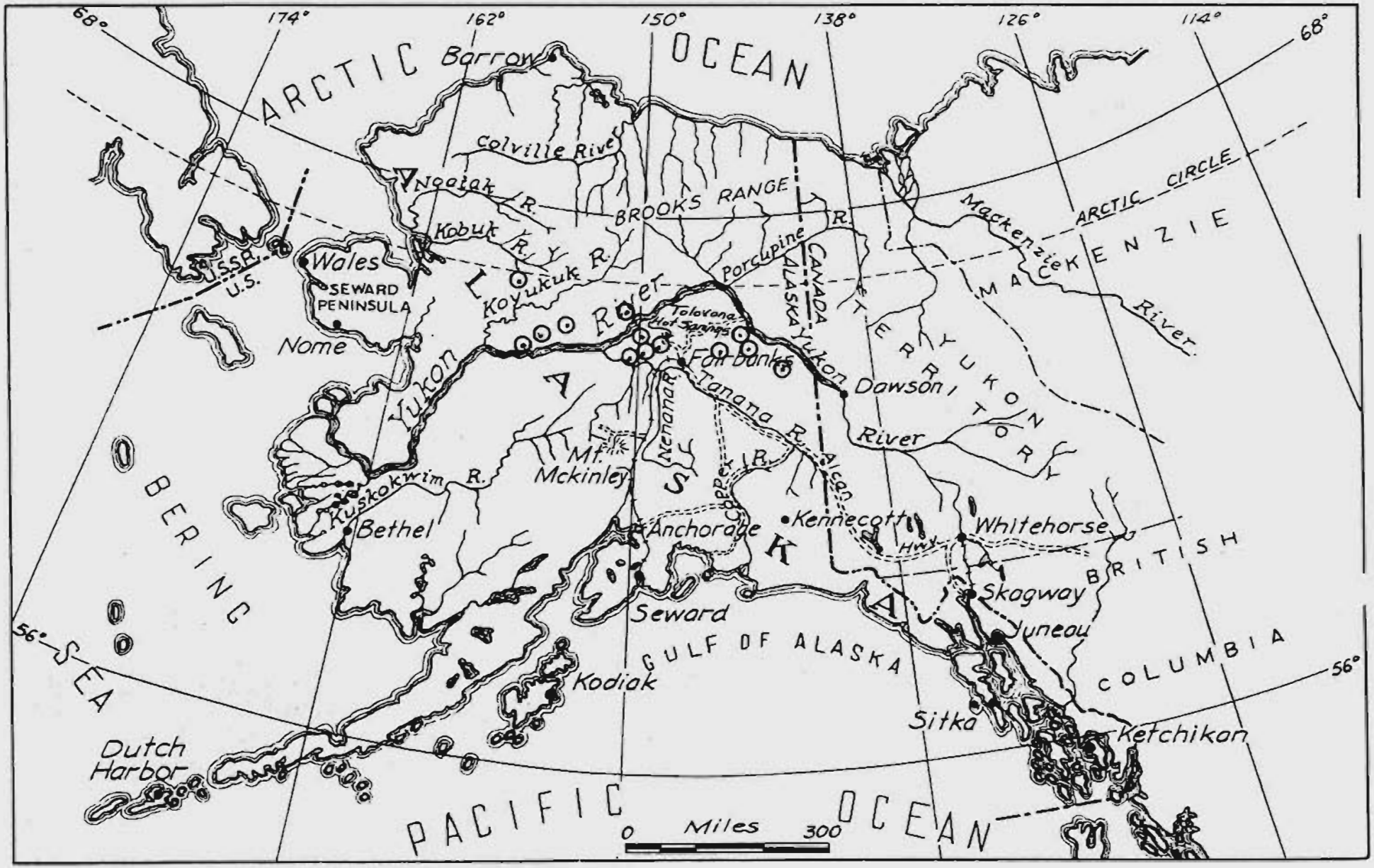

Fig.1 DISTRIBUTION HOT SPRINGS INTERIOR ALASKA

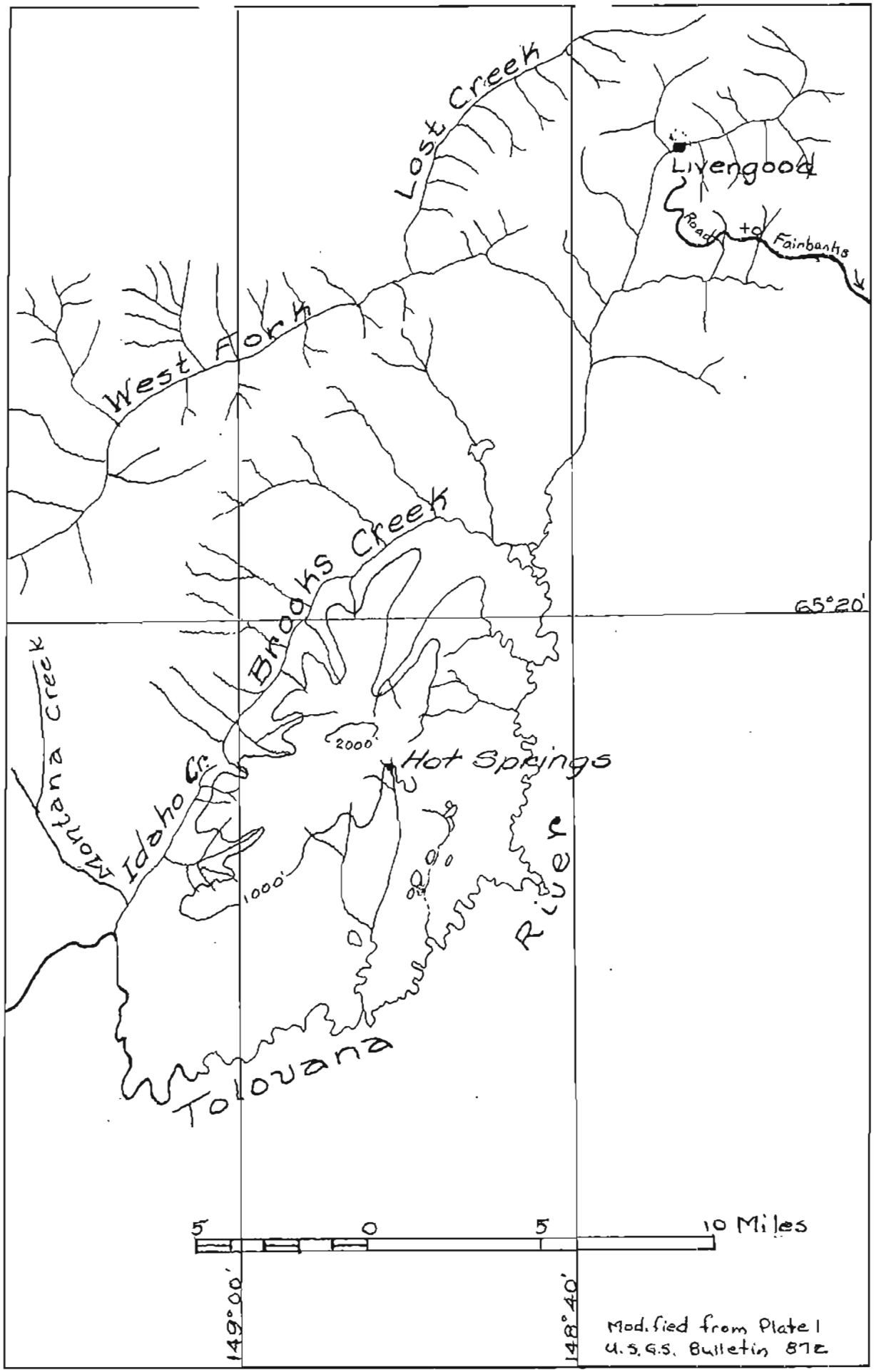

Fig. 2 LOCATION TOLOVANA HOT SPRINGS

the Tolovana River Valley to a small stream that flows south into the Tolovana River. This stream has its headwaters near the base of a prominent peak which is 2,411 feet above sea level. The hot springs are located near the base of this peak on two forks of the small stream. A trap-line trail follows the course of the creek and goes within one-quarter mile of the hot springs. During the winter small ski-equipped airplanes can land on a small lake near the base of the hill. This lake is about six miles from the springs. The trap-line trail, previously mentioned, crosses the west end of this lake.

The practical route for a road south from Livengood to the springs would be on high ground above the swampy and marshy floor of lower Livengood Creek and the Tolovana River valleys. A road along the ridges and on the flanks of the western frontal hills would be about thirty-five miles long. This route would necessitate crossing three major streams: Myrtle Creek, West Fork and Brooks Creek. A road starting at lower Globe Creek on the Elliot Highway west to the springs would be approximately twenty miles long; this route would cross the broad expansive valleys of the Tatalina River and Tolovana River.

