

**The Washburn
Yellowstone Expedition**

Parts 1 and 2

from

THE
OVERLAND MONTHLY

DEVOTED TO

THE DEVELOPMENT OF THE COUNTRY

Vol. 6 - May, June, 1871 - Nos. 5, 6.

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THE WASHBURN YELLOWSTONE EXPEDITION.

NO. I.

SINCE the first settlement of Montana, vague stories have been floating about, in regard to the wonders of the country surrounding Lake Yellowstone. Trappers and half-breeds have dilated, in glowing terms, of impassable cañons, water-falls thousands of feet in height, and "steambot springs" of remarkable magnitude. Heretofore, these reports have been generally believed to be gross exaggerations. They, however, led to the formation of a party last summer, resolved upon as thorough an examination of that section of country as their leisure time would admit.

The expedition left Helena, Montana, August 17th, 1870. General Washburn, Surveyor-General of Montana, was elected Captain. The remaining members of the expedition were: S. T. Hauser, President of the First National Bank of Helena; N. P. Langford, late U. S. Collector of Internal Revenue; T. C. Everts, late U. S. Assessor; Messrs. Hedges, Gillette, Smith, Stickney, and Trumbull, all of Helena; two packers, and two unbleached American citizens of African descent. Each member of the party was mounted on horseback, and there were twelve pack animals.

By order of General Hancock, we were provided with an escort; and at Fort Ellis we were joined by Lieutenant Doane, of the Second Cavalry, with a

squad of soldiers, well mounted, and armed with needle carbines and revolvers. We citizens carried an assorted armory, consisting of Henry, Ballard, and Spencer rifles, revolvers, and bowie-knives. We intended to hunt for all sorts of large game, Indians only excepted. No one desired to find any of them.

On Monday morning, August 22d, our party bade adieu, for a time, to civilization; and leaving Fort Ellis, turned our faces toward the almost unexplored wilderness. The weather was fine; the air invigorating; all were cheerful, and each face betrayed that curiosity and expectation, which almost every one feels when entering upon a new field of adventure. Our course lay to the east, over Bozeman Pass; which will necessarily be the route of the Northern Pacific Railroad, if it goes anywhere in that vicinity.

Having passed over the divide, the party camped on Trail Creek, a small stream flowing into the Yellowstone. At this place a night-watch was established; which was maintained throughout the entire trip, in order to keep the Indians from breaking the Eighth Commandment.

The following day we reached the Yellowstone, and camped at Botteller's, which is the frontier *ranch*, as you as-

ced that river. During the day the party traveled in detachments. Three hunters kept several miles ahead; next, were two skirmishers in front of the main body; and a half-mile farther back, came the main body itself, together with the pack-train. As the skirmishers neared the river they discovered three Crows; not sitting on a tree, but riding in their direction. With keen military sagacity, they appreciated the position, and rallied on the main body with astonishing rapidity. This movement was much commended by parties who had had experience in our "late unpleasantness."

For many miles, both up and down the river, on the side opposite Botteller's, the mountains rise somewhat abruptly, bold and rugged, to a height of three or four thousand feet above the river. Clumps of pines and cedars are scattered over them. They remind one very much of the grandeur and massiveness of the Sierra Nevada Range. A recent snow-storm had thrown a robe of purity over the scene, which rendered it more than ordinarily beautiful.

From this point we followed the old Indian trail, leading up the left bank of the Yellowstone. It was generally from a fourth to a half-mile distant from the river-bank, and near the first line of bluffs, which bound the valley or river bottom. During the day we crossed three small streams, designated as Two-mile Creek and Eight-mile Creek—Nos. One and Two—being about those distances from Botteller's. At one place the trail crossed a rocky point, more than three hundred feet above the river, which there ran beside a precipice. The view was exceedingly fine. The valley was in sight from the mouth of the *cañon*, eight miles above, to a point at least forty miles below. The course of the river could be plainly discerned by an unbroken line of willows, stretching away to the north-east, while in the

background the lofty, snow-capped peaks glistened midway between the earth and the cloudless firmament above. We camped at the mouth of the *cañon*, where the Yellowstone issues from the mountains. Above that point there is no open country, until you reach the basin of the great lake.

During the day plenty of small game was killed, and the fishing was found to be excellent. Trout and white-fish were abundant—and such trout! They can only be found in the neighborhood of the Rocky Mountains, and on the Pacific Slope. Few of them weighed less than two pounds, and many of them over three. They had not been educated up to the fly; but when their attention was respectfully solicited to a transfixed grasshopper, they seldom failed to respond.

During the pleasant evening, and the long summer twilight peculiar to a northern latitude, some made rough sketches of the magnificent scenes by which we were surrounded; others wrote up their notes of the trip, while the rest serenely smoked their pipes, and listened to reminiscences from each other of by-gone times, or other scenes somewhat similar to those we then enjoyed.

