In the river hills at this place I discovered strata of fossiliferous rock having an *oolitic structure*, which, in connection with the neighboring strata, authorizes us to believe that here, on the west side of the Rocky Mountains, we find repeated the modern formations of Great Britain and Europe, which have hitherto been wanting to complete the system of North American geology.

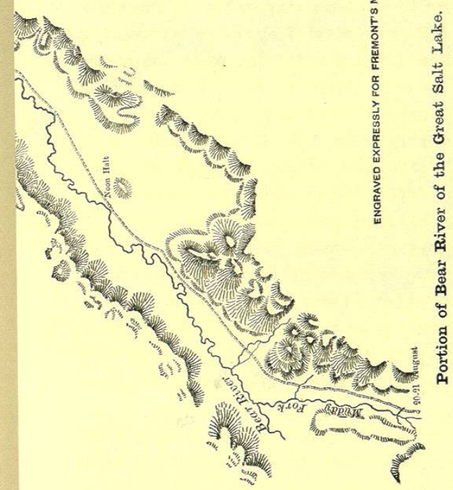
In the afternoon we continued our road, and, searching among the hills a few miles up the stream, and on the same bank, I discovered among alternating beds of coal and clay a stratum of white indurated clay containing very clear and beautiful impressions of vegetable remains. This was the most interesting fossil locality I had met in the country, and I deeply regretted that time did not permit me to remain a day or two in the vicinity; but I could not anticipate the delays to which I might be exposed in the course of our journey—or, rather, I knew that they were many and inevitable—and after remaining here only about an hour, I hurried off, loaded with as many specimens as I could conveniently carry.

Coal made its appearance occasionally in the hills during the afternoon, and was displayed in rabbit-burrows in a kind of gap, through which we passed over some high hills, and we descended to make our encampment on the same stream, where we found but very poor grass.

In the evening a fine cow with her calf, which had strayed off from some emigrant party, were found several miles from the road and brought into camp; and as she gave an abundance of milk, we enjoyed to-night an excellent cup of coffee. We travelled to-day twenty-eight miles, and, as has been usual since crossing the Green River, the road has been very dusty and the weather smoky and oppressively hot. Artemisia was characteristic among the few plants.

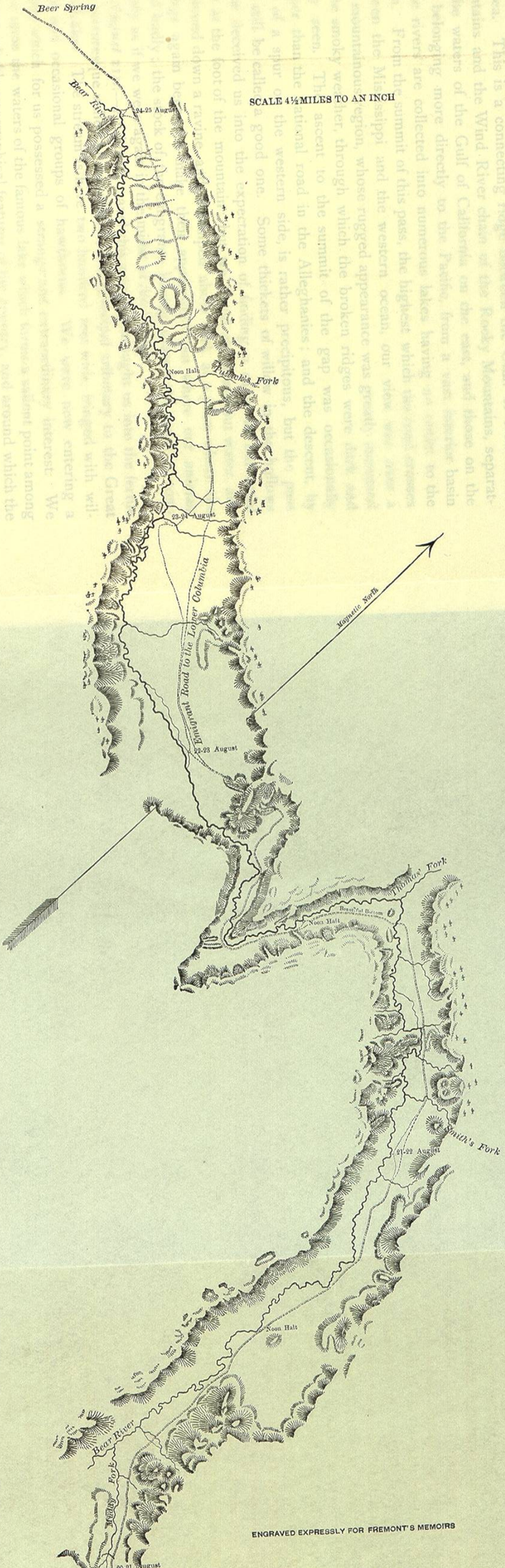
August 20th.—We continued to travel up the creek by a very gradual ascent and a very excellent grassy road, passing on the way several small forks of the stream. The hills here are higher, presenting escarpments of parti-colored and apparently clay rocks—purple, dark-red, and yellow—containing strata of sandstone and limestone with shells, with a bed of cemented pebbles, the whole overlaid by beds of limestone. The alternation of red and yellow gives a bright appearance to the hills, one of which was called by our people the Rainbow Hill; and the character of the country became more agreeable, and travelling far more pleasant, as now we found timber and very good grass. Gradually ascending, we reached the lower level of a bed of white limestone, lying upon a white clay, on the upper line of which the whole road is abundantly supplied with beautiful cool springs, gushing out a foot in breadth and several inches deep, directly from the hill-side.

