

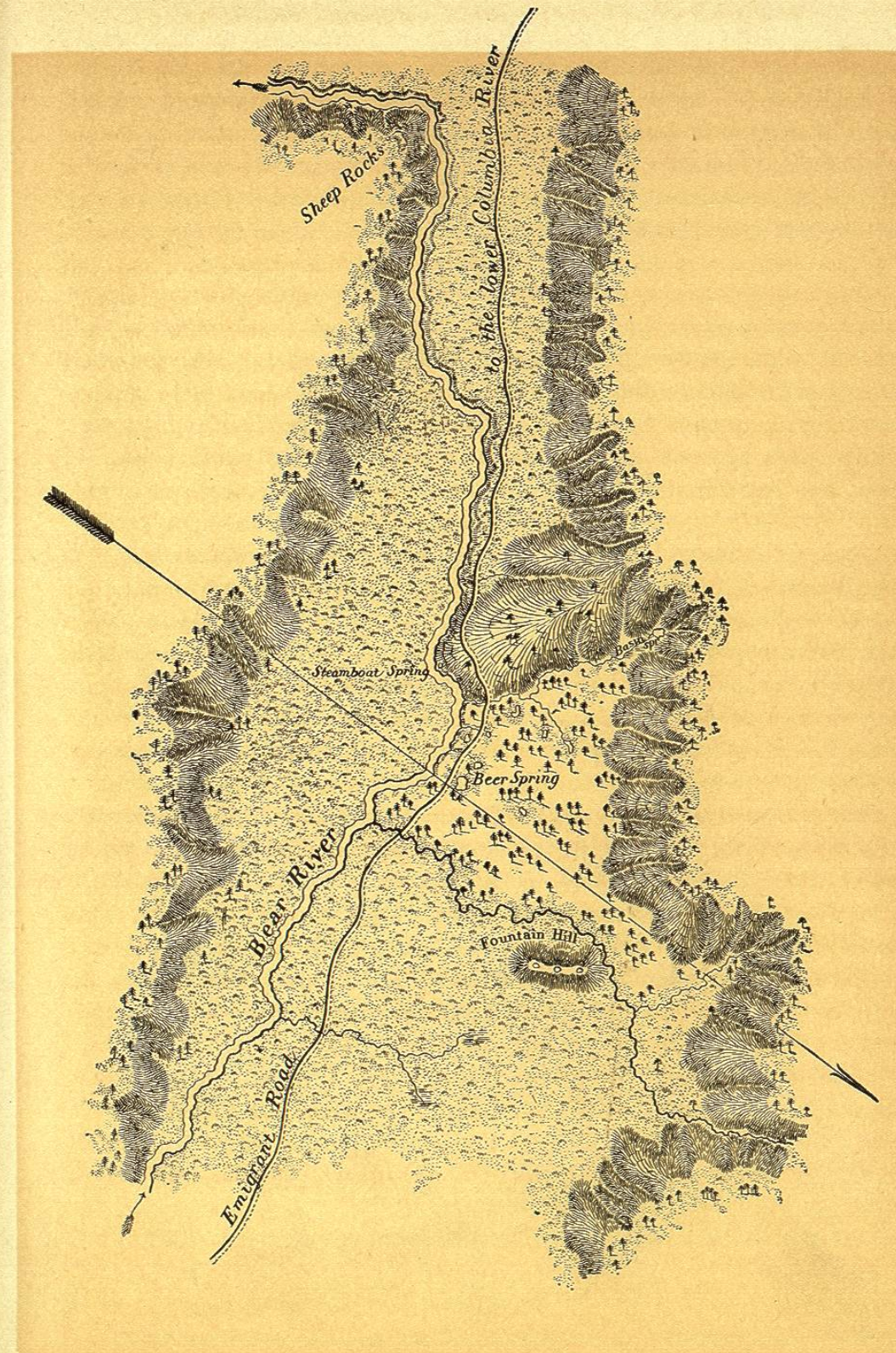
Although somewhat disappointed in the expectations which various descriptions had led me to form of unusual beauty of situation and scenery, I found it altogether a place of very great interest; and a traveller for the first time in a volcanic region remains in a constant excitement, and at every step is arrested by something remarkable and new. There is a confusion of interesting objects gathered together in a small space. Around the place of encampment the Beer Springs were numerous; but, as far as we could ascertain, were entirely confined to that locality in the bottom. In the bed of the river, in front, for a space of several hundred yards, they were very abundant, the effervescing gas rising up and agitating the water in countless bubbling columns. In the vicinity round about were numerous springs of an entirely different and equally marked mineral character.