The day following we continued our way through the *cañon*, up the river, which there wound around to the east. The trail kept near the river, was very rough, and went over several high, rocky points. Distant views were shut out by the mountains, which constantly surrounded us. The only features of unusual interest seen during the day were a beautiful, snow-capped mountain, at least ten thousand feet above the sea, and the Devil's Slide, similar to a feature so named in Echo Cañon, on the Union Pacific Railroad, but vastly exceeding that one in size. Two perpendicular walls of mud and rock run directly down a mountain. They are about half a mile long, and the larger one a hundred feet

high, and thirty feet across the top. Similar formations extend along the side of the mountain for some distance, but the rest are much smaller than the two mentioned. From a distance, the mountain appears to be traversed by a number of stone-walls running parallel to each other, from the summit to the base of the mountain, which is shaped like a long hay-stack. The walls are as regular as if they were a work of art.

In the evening we camped on the Yellowstone, at the mouth of Gardiner's River. The beach was of sand, with large rocks lying right at the water's edge. It was wide enough for us to spread our blankets upon it, and was lined upon the inside by a row of cedar-trees, beyond which the bluff, covered with sage-brush, rose a hundred feet.

The next day we forded Gardiner's River at its mouth, followed up the Yellowstone about two miles, and then, finding the *cañon* impassable, took a trail leading up the gulch to the right. In crossing the mountains, we attained the highest elevation we had yet reached. During the day an antelope was killed by one of the party. In the evening we camped on a clear mountain stream, not more than ten miles from our previous camp. The grass was abundant, and the location excellent. Two of the party, who went ahead, missed the camp, and were out overnight, although every endeavor was made to find them. They, however, got along well, by building a shelter of pine boughs, in front of which they made a large fire.

By the brook-side we found a number of prospect-holes, and some blazed trees, showing that enterprising miners had preceded us. A gentleman got a pan of dirt from one of the holes, and succeeded in panning out two nuggets, evidently from different gulches, their combined value being about \$8.

The next day we traveled about six hours, nearly due east, over the mount-

ains. After going sixteen miles, up hill and down, through gulches and woods, we camped on Warm Spring Creek, about a half-mile from its mouth, and at an elevation of 7,200 feet. Here we found our two lost friends, who had preceded us. The Yellowstone was several hundred feet beneath us; and but a short distance below our camp, one of the gentlemen had discovered some very picturesque falls, on Warm Spring Creek. At the foot of this creek we found a few warm springs, which probably caused early prospectors to so name the stream. The springs were small, and principally alum and sulphur, but they were interesting to us, as they were a new feature of the trip.

On the Yellowstone, opposite the mouth of the creek, huge, basaltic cliffs and columns rose to a height of six hundred feet, looking like castles and massive fortifications. A short distance below our camp there was a fall in the creek of 112 feet. For a few hundred yards above the fall the stream had worn its way through a sandstone bluff, cutting quite a deep *cañon*. Immediately about the head of the falls the rocks were worn into curious and fantastic shapes, looking, in daylight, like spires or steeples, rising from thirty to sixty feet above the falls; but, in the moonlight, reminding one of the portal of an old castle, or a number of the fabled *genii* standing ready to hurl adventurous mortals into the gorge below, which was enveloped by the shadows of the night in impenetrable darkness.

It was proposed to name these falls in honor of the discoverer, but it was decided to be in bad taste to name prominent objects after members of the expedition; besides, one of the party took an unaccountable interest in bestowing upon them the name of Tower Falls, which was finally adopted. His peculiar interest was afterward satisfactorily explained, as we learned he had a sweet-

heart by that name, somewhere in the States. Another of the party was in favor of the name of Minaret (Minnie Rhett); but that was too apparent, and he was outvoted.

The following day the party struck across the country to the south, cutting off a large bend in the river, and then passed to the right of a high mountain, which some of the party ascended. It was found to be the highest peak in that section, a barometrical observation showing it to be 10,700 feet high. In honor of General Washburn, whom we had elected Captain of the expedition, we named it "Mount Washburn."

About four o'clock we camped by a small, clear, cold brook, flowing through a grassy upland opening, and, just below us, entering a thick, gloomy forest, which continued to the Yellowstone, about three miles distant. In exploring the creek toward the river, when about a mile from camp, we came suddenly to a small opening on a steep hill-side, where we found a number of hot springs. There were four quite prominent, besides a number of smaller ones. I can not describe them better than by quoting from a description given by Mr. Hedges to a local paper. He spent some time in giving them a thorough examination:

