

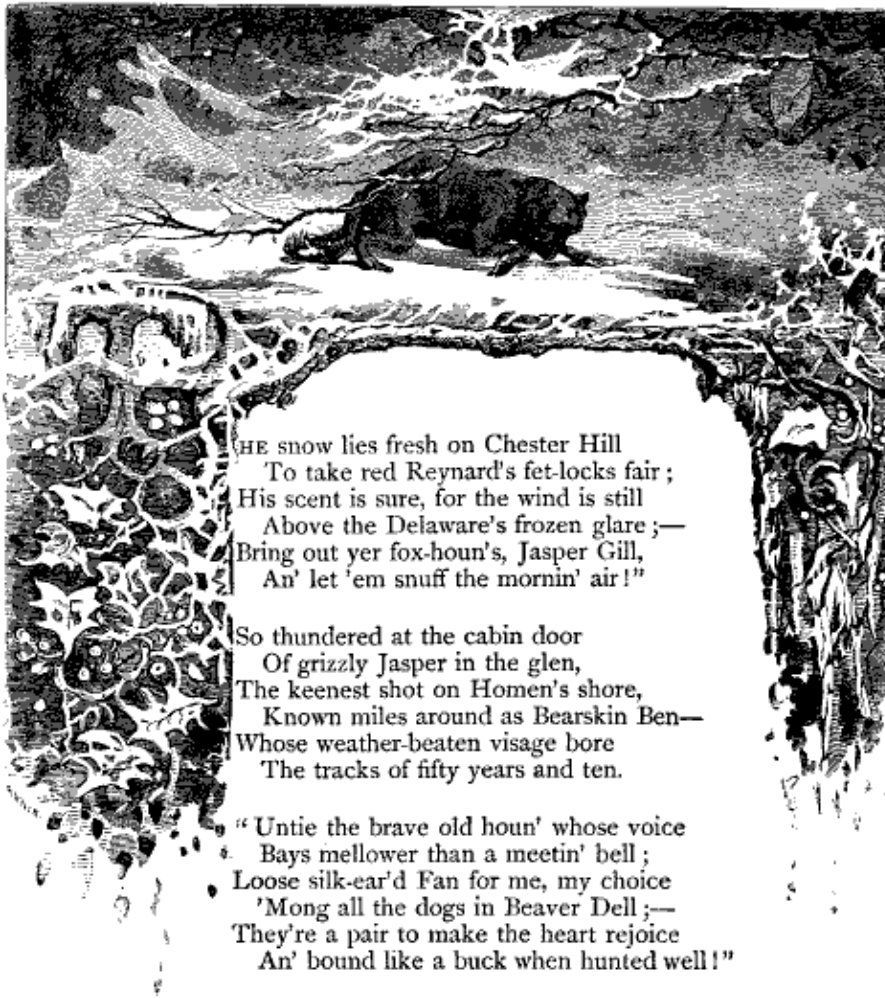
# SCRIBNER'S MONTHLY.

Vol. III.

FEBRUARY, 1872.

No. 4

## THE FOX-HUNTERS.



THE SNOW lies fresh on Chester Hill  
To take red Reynard's fet-locks fair ;  
His scent is sure, for the wind is still  
Above the Delaware's frozen glare ;—  
Bring out yer fox-houn's, Jasper Gill,  
An' let 'em snuff the mornin' air !”

So thundered at the cabin door  
Of grizzly Jasper in the glen,  
The keenest shot on Homen's shore,  
Known miles around as Bearskin Ben—  
Whose weather-beaten visage bore  
The tracks of fifty years and ten.

“Untie the brave old houn' whose voice  
Bays mellow than a meetin' bell ;  
Loose silk-ear'd Fan for me, my choice  
'Mong all the dogs in Beaver Dell ;—  
They're a pair to make the heart rejoice  
An' bound like a buck when hunted well !”

Gray Jasper hears his comrade call,  
And, whistling to his eager pack,  
Down snatches from the cabin-wall  
His rifle, hung on stag-horn rack ;  
Bids wife farewell till twilight-fall,  
And strides away on the red-fox track.

O'er mountain-crest, 'cross lowland vale,  
Where Hero hotly leads the chase,

## THE WONDERS OF THE WEST—II.

MORE ABOUT THE YELLOWSTONE.



THE GREAT CAÑON AND LOWER FALLS OF THE YELLOWSTONE.

