

tion of an occultation of Tau⁺ Arietis, with other observations. Both immersion and emersion of the star were observed; but, as our observations have shown, the phase at the bright limb generally gives incorrect longitudes, and we have adopted the result obtained from the emersion at the dark limb, without allowing any weight to the immersion. According to these observations the longitude is $112^{\circ} 05' 12''$, and the latitude $41^{\circ} 42' 43''$. All the longitudes on the line of our outward journey, between St. Vrain's Fort and the Dalles of the Columbia, which were not directly determined by satellites, have been chronometrically referred to this place.

The people to-day were rather low-spirited, hunger making them very quiet and peaceable; and there was rarely an oath to be heard in the camp—not even a solitary *enfant de garce*. It was time for the men with an expected supply of provisions from Fitzpatrick to be in the neighborhood; and the gun was fired at evening to give them notice of our locality, but met with no response.

September 14th.—About four miles from this encampment the trail led us down to the river, where we unexpectedly found an excellent ford—the stream being widened by an island, and not yet disengaged from the hills at the foot of the range. We encamped on a little creek where we had made a noon halt in descending the river. The night was very clear and pleasant, the sunset temperature being 67° .

The people this evening looked so forlorn that I gave them permission to kill a fat young horse which I had purchased with goods from the Snake Indians, and they were very soon restored to gayety and good humor. Mr. Preuss and myself could not yet overcome some remains of civilized prejudices, and preferred to starve a little longer—feeling as much saddened as if a crime had been committed.

The next day we continued up the valley, the soil being sometimes very black and good, occasionally gravelly, and occasionally a kind of naked salt plains.

We found on the way this morning a small encampment of two families of Snake Indians, from whom we purchased a small quantity of *kooyah*. They had piles of seeds, of three different kinds, spread out upon pieces of buffalo robe; and the squaws had just gathered about a bushel of the roots of a thistle (*Cirsium Virginianum*). They were about the ordinary size of carrots, and, as I have previously mentioned, are sweet and well flavored, requiring only a long preparation. They had a band of twelve or fifteen horses, and appeared to be growing in the sunshine with about as little labor as the plants they were eating.

Shortly afterward we met an Indian on horseback who had killed an antelope, which we purchased from him for a little powder and some balls.

We crossed the Roseaux, and encamped on the left bank; halting early

for the pleasure of enjoying a wholesome and abundant supper, and were pleasantly engaged in protracting our unusual comfort, when Tabeau galloped into the camp with news that Mr. Fitzpatrick was encamped close by us with a good supply of provisions—flour, rice, and dried meat, and even a little butter.

Excitement to-night made us all wakeful; and after a breakfast before sunrise the next morning, we were again on the road, and, continuing up the valley, crossed some high points of hills and halted to noon on the same stream, near several lodges of Snake Indians, from whom we purchased about a bushel of service-berries, partially dried. By the gift of a knife I prevailed upon a little boy to show me the *kooyah* plant, which proved to be *Valeriana edulis*. The root, which constitutes the *kooyah*, is large, of a very bright yellow color, with the characteristic odor, but not so fully developed as in the prepared substance. It loves the rich moist soil of river bottoms, which was the locality in which I always afterward found it. It was now entirely out of bloom; according to my observation flowering in the months of May and June.

In the afternoon we entered a long ravine leading to a pass in the dividing ridge between the waters of Bear River and the Snake River, or Lewis' Fork of the Columbia; our way being very much impeded, and almost entirely blocked up, by compact fields of luxuriant artemisia. Taking leave at this point of the waters of Bear River, and of the geographical basin which encloses the system of rivers and creeks which belong to the Great Salt Lake, and which so richly deserves a future detailed and ample exploration, I can say of it, in general terms, that the bottoms of this river (Bear) and of some of the creeks which I saw, form a natural resting and recruiting station for travellers, now, and in all time to come. The bottoms are extensive, water excellent, timber sufficient, the soil good and well adapted to the grains and grasses suited to such an elevated region.

A military post and a civilized settlement would be of great value here; and cattle and horses would do well where grass and salt so much abound.

The lake will furnish exhaustless supplies of salt. All the mountain sides here are covered with a valuable nutritious grass, called bunch grass, from the form in which it grows, which has a second growth in the fall. The beasts of the Indians were fat upon it; our own found it a good subsistence; and its quantity will sustain any amount of cattle and make this truly a bucolic region.

We met here an Indian family on horseback, which had been out to gather service-berries, and were returning loaded. This tree was scattered about on the hills, and the upper part of the pass was timbered with aspen (*Populus trem.*); the common blue flowering flax occurring among the plants.

The approach to the pass was very steep; and the summit about six thousand three hundred feet above the sea—probably only an uncertain approximation, as at the time of observation it was blowing a violent gale of wind from the northwest, with *cumuli* scattered in masses over the sky, the day otherwise bright and clear.