At noon we halted at the last main fork of the creek, at an elevation of

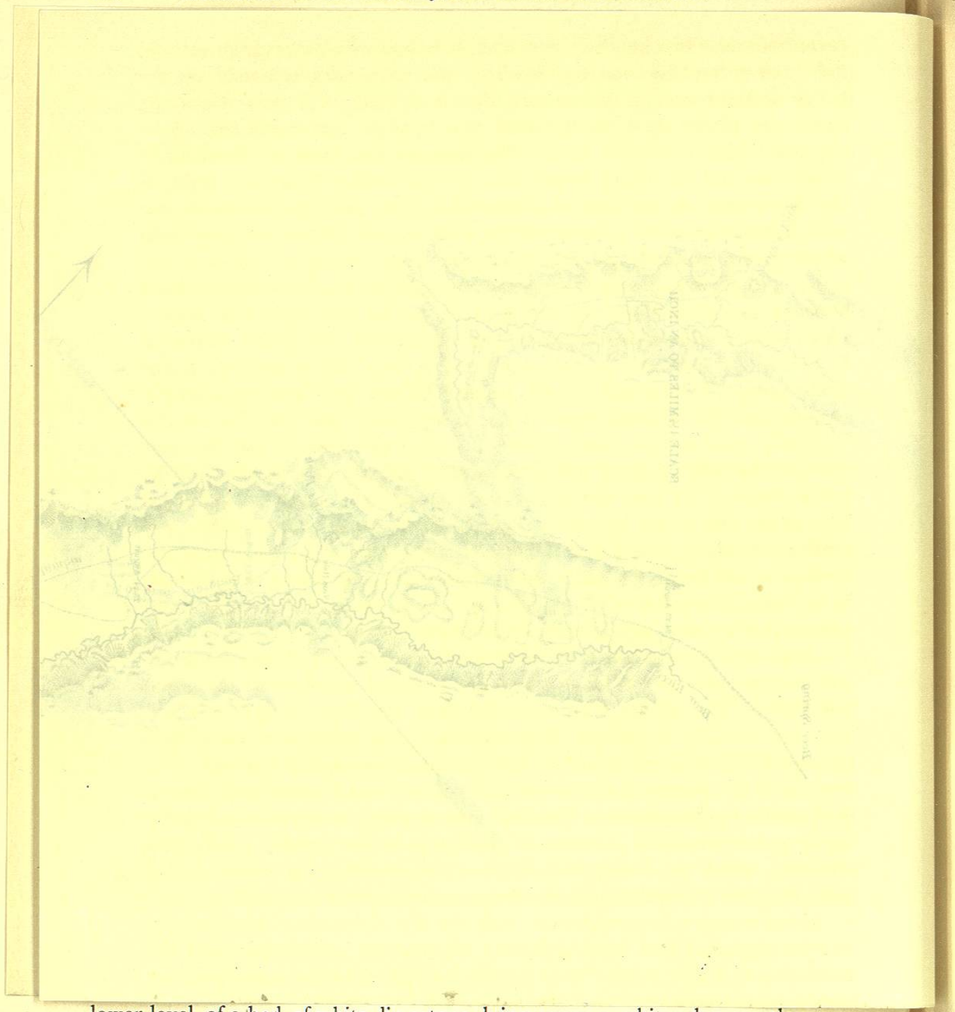


...gly exaggerated and impossible.

Hitherto this lake had been seen only by trappers who were wandering through the country in search of new beaver streams, caring very little for geography; its islands had never been visited; and none were to be found who had entirely made the circuit of its shores; and no instrumental observations, or geographical survey of any description, had ever been



Portion of Bear River of the Great Salt Lake.



lower level of a bed of white limestone, lying upon a white clay, on the upper line of which the whole road is abundantly supplied with beautiful cool springs, gushing out a foot in breadth and several inches deep, directly from the hill-side.

At noon we halted at the last main fork of the creek, at an elevation of

seven thousand two hundred feet, and in latitude, by observation, 41° 39′ 45″; and in the afternoon continued on the same excellent road, up the left or northern fork of the stream, toward its head, in a pass which the barometer placed at eight thousand two hundred and thirty feet above the sea. This is a connecting ridge between the Utah or Bear River Mountains and the Wind River chain of the Rocky Mountains, separating the waters of the Gulf of California on the east, and those on the west belonging more directly to the Pacific, from a vast interior basin whose rivers are collected into numerous lakes having no outlet to the ocean. From the summit of this pass, the highest which the road crosses between the Mississippi and the western ocean, our view was over a very mountainous region, whose rugged appearance was greatly increased by the smoky weather, through which the broken ridges were dark and dimly seen. The ascent to the summit of the gap was occasionally steeper than the national road in the Alleghanies; and the descent, by way of a spur on the western side, is rather precipitous, but the pass may still be called a good one. Some thickets of willow in the hollows below deceived us into the expectation of finding a camp at our usual hour at the foot of the mountain; but we found them without water, and continued down a ravine, and encamped about dark at a place where the springs again began to make their appearance, but where our animals fared badly; the stock of the emigrants having grazed the grass as completely as if we were again in the midst of the buffalo.