In a rather picturesque spot, about thirteen hundred yards below our encampment, and immediately on the river bank, is the most remarkable spring of the place. In an opening on the rock, a white column of scattered water is thrown up, in form like a *jet d'eau*, to a variable height of about three feet, and, though it is maintained in a constant supply, its greatest height is attained only at regular intervals, according to the action of the force below. It is accompanied by a subterranean noise, which, together with the motion of the water, makes very much the impression of a steamboat in motion; and, without knowing that it had been already previously so called, we gave to it the name of the *Steamboat Spring*. The rock through which it is forced is slightly raised in a convex manner, and gathered at the opening into an urn-mouthed form, and is evidently formed by continued deposition from the water, and colored bright red by oxide of iron.

An analysis of this deposited rock, which I subjoin, will give you some idea of the properties of the water, which, with the exception of the Beer Springs, is the mineral water of the place.* It is a hot spring, and the water has a pungent and disagreeable metallic taste, leaving a burning effect on the tongue. Within perhaps two yards of the *jet d'eau* is a small hole of about an inch in diameter, through which, at regular intervals, escapes a blast of hot air with a light wreath of smoke, accompanied by a regular noise. This hole had been noticed by Dr. Wislizenus, a gentleman who several years since passed by this place, and who remarked,

* ANALYSIS.

Carbonate of lime	92.55
Carbonate of magnesia.....	0.42
Oxide of iron.....	1.05
Silica	5.98
Alumina	
Water and loss	
	100.00



BEER SPRINGS.

with very nice observation, that smelling the gas which issued from the orifice produced a sensation of giddiness and nausea.

Mr. Preuss and myself repeated the observation, and were so well satisfied with its correctness, that we did not find it pleasant to continue the experiment, as the sensation of giddiness which it produced was certainly strong and decided. A huge emigrant wagon, with a large and diversified family, had overtaken us and halted to noon at our encampment; and, while we were sitting at the spring, a band of boys and girls, with two or three young men came up, one of whom I asked to stoop down and smell the gas, desirous to satisfy myself further of its effects. But his natural caution had been awakened by the singular and suspicious features of the place, and he declined my proposal decidedly, adding a few indistinct remarks about the devil, whom he seemed to consider the *genius loci*. The ceaseless motion and the play of the fountain, the red rock, and the green trees near, make this a picturesque spot.

A short distance above the spring, and near the foot of the same spur, is a very remarkable yellow-colored rock, soft and friable, consisting principally of carbonate of lime and oxide of iron, of regular structure, which is probably a fossil coral. The rocky bank along the shore between the Steamboat Spring and our encampment, along which is dispersed the water from the hills, is composed entirely of strata of a calcareous *tufa*, with the remains of moss and reed-like grasses, which is probably the formation of springs.

The *Beer* or *Soda Springs*, which have given name to this locality, are agreeable, but less highly flavored than the *Boiling Springs* at the foot of Pike's Peak, which are of the same character. They are very numerous, and half hidden by tufts of grass, which we amused ourselves in removing and searching about for more highly impregnated springs. They are some of them deep and of various sizes—sometimes several yards in diameter, and kept in constant motion by columns of escaping gas. By analysis, one quart of the water contains as follows :

	Grains.
Sulphate of magnesia.....	12.10
Sulphate of lime.....	2.12
Carbonate of lime.....	3.86
Carbonate of magnesia.....	3.22
Chloride of calcium.....	1.33
Chloride of magnesium.....	1.12
Chloride of sodium.....	2.24
Vegetable extractive matter, etc.....	0.85
	<hr/> 26.84

The carbonic acid, originally contained in the water, had mainly escaped before it was subjected to analysis ; and it was not therefore taken into consideration.

In the afternoon I wandered about among the cedars, which occupy the greater part of the bottom toward the mountains. The soil here has a dry and calcined appearance; in some places, the open grounds are covered with saline efflorescences, and there are a number of regularly shaped and very remarkable hills, which are formed of a succession of convex strata that have been deposited by the waters of extinct springs, the orifices of which are found on their summits, some of them having the form of funnel-shaped cones.