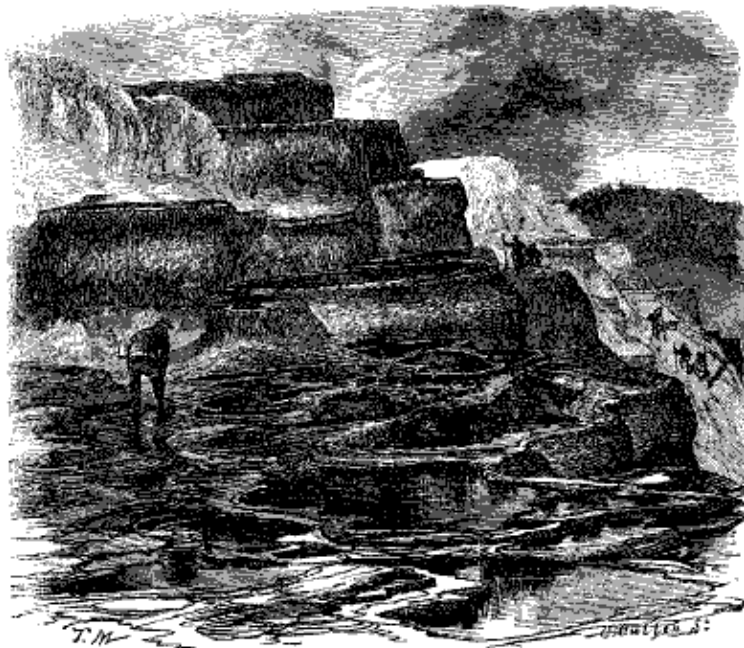
THE interesting accounts that have been given in this MONTHLY, from time to time, of the remarkable natural phenomena in the valley of the Yellowstone, have created a general interest throughout the country.

During the past summer the writer enjoyed unusual facilities for exploring this singular region, and he gladly bears witness that the statements of Mr. Langford were in no respect exaggerated. Indeed, it is quite impossible for any one to do justice to the remarkable physical phenomena of this valley by any description, however vivid. It is only through the eye that the mind can form anything like an adequate conception of their beauty and grandeur.

We may make our story more clear to our readers if we take as our starting-point Fort Ellis, a beautiful frontier military post, located near the head of the fertile valley of the Gallatin. By the great kindness of the officers of that post, we were provided with all the outfit that was necessary for our adventurous journey to the Yellowstone. On the 15th of July last we commenced our winding way over the grassy hills that form the divide

between the waters of the Missouri and Yellowstone. Our course was nearly due east for about thirty miles, when we came to the valley of the Yellowstone, and then we ascended the valley for ten miles farther, and pitched our permanent camp near Boteler's Ranch, close to the lower cañon, and at the farthest point to which it would be safe to go with our wagons. From this point we changed our mode of travel to pack-animals. Here began the more difficult part of our journey. The whole party were filled with enthusiasm to catch a glimpse of the wonderful visions of which we had already heard so much. Opposite our camp were the Yellowstone mountains, with peaks rising 12,000 feet above the sea-level and 6,000 feet above the valley. For beauty and symmetry of outline I have never seen this range equaled in the Far West, and several members of the party, who were familiar with the mountains of Central Europe, were struck at once with the resemblance to the Alps. But we will continue our way up the valley, leaving behind us the lofty volcanic hills, which wall us in on each side, and enter the lower cañon. Here granite walls rise on

either side to the height of a thousand feet or more, and through the narrow gorge the river dashes with great velocity. The bright green color of the water, and the numerous ripples, capped with white foam, as the roaring torrent rushes around and over the multitude of rocks that have fallen from above into the channel, give a most picturesque view to the eye as we look from our lofty heights. Not the least attractive feature, and one that to us amounted to a wonder, was the abundance of fine trout which the river afforded. There seemed to be no limit to them, and hundreds of pounds' weight of the speckled beauties were caught by the different members of our party. But we cannot linger here, although the scenery is very attractive, so we hasten on to the Devil's Slide, or Cinnabar Mountain, as it is usually called. It is one of the singular freaks of nature which occur very seldom in the West; is formed of alternate beds of sandstone, limestone, and quartzites, elevated to a nearly vertical position by those internal forces which acted in ages past to lift the mountain ranges into their present heights. As we stand at the base and look up the sides of the mountains, we are filled with wonder at the apparent evidences of the convulsions of nature which could have thrown 3,000 to 5,000 feet in thickness of rocks into their present position. Ridge after ridge extends down the steep sides of the mountain like lofty walls, the intervening softer portions having been washed away, leaving the harder layers projecting far above. At one locality the rocks incline in every possible direction, and are crushed together in the utmost confusion. Between the walls at one point is a band of bright brick-red clay, which has been mistaken for cinnabar, and hence the name of the mountain. The most conspicuous ridge is composed of basalt, and the igneous material was poured out on the surface when all the rocks were in a horizontal position during the Jurassic period. Indeed, all the rocks are either of the Carboniferous, Jurassic, or Cretaceous age. During the day we passed many