August 21st.—An hour's travel this morning brought us into the fertile and picturesque valley of Bear River, the principal tributary to the Great Salt Lake. The stream is here two hundred feet wide, fringed with willows and occasional groups of hawthorns. We were now entering a region which for us possessed a strange and extraordinary interest. We were upon the waters of the famous lake which forms a salient point among the remarkable geographical features of the country, and around which the vague and superstitious accounts of the trappers had thrown a delightful obscurity, which we anticipated pleasure in dispelling, but which, in the meantime, left a crowded field for the exercise of our imagination.

In our occasional conversations with the few old hunters who had visited the region, it had been a subject of frequent speculation; and the wonders which they related were not the less agreeable because they were highly exaggerated and impossible.

Hitherto this lake had been seen only by trappers who were wandering through the country in search of new beaver streams, caring very little for geography; its islands had never been visited; and none were to be found who had entirely made the circuit of its shores; and no instrumental observations, or geographical survey of any description, had ever been

made anywhere in the neighboring region. It was generally supposed that it had no visible outlet; but among the trappers, including those in my own camp, were many who believed that somewhere on its surface was a terrible whirlpool, through which its waters found their way to the ocean by some subterranean communication.

All these things had made a frequent subject of discussion in our desultory conversations around the fires at night; and my own mind had become tolerably well filled with their indefinite pictures, and insensibly colored with their romantic descriptions, which, in the pleasure of excitement, I was well disposed to believe, and half expected to realize.

Where we descended into this beautiful valley it is three to four miles in breadth, perfectly level, and bounded by mountainous ridges, one above another, rising suddenly from the plain.