We descended by a steep slope into a broad open valley—good soil—from four to five miles wide; coming down immediately upon one of the head-waters of the Pannack River, which here loses itself in swampy ground. The appearance of the country here is not very interesting. On either side is a regular range of mountains of the usual character, with a little timber, tolerably rocky on the right, and higher and more smooth on the left, with still higher peaks looking out above the range. The valley afforded a good level road; but it was late when it brought us to water, and we encamped at dark.

The northwest wind had blown up very cold weather, and the artemisia, which was our fire-wood to-night, did not happen to be very abundant. This plant loves a dry, sandy soil, and cannot grow in the good bottoms where it is rich and moist; but on every little eminence, where water does not rest long, it maintains absolute possession.

Elevation above the sea about five thousand one hundred feet.

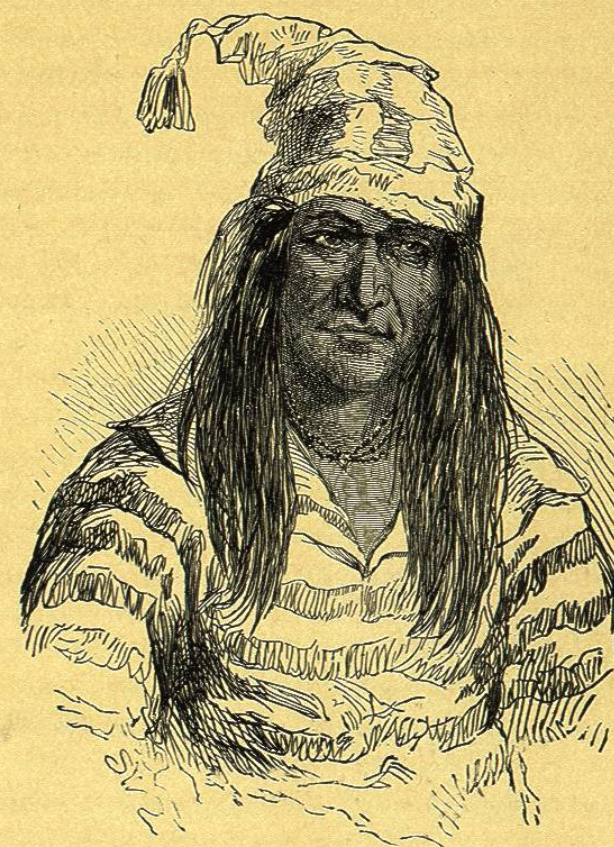
At night scattered fires glimmered along the mountains, pointing out camps of the Indians; and we contrasted the comparative security in which we travelled through this country with the guarded vigilance we were compelled to exert among the Sioux and other Indians on the eastern side of the Rocky Mountains.

At sunset the thermometer was at 50° , and at midnight at 30° .

September 17th.—The morning sky was calm and clear, the temperature at daylight being 25° , and at sunrise 20° . There is throughout this mountain country a remarkable difference between the morning and mid-day temperatures, which at this season was very generally 40° or 50° , and occasionally greater; and frequently, after a very frosty morning, the heat in a few hours would render the thinnest clothing agreeable.

About noon we reached the main fork. The Pannack River was before us; the valley being here one and a half mile wide, fertile, and bordered by smooth hills, not over five hundred feet high, partly covered with cedar; a high ridge in which there is a prominent peak rising behind those on the left. We continued to descend this stream, and found on it at night a warm and comfortable camp. Flax occurred so frequently during the day as to be almost a characteristic, and the soil appeared excellent. The opposite hills on the right are broken here into a great variety of shapes.

The evening was gusty, with a temperature at sunset of 59° . I ob-



UTAH INDIANS.

tained, about midnight, an observation of an emersion of the first satellite; the night being calm and very clear, the stars remarkably bright, and the thermometer at 30° . Longitude, from mean of satellite and chronometer, $112^{\circ} 29' 52''$; and latitude, by observation, $42^{\circ} 44' 40''$.

September 18th.—The day clear and calm, with a temperature of 25° at sunrise. After travelling seven or eight miles we emerged on the plains of the Columbia, in sight of the famous "*Three Buttes*," a well-known landmark in the country, distant about forty-five miles.

The French word *butte*, which so often occurs in this narrative, is retained from the familiar language of the country, and identifies the objects to which it refers. It is naturalized in the region of the Rocky Mountains; and even if desirable to render it in English, I know of no word which would be its precise equivalent. It is applied to the detached hills and ridges which rise abruptly and reach too high to be called hills or ridges, and not high enough to be called mountains. *Knob*, as applied in the Western States, is their most descriptive term in English. *Cerro* is the Spanish term; but no translation or paraphrasis would preserve the identity of these picturesque landmarks, familiar to the traveller, and often seen at a great distance.

Covered as far as could be seen with artemisia, the dark and ugly appearance of this plain obtained for it the name of the *Sage Desert*; and we were agreeably surprised on reaching the Portneuf River to see a beautiful green valley with scattered timber spread out beneath us on which, about four miles distant, were glistening the white walls of the fort. The Portneuf runs along the upland plain nearly to its mouth, and an abrupt descent of perhaps two hundred feet brought us down immediately upon the stream, which at the ford is one hundred yards wide and three feet deep, with clear water, a swift current, and gravelly bed; but a little higher up the breadth was only about thirty-five yards, with apparently deep water.