BATHING-POOLS; (DIANA'S BATH).

examples of volcanic action, which in any other region would have excited attention. Small lakes, covered with wild fowl and fringed with a luxuriant growth of vegetation, occupied the old volcanic craters. On the evening of the third day, as we came to the junction of Gardiner's River, the warm springs began to appear near the edge of the stream. The white calcareous deposit, which always indicates that those springs do exist, or have existed, covered the bottom, and from underneath this crust a stream poured a volume of water into the river, six feet wide and two feet deep, with a temperature of 130°. A little farther up the stream were a number of hot springs of about the same temperature, with nearly circular basins six to ten feet in diameter and two to four feet deep. Around them had already gathered a number of invalids, who were living in tents, and their praises were enthusiastic in favor of the sanitary effects of the springs. Some of them were used for drinking and others for bathing purposes.

From the river our path led up the steep sides of the hill for about one mile, when we came suddenly and unexpectedly in full view of the springs. This wonder alone, our whole company agreed, surpassed all the descriptions which had been given by former travelers. Indeed, the Langford party saw nothing of this. Before us arose a high white mountain, looking precisely like a frozen cascade. It is formed by the calcareous sediment of the hot springs,

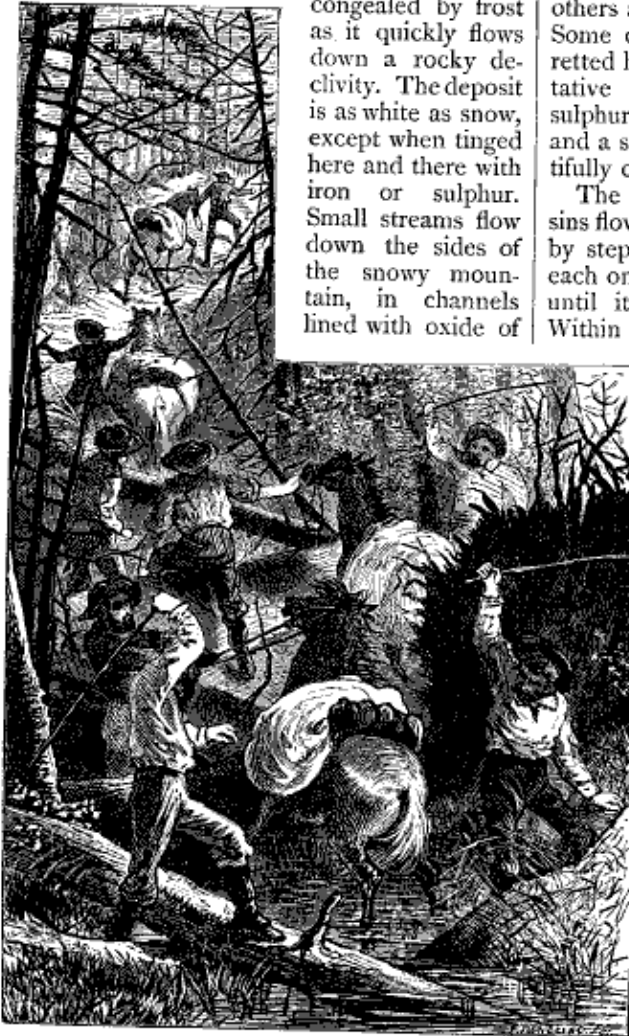
precipitated from the water as it flows down the steep declivities of the mountain side. The upper portion is about one thousand feet above the waters of Gardiner's River. The surface covered with the deposit comprises from three to four square miles. The springs now in active operation cover an area of about one square mile, while the rest of the territory is occupied by the remains of springs which have long since ceased to flow. We pitched our camp upon a grassy terrace at the base of the principal group of active springs. Just in the rear of us were a series of reservoirs or bathing-pools, rising one above the other, semi-circular in form, with most elegantly scalloped margins composed of calcareous matter, the sediment precipitated from the water of the spring. The hill, which is about two hundred feet high, presents the appearance of water

congealed by frost as it quickly flows down a rocky declivity. The deposit is as white as snow, except when tinged here and there with iron or sulphur. Small streams flow down the sides of the snowy mountain, in channels lined with oxide of

iron colored with the most delicate tints of red. Others present the most exquisite shades of yellow, from a deep bright sulphur to a dainty cream-color. In the springs and in the little channels is a material like the finest Cashmere wool, with its slender fibers floating in the water, vibrating with the movement of the current, and tinged with various shades of red and yellow, as bright as those of our aniline dyes. These delicate wool-like masses are undoubtedly plants, which seem to be abundant in all the hot springs of the West, and are familiar to the microscopist as diatoms. Upon a kind of terrace covering an area of two hundred yards in length and fifteen in width are several large springs in a constant state of agitation, but with a somewhat lower temperature than the boiling-point. The hottest spring is  $162^{\circ}$ ; others are  $142^{\circ}$ ,  $155^{\circ}$ , and  $156^{\circ}$ , respectively. Some of them give off the odor of sulphuretted hydrogen quite perceptibly. A qualitative analysis shows the water to contain sulphuretted hydrogen, lime, soda, alumina, and a small amount of magnesia. It is beautifully clear, and slightly alkaline to the taste.