"The westernmost spring had an oval-shaped basin, twenty by forty feet in diameter. Its greenish-yellow water was hot, and bubbles of steam or gas were constantly rising from various parts of its surface. This spring, with two others, was situated in about an east and west line, and at the upper side of the basin, which opened south, toward the creek. The central one of these three was the largest of all, and was in constant, violent agitation, like a seething caldron over a fiery furnace. The water was often thrown higher than our heads, and fearful volumes of stifling, sulphurous vapors were constantly escaping. The water was of a dark-lead color, and

intensely hot. As near as I now recollect, the basin of this spring was about thirty feet in diameter. There was very little water flowing away from it, and very little deposit from its overflowings was visible. It had no such mound as many that we saw subsequently, nor was its margin of such solid material. The easternmost and uppermost spring was not as large in its crater as its near neighbors, but was more infernal to look at, and suggested the name that we attached to the springs. . . . The substance was not as thick as mud, but rather beyond the consistency of soup, and was in constant, noisy ebullition, emitting fumes of villainous smell. The margin was not safe for close approach, but I ventured near enough to thrust a pine sapling into the substance of this infernal kettle, and on pulling it out found it covered about one-fourth of an inch thick with a lead-colored, sulphury slime. Nothing flows away in liquid form from this spring. It seems to be boiling down, and will doubtless become thick as pudding, like so many that we afterward saw. . . . So secluded is this cluster of springs, that it would be impossible to suppose it to have ever been seen before by any White Man; and it appeared to us the merest chance that directed our steps hither. How many similar basins are hidden away among the vast forests that cover this region we can best conceive, who have seen scores of them without turning much from our direct course."

We reached the falls of the Yellowstone on the morning of August 30th. These falls, two in number, are less than half a mile apart. From the lake to the upper falls, a distance of about twenty miles, the river flows, with the exception of a short series of rapids having a moderate current, through an open, undulating country, gently sloping toward the stream. Here and there are small groves, and the timber is quite

thick a mile away from the river. A quarter of a mile above the upper falls the river breaks into rapids, and foams in eddies about huge, granite bowlders, some of which have trees and shrubs growing upon them. Above the rapids the river is about 150 yards wide, but, as it approaches the falls, high, rocky bluffs crowd in on both sides, forcing the water into a narrow gorge, which, at the brink of the falls, is about thirty yards wide. The most convenient and desirable place from which to view the falls is from a ledge, easily reached, which juts into the river a considerable distance, just below the falls, and a few feet lower than their brink. It is so close that occasional drops dampen one's face. The height of the upper falls is 115 feet. The ledge is irregular, the water being much deeper on the west side than on the east. Great rocks project in the face of the fall, tearing and churning the waters into foam, with here and there a little strip of green, which contrasts beautifully with the surrounding silvery whiteness of the water.

Between the two falls the river flows quietly, in a wide channel, between steep, timbered bluffs, four hundred feet high. Just above the lower falls the bluffs again converge; the one from the west stretching out as if to dam up the river, which has, however, forced its way through a break, forty yards wide. The rocky cliffs rise perpendicularly from the brink of the falls, to a height of several hundred feet. The rocky formation is of a shelly character, and slightly colored with flowers of sulphur. The plunge of the water is in the direct course of the stream, and at the brink of the falls it appears to be of uniform depth. It clears its bed at a bound, and takes a fearful leap of 350 feet. The volume of water is about half as great as that which passes over the American Fall, at Niagara, and it falls more than twice the distance. The adjacent scenery is

infinitely grander. Having passed over the precipice, the clear, unbroken, greenish mass is in an instant transformed by the jagged edges of the precipice into many streams, apparently separated, yet still united, and having the appearance of molten silver. These streams, or jets, are shaped like a comet, with nucleus and trailing *coma*, following in quick succession; or they look like foaming, crested tongues, constantly overlapping each other. The outer jets decrease in size as they descend, curl outward, and break into mist. In the sunlight, a rainbow constantly spans the chasm. The foot of the falls is enveloped in mist, which conceals the river for more than a hundred yards below.

These falls are exactly the same in height as the Vernal Falls in the Yosemite Valley, but the volume of water is at least five times as great. I think I never saw a water-fall more beautiful than the Vernal, and its surroundings are sublime. Its Indian name is said to mean "Crown of Diamonds;" and it certainly deserves the name. I remember sitting on the rocky ledge just at the edge of the falls, and with an opera-glass watching the waters as they plunged downward, breaking into myriads of drops; each drop, like a lens, gathering prismatic tints from the shining sun, and flashing like diamonds of the purest brilliancy. The lower fall of the Yellowstone reminds me of the Vernal Fall, on the Merced. Though nothing, perhaps, can equal the sublime scenery of the Yosemite, yet that only excels the lower falls of the Yellowstone, and the grand *cañon* which extends for many miles below them.

Below the falls the hills gradually increase in height, while the river descends in a succession of rapids through the *cañon*. At the falls the *cañon* is not more than twelve hundred feet deep, but a few miles lower down it is nearly eight-hundred feet deep. Its average

width at the top is about a third of a mile. The east wall is nearly vertical for its entire height, and presents an almost unbroken face. The west wall is much cut by re-entering angles, or steep, lateral ravines, leaving between them rocky, projecting points, or cliffs, from which can be obtained a magnificent view of the falls and cañon. These cliffs have perpendicular faces, varying from four to eight hundred feet in height, below which the cañon, composed mostly of the *débris* which have fallen from above, slopes steeply to the water's edge.