The emigrant road passes along a portion of the river, which in its character of level bottoms, inclosed between abrupt mountains, presents a type of the streams of this region.

We continued our road down the river, and at night encamped with a family of emigrants—two men, women, and several children—who appeared to be bringing up the rear of the great caravan. I was struck with the fine appearance of their cattle, some six or eight yoke of oxen, which really looked as well as if they had been all the summer at work on some good farm. It was strange to see one small family travelling alone through such a country, so remote from civilization. Some nine years since, such a security might have been a fatal one; but since their disastrous defeats in the country a little north, the Blackfeet have ceased to visit these waters. Indians, however, are very uncertain in their localities; and the friendly feelings, also, of those now inhabiting it may be changed.

According to barometrical observation at noon, the elevation of the valley was six thousand four hundred feet above the sea; and our encampment at night in latitude 42° 03′ 47″, and longitude 111° 10′ 53″, by observation —the day's journey having been twenty-six miles. This encampment was therefore within the territorial limit of the United States; our travelling, from the time we entered the valley of the Green River, on August 15th, having been to the south of the forty-second degree of north latitude, and consequently on Mexican territory; and this is the route all the emigrants now travel to Oregon.

The temperature at sunset was 65°; and at evening there was a distant thunder-storm, with a light breeze from the north.

Antelope and elk were seen during the day on the opposite prairie; and there were ducks and geese in the river.

The next morning, in about three miles from our encampment, we reached Smith's Fork, a stream of clear water, about fifty feet in breadth.

It is timbered with cotton-wood, willow, and aspen, and makes a beautiful débouchement through a pass about six hundred yards wide, between remarkable mountain hills, rising abruptly on either side, and forming gigantic columns to the gate by which it enters Bear River Valley. The bottoms, which below Smith's Fork had been two miles wide, narrowed, as we advanced, to a gap five hundred yards wide; and during the greater part of the day we had a winding route, the river making very sharp and sudden bends, the mountains steep and rocky, and the valley occasionally so narrow as only to leave space for a passage through.

We made our halt at noon in a fertile bottom, where the common blue flax was growing abundantly, a few miles below the mouth of Thomas' Fork, one of the larger tributaries of the river.

Crossing, in the afternoon, the point of a narrow spur, we descended into a beautiful bottom, formed by a lateral valley, which presented a picture of home beauty that went directly to our hearts. The edge of the wood, for several miles along the river, was dotted with the white covers of emigrant wagons, collected in groups at different camps, where the smokes were rising lazily from the fires, around which the women were occupied in preparing the evening meal, and the children playing in the grass; and herds of cattle, grazing about in the bottom, had an air of quiet security and civilized comfort that made a rare sight for the traveller in such a remote wilderness.

In common with all the emigration, they had been reposing for several days in this delightful valley, in order to recruit their animals on its luxuriant pasturage after their long journey, and prepare them for the hard travel along the comparatively sterile banks of the Upper Columbia. At the lower end of this extensive bottom the river passes through an open cañon where there were high vertical rocks to the water's edge, and the road here turns up a broad valley to the right. It was already near sunset; but, hoping to reach the river again before night, we continued our march along the valley, finding the road tolerably good, until we arrived at a point where it crosses the ridge by an ascent of a mile in length, which was so very steep and difficult for the gun and carriage that we did not reach the summit until dark.

It was absolutely necessary to descend into the valley for water and grass, and we were obliged to grope our way in the darkness down a very steep, bad mountain, reaching the river at about ten o'clock. It was late before our animals were gathered into camp, several of those which were very weak being necessarily left to pass the night on the ridge; and we sat down again to a midnight supper. The road, in the morning, presented an animated appearance. We found that we had encamped near a large party of emigrants, and a few miles below another body was already in

motion. Here the valley had resumed its usual breadth, and the river swept off along the mountains on the western side, the road continuing directly on.

In about an hour's travel we met several Shoshonee Indians, who informed us that they belonged to a large village which had just come into the valley from the mountains to the westward, where they had been hunting antelope, and gathering service-berries. Glad at the opportunity of seeing one of their villages, and in the hope of purchasing from them a few horses, I turned immediately off into the plain toward their encampment, which was situated on a small stream near the river.