The water after rising from the spring basins flows down the sides of the declivity, step by step, from one reservoir to the other, at each one of them losing a portion of its heat, until it becomes as cool as spring-water. Within five hundred feet of its source our

large party camped for two days by the side of the little stream formed by the aggregated waters of these hot springs, and we found the water most excellent for drinking as well as cooking purposes. It was perfectly clear and tasteless, and harmless in its effects. During our stay here all the members of our party, as well as the soldiers comprising our escort, enjoyed the luxury of bathing in these most elegantly carved natural bathing-pools, and it was easy to select, from the hundreds of reservoirs, water of every variety of temperature. These natural basins vary somewhat in size, but many of them are about four by six feet in diameter, and one to four feet in depth. With a foresight worthy of commendation, two men have already preempted 320 acres of land covering most of the surface occupied by the active springs, with the expectation that upon the completion of the Northern Pacific Railroad this will



TRAVELING IN THE YELLOWSTONE COUNTRY.



GREAT HOT SPRINGS AT GARDINER'S RIVER.

physical phenomena of that most interesting region.

The level or terrace upon which the principal active springs are located is about midway up the sides of the mountain covered with the sediment. Still farther up are the old ruins of what must have been at some period of the past even more active springs than any at present known. The sides of the mountain for two or three hundred feet in height are covered with a thick crust of the calcareous deposit, which was originally ornamented with the most elegant sculpturing all over the surface, like the bathing-pools below. But atmospheric agencies, which act readily on the lime, have obliterated all their delicate beauty. Chimneys partially broken down are scattered about here and there with apertures varying in size from two inches to two feet in diameter. Long, rounded ridges are also quite numerous, with fissures extending the entire length, from which the boiling water issued forth and flowed over the sides. Thus the sediment was continually precipitated in thin

become a famous place of resort for invalids and pleasure-seekers. Indeed, no future tourist in traveling over the Far West will think of neglecting this most wonderful of the

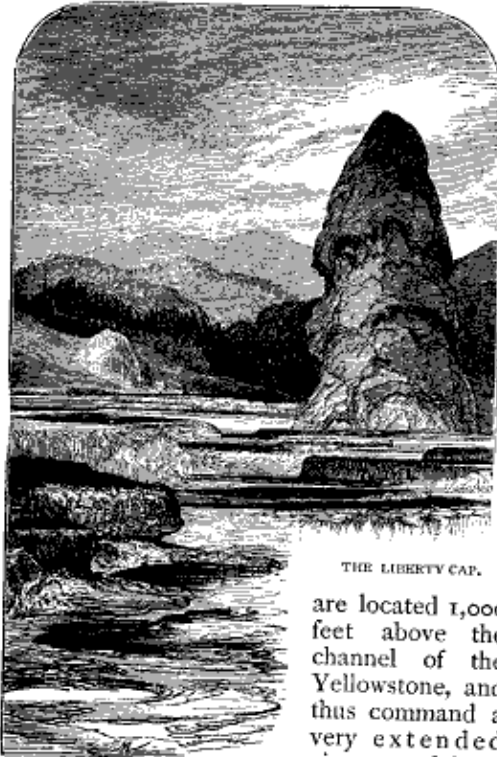
oval layers, so that a section of these oblong chimneys presents the appearance of layers of hay in a stack, or the thatched cabin of a peasant. Some of these chimneys were undoubtedly formed by geysers, now extinct; others by what may be called spouting-springs, as those which are in a constant state of violent ebullition, throwing the water up two to four feet—a phenomenon intermediate between a boiling-spring and a true geyser. The water is forced up through an orifice in the earth by hydrostatic pressure, and overflowing, precipitates the sediment around it; and thus, in time,

it builds up a mound varying in height according to the force of this pressure. One of these cones is very remarkable, surpassing any observed in any other portion of the West. From its peculiar form we almost involuntarily named it the "Liberty Cap." It is entirely composed of carbonate of lime, in flexible cap-like layers, with a diameter at the base of fifteen feet, and a height of about forty feet. It is completely closed over at the summit. This is probably an extinct geyser, and was the most powerful one of this group.