Others of these remarkably shaped hills are of a red-colored earth, entirely bare, and composed principally of carbonate of lime, with oxide of iron, formed in the same manner. Walking near one of them, on the summit of which the springs were dry, my attention was attracted by an underground noise, around which I circled repeatedly, until I found the spot from beneath which it came; and, removing the red earth, discovered a hidden spring, which was boiling up from below, with the same disagreeable metallic taste as the Steamboat Spring.

Continuing up the bottom, and crossing the little stream which has been already mentioned, I visited several remarkable red and white hills, which had attracted my attention from the road in the morning. These are immediately upon the stream, and, like those already mentioned, are formed by the deposition of successive strata from the springs. On their summits, the orifices through which the waters had been discharged were so large that they resembled miniature craters, being some of them several feet in diameter, circular, and regularly formed as if by art. At a former time, when these dried-up fountains were all in motion, they must have made a beautiful display on a grand scale; and nearly all this basin appears to me to have been formed under their action, and should be called the *place of fountains*.

At the foot of one of these hills, or rather on its side near the base, are several of these small limestone columns, about one foot in diameter at the base, and tapering upward to a height of three or four feet; and on the summit the water is boiling up and bubbling over, constantly adding to the height of the little obelisks. In some, the water only boils up, no longer overflowing, and has here the same taste as the Steamboat Spring. The observer will remark a gradual subsidence in the water which formerly supplied the fountains, as on all the summits of the hills the springs are now dry, and are found only low down upon their sides or on the surrounding plain.

A little higher up the creek, its banks are formed by strata of a very heavy and hard scoriaceous basalt, having a bright metallic lustre when broken. The mountains overlooking the plain are of an entirely different geological character. Continuing on, I walked to the summit of one of

them, where the principal rock was a granular quartz. Descending the mountains, and returning toward the camp along the base of the ridge which skirts the plain, I found at the foot of a mountain spur, and issuing from a compact rock of a dark-blue color, a great number of springs having the same pungent and disagreeably metallic taste already mentioned, the water of which was collected into a very remarkable basin, whose singularity, perhaps, made it appear to me very beautiful. It is large—perhaps fifty yards in circumference; and in it the water is contained at an elevation of several feet above the surrounding ground by a wall of calcareous *tufa*, composed principally of the remains of mosses, three or four, and sometimes ten feet high. The water within is very clear and pure, and three or four feet deep, where it could be conveniently measured near the wall; and, at a considerably lower level, is another pond or basin of very clear water, and apparently of considerable depth, from the bottom of which the gas was escaping in bubbling columns at many places. This water was collected into a small stream which, in a few hundred yards, sank underground, reappearing among the rocks between the two great springs near the river, which it entered by a little fall.

Late in the afternoon I set out on my return to the camp, and, crossing in the way a large field of a salt that was several inches deep, found on my arrival that our emigrant friends, who had been encamped in company with us, had resumed their journey, and the road had again assumed its solitary character.

The temperature of the largest of the *Beer Springs* at our encampment was 65° at sunset, that of the air being 62.5° . Our barometric observation gave five thousand eight hundred and forty feet for the elevation above the Gulf, being about five hundred feet lower than the Boiling Springs, which are of a similar nature, at the foot of Pike's Peak. The astronomical observations gave for our latitude $42^{\circ} 39' 57''$, and $111^{\circ} 46' 00''$ for the longitude. The night was very still and cloudless, and I sat up for an observation of the first satellite of Jupiter, the emersion of which took place about midnight; but fell asleep at the telescope, awaking just a few minutes after the appearance of the star.

The morning of the 26th was calm, and the sky without clouds, but smoky; and the temperature at sunrise 28.5° . At the same time, the temperature of the large Beer Spring, where we encamped, was 56° ; that of the Steamboat Spring 87° ; and that of the steam-hole near it, 81.5° . In the course of the morning the last wagons of the emigration passed by, and we were again left in our place in the rear.

Remaining in camp until nearly eleven o'clock, we travelled a short distance down the river, and halted to noon on the bank at a point where the road quits the valley of Bear River, and, crossing a ridge which divides

the Great Basin from the Pacific waters, reaches Fort Hall by way of the Portneuf River in a distance of probably fifty miles, or two and a half days' journey for wagons.