The immense depth of this gorge almost overcomes the roar of the falls, and a short distance from the edge of the cañon the sound of the waters is unheard. The general color of the cañon is yellow, owing to the sulphureous fumes which rise from many steam-jets near the bottom; but in places the rock is of a reddish hue, while in others it is dazzlingly white. Days would be required to examine thoroughly and fully appreciate the vicinity of the falls, which, in many respects, are the most remarkable in America.

Leaving the falls the first morning in autumn, we took the trail through the timber, in a south-west direction. We soon found ourselves in an open, rolling country, gradually sloping down to the river. About six miles from the falls, and a half-mile back from the river, we came to three white hills, of a volcanic nature, thrown up entirely by deposits from hot and boiling mineral springs, which were between and around them. The largest was forty feet by sixty. It was perfectly quiet, and looked like any other deep, muddy pond; its peculiarity being that, although it was easy for any one to handle it, he who attempted any such familiarity was sure to get scalded. The spring which attracted most attention was about seven feet by ten, and threw whitish, hot water from eight to ten feet above the rim of its basin. It

also puffed like a steamboat, throwing off vast quantities of steam, and much resembled the Steamboat Geyser, in Sonoma County, California. Its rim was incrustated with sulphur, some specimens being quite pure.

Within a space of half a mile square, at least seventy-five different springs and steam-jets occur. The mounds, or hills, at the bases of which are these springs, are nearly three hundred feet high. They are covered with small holes and fissures, from which issue hot air and steam. No vegetation of consequence grows on them, but a few clumps of trees are scattered between the springs at their base. Many of the craters contain a grayish, pasty-looking substance, about the consistency of mush nearly cooked. Other springs have waters of blue, pink, yellow, and brown tinges. One small, bubbling spring, of clear water, has an intensely sour, acrid taste.

It is said that Indians do not go above the grand cañon on the Yellowstone. Whether this is true I know not, but I imagine that the unscientific savage finds little to interest him in such places. I should rather suppose he would give them a wide berth, believing them sacred to Satan. If a person should be cast into one of these springs, he would be literally immersed in a lake of burning brimstone.

There being no good grass near Crater Hills, after stopping a few hours to examine them we moved to a point on the Yellowstone, about three miles above. Near this camp were several mineral springs, all hot, and many of them boiling. Most of them were ordinary, bubbling, spluttering mud-springs, but three of them were quite remarkable. Of these the first, or lowest down the river, is a cave-spring, with an opening of ten feet in width by six in height, in solid rock, with an almost perfect, oval arch. The water is clear as crystal, of boiling heat, and a vitriolic taste. As you look into

the cave, it has the appearance of an opening to a subterranean lake. A small, hot stream flows from it. The water is continually washing its ten or twelve feet of shore, like an agitated lake. The bright pebbles in the bottom, the clean sand, and the smooth, white, flat stones left in regular ripples on its margin, together with the green, mossy sides of the cave, and the musical monotones of the rippling waters, almost lead one to think it the entrance to an enchanted land.

A hundred yards above this spring, upon the side of a hill, was another, entirely different in character. It was really a small volcano, throwing mud instead of lava. Intermittent thumps, like the discharge of artillery, could be heard, at intervals of from fifteen to thirty seconds, for the distance of a mile. At every pulsation, thick, white clouds of steam came rolling out, and mud was thrown from the crater, gradually enlarging the mound which surrounded it. While we were watching this spring the mud was only thrown over the rim of the crater, but from the clay clinging to the branches of surrounding trees, especially on the upper side of the spring, it was evidently thrown, at times, to a height of two hundred feet. A circle, a

hundred yards in diameter, was also well bespattered.

Between the last-mentioned spring and the river is a boiling spring, a placid pond, a deep, dry funnel, or an active geyser, according to the time of one's visit. In the course of a day we saw it in all its protean shapes. When in its funnel form, one would not dream that, from the small opening in the bottom, twenty or thirty feet below, would come a power capable of filling with water the funnel, which at the top is thirty feet by forty, and then so agitating it that the water would be splashed to a height of from thirty to fifty feet. If one saw it when the waters were troubled, he would be scarcely less astonished to hear it give one convulsive throb, and then see it quietly settle down in a single instant to the smooth surface of a placid pool. When the waters retired we went into the funnel, and found it rough, efflorescent, and composed of rock and hardened sulphur.

Though very different in character from the geysers afterward seen on the head-waters of the Madison River, and far less grand, this one was very peculiar, and we saw nothing resembling it during the rest of the trip.

THE WASHBURN YELLOWSTONE EXPEDITION.

NO. II.