Sometimes the orifice is in the form of a fissure 100 to 300 feet in length, and the mound built up by the deposition of the sediment will be of oblong shape. As the mound rises, the hydrostatic force diminishes, until finally the spring entirely conceals itself at the summit, and either becomes extinct or flows out through fissures in the sides. Classed with reference to their chemical constituents, there are two kinds of springs in the valley of the Yellowstone, viz.: those in which lime predominates, and those in which silica is most abundant. In respect to beauty of form, the calcareous springs build up monuments that far surpass the others. The stalactites and beautiful fresco-work in the Mammoth Cave of Kentucky are precipitated from springs holding a great amount of lime in solution. The remarkable forms which lime is caused to assume through the influences of water is well shown in all limestone regions.

The scenery in the vicinity of these hot springs is varied and beautiful beyond description. I have already stated that they





THE LIBERTY CAP.

are located 1,000 feet above the channel of the Yellowstone, and thus command a very extended view up and down

the valley. To the north the Devil's Slide can be distinctly seen, while on either side the mountains rise to the height of 2,000 feet, inclosing the valley as with gigantic walls. From the summit still higher, piercing the clouds, are numerous basaltic peaks, presenting a great variety of unique forms. To the eastward is a bluff wall composed of 1,200 to 1,500 feet of strata, revealing one of the most perfect geological sections observed in the



THE FIRST BOAT ON YELLOWSTONE LAKE.

West. On the summit is a thick cap of basalt which extends up Gardiner's River, and forms the floor over which the waters of the east, middle, and west forks of that stream flow, and dash down in most beautiful cascades.

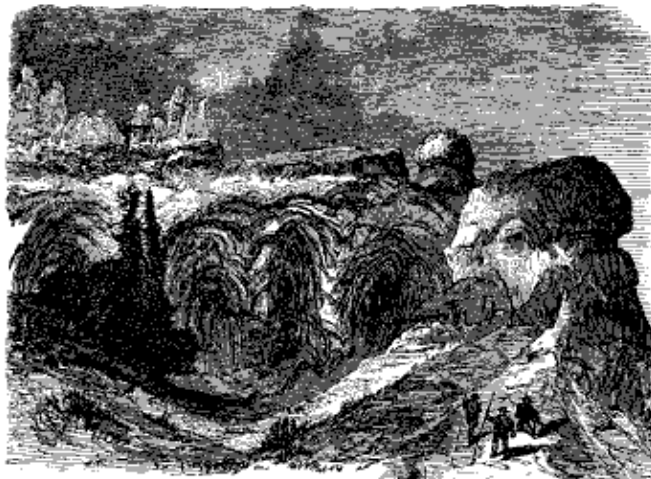
In the sides of the cañons of these branches are rows of basaltic columns as perfect as those so familiar to all who have visited Finjal's Cave in Staffa. In all my explorations in the Far West I have never seen such exquisite exhibitions of this semi-crystallized structure. Between the middle and west forks stands the dome-like form of Mount Everts, clothed with a dense growth of pines, its summit covered with fragments of basalt. From its top the view is grand, reaching over a radius of fifty to one hundred miles in every direction. On the west are the higher ranges of mountains about the sources of the Gallatin and Missouri forks, with their loftiest peaks covered with perpetual snow.

We must not linger here, however, amid these impressive scenes, but wind our way up the valley in search of more wonders. These will meet us in rapid transition from step to step. We can only stop a moment to glance at one of the greatest beauties of the valley—Tower Falls, or Tower Creek, where the water makes a vertical descent of 156 feet. On either side the somber brecciated columns stand like gloomy sentinels. But an excellent description of these falls has been given in a former number of this MONTHLY.

Near this point the Grand Cañon of the Yellowstone River commences, and continues about thirty miles to the Great Falls. In some respects this cañon is the greatest wonder of all. The river has carved out a channel through the basalt volcanic breccia and hot spring deposits, one thousand to twelve hundred feet deep and one to two thousand feet in width, at the bottom of which the water foams along with torrent-like rapidity. But the striking feature of this remarkable view is the effect of colors derived from the hot spring deposits, which have a brilliancy like the most delicate of our aniline dyes. None but an artist with a most delicate perception of colors could do justice to the picture. The well-known landscape painter, Thomas Moran, who is justly celebrated for his exquisite taste as a colorist, exclaimed, with a sort of regretful enthusiasm, that these beautiful tints were beyond the reach of human art. Between the Upper and Lower Falls a fine stream, called Cascade Creek, empties into the Yellowstone. Standing upon the east margin of the cañon one can look up

the channel of this little creek a few hundred feet and enjoy a full view of Cascade Falls, which have given the name to the creek. The water as it pours over a succession of basaltic steps separates into a number of little streams, giving to the whole view a most pleasing effect. Above the Falls the river seems to flow quietly along over the surface but little below the general level, and here it may be said to present some of its finest and most attractive views. If below the Falls this river surpasses all others in the West for its rugged grandeur, above the Falls it excels in picturesque beauty.