We had approached within something more than a mile of the village, when suddenly a single horseman emerged from it at full speed, followed by another, and another, in rapid succession; and then party after party poured into the plain, until, when the foremost rider reached us, all the whole intervening plain was occupied by a mass of horsemen, which came charging down upon us with guns and naked swords, lances, and bows and arrows—Indians entirely naked, and warriors fully dressed for war, with the long red streamers of their war bonnets reaching nearly to the ground—all mingled together in the bravery of savage warfare. They had been thrown into a sudden tumult by the appearance of our flag, which, among these people, is regarded as an emblem of hostility; it being usually borne by the Sioux, and the neighboring mountain Indians, when they come here to war; and we had accordingly been mistaken for a body of their enemies. A few words from the chief quieted the excitement; and the whole band, increasing every moment in number, escorted us to their encampment, where the chief pointed out a place for us to encamp near his own lodge, and made known our purpose in visiting the village.

In a very short time we purchased eight horses, for which we gave in exchange blankets, red and blue cloth, beads, knives, and tobacco, and the usual other articles of Indian traffic. We obtained from them also a considerable quantity of berries of different kinds, among which service-berries were the most abundant; and several kinds of roots and seeds, which we could eat with pleasure, as any kind of vegetable food was gratifying to us.

I ate here, for the first time, the *kooyah*, or *tobacco root* (*Valeriana edulis*), the principal edible root among the Indians who inhabit the upper waters of the streams on the western side of the mountains. It has a very strong and remarkably peculiar taste and odor, which I can compare to no other vegetable that I am acquainted with, and which to some persons is extremely offensive. It was characterized by Mr. Preuss as the most horrid food he had ever put in his mouth; and when, in the evening, one of the chiefs sent his wife to me with a portion which she had prepared as a delicacy to regale us, the odor immediately drove him out of the lodge;

and frequently afterward he used to beg that when those who liked it had taken what they desired, it might be sent away. To others, however, the taste is rather an agreeable one, and I was afterward always glad when it formed an addition to our scanty meals. It is full of nutriment; and in its unprepared state is said by the Indians to have very strong poisonous qualities, of which it is deprived by a peculiar process, being baked in the ground for about two days.

The morning of the 24th was disagreeably cool, with an easterly wind and very smoky weather. We made a late start from the village, and regaining the road (on which, during all the day, were scattered the emigrant wagons), we continued on down the valley of the river, bordered by high and mountainous hills, on which fires are seen at the summit.

The soil appears generally good, although, with the grasses, many of the plants are dried up, probably on account of the great heat and want of rain. The common blue flax of cultivation, now almost entirely in seed—only a scattered flower here and there remaining—is the most characteristic plant of the Bear River Valley. When we encamped at night on the right bank of the river, it was growing as in a sown field. We had travelled during the day twenty-two miles, encamping in latitude (by observation) 42° 36′ 56″, chronometric longitude 111° 42′ 05″.

In our neighborhood, the mountains appeared extremely rugged, giving still greater value to this beautiful natural pass.

August 25th.—This was a cloudless but smoky autumn morning, with a cold wind from the southeast, and a temperature of forty-five degrees at sunrise. In a few miles I noticed, where a little stream crossed the road, fragments of *scoriated basalt* scattered about—the first volcanic rock we had seen, and which now became a characteristic rock along our future road. In about six miles' travel from our encampment, we reached one of the points in our journey to which we had always looked forward with great interest—the famous *Beer Springs*. It is a basin of mineral waters inclosed by the mountains, which sweep around a circular bend of Bear River here, at its most northern point, and which from a northern, in the course of a few miles acquires a southern direction toward the GREAT SALT LAKE.

A pretty little stream of clear water enters the upper part of the basin from an open valley in the mountains, and, passing through the bottom, discharges into Bear River. Crossing this stream, we descended a mile below, and made our encampment in a grove of cedar immediately at the Beer Springs, which, on account of the effervescing gas and acid taste, have received their name from the voyageurs and trappers of the country, who, in the midst of their rude and hard lives, are fond of finding some fancied resemblance to the luxuries they rarely have the fortune to enjoy.