AFTER remaining one day in the vicinity of the first geyser, we forded the Yellowstone just above our camp, and shaped our course for the lake. At the ford the river was quite wide, and a narrow bench of rock rose up from the bottom, stretching from bank to bank. On this bench the water was about three feet deep, but on either side of it was a foot or two deeper. In fording the stream, each man led a pack animal. All did very well while they kept upon the bench. Occasionally some one would get into deeper water, and become drenched, but he had the benefit of encouraging cheers from those who had crossed in safety, and who stood ready to welcome him upon the anticipated shore.

From the ford to the lake—a distance of about ten miles—our course was generally through timber, much of which had been blown down by strong winds, rendering traveling exceedingly tedious and difficult. In open places near the

river we were continually meeting with mud-springs, some of them of considerable magnitude. At one point in the river we discovered a short series of rapids, between high, rocky banks; the one on the east side rising to the proportion of a bluff. After fording a stream, about one-third the size of the Yellowstone, emptying into the lake, we camped on the edge of the timber, about a hundred yards from the lake-shore.

Lake Yellowstone is a lonely, but lovely inland sea, everywhere surrounded by "forests primeval," and nestled in the bosom of the Rocky Mountains. Some trappers have insisted that its waters ran both to the Atlantic and the Pacific, but such is not the case. The summit of the main chain, however, approaches within half a mile of its south shore, and in places the divide is very little above the lake. Its shape resembles the broad hand of an honest German, who has had his forefinger and the two adjoining shot off at the second

joint, while fighting for glory and Emperor William. The palm of the hand represents the main body, or north part, of the lake. The fingers and thumb, spread to their utmost extent—the thumb and little finger being much the longest—represent inlets indenting the south shore, and stretching inland, as if to wash away the Rocky Mountains. Between these inlets project high, rocky promontories, covered with dense timber. The largest stream flows into the lake at its upper end, or the extreme south-east corner. This stream is really the Yellowstone River, which, for a distance of thirty miles, has an average width of over fifteen miles. This enlargement constitutes the lake, which, after being augmented by several smaller streams, narrows down to the width of an eighth of a mile, and flows northward toward the great falls.

The mood of the lake is ever changing; the character of its shore is ever varying. At one moment, it is placid and glassy as a calm summer's sea; at the next, "it breaks into dimples, and laughs in the sun." Half an hour later, beneath a stormy sky, its waters may be broken and lashed into an angry and dangerous sea, like the short, choppy waves which rise in storms on Lake Erie and Lake Michigan. Where we first saw it, it had a glittering beach of gray and rock-crystal sand, but as we continued around it, we found rocky and muddy shores, gravel beaches—on which several varieties of chaledony were profusely scattered—and hot springs in abundance. Near the south-east end of the lake is the highest peak in the vicinity. It is steep and barren, and from the lake-shore appears to taper to a point. On the south side is a precipice, nearly a thousand feet high. Two of the party ascended it. It took them all of one day to make the trip and return. About two-thirds of the way up they were obliged to leave their horses,

and continue the ascent on foot. The altitude of the mountain, as obtained by observations with the barometer and thermometer, was 11,163 feet. Much snow was found before reaching the summit. A fine view of the surrounding country, and a good idea of the shape of the lake, were obtained. Immense steam-jets were seen to the south; but as our time was becoming somewhat limited, we did not remain to visit them. Several barometrical calculations were made; and we determined the height of the lake to be 8,300 feet.

On the south side of the lake we found dense timber, much of which was fallen. Through it were no trails, and traveling was exceedingly difficult. Many large trees had fallen, with their branches clear out into the lake, rendering it very hard to follow the lake-shore. We, however, kept the shore as much as possible, except when we cut across the bases of the promontories; though on one occasion we crossed a low divide in the main chain, and camped on the head-waters of Snake River, without finding it out for a day or two afterward. We thought the brook on which we were camped circled around, and ran into the lake.

While straggling irregularly through the dense timber which covers the main chain, one of the party, Mr. Everts, became separated from the rest of us; but his disappearance was unnoticed until we reached a small strip of open country on the head-waters of Snake River. Leaving the party for a short time, either in pursuit of game or for the purpose of viewing the country, was not an unusual occurrence with members of the expedition; and consequently little was thought of Mr. Everts' absence. We, however, at once camped, and waited for him to catch up.