About half a mile above the Falls on this creek the gorge is so narrow and deep that the traveler looks down from the margin above into an abyss so dark and forbidding that a very appropriate name comes almost involun-

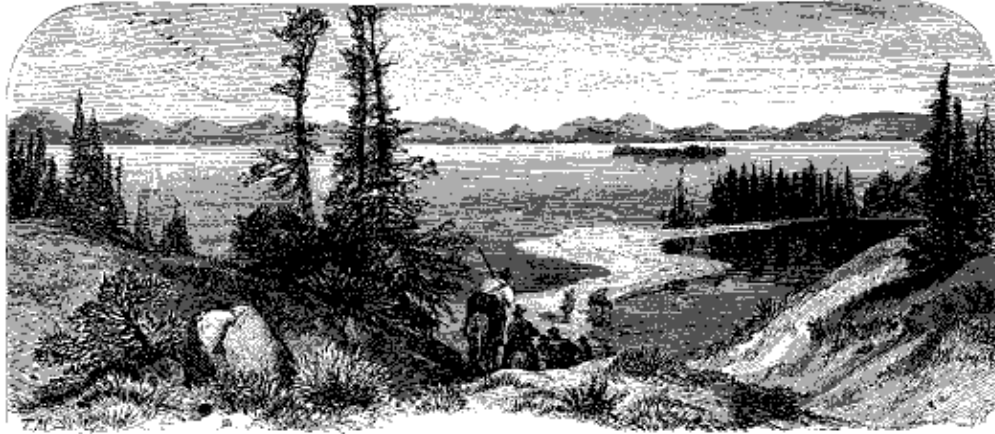


RUINS OF HOT SPRINGS AND GEYSERS.



THE DEVIL'S DEN.

tarily to one's lips — the "Devil's Den." The sides of the gorge are very rugged, composed of angular masses of basalt and obsidian cemented with volcanic ashes. There is also a large amount of sulphur mingled with the ashes, so that the débris looks like the remains of an old furnace. On either side of the river, as we ascend the valley, are remarkable groups of hot springs. There is a singular group on the south side of Mount Washburn, which is well worthy of the attention of the traveler. The deposit formed by these springs extends across the Yellowstone River and occupies a large area. Most of these springs contain clear water, but there are several which are called mud springs. These mud springs do not differ in their origin from the others. Some are what may be called dead springs, as those which have passed the period of their activity and now are filled with turbid water. Others are in a constant state of agitation, and may be called living springs, while others at certain periods throw out great quantities of mud, and may be called mud geysers. There is every grade, from simply turbid water to thick mud. The superficial deposits here are composed of basalts and hot spring deposits, as silica and feldspar. And as the aperture through which the hot water reaches the surface sometimes extends a considerable distance through this material, it is dissolved from the sides of the passage, and, mingling with the boiling water, becomes in due time much like boiling mush. Whenever the mud becomes so thick as to close up the orifice for any length of time, a sort of explosion takes place, which sometimes hurls masses of the mud to the height of fifty or one hun-



YELLOWSTONE LAKE.

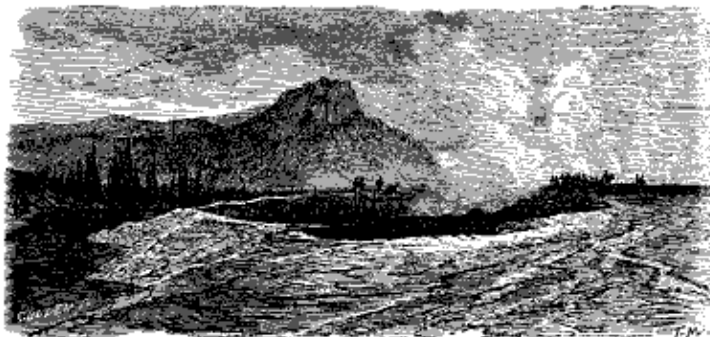
dred feet. At "Mud Springs" and "Crater Mountains" there are several of these mud springs, with basins varying in size from a few inches to thirty feet in diameter, mostly with circular rims and funnel-shaped orifices.