An examination of the great lake which is the outlet of this river, and the principal feature of geographical interest in the basin, was one of the main objects contemplated in the general plan of our survey; and I accordingly determined at this place to leave the road, and, after having completed a reconnoissance of the lake, regain it subsequently at Fort Hall. But our little stock of provisions had again become extremely low; we had only dried-meat sufficient for one meal, and our supply of flour and other comforts was entirely exhausted. I therefore immediately despatched one of the party, Henry Lee, with a note to Carson, at Fort Hall, directing him to load a pack-horse with whatever could be obtained there in the way of provisions, and endeavor to overtake me on the river.

In the meantime, we had picked up along the road two tolerably well-grown calves, which would have become food for wolves, and which had probably been left by some of the earlier emigrants, none of those we had met having made any claim to them; and on these I mainly relied for support during our circuit to the lake.

In sweeping around the point of the mountain which runs down into the bend, the river here passes between perpendicular walls of basalt, which always fix the attention, from the regular form in which it occurs and its perfect distinctness from the surrounding rocks among which it has been placed. The mountain, which is rugged and steep, and, by our measurement, one thousand four hundred feet above the river directly opposite the place of our halt, is called the *Sheep Rock*—probably because a flock of the common mountain sheep (*Ovis montana*) had been seen on the craggy point.

As we were about resuming our march in the afternoon I was attracted by the singular appearance of an isolated hill with a concave summit, in the plain, about two miles from the river, and turned off toward it while the camp proceeded on its way to the southward in search of the lake. I found the thin and stony soil of the plain entirely underlaid by the basalt which forms the river walls; and when I reached the neighborhood of the hill, the surface of the plain was rent into frequent fissures and chasms of the same scoriated volcanic rock, from forty to sixty feet deep, but which there was not sufficient light to penetrate entirely, and which I had not time to descend. Arrived at the summit of the hill, I found that it terminated in a very perfect crater, of an oval or nearly circular form, three hundred and sixty paces in circumference, and sixty feet at the greatest depth. The walls, which were perfectly vertical and disposed like masonry in a very regular manner, were composed of a brown-colored scoriaceous



UTAH BOY.

lava, evidently the production of a modern volcano, and having all the appearance of the lighter scoriaceous lavas of Mount Ætna, Vesuvius, and other volcanoes. The faces of the walls were reddened and glazed by the fire, in which they had been melted, and which had left them contorted and twisted by its violent action.

Our route during the afternoon was a little rough, being (in the direction we had taken) over a volcanic plain, where our progress was sometimes obstructed by fissures, and black beds, composed of fragments of the rock. On both sides the mountains appeared very broken, but tolerably well timbered.

August 26th.—Crossing a point of ridge which makes in to the river, we fell upon it again before sunset, and encamped on the right bank, opposite to the encampment of three lodges of Snake Indians. They visited us during the evening, and we obtained from them a small quantity of roots of different kinds in exchange for goods. Among them was a sweet root of very pleasant flavor, having somewhat the taste of preserved quince. My endeavors to become acquainted with the plants which furnish to the Indians a portion of their support were only gradually successful, and after long and persevering attention; and even after obtaining, I did not succeed in preserving them until they could be satisfactorily determined.

In this portion of the journey I found this particular root cut up into such small pieces that it was only to be identified by its taste, when the bulb was met with in perfect form among the Indians lower down on the Columbia, among whom it is the highly celebrated kamás. It was long afterwards, on our return through Upper California, that I found the plant itself in bloom, which I supposed to furnish the kamás root (*Camassia esculenta*). The root-diet had a rather mournful effect at the commencement, and one of the calves was killed this evening for food. The animals fared well on rushes.

August 27th.—The morning was cloudy, with appearance of rain, and the thermometer at sunrise at 29°. Making an unusually early start, we crossed the river at a good ford; and, following for about three hours a trail which led along the bottom, we entered a labyrinth of hills below the main ridge and halted to noon in the ravine of a pretty little stream, timbered with cotton-wood of large size, ash-leaved maple, with cherry and other shrubby trees. The hazy weather, which had prevented any very extended views since entering the Green River Valley, began now to disappear. There was a slight rain in the earlier part of the day, and at noon, when the thermometer had risen to 79.5°, we had a bright sun, with blue sky and scattered *cumuli*. According to the barometer our halt here among the hills was at an elevation of five thousand three hundred and twenty feet.