One of the pack animals was missing; and the two packers, together with one of the party, went back on the trail to find him, hoping also to meet Mr. Ev-

erts, and to save him all trouble by guiding him into camp. The lost pack-horse was an extraordinary animal—a beautiful, golden stallion of vast proportions, some thought as much as thirteen hands high. Some people would have called him of buckskin color, but he was of that intensely brilliant hue which buckskin assumes when wet and in the shade. He was one of the animals which, in fording the Yellowstone, managed to flounder into deep water and saturate his pack; and whenever we waded through a slough, he was sure to be the horse that got stalled. In such cases he invariably waited until the packers, with their patience severely tried, went back and lifted him out by main force. On this particular occasion, he had proven himself the acrobat of the pack-train by turning a number of somersaults backward, down the hill, pack and all; and when found, was astride a log lengthwise, his feet just touching on either side, but either unable to extricate himself, or too proud and patient to make an effort to do so. He consequently very resignedly contemplated his position and surroundings. He was too proud and spirited to betray any emotion, though his situation was undoubtedly distasteful to his feelings. In war, he might have been a lion; in peace, he was certainly a lamb. He was just the kind of a horse that, in a race, would have driven every thing else before him. The pedigree of the beast has not been authentically preserved, but there is good reason to believe that his dam was Rosinante, while he was sired by Baalbec, the horse Mark Twain rode through the Holy Land. He was dubbed the "Yellowstone Wonder."

Toward evening Mr. Everts' disappearance excited grave apprehensions. It would have been extremely difficult for any one to have followed our trail through the dense forests and over the fallen timber. Besides, Mr. Everts was

quite near-sighted. Every endeavor was made to attract his attention, by firing guns and building fires on prominent points near the camp. Failing to find him, we changed our camp to the lake-shore, and remained for more than a week in the immediate vicinity, searching vigilantly for him. We expected to find him somewhere on the south-west shore of the lake, as at the time he was lost it was generally understood we would that evening camp on the south-western arm of the lake.

On the afternoon of September 13th, when Mr. Everts had been missing four days, there were slight indications of snow, which indications continued for two days, by which time it was two feet deep. The weather was not very cold, and by means of the tent we got along quite comfortably; but we feared that the storm would prove fatal to our poor, lost friend. Conjectures as to his probable fate were numberless, but futile. Our chief hope lay in the fact of his being well mounted, and the hope that, failing to find us on the second day, he had started for the settlements; in which case he might possibly be beyond the region of the snow-storm. When lost he was without provisions, but had with him a needle-gun. We continued our efforts until nearly out of provisions; and then, leaving three persons to still look for him, the rest of us turned toward the settlements.

Immediately on our arrival, two old mountaineers were furnished with six weeks' provisions, and offered a large reward if they succeeded in finding him, or should bring back his body. They found him, quite exhausted, and nearly famished, about sixty miles from Bozeman. He was trying to follow back on the route by which we ascended the Yellowstone. It seems that his horse got away from him the day after he left us. His gun was made fast to the saddle, and his revolver was in his *cantinas*; so

that he had no means of providing himself with food. During the snow-storm he got along by building a shelter of pine boughs over a warm spring. For forty days he lived on roots, and two minnows, which he caught in his hat. He tried to eat grasshoppers, but he found their jumping propensities were not confined to a living state; for he had no sooner swallowed one than it cleared his throat with a bound. It was weeks after his rescue before he fully recovered his strength. His escape from a terrible death was almost marvelous.

Our last camp on the lake was near the extremity of the south-west arm. Close by us was a collection of warm springs—the largest, most numerous, varied, and peculiar which we had then discovered. Several were from fifty to eighty feet in length, by from twenty to fifty in width. The water was generally clear, and of great depth. All were hot, but of different temperatures. Around the larger ones the ground was marshy, and largely composed of a reddish earth, which looked like wet brick-dust. A number of hot streams flowed from these springs into the lake. The lake-shore was covered with a subsilica, broken into small pieces, and washed smooth by the action of the waves. Many of these pieces were pure and white as alabaster. Many of the smaller springs were mud-springs, boiling and spluttering incessantly. These were generally a few feet below the surface, and encased in clay banks. They emitted a strong, sulphurous smell, which rendered a close examination rather disagreeable. Several springs were in the solid rock, within a few feet of the lake-shore. Some of them extended far out underneath the lake; with which, however, they had no connection. The lake water was quite cold, and that of these springs exceedingly hot. They were remarkably clear, and the eye could penetrate a hundred feet into their depths, which to the hu-

man vision appeared bottomless. A gentleman was fishing from one of the narrow isthmuses, or shelves of rock, which divided one of these hot springs from the lake, when, in swinging a trout ashore, it accidentally got off the hook and fell into the spring. For a moment it darted about with wonderful rapidity, as if seeking an outlet. Then it came to the top, dead, and literally boiled. It died within a minute of the time it fell into the spring.

On the 17th of September, the party left Lake Yellowstone for home, by way of the Madison River. Our immediate objective point was a small lake, in which the Fire Hole River, the main branch of the Madison, has its source. This was supposed to be about twelve miles west of us. In crossing the divide we found that the snow-storm had been general; about two feet of snow still remaining. We failed to find the lake, but finally camped in the snow, on a small stream running to the south, probably into the lake. The mountains were everywhere thickly timbered. Nearly all the trees had great lumps, like hornets' nests, upon their trunks. They were generally large, but scraggy and irregular, and wholly unlike the tall, straight pines of the Sierras. It is said that nothing was created in vain; but it was a long time before I could conceive the utility of a forest so vast in a locality so remote and inaccessible. It was suggested to me by a comrade that the trees protected the snow, preventing it from melting at once during the first warm days of spring, and thereby producing a freshet destructive of every thing in its wake. I can think of no other reason for their creation.