In the bottom I remarked a very great number of springs and sloughs, with remarkably clear water and gravel beds. At sunset we encamped with Mr. Talbot and our friends who came on to Fort Hall when we went to the lake, and whom we had the satisfaction to find all well, neither party having met with any mischance in the interval of our separation. They, too, had had their share of fatigue and scanty provisions, as there had been very little game left on the trail of the populous emigration; and Mr. Fitzpatrick had rigidly husbanded our stock of flour and light provisions, in view of the approaching winter and the long journey before us.

September 19th.—This morning the sky was very dark and gloomy, and at daylight it began snowing thickly, and continued all day, with cold, disagreeable weather. At sunrise the temperature was 43° . I rode up to

the fort, and purchased from Mr. Grant (the officer in charge of the post) several very indifferent horses, and five oxen in very fine order, which were received at the camp with great satisfaction; and one being killed at evening, the usual gayety and good humor were at once restored. Night came in stormy.

September 20th.—We had a night of snow and rain, and the thermometer at sunrise was at 34° ; the morning was dark, with a steady rain, and there was still an inch of snow on the ground, with an abundance on the neighboring hills and mountains. The sudden change in the weather was hard for our animals, which trembled and shivered in the cold—sometimes taking refuge in the timber, and now and then coming out and raking the snow off the ground for a little grass, or eating the young willows.

September 21st.—Ice made tolerably thick during the night, and in the morning the weather cleared up very bright, with a temperature at sunrise of 29° ; and I obtained a meridian observation for latitude at the fort, with observations for time. The sky was again covered in the afternoon, and the thermometer at sunset 48° .

September 22d.—The morning was cloudy and unpleasant, and at sunrise a cold rain commenced, with a temperature of 41° .

The early approach of winter and the difficulty of supporting a large party determined me to send back a number of the men who had become satisfied that they were not fitted for the laborious service and frequent privation to which they were necessarily exposed, and which there was reason to believe would become more severe in the further extension of the voyage. I accordingly called them together, and, informing them of my intention to continue our journey during the ensuing winter, in the course of which they would probably be exposed to considerable hardship, succeeded in prevailing upon a number of them to return voluntarily. These were: Charles De Forrest, Henry Lee, J. Campbell, William Creuss, A. Vasquez, A. Pera, Patrick White, B. Tesson, M. Creely, François Lajeunesse, Basil Lajeunesse.

Among these I regretted very much to lose Basil Lajeunesse, one of the best men in my party, who was obliged, by the condition of his family, to be at home in the coming winter. Our preparations having been completed in the interval of our stay here, both parties were ready this morning to resume their respective routes.

Except that there is a greater quantity of wood used in its construction, Fort Hall very much resembles the other trading-posts which have been already described, and would be another excellent post of relief for the emigrant. It is in the low, rich bottom of the valley, apparently twenty miles long, formed by the confluence of Portneuf River with Lewis' Fork of the Columbia, which it enters about nine miles below the fort, and

narrowing gradually to the mouth of the Pannack River, where it has a breadth of only two or three miles. Allowing fifty miles for the road from the *Beer Springs* of Bear River to Fort Hall, its distance along the *travelled* road from the town of Westport, on the frontier of Missouri, by way of Fort Laramie and the great South Pass, is one thousand three hundred and twenty-three miles. Beyond this place, on the line of road along the *barren* valley of the Upper Columbia, there does not occur, for a distance of nearly three hundred miles to the westward, a fertile spot of ground sufficiently large to produce the necessary quantity of grain, or pasturage enough to allow even a temporary repose to the emigrants.

On their recent passage they had been able to obtain, at very high prices and in insufficient quantity, only such assistance as could be afforded by a small and remote trading-post—and that a foreign one—which, in the supply of its own wants, had necessarily drawn around it some of the resources of civilization, but which obtained nearly all its supplies from the distant depot of Vancouver, by a difficult water-carriage of two hundred and fifty miles up the Columbia River and a land-carriage by pack-horses of six hundred miles.

An American military post sufficiently strong to give to their road a perfect security against the Indian tribes, who are unsettled in locality and very *uncertain* in their disposition, and which, with the necessary facilities for the repair of their equipage, would be able to afford them relief in stock and grain from the produce of the post, would be of extraordinary value to the emigration. Such a post (and all others which may be established on the line to Oregon) would naturally form the *nucleus* of a settlement at which supplies and repose would be obtained by the emigrant or trading caravans which may hereafter traverse these elevated and, in many places, desolate and inhospitable regions.

I subjoin an analysis of the soil in the river bottom near Fort Hall, which will be of assistance in forming some correct idea of its general character in the neighboring country. I characterize it as good land, but the analysis will show its precise properties.

ANALYSIS OF SOIL.

Silica	68.55
Alumina	7.45
Carbonate of lime	8.51
Carbonate of magnesia	5.09
Oxide of iron	1.40
Organic vegetable matter	4.74
Water and loss	4.26
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