PHYSICAL FEATURES AND CLIMATE

The prominent hill, upon which the hot springs are located, rises somewhat gradually above the flat level floor of the Tolovana River valley. It is about fifteen miles long and about five miles wide and rises to a maximum height of 2,411 feet above sea level. The average elevation of the Tolovana River valley, in the vicinity of the prominent hill, is about 350 to 400 feet above sea level. The hill is incised by many small streams and many spurs lead from the central mass, are flat topped with gentle slopes toward the outer periphery.

The sub-Arctic climate of the region is characterized by long cold winters with short days in midwinter; the summers are comparatively short, warm with almost three months of continuous daylight. The hottest time of the year comes during the first part of July with maximum temperatures above 90°F. and the coldest time of the year comes during the middle of January with minimum temperatures below -60° F. The mean annual temperature is about 24°F.; the average annual rainfall is about 10.5"; the average snowfall is about 50".

TIMBER AND VEGETATION

About one half mile below the springs, near the forks of the main creek, is a thick stand of spruce. The trees are suitable for constructing log buildings and are large enough in diameter for saw timber. Adjacent to the springs, on the steep hill sides, poplar and birch are quite numerous. Thick growths of dwarf willow and alder, in a heavy blanket of moss, are found in the immediate vicinity of the springs. It would be difficult to find the springs if the water course of the creek was not followed to where it emanates from the solid rock. The thick undergrowth limits vision to relatively short distances.

HISTORY

During the gold rush days at Livengood some of the miners would leave their diggings in the fall and go to the springs for hot baths. The accomodations and bathing facilities were crude. At the present time there is the remnant of an old log bath house at the site of the largest and hottest spring. The bathhouse has long since caved and no portion of it is suitable for use today.

PROPERTY AND OWNERSHIP

Mr. John Cross and Associates, P.O. Box 1346, Fairbanks, Alaska have applied for a lease, through the Office of Land Management, Washington 25, D.C., for forty acres of land which encompass the mineral springs.

Mineral springs are acquired by applying for a lease through the Department of the Interior, Office of Land Management.

HOT SPRINGS

The hot waters emanate from joints and fractures in slate. The thermal waters are probably genetically related to a quartz monzonite which intrudes the slate. This monzonite mass is exposed to the west of the flows. Heated waters rising from the igneous mass, from considerable depth, reach the surface through channels developed along fracture planes in the slate near the margins of the intrusion.

Thin coatings of white silicon dioxide are formed on the pebbles along the course of the water near where it enamates from the underground vents. Green algal growths, which are common to many hot springs, also grow on rocks at the source. Algae grows thickest in pools and quiet water of slow velocity.

There are five separate and distinct major flows. Three major flows are on the upper end of the main creek about 1,500 feet north of the northwest fork. They are on the hillside 10 to 15 feet above the stream bed. (Figure 3). The soil in the immediate vicinity of the springs at this locality has an average temperature of approximately 68° F. The seepage is quite large and it appears as if a comparatively large stream of hot water