The following day we traveled north-west, and soon reached the Fire Hole River. After passing by a fine cascade—which we stopped but a short time to examine—we forded the river, and camped about noon in the midst of the most

wonderful geysers yet discovered in any country. The basin in which they were situated was over two miles long, and about a mile wide. It was nearly destitute of vegetation, but there were a few clumps of trees scattered through it, and in one place we found grass enough for our horses. The basin was chiefly on the west side of the river, but there was a narrow strip, with an average width of three hundred yards, on the east side, which was literally alive with geysers and steam-jets. We remained two days in this wonderful basin. The most prominent geysers which we saw in operation we named as follows: "Old Faithful," which was farthest up the river on the western bank; "The Castle," which was a third of a mile below "Old Faithful;" "The Giant," which was a half-mile below "The Castle;" "The Grotto," a short distance below "The Giant;" then crossing the river, lowest down was the "Fantail," and much higher up, nearly opposite "Old Faithful," were "The Giantess" and "Beehive."

All around the geysers the ground was covered with incrustations and subsilica; and immediately about the vent of most of them the incrustations rose several feet above the surrounding level, assuming grotesque and fanciful shapes.

"Old Faithful" was the first geyser we saw throwing up a column of water. It was named on account of its almost constant action. It did not intermit for more than an hour at any time during our stay. It had a vent five feet by three, and projected a solid column of water to a height of eighty or ninety feet. All around it were found pebbles and small stones, which, when broken open, proved to be simply pieces of wood, thoroughly incrustated, and perfectly hard and smooth on the outside, having the appearance of an ordinary stone.

About the crater of "The Castle" was the largest cone, or mass of incrustations, in the basin. For a hundred yards

around, the ground, flooded with subsilica, of glittering whiteness, sloped gradually up to the cone, which itself rose thirty feet, nearly perpendicular. It was quite rugged and efflorescent, and on its outer sides had a number of benches, sufficiently wide for a man to stand upon. These enabled us to climb up and look into its crater, which was irregular in shape, and about seven feet, the longest way, by five feet, the shortest. The outside of the mound was nearly round, and not less than thirty feet through at its base. We called it "The Castle," on account of its size and commanding appearance. It was in action a short time on the morning after our arrival, but only threw water about thirty feet high. The water did not retain the shape of a column, like that thrown out by "Old Faithful," but rather splashed up and slopped over. This geyser did not appear to be doing its best, but only spouted a little in a patronizing way, thinking to surprise us novices sufficiently without any undue exertion on its part.

The mound around "The Giant" was about twelve feet high, and had a piece knocked out of one side of it, so that we could look into the crater, which was shaped like a hollow cylinder, and six feet in diameter. "The Giant" discharged a column of water, of the same size as its crater, to a height of a hundred feet. It played as if through an immense hose. We thought it deserved to be called "The Giant," as it threw out more water than any other geyser which we saw in operation. Its cone was also large, and the water was very hot; as, in fact, was the case with the water of all the geysers. The day of our arrival, it was in nearly constant action for about three hours, after which we did not see it again discharge.

"The Grotto" has two craters, connected on the surface by the incrustations which surround them. We did not ascertain whether there was any

subterranean connection between them. We did not observe both craters discharge at the same time, but one began when the other ceased. Neither was in action for more than an hour. A solid stream was thrown up more than sixty feet; that from the larger crater being about five feet in diameter, and that from the smaller one not more than three feet. The larger mound of incrustations was about ten feet high, and twenty feet through at the base. There were several holes in it large enough for a man to crawl through, which some of the party did, when the geyser was not in action. The smaller mound was not more than five feet high, and shaped like a hay-cock, with a portion of the top knocked off. The two mounds were about twenty feet apart, and connected by a ridge, or neck of incrustations, two feet high. "The Grotto" was about a hundred yards from the river. A quarter of a mile farther back, and just at the edge of the timber, we found a mound in the true shape of a cone. At the vertex was a small opening, not more than a foot in diameter. This geyser did not appear to have discharged for some time. The ground was quite dry all around, and a number of incrustated pine twigs, leaves, and cones were found, which retained their shape perfectly, but were hard, smooth, and white as alabaster. At that point, much ballast was obtained for the pack animals.

Crossing the river, we named the "Fantail" geyser from the fact that it discharged two streams from its vent which spread out very much like a fan.