The most interesting of the mud springs occur in the valley of the Fire-Hole Creek. Some of them are filled with very black mud, others a brownish clay; but in a few instances the mud has the snowy whiteness which is due to the decomposition of the silica deposited from the hot waters. To heighten the effect, it is also tinged with the bright red from the oxide of iron. Some of these may be called alum springs, from the fact that the mud is composed largely of alum. Sometimes there will be a group of fifteen or twenty of these little mud springs, with orifices from two to six inches in diameter, all of them operating at the same time with a low thud-like noise.

We made our first camp on the northeast shore of the Lake, near the point where the river takes its departure from it. Here we had one of the finest views of this beautiful sheet of water. This portion of the Lake is about ten miles wide. Our camp was located

in a broad, open, meadow-like space, with the grass two feet or more in height, adorned with bright flowers having a great variety of colors. A dense growth of pine surrounded it, and to the eastward the range of forest-covered hills was 1,200 to 1,800 feet above the Lake. At this place we launched our little boat, which was destined to perform most excellent service. We had transported the framework on the back of a mule from Fort Ellis. We covered the frame with a heavy canvas, which rendered it perfectly water-tight, and with this little craft, twelve feet long, three and a half feet wide, and twenty-two inches high, the entire length and breadth of the Lake was navigated many times. Soundings of the Lake were made in every direction, and the greatest depth discovered was three hundred feet. Messrs. Elliott and Carrington made a survey of the shore-line from the boat, and, with the numerous bays and indentations, they estimated the distance to be about one hundred and seventy-five miles. So far as beauty of scenery is concerned, it is probable that this lake is not surpassed by any other on the globe. There is not space in the present article to make more than this passing allusion to it; but we hope at some future time to do more ample justice to this region, and trust that the few isolated facts which we now skim from the surface will sharpen curiosity for the complete account.

While some were making an exploration of this beautiful lake, the writer, with a small party, made a trip over the high divide between the waters of the Yellowstone



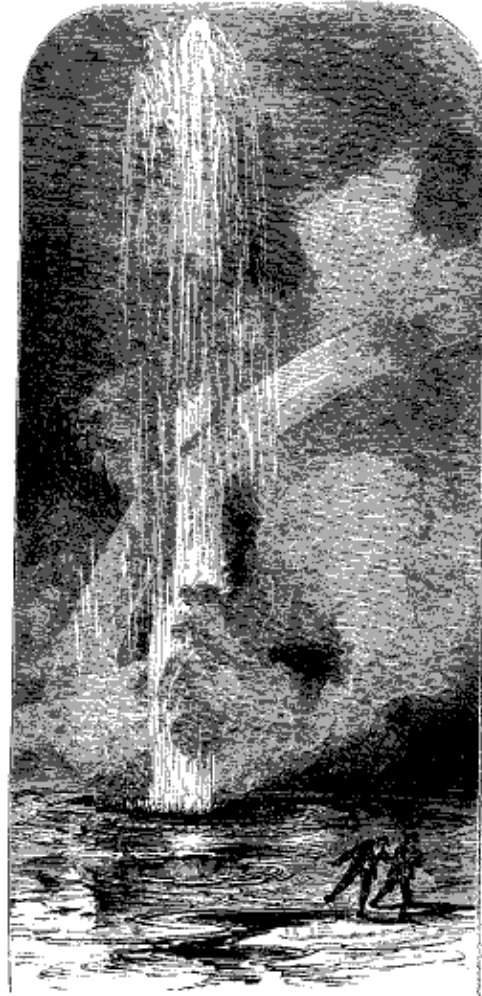
GREAT SPRING, FIRE-HOLE BASIN.



and Missouri Rivers into the Fire-Hole Basin. We had already encountered many of the difficulties attendant upon traveling in this rocky and densely wooded region, but we were not prepared for the impediments which seemed to block our pathway everywhere. We were without a guide, and endeavored to make our courses with a compass. The autumnal fires sweep through the dry pines at times so that many square miles are covered with dead trees. These are soon blown down by the winds, and their long bodies are lodged upon each other in every possible direction. Sometimes these fallen pines are piled up in a sort of irregular net-work, for six or eight feet in height, presenting insurmountable obstacles in the way of the traveler. Then again the small pines grow so thickly that it seems almost impossible to find an interval between so wide as to admit a pack-animal with his load. The traveler may thus wind about among the fallen pines or the dense growth of living trees for an entire day, and yet at night find that he has not made a distance of more than five or six miles in a straight line. After encountering many obstructions, we arrived at the Fire-Hole Basin, and spent five days in exploring its wonders, making charts, sketches, photographs, and taking the temperatures of the springs. The boiling-point of water at this elevation is about  $192^{\circ}$  to  $196^{\circ}$ . We ascertained the temperatures of more than six hundred hot springs in this valley, and there were as many more that were dying out, to which we did not think it worth while to give our attention. Many also must have been overlooked by us; so that within an area of about five miles square we may estimate the existence of about 1,200 to 1,500 springs, with basins of all sizes, from a few inches in diameter to three hundred feet. The springs in this valley are of three kinds, but varying much in their active power: 1st, those in which the ebullition occurs only at intervals, and which may therefore be called intermittent springs; 2d, such as are constantly boiling and bubbling up, therefore permanent springs; 3d, those whose surface is always undisturbed, and in which there is no bubbling or boiling up. The first class reach the boiling-point only when in operation—when in a state of repose the temperature of the water is as low as  $150^{\circ}$ . The second class have a temperature equal to boiling water, or not far below it—in this region, varying from  $180^{\circ}$  to  $196^{\circ}$ . Some of the largest of the springs are in a constant state of agitation. One of the largest in the Fire-Hole Basin is represented in the accompanying sketch. The basin is about two hun-