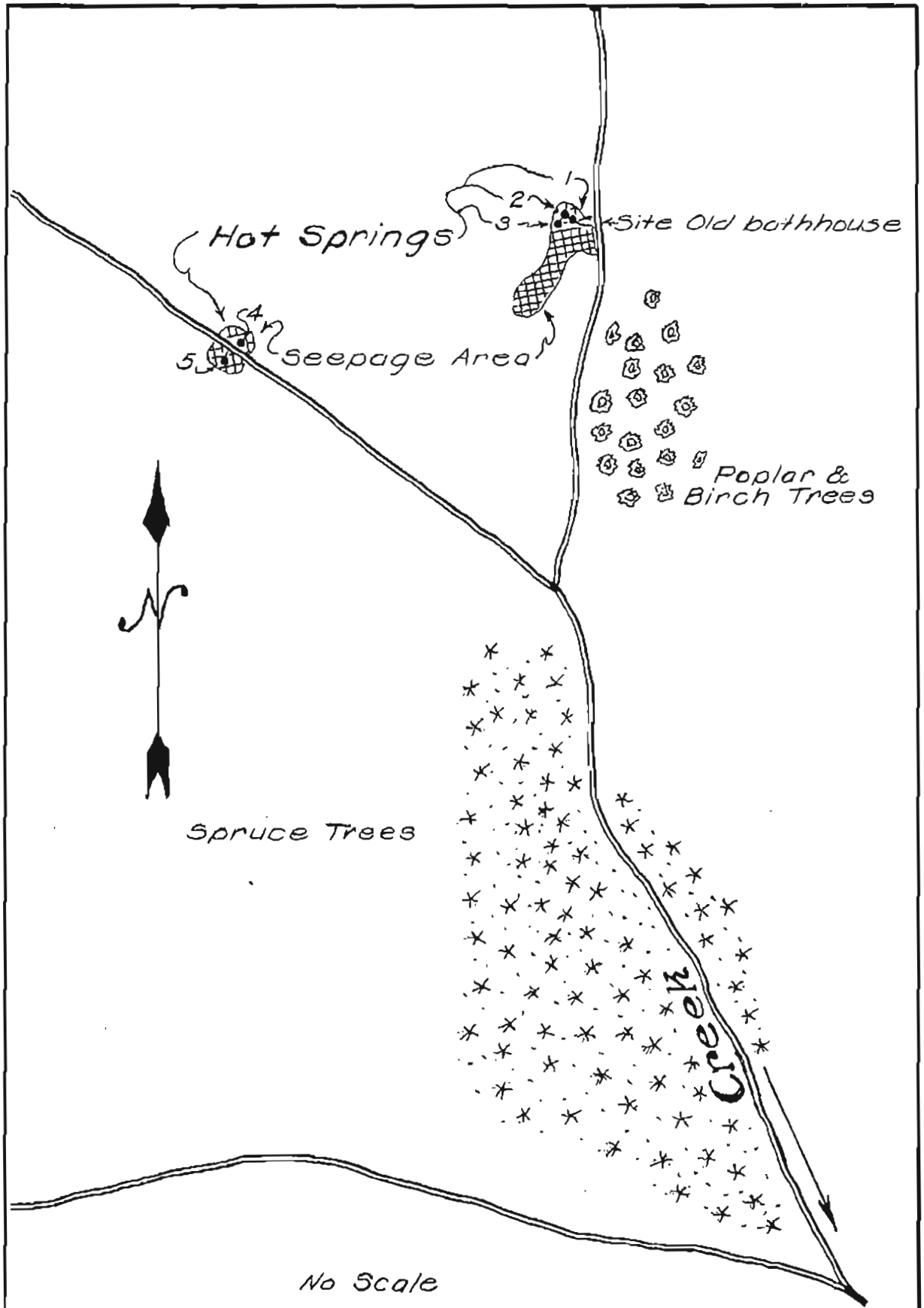

Fig. 3 Sketch Showing Hot Springs

could be developed by diverting the many small flows into one channel. This would be in addition to the three existing free flowing springs at this locality. The estimated flow of water is given in Table I.

TABLE I

Estimated Volume of Water Flowing April 1948:

Location	Gallons of Water per Minute
1 - Lower Spring at bathhouse	10
2 - Upper spring at bathhouse	25
3 - Large spring below bathhouse (down stream)	25

The tempe ature of the water was taken at the point where the water discharges from the solid rock. Water temperatures are given in Table II.

TABLE II

Location	Temperature Degrees F.
1 - Lower spring at bathhouse	131.9
2 - Upper spring at bathhouse	133.7
3 - Large spring below bathhouse (down stream)	130.1

A smaller seepage area with two springs is located on the north west fork of the creek about 1,000 feet from its confluence with the creek. The flow from these springs is about one-third the combined flow of the springs in the large seepage area. The temperature if about 130° F. Manley (Baker) Hot Springs has a temperature of 125° - 136° F; Circle Hot Springs a temperature of 130° - 134° F.

Both hot spring areas are located in narrow valleys with steep walls. These localities are not suitable sites for the construction of large buildings. A suitable site can be found below the confluence of the

northwest fork. The hot wate rs could be piped from both areas to this locality without much difficulty.

WATER SAMPLING AND ANALYSIS

The sample of the spring water consisted of one gallon of hot water taken from the point where the water issued from the solid rock. The water was taken in a glass jug which had been cleaned thoroughly before it was used. Prior to taking the sample, the jug was rinsed three times with spring water. This was done by filling the jug until it was overflowing then emptying it and filling it again. Upon completion of the last filling the jug was corked tightly to avoid contamination from any outside source. Table III is the chemical analysis of the water.

TABLE III

Total Solids	1312 ppm.
Fixed Residue	918 ppm.
Volatile Matter	394 ppm.
Alkalinity	
Hydroxide	0000
Carbonate	0000
Bicarbonate	45 ppm. (as $CaCO_3$)
Acidity	4.5 ppm. (as $CaCO_3$)
Magnesium	11.6 ppm.
Chlorides	705 ppm.
Iron	0000
Iron and Aluminum Oxides	0000
Sulphates	36 ppm.
Calcium	95 ppm.
Total Hardness	285 ppm. (as $CaCO_3$)
Color	less than 5

These thermal waters are classified as the chloride type. They have no noticeable odor and a slight saline taste. The analysis does not indicate the presence of any chemical compounds that would be injurious to the health.