One of the most remarkable geysers was "The Giantess." For yards around the ground rose gradually to its crater, but immediately about it was no formation rising above the surface, as was the case with all the other geysers which we saw in active operation. When quiet, it was a clear, beautiful pool, caught in a subsilica urn, or vase, with a hollow,

bottomless stem, through which the steam came bubbling, just like the effervescence of champagne from the bottom of a long, hollow-necked glass. The mouth of the vase, represented by the surface, was twenty feet by thirty; and the neck, fifty feet below, was fifteen feet by ten. The water, at times, retired to the level of the neck, or vent, and at other times rose nearly to the surface. When in action, "The Giantess" became a fountain with five jets, shooting the spray to a height of two hundred feet. At the surface the largest jet was about two feet in diameter, and it kept in solid column for more than a hundred and fifty feet before breaking into drops and spray. It burst forth just before sunset, and the last rays of light gave prismatic tints to the glistening drops, when, having reached their utmost altitude, they trembled at their coming fall. The clouds of steam, which in this, as in all other instances, accompanied the boiling water, became a golden fleece lit up by wreaths of rainbows. Though inferior to "The Giant" in immensity of volume, and perhaps in grandeur, "The Giantess" was by far the most beautiful sight we saw in the geyser basin.

"The Beehive" — named from the shape of its mound — was quite small, but threw its water higher than any other geyser which we saw. The stream was less than two feet in diameter, and ascended two hundred and twenty feet, from accurate measurement by triangulation. It remained in action only a few moments.

We saw many other geysers in action, but those I have particularly described were the most notable. They were all intermittent, few of them continuing in action more than half an hour at a time. There were also many mounds from which the water was evidently discharged at times, but they were quiet during our stay. We were probably very fortunate

in the time of our visit, for those we left behind to search for Mr. Everts came by these geysers several days later, and saw but two in operation: "The Fantail," and a smaller one near it. They were, however, short of provisions, and remained in the vicinity of the geysers but a few hours.

Steam-jets and clear, deep pools occurred in great numbers, all over the geyser basin. The latter were very beautiful. Four or five miles below the geyser basin, on the west side of the Fire Hole, were four hot lakes. They were similar to the clear, pale-violet pools which we saw above, and at the point where we left the lake, but were very much larger. Three of the party paced around the largest one, making the circumference four hundred and fifty paces. It looked very deep. The sides, of the whitest subsilica, converged at an angle of about forty-five degrees. It was full to the brim, and a track, about twenty feet wide all around it, was covered with two inches of water, which was so hot that it almost scalded our feet, through heavy boots. Before our pacers got all the way round, they stepped not only very high, but in quite a lively, animated style. Beyond the track of water which circled the lake, the ground, covered with subsilica, sloped away gradually on all sides. Immense volumes of steam rose from all these lakes, and first attracted our attention to them. So much hot water flowed from them that the Fire Hole was tempered for several miles below. We found no fish anywhere in the Fire Hole, though after its junction with the Madison they were quite plentiful.

Leaving the hot lakes, we continued homeward. On the way we passed through two beautiful *cañons*; one on the Fire Hole, and one on the Madison. The *cañon* on the Fire Hole is grand and beautiful. Its sides are granite, nearly perpendicular, and from eight

hundred to a thousand feet high. It is cut on both sides by small, lateral ravines, which are filled with evergreens; and on both sides of the river is a narrow bottom, also covered with trees and verdure. The *cañon* on the Yellowstone is grand and gloomy. This one is beautiful and cheerful. The first was seen from above, the last from below. The former inspires one with awe, the latter with delight.

The Madison *Cañon* may be less grand, but scarcely less beautiful. Its walls are not so high, and generally not quite so precipitous. It is filled with fine timber, affords splendid and picturesque camping-places, and is watered not only by the Madison River, but by pleasant, clear, rippling brooks, which flow through ravines entering the sides of the *cañon*.

On the 22d of September, just one month after leaving Fort Ellis, the party reached Farley's, the frontier *ranch* on the Madison River. It was a little strange to feel that we were again within the pale of civilization. During our month's absence, we had seen so much that was new and strange that it seemed more like a year. Every one felt funny; and we looked at each other and laughed in a silly way, as one small boy does, when, on entering church or any other place where he ought to keep quiet, he catches the eye of another small-boy acquaintance. There was a pleasure in getting home; and all felt curious to hear the news. Papers, old and new, were alike seized, and devoured with wonderful avidity. One gentleman even got hold of a Norwegian paper, but it was too much for his brain.

As an agricultural country, I was not favorably impressed with the great Yellowstone basin; but its brimstone resources are ample for all the match-makers of the world. A snow-storm in September, two feet deep, is hardly conducive to any kind of agricultural enter-

prise or stock-raising; still, I think sheep would do well in that country, if some shelter were erected for them in winter. When, however, by means of the Northern Pacific Railroad, the falls of the Yellowstone and the geyser basin are rendered easy of access, probably no portion of America will be more popular as a watering-place or summer resort than that which we had the pleasure of viewing, in all the glory and grandeur of its primeval solitude.