dred feet in diameter, and the sides of the crater, which have been much broken down, are about thirty feet deep. The crater is so filled with dense steam that it is only at periodical times that it is cleared away so that one can catch a glimpse of the seething caldron below. From one side of it five streams of water are ever flowing, which in the aggregate form a river ten feet wide and two feet deep. The delicate shades of coloring from the iron and sulphur are most finely displayed upon the surface over which this water flows.

But perhaps the most striking exhibition of Nature's forces in this wonderful region is that of the "Grand Geyser," which is well shown in the accompanying illustration. While we were in the Fire-Hole Valley this geyser played only at intervals of about thirty-two hours; but when it was in active operation the display was grand beyond description. As we stood



THE GREAT GEYSER OF THE FIRE-HOLE BASIN.

near the crater or basin, it threw up, with scarcely any preliminary warning, a column of hot water eight feet in diameter to the height of two hundred feet; and so steady and uniform did the force act, that the column of water appeared to be held there for some minutes, returning into the basin in millions of prismatic drops. This was continued for about fifteen minutes, and the rumbling and confusion attending it could only be compared to that of a charge in battle. The steam poured out in immense masses, rising in clouds a thousand feet or more in height. After the Grand Geyser had ceased playing the water of the basin retired from the surface, and the temperature fell gradually to 150°. Another geyser in the same group, and named by the Langford party "Old Faithful," was far more accommodating, and played at intervals of only an hour, throwing up a column of water at least six feet in

diameter and one hundred and fifty feet high, for a period of about fifteen minutes. The ease with which this column of water was sustained at the great height during the period of its operation rendered it a marvel of beauty as well as of power.

We may say, in conclusion, that we have been able in this article to do little more than to allude to a few of the wonderful physical phenomena of this marvelous valley. We pass with rapid transition from one remarkable vision to another, each unique of its kind and surpassing all others in the known world. The intelligent American will one day point on the map to this remarkable district with the conscious pride that it has not its parallel on the face of the globe. Why will not Congress at once pass a law setting it apart as a great public park for all time to come, as has been done with that not more remarkable wonder, the Yosemite Valley?

#### THE MORMONS AND THEIR RELIGION.



BRIGHAM YOUNG.

THE traveler across the continent has his attention drawn to the Mormons and Mormonism in a singular manner just before entering the Salt Lake Valley. The Pacific Railroad passes the Wahsatch Mountains through the deep gorges known as Echo and Weber Cañons. On the left the hills slope away so gradually as to present nothing of extraordinary interest. But on the right hand the rocks tower almost perpendicularly to the height of a thousand feet or more. Of granite, sandstone, and conglomerate, they have

presented an unequal resistance to the attacks of the weather, rain-storms, blasts of sand, and alternate heat and frost, so that they rise here in solid walls, and there in detached masses, presenting the appearance of castles, cathedrals, columns, domes, and spires, on a scale so grand as to cast the most ambitious attempts of human art and skill entirely into the shade. Not even Ehrenbreitstein is worth naming in comparison. Among the picturesque objects thus presented, "Hanging Rock," the "Witches' Rocks," and "Pulpit Rock" are conspicuous. But while gazing upon these sublime "sentinels of the sky," one's attention is arrested by piles of smaller rocks on the lofty edge of these towering heights, and he is informed that they are the "Mormon fortifications!"

It appears that when, in 1857, the United States Government first determined to station a military force in Utah, Brigham Young foresaw that it would frustrate all his plans for the isolation of the Latter-day Saints from the Gentiles. He therefore resolved to resist the movement, and, for this purpose, fortified the pass of the Wahsatch Mountains at Echo Cañon. The old emigrant road lay along the foot of these frowning walls, and Brigham, posting his men on the heights where they commanded the road, had extensive supplies of rocks brought to the edge of the precipice, which were to be rolled down on the advanc-